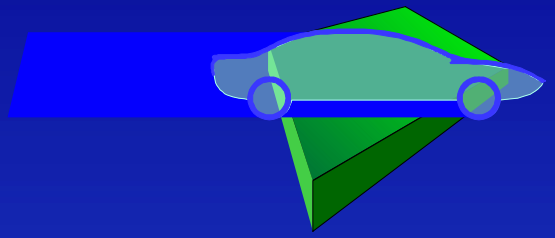
Access Management & Site Planning

WHAT IS Access Management?

The control and regulation of the spacing and design of:

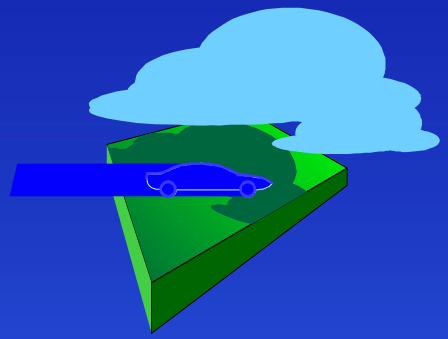
- Driveways
- Medians
- Median Openings
- Traffic Signals
- Freeway Interchanges

What are the Benefits of Access Management?



OPERATIONAL

- Reduced Delay
- Increased Capacity



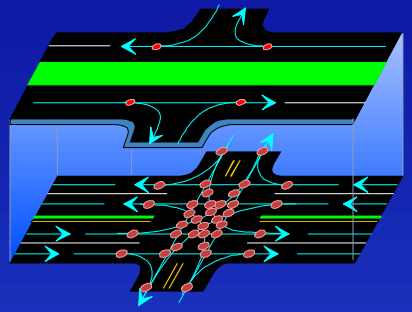
ENVIRONMENTAL

- Improved Fuel Economy
- Reduced Emissions

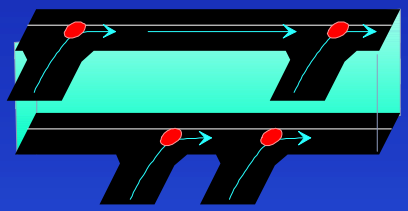
SAFETY

- Fewer/Less Severe Accidents

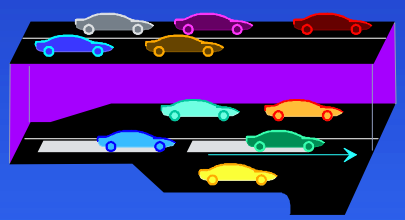
WHAT ARE THE GOALS OF Access Management?



Limit the number of conflict points

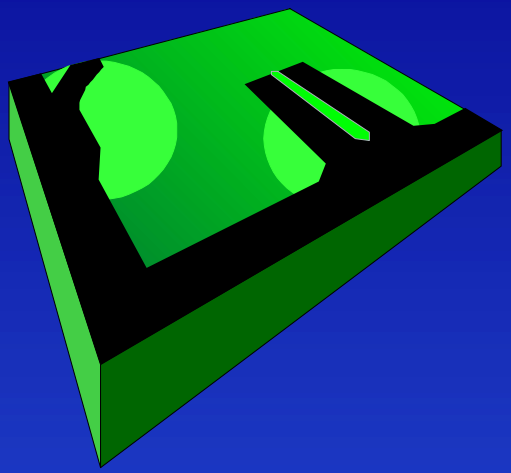


Separate the conflict points

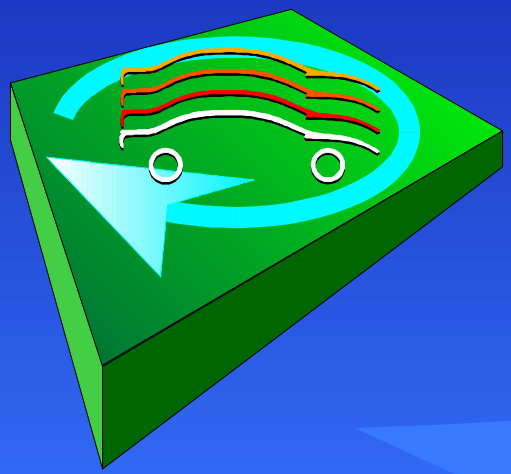


Remove turning vehicles and queues from through movements

How are these goals achieved in the Site Planning Process

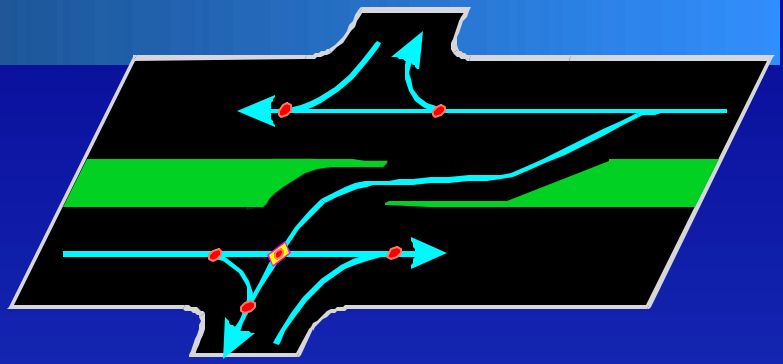


Connection
Location & Design



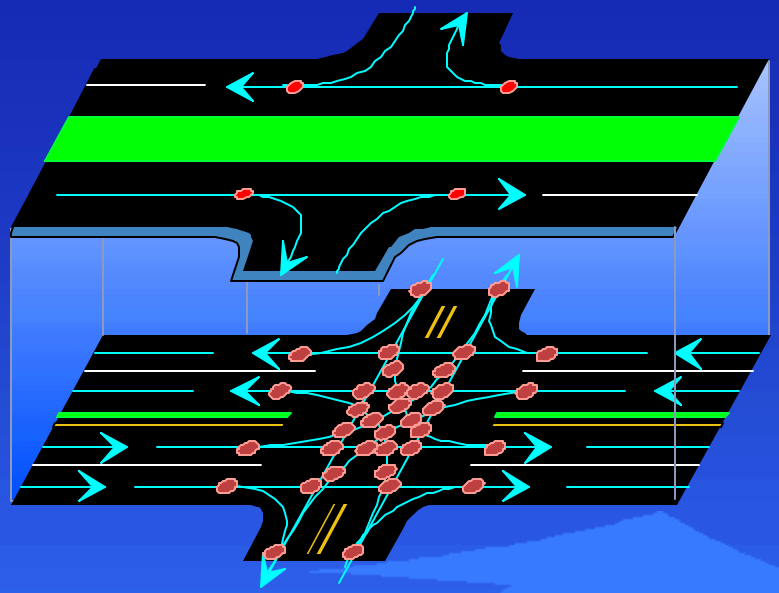
On-Site Circulation
& Parking

CHANNELIZATION



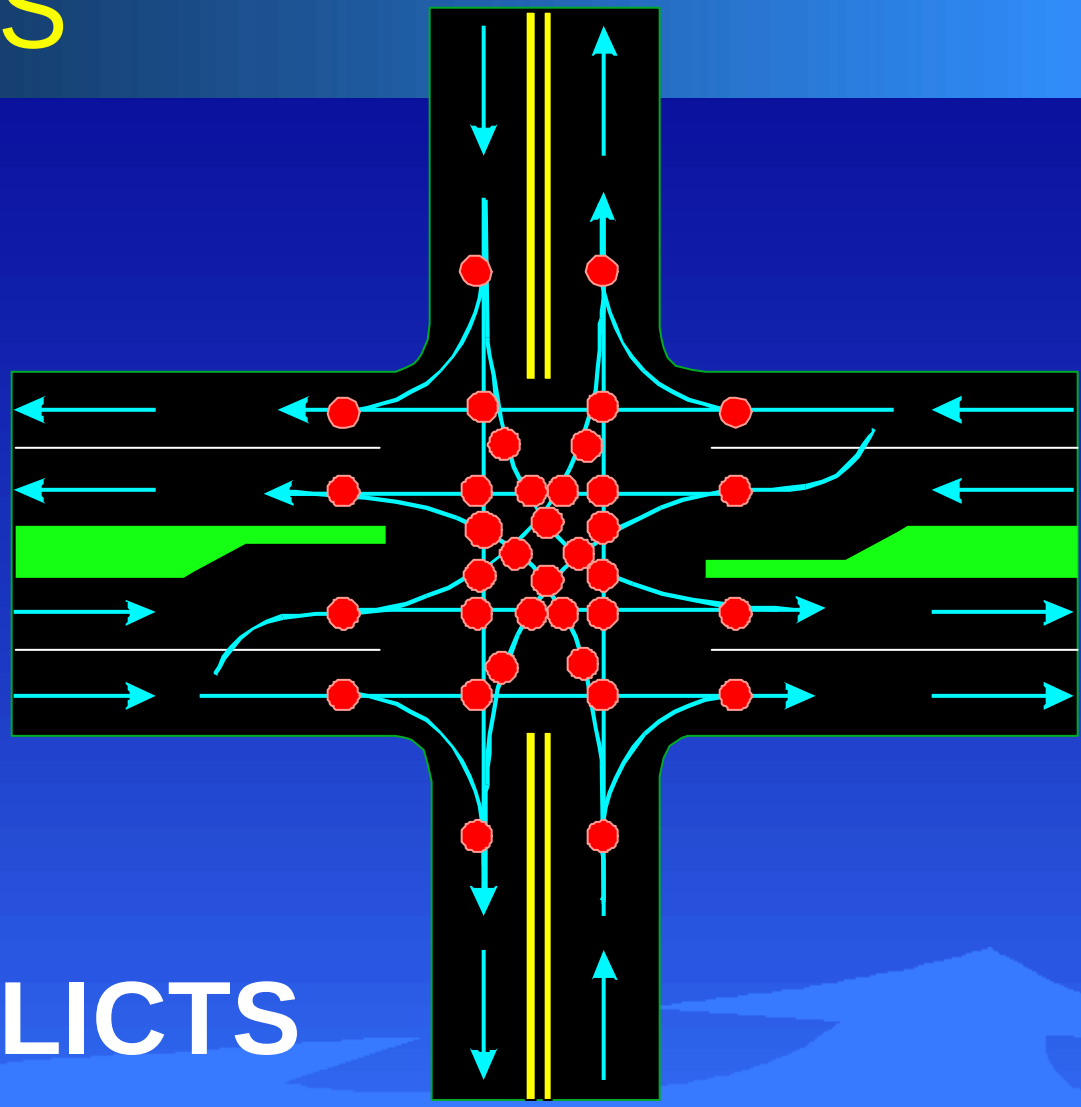
&

CONFLICT REDUCTION



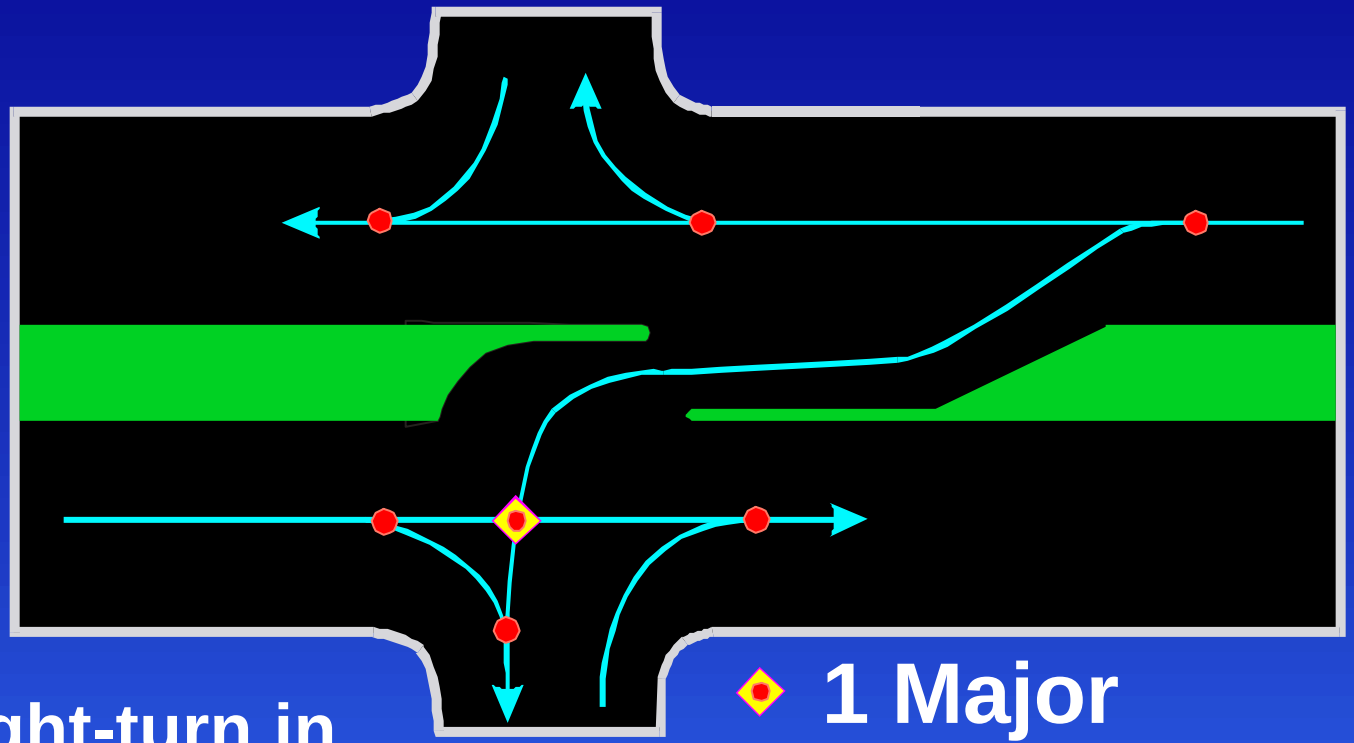
To Achieve Goal #1

CONFLICTS



36 **CONFLICTS**

CONFLICTS

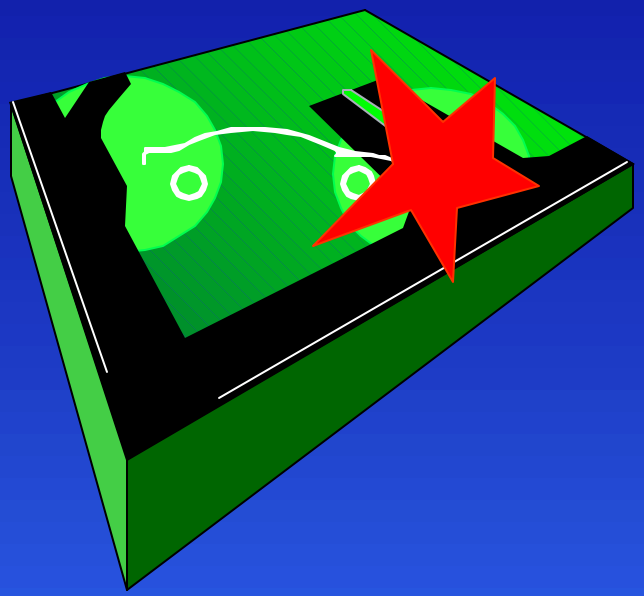


Right-turn in
Right-turn out

- 1 Major
- 6 Minor

7 CONFLICTS

Separation of Conflicts



- Driveway Spacing
- Corner Clearance
- Median Opening Spacing

To Achieve Goal #2

Access Management Standards

Well planned with system of service roads

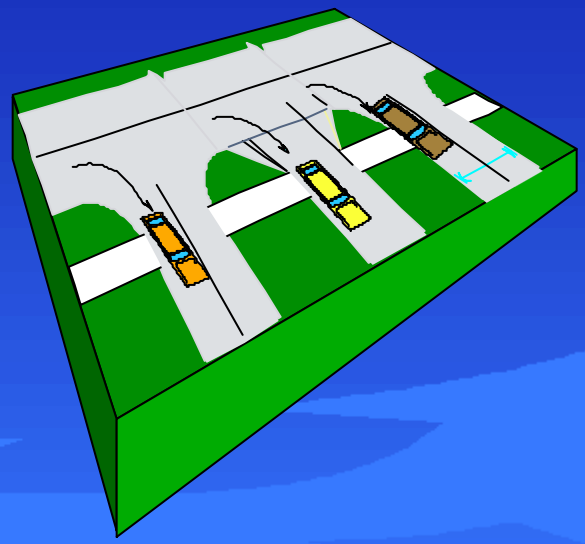
Essentially the same except for medians

Essentially the same except for medians

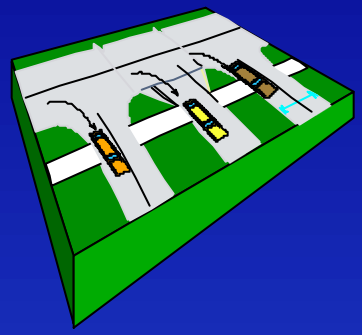
The Urban/ Suburban Strip

Class	Medians	Connection		Median Opening		Signal
		>45mph	≤ 45mph	Directional	Full	
Freeways	**GENERALLY DEVELOPING OR UNDEVELOPED**					
2	Restrictive w/ Service Roads	1320	660	1320	2640	2640
3	Restrictive	660	440	1320	2640	2640
4	Non-Restrictive	660	440			2640
	GENERALLY DEVELOPED					
5	Restrictive	440	245	660	2640/ 1320	2640/ 1320
6	Non-Restrictive	440	245			1320
7	Both Median Types	125		330	660	1320

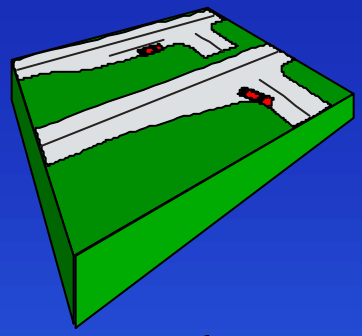
Goal # 3 - Remove Turning Vehicles and Queues from Through Lanes



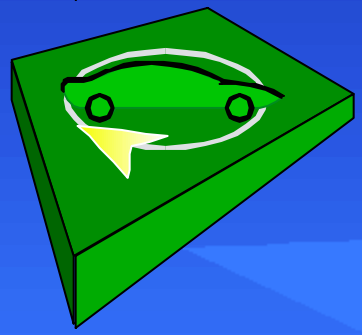
Techniques to remove turns and queues from the through movement



Turn radii
Driveway flare
Driveway width



Turn lanes
Turn tapers



Better site design

Queue backed out in through lanes

Regulations and Florida Guidance on Access Management

FLORIDA STATUTE 335.18 ACCESS MANAGEMENT ACT

RULE 14-96
Dealing with the Application and Permit Process

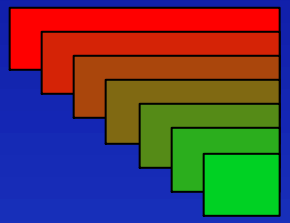
RULE 14-97
Dealing with the Access Management Classification System and Standards for Access

STANDARD INDEX -
For geometric design and materials standards of driveways

MEDIAN HANDBOOK -
Access Management procedures on district teams

14-97 The Standards Rule

- **Establishes Access Management Classifications**

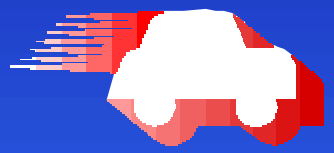


1 = Freeways/Most Control

TO

7 = Least Control

- **Procedure and Criteria for Establishing Classifications**

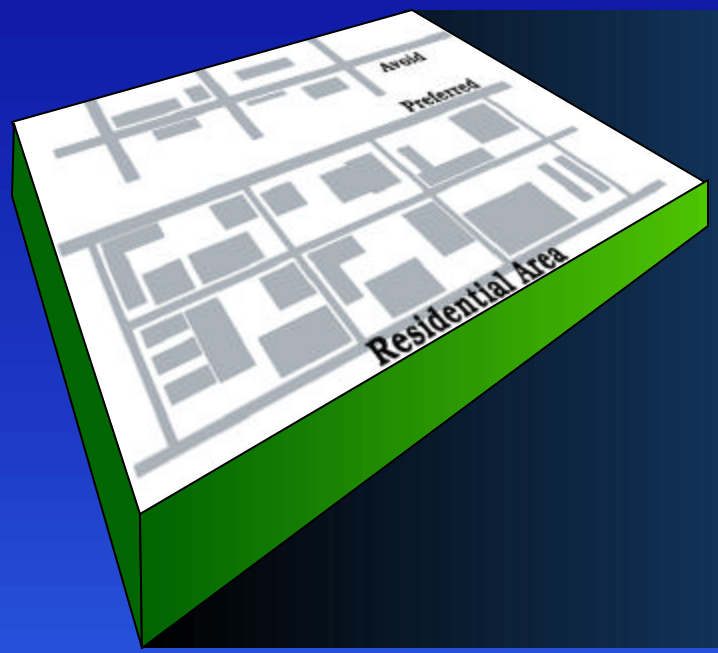


Roads most intended for high speed/high volume traffic would have the highest standards

- **Established Interim Standards Based on Posted Speed Limits**

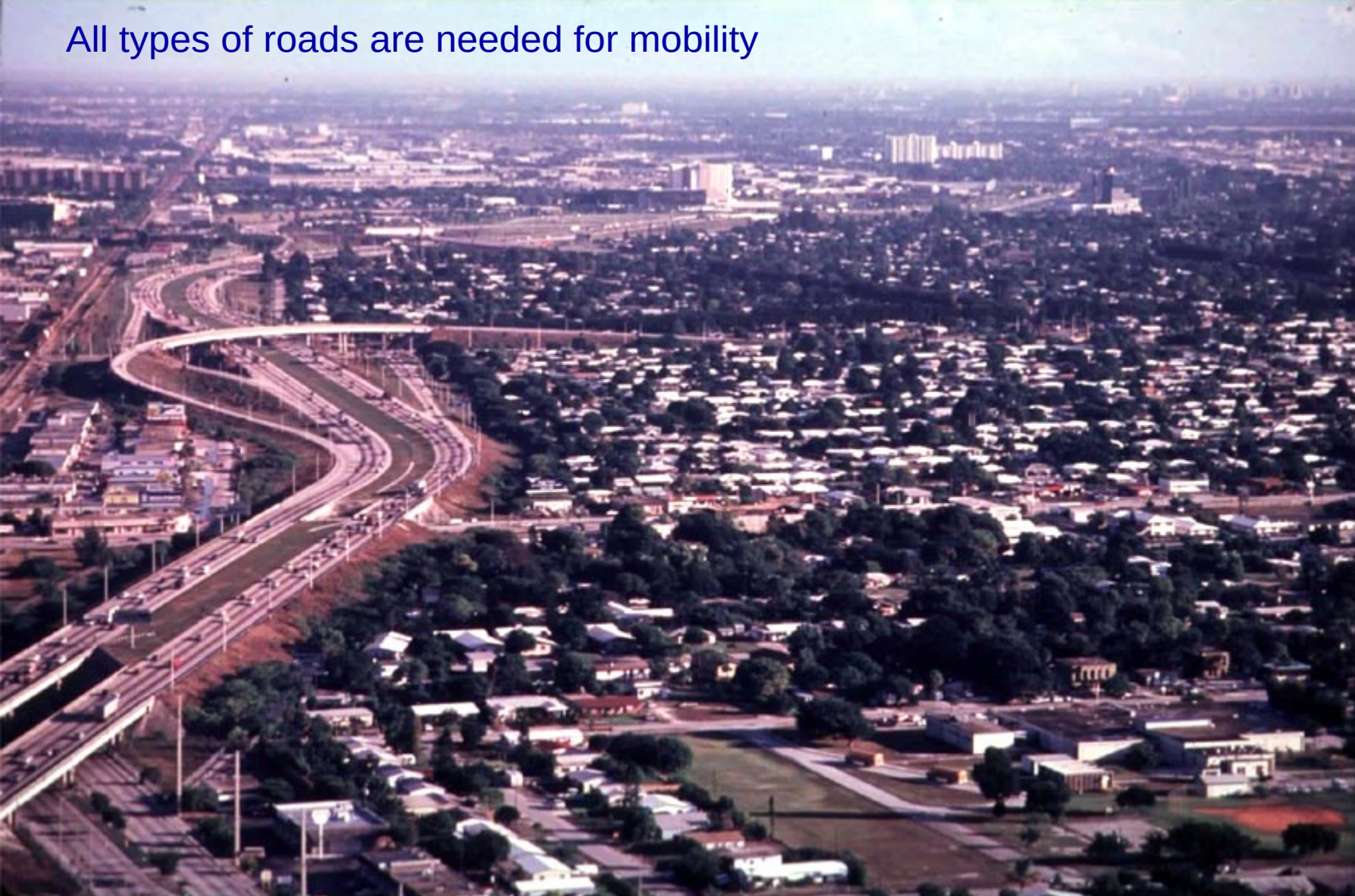
14-96 The Permits Rule

- Applications & Permits Prodecure
- Closing & Redesigning Existing Driveways
- Local Government Coordination on Permits
- Traffic Study Requirements
- Non-Conforming Driveways
- Performance Bond Requirements



Importance of Functional Classification in Site Planning

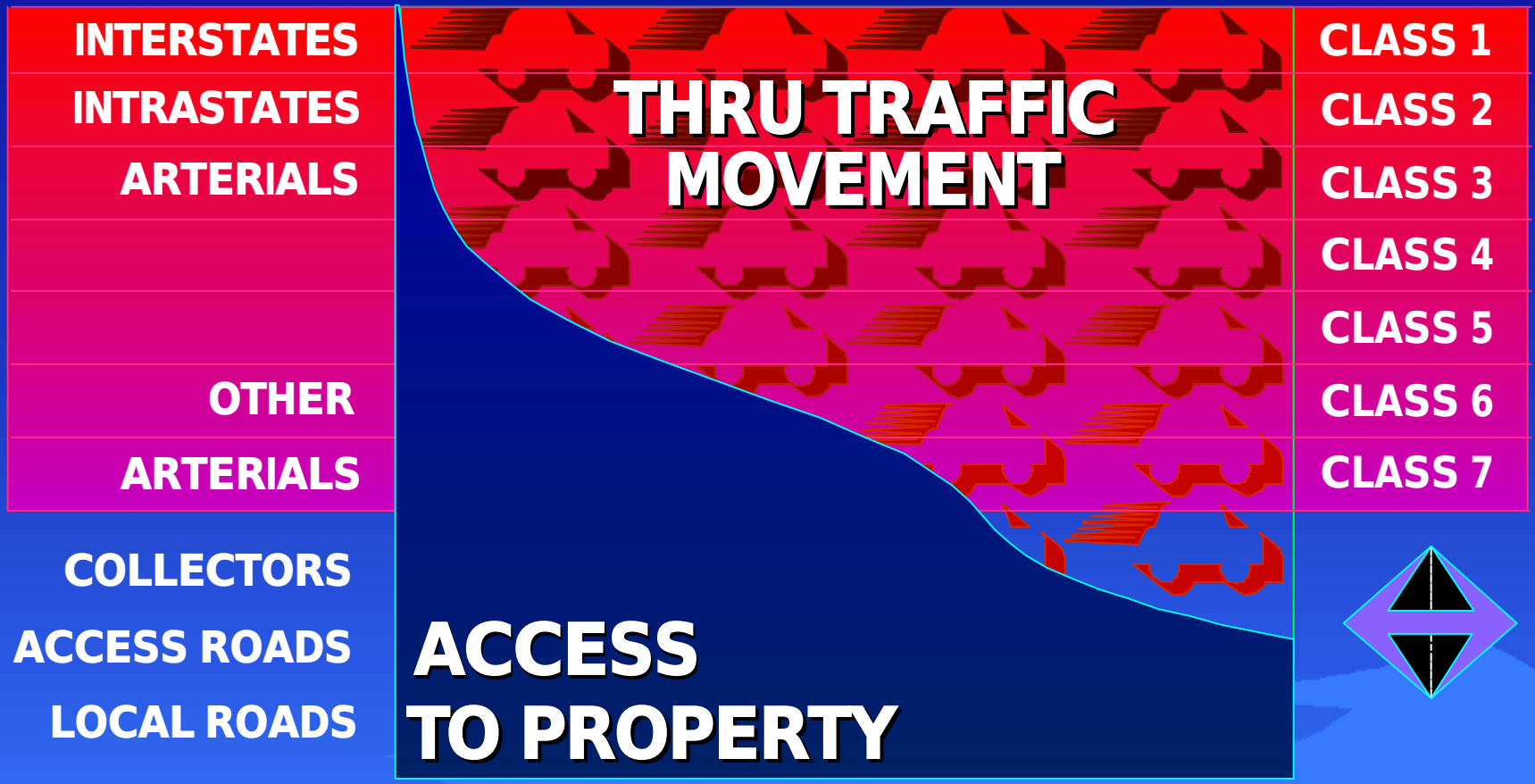
All types of roads are needed for mobility



