Access Management

Model Ordinances for Pennsylvania Municipalities Handbook

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Introduction

Access management is a means of controlling the ways in which vehicles can access major roadways, using techniques such as limiting the number of driveways and intersections with local roadways. Although it involves a sometimes complex balance of the need for local accessibility with the need for overall mobility, properly managed access is vital to the safety and efficiency of your community's road network.

Conversely, when highway access points are not managed effectively, accidents and congestion increase and a community's quality of life can deteriorate.

The purpose of this handbook is to help Pennsylvania's local governments better understand access management and guide them in the development and implementation of a program for their community. It is structured in three sections:

1. What access management is and why it is important to your community.
2. How you can develop an access management program for your community.
3. Access management model ordinances.

The sample ordinances range from simple techniques suited to smaller communities to more involved practices appropriate for complex local transportation networks. As with the adoption of any model ordinance, it is strongly recommended that your municipal solicitor assist in the review and adoption of these regulations for your community.

Adopting appropriate access management practices will help ensure that your community can better accommodate growing traffic demand and development, while preserving the character of your town and quality of life for your residents and businesses.

> "An effective access management program can reduce crashes as much as 50 percent, increase roadway capacity by 23 to 45 percent, and reduce travel time and delay as much as 40 to 60 percent."
> — *National Highway Institute*

The Transportation Research Board's Manual Identifies 10 Principles for Access Management

Access management programs seek to limit and consolidate access points along major roadways, while promoting a supporting street system and unified access and circulation systems for development. The result is a roadway that functions safely and efficiently for its useful life, and a more attractive corridor. The goals of access management are accomplished by applying the following principles:

1. **Provide a specialized roadway system** – it is important to design and manage roadways according to the primary functions that they are expected to serve;
2. **Limit direct access to major roadways** – roadways that serve higher volumes of regional through traffic need more access control to preserve their traffic function;
3. **Promote intersection hierarchy** – an efficient transportation network provides appropriate transitions from one classification of roadway to another;
4. **Locate signals to favor through movements** – long, uniform spacing of intersections and signals on major roadways enhances the ability to coordinate signals and ensure continuous movement of traffic at the desired speed;
5. **Preserve the functional area of intersections and interchanges** – the functional area is where motorists are responding to the intersection (i.e., decelerating, maneuvering into the appropriate lane to stop or complete a turn);
6. **Limit the number of conflict points** – drivers make more mistakes and are more likely to have collisions when they are presented with the complex driving situations created by numerous conflicts. Traffic conflicts occur when the paths of vehicles intersect and may involve merging, diverging, stopping, weaving, or crossing movements;
7. **Separate conflict area**s – drivers need sufficient time to address one potential set of conflicts before facing another;
8. **Remove turning vehicles from through-traffic lanes** – turning lanes allow drivers to decelerate gradually out of the through lane and wait in a protected area for an opportunity to complete a turn, thereby reducing the severity and duration of conflict between turning vehicles and through traffic;
9. **Use non traversable medians to manage turn movements** – they minimize left turns or reduce driver workload and can be especially effective in improving roadway safety; and
10. **Provide a supporting street and circulation system** – a supporting network of local and collector streets to accommodate development, and unify property access and circulation systems. Interconnected streets provide alternate routes for bicyclists, pedestrians, and drivers.

An Overview: What is Access Management?

Access and Mobility by Roadway Type

Mobility	**Arterials** • Higher Mobility • Low Degree of Access
	Collectors • Balance between Mobility and Access
Land Access	**Locals** • Lower Mobility • High Degree of Access

Source: Safety Effectiveness of Highway Design Features: Volume I, Access Control, FHWA, 1992.

The Transportation Research Board's (TRB) Access Management Manual defines access management as:

..the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals. The purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system.

Access management involves a delicate balance among constitutional rights, private property rights, and state regulations. The principles of access management seek to limit and/or consolidate access along major roadways, while promoting a supporting street system and unified access and circulation systems for development.

Balancing Access and Mobility

Access management hinges on balancing two concepts—mobility and accessibility. Mobility refers to the movement of traffic while accessibility refers to the ability of traffic to enter and exit a roadway from adjacent properties. Roadway systems are developed in a hierarchical structure aimed at best serving both of these functions. As the graphic to the left demonstrates, higher order facilities (e.g., Interstates, arterials) are intended to play a greater role in providing mobility, while lower order roadways (e.g., collectors, local roads) are intended to serve a greater role in providing access to property.

Why Access Management?

Without applying access management techniques, studies show that corridors experience:

- Diminished roadway capacity, resulting in greater congestion.
- An increase in the number of crashes with other vehicles, as well as pedestrians and cyclists.
- Reduced character.
- An unfriendly environment for those who walk or bike.
- Commercial strip development.
- Overburdened arterials resulting in more cut-through traffic in residential areas.
- Homes and businesses adversely affected by a continuous cycle of widening roads.
- Increased commute times, fuel consumption, and vehicular emissions.

Finally, with increasing fiscal pressure on both the local and state levels, capital intensive solutions such as widening a roadway may not always be possible. The more proactive communities can be in addressing this issue, the greater the likelihood a community will have of preserving its character and quality of life.

Benefits of Access Management

An effectively implemented access management program can improve public safety and reduce traffic congestion. Studies show that as the number of access points increases, crash rates increase. In addition to fatalities and injuries, roadway incidents are responsible for nearly 25 percent of delays.

Additionally, the operational benefits of access management are well documented. Studies indicate that access management assists in maintaining travel speeds and reducing delays. *NCHRP Report 420* summarizes research showing a speed reduction of 0.15 to 0.25 miles per hour per access point.

> Studies have shown that an increase in the number of access points from 10 to 20 per mile can result in an increase in the number of crashes by approximately 30 to 40 percent.
> — *NCHRP Report 420*

Summary of Benefits by Stakeholder

Stakeholders	Benefits of Access Management
Community/ Neighborhoods	• Safer transportation system • More attractive roadway corridors • Lower taxes for future roadway investment • Preservation of property values • Safer pedestrian and bicycle travel • Improved appearance of the built environment • Reduced fuel consumption and air emissions
Business Community	• More efficient roadway system captures a broader market area • Stable property values • More consistent development environment • Reduced transportation and delivery costs
Pedestrians	• Safer walking routes due to fewer conflicts with traffic • Refuge areas created by medians
Bicyclists	• Fewer conflicts with traffic • More predictable traffic patterns • Greater choice of alternative travel routes
Transit Riders	• Reduced delay and travel times • Safer walking environment for access to stations
Motorists	• Fewer traffic conflicts which increases driver safety • Fewer traffic delays
Governmental Agencies	• Lower cost of providing a safe and efficient roadway • Improved internal and intergovernmental coordination • More success in accomplishing transportation goals • Lowered accident and accident response costs

Legal Basis for Access Management

Ice v. Cross Roads Borough

In *Ice v. Cross Roads Borough, 694 A.2d 401 (Pa. Cmwlth. 1997)*, appeal denied, 702 A.2d 1062 (Pa. 1997), the plaintiffs (Ice) developed a subdivision and made a restrictive covenant with the borough that a certain driveway would connect with a subdivision road and not with a nearby state highway. The plaintiffs applied for and received a highway occupancy permit from PennDOT that gave permission to make the connection to the state highway. The plaintiffs then constructed the driveway so that it connected with the state highway. When the borough sought to enforce the covenant, the plaintiffs argued that the state approval pre-empted the covenant and also the local ordinance requiring subdivision driveways to connect with subdivision roads.

Pennsylvania Commonwealth Court denied the appeal and upheld that "a landowner seeking access to a state highway must be given permission for this access by both governmental entities." **The court decision recognized that PennDOT's highway occupancy permit guidelines are subject to ordinances enacted by local municipalities, which may contain more stringent minimum safety requirements.**

In Pennsylvania, PennDOT has police power authority to regulate access to protect the right of the traveling public to reasonably safe passage. Additionally, PennDOT has authority under the State Highway Law to make reasonable rules and regulations governing the use and flow of traffic on state highways.

PennDOT has exercised this authority by issuing regulations governing access to and occupancy of state highways by driveways and local roads through the adoption of Title 67, Pennsylvania Code, Chapter 441 – Access To and Occupancy of Highways and Driveways and Local Roads. Under these regulations, no party may open a driveway onto a state highway, or open the surface of or occupy a state highway, without a permit. The regulations focus on individual permit requirements for property owners proposing to gain access along state highway frontage. Major traffic generators are also evaluated for their impact on highway traffic beyond the property owner's frontage.

The Pennsylvania Municipalities Planning Code (MPC) is the Commonwealth's planning-enabling legislation that creates a uniform approach to planning and land use regulation in Pennsylvania. The MPC enables municipalities to adopt a subdivision and land development ordinance (SLDO) and zoning ordinance, which control the layout, design, and location of transportation facilities within the municipality. The SLDO is intended to comply with the goals and objectives of the comprehensive plan and provide the link

It is important for each municipality to notify their PennDOT district office of the adoption of local access management ordinances, and to coordinate with PennDOT when an applicant is seeking access to a state-owned road.

between transportation and land use. The MPC enables municipalities to regulate the following provisions through the SLDO:

- Layout or arrangement of new roadways conforming to the transportation element of the comprehensive plan or official map adopted pursuant to the MPC.
- Coordination and design of streets in and bordering the subdivision or land development to accommodate prospective traffic and facilitate fire protection.
- Provision of standards for street design and improvements, including grading, walkways, curbs and gutters as a condition of final plat approval or as part of a phased development plan.

Local government has the authority to manage access points through the adoption and implementation of access management regulations. Additionally, local governments, through the adoption of local regulations, can regulate access on local and state-owned roads. This authority has been upheld in Pennsylvania by two key court cases, summarized in the side boxes.

These court rulings uphold the authority of Pennsylvania municipalities to adopt local ordinances to regulate access on both local and state-owned roads, as the applicant is required to meet both sets of requirements. Since applicants are still required to obtain PennDOT approval on state-owned roads, it is important for each municipality to notify their PennDOT district office of the adoption of local access management ordinances, and to coordinate with PennDOT when an applicant is seeking access to a state-owned road.

Township of Middle Smithfield v. Kessler

In *Township of Middle Smithfield v. Kessler, 2005 WL 1903403 (Pa. Cmwlth. 2005)* the plaintiffs (Kessler) opened a gas station on a lot in Middle Smithfield Township. They sought conditional use approval to add a convenience store at the existing site, which consisted of a gas station, car wash, and building. The township granted conditional use approval but required the applicant to obtain a highway occupancy permit from PennDOT. The applicant submitted a plan to PennDOT and received a highway occupancy permit.

The township issued a preliminary approval of the applicant's land development plan, and the applicant obtained a building and zoning permit. That permit required the plaintiff to obtain a certificate of occupancy before they re-opened the gas station or car wash. The township denied the request for a final "as built" land development approval and did not issue a certificate of occupancy.

Under the MPC, the township is entitled to an injunction prohibiting the plaintiff's continued operation of their business if that business violates the zoning ordinance. Here, the township's zoning ordinance provides that it is unlawful to use and/or occupy any new principal building or establish any new or replacement principal non-residential use until a certificate for such building or use has been issued. **The court determined that PennDOT lacked statutory authority to override the township's authority to enforce its zoning ordinance and land development regulations.** Thus, the applicant could not open the business without obtaining a certificate of occupancy, regardless of the fact that PennDOT had issued a highway occupancy permit.

