



ACCESS MANAGEMENT

PRINCIPLES, REGULATIONS, STANDARDS, INNOVATIVE INTERSECTIONS

Thomas Jefferson Rural Transportation Meeting

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Access Management – What Is It and Why Do We Need It?

Access Management – The location, spacing, and design of entrances, street intersections, median openings, and traffic signals

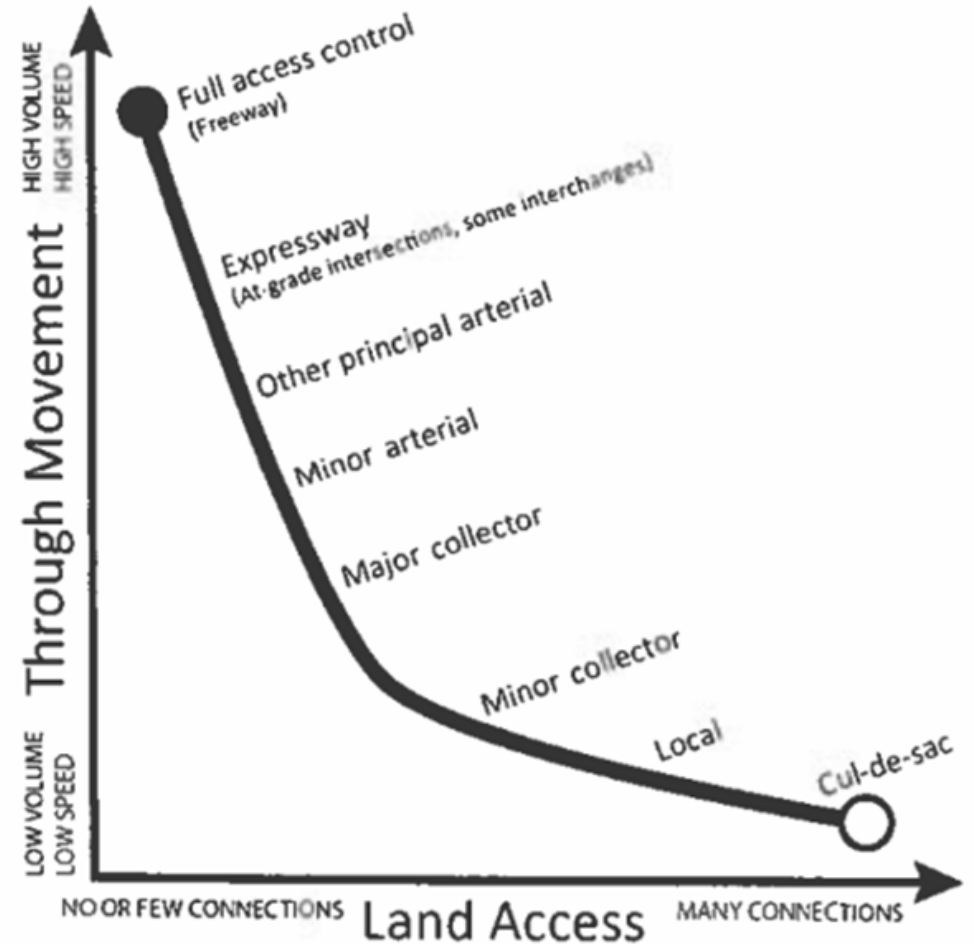
Why Do We Need It?

Most crashes occur at intersections and entrances

Access Management Principles: Mobility versus Access

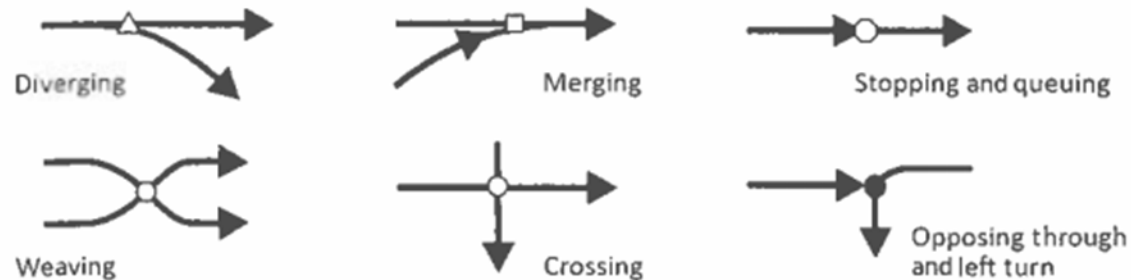
Highway Functional Classification

- Arterials
 - ❑ Function: Efficient movement of high traffic volumes
- Collectors
 - ❑ Function: Both traffic circulation in an area and access to property
- Local Streets
 - ❑ Function: Provide access to property

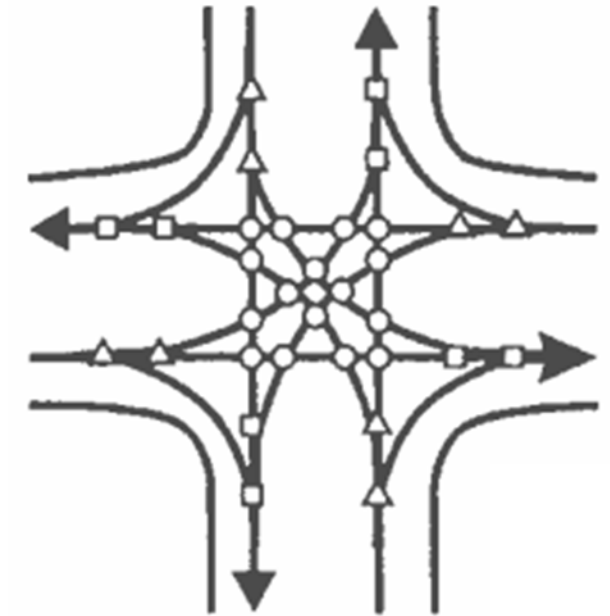


Access Management Principles: Conflict Points

- Reduce Conflict Points
 - Where traffic movements cross, merge, diverge
- Separate Conflict Points
 - Give drivers one problem at a time



Types of Conflict Points

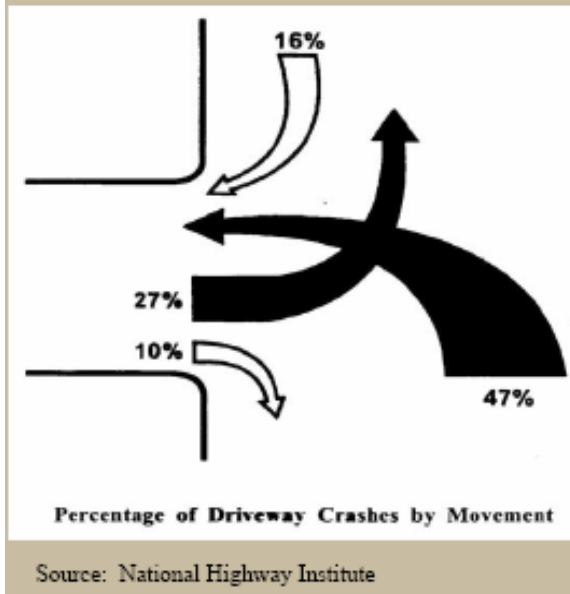


Typical 2-Lane 4-Leg Intersection
(32 conflict points)