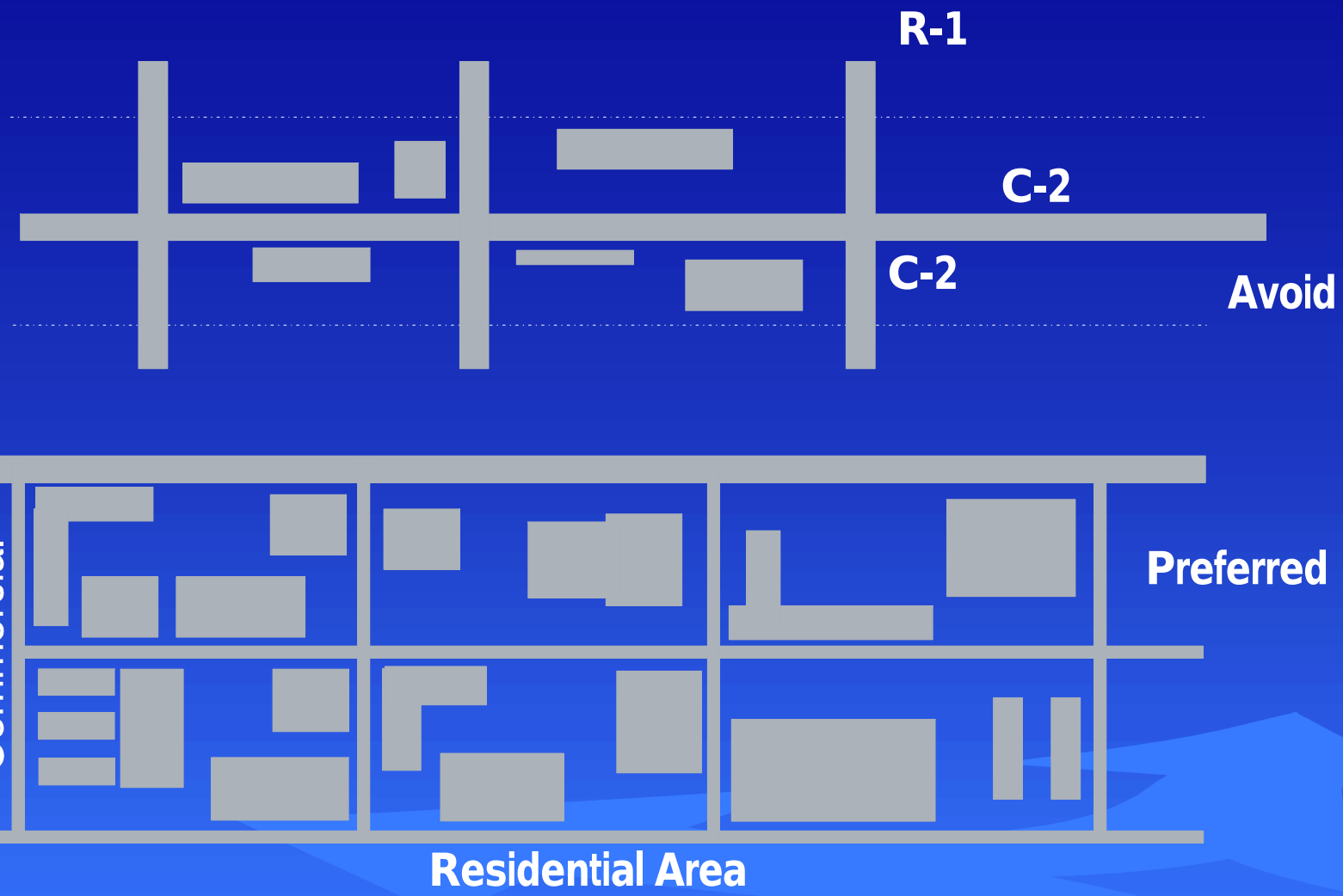
ARTERIAL: STATE SYSTEM

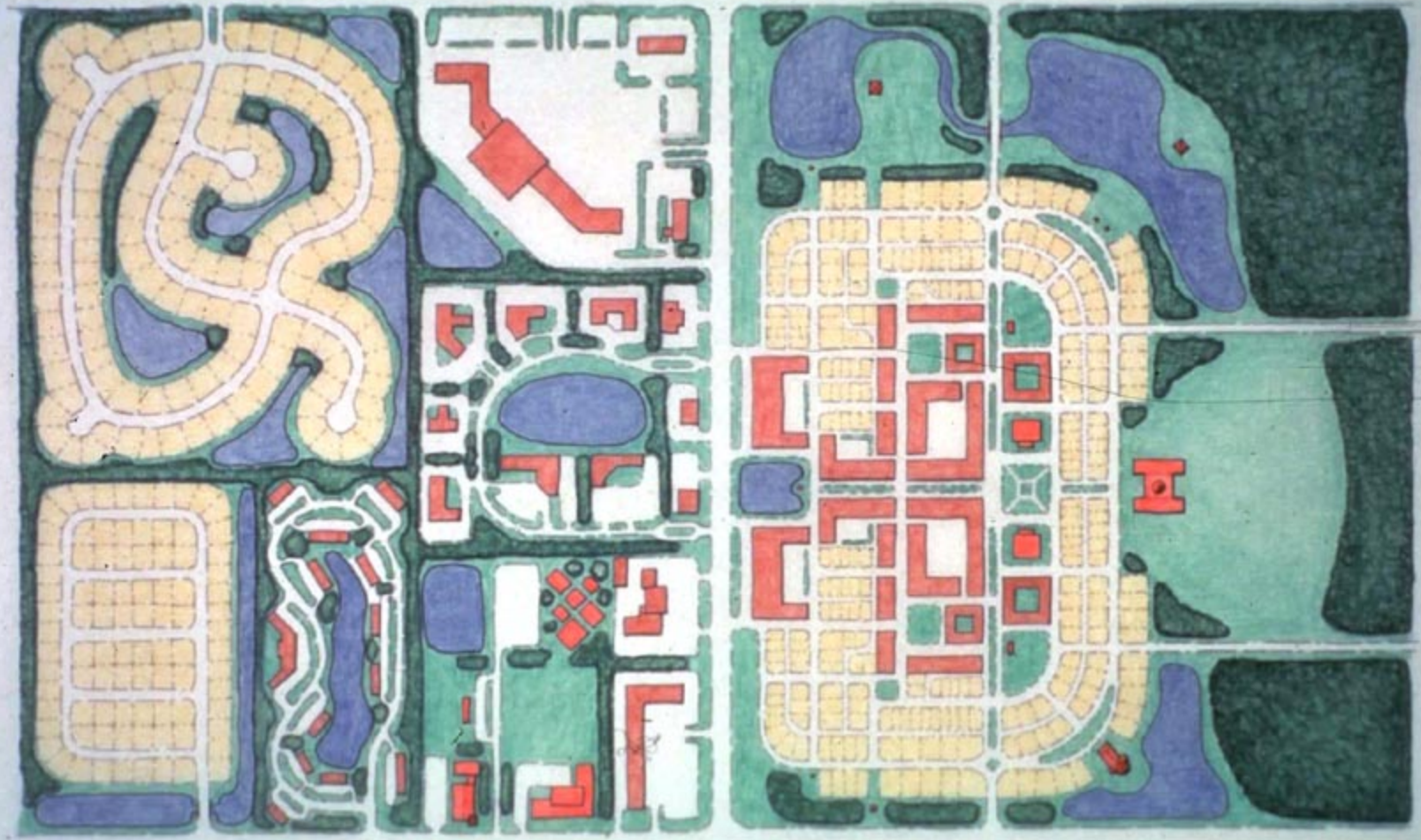

LOCAL ROADS
CITIES & COUNTIES

How FDOT Access Classes Fit Into the Whole Picture



Promote Activity Centers with Supporting Roads

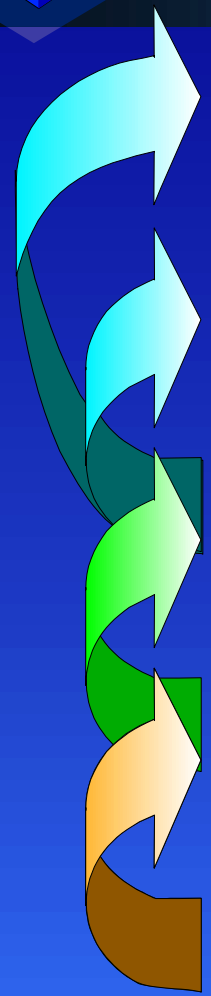




Access Relationship Between Functional Classes

Source: Virgil Stover

PUBLIC STREET SITE CIRCULATION



Major Arterial	Access drive of a very large development (shopping center of 1,000,000 GLA)
Minor Arterial	Access drive of a medium size development (500,000-750,000 GLA); Ring road for a very large development
Major Collector	Circulation road connecting parking areas of a large development; Access drive of a medium development
Minor Collector	Circulation at end of parking rows; access drive to convenience development
Local	The aisles between parking stalls; Driveway of neighborhood shopping center

Source: Virgil Stover

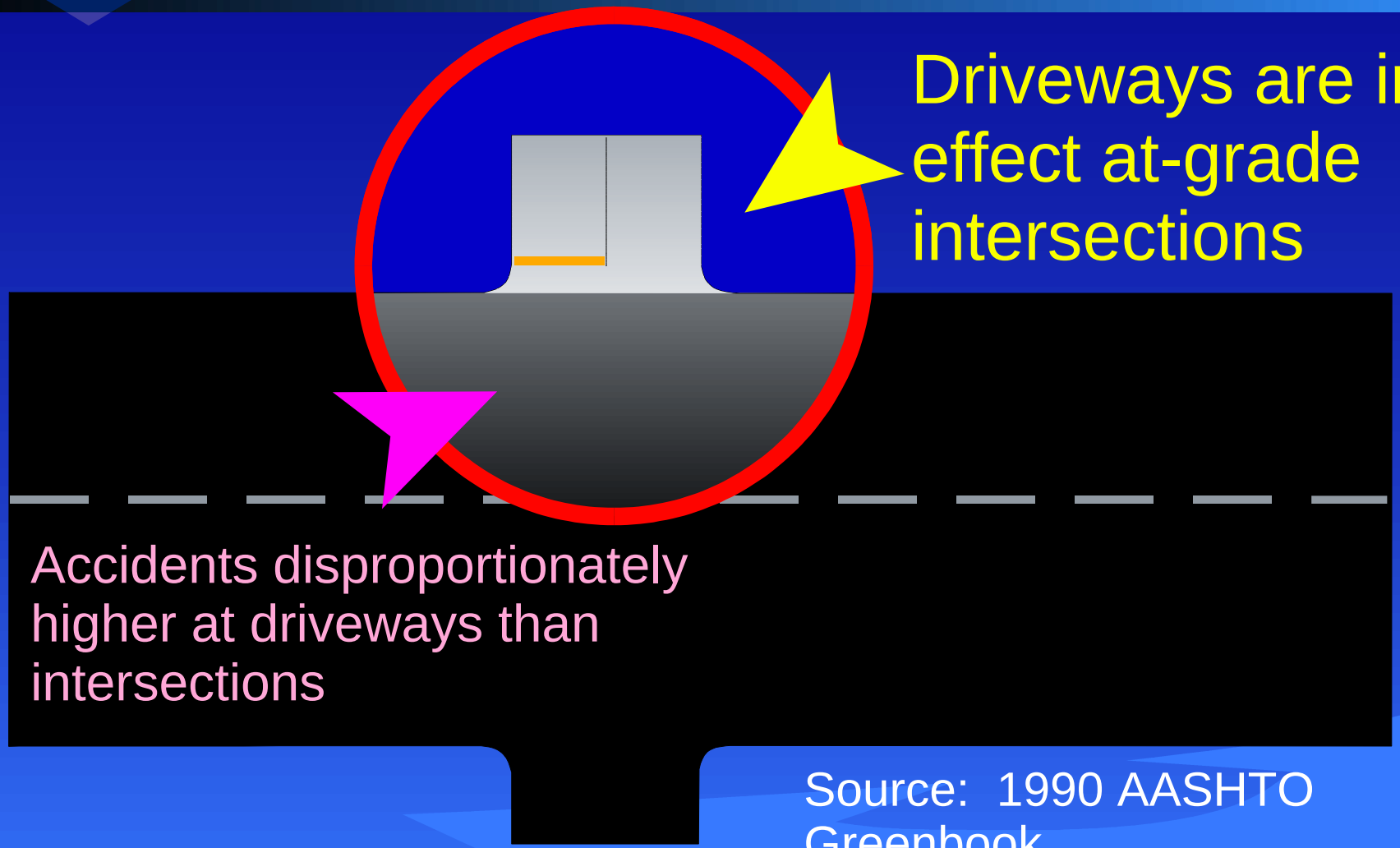
Internal Circulation Patterns

Internal Circulation Patterns
Notice ring road around mall.
Enlarging the view of this photo
allows much more detail.

General Review of Site Plan

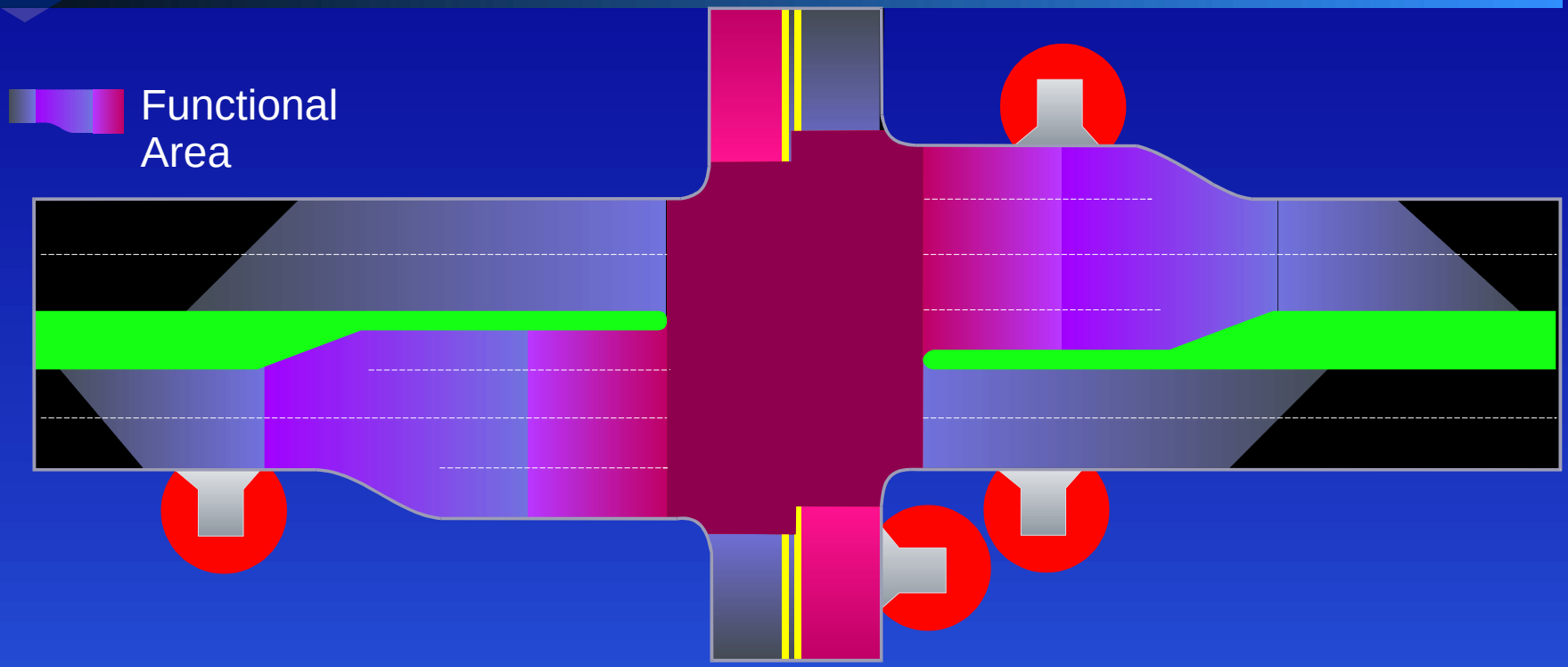
Design Outside to In

Driveways = Intersections



Source: 1990 AASHTO Greenbook

Where driveways should not be

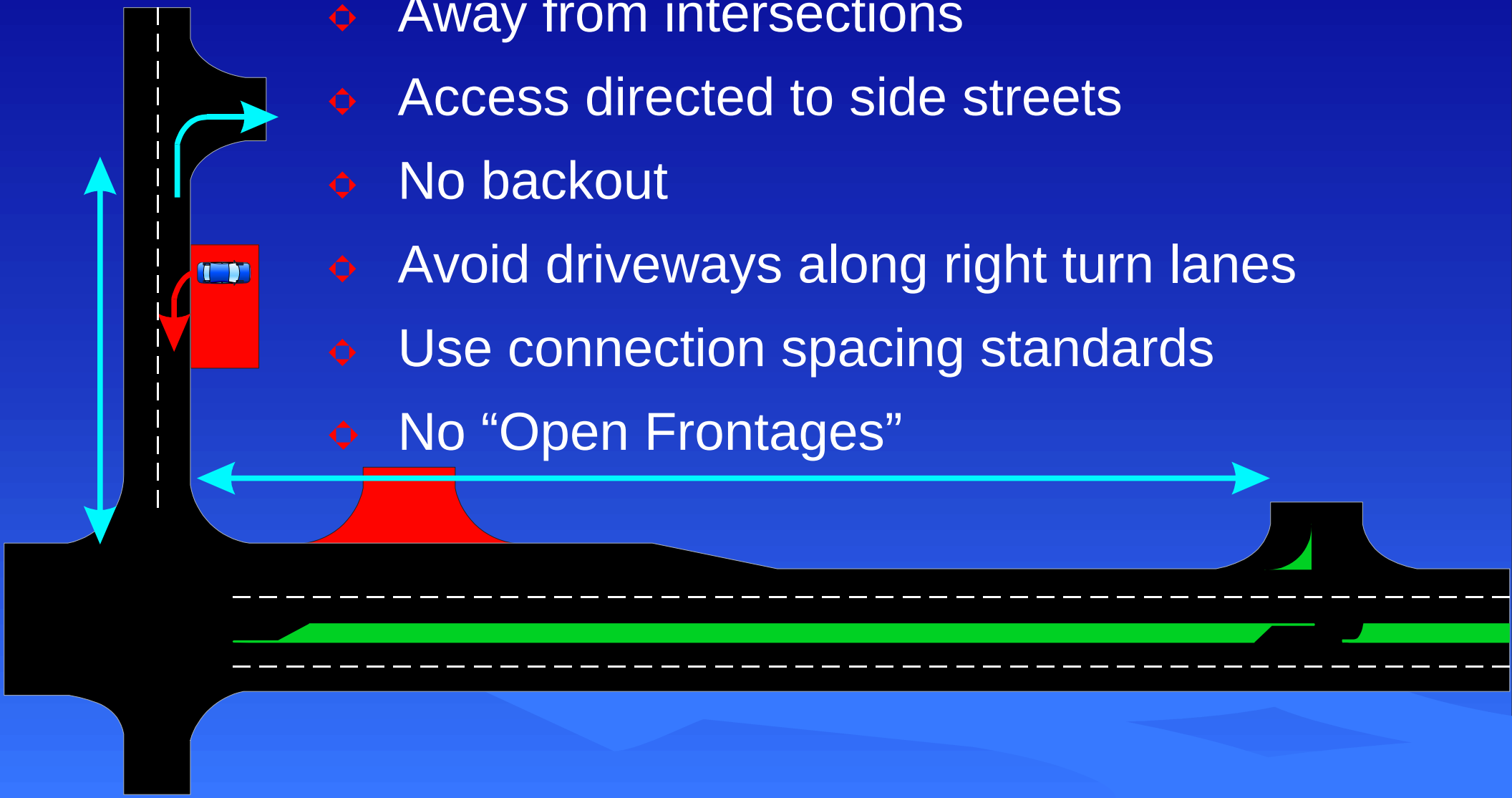


Driveways should not be situated within the functional boundary of at-grade intersections. This boundary would include the longitudinal limits of auxiliary lanes . . .

AASHTO Greenbook

Driveway Location Principles

- Away from intersections
- Access directed to side streets
- No backout
- Avoid driveways along right turn lanes
- Use connection spacing standards
- No “Open Frontages”



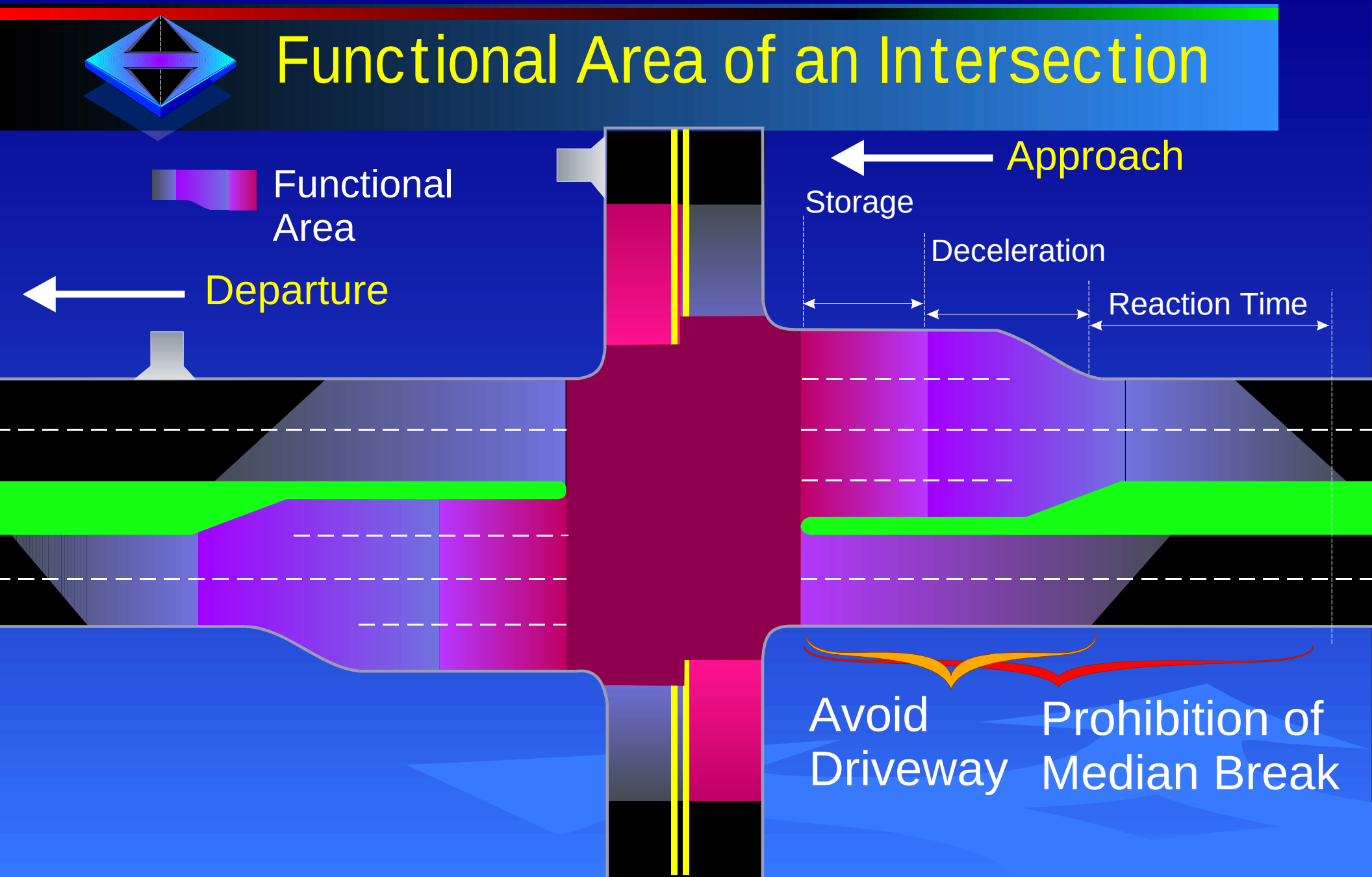
A wide open frontage

Wide open frontage allows cars
to back out directly into traffic

SPACING BETWEEN MEDIAN OPENINGS

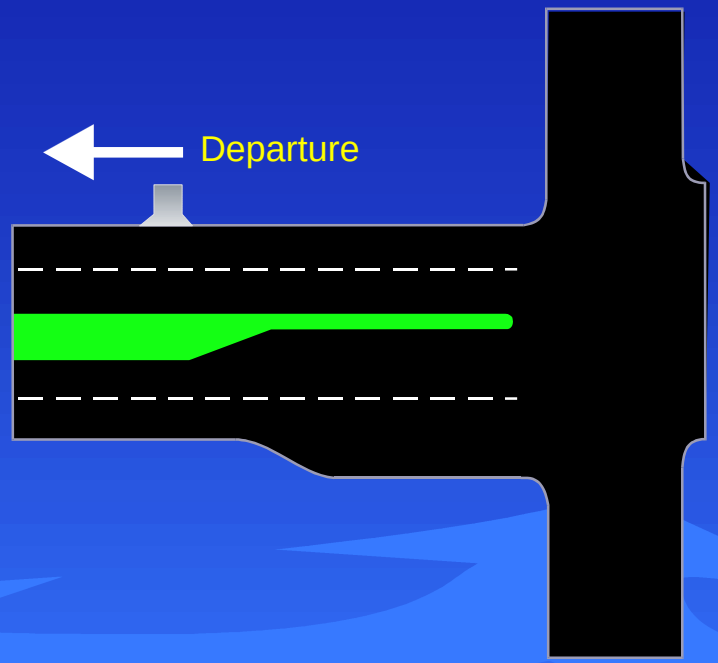
Access Class	Medians "Restrictive" physically prevent vehicles crossing "Non-Restrictive" allow turns across any point	Connection Spacing (feet)		Median Opening Spacing		Signal Spacing
		>45mph	≤45mph	Directional	Full	
2	Restrictive w/ Service Roads	1320	660	1320	2640	2640
3	Restrictive	660	440	1320	2640	2640
4	Non-Restrictive	660	440			2640
5	Restrictive	440	245	660	2640/ 1320	2640/ 1320
6	Non-Restrictive	440	245			1320
7	BothMedianTypes	125		330	660	1320

Functional Area of an Intersection



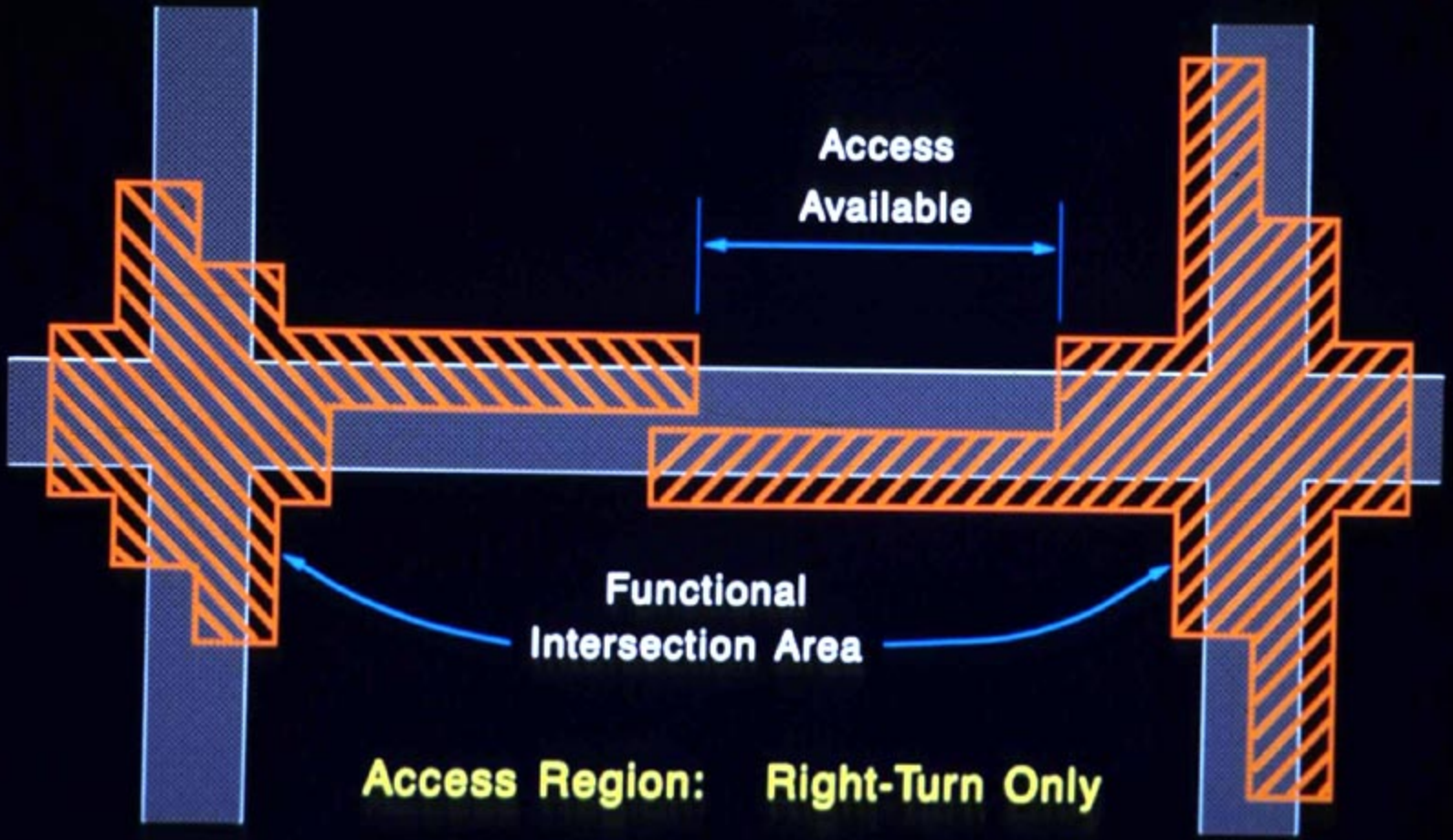
Departure Side Functional Area for Urban/Suburban Area

Departure Side Functional Area for Urban/Suburban Areas		
	Meters	**Feet**
Minimum	75	245
Desirable	100	350

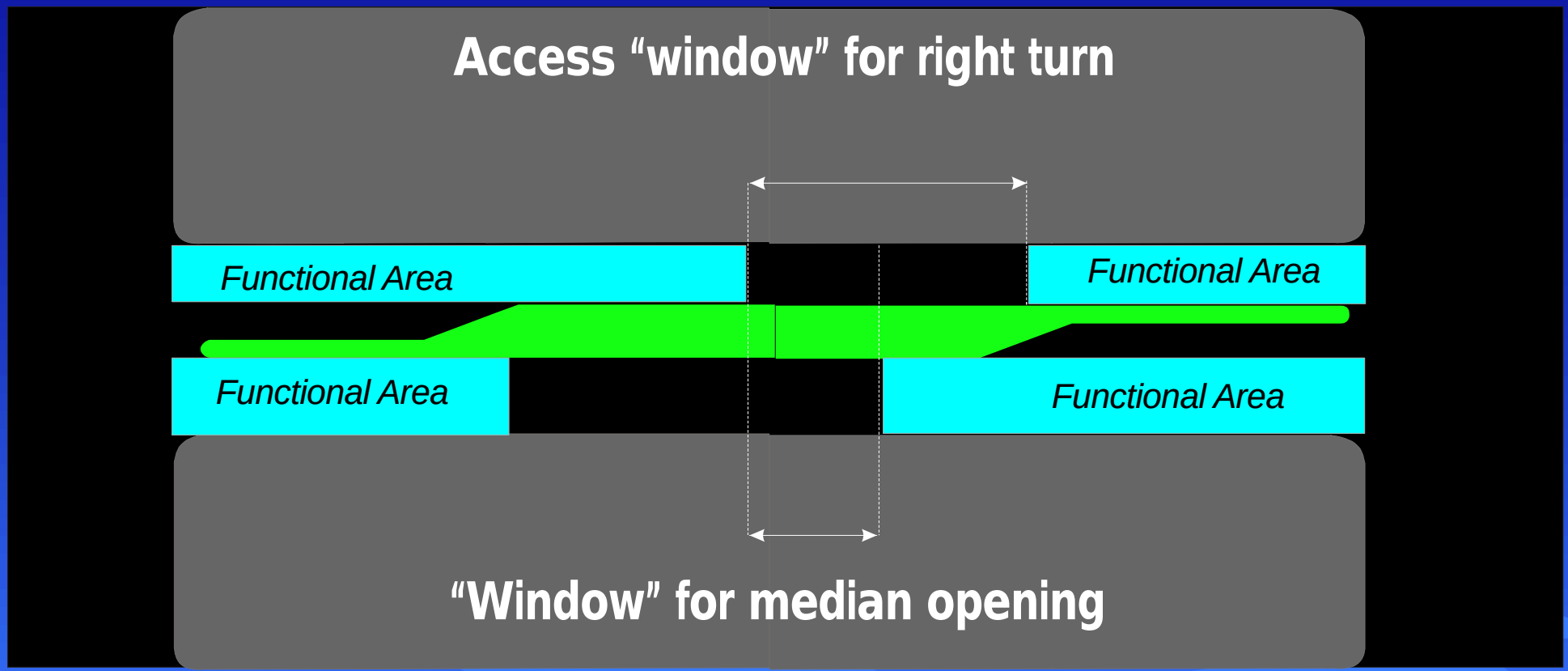


Source: Transportation and Land Development, Stover & Keopke; pg. 109, Right Turn Conflict Overlap