Developing an Access Management Program for Your Community

Because local issues and circumstances can vary greatly, a "one size fits all" approach to access management is not appropriate. To provide the flexibility required to make access management meaningful and successful in your community, this document is focused on helping your community develop a program that best suits your local conditions. This section of the document outlines a process by which your community can develop its own customized access management program.

Access management programs can be either system-wide or corridor-based. Smaller communities served by only one or two principal arterials may choose to implement access management techniques only on those major corridors, while larger communities with a more complex transportation network may benefit more from a system-wide program. For communities choosing the corridor-based approach, an overlay district (as discussed later in Tier III of the model ordinances) may be most suitable. System-wide programs require supportive policy in the comprehensive plan and the adoption of an access management ordinance or the addition of regulations to the existing subdivision and land development ordinance.

Development of most access management programs involves three basic elements:

1. Defining and assigning a classification system.
2. Preparing a compendium of best practices.
3. Establishing thresholds that warrant a traffic impact or access study.

Existing PennDOT Roadway Classification System

Category	Name	Description
1	Interstate System	The highest classification of arterial roads and streets. They provide the highest level of mobility, at the highest speed, for long uninterrupted distances.
2	Other Arterials (Principal and Minor)	These consist of limited access freeways, multi-lane highways, and other important highways supplementing the Interstate System that connect, as directly as practicable, the nation's principal urbanized areas, cities, and industrial centers.
3	Collectors (Major and Minor)	The collectors connect local roads and streets with arterials and provide both land access service and traffic circulation within residential neighborhoods, commercial and industrial areas, and downtown city centers.
4	Local Roads	The local roads and streets provide a high level of access to abutting land but limited mobility.

Defining and Assigning a Classification System

A classification system is used to reflect the roadway function and establish the desired level of access control. Functional classification is the process by which roads are grouped into categories reflecting the type of service they are intended to provide. These categories serve to determine the level of emphasis that is placed on mobility versus accessibility for each facility.

Classification categories need to be defined for applying design standards to roadways or segments. The number and type of access management categories depends on the planning objectives of the municipality, projected patterns of growth and development, and the characteristics of the roadway system. The following are factors for municipalities to consider in defining access management categories:

- **Level of Importance of Roadways** - Access management categories should be closely related to the roadway functional classification system. The local or county comprehensive plan establishes functional classifications for the roadway system. Categories typically include: interstate, arterials (principal and minor), collectors (major and minor), and local roads. If a municipality does not have a designated functional classification in its comprehensive plan, it can default to the county or state system.
- **Characteristics of Roadways** – Roadway characteristics should be determined for the current and future system as established in the comprehensive plan. Characteristics to be evaluated include traffic volumes, travel speeds, geometric design, connectivity to other roadways, and types of land uses accessed.
- **Land Use Goals and Objectives** - The consideration of land development projections, growth management goals, and the transportation system that will be needed to support projected traffic volumes should be included in the definition of access management categories.

Defining Access Management Classifications

There are two approaches commonly taken when developing an access management classification system. The first is to simply use the existing local or comprehensive plan classifications or the PennDOT roadway classification system. The advantage is that the system is already defined. A weakness can be that these classifications may not be entirely appropriate if the type and intensity of development varies significantly along a facility.

A second approach is to define roadways or segments by their expected future use and intensity of development. Under this approach, the number of the categories can vary and will depend on the diversity of land use characteristics within the municipality. A typical classification may include categories such as:

- Central Business District
- Urban
- Suburban
- Rural

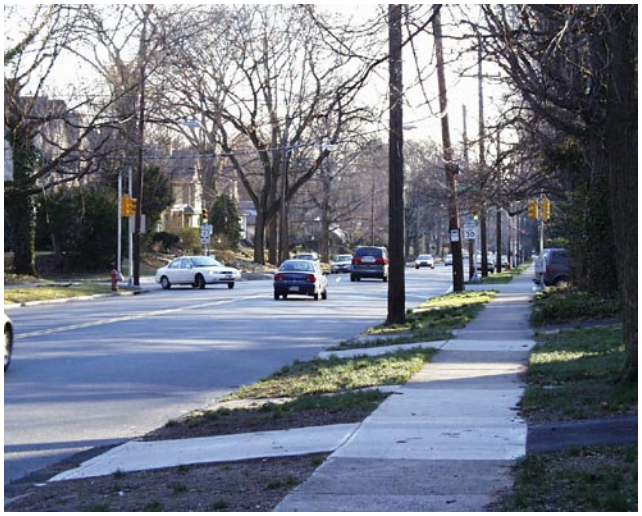
Assigning Access Management Classifications

After developing an access management classification system, a municipality must assign the most appropriate category to each segment of the roadway network. Each segment will be subject to that category's design standards during the land development approval and permitting process. The following features should be examined for each segment:

1. The intended function of the segment as a component of the overall roadway network. It should be determined whether the segment's function is to serve interstate, intrastate, regional, or local traffic.
2. The planned long-term movement and access functions of the segment.
3. The setting where the segment is located (i.e., rural, suburban, central business district, urban core, or commercial center).
4. The ability of the supporting roadway network to supply alternative access for properties.
5. The appropriate balance between mobility and direct access.

These assignments should be documented in the Comprehensive Plan and Subdivision and Land Development Ordinance.

Preparing a Compendium of Best Practices



An area-specific access management study can be used to develop a compendium of best practices to use in a particular area or corridor. This compendium should also identify related regulations to adopt for the subdivision and land development, zoning, or access management ordinance. An access management study should include an analysis of current and projected land development patterns and traffic conditions, and could include several municipalities along a corridor where appropriate. The study should conclude with findings and recommendations that address the following:

Zoning Ordinance
- Building Setbacks
- Lot Width and Street Line
- Sign Provisions
- Permitted Use Changes

Municipal Comprehensive Plans
- Goals and Objectives
- Circulation Inventory
- Land Use Plan
- Circulation Plan

Subdivision/Land Development Ordinance
- Access Restrictions
- Landscaping and Screening
- Traffic Impact Studies
- Right-of-Way Width

Access/Highway Improvement Recommendations
- Short-Term Improvements
- Long-Term Improvements

In addition to a compendium of best practices, an access management study should contain an implementation plan that establishes priorities and responsible parties for completing roadway improvements or municipal ordinance updates. The municipality should adopt the access management plan and related regulations and include it in the land development review process. A copy should also be forwarded to PennDOT for use in their review of highway occupancy permits and design of capital improvements within the municipality.

Establishing Thresholds that Warrant a Traffic Impact or Access Study

A municipality should establish thresholds, or conditions, determining when a traffic impact study is required. A traffic impact study is an engineering study that evaluates the effect that traffic generated by the proposed development would have on surrounding roadway operations, and determines the improvements to the existing transportation system necessary to accommodate that traffic. Municipalities use traffic impact studies as a planning tool to identify access management practices that may be appropriate to mitigate the effects of development. A traffic impact study should be completed when thresholds are met based on the size of the development and its impact on adjacent access points and intersections.

PennDOT Publication 282 uses the following thresholds to determine when traffic impact studies are warranted:

An application for access to a development shall include a traffic impact study if:

1. The access is expected to have an average daily traffic volume of 3,000 or more,
2. During any one-hour time period, the development is expected to generate either 100 or more new vehicle trips entering the development or 100 or more new vehicle trips exiting the development, or
3. In the opinion of the Department, the development is expected to have a significant impact on highway safety or traffic flow even though it does not meet 1 or 2 above.

For purposes of determining the need for a traffic impact study, it must be assumed that the total development will have access at only one location, and include all vehicle trips that are expected to be generated by a "full build-out" and occupancy of an entire tract.

The Institute of Transportation Engineers (ITE) recommends that a traffic study be required if the proposed development generates 100 or more new one-way (inbound or outbound) trips during the peak period of the proposed development or adjacent street traffic. The following table shows the scale of development by type required to generate approximately 100 one-way trips, based on the manual *Trip Generation, Seventh Edition (2003)*:

ITE Typical Development Thresholds to Generate 100 One-Way Peak Hour Trips

Land Use	Size of Development Producing 100 One-Way Peak Hour Trips
Single Family Detached	100 dwelling units
Other Residential	185 dwelling units
Commercial	26,000 square feet
Restaurant	9,000 square feet
Office	65,000 square feet
Industrial	100,000 square feet
Hotel	140 occupied rooms

ITE also recommends that studies be required if any of the following conditions exists:

- Traffic problems currently exist on surrounding roadways.
- The level of service on nearby roadways will be significantly affected.
- Sensitivity of the adjacent areas will be impacted.
- Proposed access is within close proximity to other site driveways or intersections.

Findings of a traffic impact study may establish a need to incorporate access management techniques within the proposed project area. The "Recommended Remedies" section of a traffic impact study report can discuss the benefits of utilizing access management techniques.

Our community is already developed. How will access management help us?

Access management ordinances only apply to new or altered development, not existing homes and businesses, so they will not immediately solve access problems that have already emerged. However, land uses change over time. For example, a house may become a business, or a current use may wish to expand. Having access management ordinances and a plan in place ensures that when changes do occur, sound access management techniques can be instituted.

What impacts will access management practices have on business?

As documented by the Transportation Research Board, most research on this topic indicates that access management practices have little overall adverse impact on business activity. Most businesses reported that techniques such as construction of a median had no effect on sales. Conversely, large volumes of turning vehicles and closely spaced, poorly designed driveways can slow down traffic to an extent that detracts from the economic attractiveness of a corridor or community.

Who should be involved in the development of an access management program?

The more inclusive a program can be, the more likely it is to be successful. At a minimum, significant effort should be made to involve the following parties:

- PennDOT County and District permit offices
- Residents and businesses along potentially affected facilities
- Municipal and County officials
- Municipal public works department
- Police, fire, and emergency medical services
- County Planning Department and Commission
- Regional planning partners (metropolitan and/or rural planning organizations)
- Representatives from the business community
- Developers
- Other potentially impacted parties

How long will it take to develop and implement an access management program?

Depending on the scope of the program, development of an access management program may take from a few months for the adoption of Tier I techniques to a year or more for more complex techniques. Implementation can often take several years or more depending on the complexity of existing problems and the availability of funding for construction.

Is there any training available on access management?

PennDOT's Local Technical Assistance Program (LTAP) will be providing access management training sessions. Information is available through the LTAP page on PennDOT's website: www.dot.state.pa.us

A Guide for Putting Model Access Management Ordinances to Use in Your Community

The Facts:

1. With over 2,565 municipalities in Pennsylvania, no two communities are exactly alike.
2. Access management problems are prevalent throughout the Commonwealth on both local and state-owned and managed roadways.
3. Some problems and issues are shared across municipal borders, while others are isolated to specific areas of a municipality.
4. The most effective way to deal with access management issues is to identify –strategize – implement.

Identify:

- ☐ Conduct a municipal roadway inventory to identify existing problem areas.
  - o Map and identify problem areas (show the link between existing and future land use).
- ☐ Determine the area of impact for each problem area. These areas may include one or a combination of the following types:
  - o Site-specific – restricted to special area of the municipality.
  - o Local network – restricted to operation of the municipal roadway network.
  - o Corridor-wide – impacted beyond municipal boundaries.
  - o Regional network – impacted by the operation of roadways throughout the region.
- ☐ Share findings with the community – building consensus with the public begins early in the study process. The message? Inform, inform, inform.
- ☐ Prioritize problems areas from most important to least important.
- ☐ Determine the process needed to further describe the issues and strategize solutions.
  - o If mostly site-specific or within the local network: work with a Local Access Management Task Force – Municipal Engineer, Public Works/Road Crew Department, Municipal Officials, Planning Commission, Representatives of Developers/Property Owners, PennDOT District staff.
  - o If corridor-wide: work with Regional Access Management Task Force or complete a special study (corridor study of the impacted area).
  - o If regional network: complete a multi-municipal comprehensive plan.