Traffic conflicts occur where vehicle paths intersect. Each conflict point is the location of a potential collision

Access Management Principles: Right-In/Right-Out Entrance Design

74% of entrance crashes involve left turns



Median to Prevent Left Turns

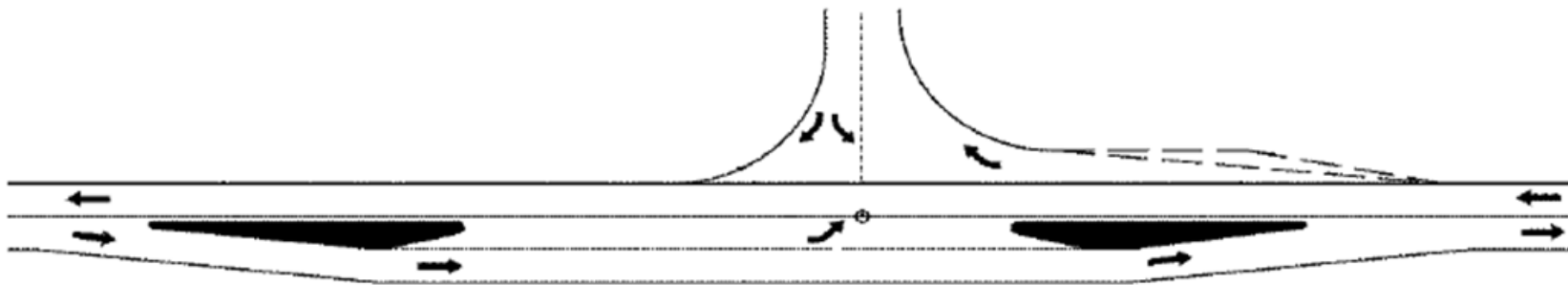
Entrance Island to Prevent Left Turns



Access Management Principles: Reduce Speed Differential

Reducing differential in speed reduces risk of crash and reduces severity if a crash occurs

- Merging, diverging, weaving better than crossing
- Auxiliary lanes (turn lanes, acceleration lanes) reduce difference in speed at conflict points



Access Management Regulations

§ 33.2-245 of the Code requires VDOT to implement access management regulations and standards

Regulations: 24VAC30-73

Standards: Road Design Manual, Appendix F

- For state-maintained highways; regulations **do not apply** to roads maintained by cities, towns over 3,500 pop and county roads in Arlington and Henrico (unless those localities adopt the VDOT standards)

Access Management Regulations: Basics

VDOT will permit reasonably convenient access to the highway:

- Fewest number of entrances to reduce conflict points
- Focus on side streets
- Use of right-in/right-out entrance design and cross-parcel access
- Demonstrate safety of proposed entrance & its impact
- Mitigate impacts on highway operation and safety.



Alternates:

- Entrance standards established by localities that are stricter than those of VDOT shall govern
- VDOT-approved access management corridor plans shall govern

Access Management Regulations: Entrance Types

- Private Entrances
 - For up to 2 residences, field entrance, utility infrastructure (with 10 trips per day or less)
 - Best possible sight distance (SD)
 - Spacing standards do not apply
- Low Volume Commercial Entrances
 - For up to 5 residences or land uses that generate less than 50 trips per day
 - Same requirements as private entrances, but must meet either stopping or intersection SD
- Commercial Entrances
 - For uses that generate more than 50 trips per day
 - Intersection sight distance
 - All design standards apply
 - VDOT may require study showing impact to fronting roadway traffic

Access Management Regulations: Existing Entrances

- VDOT may review or require reconstruction or new permit of an entrance if a site is
 - Found to be unsafe
 - Generating more traffic such that a change is required
 - Site is redeveloping and rezoning or special use permit is being requested
 - Site is subject to a new site plan or subdivision plat review
 - Change in commercial use by owner or tenant
 - Vehicle /pedestrian circulation with adjoining property becomes available
- Cannot require off-site improvements
 - Unless those are required to accommodate entrance improvements
 - Example: road widening to accommodate left turn lane may extend well beyond property lines of property being accessed.

Access Management Regulations: Spacing Exceptions

- Do Access Management spacing requirements apply?
 - Department versus locality maintained
 - Functional classification (local roads mostly exempt)
 - Area covered by approved corridor plan
- Address at earliest stage possible
 - Zoning stage or early in site plan review process
- Engage stakeholders
 - Developer, engineer, locality
 - Consider “big picture”—future development, corridor growth
 - Study to identify safety and operational impacts (including bicyclists and pedestrians)

Access Management Design: Entrance Types

Road Design Manual

Appendix F

Page F-100

<u>Type of Entrance</u>	<u>Design</u>	<u>Sight Distance</u>	<u>Access Management*</u>	<u>Permit</u>
Commercial	Figures 4-1B, Figure 4-8 to 4-14	Intersection	Yes	Commercial
Commercial Moderate Volume	Figure 4-1B & 4-15	Intersection	Yes	Commercial
Low Volume Commercial	Figure 4-1 & Figure 4-1B	Stopping	No	Commercial
Private	Figure 4-1 & Figure 4-1B	Best Possible	No	Private

TABLE 4-1 ENTRANCE TYPES AND RULES

NOTE: See [Section 120, Access Management Regulations](#)

Access Management Design: Spacing Requirements

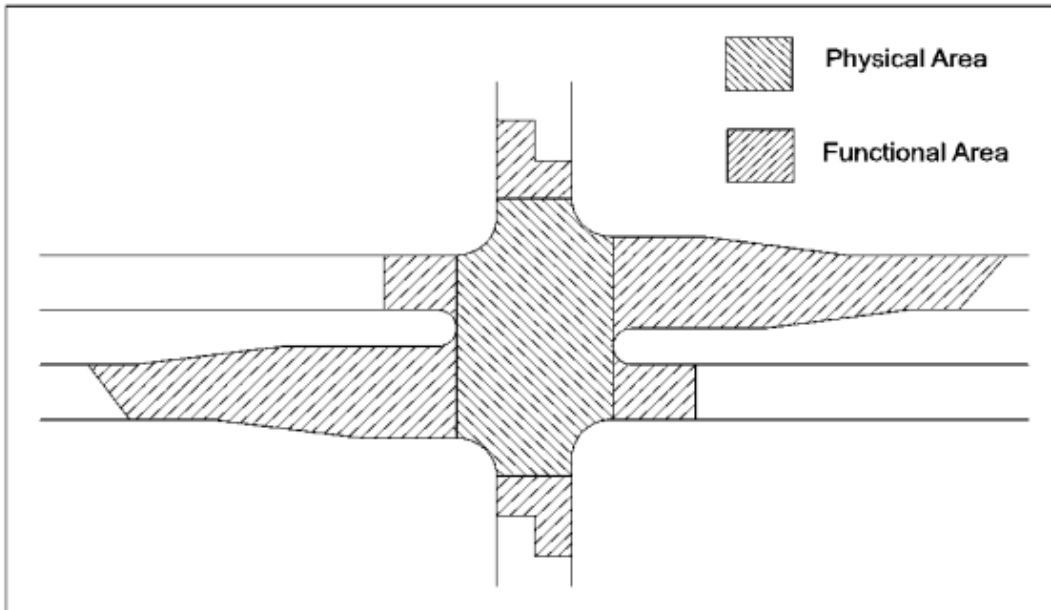
- Entrance spacing required to meet RDM App F or get exception