SITE

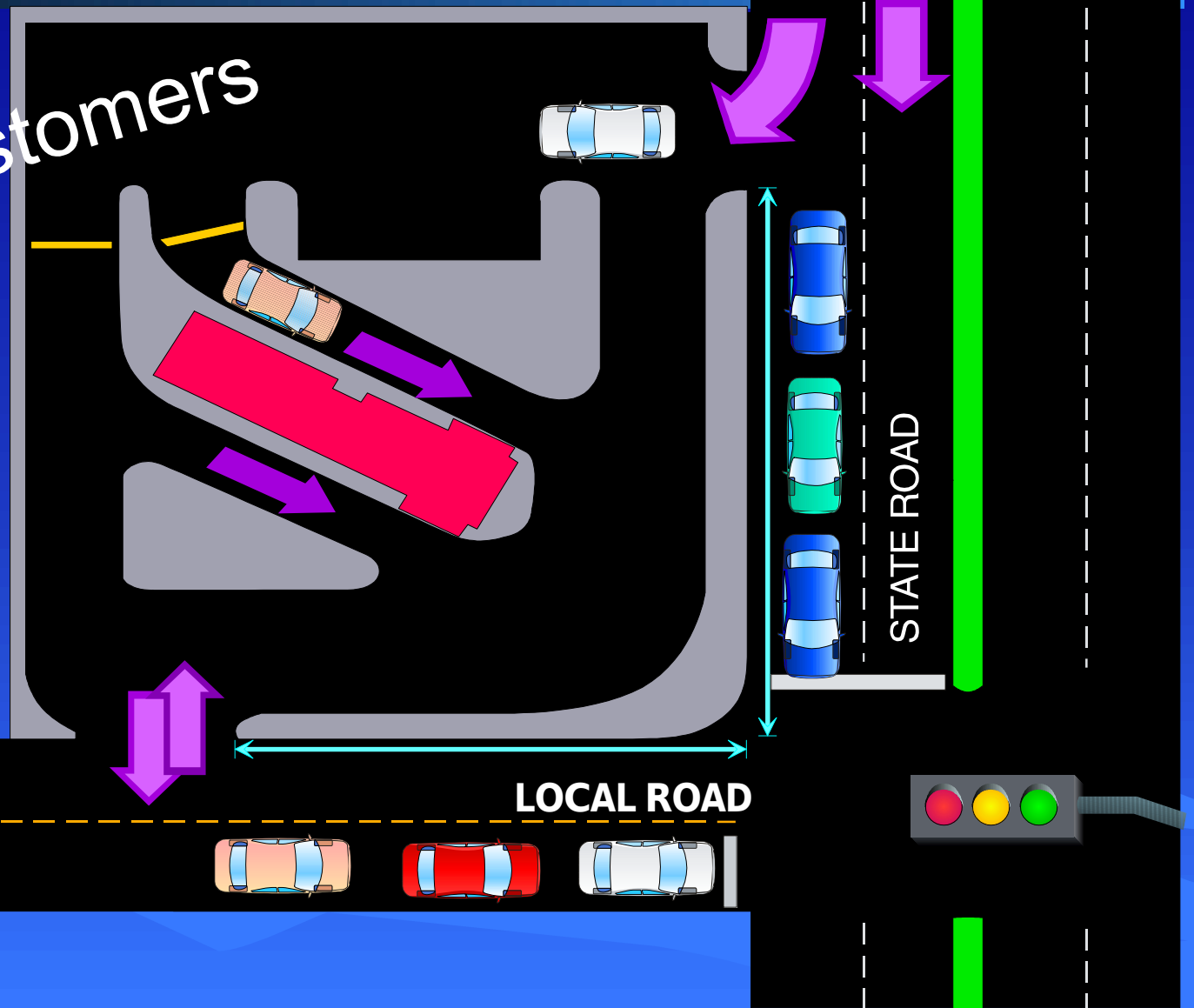

Access
Available
Functional
Intersection Area
Access Region: Right-Turn Only

Where Should Access Go?



Corner Clearance

Helps customers




Poor corner clearance

Note lack of corner clearance in this downtown location. Perhaps this entrance should have been located to the side street.

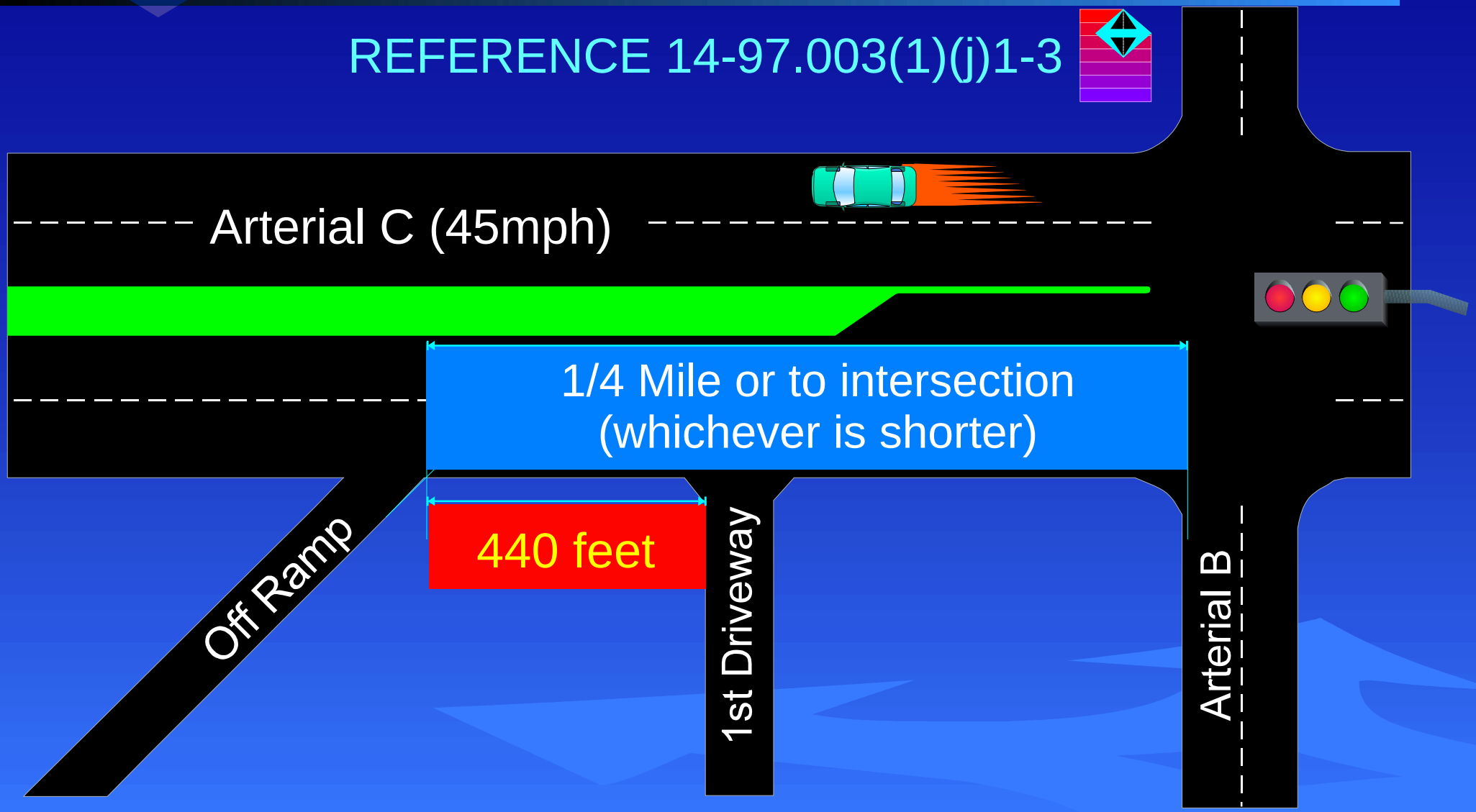
Note lack of corner clearance in this downtown location. Perhaps this entrance should have been located to the side street.

INTERCHANGE AREAS

14-97.003(1)(j)1-3

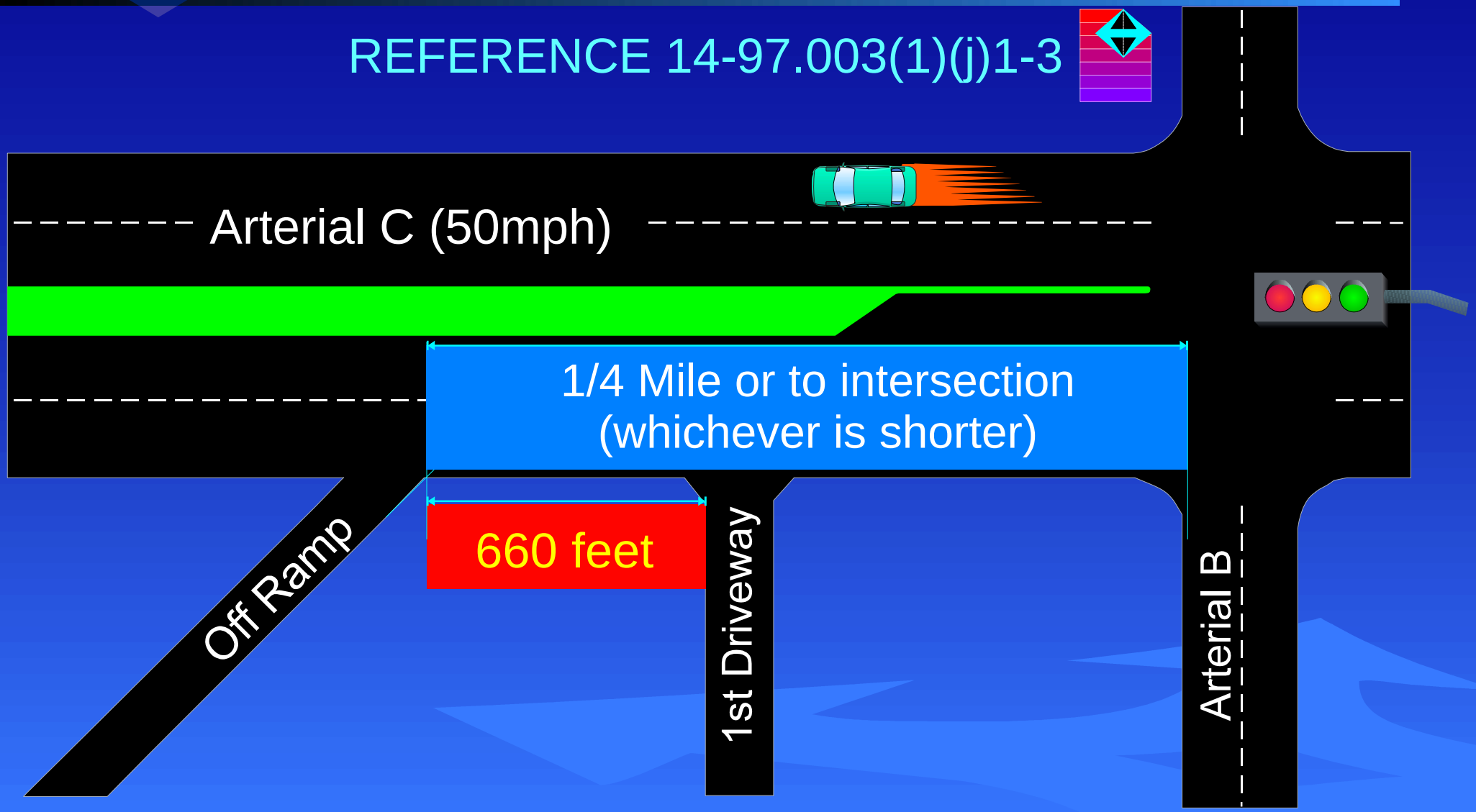
INTERCHANGE AREA

REFERENCE 14-97.003(1)(j)1-3

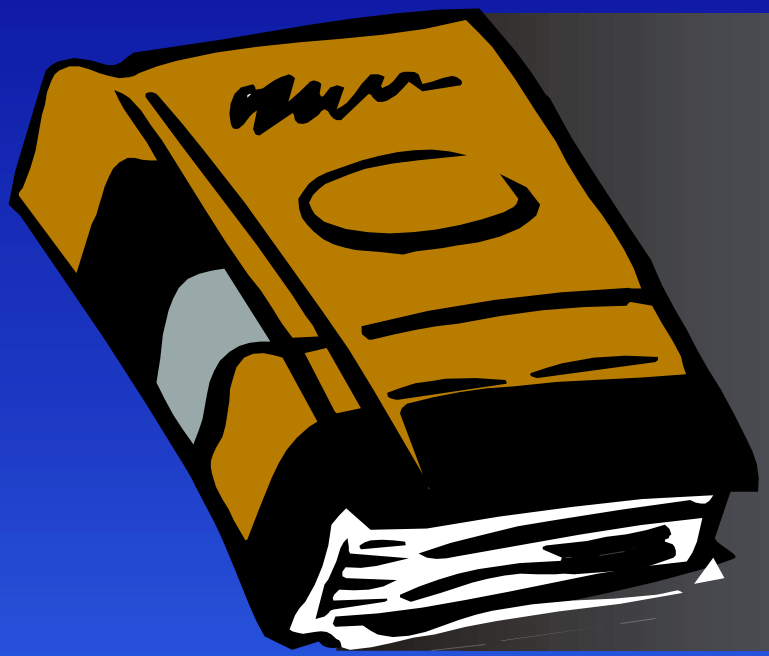


INTERCHANGE AREA

REFERENCE 14-97.003(1)(j)1-3



Wide open frontage immediately after freeway off ramp



Driveways in Florida Statute

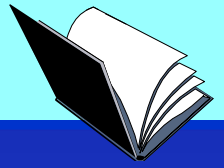
Direct Connections

A connection will be made
(full, right in/out,
right out only, etc.)
on every abutting state highway -- **UNLESS:**

- There is a safety concern (such as sight distance or heavy conflicting volumes
- The connection would have a negative impact on operations
- The property is on a freeway or service road 335.181(7)

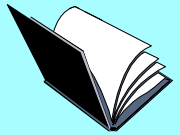
"A property owner shall be granted a permit for an access connection to the abutting state highway, unless the permitting of such access connection would jeopardize the safety of the public or have a negative impact upon the operational characteristics of the highway."

335.184(3)FS



" Nothing in this subsection limits the department's authority to restrict the operational characeristics of a particular means of access."

335.184(3)(d)FS



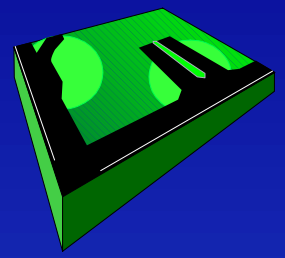
Nothing in the law
limits the Department's authority
to restrict the driveway's
allowed movements such as
right-in only or right out only

What Should be in a Site Plan?

Access Permit Categories

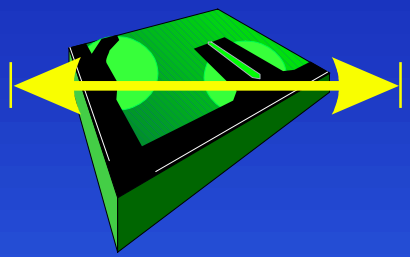
Access Permit Categories - Rule 14-96		
Category	**Vehicles per Day**	**Fees**
A	to 20 VPD	$50
B	21 - 600	$250
C	601 - 1,200	$1,000
D	1,201 - 4,000	$2,000
E	4,001 - 10,000	$3,000
F	10,001 - 30,000	$4,000
G	Over 30,000	$5,000

NECESSARY INFORMATION



Site plan

- Basic geometry of site/ Aerial photographs
- Detailed drawing of access, circulation & parking
- Landscaping details
- Location of existing/ proposed utilities
- Finished grades and contours
- Neighboring properties



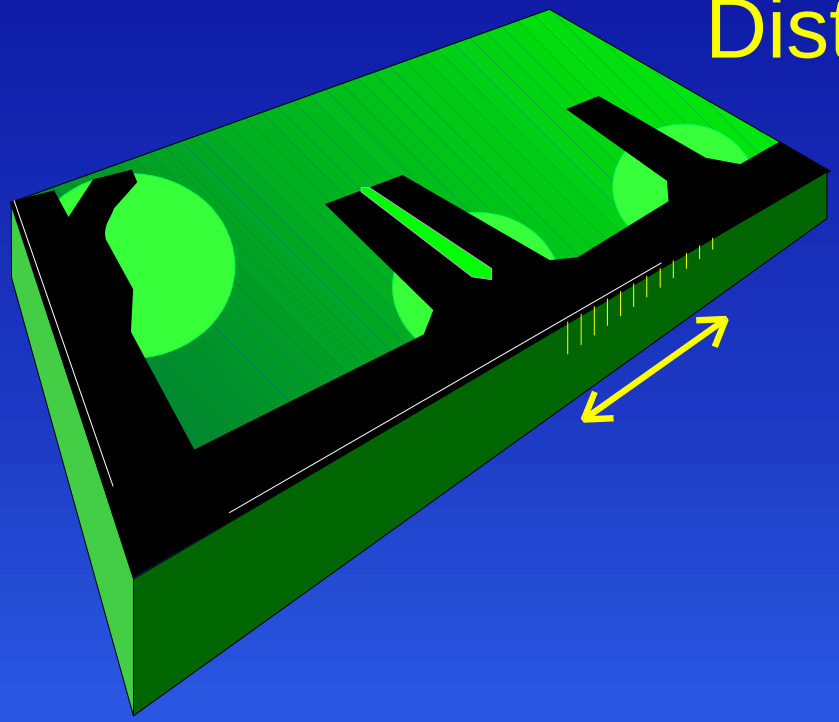
Critical measurements (Rule 14-97)

- Distance between driveways
- Corner clearance
- Median opening spacings

Traffic data critical to the site analysis

- Look especially for conflicts (left turns)

Critical Measures on Site Plan



Distances to Neighboring

- Driveways
- Intersections
- Median Openings

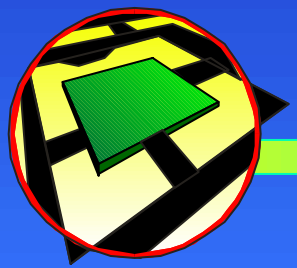
- 660 feet if posted speed is 45 mph or less
- 1,320 feet if posted speed is greater than 45 mph

Source: 14 - 96

What minimum information is required for a site plan review?

For developments over 600 daily trips:

- All proposed driveways
- Any internal site circulation element impacting the public road system
- Right of way lines
- Neighboring property lines
- Critical road features and distance measures
- Distance from neighboring driveways, median openings, and signals



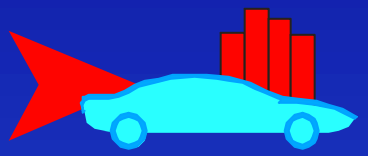
The larger the project, the more detail required

Source: 14 - 96

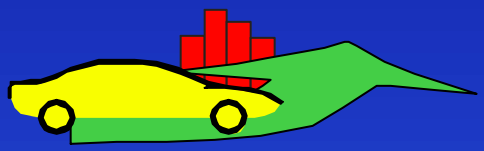
Traffic Study Requirements

For developments over 1,200 daily trips:

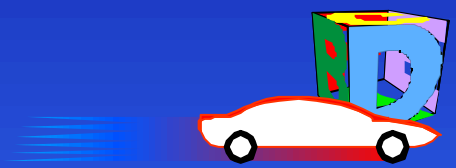
1200+



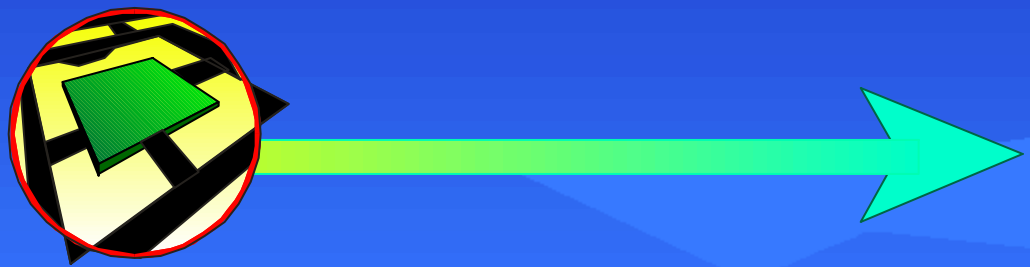
- Trip generation analysis (peak hour)



- Critical peak hour turning movements



- Traffic operations analysis of sufficient detail

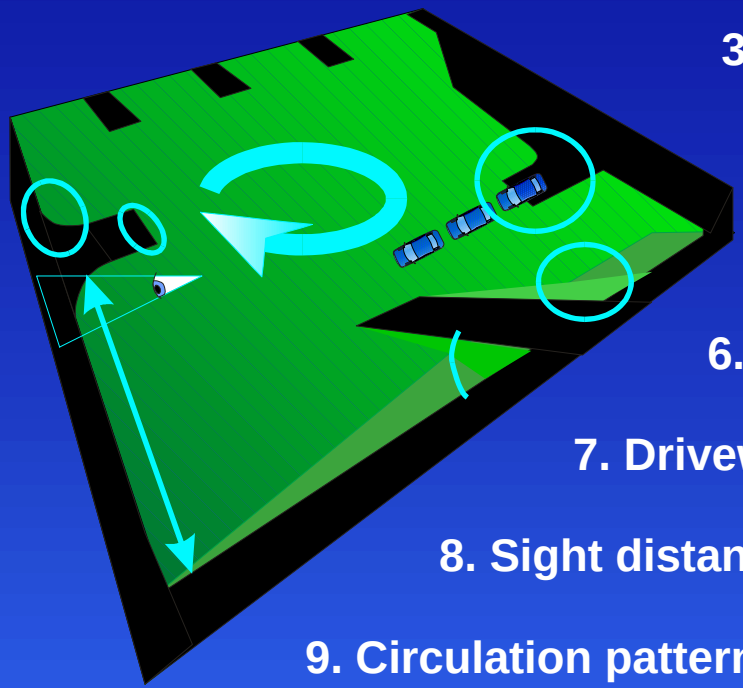


The larger the project, the more detail required

Source: 14 - 96

Overall Review of Access Plans

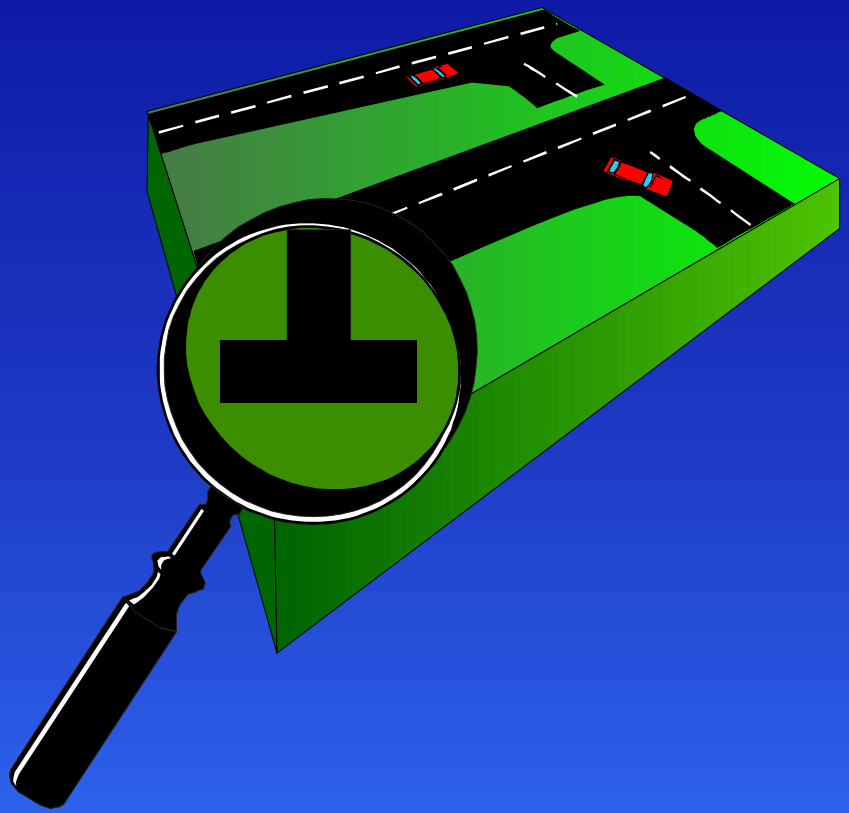
1. **Driveway location** - Meet Rule 14-97 standards? Located in the functional area?
2. **Total number of driveways** - Can number of driveways be reduced?



3. **Driveway radius or flare** - Getting vehicles on and off
4. **Driveway width** - Too wide?
5. **Auxiliary lanes** - Right or left turning traffic?
6. **Angle of driveways** - One-way drives
7. **Driveway grade** - Entry and exit at safe speeds
8. **Sight distance** - Are obstructions in the line of sight?
9. **Circulation pattern** - Circulation to take place on-site
10. **Projected conditions** - Is there enough storage?
11. **Physical construction design** - Construction materials sufficient?

See Section 23 Site Plan Review pg 2 - 35

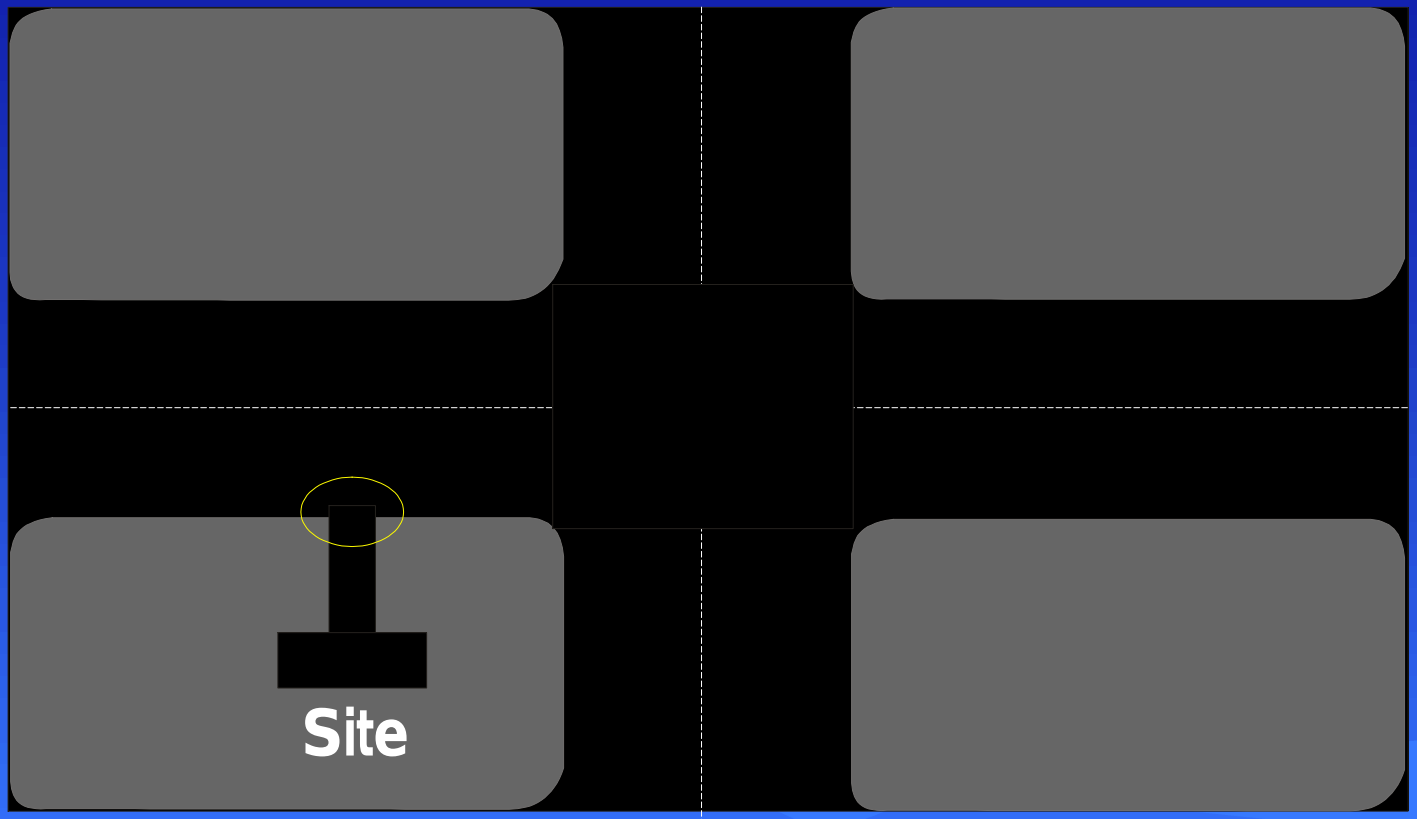
Adapted from: Access Management for Streets and Highways USDOT/1982 (Stover, Adkins, & Goodknight)