Strategize:

- ☐ Understand the facts: Completely describe each access management problem.
- ☐ Develop the targets: What needs to be resolved to alleviate the problems?
- ☐ Consider alternative strategies for meeting the targets. Use the PennDOT Access Management Handbook and Ordinance to explore potential alternatives.
- ☐ Share findings with the community.
- ☐ Select the best strategies to reduce access management problems and conflicts in the community, based on the ease of application, cost, public acceptance, and public will.

Implement:

- ☐ Complete a review of your existing municipal ordinance, using the PennDOT Access Management Model Ordinance to determine if your Subdivision and Land Development Regulations include the appropriate regulations or present barriers to implementing the selected strategies.
- ☐ Determine what ordinance regulation would need to be added or deleted and compile a list of recommended changes.
- ☐ Send the recommendations to the local planning commission and solicitor for their review and recommendations.
- ☐ Meet the requirements of the Pennsylvania Municipalities Planning Code for adopting the amendments to the ordinance.

Model Ordinances

The model ordinances are presented in three tiers to allow your municipality to customize and apply the techniques that are most appropriate for your situation. The model ordinances are written in a form that can be incorporated into your existing subdivision and land development ordinance and comprehensive plan. Commentary is included to provide context and a better understanding of each access management technique and its implementation.

The practices presented in the model ordinances are commonly used in developing an effective access management program. However, these practices should not be viewed as the only solutions. Many other access management practices exist that may be used to address unique situations or meet specific goals and objectives of the municipality. Additional resources, provided at the end of this handbook, contain many more access management practices that may be applicable to your community.

It is important to establish a cooperative relationship with your district PennDOT office as you adopt access management ordinances to ensure local and state-level consistency and awareness. The following model ordinances, as written, complement PennDOT's regulations.

Note that local access management practices are most effective when they include both strong planning and supporting regulations. Communities may consider developing a policy framework that supports access management in the local comprehensive plan, preparing corridor or access management plans for specific problem areas, and encouraging good site planning through regulatory requirements. Access management plans and regulatory requirements should support the future land use plan of the municipality reflected in the comprehensive plan.

Model Ordinance Tiers

The access management practices in this handbook have been categorized into three tiers of model ordinance language based on ease of implementation; timeline to achieve desired outcomes; and the level of coordination required between the municipality, property owners, affected stakeholders, and PennDOT.

Tier 1

Tier 1 practices relate to the number and location of driveways and basic design elements that should be evaluated for every access. These practices should be implemented during the land development approval process and require coordination between the municipality, property owner, and possibly PennDOT. Additional practices such as shared driveways and internal access to outparcels attempt to consolidate access points among adjacent property owners. The practices included in this tier are generally the easiest to implement because they cost the least, take the least time to implement, and require the least amount of coordination between the property owner, municipality, and PennDOT.

Tier 2

Tier 2 practices involve more complex design elements for individual driveways, such as left turn lanes and deceleration lanes. Other practices, such as driveway and signalized intersection spacing, involve multiple driveways or off-site intersections. The practices in this tier can be implemented during the land development approval process, but they could require a higher level of coordination among the municipality, multiple property owners, and PennDOT. Some of the practices could require implementation through multiple land development approvals or a comprehensive project involving several properties. The practices in this tier can be more costly and require a longer period of time to implement than the practices in Tier 1 due to the participation of multiple property owners.

Tier 3

Tier 3 includes roadway design and planning practices such as medians, two-way center left turn lanes, setbacks, frontage roads involving multiple driveways, intersections, and properties. These practices cover a much larger corridor or area and typically require the highest degree of coordination among property owners, the municipality, and PennDOT. In addition, this tier contains planning and regulatory tools such as the official map and zoning overlay districts to implement these types of practices. In most situations, these practices would require capital funding for implementation. These types of practices could require years to fully implement. These practices are more expensive, require much higher levels of coordination between stakeholders, and much more time to implement than Tier 1 and Tier 2 practices.

Access Management Practices

- Number of Driveways
- Corner Clearance
- Safe Sight Distance
- Driveway Channelization
- Joint and Cross Access
- Access to Outparcels
- Driveway Throat Length
- Driveway Throat Width
- Driveway Radius
- Driveway Profile

- Auxiliary Lanes
- Left Turn Lane
- Acceleration Lane
- Driveway Spacing
- Signalized Intersection Spacing
- Driveway Clearance from Interchange Ramps

- Overlay Districts
- Official Map
- Two-way Left Turn Lanes
- Frontage/Service Roads
- Non-traversable Medians
- Setbacks
- Bonuses and Incentives
- Pre-existing Access

Purpose

"The purpose of this ordinance is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system. Access management encompasses the careful planning of the location, design and operation of driveways, median openings, interchanges, and street connections. If access systems are not properly designed, the primary transportation network, including arterials and highways, will be unable to accommodate the access needs of development and retain their primary transportation function.

This ordinance is intended to promote safe and efficient travel within (municipality, county) by limiting the number of conflict points, providing safe spacing standards between driveways, encouraging shared access between abutting properties, and ensuring safe access by emergency vehicles."

Applicability

"This ordinance shall apply to all arterials and selected collectors within (municipality/county), as identified in (either the comprehensive plan or other functional classification table), and to all properties which abut these roadways."

Conformance with Plans, Regulations, and Statutes

"This ordinance is generally consistent with (cite specific policies) of the comprehensive plan for (municipality). This ordinance also conforms with the requirements of the Pennsylvania Municipalities Planning Code and meets or exceeds the standards contained in Title 67, Chapter 441 of the Pennsylvania Code titled, Access To And Occupancy Of Highways By Driveways And Local Roads."

Definitions

85th Percentile Speed – The speed, in miles per hour, which is exceeded by only 15 percent of the drivers traveling on a section of highway.

95th Percentile Queue Length - The queue exceeded at some point during 5 percent of the signal cycles.

Access – A driveway, street, or other means of passage of vehicles between the highway and abutting property, including acceleration and deceleration lanes and such drainage structures as may be necessary for proper construction and maintenance thereof. [67 PA Code Chapter 441]

Auxiliary Lane – The portion of the roadway adjoining the through lane that is used for speed change, turning, storage for turning, deceleration, acceleration, weaving, and other purposes supplementary to through traffic movement.

Average Daily Traffic (ADT) – The total volume of traffic during a number of whole days (more than one day) and less than one year divided by the number of days in that period.

Design Speed – The maximum safe speed that can be maintained over a section of roadway when conditions are so favorable that the design features of the road govern.

Driveway – Every entrance or exit used by vehicular traffic to or from properties abutting a highway. The term includes proposed streets, lanes, alleys, courts, and ways. [67 PA Code Chapter 441]

Egress – The exit of vehicular traffic from abutting properties to a street.

Functional Area – The area beyond the physical intersection of two controlled access facilities that comprises decision and maneuver distance, and the required vehicle storage lengths.

High Volume Driveway – A driveway used or expected to be used by more than 1,500 vehicles per day. [67 PA Code Chapter 441]

Highways, Roads, or Streets – any highways, roads, or streets identified on the legally adopted municipal street or highway plan or the official map that carry vehicular traffic, together with all necessary appurtenances, including bridges, rights-of-way and traffic control improvements. The term shall not include the Interstate Highway System.

Ingress – The entrance of vehicular traffic to abutting properties from a street.

Interchange – A grade-separated system of access to and from highways that includes directional ramps for access to and from the crossroads.

Internal Trips – Site-generated trips that occur between two or more land uses on the subject site without exiting onto the intersecting street.

Level of Service (LOS) – A qualitative measure describing the operational conditions within a section of roadway or at an intersection that includes factors such as speed, travel time, ability to maneuver, traffic interruptions, delay, and driver comfort. Level of service is described as a letter grade system (similar to a school grading system) where delay (in seconds) is equivalent to a certain letter grade from A through F.

Local Road – Every public highway other than a state highway. The term includes existing streets, lanes, alleys, courts, and ways. [67 PA Code Chapter 441]

Low Volume Driveway – A driveway used or expected to be used by more than 25 but less than 750 vehicles per day. [67 PA Code Chapter 441]

Medium Volume Driveway – A driveway used or expected to be used by more than 750 but less than 1,500 vehicles per day. [67 PA Code Chapter 441]

Minimum Use Driveway – A residential or other driveway that is used or expected to be used by not more than 25 vehicles per day. [67 PA Code Chapter 441]

Offsite Improvements – Those public capital improvements that are not onsite improvements and that serve the needs of more than one development.

Onsite Improvements – All improvements constructed on the applicant's property, or the improvements constructed on the property abutting the applicant's property necessary for ingress and egress to the applicant's property, and required to be constructed by the applicant pursuant to any municipal ordinance, including, but not limited to, the municipal code, subdivision and land development ordinance, planned residential development regulations, and zoning ordinance.

Outparcel – A lot that is adjacent to the roadway that interrupts the frontage of another lot.

Pre-Existing Driveway – Permitted driveways in place at the time of the adoption of this ordinance that do not conform to the standards herein.

Right-of-Way – An area of land, measured from the centerline of the cartway that can be used by the public for travel and the location of utilities.

Right-of-Way Preservation – The acquisition of an area of land, through dedication or easement, needed to accommodate the future widening of the roadway.

Road Improvement – The construction, enlargement, expansion, or improvement of public highways, roads, or streets.

Setbacks – The minimum distance from the street right-of-way line to the lot line that establishes the area within which no structure can be erected.

Signal Progression – The timing of a series of traffic signals to provide a progressive movement of traffic at a planned rate of speed through the signalized intersections without stopping.

Stopping Sight Distance – The distance required by a driver traveling at a given speed to stop the vehicle after an object on the roadway becomes visible to the driver.

Street – Includes street, avenue, boulevard, road, highway, freeway, parkway, lane, alley, viaduct, and any other ways used or intended to be used by vehicular traffic or pedestrians, whether private or public.

Storage Length – Lane footage needed for a right or left turn lane to store the maximum number of vehicles likely to accumulate during a peak period of travel.

Taper – The widening of the roadway to allow the redirection or transition of vehicles into or around an auxiliary lane.

Trip – A one-directional vehicular trip to or from a site.

Trip Generation – The total number of vehicular trips going to and from a particular land use on a specific site during a specific time period.

Ultimate Right-of-Way – An area of land beyond the legal or dedicated right-of-way needed to accommodate future widening of the roadway, measured from the centerline.

I.A.1. Commentary

According to PennDOT's regulations, *67 PA Code CH. 441*, "the number of driveway locations to be permitted to serve a property will be based on preserving the flow of traffic and highway safety, considering the amount and type of traffic the driveway is expected to serve, the location, type, and density of the development, the type and character of the roadway which it accesses, interior traffic patterns, frontage and other criteria consistent with the AASHTO publication entitled *A Policy on Geometric Design of Highways and Streets*."

The applicant should be given the opportunity to provide capacity and circulation analyses to demonstrate whether an additional driveway will be needed to accommodate traffic generated by the development. PennDOT considers a level of service C to be acceptable in rural conditions, and a level of service D to be acceptable in urban conditions. Safety is always a concern when there are sight distance constraints. The municipality may require access to be served by an internal collector roadway separated from the main roadway when driveway spacing requirements cannot be achieved or when outparcels are part of a commercial development.

