



1.0 Background

The use of nationally recognized access management concepts has been proven to improve motorist safety, reduce crashes, ensure the preservation of highway capacity, and promote the reasonable and safe access to farmlands, residences, and businesses. They are found in national access management publications such as TRB's Access Management Manual and have been adopted by many state DOTs including WisDOT into its policies and guidelines. As much as possible, use and adhere to the main concepts listed below when reviewing STH connection permit applications.

1.1 Limit the Number of Conflict Points / Consolidate Access

Each connection is a possible conflict point. Along a corridor, traffic entering and leaving the highway should do so through a minimum number of connections in such a manner and from a location that minimizes traffic congestion and does not adversely affect highway safety or operations. One way to limit the number of conflict points is to eliminate horseshoe driveways. Also consider requiring:

- A shared connection when conditions merit by placing it on a common property line (Figure 1)
- A non-abutting STH property owner obtain a permanent easement to use a connection of an abutting property owner
- An abutting STH property owner who cannot safely obtain direct access to the STH obtain a permanent easement through an adjacent property that does have direct STH access. The use of a cross-access agreement is necessary, and WisDOT should not approve a permit application until evidence of that agreement has been submitted.
- Adjacent properties construct cross-access roads between their properties to promote internal circulation rather than using the STH to get from one property to another (Figure 2).

When possible, work with property owners, developers, etc. during the planning phase of a project to promote items (a)-(d) above.

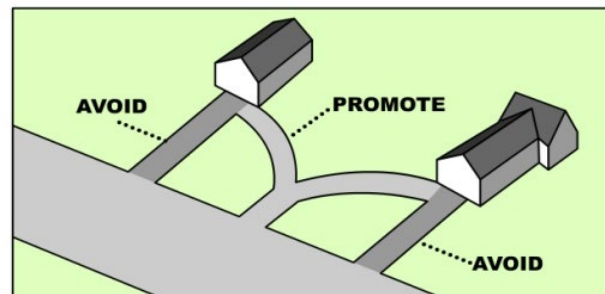


Figure 1: Shared access

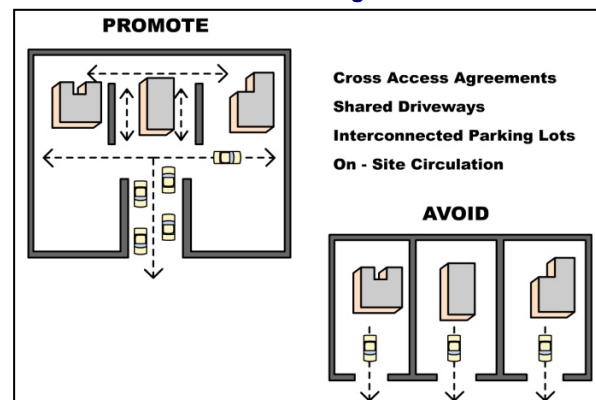


Figure 2: Promoting cross-access

1.2 Connection Purposefulness

Each STH connection must serve a purpose. Consider both the immediate reasons for and the long-term effects of any new connection with each permit application. Deny an additional connection request without a reasonable justification using [Trans 231.03\(2\)](#).

1.3 Use / Change of Use

Evaluate the relationship of use between a proposed connection and other existing connections on adjacent or surrounding lands now and in the future. For example, mixing commercial use with residential may not be appropriate for a corridor. However, the potential and/or desirability for changes of use to connections may be appropriate if a pattern of development is emerging throughout the corridor and is supported by local government(s) – especially if the change follows an approved comprehensive or land-use plan.

1.4 Limit Direct STH Access / Alternative Access

Limit direct STH access when alternative access is available (Figure 3). This is especially critical for SAMP Tiers 1, 2, and 3 (see 2.0). Access to a property should be off of the lowest functioning road, which may be a STH in some cases. WisDOT should deny access to a STH when a property abuts a lower functioning non-STH road and reasonable access is available to that road.