Guidelines for External Study Area

Traffic Assessment
Categories A and B

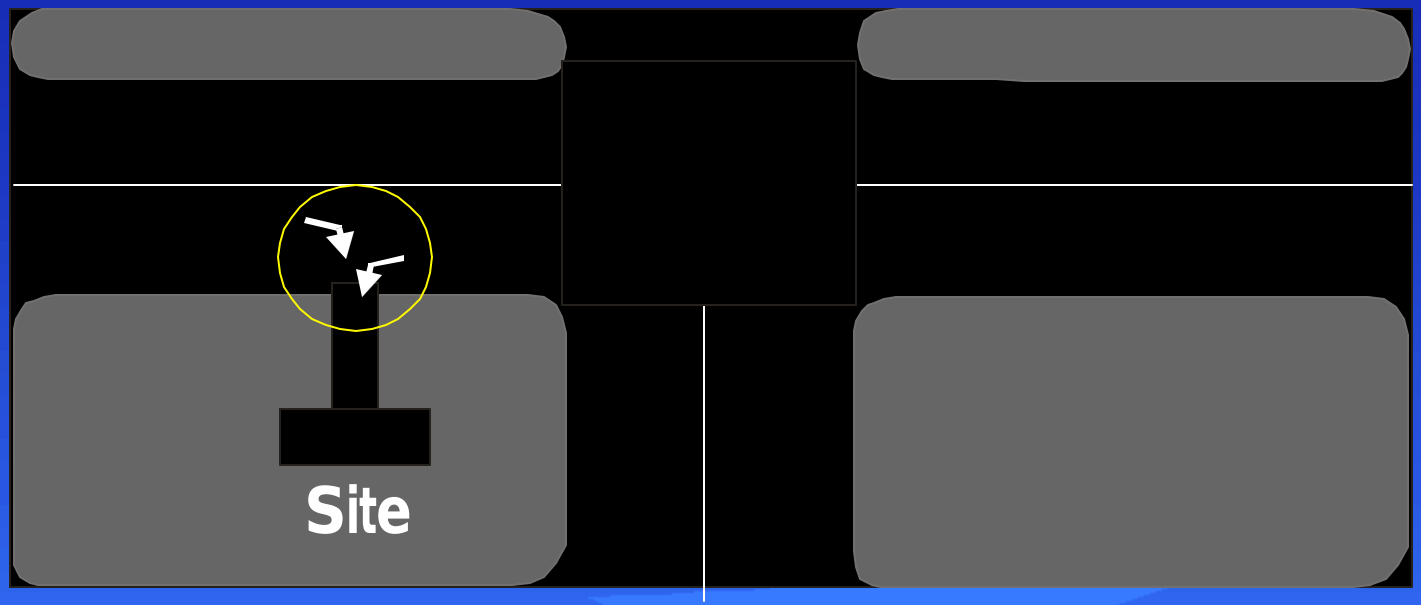
1 - 600 trips per day
Traffic generally of little impact



Examples Category A & B
Single Family Home
Duplex
Mom and Pop Catering

Traffic Assessment
Categories C

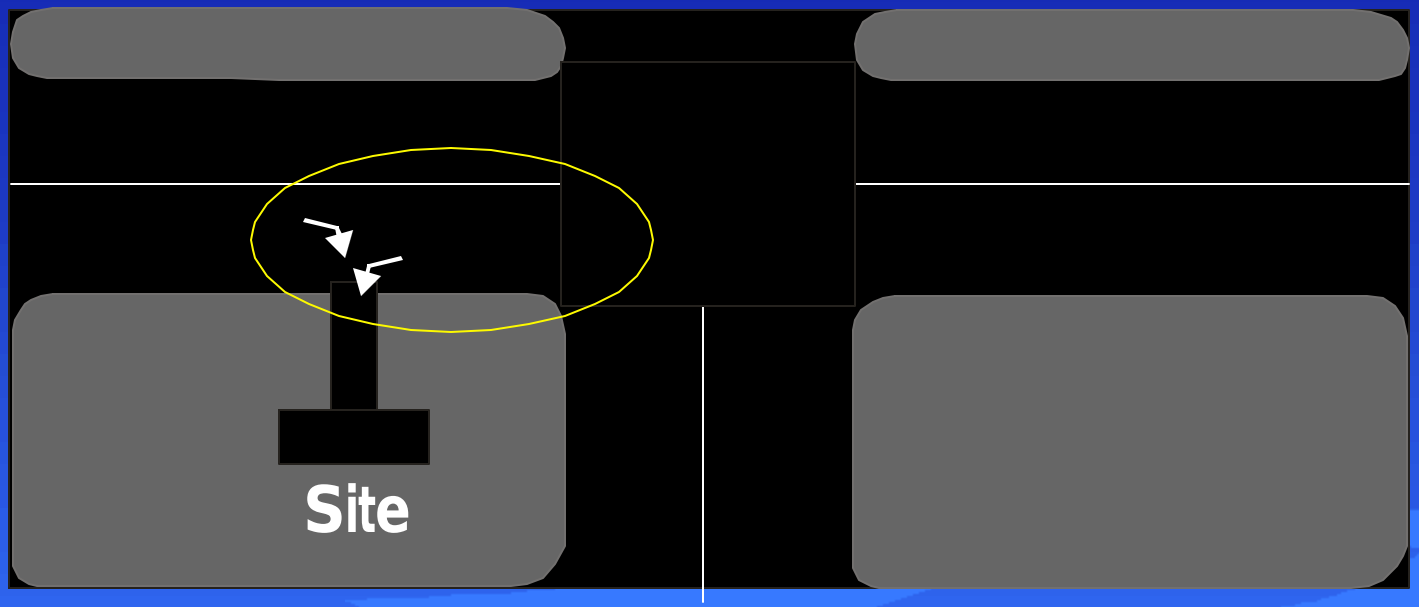
601 - 1,200 trips per day
Evaluate driveway movements for potential problems
- You may require study if you have concerns



Examples Category C
50 home subdivision
30,000 sq ft Medical Office
100 room Motel
50,000 sq ft General Office

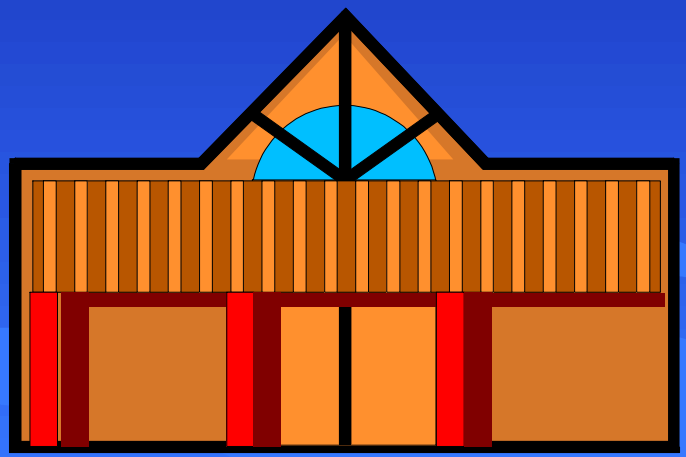
Traffic Assessment
Categories D

A comprehensive study may be necessary
1,201 - 4,000 trips per day
Evaluate driveway movements
Assess impacts on nearby intersections



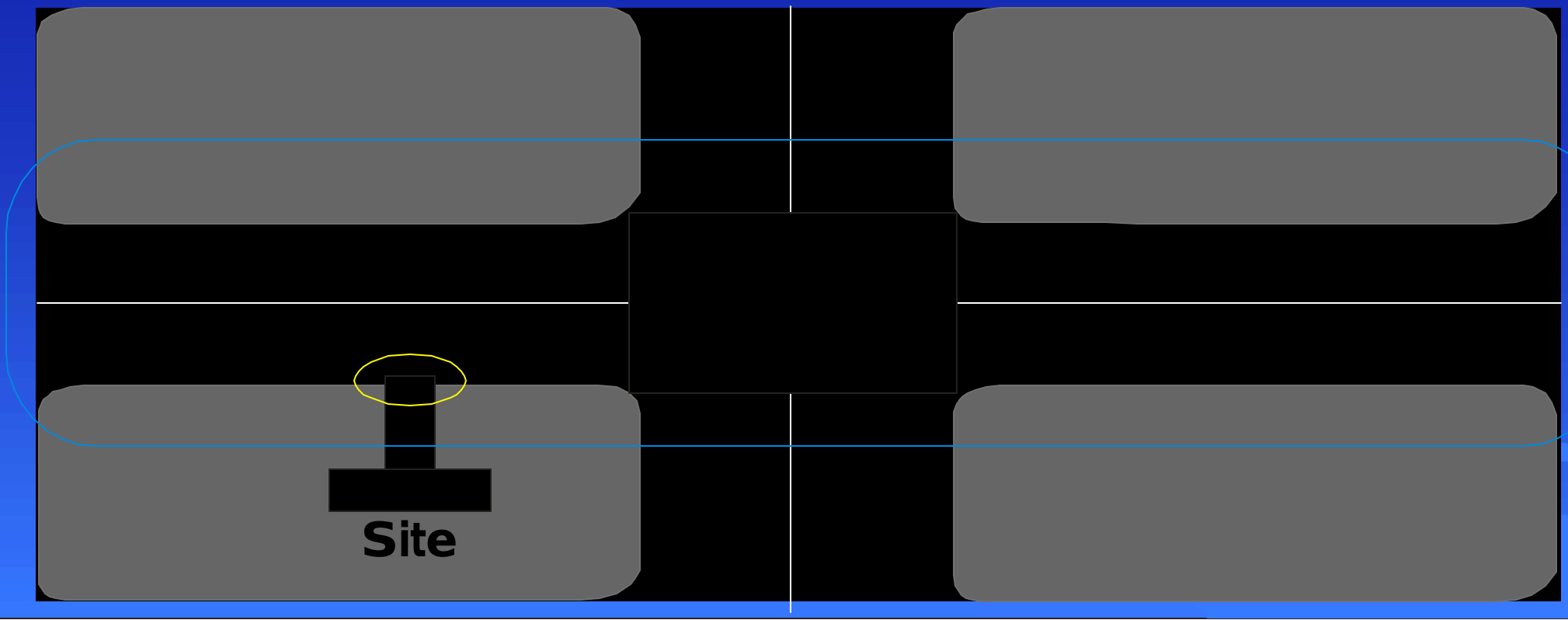
Examples Category D

1,201 - 4,000 trips per day
300 home subdivision
35,000 sq ft Shopping Center
- neighborhood size
1,000 sq ft Convenience Market
- with 6 fueling stations
300,000 sq ft General Office
- approx. 25 acres at suburban densities



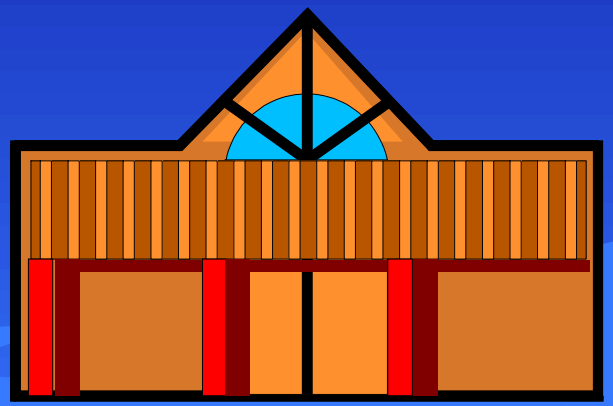
Traffic Assessment - Category E

4,001 - 10,000 trips per day
Evaluate driveway movements
Assess impacts on several nearby intersections



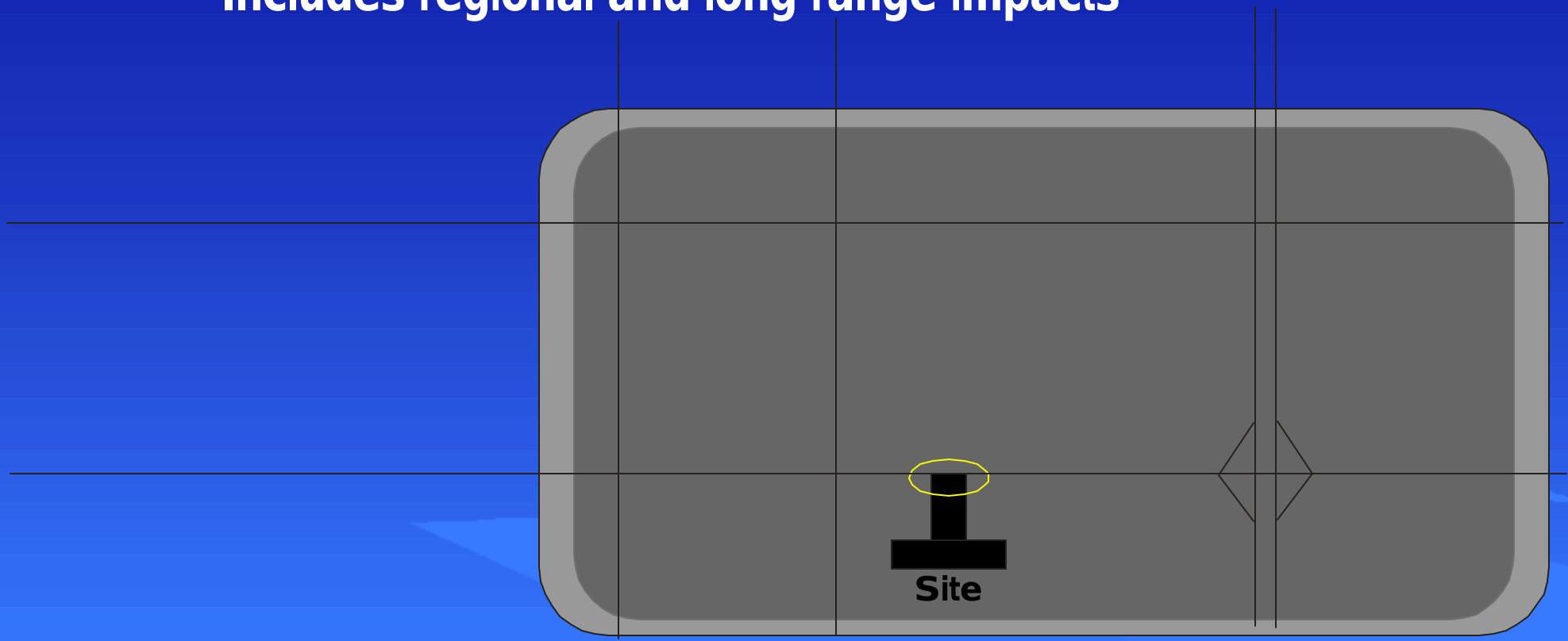
Examples Category E

4,001 to 10,000 trips per day
400,000 sq ft of General Office
150,000 sq ft shopping center
500 home subdivision



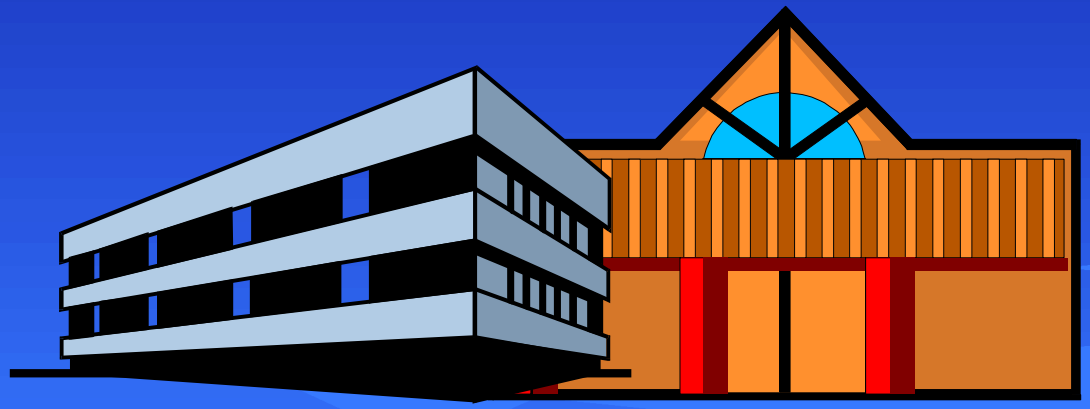
Traffic Assessment - Category F

10,000 - 30,000 trips per day
Evaluate driveway movements
Assess impacts on several nearby intersections
Includes regional and long range impacts



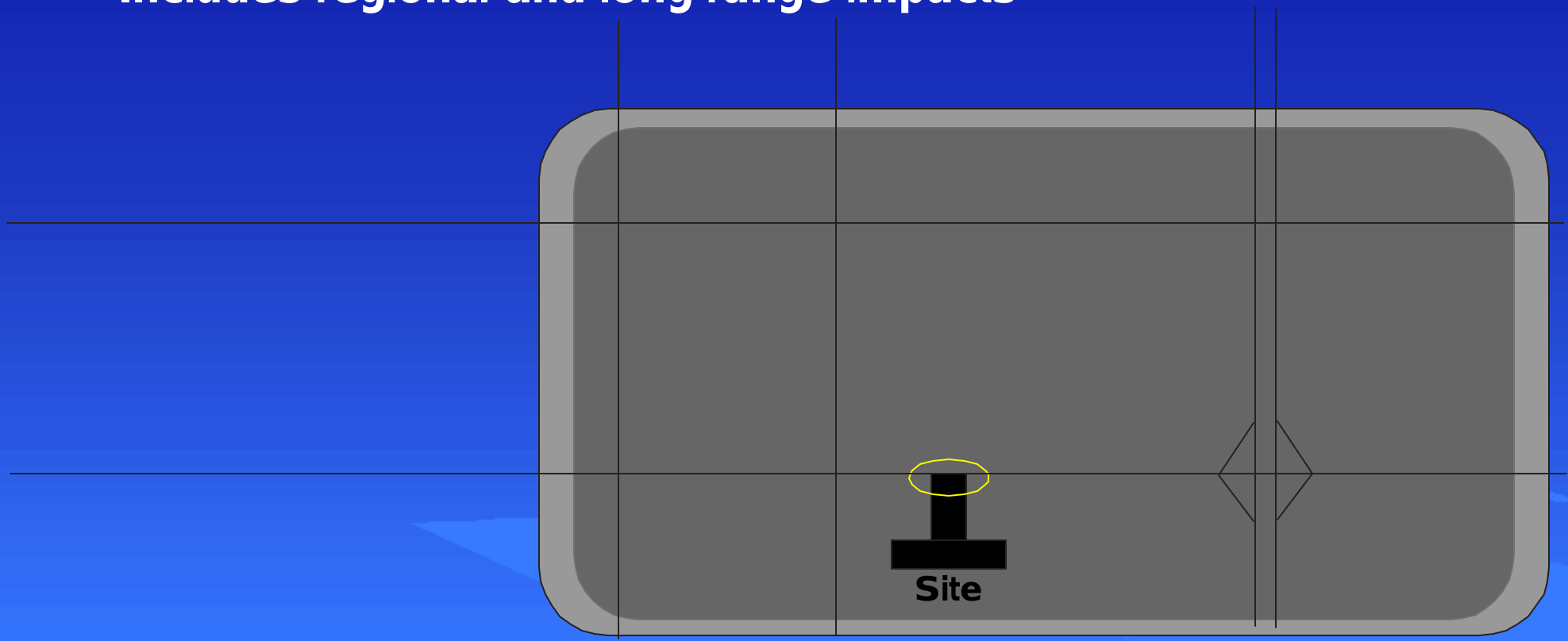
Examples Category F

- 10,000 - 30,000 trips per day
- 1.4 Million sq ft General Office
- 200,000 sq ft shopping center
- 2,000 Home subdivision



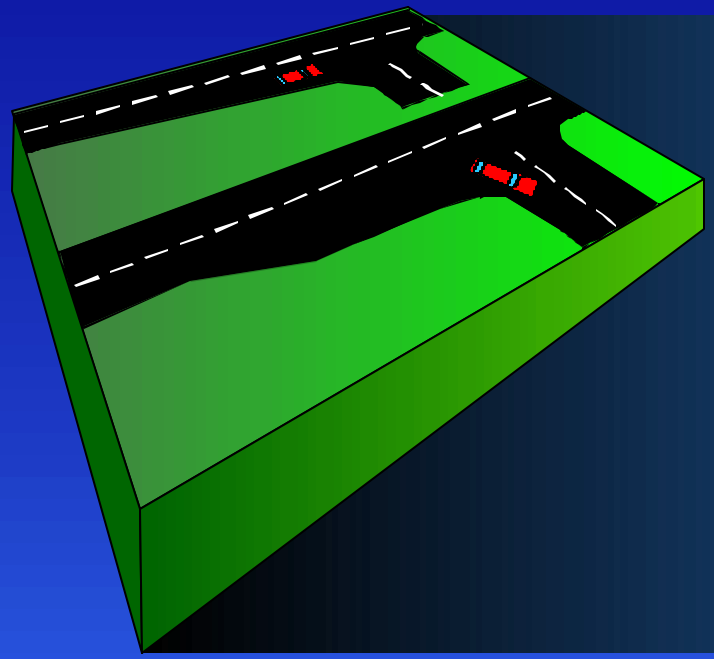
Traffic Assessment - Category G

Over 30,000 trips per day
Assess impacts on intersections and wide range of facilities
Includes regional and long range impacts



Examples - Category G

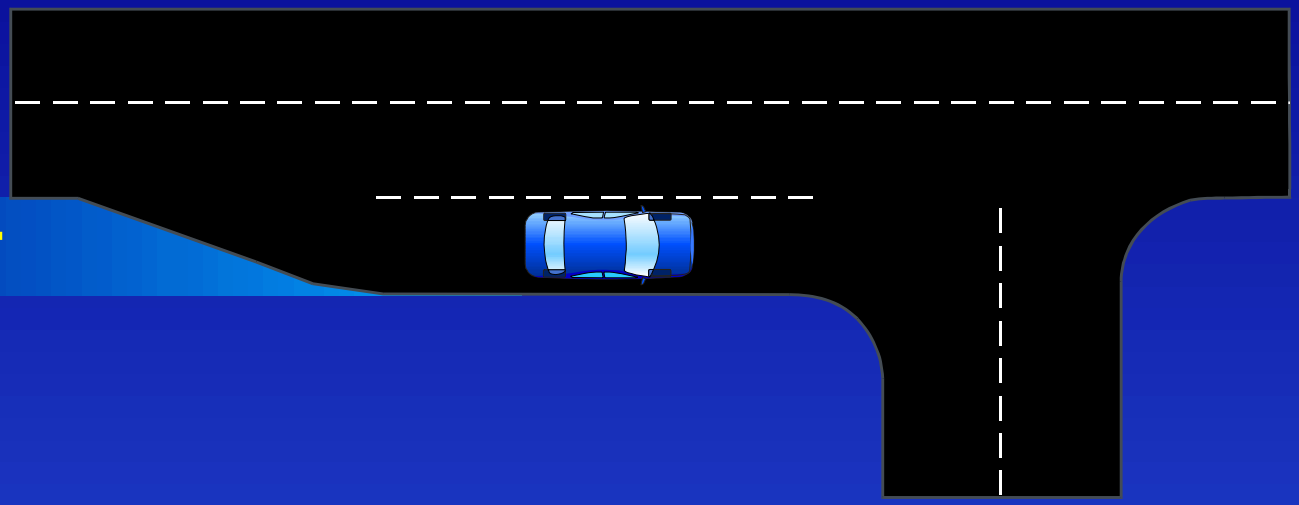
- 1.5 Million sq ft Regional Mall
- 6 Million sq ft General Office
- Large mixed use



RIGHT TURN LANES

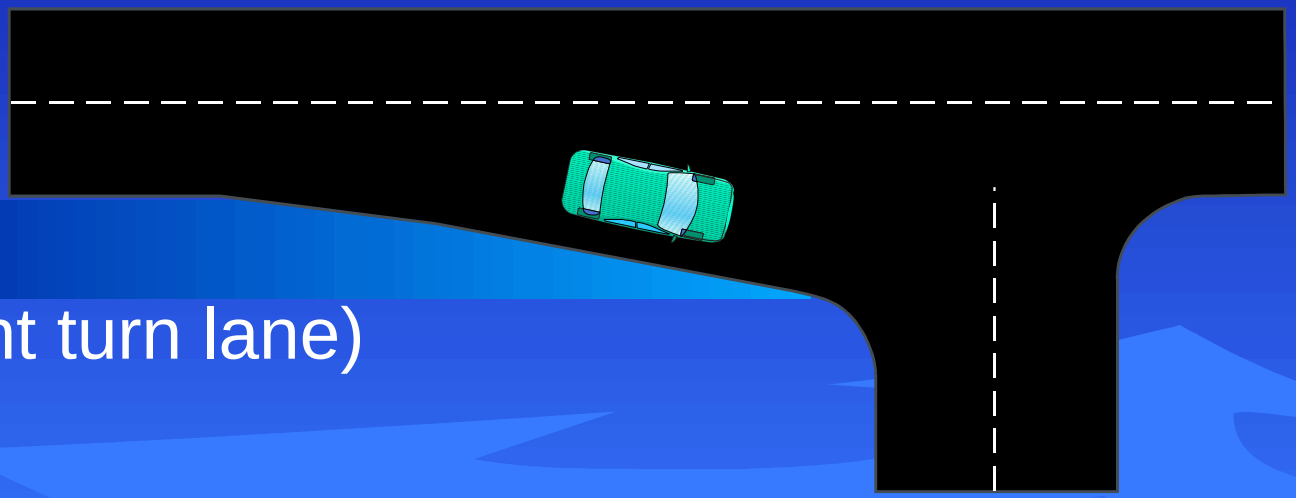
TURN LANES

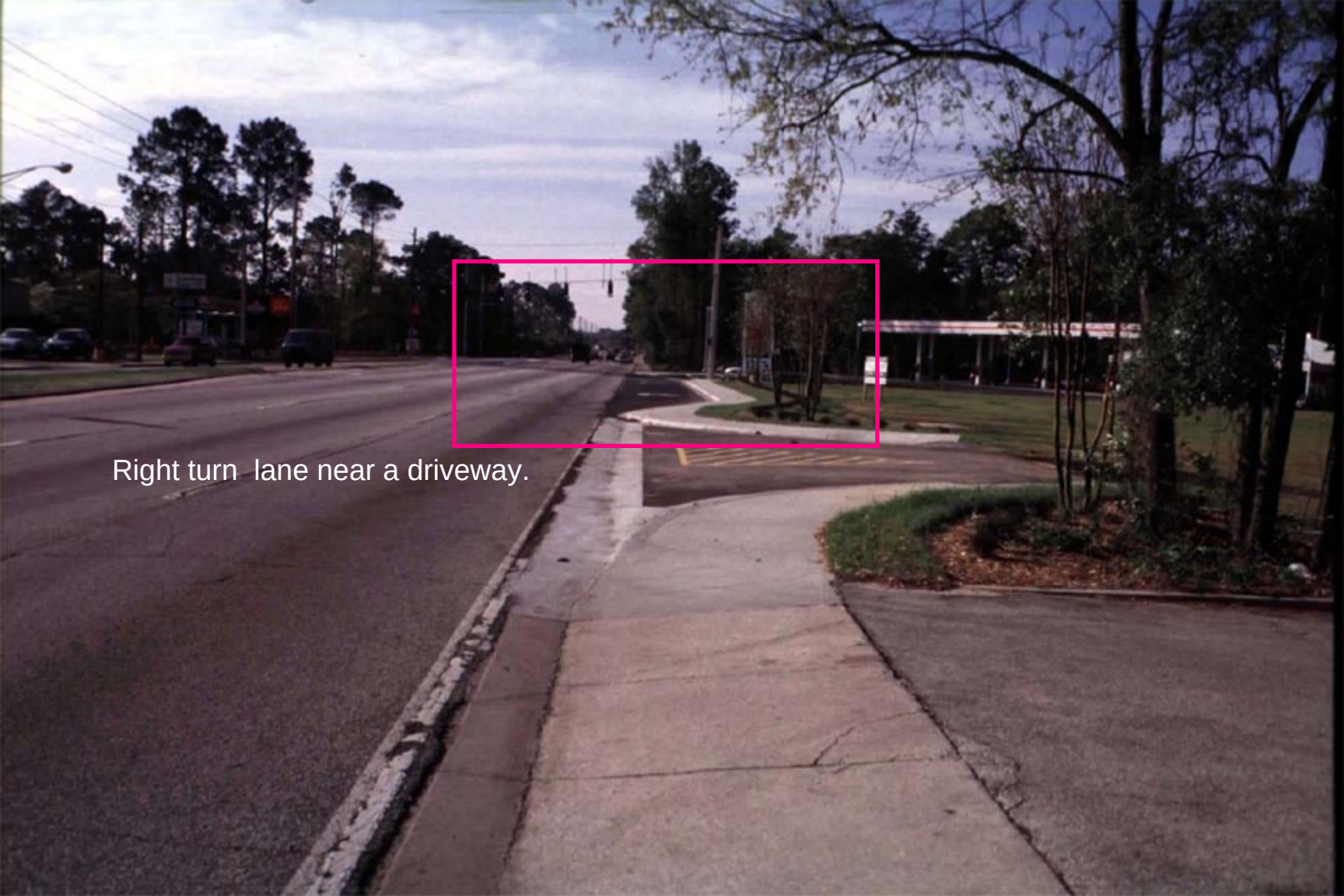
FULL RIGHT TURN LANE



TAPER

(Not a full right turn lane)

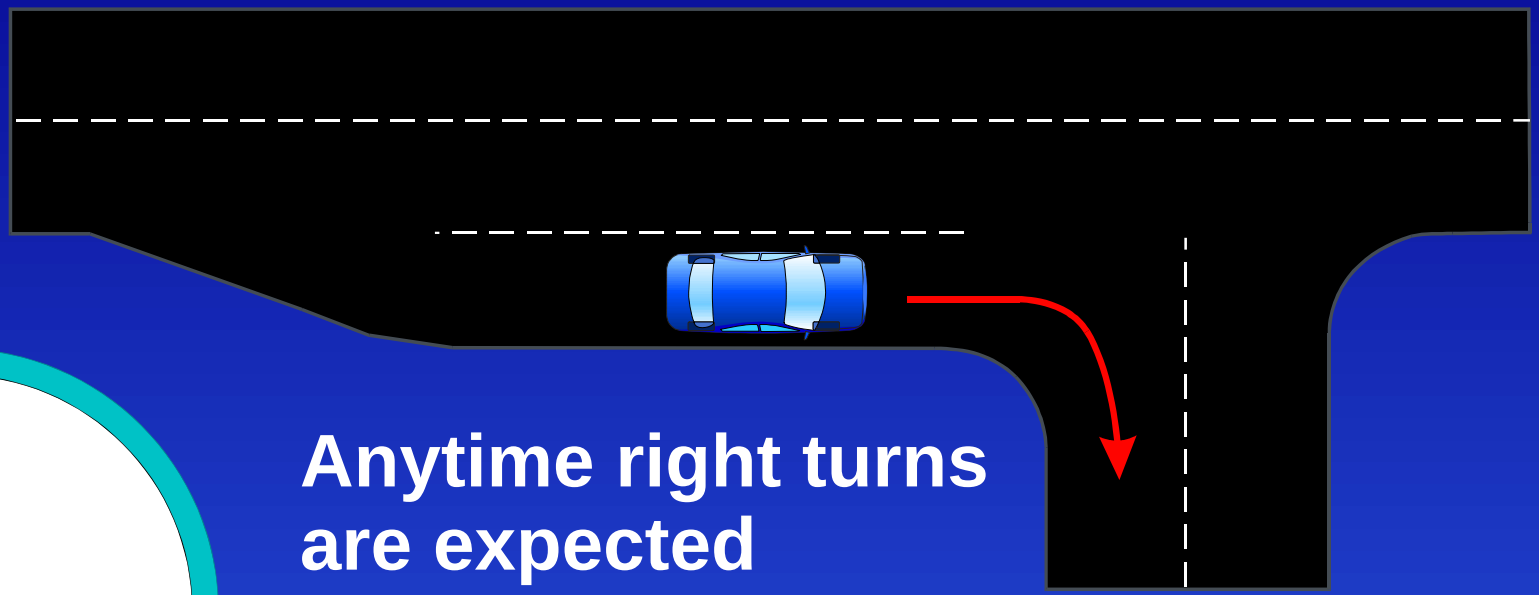




Right turn lane near a driveway.