	Highway Functional Classification	Legal Speed Limit (mph) ^①	Minimum Centerline to Centerline Spacing (Distance) in Feet			
			Spacing from Signalized Intersections to Other Signalized Intersections ^②	Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers ^③	Spacing from Full Access Entrances & Directional Median to Other Full Access Entrances and Any Intersection or Median Crossover ^④	Spacing from Partial Access One or Two Way Entrances to Any Type of Entrance, Intersection or Median Crossover ^⑤
Fraction of a mile						
Intersection sight distance						
Stopping sight distance						
	Principal Arterial	≤ 30 mph 35 to 45 mph ≥ 50 mph	1,050 1,320 2,640	880 1,050 1,320	440 565 750	250 305 495
	Minor Arterial	≤ 30 mph 35 to 45 mph ≥ 50 mph	880 1,050 1,320	660 660 1,050	355 470 555	200 250 425
	Collector	≤ 30 mph 35 to 45 mph ≥ 50 mph	660 660 1,050	440 440 660	225 335 445	200 250 360
	Local Street ^⑥	Commercial entrance spacing: See Figure 4-11.				

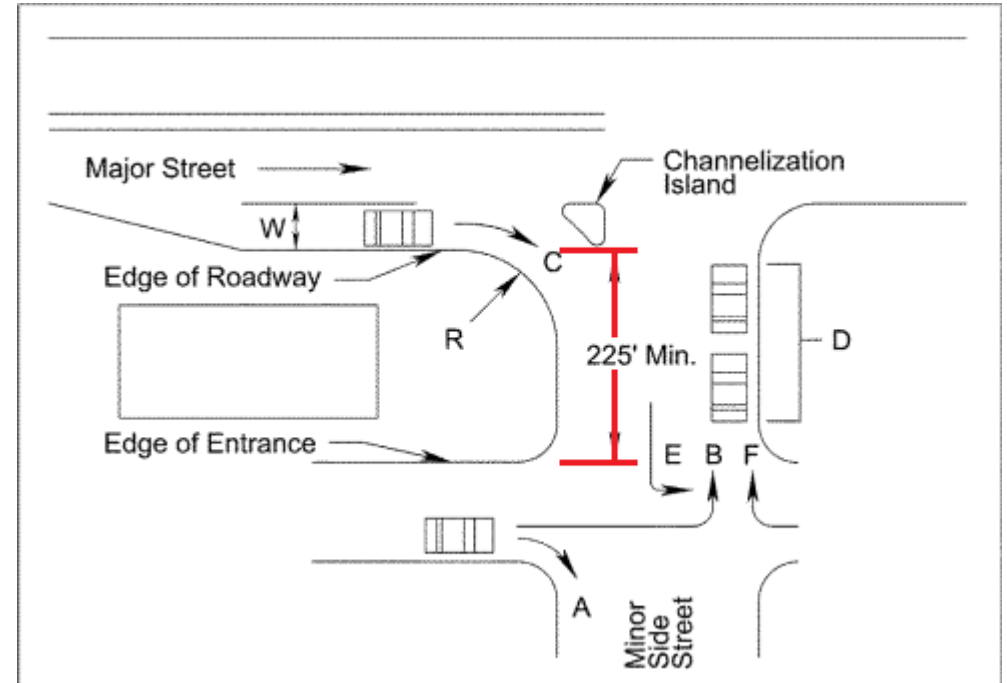
Access Management Design: Spacing Requirements (cont'd)

- Other kinds of spacing requirements
 - Not in functional area of intersection
 - Corner clearance

(Only apply on private side if issue could impact traffic on state highway—but throat length does apply in all cases)



Source: FHWA, National Highway Institute Course No. 15255



Access Management Design: Spacing Requirements (cont'd)

1. Local Street Spacing – No commercial entrance shall be allowed within the functional area of an intersection without prior approval from the Engineer at the Residency or District. For commercial entrances on local streets (not individual private entrance driveways to homes), a spacing distance of 50 feet between entrance radii is specified to assure a minimum separation between such entrances (illustrated in [Figure 4-11](#)).

No commercial entrance shall be within 115 feet minimum measured from the outer edge of the inscribed circle of a Roundabout, without prior approval from the Engineer at the Residency or District. If an entrance is approved within the 115 feet of the outer edge of the inscribed circle it shall be “Right-In, Right-Out” Only (115’ feet minimum is based on the stopping sight distance for 20 mph).

Access Management Design: Throat Distance

Both sides of the entrance throat need to be protected. The length of the entrance-side throat equals the exiting throat. When entering vehicles stop to turn left there must be sufficient queuing length to prevent other entering vehicles from backing up on to the highway. Minimum connection throats are provided in the table below.

Summary of Entrance Throats	
Number of Egress Lanes (left, thru and right)	Minimum Throat Length
	Feet
1	35 *
2	75
3	200
4	300

TABLE 4-2 SUMMARY OF ENTRANCE THROATS

Source: *Transportation & Land Development 2nd Edition 2003*, Koepke and Stover

* Inadequate entrance length can also produce hazards to entering traffic on site. Particularly where the on-site parking can back out of and block the entrance and prevent a vehicle from entering. To avoid this problem, a distance of at least 50 feet is used on entrance length where back out parking may interfere with entry movement.

Access Management Design: Turn Lanes

Rural Roads:

- Minimum Storage¹ Length:
 - 200 feet for Design Speeds 50 MPH or higher
 - 100 feet for Design Speeds 45 MPH or less
- Minimum Taper² Length:
 - 200 feet for Design Speeds 35 MPH or higher
 - 100 feet for Design Speeds 30 MPH or less
 - A dual turn lane on a rural road shall have a minimum taper length of 200 feet

Urban Roads:

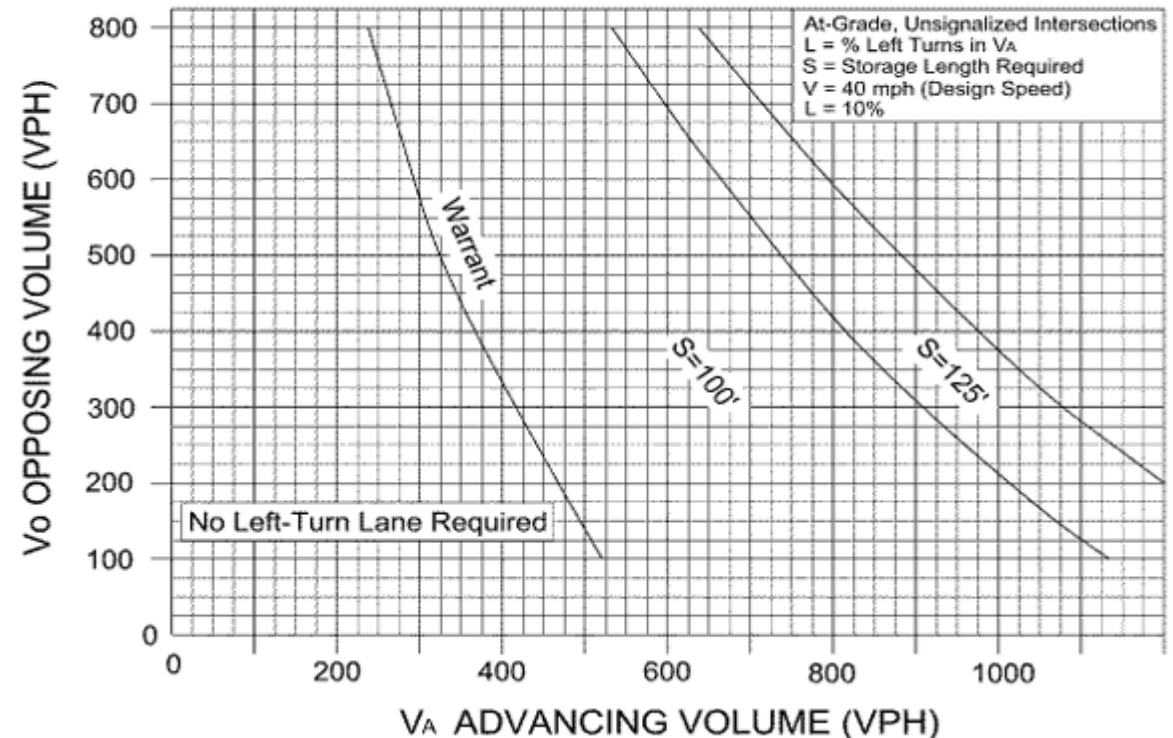
- Minimum Storage¹ Length:
 - Minimum storage length for all turn lanes shall be 100 feet
- Minimum Taper² Length:
 - 200 feet for Design Speeds 50 MPH or higher
 - 100 feet for Design Speeds 45 MPH or less
 - A dual turn lane on a urban road shall have a minimum length of 150 feet

Notes:

1. Minimum storage length shall be adjusted upward as determined by a capacity analysis for Left and Right Turn Turning movements in accordance with the Traffic Operations and Safety Analysis Manual (TOSAM)
2. All tapers are to be straight-line unless local policy requires reverse curves. In congested areas the taper length may be reduced to increase the storage length; however, a design waiver shall be required.

For instructions on selection of design speed, see [Appendix A1](#).

FIGURE 3-4 WARRANT FOR LEFT TURN STORAGE LANES ON TWO LANE HIGHWAY

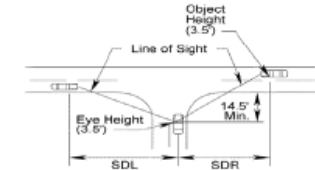


Access Management Design: Sight Distance Exceptions

- Sight distance waiver versus exception
 - None require for private entrance (just need “best possible”)
 - Waiver not required for stopping SD on low volume commercial
 - For commercial to use stopping sight distance, waiver
 - To use less than stopping sight distance, exception
- Covered by 24VAC30-73-50 (B)
 - Must include study by professional engineer
 - Copy of request must be submitted to locality
 - Made in accordance with IIM-LD-227
 - Decision required within 60 days of request

Intersection Sight Distance

The following table shows intersection sight distance requirements for various speeds along major roads:



SDR = Sight Distance Right (For a vehicle making a left turn)
SDL = Sight Distance Left (For a vehicle making a right or left turn)

Design Speed (mph)**	Height of Object 3.5'										
	20	25	30	35	40	45	50	55	60	65	70
SDL=SDR: 2 Lane Major Road	225	280	335	390	445	500	555	610	665	720	775
SDR: 4 Lane Major Road (Undivided) or 3 Lane	250	315	375	440	500	565	625	690	750	815	875
SDL: 4 Lane Major Road (Undivided) or 3 Lane	240	295	355	415	475	530	590	650	710	765	825
SDR: 4 Lane Major Road (Divided – 18' Median)	275	340	410	480	545	615	680	750	820	885	955
SDL: 4 Lane Major Road (Divided – 18' Median)	240	295	355	415	475	530	590	650	710	765	825
SDR: 5 Lane Major Road (continuous two-way turn-lane)	265	335	400	465	530	600	665	730	800	860	930
SDL: 5 Lane Major Road (continuous two-way turn-lane)	250	315	375	440	500	565	625	690	750	815	875
SDR: 6 Lane Major Road (Divided – 18' Median)	290	360	430	505	575	645	720	790	860	935	1005
SDL: 6 Lane Major Road (Divided – 18' Median)	250	315	375	440	500	565	625	690	750	815	875
SDL: (Where left turns are physically restricted)	210	260	310	365	415	465	515	566	620	670	725

TABLE 2-5 INTERSECTION SIGHT DISTANCE

Source: AASHTO Green Book, Chapter 9, Section 9.5.3, page 9-37 thru 9-52, * Table 9-5 thru 9-14

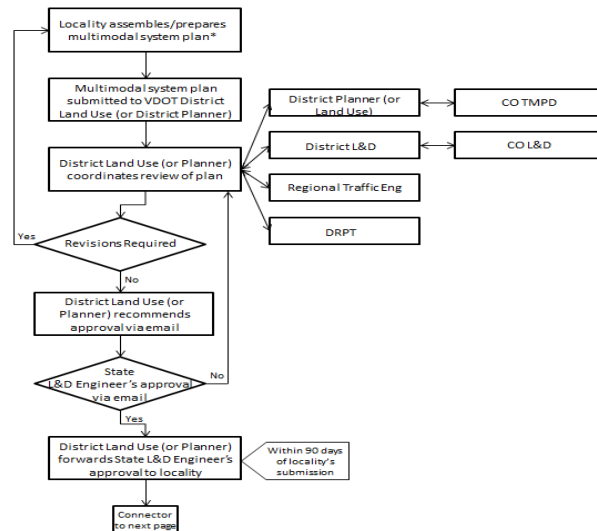
**For all tables, use design speed if available, if not use legal speed.