In many instances it may be desirable to restrict access for a parcel that abuts two or more intersecting roadways to the one of lower functional classification. However, there may be some instances when access to the higher classification road or both roads is desirable for capacity or safety reasons.

A. Driveways

1) Number of Driveways

a) Only one access shall be permitted for a property.

b) An additional access or accesses shall be permitted if the applicant demonstrates that an additional access or additional accesses are necessary to accommodate traffic to and from the site and it can be achieved in a safe and efficient manner.

c) The municipality shall restrict access to right turn only ingress and egress or to another state maintained road or local road if safe and efficient movements cannot be accommodated.

d) For a property that abuts two or more roadways, the municipality may restrict access to only that roadway that can more safely and efficiently accommodate traffic.

e) If the municipality anticipates that a property may be subdivided and that the subdivision may result in an unacceptable number or arrangement of driveways, or both, the municipality shall require the property owner to enter into an access covenant to restrict future access.

2) Corner Clearance

a) Corner clearance shall meet the following driveway spacing standards that are desirable for arterial and major collector roads:

i) Principal arterial: 600 feet

ii) Minor arterial: 400 feet

iii) Major collector: 200 feet

b) Access shall be provided to the roadway where corner clearance requirements can be achieved.

c) If the minimum driveway spacing standards cannot be achieved due to constraints, the following shall apply in all cases:

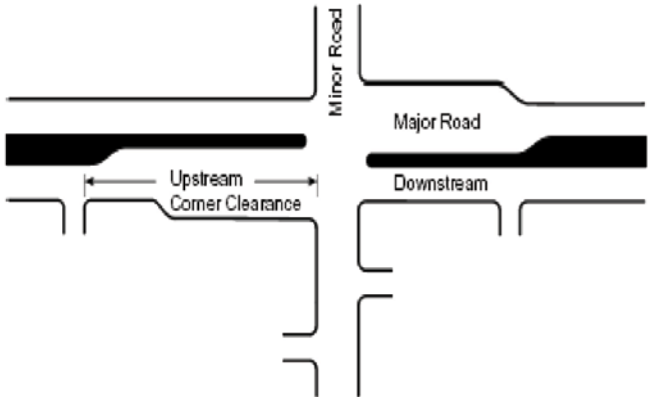
i) There shall be a minimum 10-foot tangent distance between the end of the intersecting roadway radius and the beginning radius of a permitted driveway.

ii) The distance from the nearest edge of cartway of an intersecting roadway to the beginning radius of a permitted driveway shall be a minimum of 30 feet.

d) If no other reasonable access to the property is available, and no reasonable alternative is identified, the driveway shall be located the farthest possible distance from the intersecting roadway. In such cases, directional connections (i.e., right in/right out only, right in only or right out only) may be required.

e) The municipality shall require restrictions at the driveway if the municipal engineer determines that the location of the driveway and particular ingress or egress movements will create safety or operational problems.

Upstream Corner Clearance



Source: TRB Access Management Manual, 2003.

I.A.2. Commentary

Corner clearance minimizes driveway-intersection conflicts and provides a greater distance for vehicles to merge into through traffic. Corner clearance, at a minimum, should be equal to or greater than driveway spacing standards. On high volume or high-speed roadways, a longer corner clearance may be needed to avoid conflicts. It is undesirable for driveways to be located within the functional area of an intersection. The functional area includes all areas where auxiliary lanes, such as right and left turn lanes, exist. Preferably, driveways for a corner property should be located on the roadway with the lower functional classification or as close to the property line farthest from the intersection as is possible.

New driveways should not be permitted within the functional area of an intersection unless no other reasonable access to the property is available and the municipal engineer determines that there is no reasonable alternative. In such cases the municipal engineer should determine the appropriate location of the driveway and whether restrictions should be placed on certain turning movements, usually left turn movements.

I.A.3. Commentary

PennDOT sight distance requirements are consistent with AASHTO design criteria. Adequate sight distance ensures that drivers can safely enter or exit a driveway or intersecting roadway. It is critical that safe sight distance requirements are met for the safe operation of vehicles at driveways or access road intersections.

The cost of constructing some driveways can be expensive when the parcel has limited frontage and topographic constraints. If improvements are needed on adjacent properties to achieve minimum sight distance standards, easements are typically needed from the adjacent property owners.

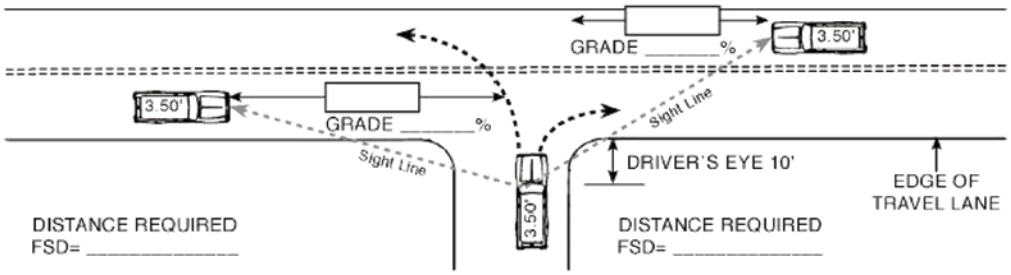
3) Safe Sight Distance

a) Safe sight distance shall be available for all permitted turning movements at all driveway intersections.

b) PennDOT's Pub. 441 and Pub. 282 for driveways or Pub. 70 for local roads shall be referenced to determine minimum driveway and roadway intersection safe sight distance requirements.

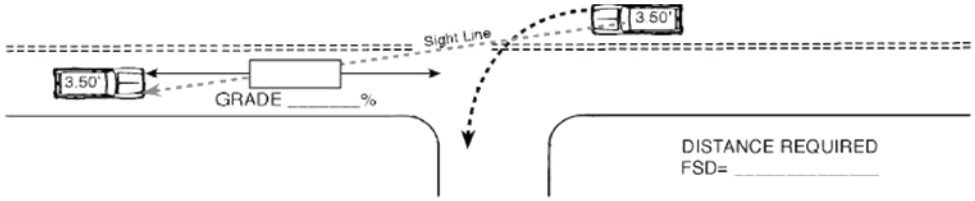
c) All driveways and intersecting roadways shall be designed and located so that the sight distance is optimized to the degree possible without jeopardizing other requirements such as intersection spacing, and at least minimum sight distance requirements are met.

Sight Distances to the Left & Right of the Driveway



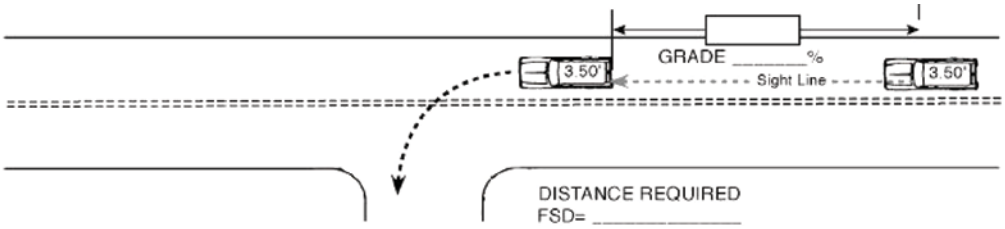
THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER AT A DRIVEWAY LOCATION CAN CONTINUOUSLY SEE ANOTHER VEHICLE APPROACHING ON THE ROADWAY.

Sight Distance to an Approaching Vehicle from a Vehicle Turning Left into the Driveway



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER OF A VEHICLE INTENDING TO MAKE A LEFT TURN INTO A DRIVEWAY CAN CONTINUOUSLY SEE A VEHICLE APPROACHING FROM THE OPPOSITE DIRECTION.

Sight Distances Approaching the Rear of a Left Turning Vehicle



THE MAXIMUM LENGTH OF ROADWAY ALONG WHICH A DRIVER ON THE ROADWAY CAN CONTINUOUSLY SEE THE REAR OF A VEHICLE WHICH IS LOCATED IN THE DRIVER'S TRAVEL LANE AND WHICH IS POSITIONED TO MAKE A LEFT TURN INTO A DRIVEWAY.

Source: TRB Access Management Manual, 2003.

4) Driveway Channelization

a) For high and medium volume driveways, channelization islands and medians shall be used to separate conflicting traffic movements into specified lanes to facilitate orderly movements for vehicles and pedestrians.

b) Where it is found to be necessary to restrict particular turning movements at a driveway, due to the potential disruption to the orderly flow of traffic or a result of sight distance constraints, the municipality may require a raised channelization island.

c) Raised channelization islands shall be designed with criteria consistent with the latest AASHTO publication entitled *A Policy on Geometric Design of Highways and Streets*.

I.A.4. Commentary

The restriction of left turns into or out of a driveway reduces interruptions to through traffic on roadways. Turn restrictions are an effective measure for corner lots at intersections, because they eliminate left turning movements within the functional area of the intersection. Turn restrictions may also be implemented if the improvements that would be required at a driveway to achieve acceptable levels of service cannot be provided due to constraints or there is a history of high crash rates caused by left turning vehicles. Islands also provide a refuge area for pedestrians crossing high volume driveways.

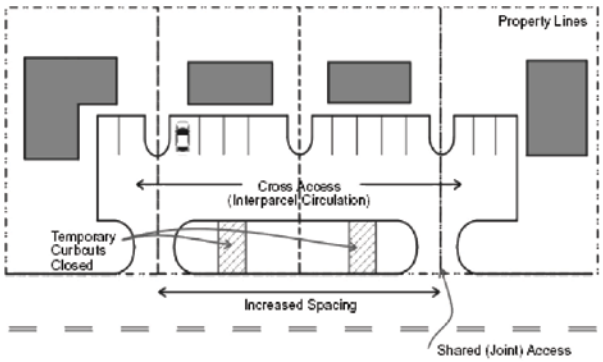
Channelizing islands can be controversial when recommended for commercial uses because they place a restriction on a direct access movement into the business. However, channelization islands are a less controversial access management practice to restrict turns at high volume driveways than the installation of medians on the intersecting roadway.

According to the Pennsylvania Code, Title 67, Transportation, Chapter 441, if sight distance requirements cannot be met, PennDOT may prohibit left turns by entering or exiting vehicles. A raised concrete island may be required to implement left turn restrictions at driveways where limited sight distance would otherwise pose a potential hazard.

I.A.5 Commentary

Joint and cross access driveways reduce the number of driveways accessing the roadway, thus reducing the number of conflict areas along the roadway. They are a safe and more efficient way to provide access to two or more adjacent land uses because motorists do not have to exit one driveway, merge into traffic on the intersecting roadway, and then enter another driveway. These types of driveways allow the municipality to maintain driveway spacing standards along corridors that have several parcels with limited roadway frontage. For undeveloped parcels, the easements for joint and cross access should be implemented during the land development approval process.

Joint Driveways and Cross Access



Source: TRB Access Management Manual, 2003.

5) Joint and Cross Access

a) The municipality may require a joint driveway in order to achieve the following driveway spacing standards that are desirable for arterial and major collector roads:

i) Principal arterial: 600 feet

ii) Minor arterial: 400 feet

iii) Major collector: 200 feet

b) Adjacent non-residential properties shall provide a joint or cross access driveway to allow circulation between sites wherever feasible along roadways classified as major collectors or arterials in accordance with the functional classification contained in the municipal comprehensive plan. The following shall apply to joint and cross access driveways:

i) The driveway shall have a design speed of 10 mph and have sufficient width to accommodate two-way traffic including the largest vehicle expected to frequently access the properties.

ii) A circulation plan that may include coordinated or shared parking shall be required.

iii) Features shall be included in the design to make it visually obvious that abutting properties shall be tied in to provide cross access.

c) The property owners along a joint or cross access driveway shall:

i) Record an easement with the deed allowing cross access to and from other properties served by the driveway.

ii) Record an agreement with the municipality so that future access rights along the driveway shall be granted at the discretion of the municipality and the design shall be approved by the municipal engineer.

iii) Record a joint agreement with the deed defining the maintenance responsibilities of each of the property owners located along the driveway.