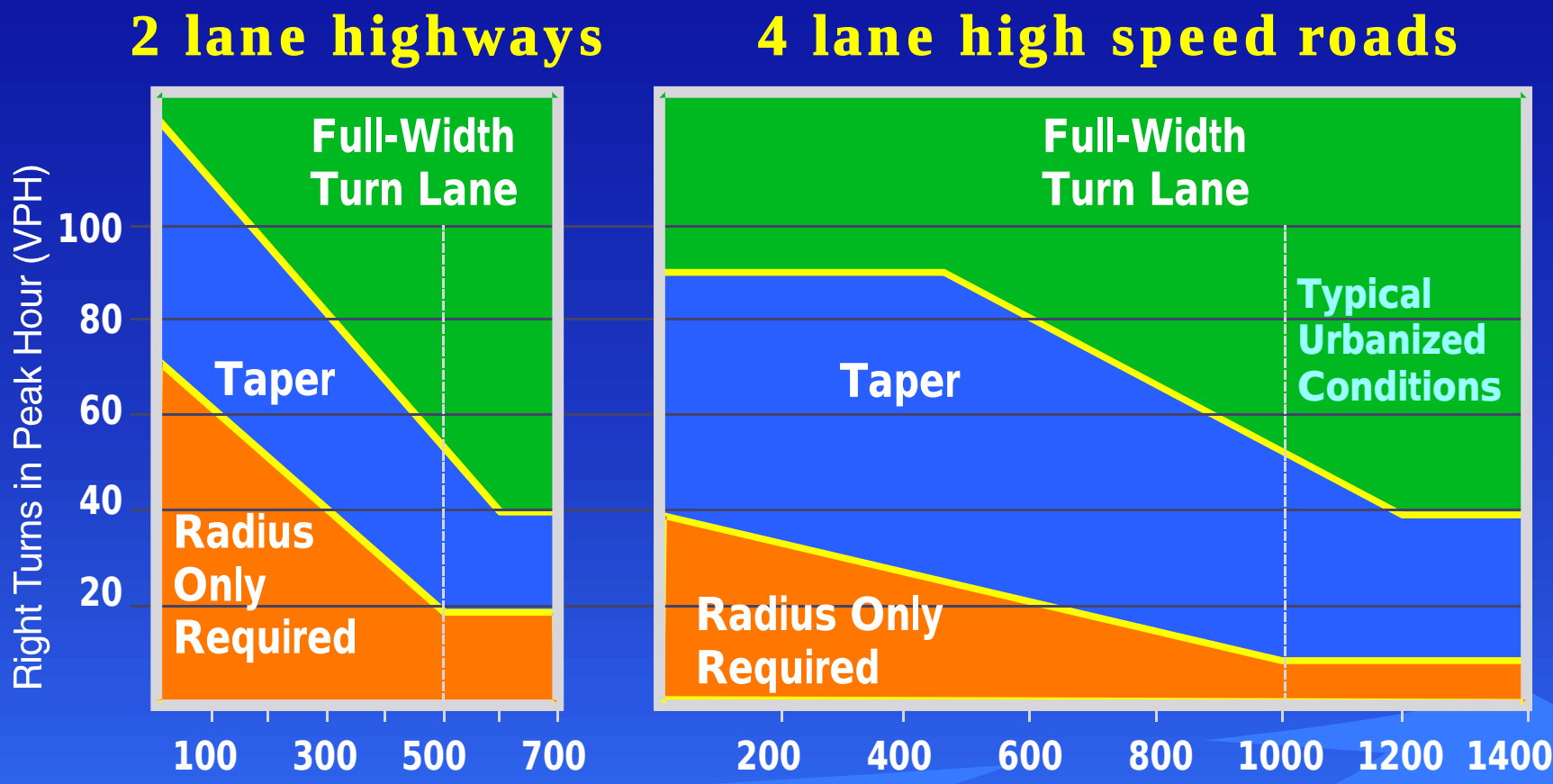
Example of a taper turn lane.

Right Turn Lane



Anytime right turns are expected to be greater than 40 right turns per hour, a separate right turn lane should be considered

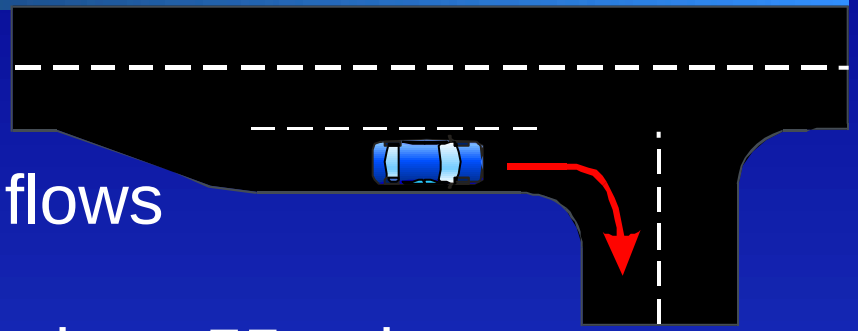
Right-Turn Lane Guidelines



Source: Virginia DOT

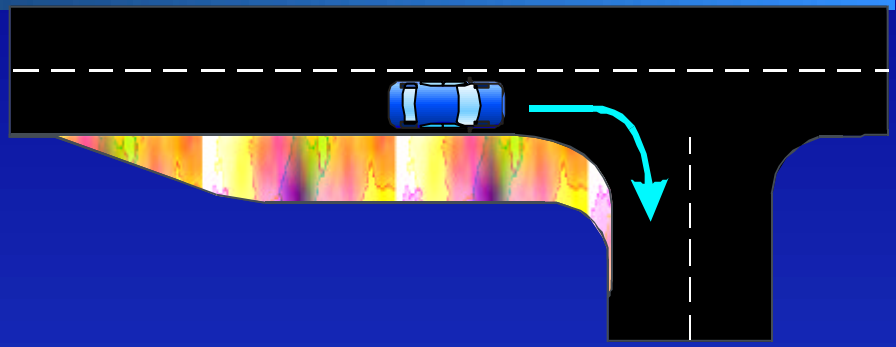
* These guidelines may be inappropriate in built-out urban areas

Conditions for providing a separate right turn lane for less than warranted traffic:



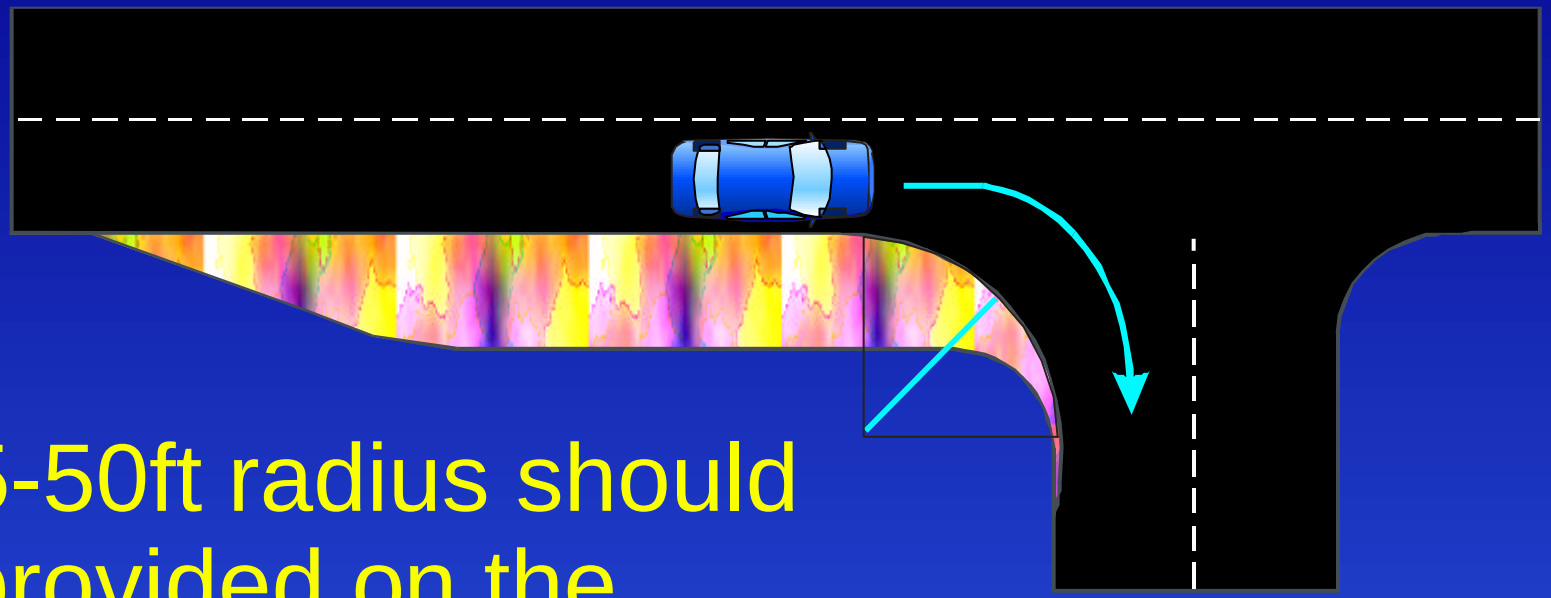
- Heavier than normal peak flows
- High operating speeds - such as 55mph
- Site in an undeveloped or developing area
- Poor internal site design causing potential of "backups" on the through lanes
- Local government policy

Conditions for not requiring a right turn lane where possibly warranted:

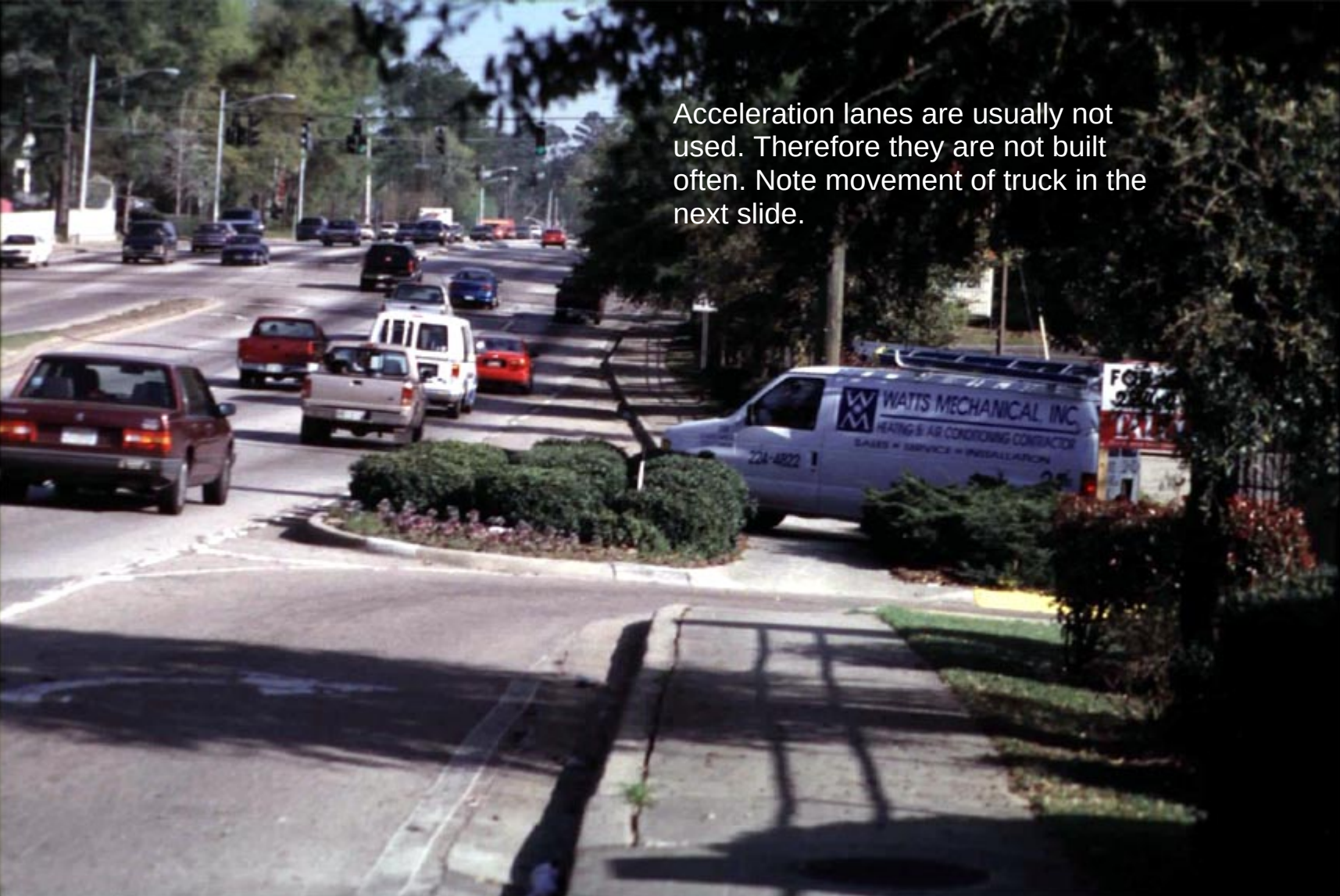


- Pedestrian concerns
- Dense or built-out corridor where space is limited
- Where sufficient length or property width is not available for appropriate design
- Local government policy

Where conditions may warrant a separate right turn and it cannot be provided,



a 35-50ft radius should be provided on the approach edge of the connection



Acceleration lanes are usually not used. Therefore they are not built often. Note movement of truck in the next slide.

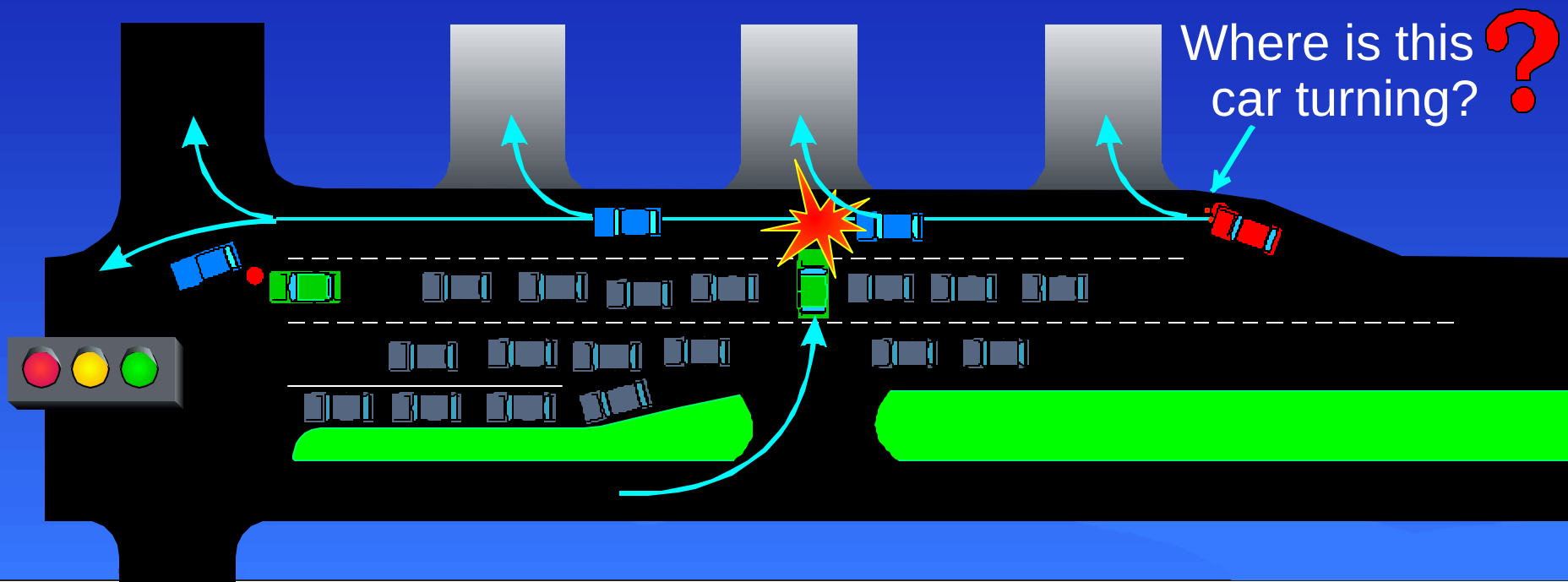
Truck moves directly to a through lane.

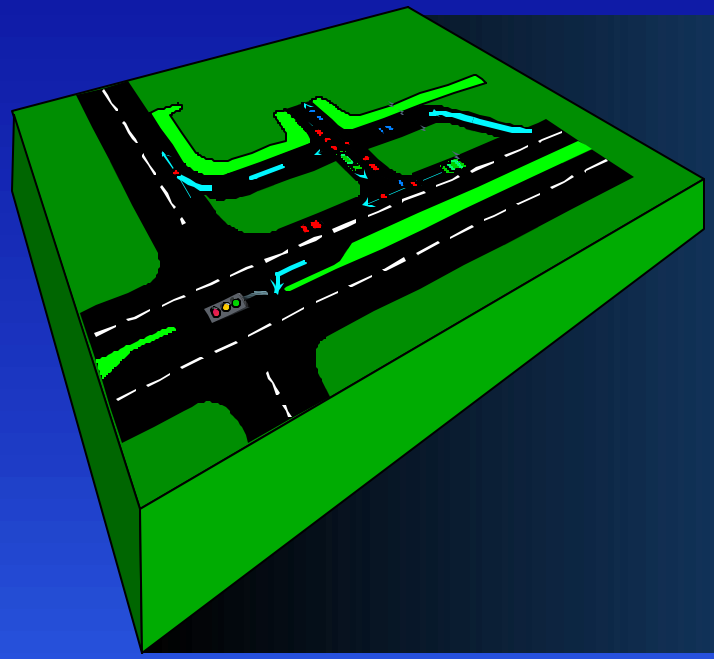
Design guidance not in Rule 14-97

CAUTION!

CONTINUOUS RIGHT TURN LANES

- May encourage use as a through-lane
- May lead to confusion where cars will turn right into driveway or street?



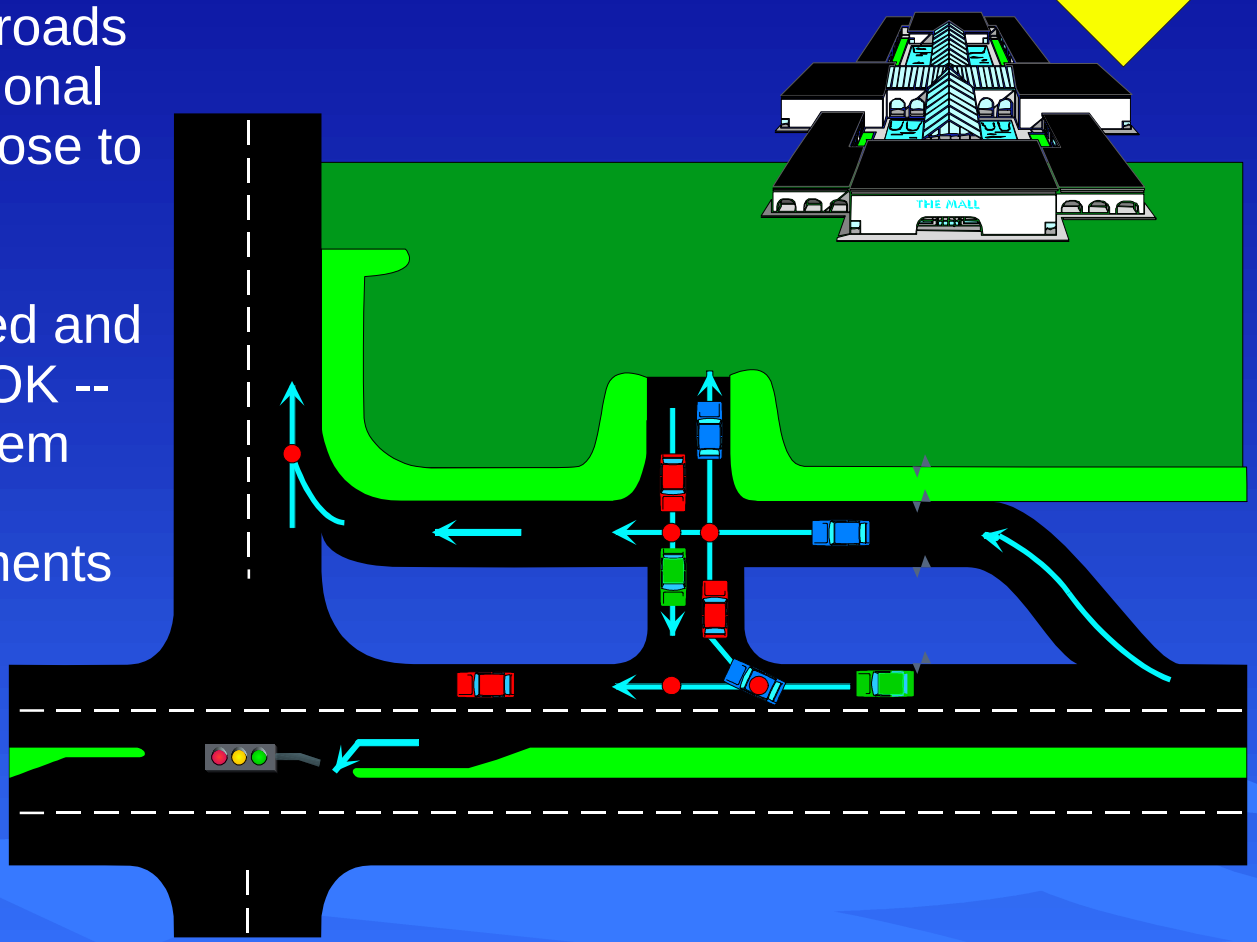


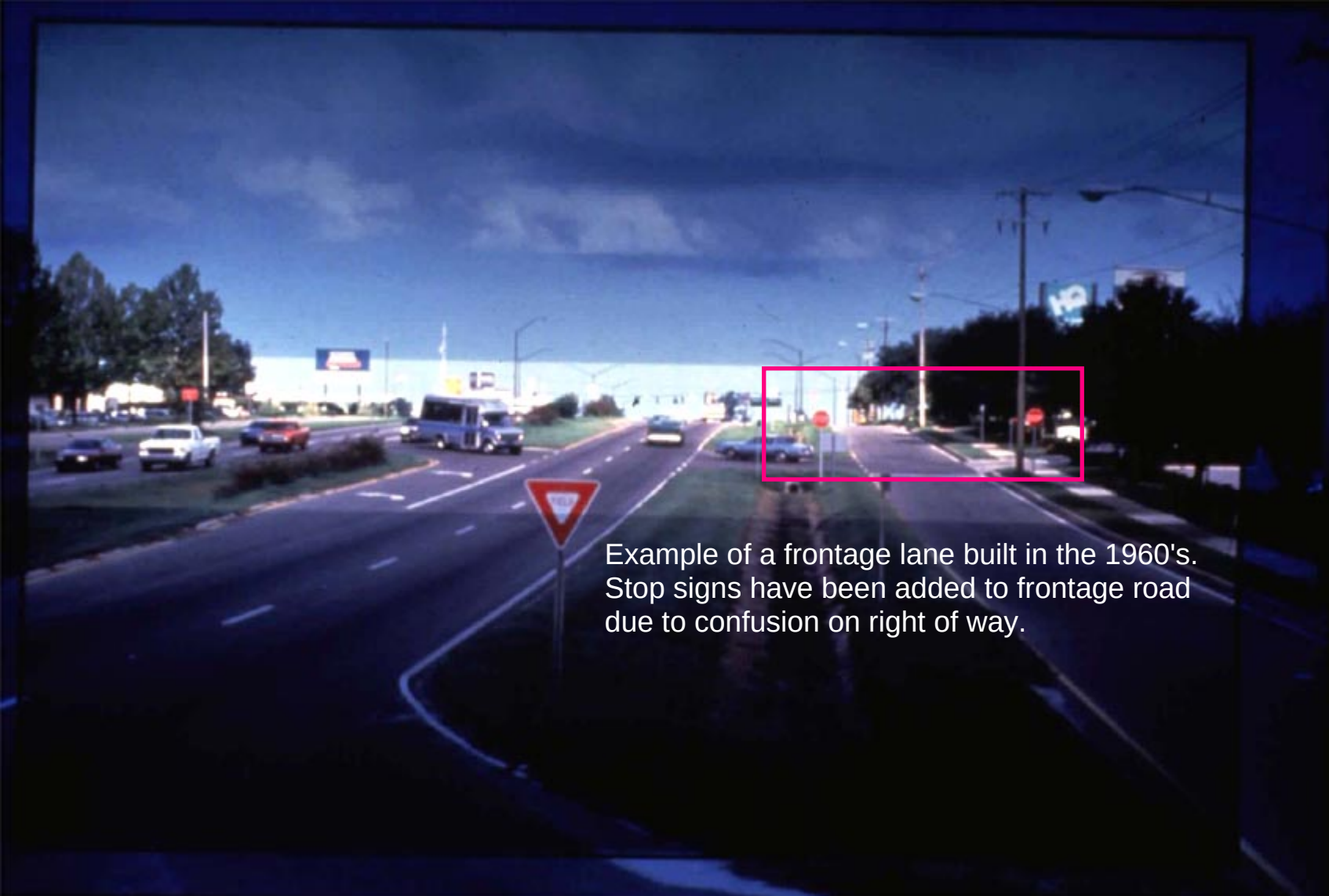
ACCESS/ SERVICE ROADS

Problems with frontage roads

CAUTION!

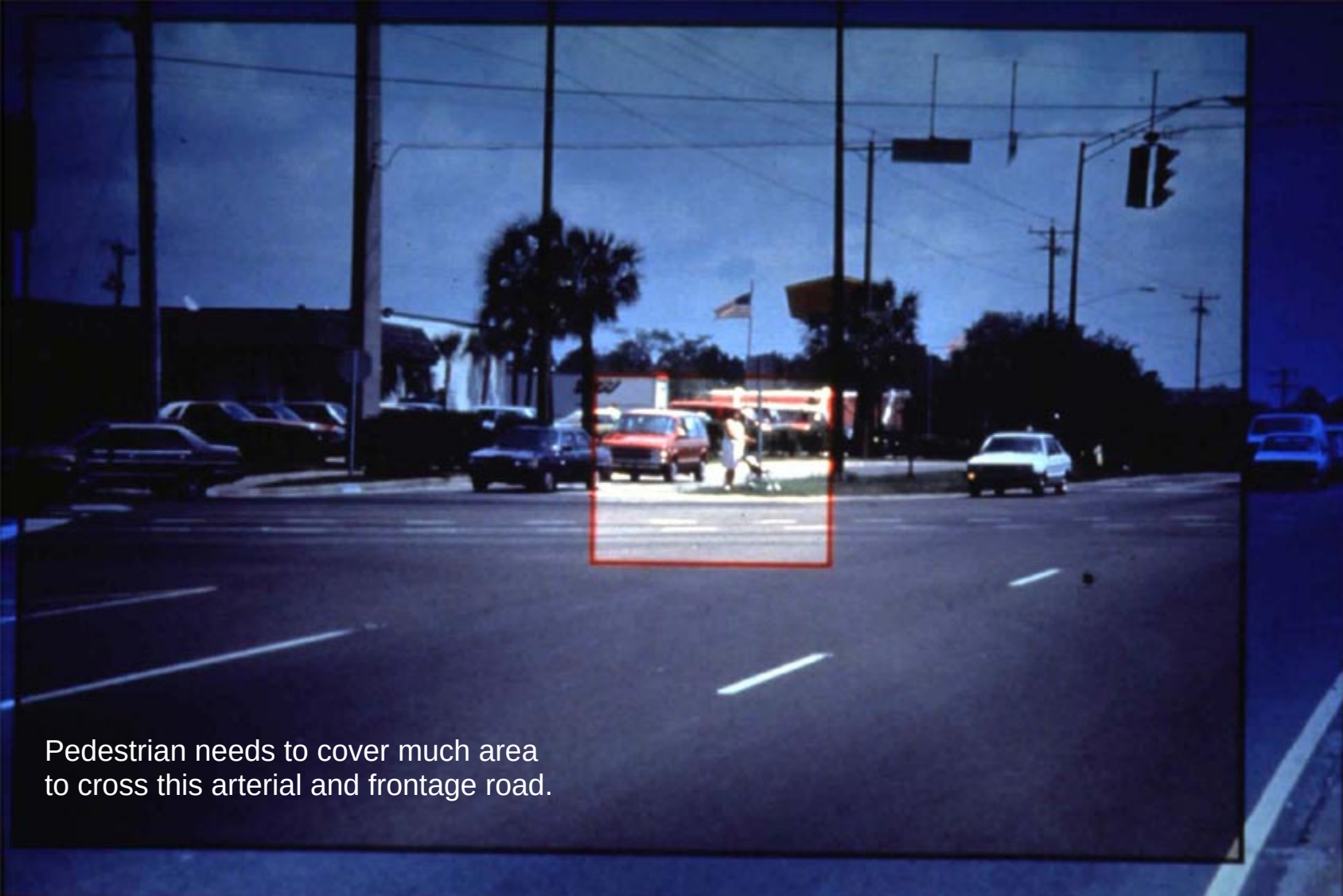
- Even one-way frontage roads (the safest) create additional conflict and confusion close to signalized intersections
- Unless carefully designed and coordinated, they work OK -- until you put traffic on them
- Full of unfamiliar movements

