Access Management Regulations & Standards

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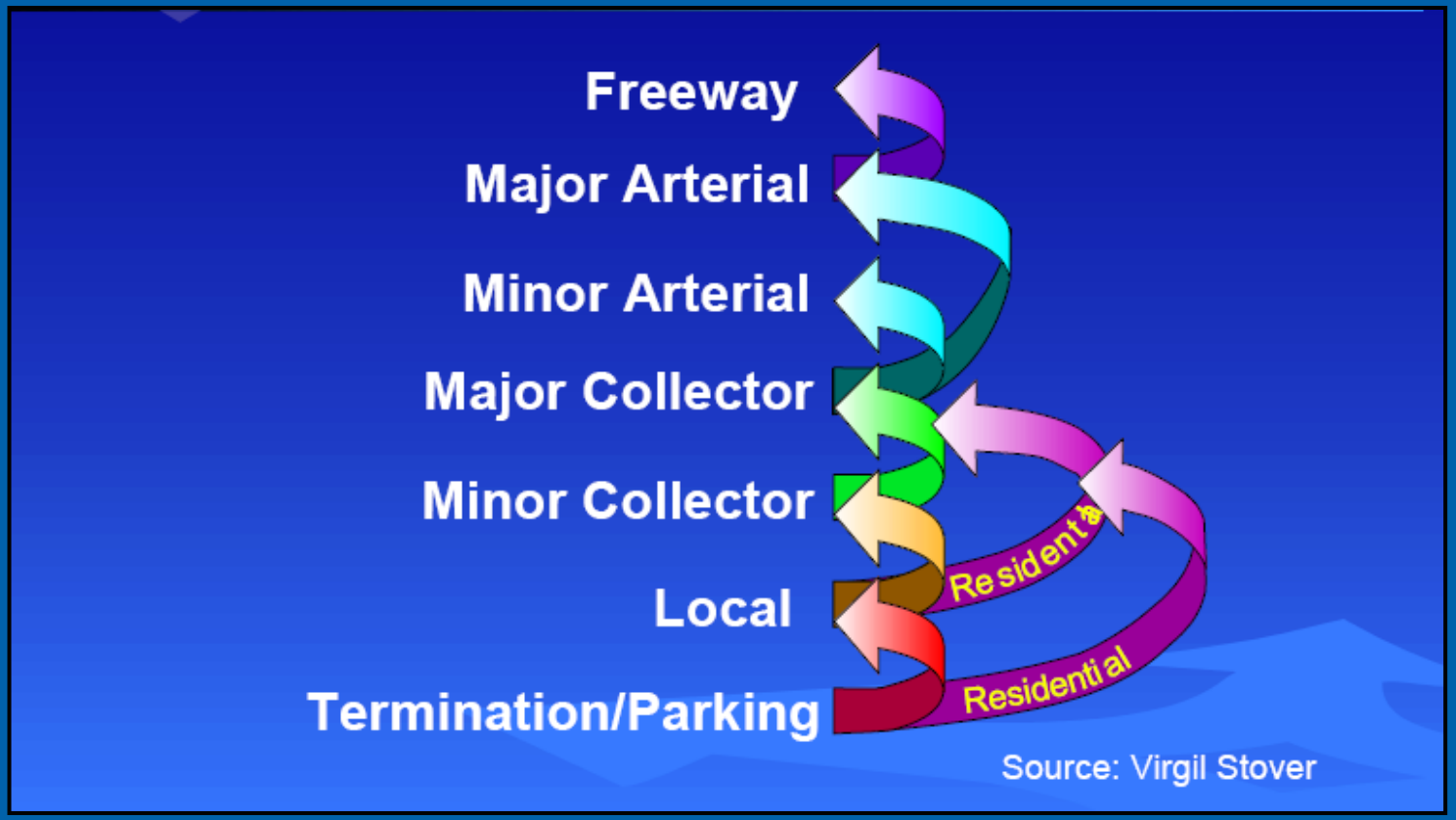
Virginia Dept. of Transportation
March 20, 2008

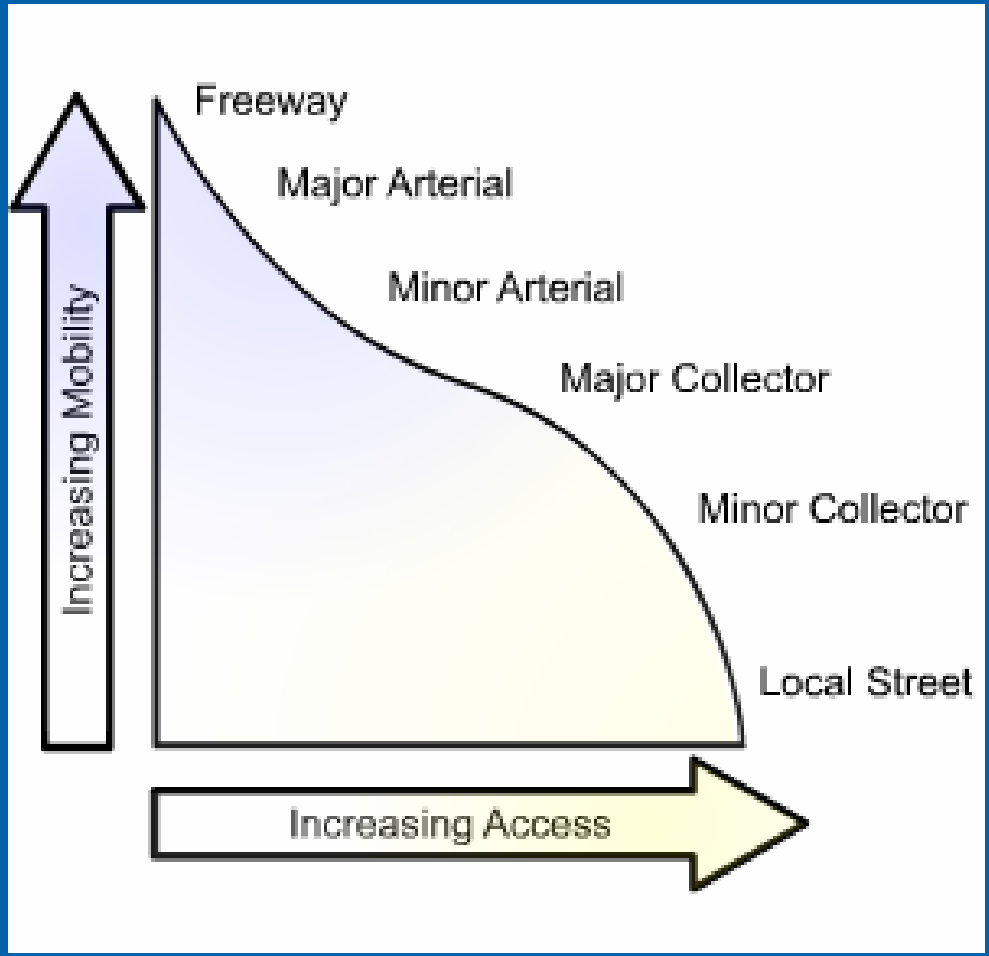
Hierarchy of Roads

- Travel involves movement of traffic through a network of roads
- Classifying roads according to their function provides a logical & efficient system for moving traffic within the network

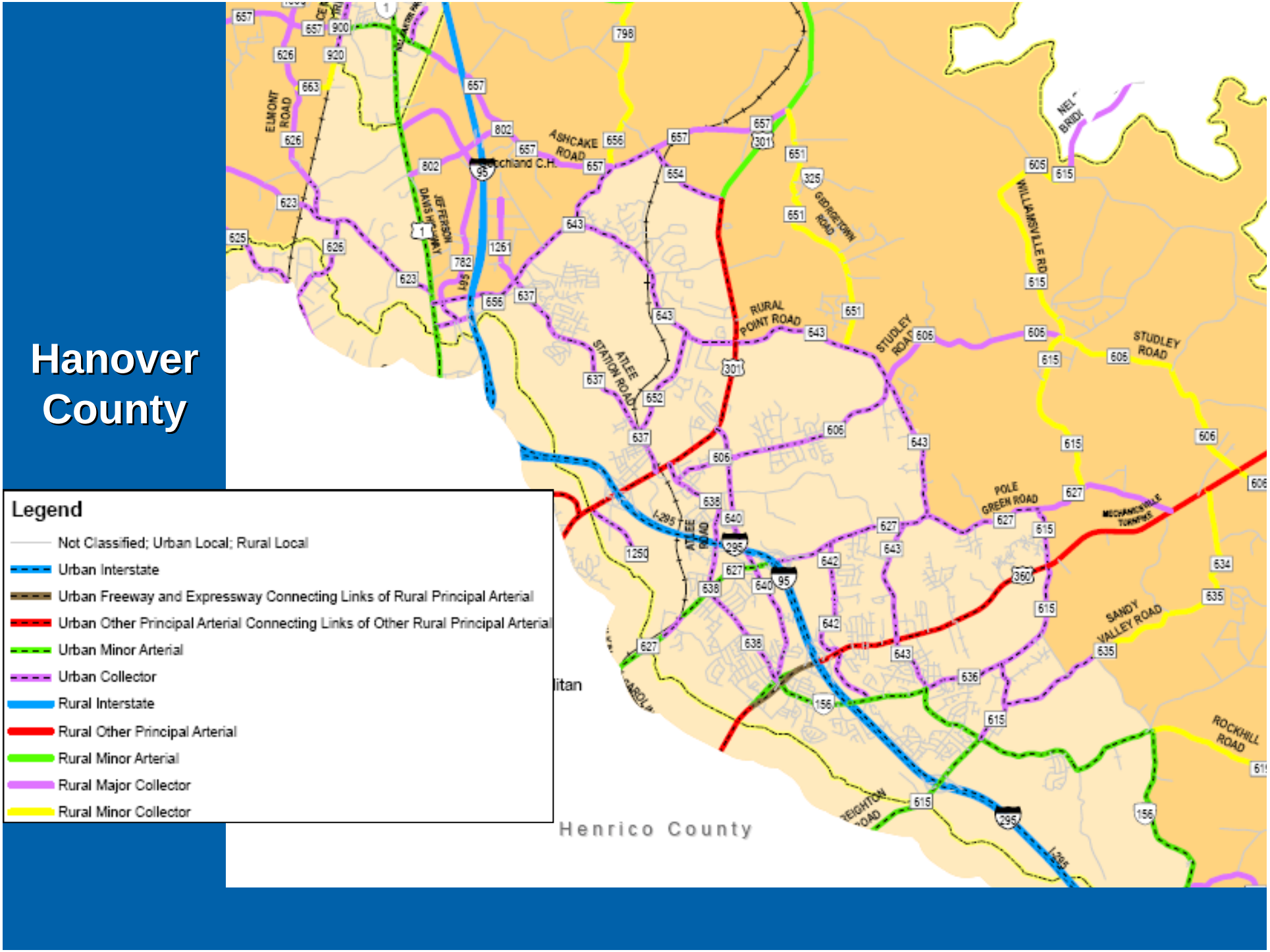


Purpose: Balance Mobility vs Access

- The functional classification of highways recognizes the dual role the highway network plays in providing:
  - Access to property, and
  - Travel mobility.



Hanover County



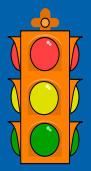
What is “Managing Access”?