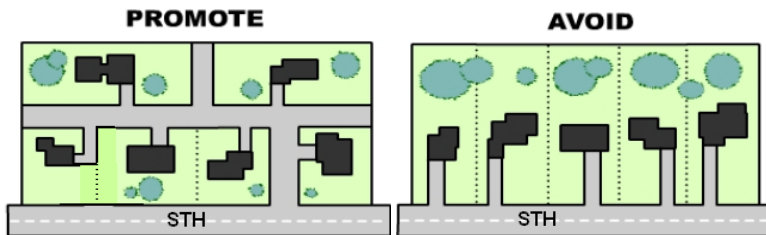


Figure 3: Limiting direct STH access

In some situations, access to a STH may be appropriate for pedestrians and bicyclists, but not for motor vehicles. For example, establishing a connection from a cul-de-sac to an arterial with a public path (Figure 4).

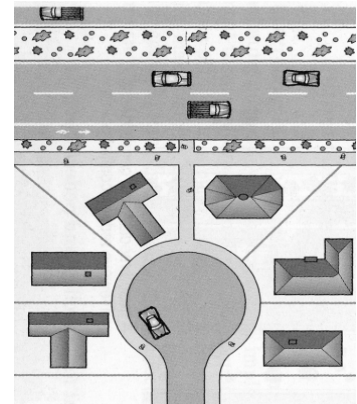


Figure 4: Non-vehicular STH access

1.5 Provide a Supporting Street and Circulation System

When reviewing public road connections, determine if there is an internal street and circulation system that would minimize short trips onto a STH (Figure 5). If an internal connection is possible, consider making that a provision of the STH connection permit. A similar concept is shown in 2.1(d) where there are more advantages in having businesses provide cross-access between adjacent properties rather than having direct STH access for each business.

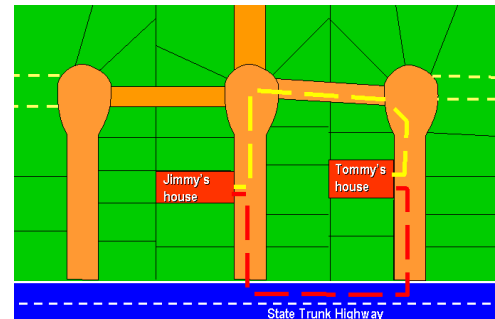


Figure 5: Internal street and circulation system

1.6 Connection Design Requirements

Connection designs should meet or exceed current geometric specifications, traffic projections, and operational requirements. In particular, each newly constructed connection should:

- Allow for safe sight distance from connection to roadway and vice-versa
- Be of maximum usefulness, and greatly reduce or eliminate (if possible) the need for other connections serving the same property
- Be part of a connection spacing pattern that will allow for easy and logical upgrading of the STH, if needed
- Be a sufficient distance away from other nearby connections
- Not be located within a vision corner
- Not adversely affect future development of adjacent properties
- Maintain proper drainage
- Not be located in the intersection functional area (Figures 6 and 7)

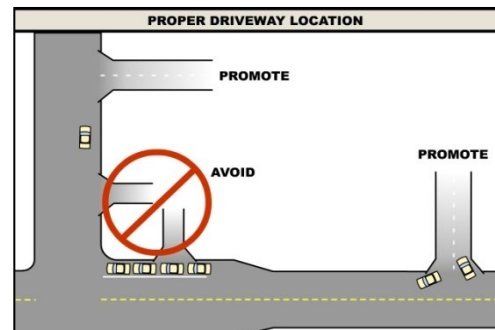
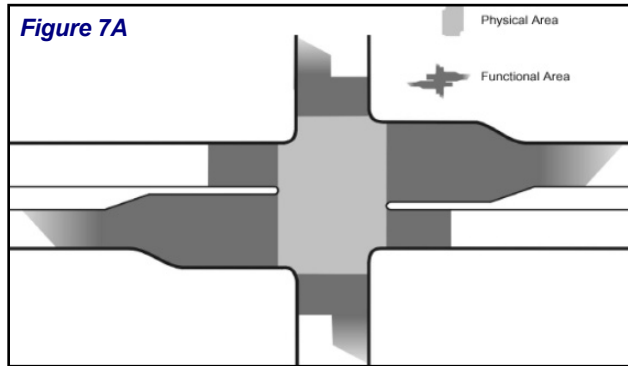


Figure 6: Intersection functional area

1.7 Preserve the Functional Area of Intersections and Interchanges

The most critical area of an intersection or interchange is its functional area (Figures 7A-B & 8). This is where motorists have to make numerous decisions regarding exiting, merging, weaving, turning, accelerating, stopping, etc. Connections too close to intersections [1.6\(h\)](#) or interchange ramps may cause serious traffic conflicts and greatly impair their function.