Access Management Design: Multimodal Activity Centers

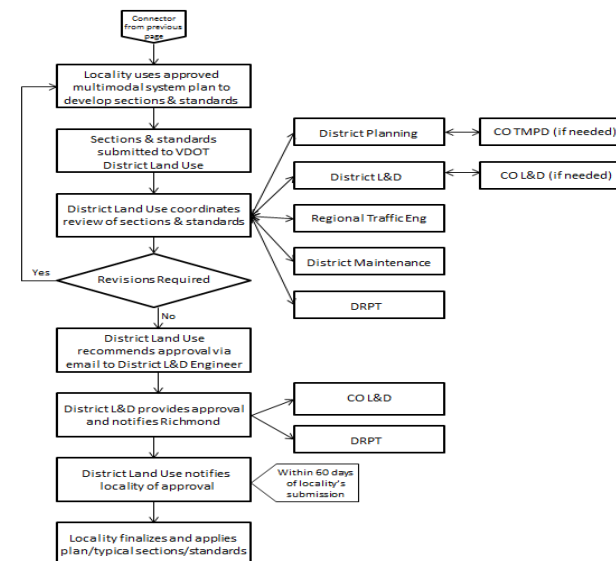
Special Standards for Multimodal Activity Centers

- Applicable in areas planned in accordance with DRPT's Multimodal System Design Guidelines
- Reduced spacing standards in Appendix B.2 of RDM
- VDOT approval required (State L&D Engineer)
- Currently being worked on by Fairfax County

Process for Adoption of Multimodal Design Approach to Development
Areas within a Locality
(Multimodal System Plan Activity Centers, Corridors, And Modal Emphasis)



Process for Adoption of Multimodal Design Approach to Development
Areas within a Locality
(Typical Sections and Design Standards)



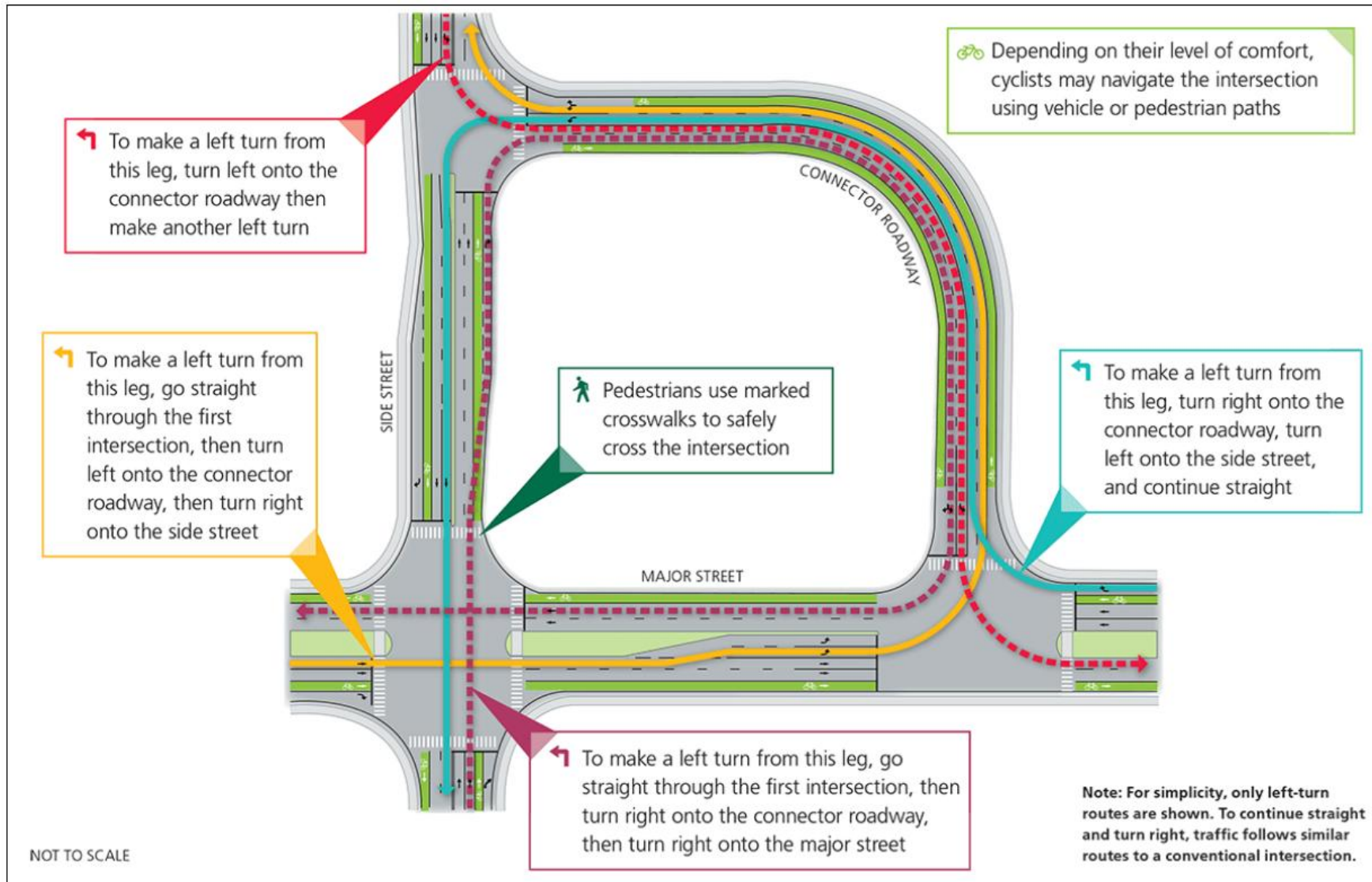
Innovative Intersections

 Contraflow Left	 Michigan Urban Diamond (MUD)	 Bowtie	 Restricted Crossing U-Turn (RCUT)
 Displaced Left Turn (DLT) Interchange	 Single-Point Urban Interchange (SPUI)	 Center Turn Overpass	 Roundabout
 Diverging Diamond Interchange (DDI)	 Single Roundabout	 Continuous Green-T (CGT)	 Mini Roundabout
 Double Roundabout		 Displaced Left Turn (DLT)	 Single Loop
		 Echelon	 Split Intersection
		 Median U-Turn (MUT)	 Thru-cut Intersection
		 Quadrant Roadway (QR)	