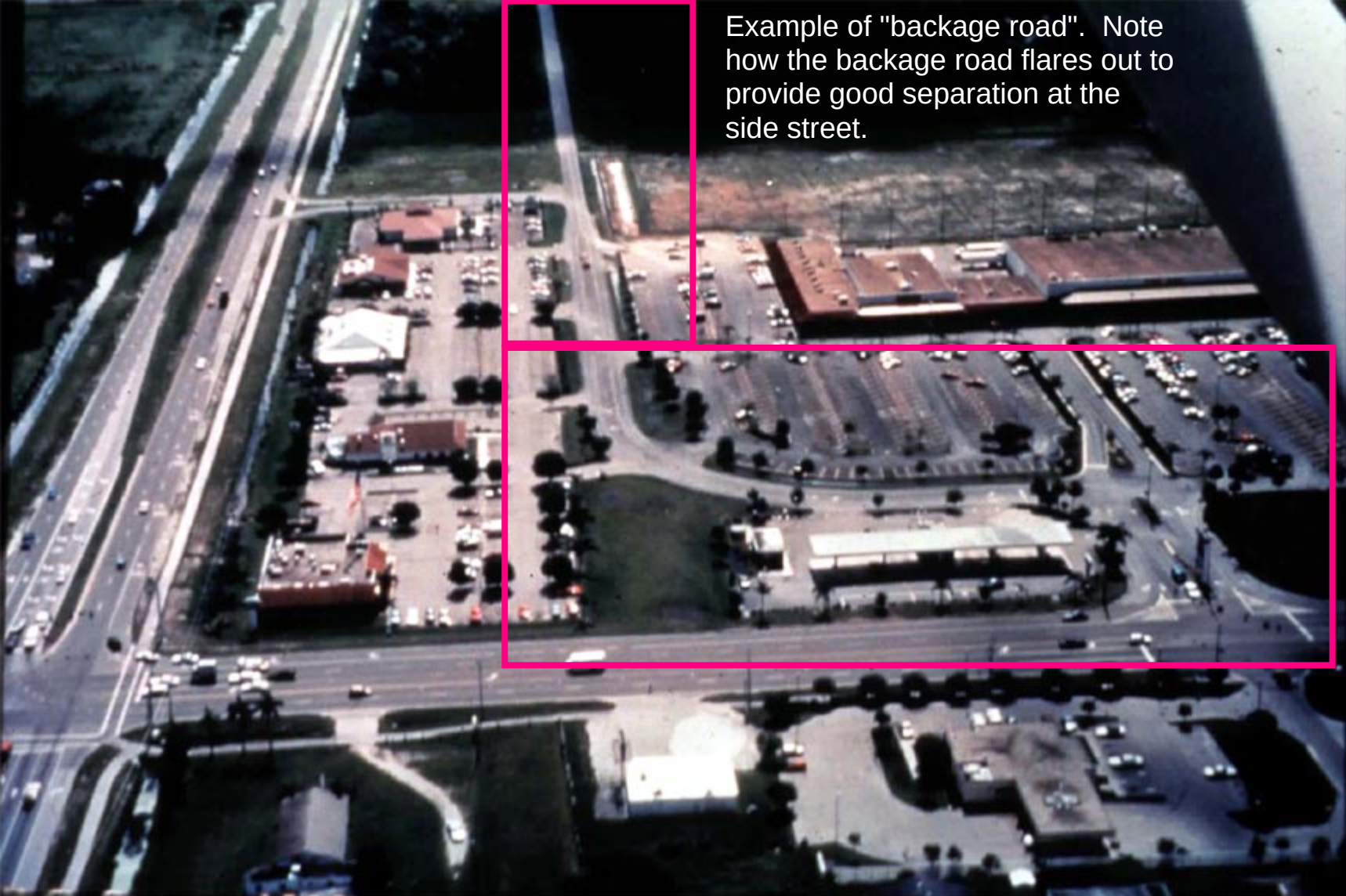




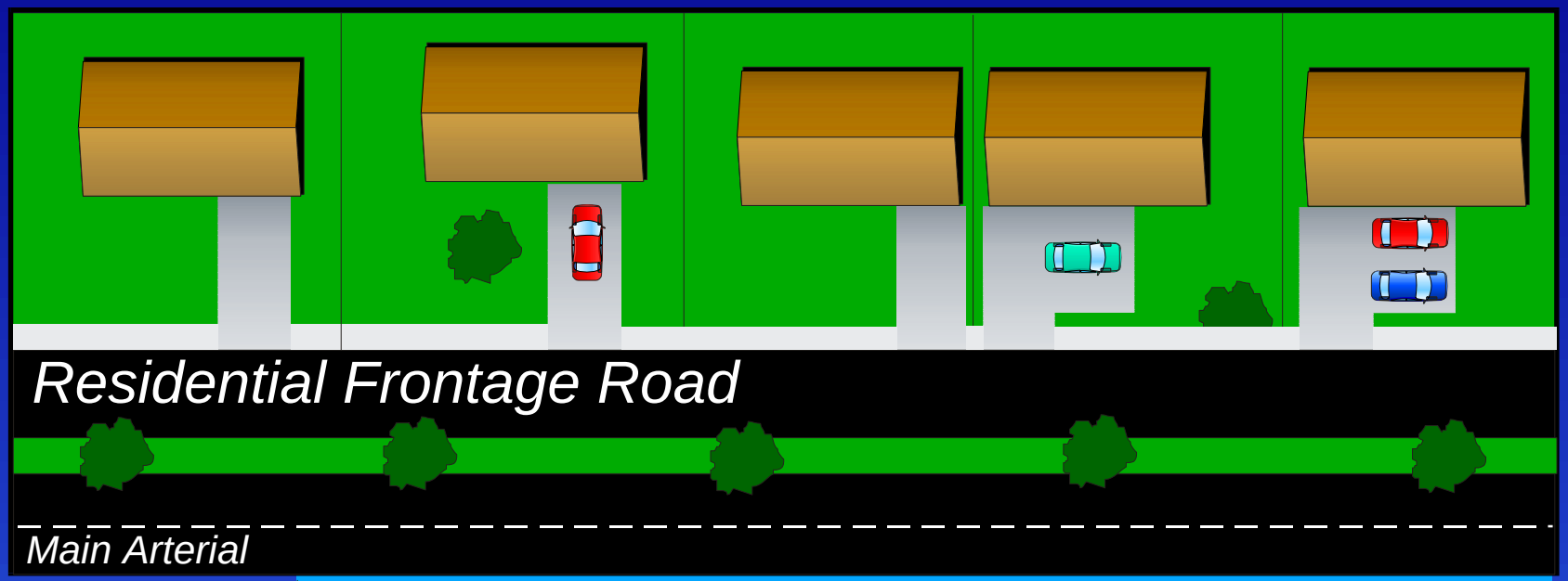
Example of a frontage lane built in the 1960's. Stop signs have been added to frontage road due to confusion on right of way.

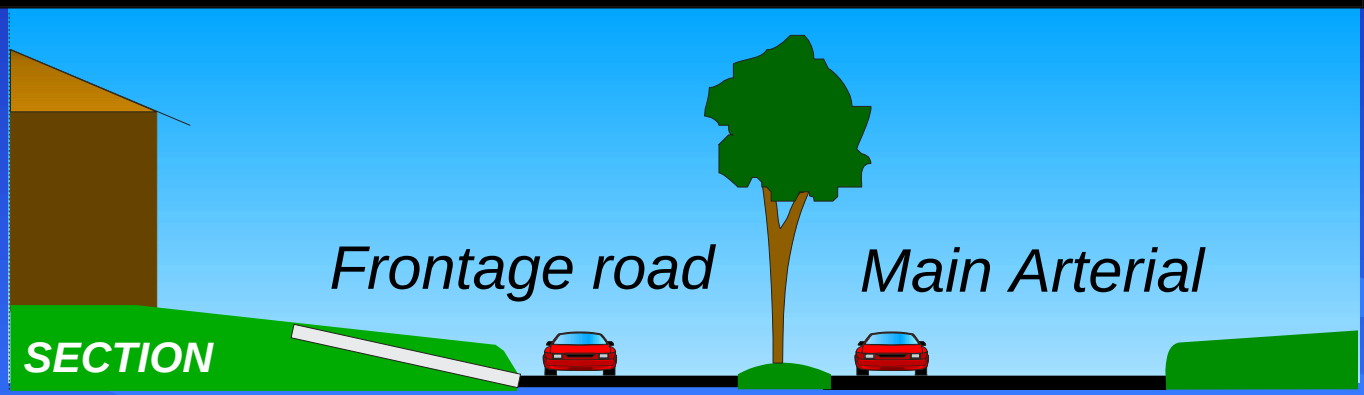
Confusing intersection as frontage road intersects with a major side street.


Pedestrian needs to cover much area
to cross this arterial and frontage road.


Example of "backage road". Note how the backage road flares out to provide good separation at the side street.

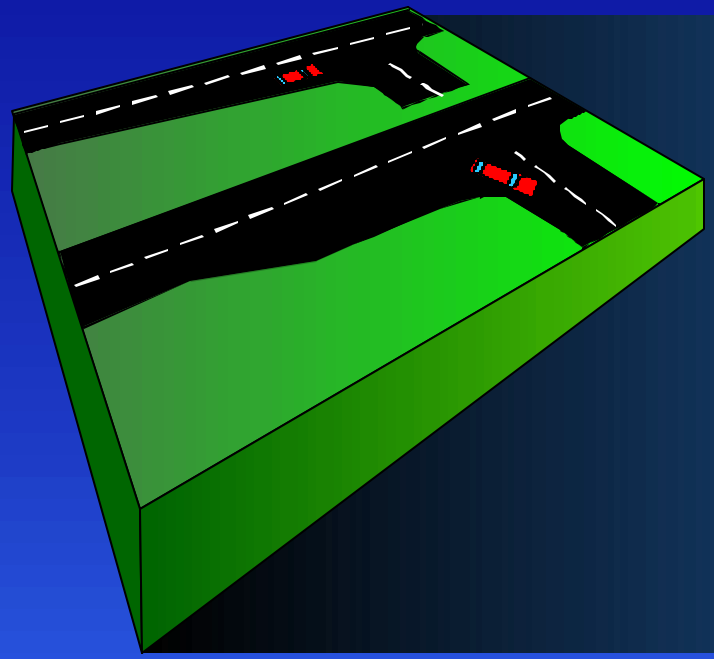
Residential Frontage Road





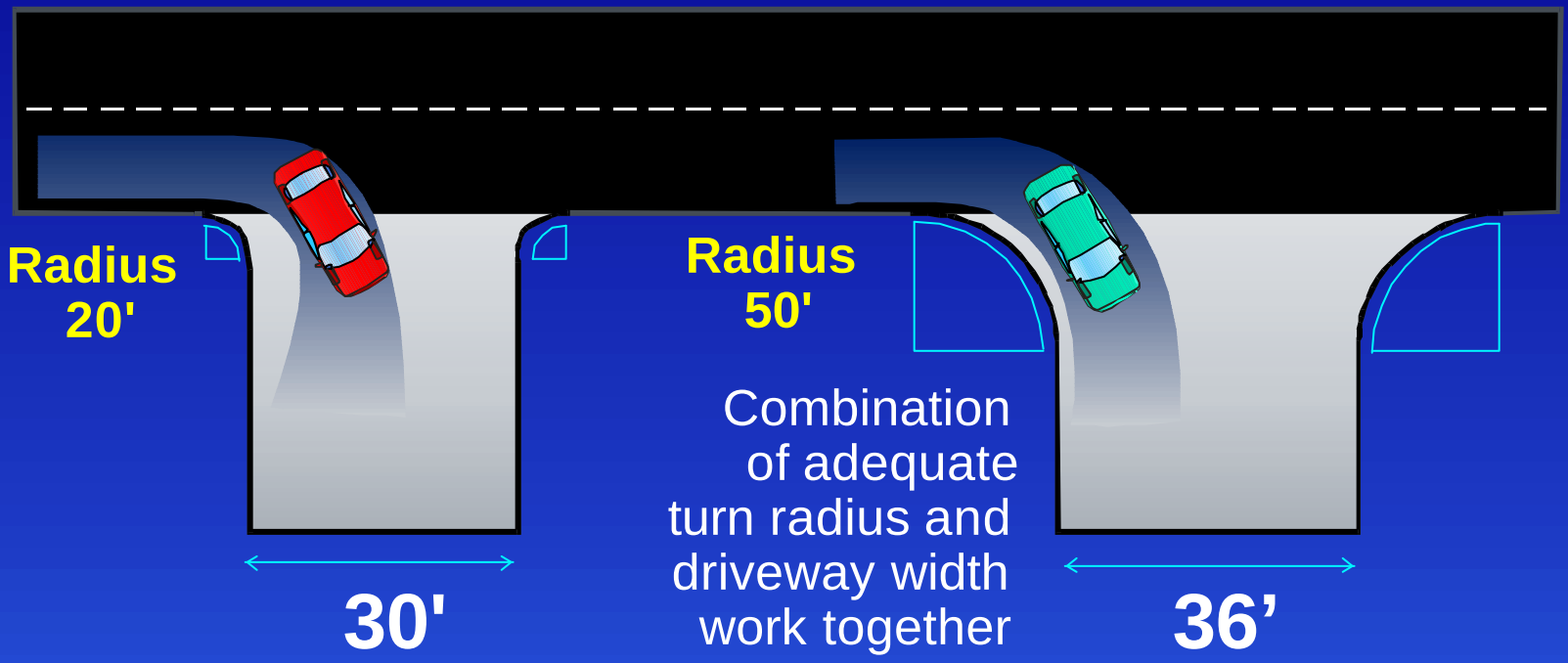
Source: Victorian Code for Residential Development (Australia)- April 1992

Frontage roads in residential or light office (such as dentist, real estate, travel agency, etc.) can work when they begin and end between major cross streets.



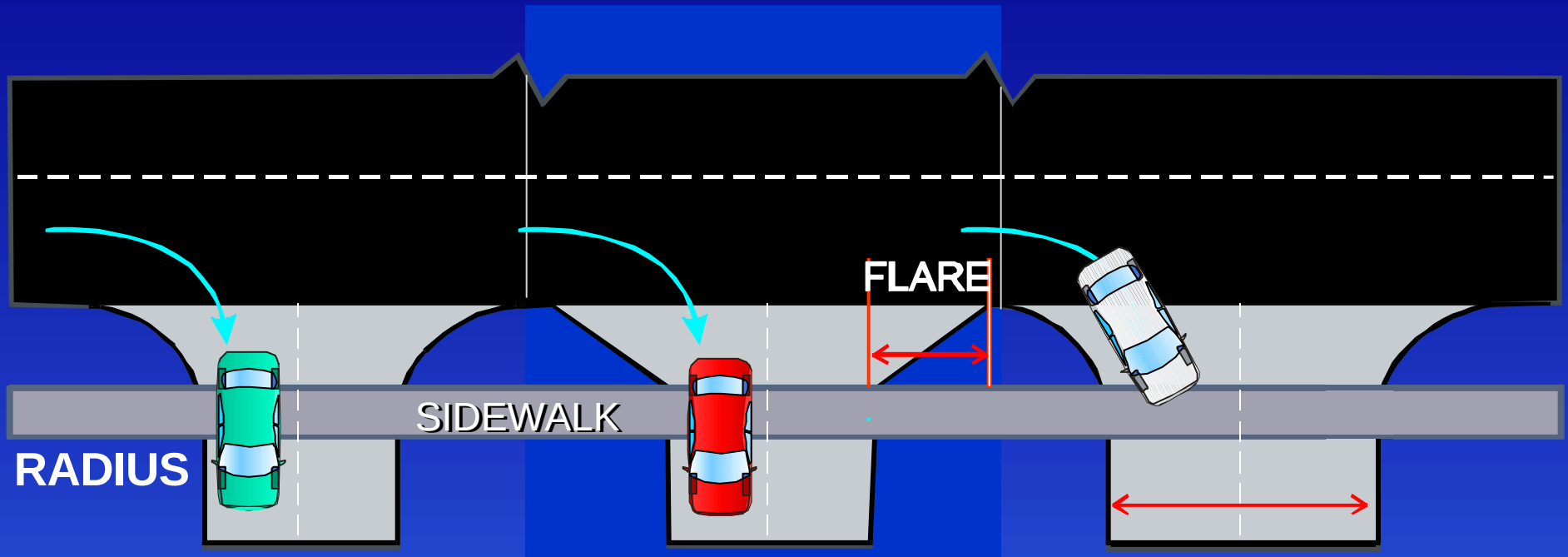
Driveway Dimensions

DRIVEWAY WIDTH



Adequate Driveway Width can also help to get turning vehicles off the road at greater speed and with less encroachment into the oncoming driveway traffic

The faster the turning vehicle can get off the road, the less conflict with through-movement vehicles

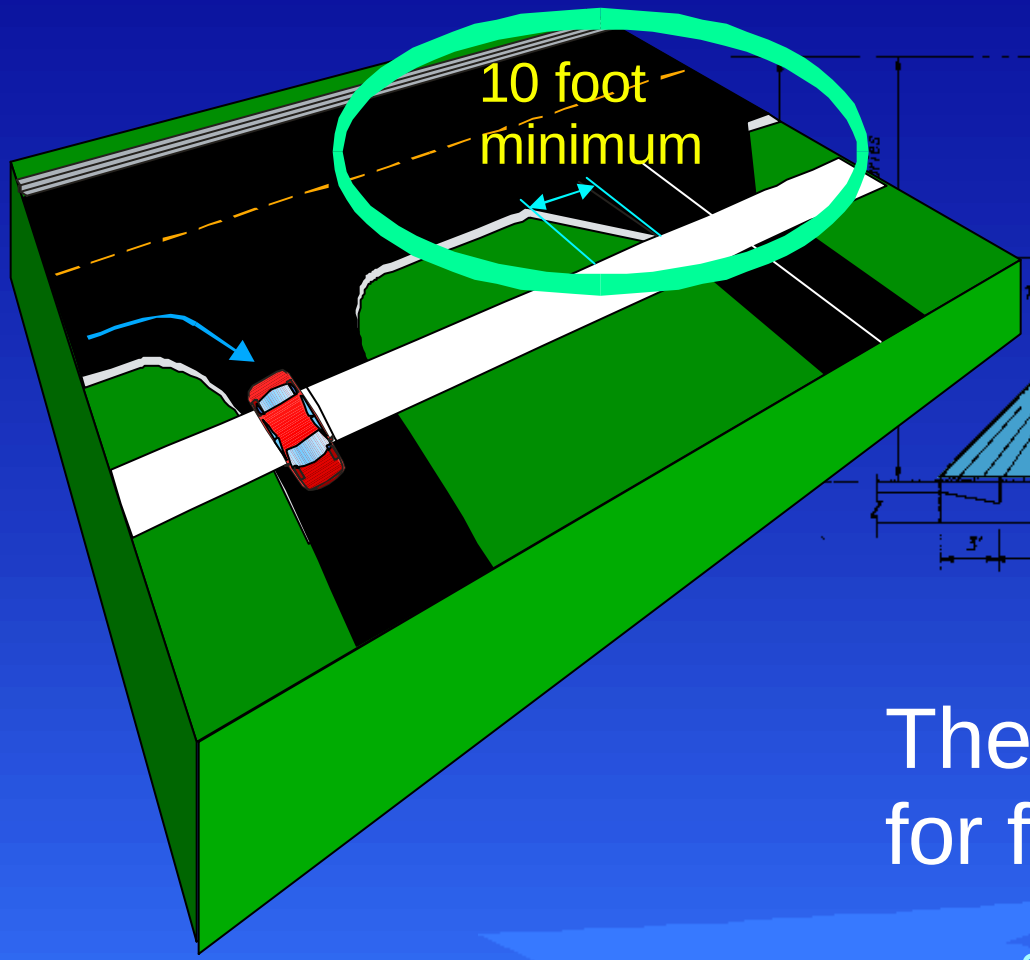


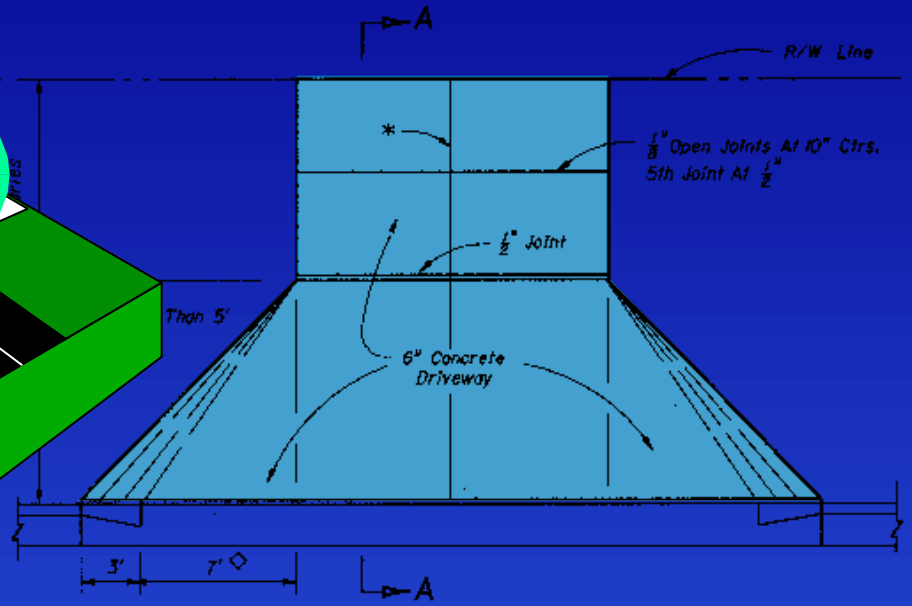
TURN RADII

DRIVEWAY FLARE

DRIVEWAY WIDTH

Flare Is Used Instead of Turn Radius in Curb and Gutter Sections

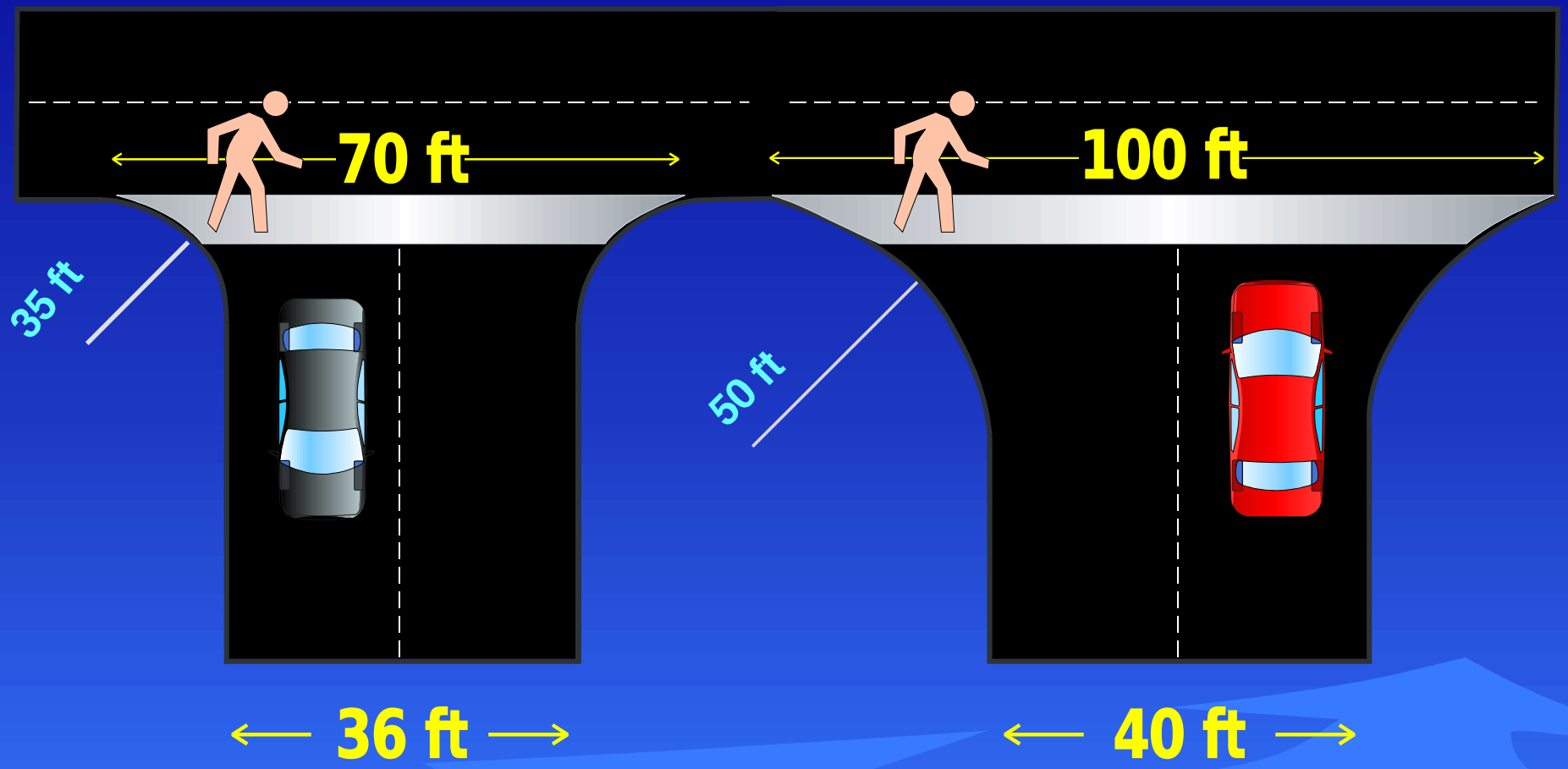




The minimum distance for flare is 10ft (3.0m)

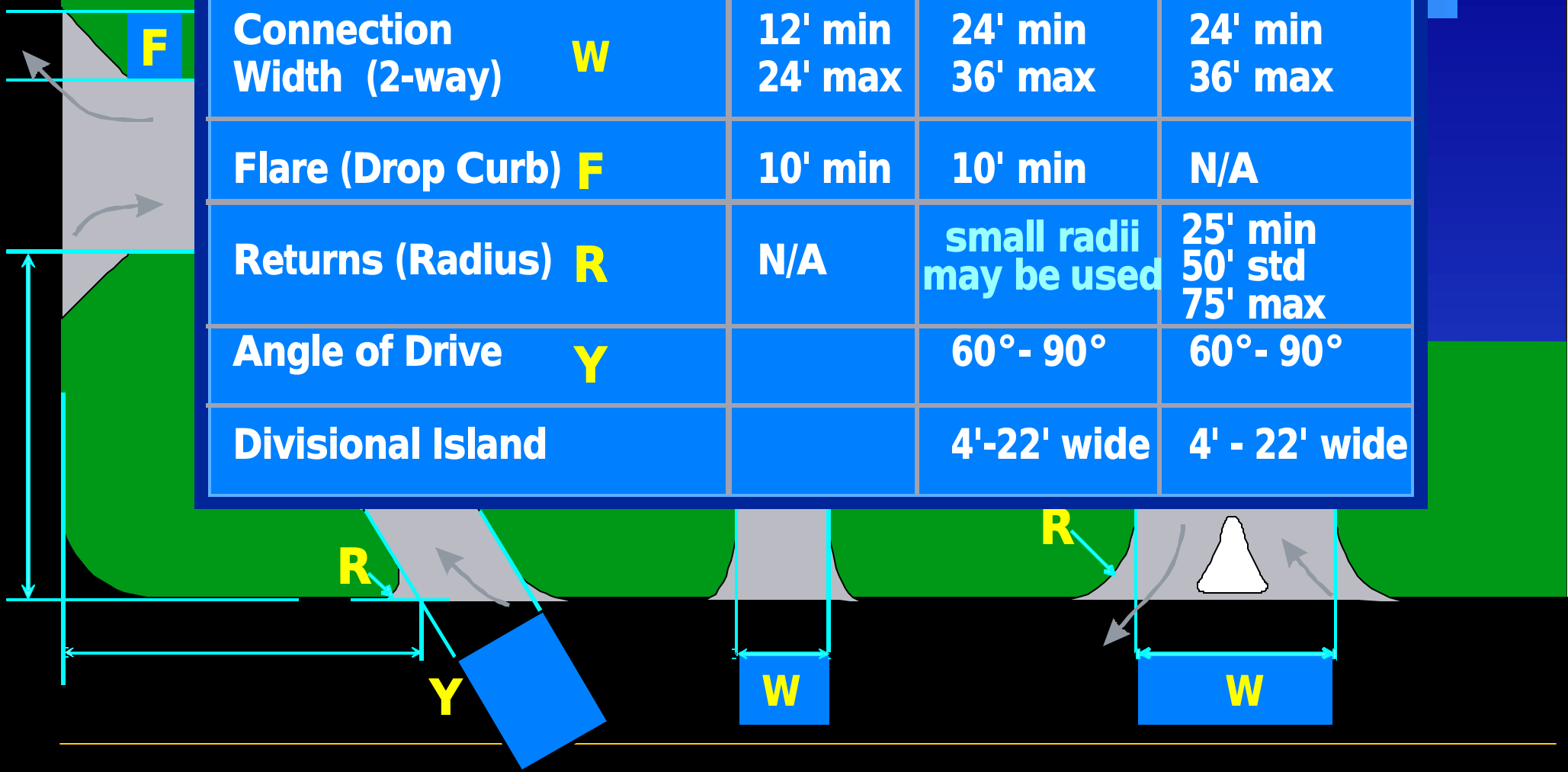
Standard Index No. 515

Pedestrian exposure due to very large radii



URBAN SECTION

Trips/Day or Trips/Hour	1-20 or 1-5	21-600 or 6-60	601- 4000 or 61-400
Connection Width (2-way) W	12' min 24' max	24' min 36' max	24' min 36' max
Flare (Drop Curb) F	10' min	10' min	N/A
Returns (Radius) R	N/A	small radii may be used	25' min 50' std 75' max
Angle of Drive Y		60°- 90°	60°- 90°
Divisional Island		4'-22' wide	4' - 22' wide