Based on functional classification of the highway, managing the location, spacing and design of:

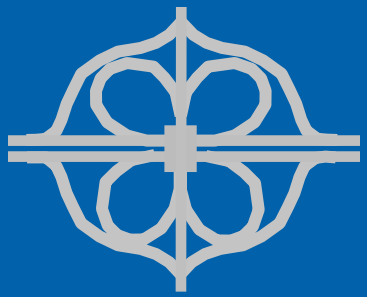
Commercial Entrances

Median Openings

Signalized Intersections



Entrances Near Interchange Ramps



Historical Perspective

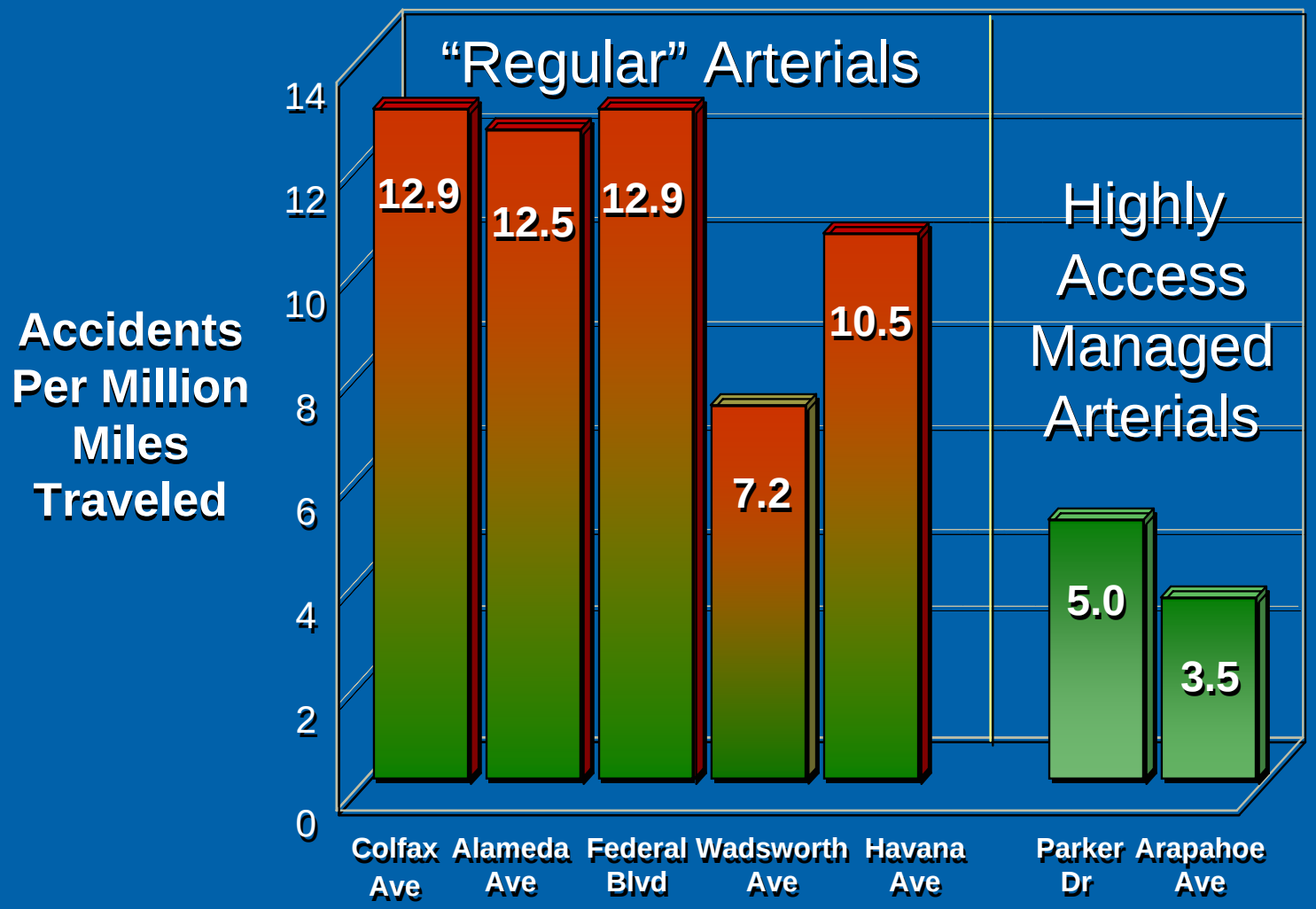
- "A Summary & Reappraisal of Access Control", Highway Research Bulletin, 1962
- "General Framework for Implementing Access Control Techniques", FHWA, 1975
- "Access Management for Streets & Highways", FHWA, 1982
- Statistical Relationship Between Vehicular Crashes and Highway Access", Minnesota DOT, 1998

Findings of National Studies

- "The lack of access control along arterial highways has been the largest single factor contributing to the obsolescence of highway facilities"
  - NCHRP Report 121 *Protection of Highway Utility.* 1971

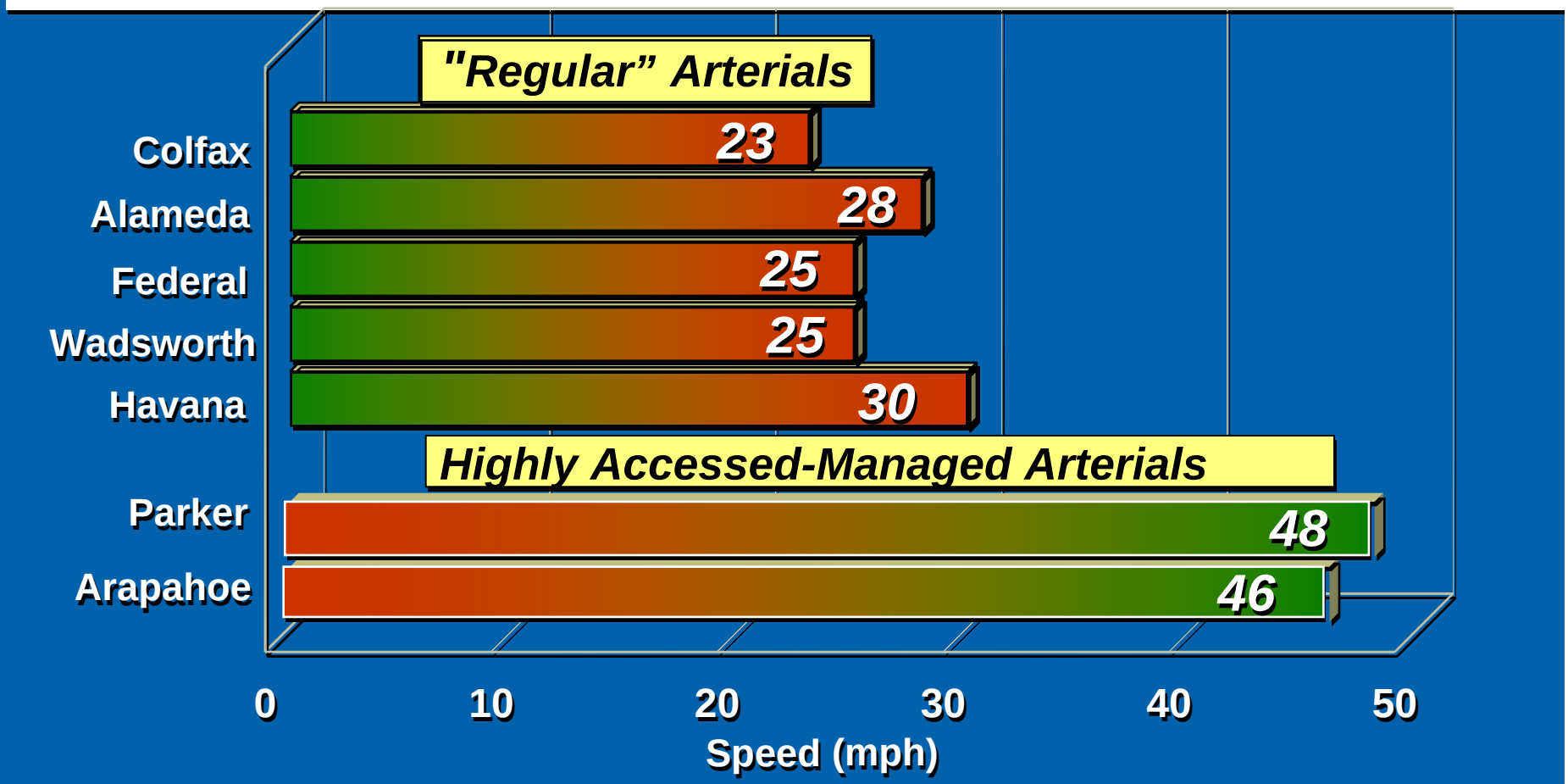
- "Every study since the 1940s has indicated a direct and significant link between access frequency and accidents"
  - International Right-of-Way Association Conference Paper, 1999.

Fewer Accidents on 'Managed' roads

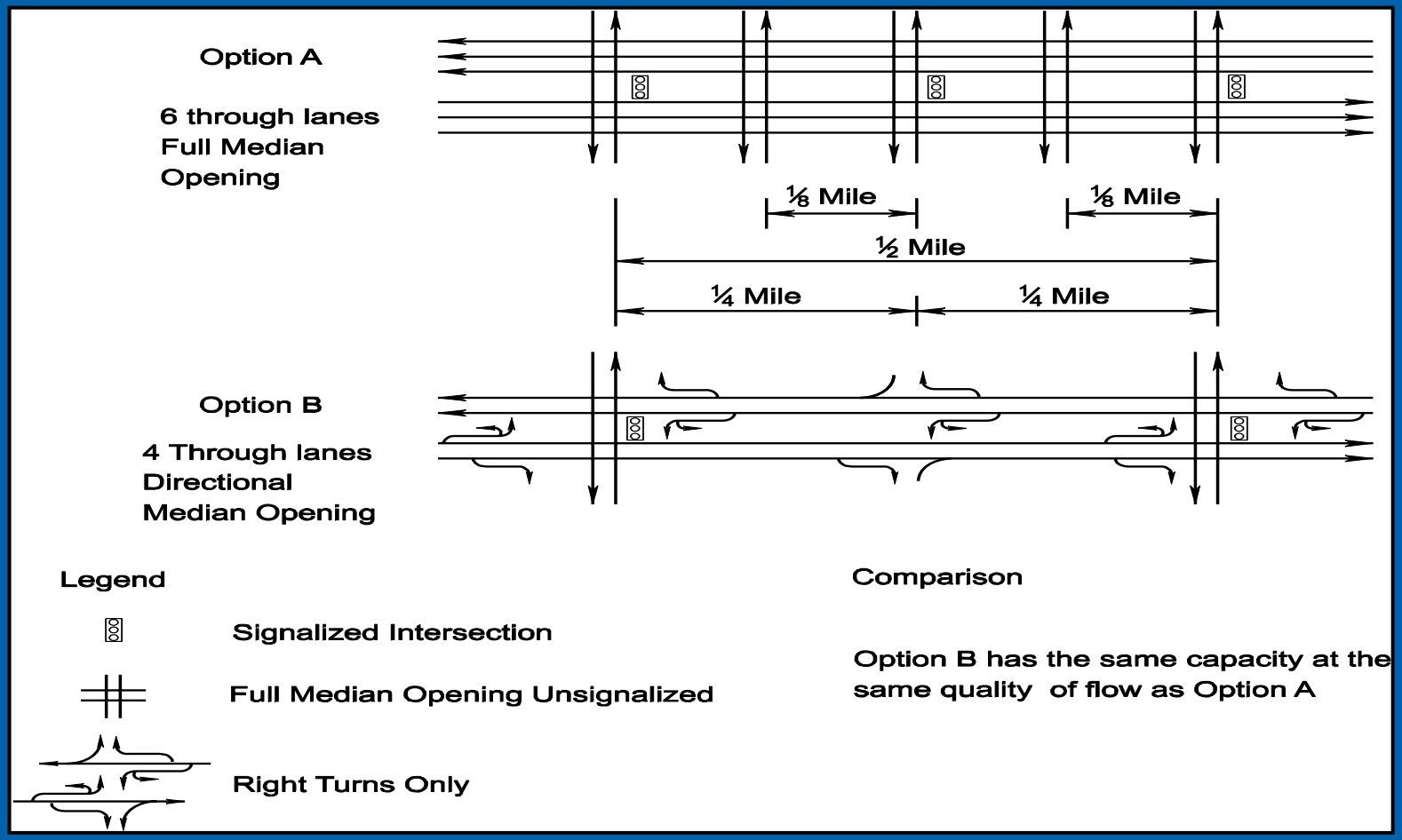


Source: "Colorado Access Control Demonstration Project" - 1985

Less Congestion on 'Managed' roads



Signal and Intersection Spacing



½ mile signal spacing and greater entrance spacing results in a 60% decrease in vehicle hours of delay

Source: "Colorado Access Control Demonstration Project" - 1985

Other States & Virginia Localities Using Access Management

States: Colorado, Florida, Georgia, Iowa, Idaho, Kansas, Maine, Minnesota, New Jersey, North Carolina, Michigan, Mississippi, New Mexico, Ohio, Oregon, Texas, Vermont, Utah.