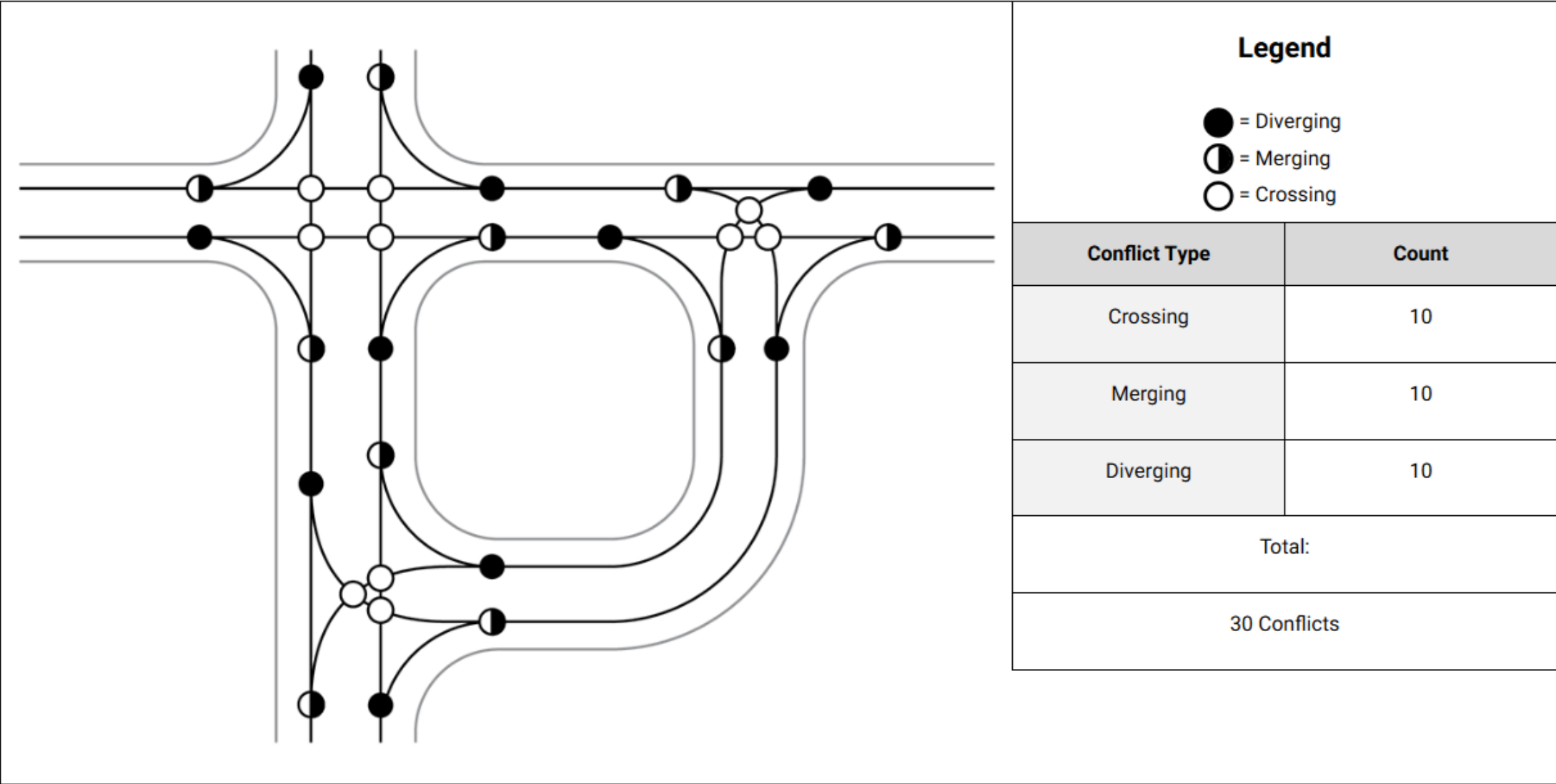
Policy

- Shall be considered for construction or reconstruction of a new intersection on Arterial Preservation Network (APN)
- For new or reconstructed signal proposals on any roadway, alternative intersections evaluated in the Signal Justification Report (SJR) – IIM-TE-387

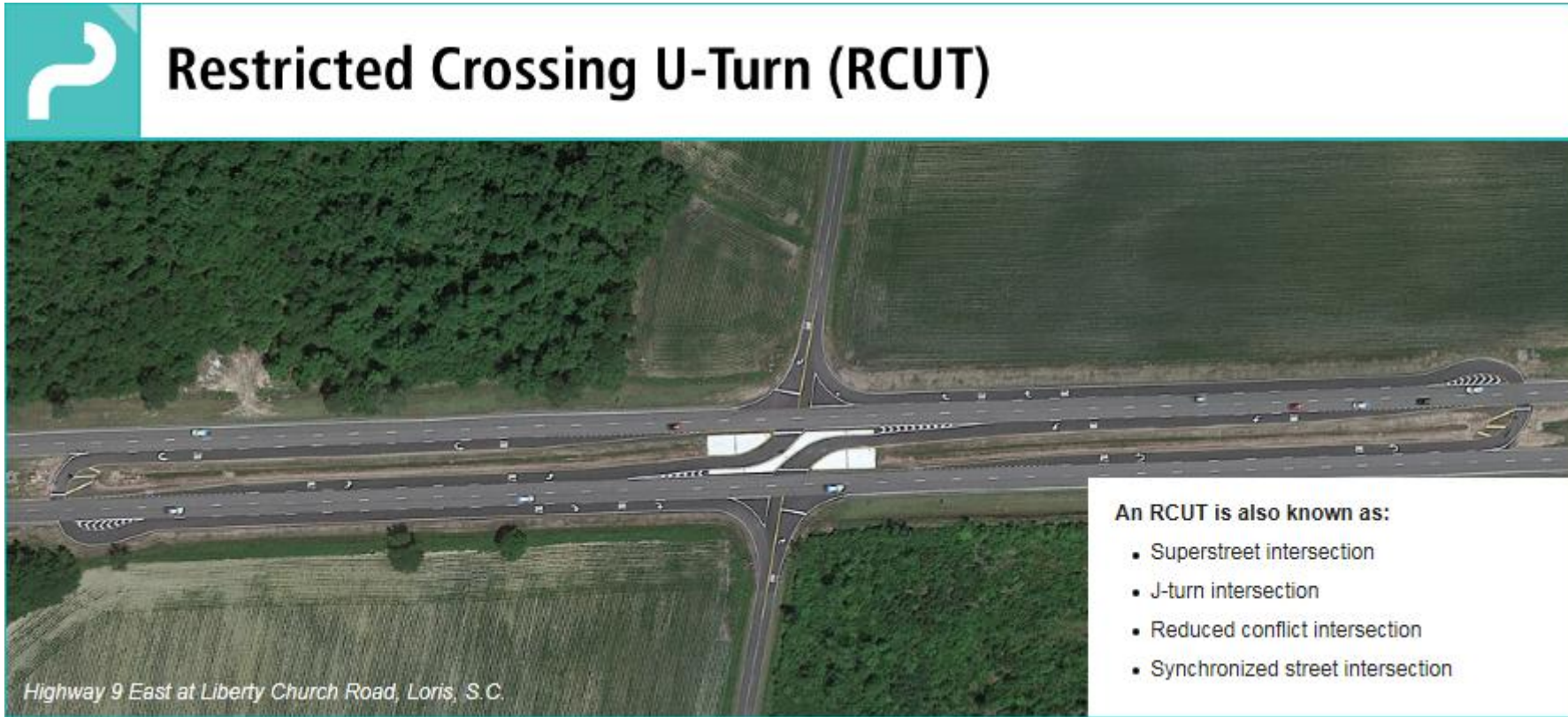
Innovative Intersections: Quadrant Roadway