6) Access to Outparcels

a) For commercial and office developments under the same ownership and consolidated for the purposes of development or phased developments comprised of more than one building site, the municipality shall require that the development be served by an internal road that is separated from the main roadway.

b) All access to outparcels shall be internalized using the internal roadway.

c) The driveways for outparcels shall be designed to allow safe and efficient ingress and egress movements from the internal road.

d) The internal circulation roads shall be designed to avoid excessive queuing across parking aisles.

e) The design of the internal road shall be in accordance with all other sections of this ordinance.

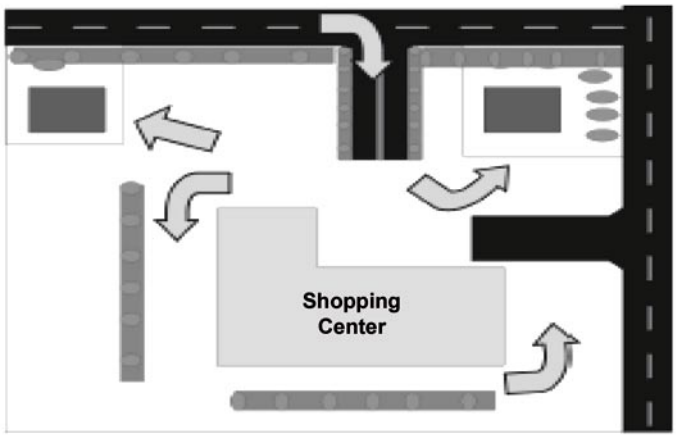
f) All necessary easements and agreements required under Section A.6.c shall be met.

g) A municipality may require an access covenant to restrict an outparcel to internal access only.

I.A.6 Commentary

Internal access reduces the number of direct access locations on major roadways in commercial districts and employment areas, thus reducing the number of conflict locations. The reduction in the number of driveways along the property frontage also creates more areas for landscaping to improve the aesthetics of a corridor. For collectors and arterials, the internalization of access to outparcels is critical in order to meet the spacing criteria found in Tier II.

Internal Access to Outparcels



Source: TRB Access Management Manual, 2003.

I.B.1 Commentary

Traffic volumes, type of vehicles, and vehicle queues are the primary considerations for determining driveway throat lengths. Adequate throat length for a driveway permits vehicles to enter the driveway without immediately encountering conflicts created by an internal intersection. Immediate conflicts can cause successive entering vehicles to queue onto the intersecting roadway. Adequate throat length also provides sufficient space for queuing of exiting vehicles, particularly at signalized driveways.

Although site conditions may not allow strict adherence to the guidelines in this ordinance, every effort should be made to design and construct the safest and most efficient access onto the municipal or state roadway. Exceptions to the design requirements in the ordinance should be reviewed by the municipal engineer on municipal roadways and PennDOT on state maintained roadways.

B. Driveway Design Elements

1) Driveway Throat Length

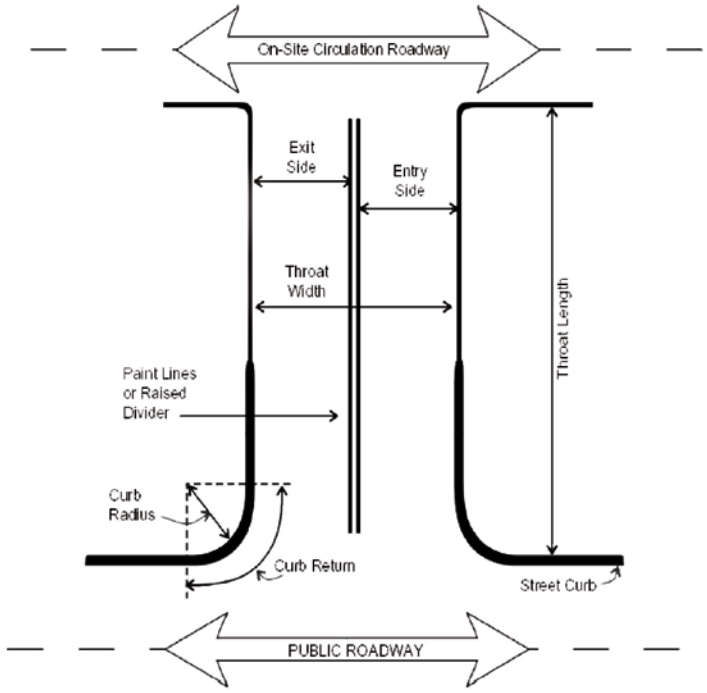
a) For minimum use driveways, the throat length shall be a minimum of 25 feet.

b) For low volume driveways, the throat length shall be a minimum of 50 feet or as determined by queuing analysis.

c) For medium volume driveways, the throat length shall be a minimum of 120 feet or as determined by a queuing analysis.

d) For high volume driveways, the throat length shall be a minimum of 150 feet or as determined by a queuing analysis.

Diagram Displaying Driveway Throat Length, Width, and Radius



Source: TRB Access Management Manual, 2003.

2) Driveway Throat Width

a) For driveways without curb:

i) A minimum use driveway shall have a minimum width of 10 feet.

ii) Low and medium volume driveways shall have a minimum width of 10 feet for one-way operation and a minimum width of 20 feet for two-way operation.

iii) The design of high volume driveways shall be based on analyses to determine the number of required lanes.

b) For driveways with curb, two feet should be added to the widths contained in Section a.i and a.ii.

c) The municipality may require additional driveway width to provide turning lanes for adequate traffic flow and safety.

d) The municipality may require that the driveway design include a median to control turning movements. Where medians are required or permitted, the minimum width of the median shall be four feet to provide adequate clearance for signs.

I.B.2 Commentary

When the proper turning radii cannot be provided due to site constraints, wider driveways may be needed to facilitate turning movements. However, if driveways have excessive width, a driver may become confused on where to position the vehicle for ingress and egress movements. Also, pedestrians and bicyclists have a greater distance to cross the driveway, exposing them longer to potential vehicular conflicts.

The width requirements presented here are based on common design practices. The width of driveways must consider the volume and type of vehicles that are anticipated to use the driveway and the volume of bicycle and pedestrian traffic crossing the driveway. Trucks and buses require more width than passenger vehicles. Although site conditions may not allow strict adherence to the requirements in the ordinance, every effort should be made to design and construct the safest and most efficient access onto the municipal or state roadway. Exceptions to the design requirements contained in this ordinance must be reviewed by the municipal engineer.

I.B.3. Commentary

A small radius may make entering a driveway more difficult and cause entering vehicles to slow down or almost stop upon entering. Thus, improperly designed radii can affect the speed and capacity of through traffic on the intersecting roadway. Large trucks need adequate radii to complete their turning movements without encroaching into opposing lanes of traffic on the driveway or main road. Large turning radii allow for easier ingress and egress maneuvers. Very large turning radii can be used to increase entry speeds where deceleration lanes are not feasible, however consideration of bicycle and pedestrian volumes is necessary.

3) Driveway Radius

a) The following criteria shall apply to driveway radii:

i) For minimum use driveways, the radii shall be a minimum of 15 feet.

ii) For low volume driveways, the radii shall be a minimum of 15 feet uncurbed and 25 feet curbed.

iii) For medium volume driveways, the radii shall be a minimum of 15 feet uncurbed and 25 feet curbed.

iv) For high volume driveways, the design should be reviewed by the municipal engineer on municipal roadways and PennDOT on state maintained roadways.

b) For all driveways, the radii shall be designed to accommodate the largest vehicle expected to frequently use the driveway.

c) Except for joint driveways, no portion of a driveway radius may be located on or along the frontage of an adjacent property.

4) Driveway Profile

a) Driveway grade requirements where curb is not present on the intersecting street:

i) Shoulder slopes vary from four percent to six percent. When shoulders are present, the existing shoulder slope shall be maintained across the full shoulder width.

ii) The change in grade between the cross slope of the connecting roadway or shoulder and the driveway shall not exceed eight percent.

iii) The driveway grade shall not exceed eight percent within 10 feet of the edge of travel lane for minimum use driveways and within 40 feet for low, medium, and high volume driveways.

iv) A 40-foot minimum vertical curve should be used for a high volume driveway.

b) Driveway grade requirements where curbs and sidewalks are present:

i) The difference between the cross slope of the roadway and the grade of the driveway apron may not exceed eight percent.

ii) The driveway grade shall not exceed eight percent within 10 feet of the edge of travel lane for minimum use driveways and within 40 feet for low, medium, and high volume driveways.

iii) If a planted area exists between the sidewalk and curb, the following shall apply:

(1) The grade of the planted area shall not exceed eight percent.

(2) If the driveway grade would exceed eight percent in the area between the curb and the sidewalk, the outer edge (street side) of the sidewalk may be depressed to enable the driveway grade to stay within eight percent. A maximum sidewalk cross slope of eight percent must be maintained.

(3) If the sidewalk cross slope exceeds two percent, the entire sidewalk may be depressed. The longitudinal grade of the sidewalk may not exceed six percent.

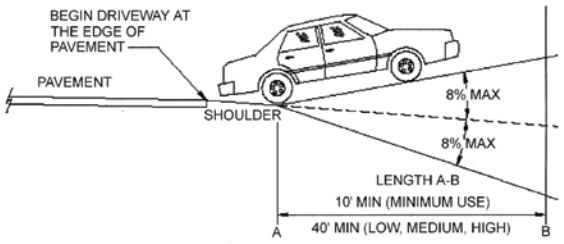
c) Although site conditions may not allow strict adherence to these guidelines in this ordinance, every effort should be made to design and construct the safest and most efficient access onto the municipal or state roadway.

I.B.4. Commentary

A properly designed driveway profile allows for more efficient and safe turning movements into and out of driveways and streets. It allows vehicles to complete a smooth 90-degree turning maneuver without a "bottoming out" of the vehicle against the pavement. The profile must be designed to accommodate the largest vehicle that will frequently use the driveway to allow for efficient movements. In areas where steep slopes are unavoidable, the driveway approach profile should be checked with an appropriate design vehicle template. The requirements of the model ordinance are consistent with PennDOT regulations. If a municipality already has more stringent design criteria, they should not be revised unless they are proven to be problematic.

Although site conditions may not allow strict adherence to these requirements, every effort should be made to design and construct the safest and most efficient access onto the municipal or state roadway. Exceptions to the design requirements in the ordinance should be reviewed by the municipal engineer on municipal roadways and PennDOT on state maintained roadways.

Driveway Profile



Source: TRB Access Management Manual, 2003.

II.A. Commentary

PennDOT's regulations, *67 PA Code Chapter 441*, establish the need for a turn lane as follows: "The permit may require the installation of a left turn lane, a two-way left turn lane, or a right turn lane to separate and protect turning vehicles from through traffic if failure to do so would result in unacceptable levels of service or undue hazard for the traveling public, as determined by a traffic study approved by the Department." The website address for the PennDOT traffic impact study guidelines can be found on the references/resources page of the Access Management Model Ordinances for Pennsylvania Municipalities handbook.