Localities in Virginia: Amherst County (Rt. 29) Powhatan, New Kent, Goochland, Fauquier, Rt. 13 corridor - Accomack & Northampton, City of Winchester,

Regulatory Background

- 2006 General Assembly: Budget Bill directs VDOT to develop access management proposal

- 2007 General Assembly: Unanimous approval of SB 1312 & HB 2228: creates new § 33.1-198.1 in the Code
  - Directs VDOT Commissioner to develop & implement regulations/standards
  - VDOT Commissioner to publish regulations by December 31, 2007 with effective date of July 1, 2008

New § 33.1-198.1: Goals

- Reduce traffic crashes
  - 2007 AAA Study Cost of Crashes:
    - VA Beach - $1.6 billion, $976 per person
    - Richmond area - $1.4 billion, $1,180 per person
- Reduce traffic congestion
  - Reduce fuel consumption and air pollution
- Preserve critical roadway capacity
  - Reduce the need for new highways and adding lanes to highways
- Support economic development
  - Enhances the market reach of businesses
- Respect property owners rights to reasonable access

New § 33.1-198.1

Develop & implement standards for the location, number, spacing, & design of:

- **Commercial** entrances
- Median openings
- Turn lanes
- Street intersections
- Traffic signals
- Interchanges

Uses the highway's federal functional classification

Process for Soliciting Input on Regulations During 2007

Policy Advisory Committee: Met August - November

Virginia Association of Counties
Virginia Home Builders Association
Piedmont Environmental Council
Virginia Commercial Real Estate Assoc.
VA Section, Institute of Transportation Engineers

VDOT Web Site deployed October 3

- Posted regulations & standards
- Email form to submit comments

Public Comment Period: Oct. 3 – 29 Public Hearing: Oct. 22

- Received over 250 public comments

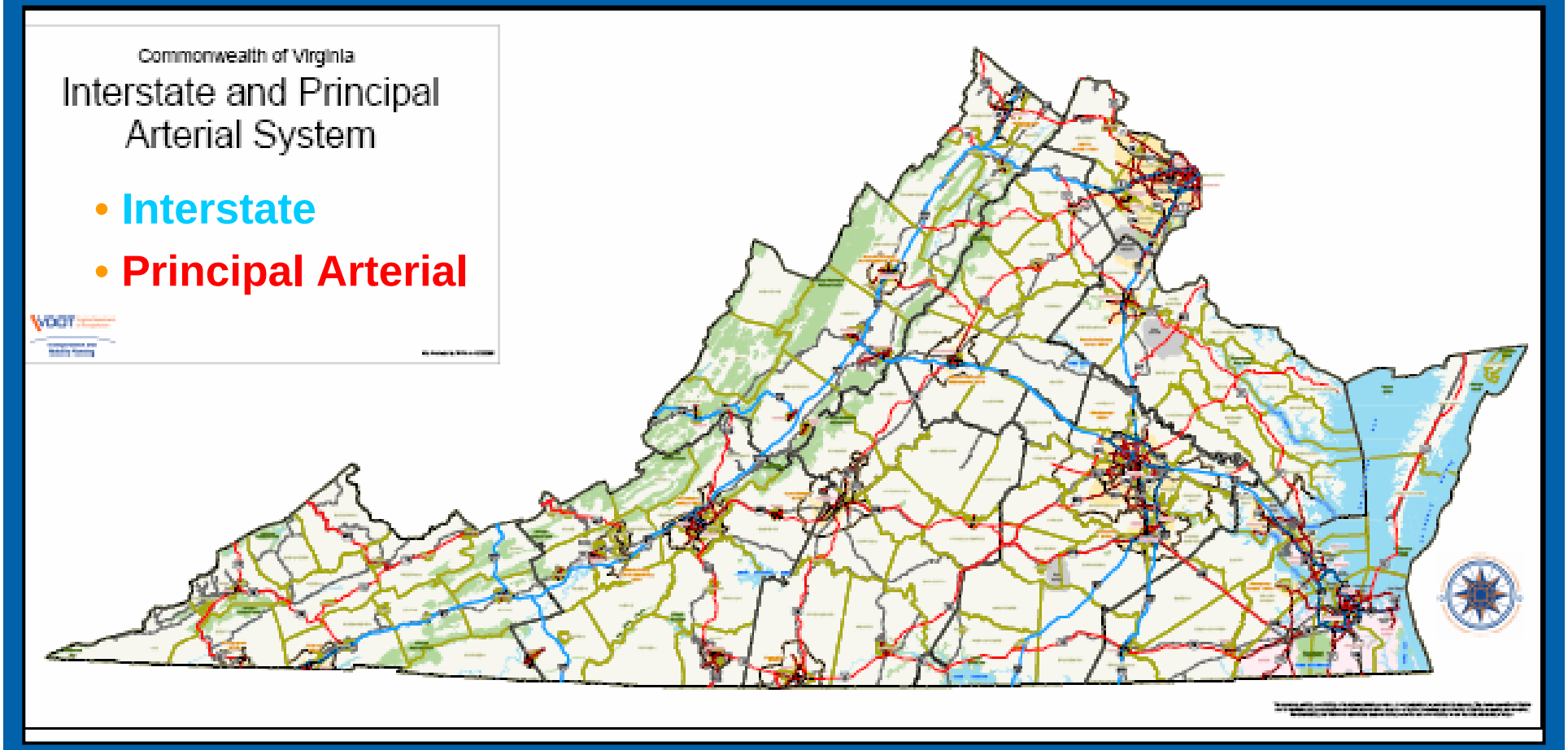
Regulations/standards developed & published Dec. 31, 2007

2008 General Assembly

- SB 370 & HB 1572 enacted
  - Establishes phased implementation
- Principal Arterials: regulations & standards developed during 2007 take effect July 1, 2008
- Minor Arterials & Collectors: additional public review of the regulations & standards
  - Opportunities for public input
    - Public hearing,
    - Public comment period,
    - Publish in VA Register per the APA.
  - Take effect October 1, 2009

Importance of Principal Arterials

- Interstate travel
- Transporting of goods
- Travel within the state
- Commuting to work
- Expands market area of businesses
- Emergency routes to safety

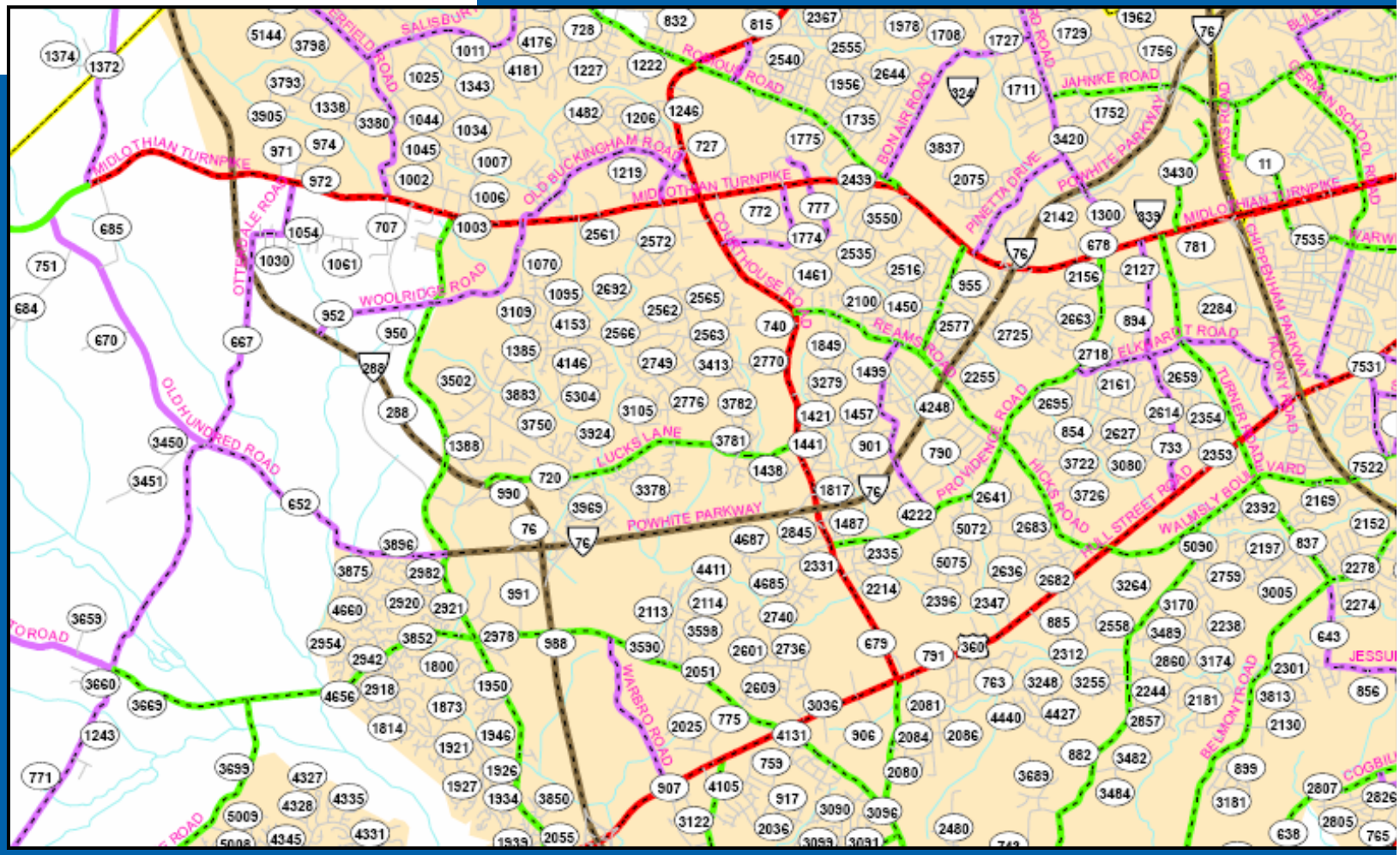


Legend

- Not Classified; Urban Local; Rural Local
- Urban Interstate
- Urban Freeway and Expressway Connecting Links of Rural Principal Arterial
- Urban Other Principal Arterial Connecting Links of Other Rural Principal Arterial
- Urban Minor Arterial
- Urban Collector
- Rural Interstate
- Rural Other Principal Arterial
- Rural Minor Arterial
- Rural Major Collector
- Rural Minor Collector

Minor Arterials: Green
Collectors: Purple

October 1, 2009



Access Management Regulations
24 VAC 30-72

- Not retroactive
  - VDOT will not close existing entrances
- Parcels abutting highway will be granted at least one entrance, except limited access highways
- Applicants to demonstrate safety of proposed commercial entrance and its impact on highway operations
- Must submit plan to mitigate any impacts & pay costs

Turn lanes	Right of way	Improve crossover
Traffic signal	Relocate/consolidate existing entrances	

Access Management Regulations
24 VAC 30-72

- Existing entrances are expected to be maintained in good condition.
- Appeal & exception procedures
  - Deadlines for VDOT decisions
- VDOT can assist localities with access management corridor plans