Standard Index #515

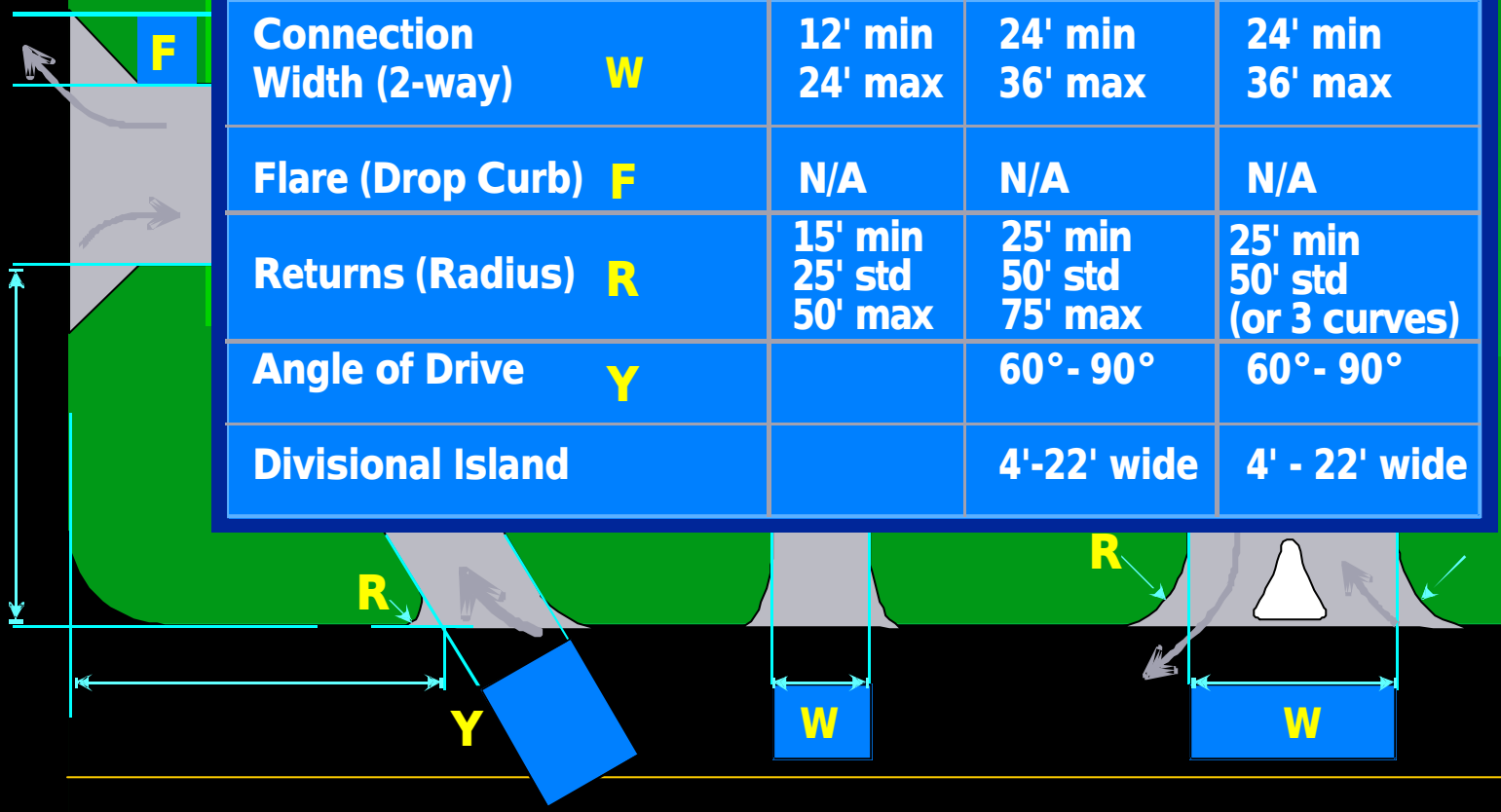
TRIP GENERATION EXAMPLES

1-20 trips/day or 1-5 trips/hour	1 or 2 single family homes
21-600 trips/day or 6-60 trips/hour	Quadraplex Apartment building < 60 units Small office in converted home Mom & Pop business
601-4,000 trips/day or 61-400 trips/hour	Small "STRIP" shopping center (20 - 75K ft) Gas station/Convenience market
over 4,000 trips/day or over 400 trips/hour	150K ft shopping center- grocery/drug store + 10-15 smaller stores (9,000 trips split w/ 2 driveways)

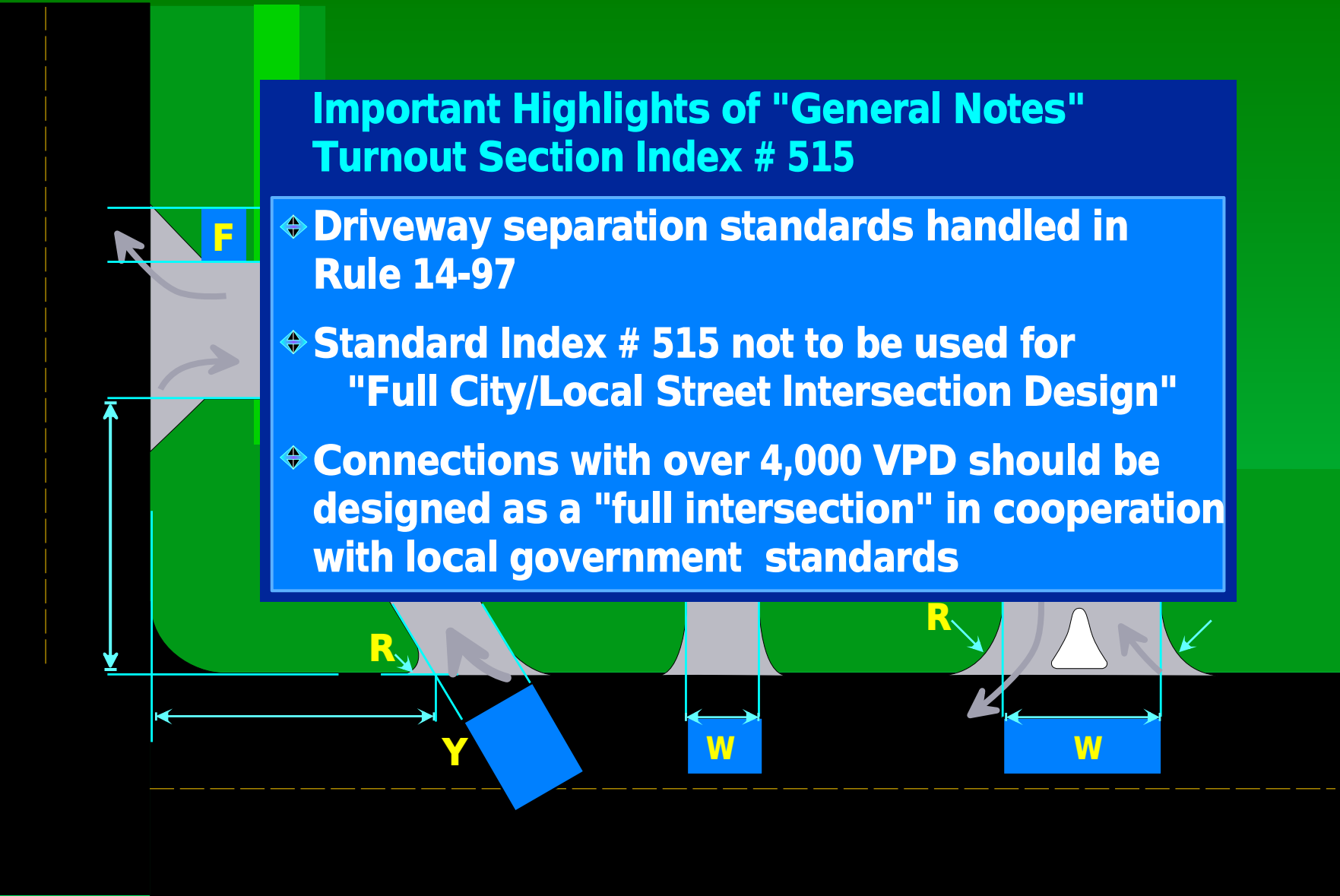
if they have more than one driveway,
there wil be less traffic on each driveway

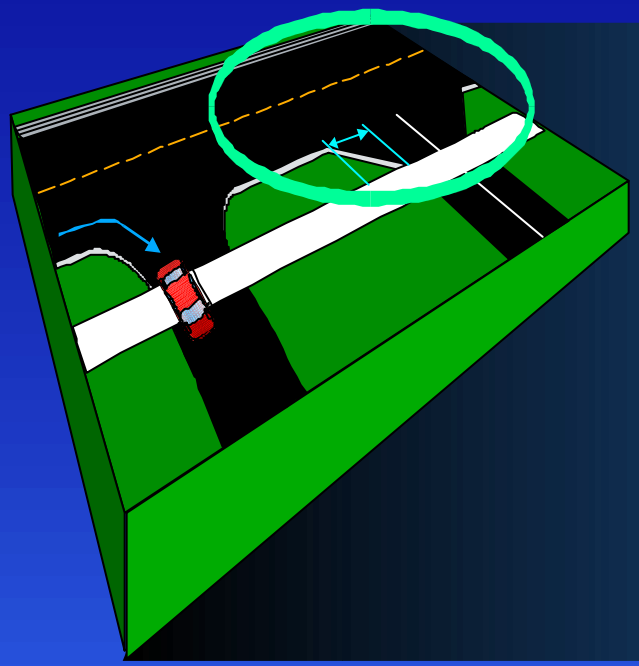
RURAL SECTION

Trips/Day or Trips/Hour		1-20 or 1-5	21-600 or 6-60	601- 4000 or 61-400
Connection Width (2-way)	W	12' min 24' max	24' min 36' max	24' min 36' max
Flare (Drop Curb)	F	N/A	N/A	N/A
Returns (Radius)	R	15' min 25' std 50' max	25' min 50' std 75' max	25' min 50' std (or 3 curves)
Angle of Drive	Y		60°- 90°	60°- 90°
Divisional Island			4'-22' wide	4' - 22' wide



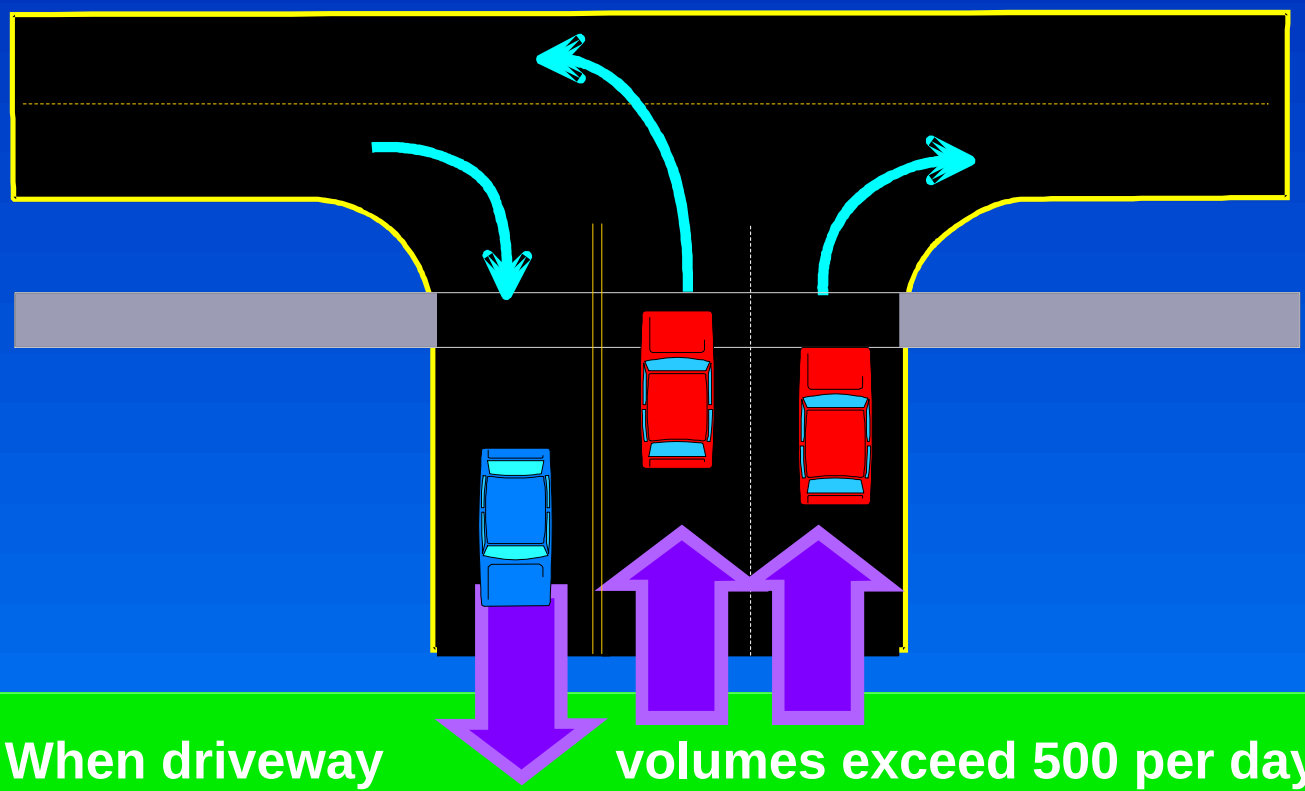
Standard Index #515


Important Highlights of "General Notes"
Turnout Section Index # 515
Driveway separation standards handled in Rule 14-97
Standard Index # 515 not to be used for "Full City/Local Street Intersection Design"
Connections with over 4,000 VPD should be designed as a "full intersection" in cooperation with local government standards
F
R
Y
W
R
W



Driveway Configuration

When driveway volumes exceed 500 per day a three-lane cross-section should be considered

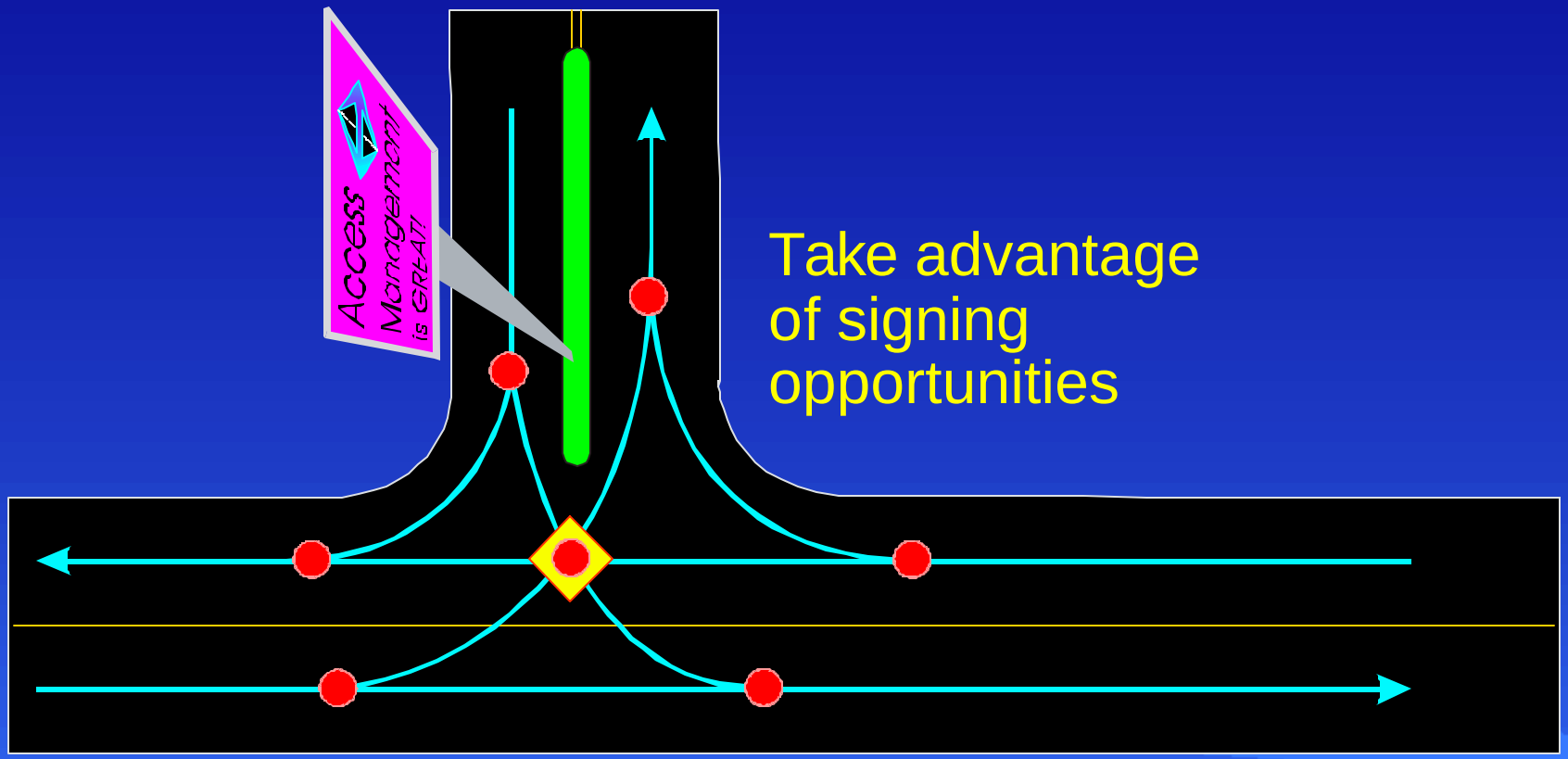


When driveway volumes exceed 500 per day a three-lane cross-section should be recommended

Lack of pavement markings

Clear pavement markings.

Driveway Channelizing Island

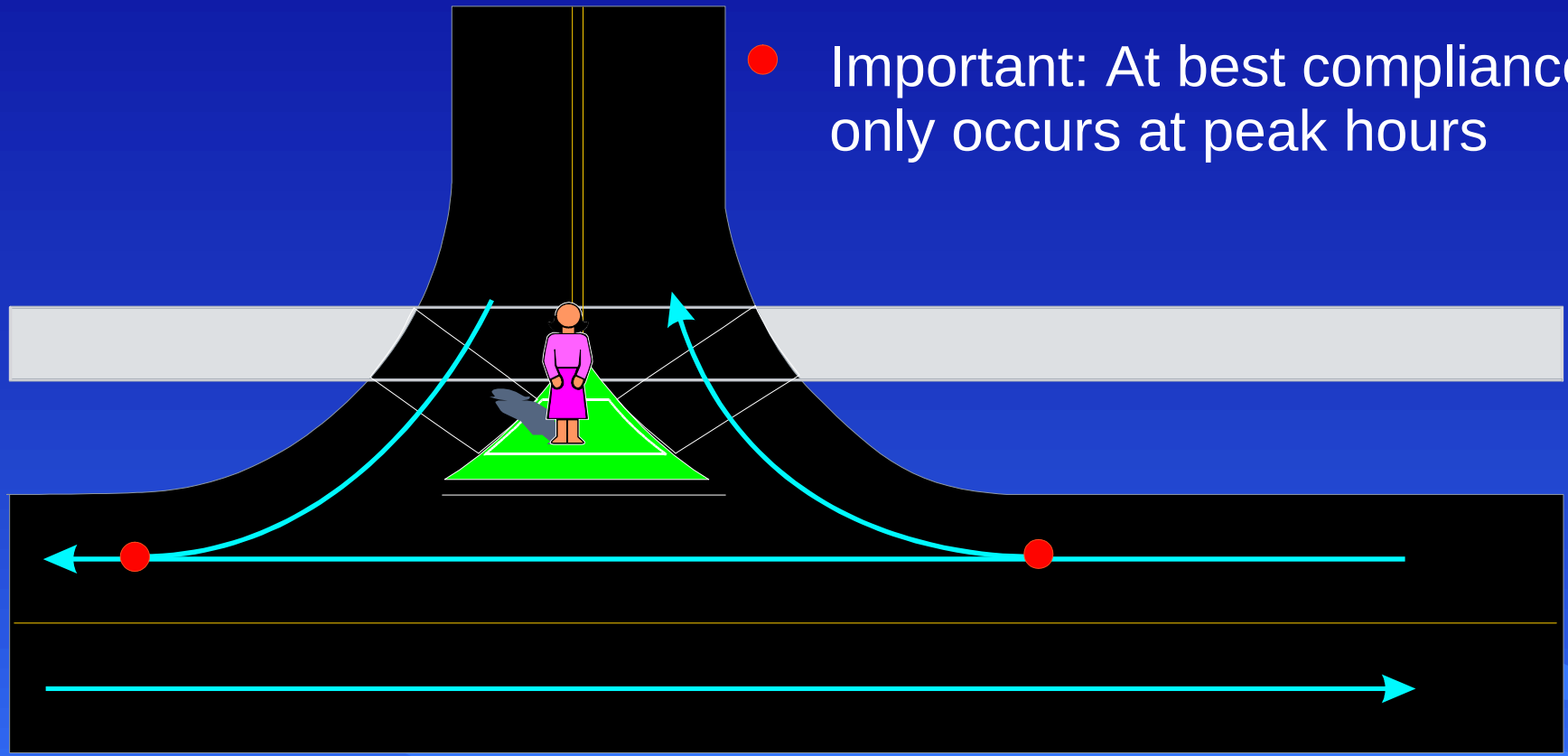


Take advantage of signing opportunities

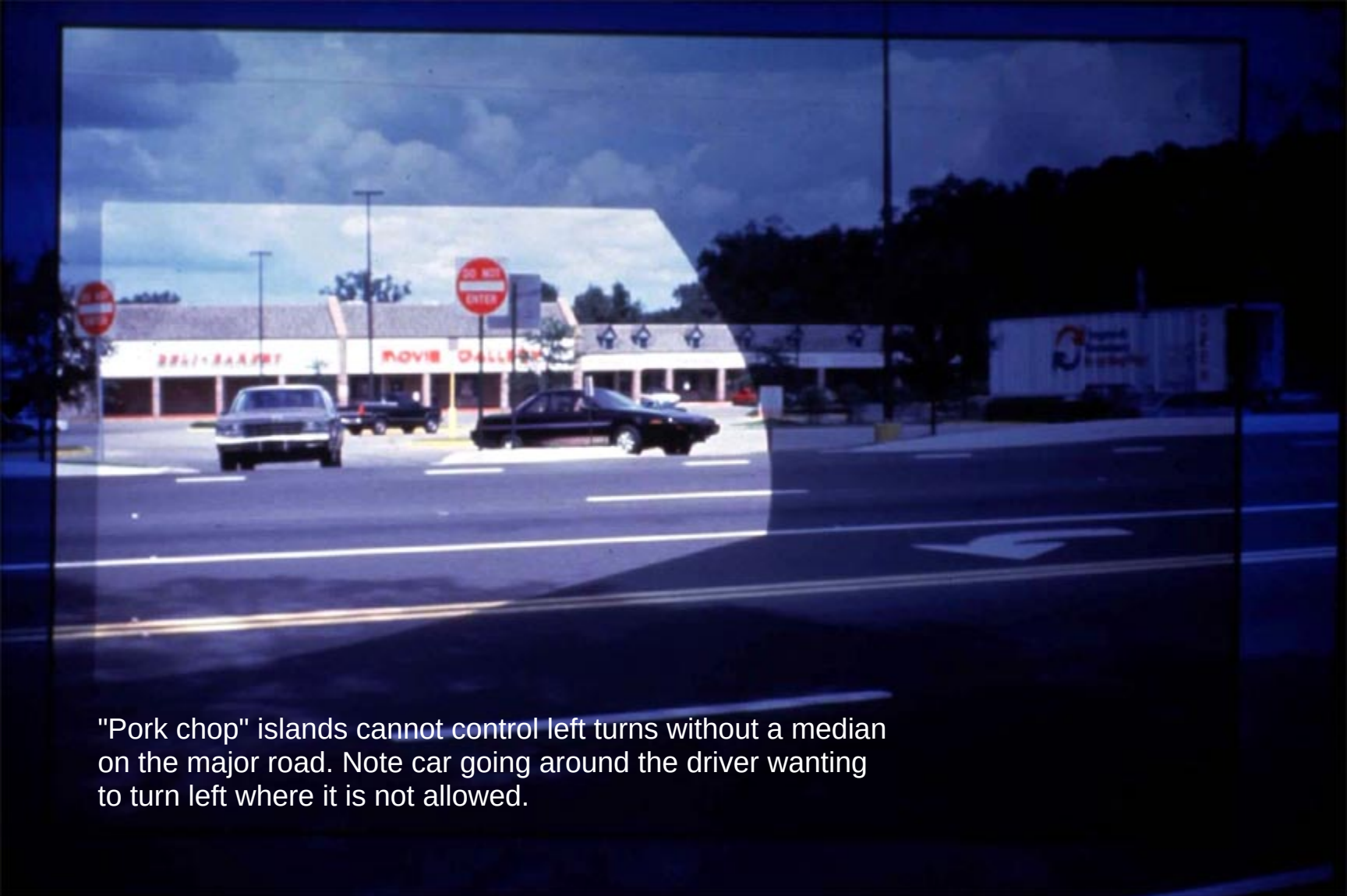
Signs inform drivers of businesses away from the frontage.

Channel Islands

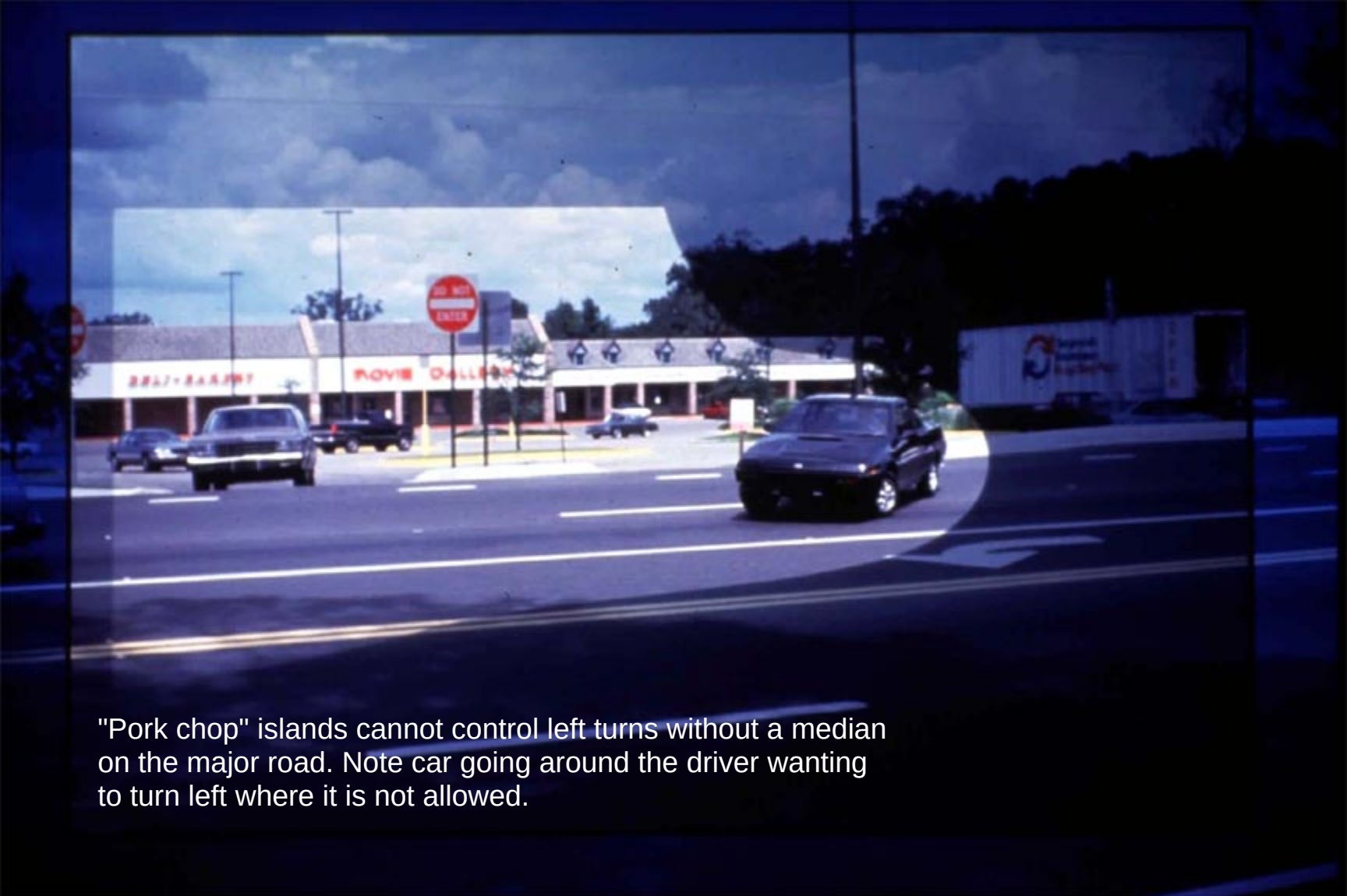
- Important: At best compliance only occurs at peak hours




"Pork chop" islands cannot control left turns
without a median on the major road.
ENTER



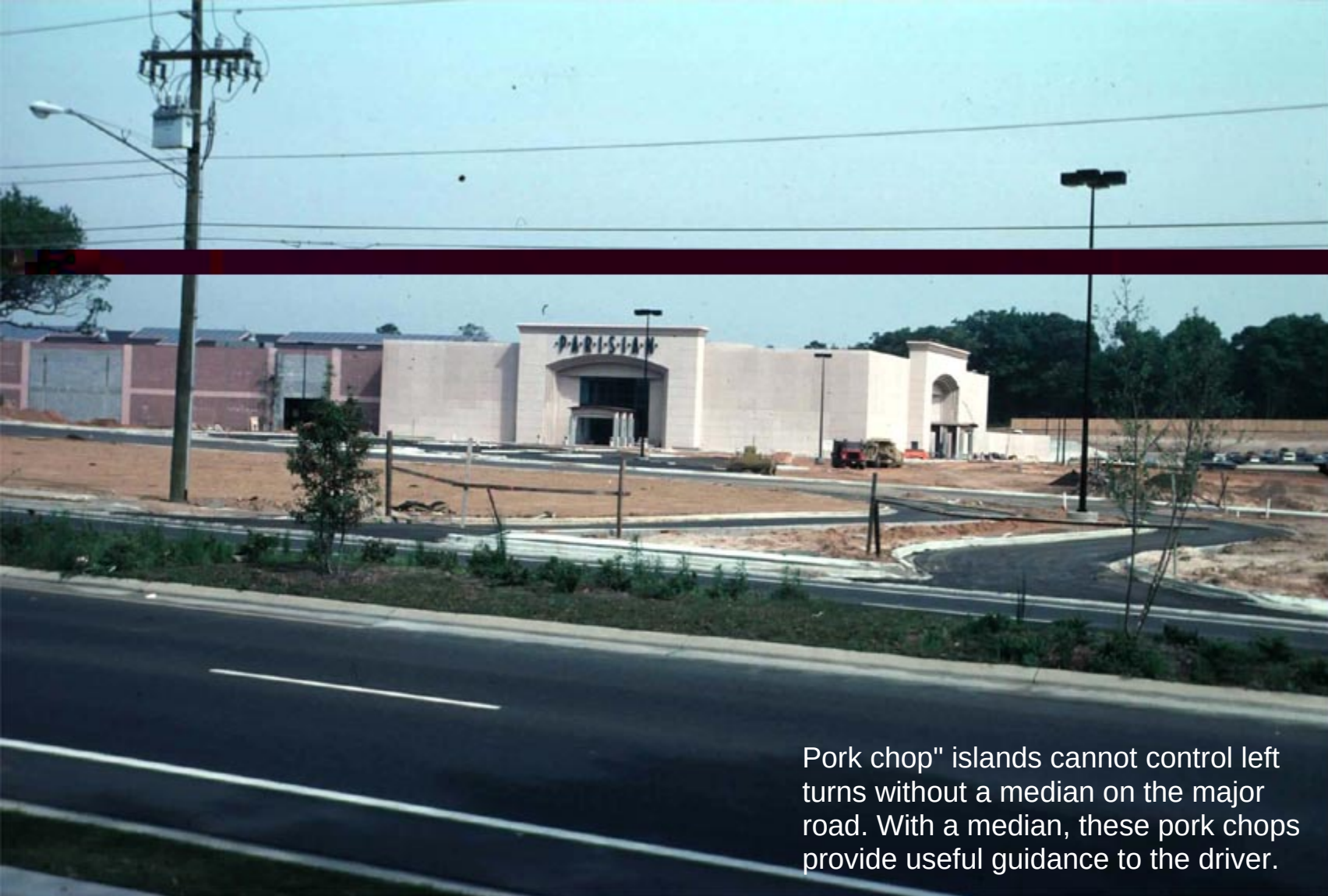
"Pork chop" islands cannot control left turns without a median on the major road. Note car going around the driver wanting to turn left where it is not allowed.