A. Auxiliary Lanes

Auxiliary lanes separate turning vehicles from through traffic, thus they increase capacity and improve operations at intersections. They reduce the potential for rear-end crashes and interference or disruption of the flow of through traffic.

1) Right Turn Lane/Deceleration Lane

a) Unsignalized intersections:

i) A right turn lane shall be considered on the major road (not stop controlled) at an unsignalized intersection when any one or a combination of the following conditions exists:

(1) Forty or more right turns in the peak hour.

(2) Three percent or more downgrade with 20 or more right turns in the peak hour.

(3) Speed in excess of 40 mph.

(4) High average daily traffic on the through road (5,000 vehicles per day or more).

ii) A right turn lane shall be required on the minor road or driveway (stop controlled) approach if a capacity analysis shows an unacceptable LOS for the approach, and the installation of a right turn lane will improve operations.

b) Signalized intersections:

i) A right turn lane shall be required when a capacity analysis shows unacceptable LOS, and the operation of the intersection can be improved by the installation of one or more right turn lanes. Levels of service E and F should be considered unacceptable in rural areas and a level of service F should be considered unacceptable in urban areas.

ii) Capacity analysis methodology shall follow criteria [either established elsewhere in the Subdivision and Land Development Ordinance or the applicable PennDOT criteria for conducting traffic impact studies.]

c) Design Criteria

i) The desirable width for a right turn lane is 14 feet with curb and 12 feet without curb. The minimum width of right turn lanes shall be 13 feet with curb and 11 feet without curb. If not curbed, shoulders shall be designed in accordance with PennDOT 3R criteria found in *PennDOT Publication 13M: Design Manual Part II*.

ii) The required lengths of right turn lanes shall consider the following components as may be applicable:

(1) Storage bay length:

(a) Shall accommodate the 95th percentile queue length for signalized intersections.

(b) The stop controlled approach of an unsignalized intersection shall accommodate the number of turning vehicles likely to arrive in an average two-minute period during the peak hour.

(2) Deceleration distance in accordance with AASHTO publication *A Policy on Geometric Design of Highways and Streets*.

(3) Taper length in accordance with AASHTO publication *A Policy on Geometric Design of Highways and Streets*.

(4) The right turn or deceleration lane shall be designed based on an analysis that projects traffic volumes for a ten-year period from the anticipated opening of the proposed development.

(5) The 85th percentile speed shall be used for the retrofit of existing deceleration or right turn lanes. The design speed of the roadway shall be used for the design of auxiliary lanes for new roads.

II.A.1 Commentary

Right turn and/or deceleration lanes separate vehicles slowing to make a right turn from through traffic. They allow the right turns to be completed without impeding the travel speed of through traffic. These lanes can also reduce rear end crashes and increase capacity at an intersection or driveway. Other factors such as sight distance limitations and crash history can also be used in determining the need for a right turn or deceleration lane.

Unacceptable levels of service can be defined differently by agencies and municipalities. The municipality should include criteria for unacceptable levels of service that meet their traffic operation objectives.

PennDOT is currently developing uniform statewide criteria for right turn and deceleration lane warrants and design criteria. The municipality should amend its ordinance when the warrants and criteria are adopted so that it is consistent with PennDOT regulations.

Right turn lanes are relatively easy to install because they do not require widening on the opposite side of an intersection to shadow or direct through traffic around turning vehicles as is needed for left turn lanes when there is an opposing approach to the intersection. The design of right turn and deceleration lanes generally consist of a taper, deceleration length, and storage length depending on the class of roadway and whether or not the approach to the intersection is uncontrolled, stop controlled, or controlled by a traffic signal. Generally, long tapers enhance the function of a deceleration or right turn lane.

Right turn lanes on stop controlled approaches of two-way stop intersections should carefully consider sight distance limitations that could be created. These lanes can be difficult to retrofit due to physical constraints and the potential need to acquire additional right-of-way. Continuous right turn lanes should be avoided because they can be confused for an additional through lane.

II.A.2 Commentary

Left turn lanes are usually provided for either a high left turn volume into a driveway or side street, or when a combination of left turn volumes and high through volumes causes long delays. They can also be used in locations with high rates of rear end crashes. A left turn lane allows turn movements to be removed from the through lanes, reducing disruption and delay for the through traffic.

Unacceptable levels of service can be defined differently by agencies and municipalities. The municipality should include criteria for unacceptable levels of service that meet their traffic operation objectives.

PennDOT is currently developing uniform statewide criteria for left turn lane warrants and design criteria. The municipality should amend its ordinance when the warrants and criteria are adopted so that it is consistent with PennDOT regulations.

AASHTO publication *A Policy on Geometric Design of Highways and Streets* provides criteria based on HRR 211 methodologies to determine the storage length of left turn lanes. For unsignalized intersections, HRR 211 takes the following variables into account in determining the need for a left turn lane:

VA = advancing volume (through, left-turning, and right-turning, vehicles per hour)

VL = left-turning volume (vehicles per hour)

L = VL/VA = proportion of left turns in the total advancing traffic stream

VO = opposing volume (opposing through and right-turning, vehicles per hour)

v = operating speed (mph)

HRR 211 provides nomographs based on these criteria to establish warrants for the installation of left turn lanes. ITE recommends that at high speed rural intersections, left turn lanes should be provided for safety reasons, whether or not warrants are satisfied.

The Highway Capacity Manual (HCM) states that for signalized intersections, the need for left turn lanes should be investigated when the volume of left turns approaches one hundred vehicles per hour. As the volume of left turns approaches three hundred vehicles during the peak hour, the need for dual left turn lanes should be investigated.

Left turn lanes are sometimes difficult to implement in a retrofit situation because they usually require widening on both sides of the road as well as on the opposing approach, and right-of-way acquisition can be difficult and expensive. Limits of work must include sufficient length to provide for lane transition tapers that are necessary to guide through traffic around the left turn lanes.

2) Left Turn Lane

a) Unsignalized Intersections:

i) For the major street, Highway Research Record 211 (HRR 211) provides warrants for requiring a left turn lane.

ii) A left turn lane shall be required when the appropriate HRR 211 nomograph indicates that the warrant for a 100-foot-long left turn lane is met for the anticipated completion date of the development.

iii) A left turn lane shall be required if the visibility to the rear of a vehicle stopped to turn left into the proposed access does not meet minimum sight distance requirements and no alternative is available.

b) Signalized Intersections:

i) A left turn lane shall be required when a capacity analysis indicates that the operation of an intersection, approach, or movement will operate at unacceptable levels of service and the operation of the intersection, approach, or movement can be improved with the installation of one or more left turn lanes. Levels of service E and F should be considered unacceptable in rural areas and a level of service F should be considered unacceptable in urban areas.

c) Design Criteria

i) The desirable width for left turn lanes is 12 feet. The minimum width shall be 10 feet, unless the percent of trucks will exceed five percent, then 11 feet shall be the minimum width.

ii) The length of a left turn lane shall consider the following components as applicable:

(1) Storage bay length.

(a) Shall accommodate the 95th percentile queue length for signalized intersections.

(b) Shall be determined from the appropriate nomograph in HRR 211 for the uncontrolled approach of an unsignalized intersection.

(2) Deceleration length in accordance with AASHTO publication *A Policy on Geometric Design of Highways and Streets*.

(3) Taper length in accordance with AASHTO publication *A Policy on Geometric Design of Highways and Streets*.

3) Acceleration Lane

a) May be required on arterial highways where operating speeds are in excess of 40 mph and where access points are located a sufficient distance apart to permit the installation of acceleration lanes.

b) The design length and width shall follow criteria found in the latest edition of *A Policy on Geometric Design of Highways and Streets* and shall conform to PennDOT requirements on state maintained highways.

II.A.3 Commentary

Acceleration lanes allow vehicles entering a highway from a driveway or side road to merge with through traffic at or near the same speed as the through traffic. For limited access highways and some principal arterials, acceleration lanes are critical to maintain smooth traffic flow, and to minimize disruption caused by entering traffic.

Acceleration lanes are generally not effective in facilitating egress from driveways or side roads that intersect the lower classification roads. Motorists tend to wait for a large enough gap in through traffic to enter directly into the flow of traffic.

B. Driveway Spacing Requirements

1) Driveway Spacing

a) Driveway spacing is measured from the end of one driveway radius to the beginning of the next driveway radius.

b) The following driveway spacing standards are desirable for arterial highways and major collector roads:

i) Principal arterial: 600 feet

ii) Minor arterial: 400 feet

iii) Major collector: 200 feet

c) Driveways shall be aligned with other driveways and roadways on the opposite side of the intersecting roadway on arterials and major collector roads in order to meet spacing requirements.

d) If these driveway spacing standards cannot be met, a system of joint or cross access driveways, frontage roads, or service roads may be required.

II.B.1 Commentary

Driveway spacing standards should be intended for arterial and major collector roads. Adequate driveway spacing allows greater speeds for through traffic, reduces the number of potential conflict points that must be monitored by motorists, and helps preserve the capacity of the roadway. Spacing standards may be developed based on the posted speed limit of the intersecting roadway and/or its functional classification. Driveway spacing requirements are difficult to implement in areas that are already developed, such as in commercial areas or corridors, and when there are no supporting land use regulations governing lot frontage or dimensions.

II.B.2 Commentary

Adequate separation distance between signalized intersections is necessary to prevent queues from one intersection extending into or otherwise influencing operations at the next upstream or downstream intersection. Furthermore, uniform spacing of traffic signals provides better traffic flow progression. Limiting the number of traffic signals in a corridor also reduces the number of locations where queuing of vehicles may obstruct turning movements from driveways or side streets.

Coordinated traffic signal systems with long and uniform signal spacing achieve efficient traffic progression at desired speeds. In a simultaneous coordinated traffic signal system, all signals along the corridor operate with the same cycle length and display the green indication at the same time. In an alternating coordinated system, each successive traffic signal or group of signals shows opposite (or alternating) green indications to that of the next signal or group.

Traffic signal spacing standards are a function of the cycle length of the traffic signal and the desired travel speed. Progression speeds increase as traffic signal spacing increases. Speeds also tend to increase as the cycle lengths increase for the signals along the corridor. Traffic signal spacing can be difficult to implement in established commercial areas. Midblock high volume driveways may require a signal for efficient ingress and egress movements. These driveways often break the uniform spacing.

2) Signalized Intersection Spacing

a) Uncoordinated traffic signals shall be located a minimum of 1,000 feet from adjacent signalized intersections.

b) Optimal signal spacing for coordinated systems may be determined by the following equations:

For simultaneous coordinated signal systems:

$S = VC / 0.681$

For alternating coordinated signal systems:

$S = VC / 1.362$

S = Signal spacing in feet

C = Cycle length in seconds

V = Progression speed in miles per hour

b) The progression speed shall be determined by the municipal engineer and PennDOT.

c) Warrants for the signalization of an intersection must be met and may be found in the Manual on Uniform Traffic Control Devices (MUTCD).

d) If a driveway or local road requires signalization and will be located within an existing coordinated traffic signal system, the traffic signal must be incorporated in the system.

3) Driveway Clearance From Interchange Ramps

a) A driveway shall not be permitted on or within an interchange ramp.

b) A driveway shall not be permitted within 100 feet in areas classified as urban by PennDOT or 300 feet in areas classified as rural by PennDOT from either the end of a ramp radius or the intersecting edge of the pavement of the ramp speed change lane to the beginning of the access radius.