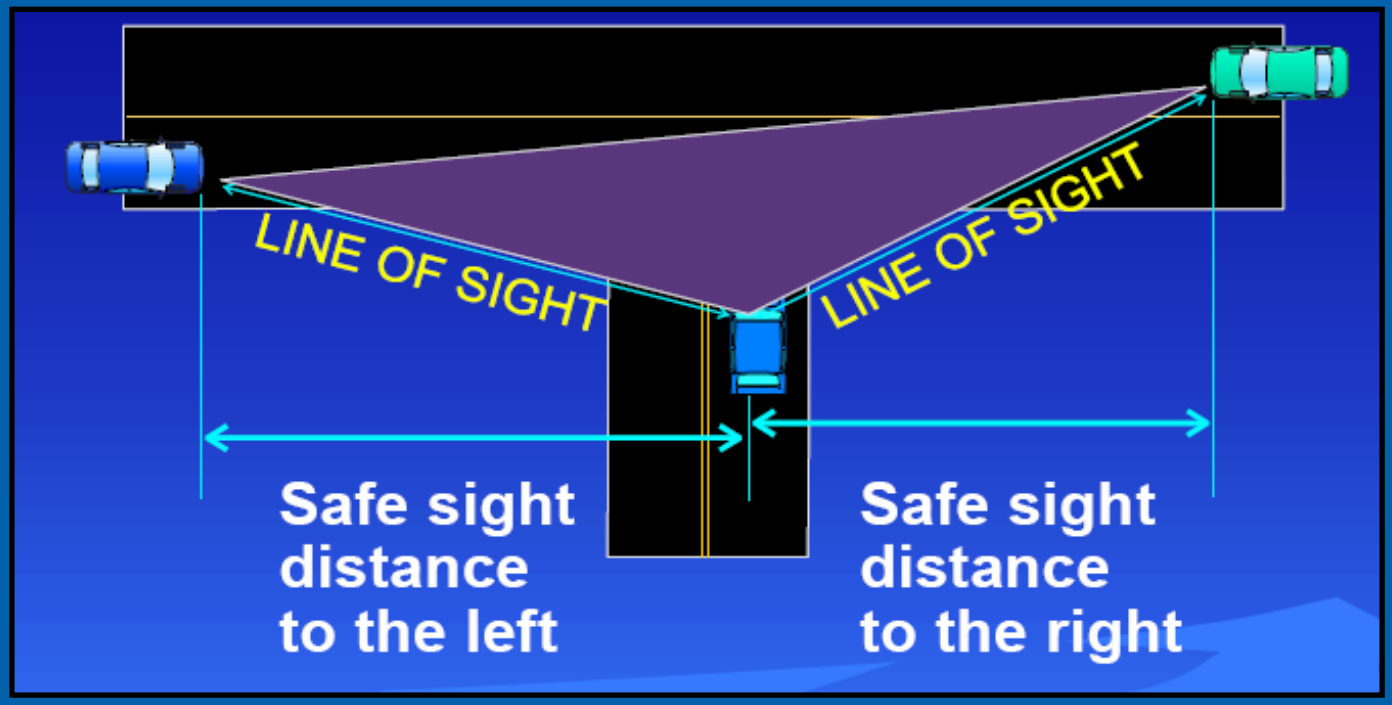
Pedestrians and Bicycle Users

All entrance design and construction shall accommodate pedestrian and bicycle users of the highway.

What methods are used?

- Medians
- Right and left turn lanes
- Signals and signal spacing
- Entrance location, spacing, and design
- Corner clearance
- Vehicular/pedestrian connections to adjoining property
- Shared use entrances

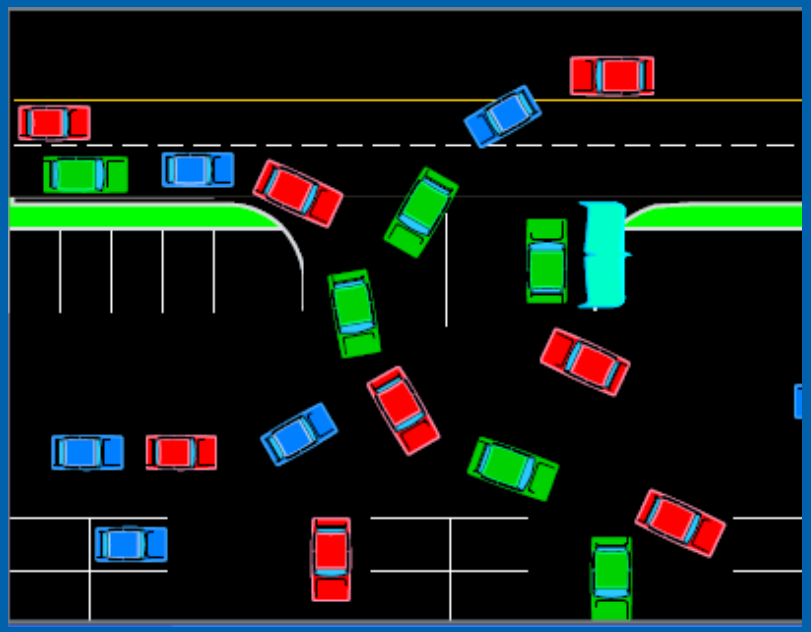
Sufficient Sight Distance at Entrance to Prevent Crashes

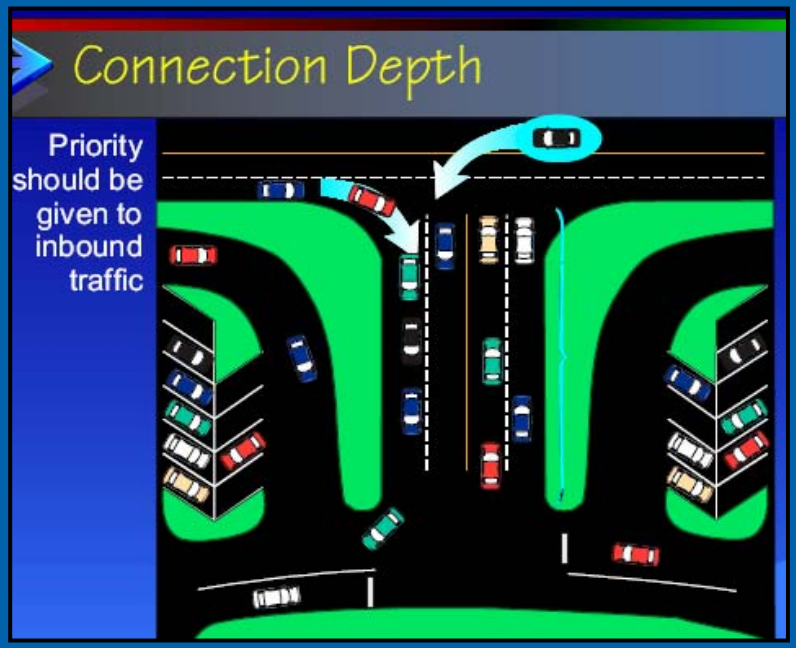


Entrance Design

Prevent Queuing of Vehicles on Highway

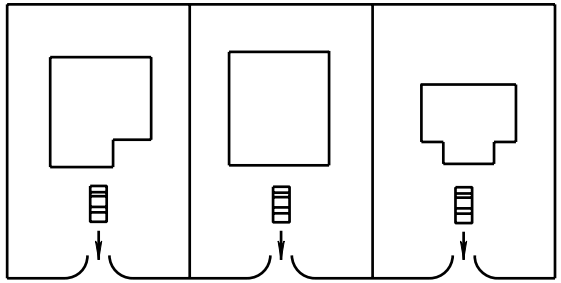
Summary of Entrance Throats	
Number of Egress Lanes (left, thru and right)	Minimum Throat Length
	Feet
1	30
2	75
3	200
4	300





Limiting Highway Entrances

Avoid

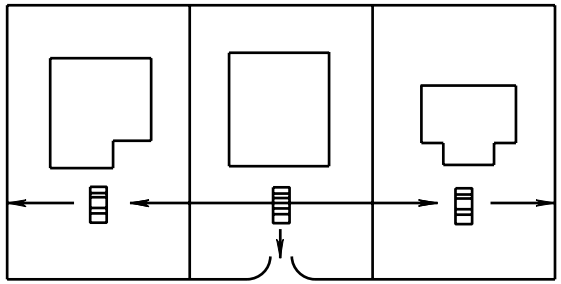


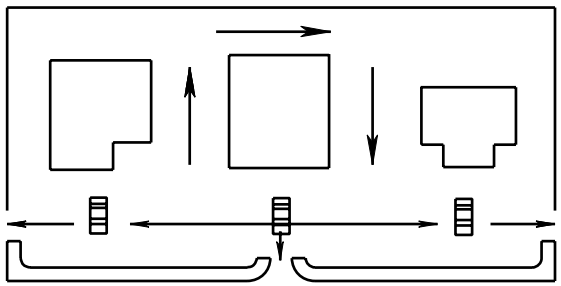
Promote

Cross Access

Shared Access

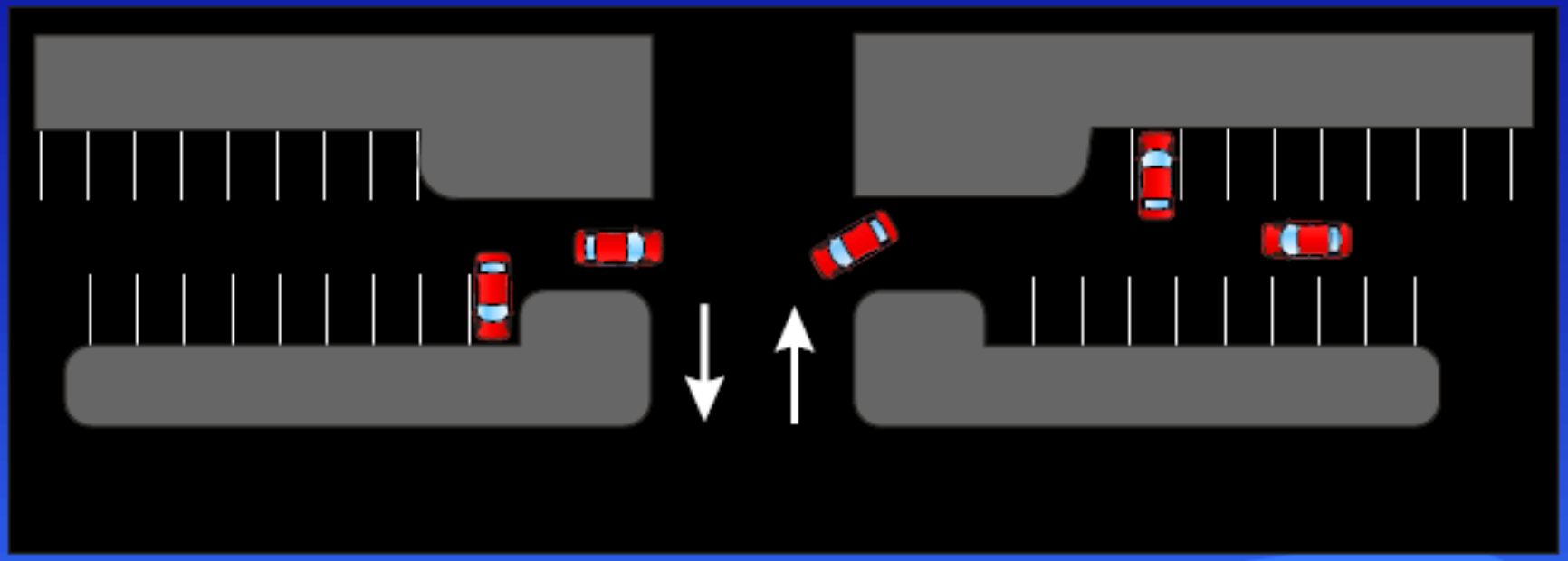
Complete on-site circulation





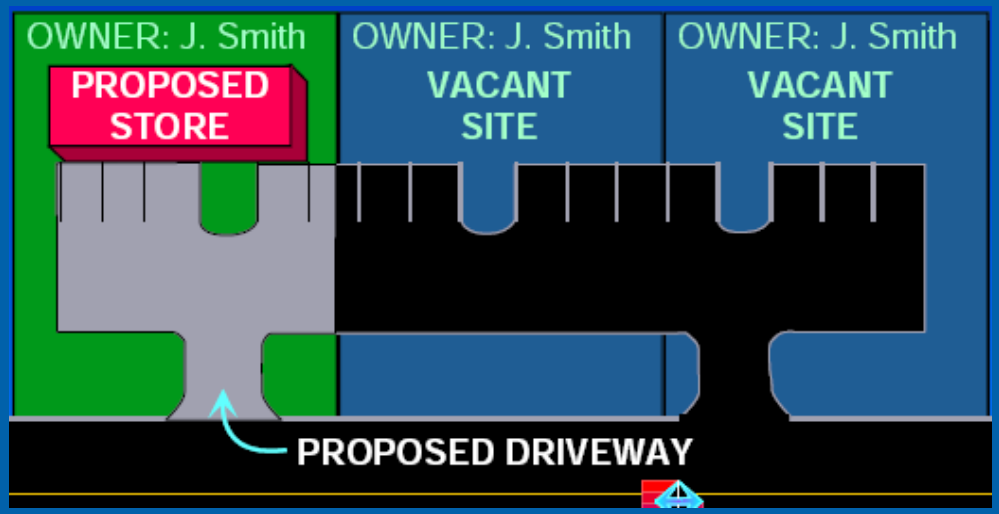
Shared Entrances

Reduces the number of entrances on the highway



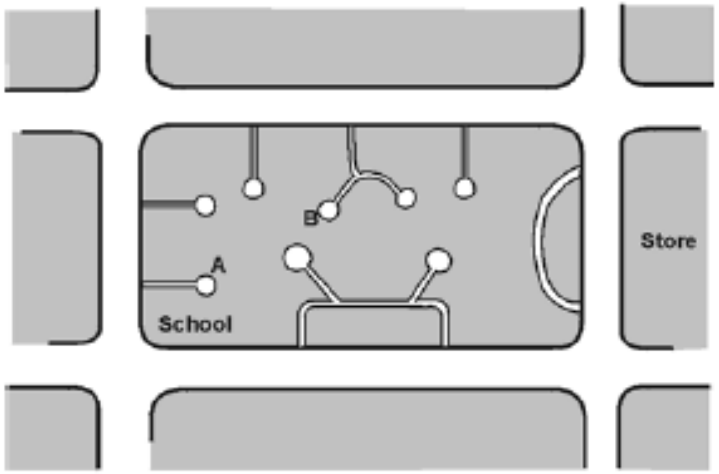
Vehicular & Pedestrian Circulation between Adjoining Properties