Physical and functional areas:
Figure 7A – Intersection
Figure 7B – Roundabout (see last page)

[FDM 11-5-5 \(Attachment 5.2\)](#) provides guidance on the appropriate distance a connection should be from the end of an interchange ramp terminal. Usually, WisDOT has purchased full access control in the functional area. In cases when this has not occurred or when sufficient access has not been purchased, permit applications that would create access conflicts in the functional area should not be approved.

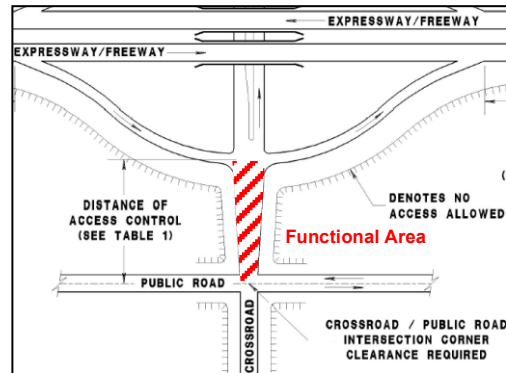


Figure 8: Interchange functional area

1.8 Separate Conflict Areas

When reviewing permit applications, connections must be sufficiently spaced from one another to ensure that STH operability and safety is maintained (Figure 9). More separation distance gives motorists longer perception and reaction time thus reducing possible crashes. Higher traffic speeds require greater connection separation.

Minimum distances between intersections and driveways, also known as corner clearances (Figure 10), are detailed in [FDM 11-5-5](#) (sections 5.3 and 5.3) and [FDM 11-25-2](#) (section 2.5). Corner clearances keep driveways out of the critical approach area (functional area) of an intersection. Inadequate corner clearances may result in traffic operation, safety, and capacity problems such as blocked driveways, conflicting or confusing turns at intersections, insufficient weaving distances, and backups from a downstream driveway into an intersection.

Locate driveways outside of the corner clearance distance. If possible, locate driveways on the side road instead of the STH. If it is necessary to locate a driveway within the corner clearance area, locate it as far as possible from the intersection, and if needed, combine with a raised median to limit the traffic volume that uses the driveway and to reduce conflicts.

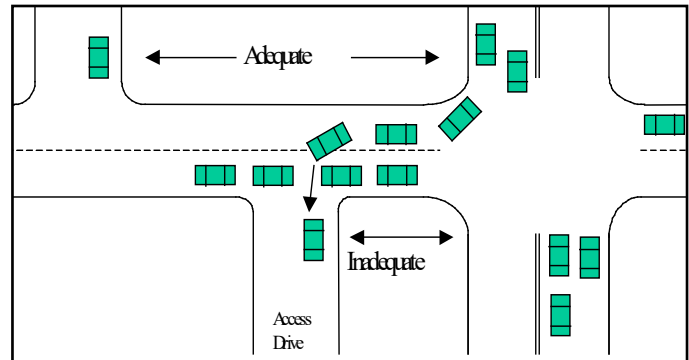


Figure 9: Connection spacing

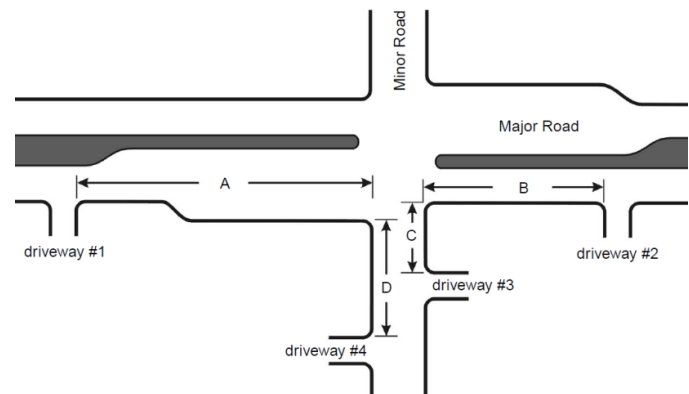


Figure 10: Corner clearances

1.9 Use Non-Traversable Medians (NTMs) to Manage Left-Turn Movements

Medians can eliminate many conflict points by limiting or eliminating left turns. Directional median openings (Figure 11) safely provide controlled access with few conflict points. With a NTM, a connection becomes right-in/right-out only with just two conflict points. With a painted or traversable median, illegal turns may still occur. NTMs provide a good two-stage crossing. When a mid-block crossing has an NTM, its visibility to motorists is increased. With this access management concept, pedestrians and bicyclists both travel along and across highways safely and comfortably.