II.B.3 Commentary

Proper interchange area management reduces the conflicts between merging traffic from interchange ramps and traffic entering or exiting from driveways. Minimum distance requirements provide adequate distance for traffic merging from ramps to avoid traffic queues from the nearest intersection and to enter left turn lanes. The minimum spacing standards can be maintained in some instances through the acquisition and preservation of limited access right-of-way.

PennDOT's proposed regulations, *67 PA Code Chapter 441*, do not permit driveways within 50 feet of an interchange ramp. NCHRP Report 420 recommends that an unsignalized access be located at least 750 feet from an interchange ramp, and that a signalized access be located one half mile or greater from the terminus of an interchange ramp.

Introduction

Tier III contains access management techniques that can be implemented through the various planning options available to municipalities, such as overlay districts and the official map. This tier contains techniques that are more comprehensive and are typically used to control access to arterials and major collector roads. Tier III techniques used in conjunction with those from Tiers I and II are the best techniques for maintaining efficient traffic flow and high safety levels in areas experiencing intense land development pressures.

Tier III techniques apply to existing arterial highways and some major collector roads that are experiencing or can be anticipated to experience pressure for new development. Since the great majority of arterial highways and many major collectors are under the jurisdiction of PennDOT, the implementation of these techniques may require PennDOT approval and permission (Highway Occupancy Permits). The cooperation and input of PennDOT should also be sought for those corridors identified by the municipality for the implementation of access management practices.

The techniques, such as non-traversable medians, two-way-left-turn lanes (TWLTL), and frontage roads, often require right-of-way acquisition, utility relocation, and roadway widening. They require significant funding, and therefore are often implemented through a capital project administered by PennDOT.

A. Access Management Overlay District

The municipality may establish an Access Management Overlay District. Access management overlay districts add special requirements to existing zoning districts. They may be established for a corridor, intersection, or interchange area. All or some of the access management requirements from Tiers 1 through Tier 3 can be applied. Overlay districts can be developed to fit the unique characteristics of a particular area or corridor to address concerns regarding safety, access, and traffic flow problems that could be experienced as a result of intense pressures from development. Overlay districts can also contain land use requirements regarding the permitted uses along arterials and major collector roads or near interchanges in order to regulate the location of large volume generators such as shopping centers or office/industrial parks.

The zoning regulations of the underlying district, such as permitted uses and conditional uses, are retained. However, the overlay district may have more restrictive regulations regarding uses, setbacks, location and number of driveways, joint or cross access, and internal circulation. Overlay districts may also contain regulations regarding signing and landscaping to preserve the community character and natural features of the area. The regulations of the overlay district will generally prevail over the underlying district.

A planning study should be completed before the enactment of an overlay district. The study may be conducted in conjunction with the municipal comprehensive plan or municipal transportation plan, or a separate corridor study may be conducted. Its purpose is to establish the need for additional regulations due to existing and/or projected traffic problems. The planning or corridor study should address the following issues:

- Purpose of the overlay district;
- Analysis of existing traffic conditions;
- Analysis of future traffic conditions based on projected land development patterns;
- Recommended access improvements and management practices; and,
- Establishment of the boundary for the overlay district.

The need for an overlay district may exist on a regional basis for arterial corridors and interchange areas located near municipal boundaries. In these instances, a multi-municipal transportation plan or corridor study should be completed prior to enactment. If overlay districts are not developed properly, they can lead to complex regulations and significant administrative costs.

After the completion of a transportation plan or study that establishes the need for an overlay district, ordinance revisions are required for its enactment. The municipal zoning ordinance should be revised to show the boundary of the overlay district and include regulations for proper development. The subdivision and land development ordinance must also be updated to include required design standards. The municipality should consider the adoption of an official map in order to preserve right-of-way to implement recommended access improvements from the study, such as corridor or intersection widening, interchange re-configuration, new collector roads, service roads, and frontage roads.

B. Official Map

The official map is an effective planning tool to reserve right-of-way for new road alignments and interchanges. In addition, it can be used to reserve right-of-way along existing roadways for turning lanes at intersections, additional through lanes along corridors, and Tier 3 access management techniques such as two-way left turn lanes and non-traversable medians.

The Pennsylvania Municipalities Planning Code (MPC) provides that a municipality may adopt an official map covering the entire municipality, or a portion thereof, to show elements of the comprehensive plan pertaining to public lands and facilities. An official map identifies areas of public interest and need for the purpose of reserving lands for public use. It can be used to implement the transportation network and other community facilities. Section 401(a) of the MPC permits the municipality to represent the following transportation facilities on the official map:

1. Existing and proposed public streets including widening, narrowing, extensions, diminutions, openings, or closings.
2. Pedestrian facilities and easements.
3. Railroad and transit rights-of-way and easements.

The adoption of any street or street lines as part of the official map does not constitute the opening or establishment of any street, the taking of any land, nor does it obligate the municipality to improve or maintain any such street. The adoption of the official map does not constitute the taking or acceptance of any land by the municipality.

The construction of any building is not permitted within the lines of any street that is shown on the official map. The municipality may fix the time for which streets on the official map shall be deemed reserved for future taking or acquisition for public use. However, the reservation of public lands lapses and becomes void one year after an owner of such lands has submitted a written notice to the municipality announcing their intentions to build, subdivide, or otherwise develop the land reserved for public use, or has made a formal application for an official permit to build a structure for private use.

The municipality may use property records, aerial photography, photogrammatic mapping, geographic information systems (GIS), or other methods for the identification, description, and publication of elements of the official map. An ordinance must accompany the official map that describes the lands identified for future public use. The ordinance may be placed directly on the map. The municipality does not need to survey designated lands prior to the adoption of the official map and ordinance. At the time of land acquisition or easements, boundary descriptions by metes and bounds must be provided by a licensed surveyor.

Prior to the adoption by the municipality, the official map and ordinance must be reviewed by the county planning commission. The county planning commission must provide its recommendations to the municipality within 45 days, or an extension to the time for review may be agreed to by the municipality. The proposed official map and ordinance may also be reviewed by adjacent municipalities, other local authorities, and similar public bodies during the same review period. If the review parties do not provide recommendations within 45 days or the agreed to extension period, the municipality may proceed without the county planning commission and other recommendations.

Prior to the enactment of the official map and ordinance, the governing body must hold a public hearing pursuant to public notice. Following the adoption of the official map and ordinance, a copy must be submitted to the county recorder of deeds within 60 days of the effective date.

For more information on the official map including procedures for adoption and implementation, please refer to Article IV Sections 401 – 408 of the Municipalities Planning Code.

III.C.1 Commentary

TWLTLs separate left turning vehicles from through traffic. They are generally safer than undivided highways because they reduce rear-end collisions. They also increase capacity and reduce travel time for through traffic.

The potential for conflicts between left turning vehicles from opposing travel streams is one potential problem with TWLTLs. Also, they do not provide a safe refuge area for pedestrians as raised medians do. TWLTLs can encourage commercial strip development along arterial corridors, particularly if there are no driveway spacing requirements.

The use of TWLTLs requires careful consideration of driveway locations. In some cases, TWLTLs can be rather easily retrofitted on corridors that consist of multiple travel lanes. For corridors consisting of only two travel lanes, TWLTLs can be much more difficult to retrofit due to right-of-way constraints and potential impacts to existing structures and properties.

C. Roadway Design Practices

1) Two-way Left Turn Lanes

a) The municipality may identify certain roadway corridors for the retrofit of a two-way left turn lane (TWLTL) where the following conditions exist:

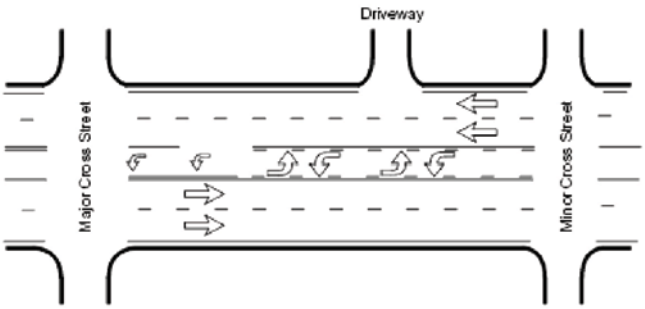
i) Speeds are less than 50 mph or as permitted by PennDOT.

ii) There are no locations of heavy concentrations of left turning vehicles that cannot be accommodated with exclusive left turn lanes.

b) At cross streets or locations with a heavy concentration of left turning vehicles, the municipality may require the modification of pavement markings for a center left turn lane to provide an exclusive left turn lane based on the requirements for unsignalized and signalized left turn lanes.

c) The pavement markings for a TWLTL shall be in accordance with the guidelines and criteria contained in the most recent edition of the Manual on Uniform Traffic Control Devices (MUTCD).

Two-way Left Turn Lane



Source: TRB Access Management Manual, 2003.

2) Frontage/Service Roads

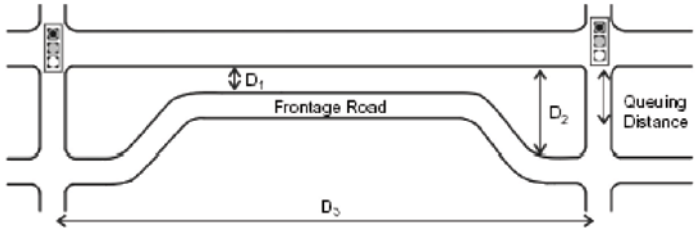
a) The municipality may require the construction of a frontage or service road to provide more favorable access for multiple commercial and residential developments to preserve the safety and capacity of the adjacent roadway.

b) The municipality may require the construction of a frontage or service road to maintain the driveway and traffic signal spacing requirements and corner clearance requirements contained in this ordinance.

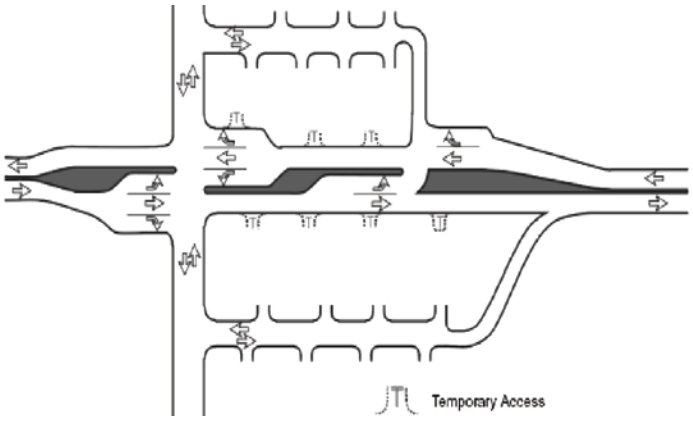
c) New developments that abut an existing service or frontage road must take access to the service or frontage road. Access to the arterial or collector road will be permitted only if driveway and intersection spacing requirements are met and a traffic study shows that it is necessary to maintain levels of service, and safety is not compromised. The traffic study shall be conducted in accord with PennDOT's applicable guidelines and requirements.

d) Frontage roads and service roads shall be designed in accordance with the most recent editions of *PennDOT Publication 13M, Design Manual Part II* and *A Policy on Geometric Design of Highways and Streets*, AASHTO.

Typical Frontage Road



Typical Service Road



Source: TRB Access Management Manual, 2003.

III.C.2 Commentary

Frontage roads provide direct access for individual parcels, thus minimizing the number of access points on an arterial. They separate local traffic from high speed through traffic. In commercial areas, businesses are still visible from the major roadway. Frontage roads are an effective access management tool in undeveloped areas experiencing development pressures.