- Reduce number of entrances
- Fewer trips and U turns on the arterial highway
- Businesses can share customers



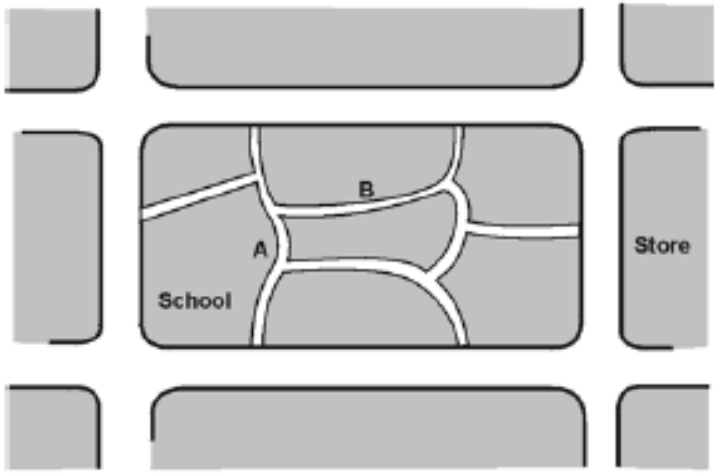
Promote Street Connectivity

STREETS ARE NOT INTERCONNECTED



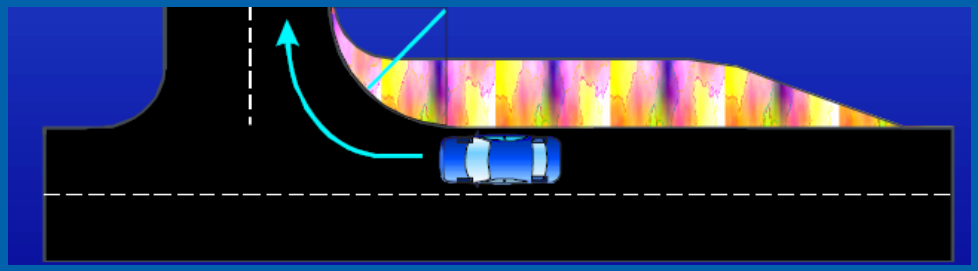
- Increases congestion along perimeter roads
- Kids traveling from home A to B have to be driven
- Creates more conflicts and crash potential.

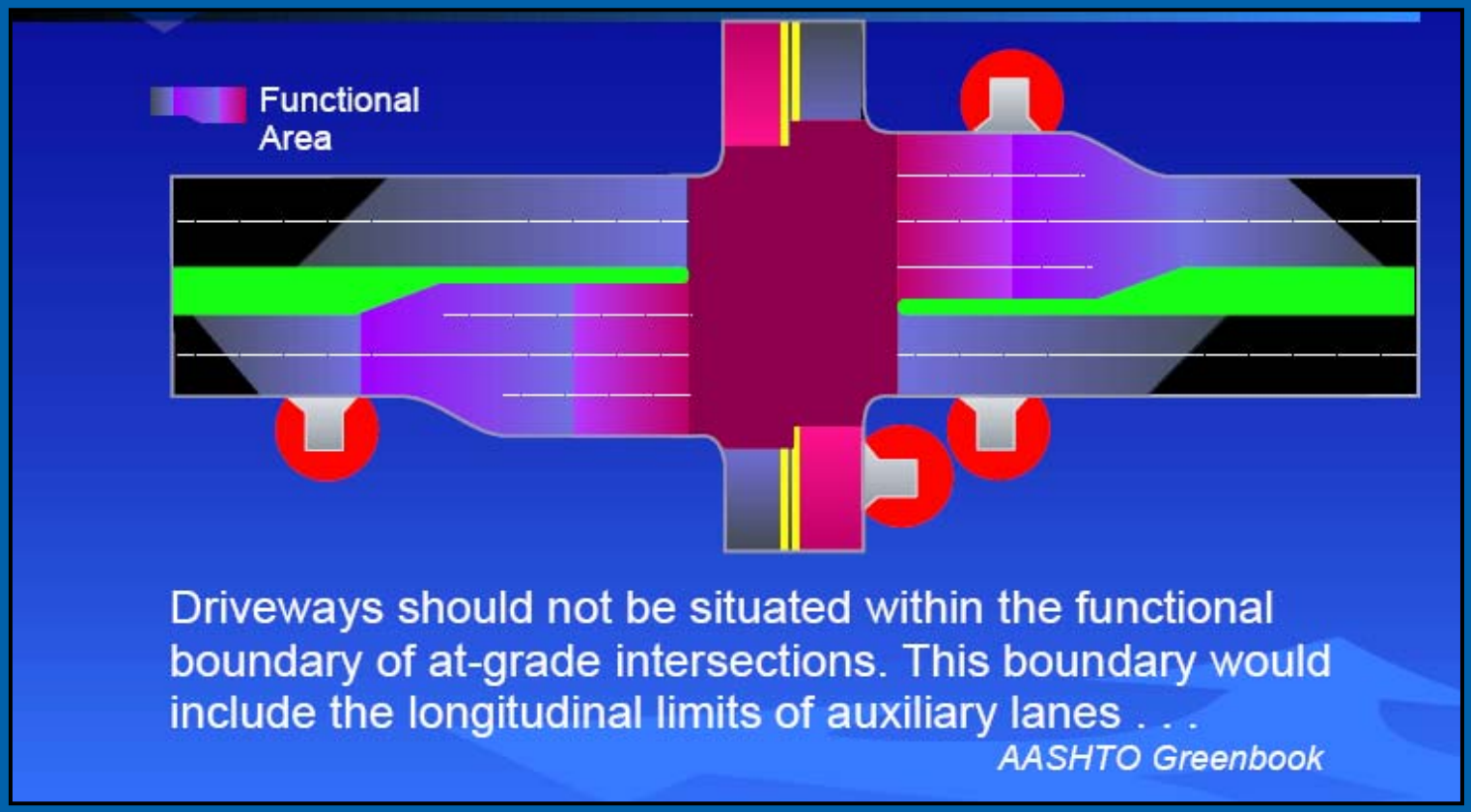
STREETS ARE INTERCONNECTED



- Residents have choices to access arterials
- Kids can walk from home A to B
- Kids can walk or bike to school more safely
- Easy access to neighborhood stores
- More efficient for snow plowing
- Easier access for emergency vehicles
- Larger sense of neighborhood.

Functional Area of an Intersection & Entrance

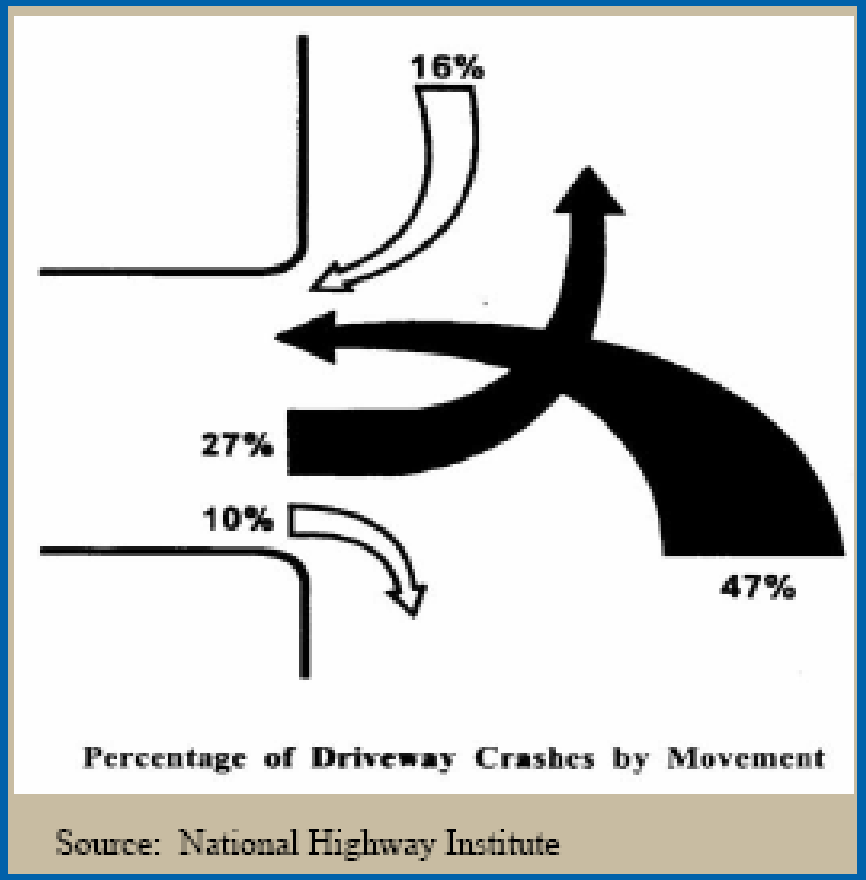




Driveways should not be situated within the functional boundary of at-grade intersections. This boundary would include the longitudinal limits of auxiliary lanes . . .

AASHTO Greenbook

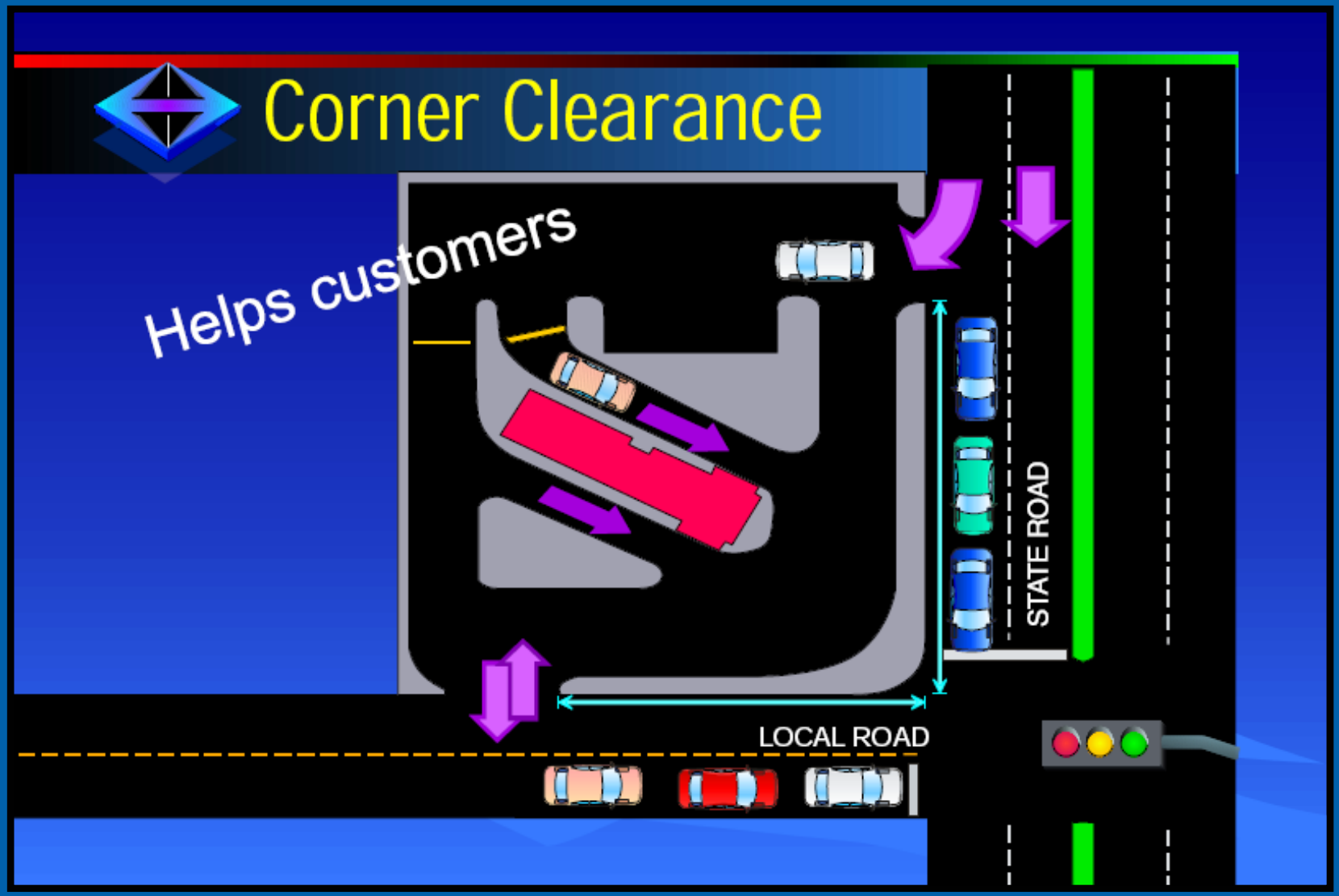
Crashes by Turning Movements



The majority of access-related crashes involve **Left Turns** (74%)