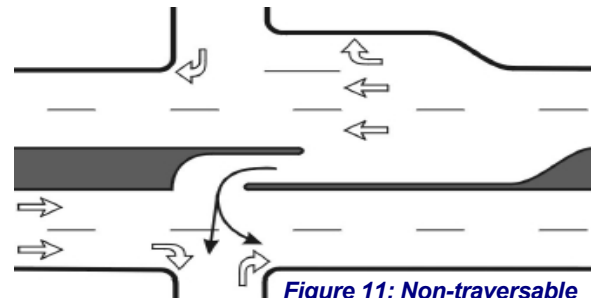


Figure 11: Non-traversable median use for left turns

1.10 Separate Turning Vehicles from Through-Traffic Lanes

Vehicles typically slow before turning. By removing turning vehicles from the main traffic flow (Figure 12), vehicle speed can be properly maintained at or near the posted limit. In addition to maintaining speed, road capacity preservation and crash potential reduction also occur. Carefully review permit applications that include modifying a STH with turn lanes to ensure that the lanes are warranted and sufficiently designed. Do the same with permit applications without turn lanes to determine if a turn or bypass lane is warranted – especially if there are high traffic counts on the proposed connection. Do not allow a median break for a driveway or alley within the limits of an exclusive left turn lane or its approach taper.

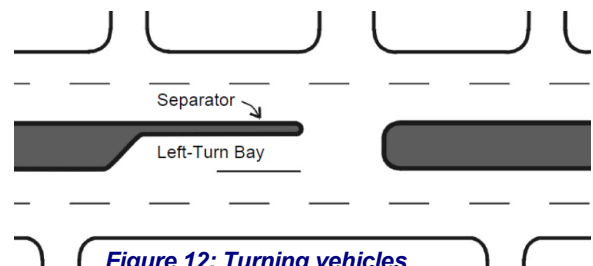


Figure 12: Turning vehicles separated from main traffic flow

1.11 Locate Traffic Signals to Favor Through Movements

If a STH has poorly spaced and uncoordinated signals, its capacity, traffic speed, and safety may be severely hampered by crossing movements. For example, a distance of 1/2-mile or more between signals is desirable, but that may be too far for effective coordination (Figure 13)



Figure 13: University Avenue in Madison, WI

Send all STH connection permit applications involving traffic signals to the region traffic section for evaluation. If not already included with the application, a traffic impact analysis (TIA) may be requested from the applicant. Signals are not allowed for private connections per the [TEOpS Manual \(section 4-2-1\)](#).

1.12 Promote Intersection Hierarchy

A safe and efficient roadway system provides the appropriate transitions from one road classification to another (Figure 14). It is important to avoid connecting a road of lower classification directly to one with a much higher classification.

For example, local roads typically connect with collectors rather than arterials, which typically do not have many residential connections. By preserving this hierarchy, traffic flow is maintained on higher road classifications and access conflicts are generally reduced and more manageable. Similarly, appropriate access is maintained on lower road classifications.

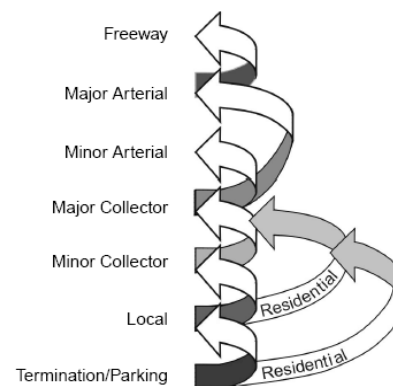


Figure 14: Road classification hierarchy

1.13 Include Pedestrian and Bicyclist in Access Management Decisions

Since WisDOT supports many travel modes, assess the potential impacts to bicyclists and pedestrians – not just motor vehicles – when reviewing STH connection permit applications. Median breaks within a roundabout, for example, provide a refuge for both pedestrians and bicyclists (Figure 15).