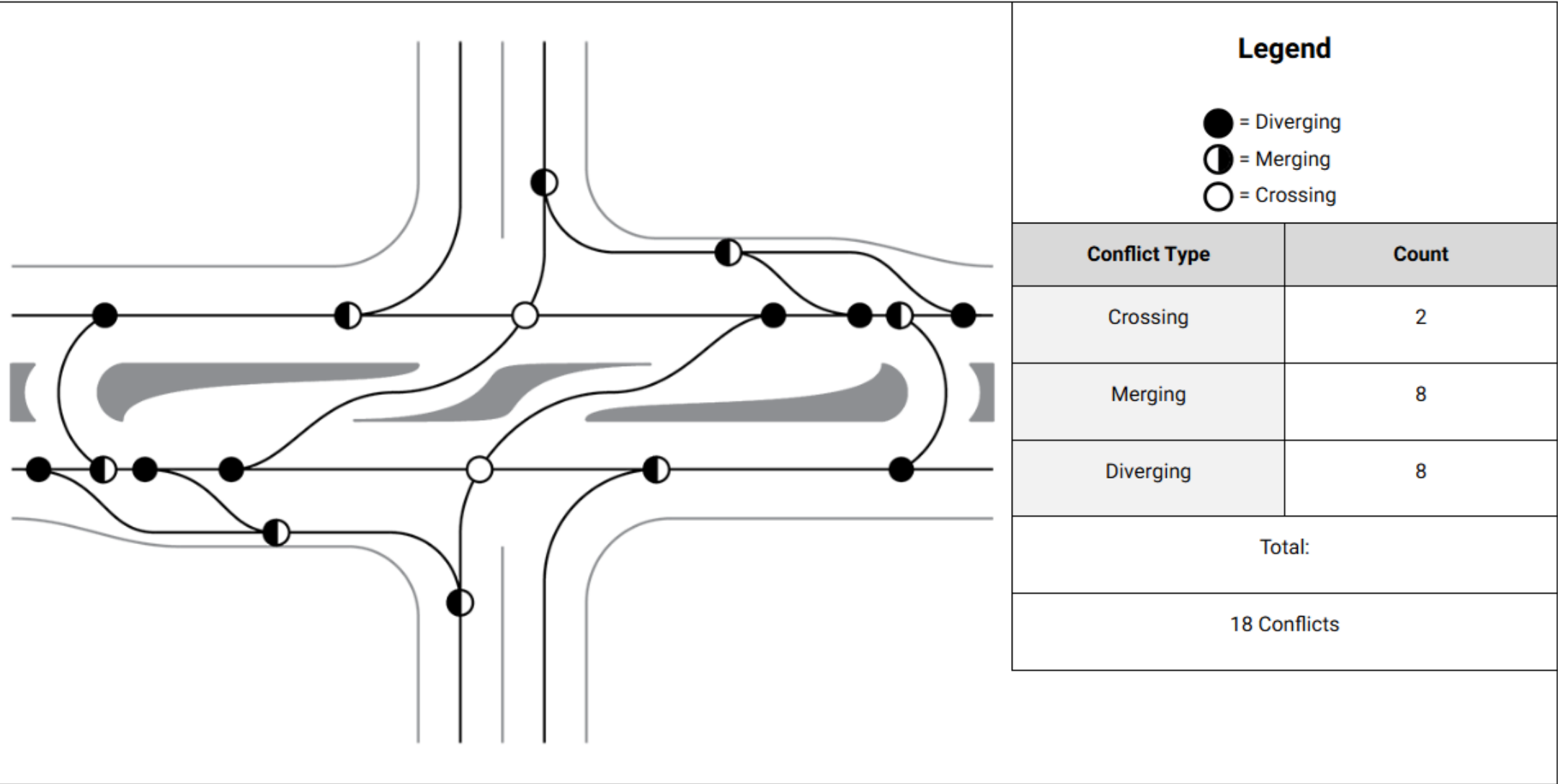
Innovative Intersections: Quadrant Roadway (Conflict Points)