Left Turn Across Traffic Lanes to Entrance Near Intersection

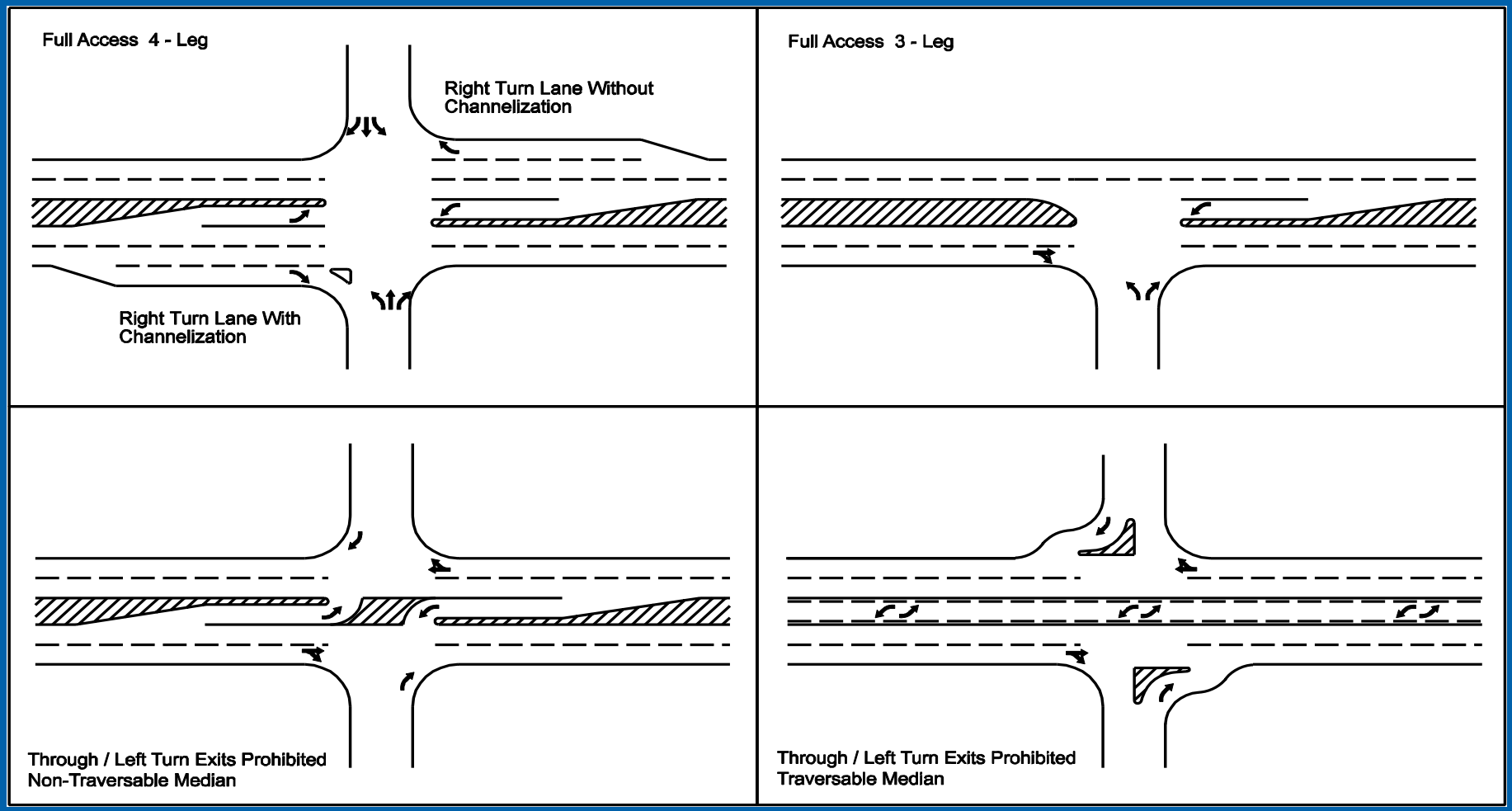
Separating Entrances & Left Turn Movements from Intersection



Retrofit to Prevent Left Turns

Raised barrier to close 1 of 2 parking lot entrances near gas station entrance

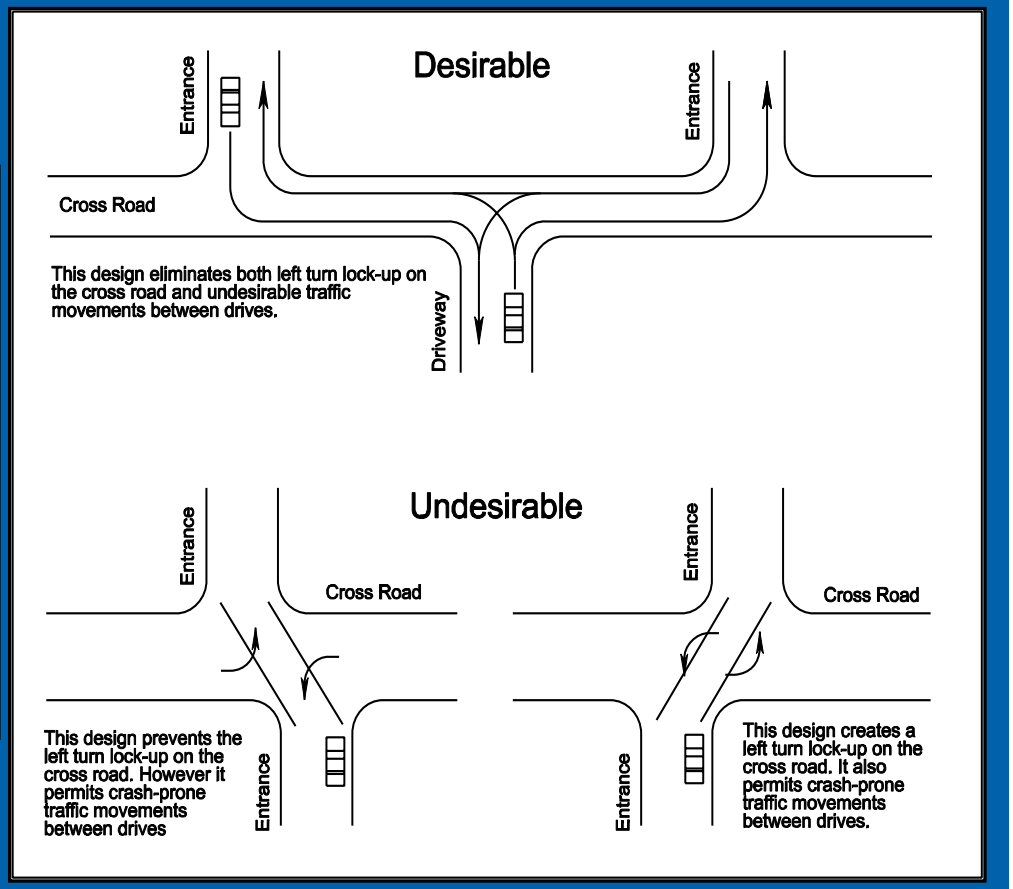
Channelize Right & Left Turns



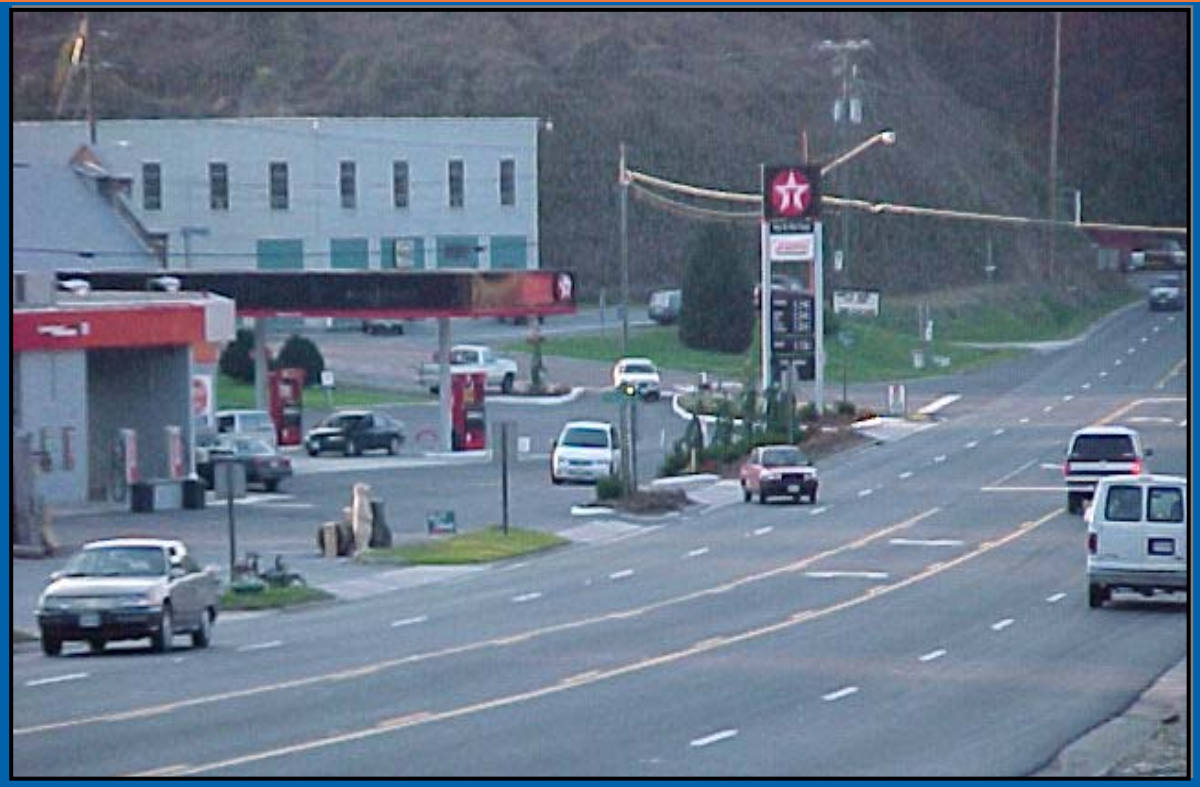
Median Turn Lanes

- Turning vehicles have to slow down, leading to
  - Rear end collisions, and
  - Traffic congestion.
- Provide turn lanes to separate turning vehicles from through traffic

Line Up Access Connections on Opposite Sides of the Highway



Spacing of Entrances & Intersections



- Each entrance creates right & left turning movements that:
  - Slows the flow of traffic on the highway
  - Increases the potential for traffic crashes
- The result: more congestion and unsafe conditions for motorists and pedestrians.