Service roads allow the development of small parcels along a major roadway without providing access to each parcel from the major roadway. These roads can provide access to properties on either side. Service roads are often less costly than frontage roads and are easier to retrofit in developed areas. If a service road will be constructed in phases, temporary driveways may be needed to access the intersecting arterial or collector road. The temporary driveways should be removed after the completion of the service road.

Frontage roads can involve significant donation of right-of-way by multiple property owners. Short spacing between the intersections of the connector roads and the major roadway can cause problems with vehicle queues that extend through the intersections. These intersections have low capacity and the traffic volumes generated by a commercial development could result in congestion. Frontage roads tend to encourage commercial strip development rather than compact activity centers. They are very difficult to retrofit in fully developed areas.

III.C.3 Commentary

Medians can be used to reduce conflict areas by restricting turn movements into and out of driveways and minor side roads that are located on an undivided highway (generally four or more lanes). A detailed traffic study must be conducted in order to determine the degree of improvement to through traffic that can be realized by installing a non-traversable median. Also, appropriate locations for breaks in the median for side roads and major roadways must be determined along with the impact on existing properties. The ability and accommodation of traffic to reverse direction must also be investigated and provisions must be included in the design.

Approval for the alteration of an existing median for access to a property must be approved by PennDOT on state maintained roadways. The National Cooperative Highway Research Program (NCHRP) is currently developing guidelines and warrants for the installation of median barriers and establishing the type of barrier to be used in certain situations. The municipality should consider updating its access management ordinance once these warrants become available.

Medians are designed to physically prevent left turns into a driveway or onto a side street and left and through movements from driveways or side streets. They also reduce angle and rear-end crashes involving left turning vehicles from the inside through lanes.

Directional medians contain breaks at key locations to provide access to a particular land use or side street. A separate ingress lane is typically used at a break in the median for left turns into the driveway and for U-turns. An egress lane, sometimes referred to as a median acceleration lane, may be used in some circumstances for exiting movements from a driveway when significant delay would occur because of infrequent simultaneous gaps in both directions of travel on the intersecting roadway. Jughandles may be used at median breaks as an alternative to left turn ingress lanes, because they eliminate left turn movements from the major roadway (intersecting roadway with the higher traffic volumes). As a result, delay is decreased at the intersection and levels of service are improved.

Crash data for study purposes can be obtained from the PennDOT Bureau of Highway Safety and Traffic Engineering.

3) Non-Traversable Medians

a) The municipality, and in conjunction with PennDOT on state maintained roadways, may establish the need for the installation of a median barrier along an arterial or major collector roadway. General criteria involves a history of high crash rates caused by conflicting turning movements, a high average daily traffic volume, and unacceptable LOS along the corridor and at intersections.

b) The placement, type, and design of median barriers must be in accordance with the most recent additions of *PennDOT Publication 13M, Design Manual Part II* and the AASHTO publications *A Policy on Geometric Design of Highways and Streets* and *Roadside Design Guide*.

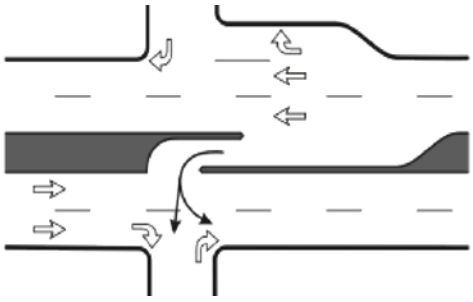
c) The municipality, in conjunction with PennDOT on state maintained roadways, shall consider the appropriateness of breaks in median barriers based on safety and capacity factors related to the proposed driveway. The removal or alteration of a portion of a median along a divided highway to provide access will not be permitted unless it is determined that the operating characteristics of the highway system will be improved by the action.

d) The spacing of median breaks shall be in accordance with the minimum driveway spacing, traffic signal spacing and corner clearance requirements contained in this ordinance.

e) A left turn ingress lane shall be required at a median break for a driveway. The length of the ingress lane shall be based on a capacity and queuing analysis conducted in accord with PennDOT's applicable guidelines and criteria.

f) A left turn egress lane (median acceleration lane) may be required at a median break for exiting left turn movements from a proposed driveway. Its design must be based on the appropriate AASHTO criteria.

Median Break with Left Turn Lane



Source: TRB Access Management Manual, 2003.

D. Planning Practices

1) Setbacks

a) The following setback distances shall be required between the legal right-of-way line and any proposed buildings or structures :

Minimum Setback Distance (Feet)

	Urban				Suburban/Rural			
	R	C	I	O	R	C	I	O
Arterial	15	15	10	15	150	150	125	150
Collector	15	15	10	15	100	100	50	100
Local	10	10	10	10	25	25	50	50

R - Residential
C - Commercial
I - Industrial
O - Office

III.D.1 Commentary

Setbacks are the minimum distance from the legal right-of-way line that establishes the area where no structures can be erected. Setbacks are not the dedication of right-of-way by the applicant, but preservation for future acquisition by the municipality. If the current municipal ordinance does not contain setbacks, the table included in the model ordinance language is from the *Chester County Circulation Handbook*, and can be used as a guide. In addition to the need for future roadway improvements, the municipality should consider other community design objectives when establishing or revising existing setback requirements.

The preservation of right-of-way well in advance of needed improvements can help reduce overall project costs and can help prevent development from precluding implementation of needed roadway improvements. The preservation of right-of-way can be done much more efficiently by the municipality than the state. The preservation of right-of-way for future roadway improvement projects must be completed on a property by property basis, which can take a considerable amount of time.

Applicants may be required to dedicate right-of-way to the municipality for the construction of on-site roadway improvements needed to provide ingress or egress to the property according to the driveway design requirements of the SLDO. The municipality cannot require off-site improvements according to the provisions of the MPC.

The official map may be used to preserve right-of-way for intersection improvements, corridor widening, or interchange reconstruction. The following table contains guidelines that may be used to preserve the ultimate right-of-way:

Minimum Right-of-Way Guidelines

	Urban	Suburban	Rural
Principal Arterial	100	150	150
Minor Arterial	80	100	100
Major Collector	80	80	80
Minor Collector	80	80	80
Local (>100 ADT)	50	50	50
Local (<100 ADT)	33	33	33

These widths are presented as a guide by the *Chester County Circulation Handbook* and *Landscapes Community Planning Handbook, Volume 2: A Toolbox for Managing Change in Chester County*. AASHTO has standards of 40-60 feet for collector roads and 50-66 feet for local roads in urban areas. Standards for other roadway classifications and area types should not be less than the area required for all of the elements of the design cross section, utility accommodation, and appropriate border areas.

III.D.2 Commentary

Bonuses and incentives provide the municipality with a negotiating tool to implement access management practices such as shared driveways, frontage roads, internal access to outparcels, and off-site roadway improvements. Careful consideration must be given to the decision to grant bonuses and incentives. Bonuses and incentives must be drafted in the ordinance in a way that does not relax other access management requirements.

2. Bonuses and Incentives

a) The municipality may grant adjustments to the requirements of the subdivision and land development ordinance when the applicant elects to implement one or more of the following access management techniques over and above the required minimums:

i) Off-site roadway and intersection improvements to improve or maintain acceptable operating levels of service on existing roadways in the vicinity of the proposed development,

ii) Reduction in the number of existing driveways onto a public roadway,

iii) Reduction in the number of driveways that would be normally permitted,

iv) Shared driveways,

v) Cross access,

vi) Frontage or service roads,

vii) Internal circulation systems, or

viii) Interconnected or shared parking areas.

b) The municipality shall determine, at its discretion, the adequacy and appropriateness of the access management techniques elected to be implemented and the corresponding adjustment to be granted to the applicant.

3) Pre-existing Access

a) Permitted driveways in place at the time of the adoption of this ordinance that do not conform to the standards herein shall be designated as pre-existing driveways. They shall be brought into compliance with the applicable standards contained herein under the following conditions:

i) New driveway permits are requested,

ii) Modifications to an existing driveway permit are requested,

iii) The property owner or applicant applies for a change in property use and will generate more vehicle trips than the existing use, or

iv) An expansion of the existing use will result in an increase in trip generation.

III.D.3 Commentary

Many pre-existing land uses will have driveways that are inconsistent with the design requirements contained in the model ordinance. It is unreasonable to assume that a municipality can impose immediate and in some cases very expensive retrofit designs. Designating these driveways as pre-existing access allows the municipality to work with the property owner or developer to implement access management requirements in a more reasonable fashion.

PennDOT's highway occupancy permit regulations provide that in granting a driveway permit, the Department does not waive its authority to require future change in operation, removal, relocation, or proper maintenance of any access to a state road.

Opportunities presented by the requirements for pre-existing access to bring driveways into compliance allow the cost to be amortized in business loans or mortgages, thereby reducing the financial hardship to the property owner or developer.

References

AASHTO, *A Policy on Geometric Design of Highways and Streets*

AASHTO, *Roadside Design Guide*

Chester County, *Chester County Circulation Handbook and Landscapes Community Planning Handbook, Volume 2: A Toolbox for Managing Change in Chester County*

FHWA, *Safety Effectiveness of Highway Design Features: Volume I, Access Control*, 1992.

National Highway Institute, S&K Transportation Consultants, Inc. *Access Management Location and Design*. Participant notebook for NHI Course133078. April 1998, revised April 2000.

PennDOT, *Publication 13M, Design Manual Part II*

PA Code, Chapter 441: *Access To and Occupancy of Highways by Driveways and Local Roads* www.pacode.com/secure/data/067/chapter441/chap441toc.html

Transportation Research Board, *Access Management Manual*, 2003.

Transportation Research Board, *NCHRP Report 420: Impacts of Access Management Techniques*, 1999.

Additional Resources

Federal Resources

Access Management TRB Committee ADA70
www.accessmanagement.gov

Federal Highway Administration
www.Ops.fhwa.dot.gov/access_mgmt

PennDOT Resources

Center for Program Development:
Linking Land Use and Transportation
www.dot.state.pa.us/Internet/Bureaus/CPDM.nsf/LandUseHomepage?OpenFrameset

PennDOT Publication 282:
ftp://ftp.dot.state.pa.us/public/Bureaus/BOMO/MC/Publication282.pdf

PennDOT HOP Project Scoping Meeting Checklist
ftp://ftp.dot.state.pa.us/public/Bureaus/BOMO/MC/282 B1 Scoping Mtg Checklist1.pdf

PennDOT Recommended HOP Application Process
ftp://ftp.dot.state.pa.us/public/Bureaus/BOMO/MC/282 B Recommended Process.pdf

PennDOT Traffic Impact Study Guidelines
ftp://ftp.dot.state.pa.us/public/Bureaus/BOMO/MC/GuidelinesTrafficImpactStudy.pdf

Other Resources

Pennsylvania Planning Association website
www.planningpa.org

Florida
www.dot.state.fl.us/planning/systems/sm/accman

Kentucky
www.transportation.ky.gov/Multimodal/Access.asp

New Jersey
www.state.nj.us/transportation/eng/documents/NJHAMC

Turner-Fairbank Highway Research Center
www.tfhrc.gov/safety/intersect.htm

Center for Urban Transportation Research (CUTR)
Planning & Corridor Management Program
www.cutr.usf.edu/research/access_m/intro.htm

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Glenn Rowe
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Angela Watson
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Visit PennDOT website
www.dot.state.pa.us and search "access management"

Visit LTAP website
https://www.dot7.state.pa.us/LTAP