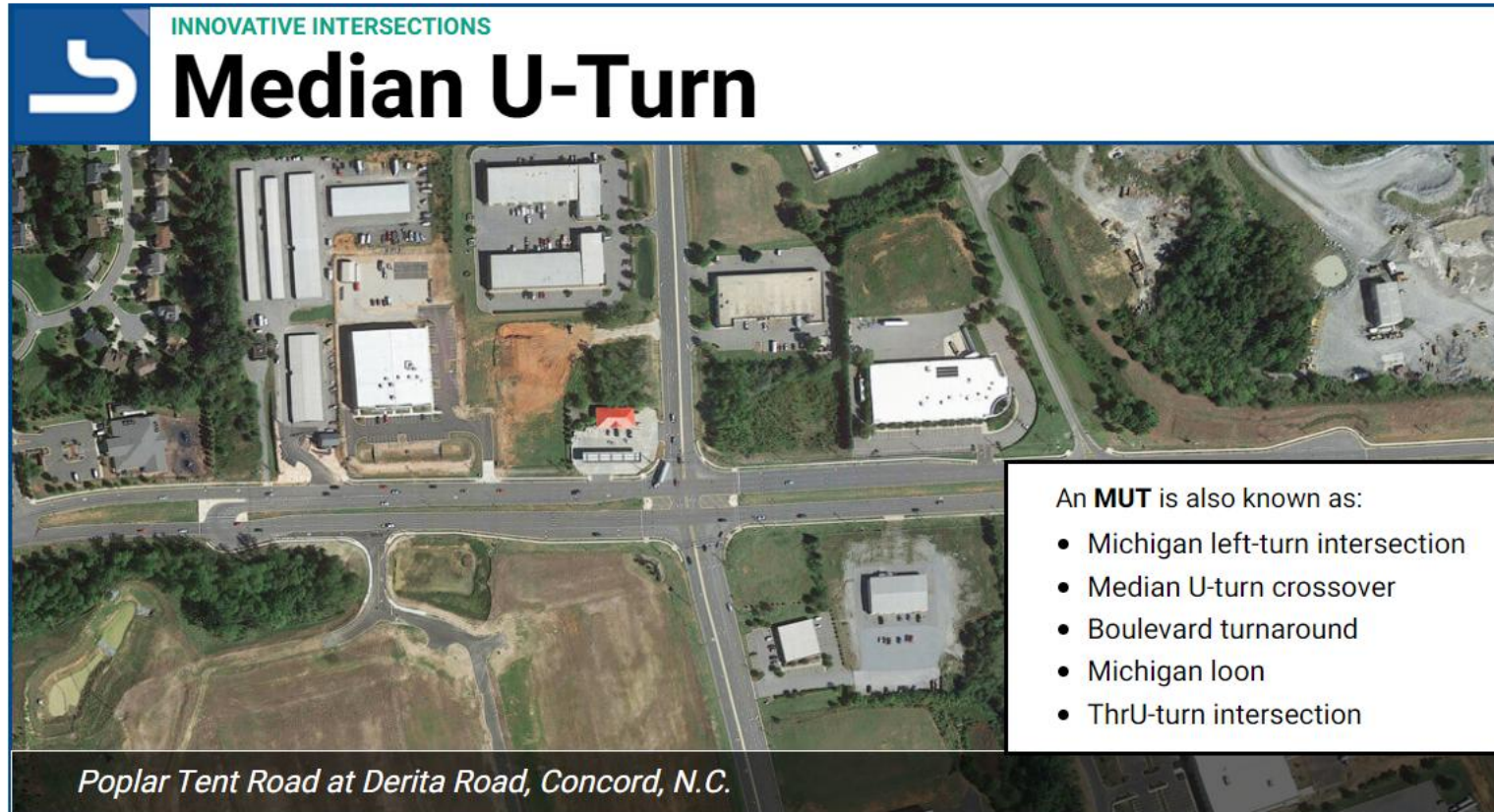
Innovative Intersections: RCUT



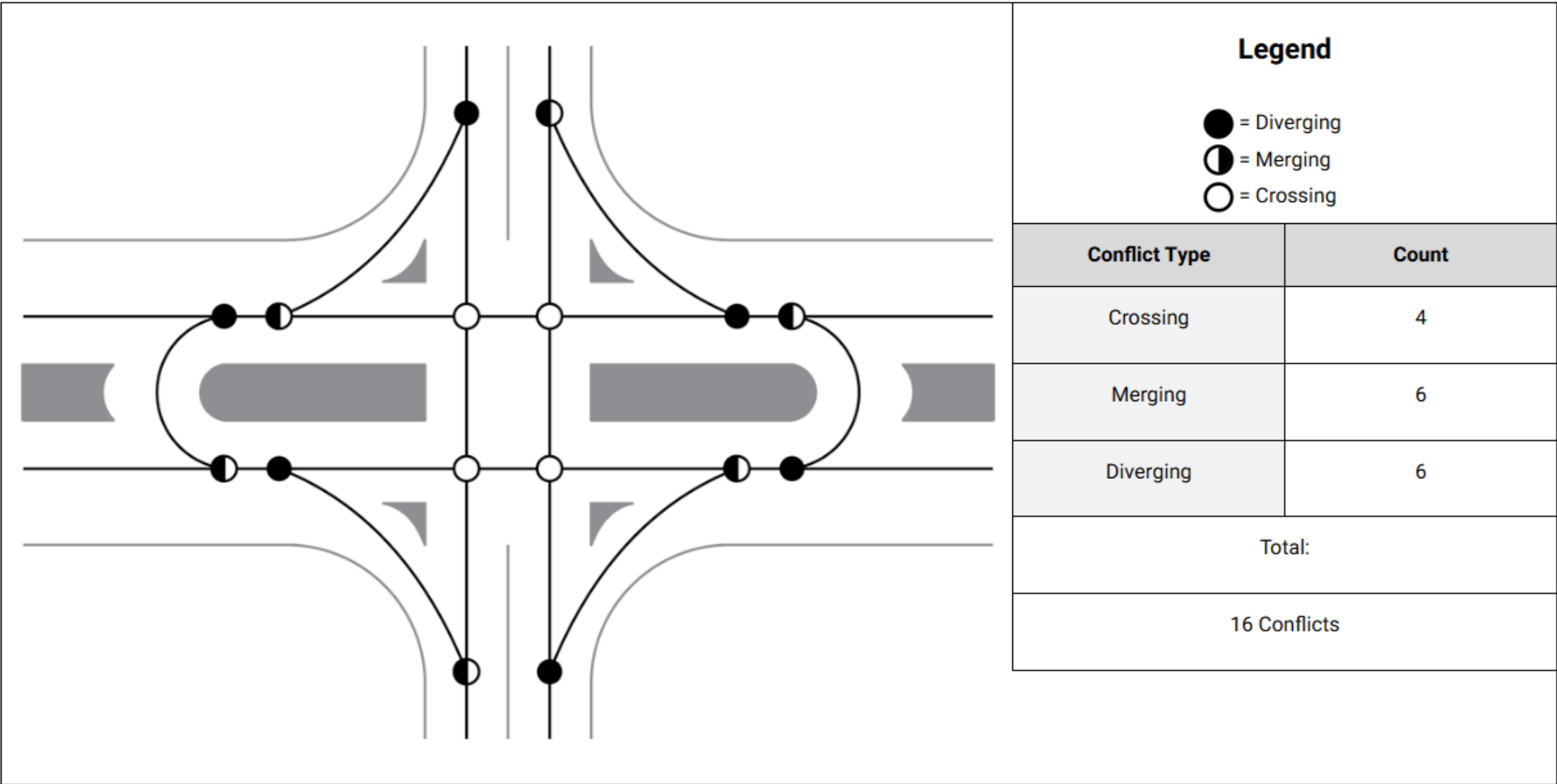
Innovative Intersections: RCUT (Conflict Points)



Innovative Intersections: MUT



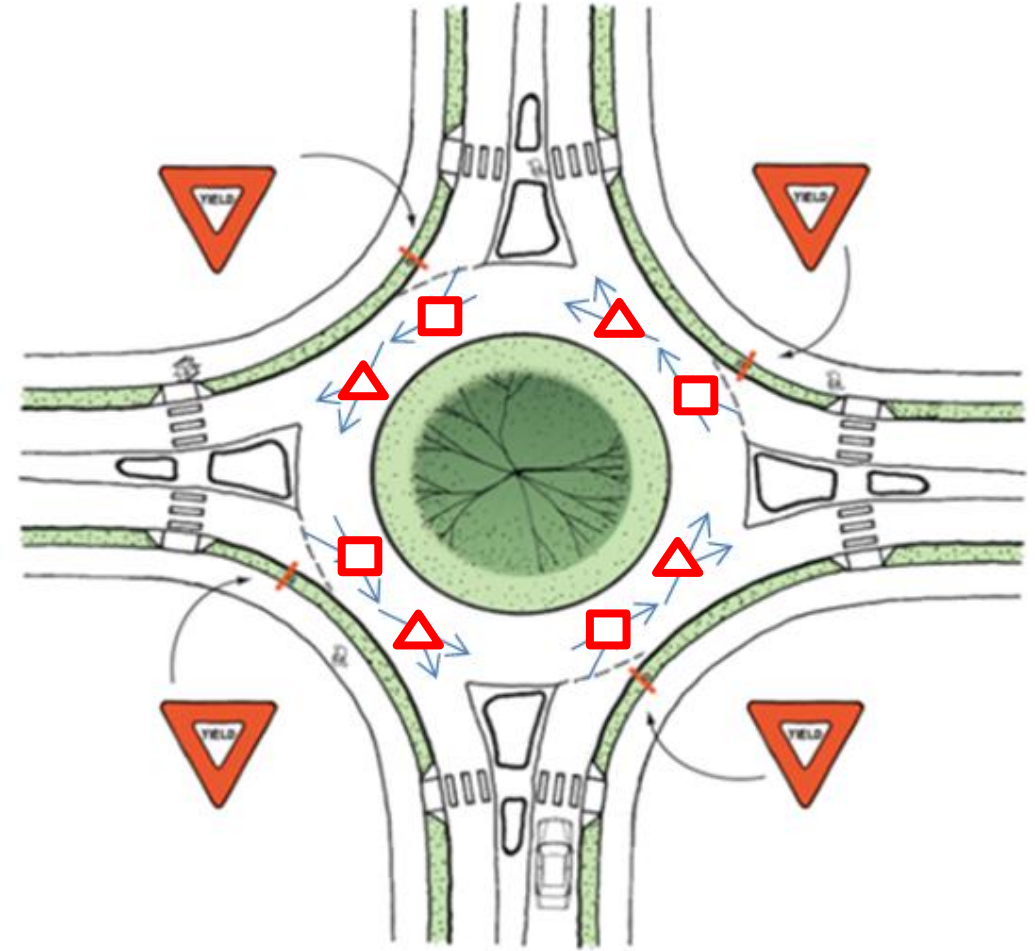
Innovative Intersections: MUT (Conflict Points)



Innovative Intersections: Roundabout

Policy – Shall be considered for construction or reconstruction of an intersection

- Conflict Points
 - 4 merging
 - 4 diverging
 - Possibility of 4 stopping and queuing
- Other Elements
 - Pedestrian crossings in driver sight lines
 - Vehicle speeds reduced
 - Merge/diverge replace crossing conflicts



Questions
?