More Distance between Entrances: Fewer Crashes

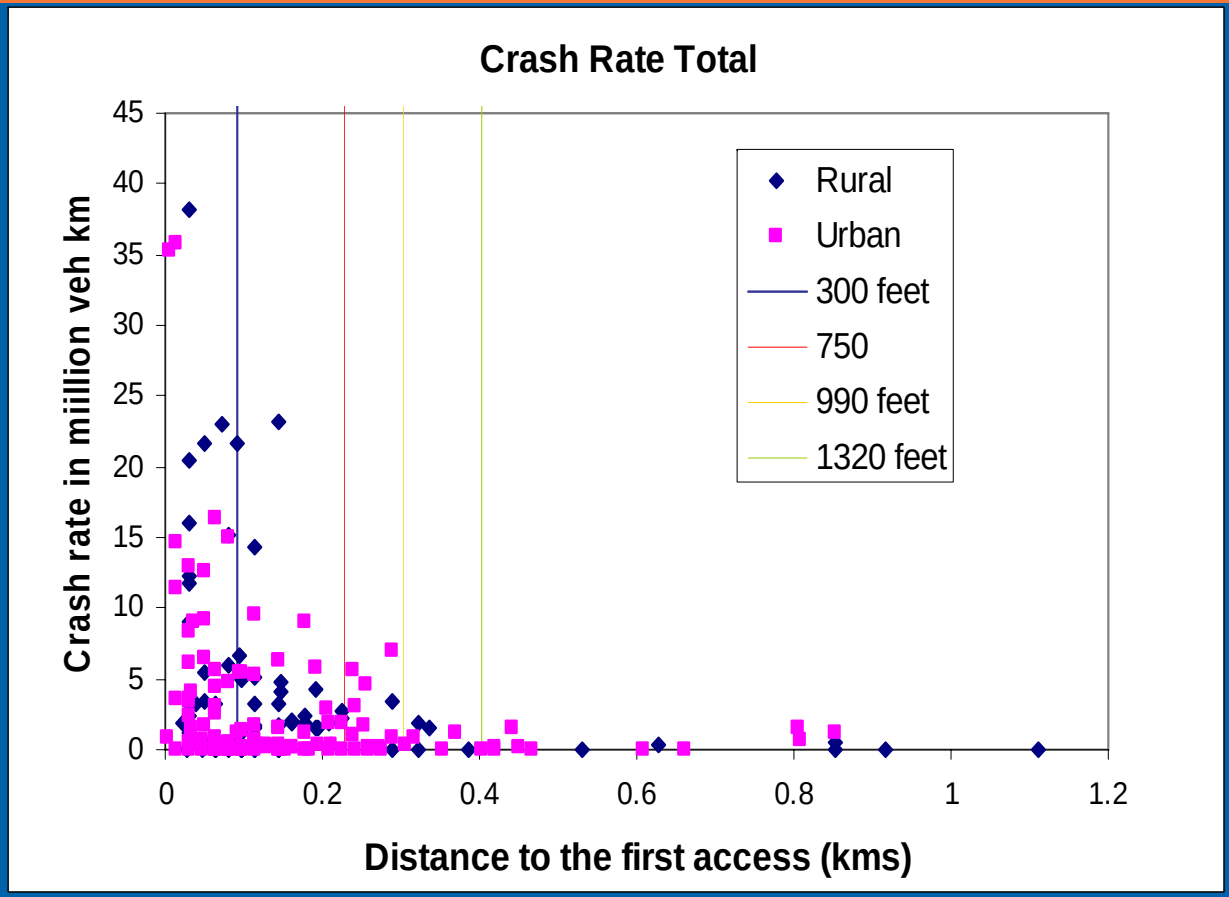
Results of ITE study –

Crash rate for average entrance spacing of:

- 150 ft was 1.6 times greater than for 265 ft spacing
- 150 ft was 2.5 times greater than for 550 ft spacing

VA Tech 2007 Access Spacing Study

- Analyze crash data at 186 intersections over 5 years: 2001 - 2005
- 2,277 accidents



Research Findings

- Increasing the spacing from 300 to 750 ft results in a 50% reduction in the crash rate: fatalities, injuries, property damage.
- The annual cost of crashes per mile is reduced from $1.7 to $.66 million

Signal Spacing & Traffic Progression

- A ½-mile spacing: provides efficient progressions at 30 mph with a 120-second cycle commonly used in developed urban areas during peak hours and 45 mph with a 80 second cycle used during off-peak hours.
- Fuel consumption and vehicle emissions increase at slower speeds and in stop & go traffic.

Cycle Length (s)	Spacing			
	1/8 mi (600 ft)	1/4 mi 1,320 ft)	1/3 mi (1,760 ft)	1/2 mi (2,640 ft)
	Progression Speed (mph)			
60	15	30	40	60
70	13	26	34	51
80	11	22	30	45
90	10	20	27	40
100	9	18	24	36
110	8	16	22	33
120	7.5	15	20	30

Relationship between speed, cycle length, and signal spacing. (Source: TRB Access Management Manual. 2003)

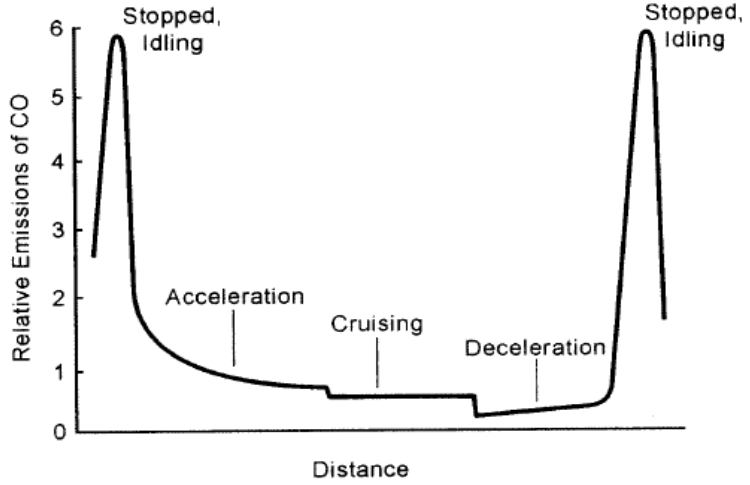


Figure 4–14. ***Relative Emissions of Carbon Monoxide During Vehicle Operation***

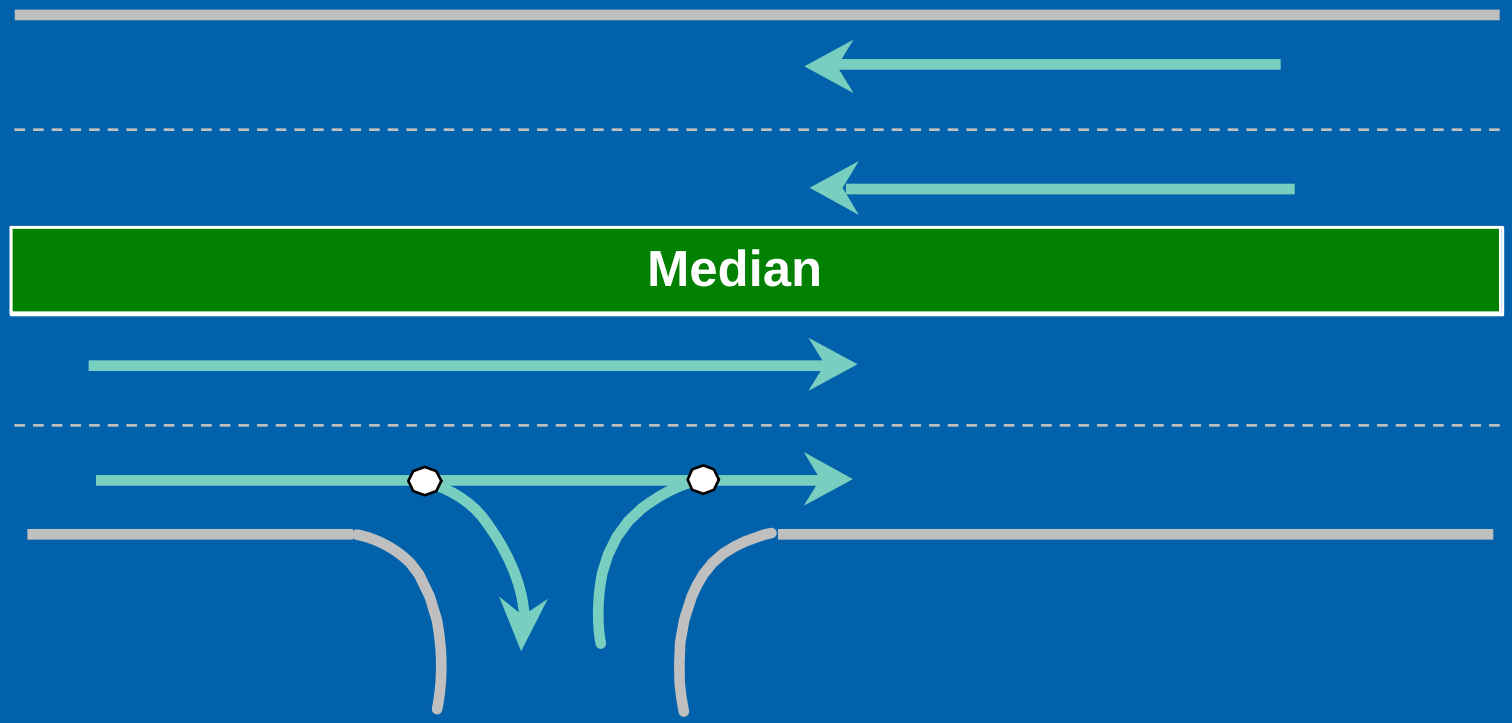
Type of Entrance and Intersection

Number of turning movements and spacing distance increases in the following order:

- Right-in or out only entrance
- Right-in/right-out entrance
- Right-in/right-out/left-in entrance
- Unsignalized, full movement entrance/intersection
- Signalized intersection