A trail crossing, whether used by pedestrians, bicyclists, ATVs, snowmobiles, etc., may be affected by an access management decision. For example, approving a new connection with a heavy turning movement may affect users of a nearby trail to safely cross the highway and damage the trail’s overall effective use. If the new connection is necessary, then measures should be taken to protect trail users such as a partial trail relocation away from the new connection or even a grade separation. Subsequently, the STH connection permittee is responsible for any changes needed for the trail, which should be documented in the provisions.



Figure 15: Median break in roundabout splitter island

2.0 State Access Management Plan (SAMP)

When reviewing STH connection permit applications, follow the SAMP guidance in [FDM 7-5-1](#).

3.0 Number of Driveways (Connections) for a Property

There is no specific number of driveways that may be permitted for a property. Use the following language from [Trans 231.03\(2\)](#) as a guide with any new STH connection permit application:

“The number of driveways permitted serving a single property frontage along a state trunk highway shall be the minimum deemed necessary by the department for reasonable service to the property without undue impairment of safety, convenience, and utility of the highway.”

Many factors should be considered when determining the number of connections including, but not limited to:

| | |
|---|---|
| <ul style="list-style-type: none"> • SAMP¹ tier classification • Existing and proposed land use • STH crash history • Internal property circulation • Sight distance and vision corners | <ul style="list-style-type: none"> • Consolidation of access • Cross access between properties • STH Average Annual Daily Traffic • Estimated connection trips/day • Current access restrictions |
|---|---|

Use the chart on the next page to aid in decision-making. The factors and situations described only serve as examples. Perform a complete permit application review as detailed in [09-10-20](#) to fully evaluate each situation.

¹ See [FDM 7-5 Attachment 1.1](#). See also Map 9-5 and Table 9-5 of the [State Access Management Plan](#), which is part of WisDOT’s Connections 2030 Long-Range Multimodal Transportation Plan.

| DETERMINING THE NUMBER (#) OF CONNECTIONS FOR A PROPERTY | |
|--|--|
| # | Factor and Situation Examples |
| 0 | <ul style="list-style-type: none"> a) STH is a major arterial and there is a greater need for mobility rather than access b) Safety is a major concern due to crash history, high AADT, inadequate spacing, etc. c) Connection would be in the functional area of an intersection Note: In (a)-(c), alternative access should exist or be attainable on a local road d) Interstates, freeways, and SAMP Tier 1 and 2A e) Prevent STH use to travel between adjacent properties and promote cross-access instead |
| 1 | <ul style="list-style-type: none"> a) Typical for most properties without access restrictions, and follows intent of Trans 231.03(2) b) Shared driveway with an adjacent property owner |
| 2 | <ul style="list-style-type: none"> a) A property that meets connection spacing guidelines, and there is a clear and reasonable need for the connections, for example, to: <ul style="list-style-type: none"> ▶ separate specific uses such as a residential farm driveway and a field entrance ▶ get around physical barriers or separate specific uses (pasture/crops) between two fields ▶ aid internal property circulation when raised medians are needed and commercial entrances are limited to entrance only/exit only b) Two residential or commercial connections (horseshoe configuration) should not be permitted unless there are safety concerns with internal property maneuvers; for example, semi-trucks or other large vehicles block the STH while turning and backing. A horseshoe layout should only be considered as a last resort after evaluating whether the owner can make reasonable property improvements to provide safe STH ingress/egress. To protect WisDOT interests in these situations, use a covenant that requires the property owner to remove one of the connections should the operation that necessitated the second connection cease to exist. |
| >2 | <ul style="list-style-type: none"> a) A large property with STH frontage meeting connection spacing guidelines; for example, to maintain STH safety for a large shopping mall, a manufacturing plant, etc. b) Use of covenants on all properties in this situation is highly recommended to help prevent unauthorized change of use, especially if the property is likely to be sold in the near future |

Figure 7B – Physical and Functional Area of a Roundabout