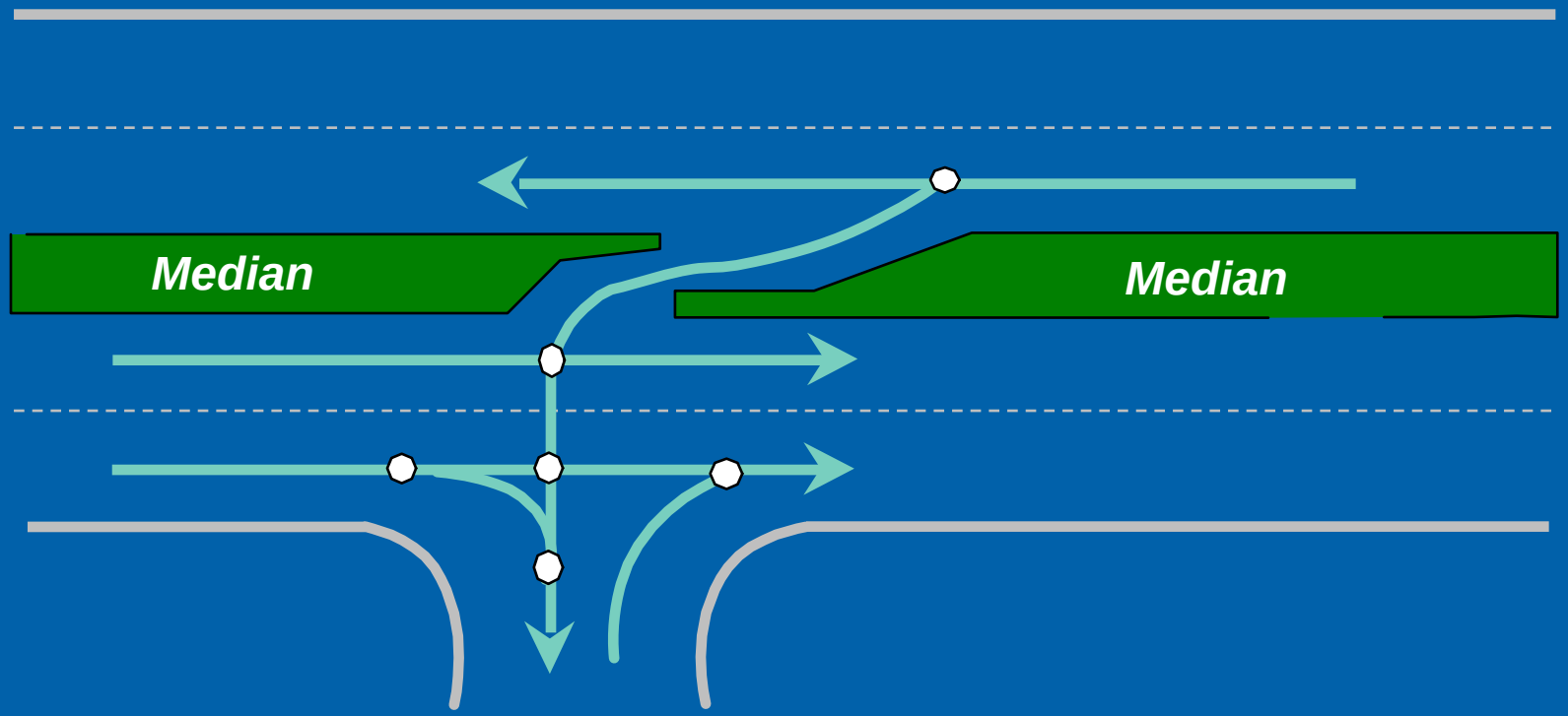
Right-In/Right-Out Entrance

Only 2 Conflict Points



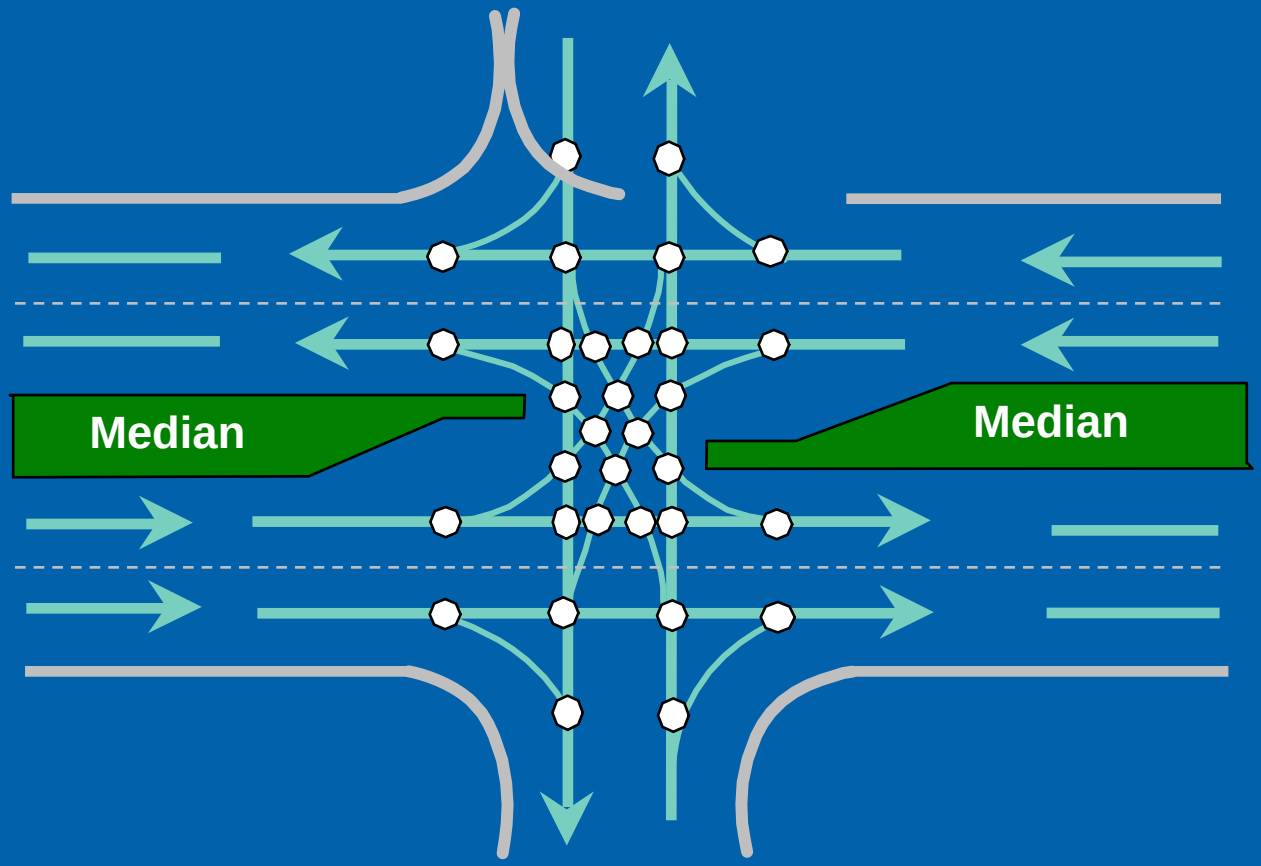
Right-In/Right-Out/Left-In Entrance

6 Conflict Points



Full Movement Intersection

32 Conflict Points



Criteria of Entrance/Intersection Spacing

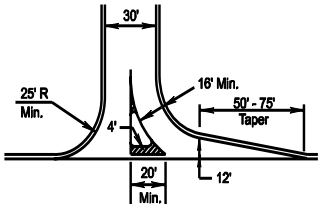
- Functional classification of highway
  - Mobility vs. access to property
- Highway speed limit
  - Longer distance to decelerate
- Traffic signal
  - Separation of signals for efficient traffic progression
- Type of entrance
  - More turning movements, more conflict points
- Rural vs. urban areas
  - Greater spacing in rural areas: lower density, larger parcel size, higher posted speed limits.
  - Shorter spacing in urban areas: higher land use density, smaller parcels with less frontage, slower traffic speed, pedestrians.

Spacing Standards in Road Design Manual

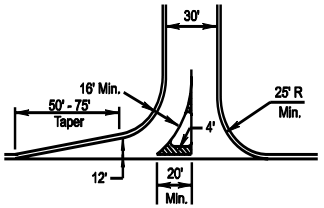
Spacing Standards for Commercial Entrances and Intersections on Principal Arterials				
Highway Functional Classification	Legal Speed Limit (mph)①	Centerline to Centerline Spacing in Feet		
		Signalized Intersections ②	Unsignalized Intersections & Full Access Entrances③	Partial Access Two Way Entrance④
Urban ⑤ Principal Arterial	≤ 30 mph 35 to 45 mph ≥ 50 mph	1,760 2,640 2,640	1,050 1,320 1,320	270 325 510
Rural ⑥ Principal Arterial	≤ 30 mph 35 to 45 mph ≥ 50 mph	2,640 2,640 2,640	1,320 1,320 1,760	270 440 585

2. ½ mile signal spacing 3. Half of signalized 4. Length of right turn lane by speed (AASHTO)

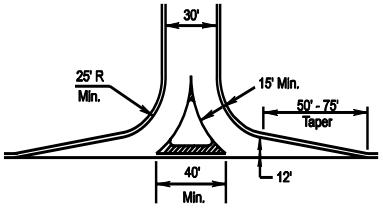
Options for Partial Entrances



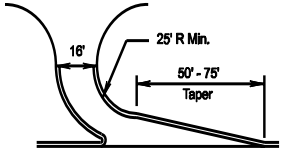
TO PREVENT LEFT TURN
INGRESS MOVEMENTS



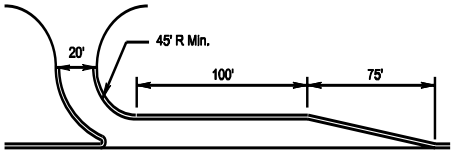
TO PREVENT LEFT TURN
EGRESS MOVEMENTS



RIGHT IN / RIGHT OUT ONLY
(TO PREVENT LEFT TURN
INGRESS & EGRESS



TO ALLOW RIGHT TURN IN ONLY
(PASSENGER CAR)



TO ALLOW RIGHT TURN IN ONLY
(FOR TRUCKS)

Spacing of Entrances and Intersections Near Interchange Ramps

Near Limited Access Interchanges

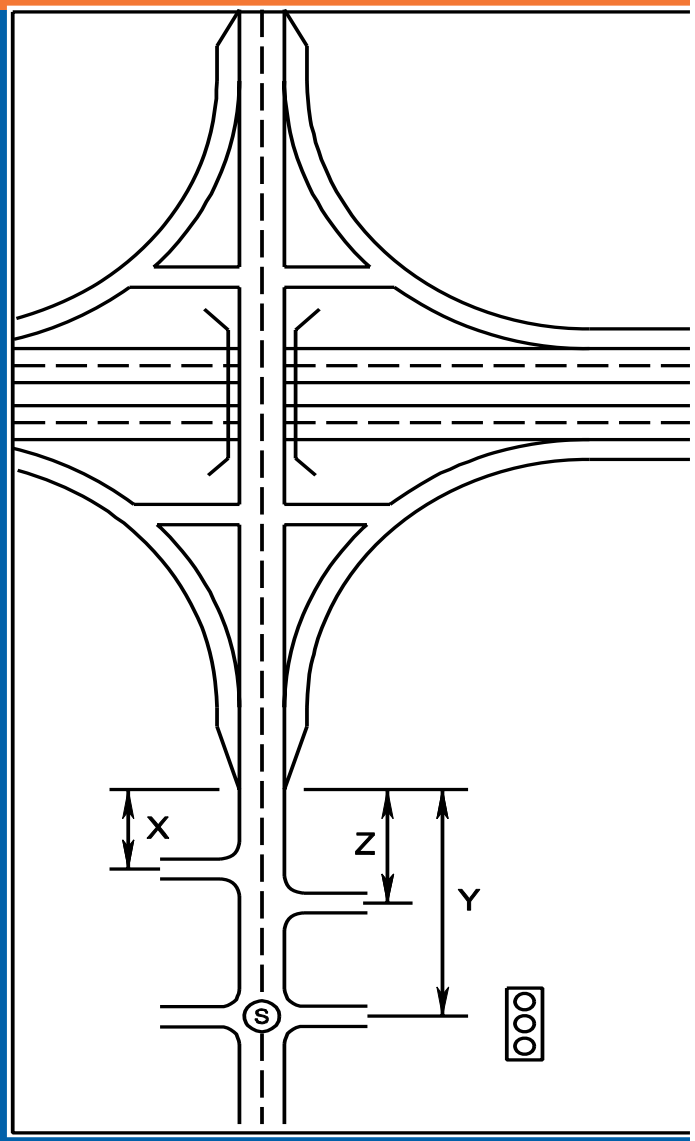
- Sufficient spacing from end of ramp
- Avoids traffic backups onto ramps
- Reduces crash potential in the vicinity of the ramps

Spacing Standards: Two Lane Crossroad

- Distance from ramp to entrance (X)

  Distance between last entrance to start of ramp (Z)
  - 750 ft urban area
  - 1,320 ft rural area
- Distance to first full access intersection (Y)
  - 1,320 ft urban and rural areas

Source: NCHRP Report 420
NCHRP Synthesis 332



Spacing Standard Exemptions

Vested property rights are respected: exemptions

- Entrance locations specified in rezoning proffered plans of development
- Entrances on valid subdivision plats & site plans

Spacing standards generally do not apply:

- On older business corridors of urban highways where spacing is established
- To the streets in new urbanism mixed use development
- On highway corridors with local access management plans

Private Entrances

- Serves up to two private residences or
  - Agricultural access to fields,
  - Very low intensity uses like cell towers, pump stations, storm water basins.
- Property owner responsible for installation of entrance drainage pipe.
- Property owner may pay actual cost for VDOT to install it.

Phasing and Effective Dates

- Principal Arterials: regulations & standards developed during 2007 take effect July 1, 2008

- Minor Arterials & Collectors: additional public review of the regulations & standards
  - Opportunities for public input prior to October 2009
    - Public hearing
    - Comment period
    - Publish in VA Register per the APA.
  - Take effect October 1, 2009

Access Management Regulations & Standards

- Property owners have a right to reasonable access to the highways.
- Roadway users have the right to:
  - Freedom of movement,
  - Safety, and
  - Efficient expenditure of public funds.

Balancing these interests is the goal of access management

VDOT Web Site

Projects and Studies

Transportation and Land Use

Questions?