"Pork chop" islands cannot control left turns without a median on the major road. Note car going around the driver wanting to turn left where it is not allowed.

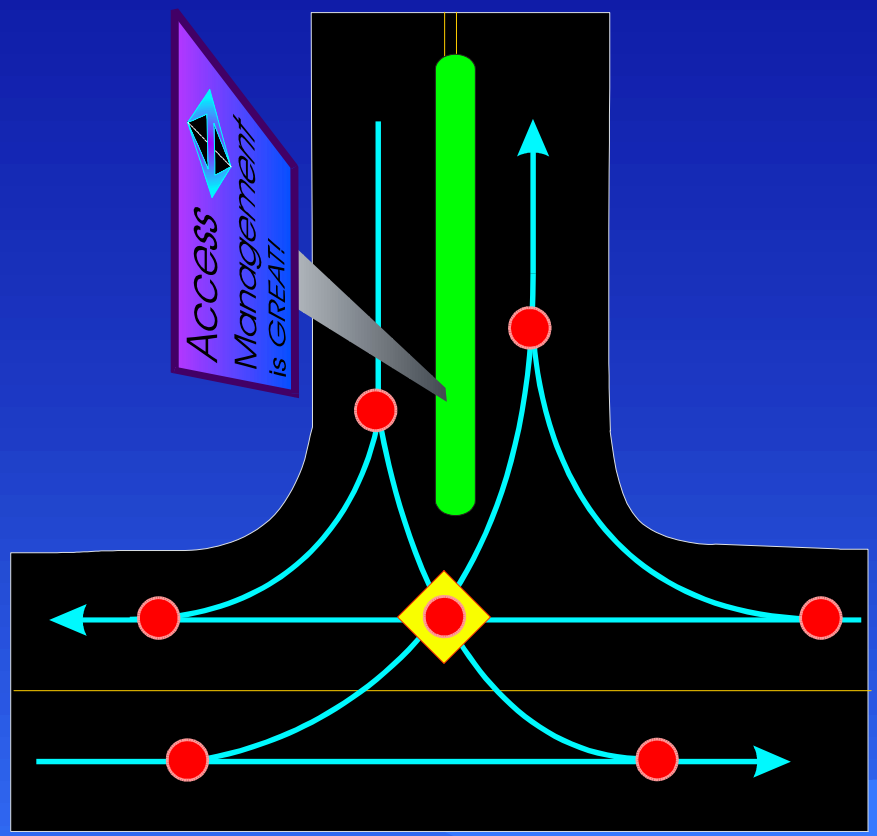
Pork chop" islands cannot control left turns without a median on the major road.


STOP
NO LEFT TURN



Pork chop" islands cannot control left turns without a median on the major road. With a median, these pork chops provide useful guidance to the driver.

Minimum Size of Channelization Island



Minimum:

area 7 m^2 or 75 ft^2

width 1.2m or 4 ft

More desirable:

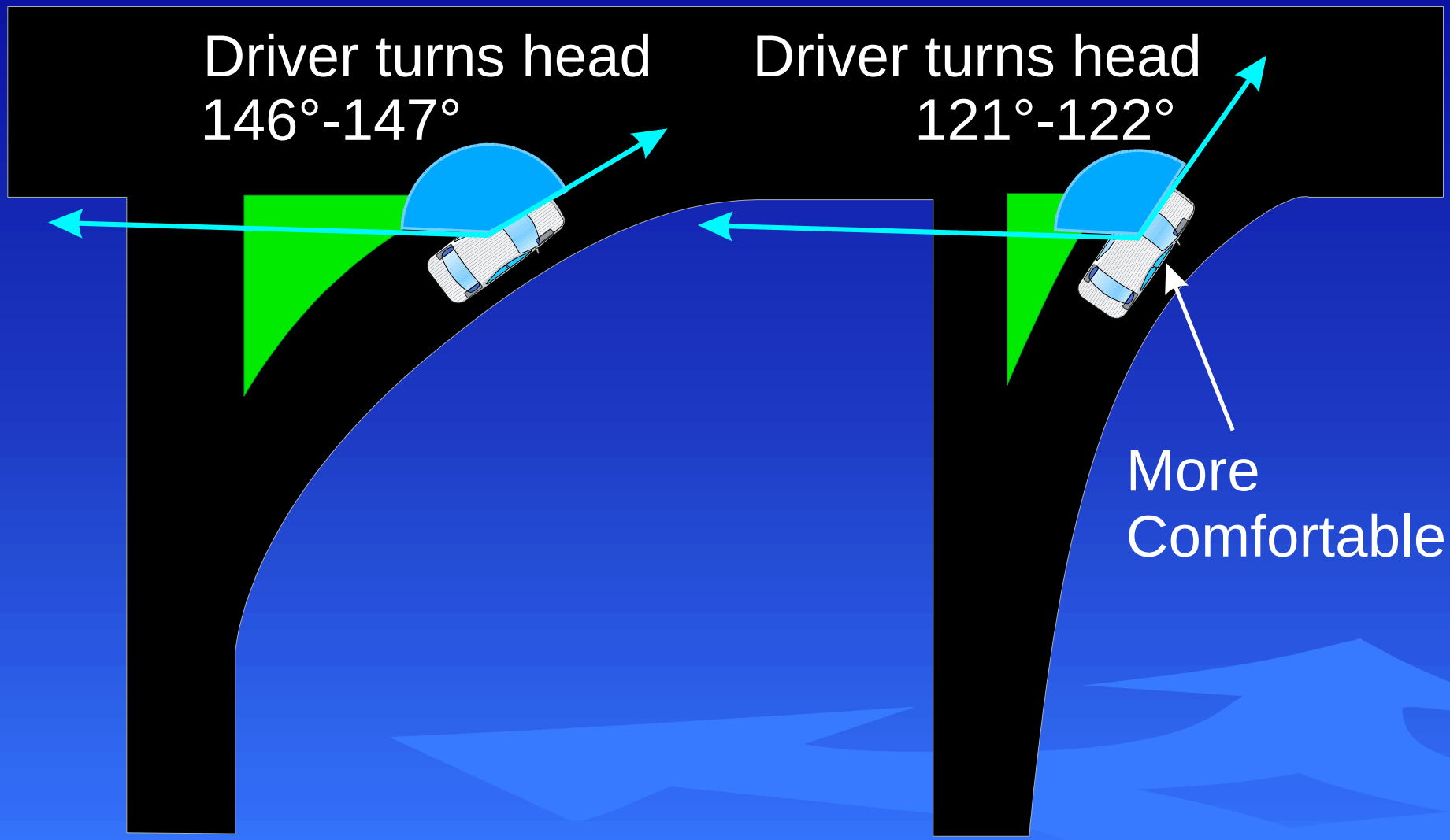
area 9 m^2 or 100 ft^2

width 1.8m or 6 ft

This allows for pedestrians (even wheelchairs)

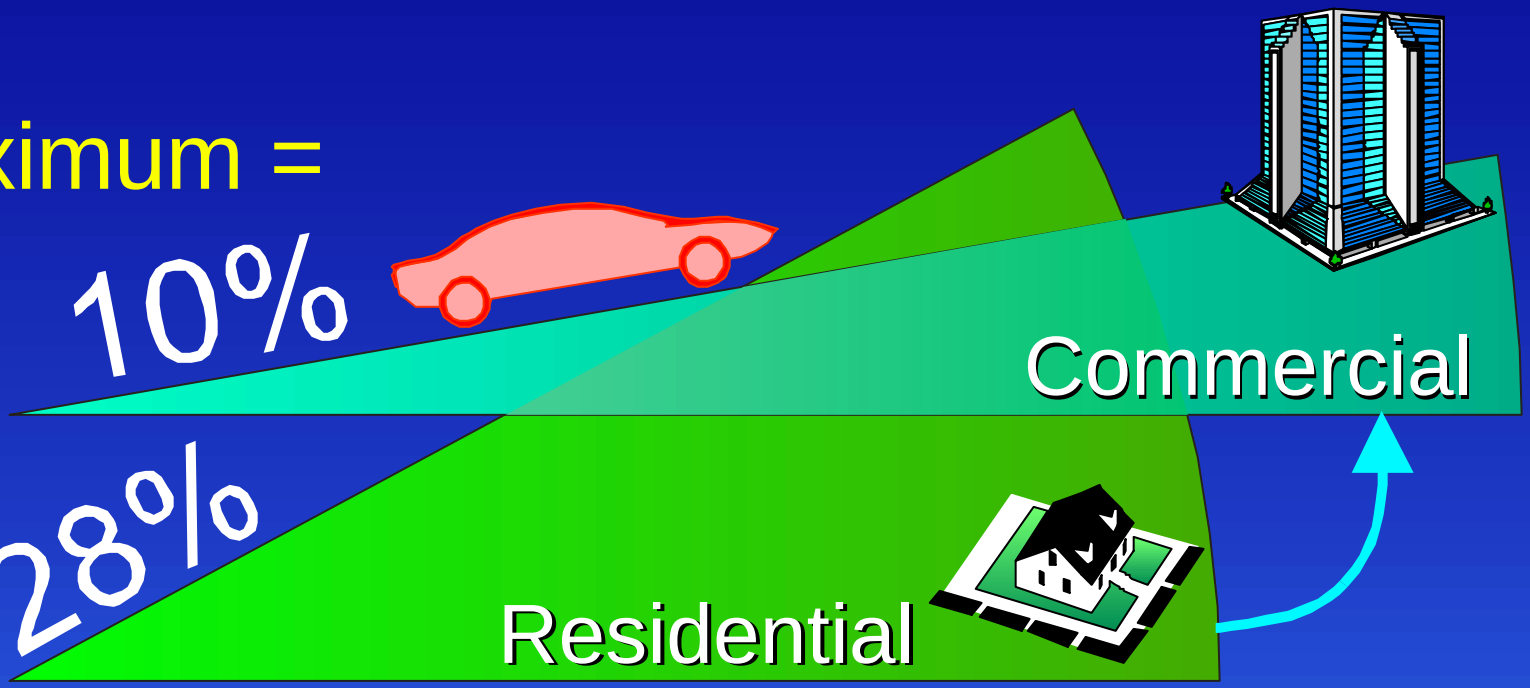

Chanelizing islands need to be larger than this

RIGHT TURN CHANNELIZATION DESIGN



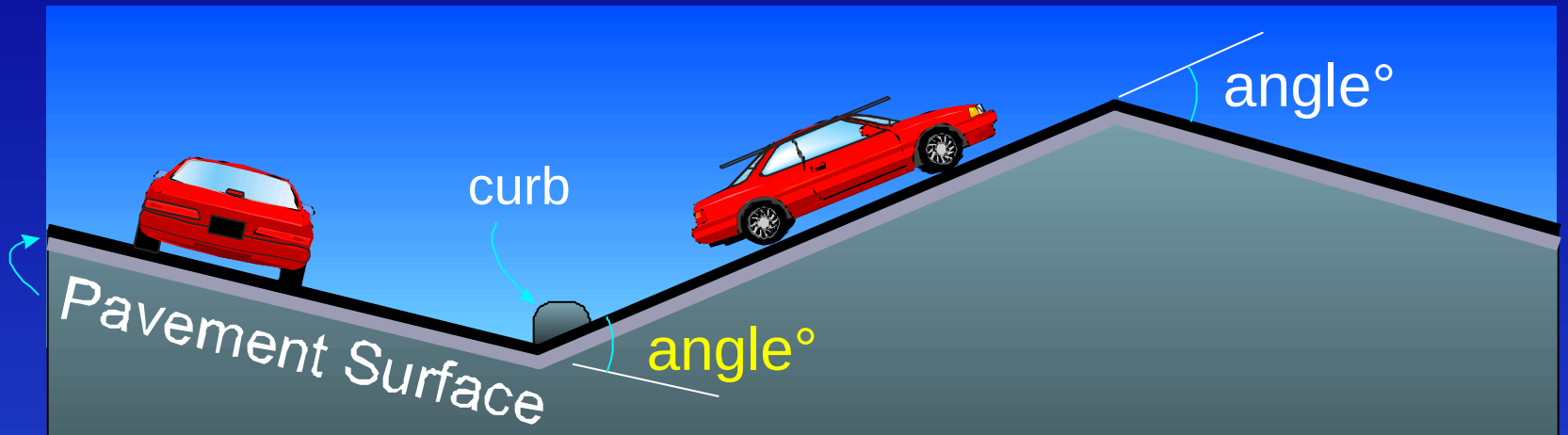
Grades in Standard Index

Maximum =



Remember: Homes turn into commercial where roads are improved.

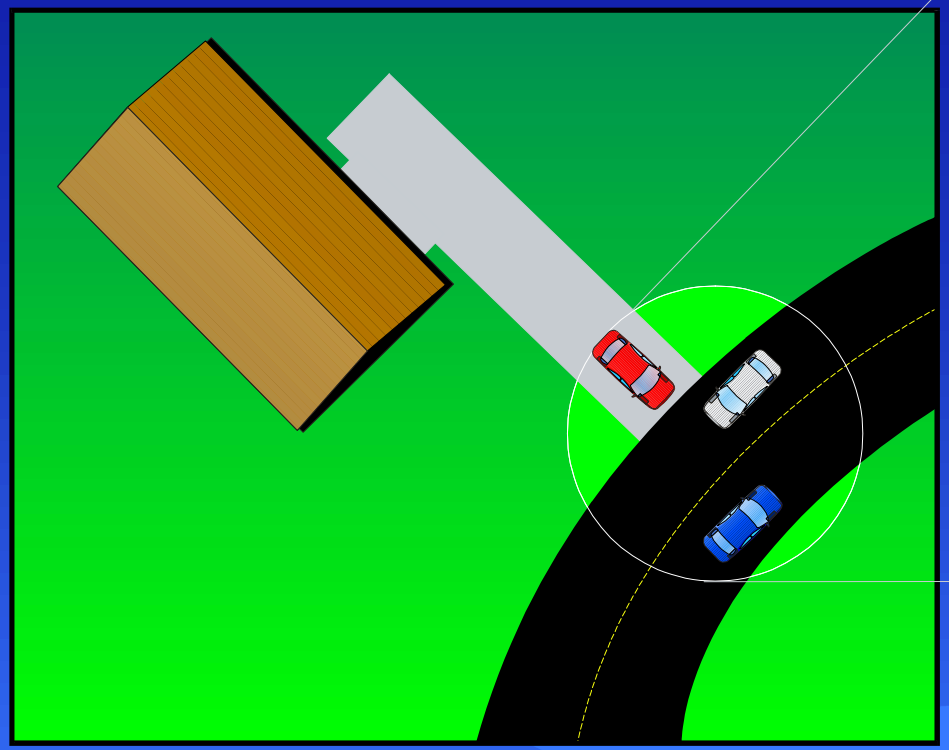
VERTICAL DRIVEWAY GEOMETRY



Functional Class	Maximum angle°
Arterial	3 - 4°
Collector	5 - 6°
Local	< 8°

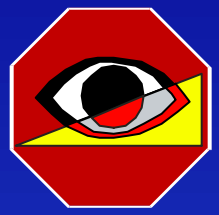
Source: Virgil Stover

Roadway Superelevation



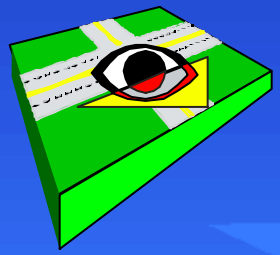
Cross-section

Sight Distances



Stopping Sight Distance

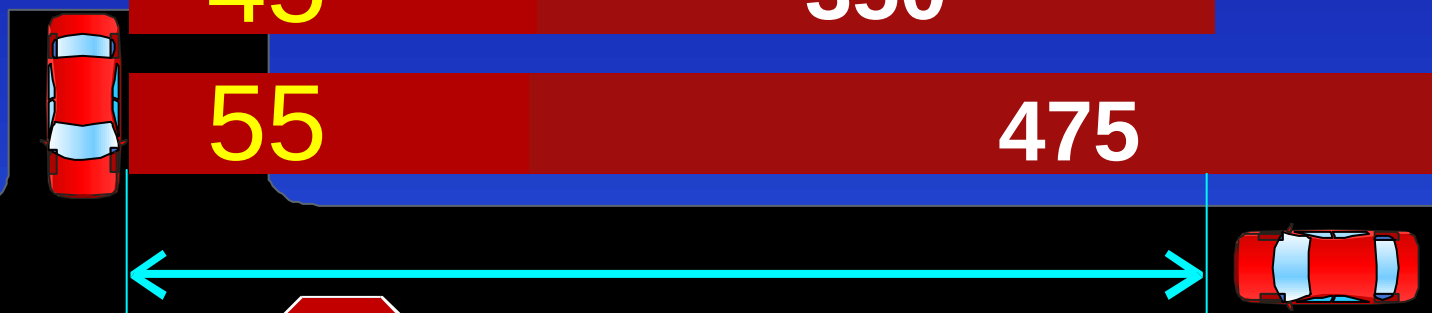
Sight Distance For
Right & Left Turns



Sight Distance For
Crossing manuever

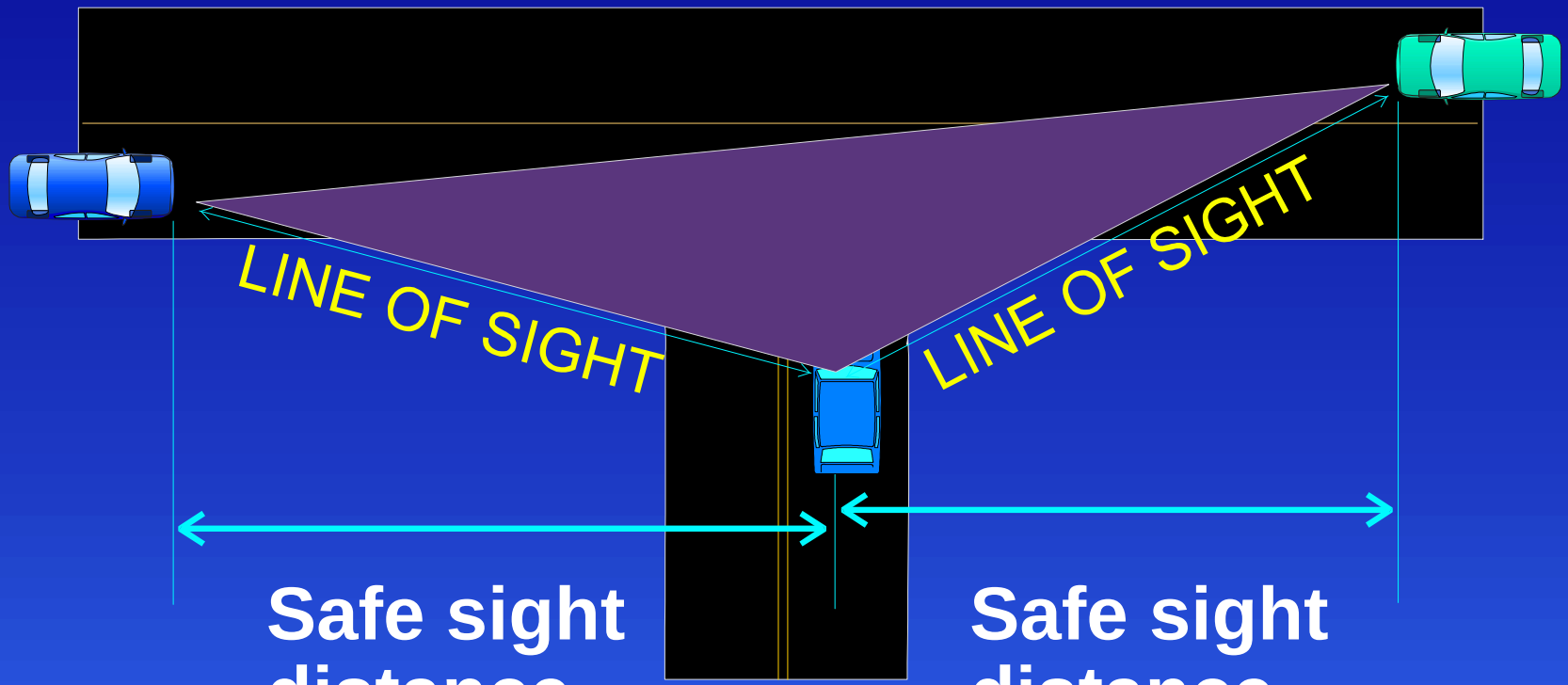
Minimum Stopping Sight Distance

Operating Speed (mph)	(feet)
35	250
45	350
55	475



STOPPING
SIGHT DISTANCE

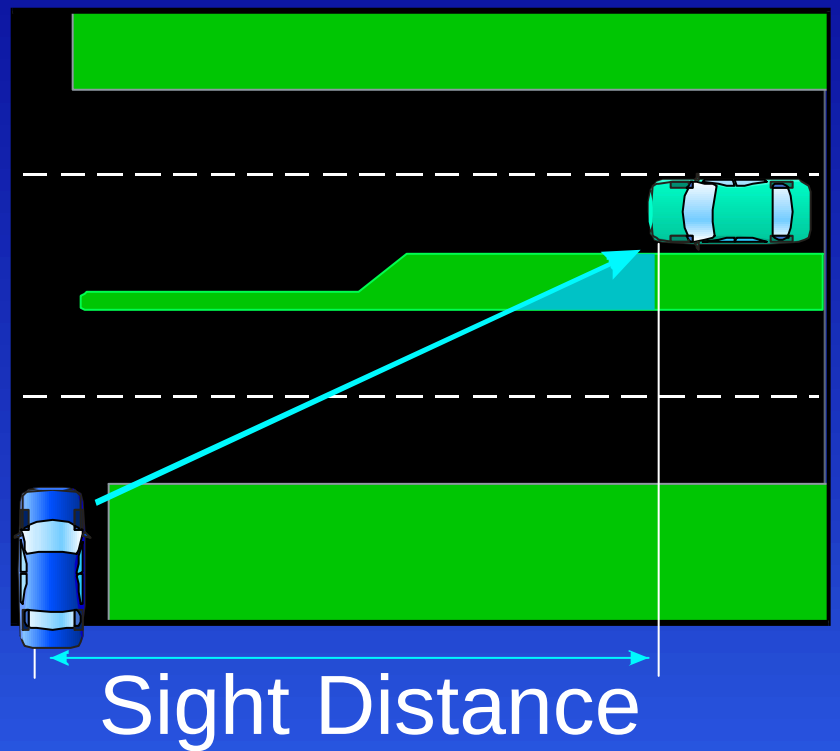
INTERSECTION SIGHT DISTANCE



Safe sight distance to the left

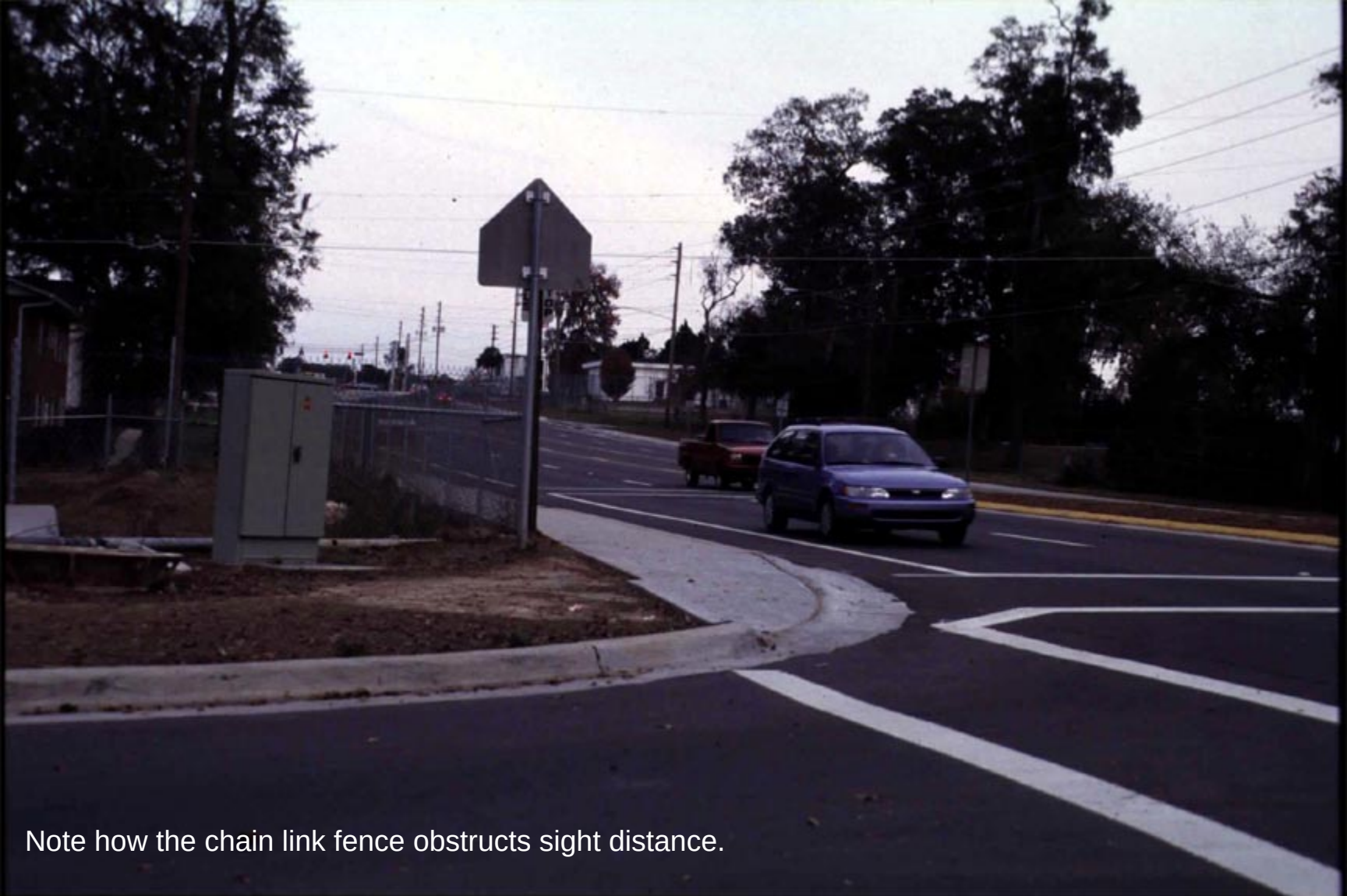
Safe sight distance to the right

Right and Left Turn Sight Distance



Design Speed	
Speed (mph)	Sight Distance at Intersection
35	470 ft
40	580
45	710
50	840
55	990
60	1,150

Source: Standard Index #546

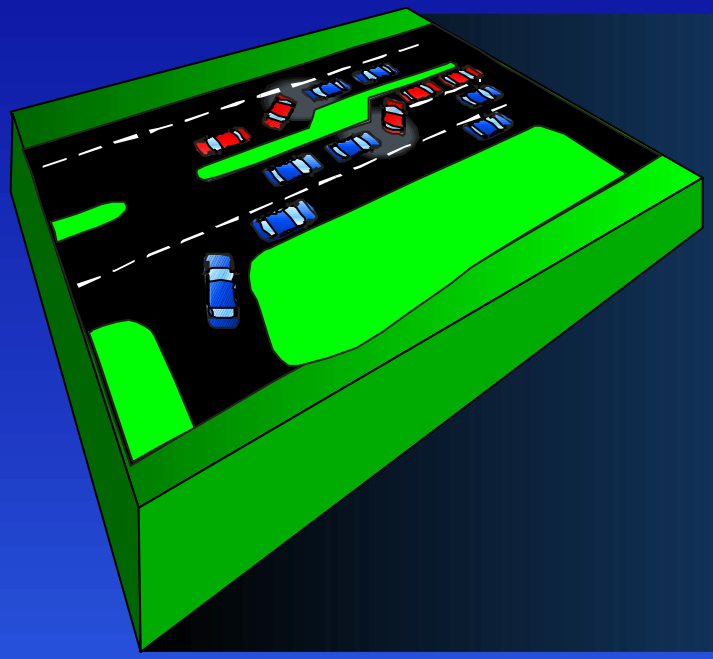


Note how the chain link fence obstructs sight distance.

Sight Distance for U-Turn at Unsignalized Median Opening

Speed (mph)	Sight Distance (ft)
35	520
40	640
45	830
50	1040
55	1250

Source: Median Handbook



LEFT TURN LANES

Guidelines for left-turn lane on two-lane highways

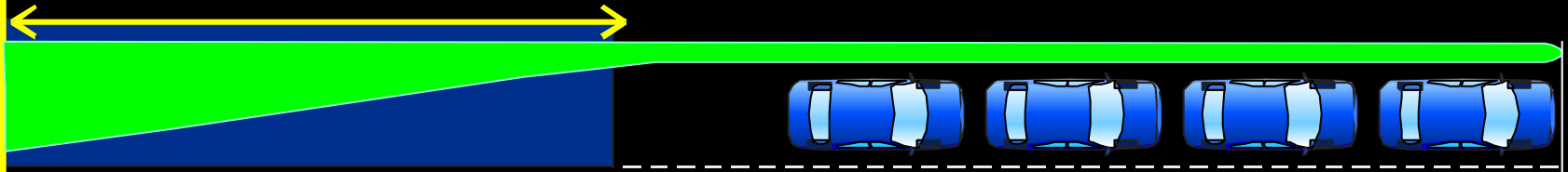
40 mph / 600 veh opposing / 5% lefts of 410

- Left turn volumes to the side street exceed 20 vehicles per hour
- Intersection geometrics result in inadequate sight distance

Source: AASHTO Greenbook 1990 pg. 791

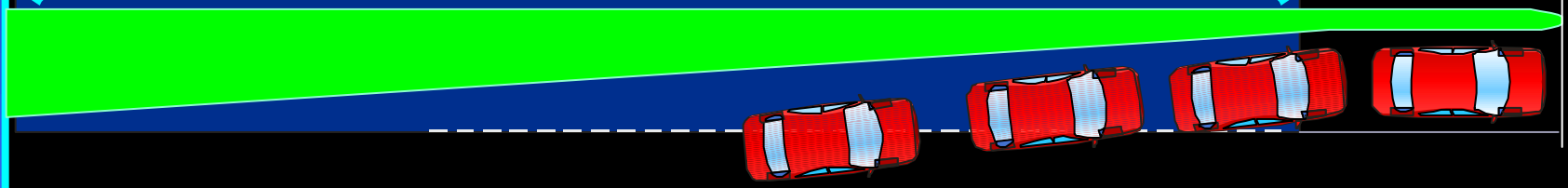
Recommended taper

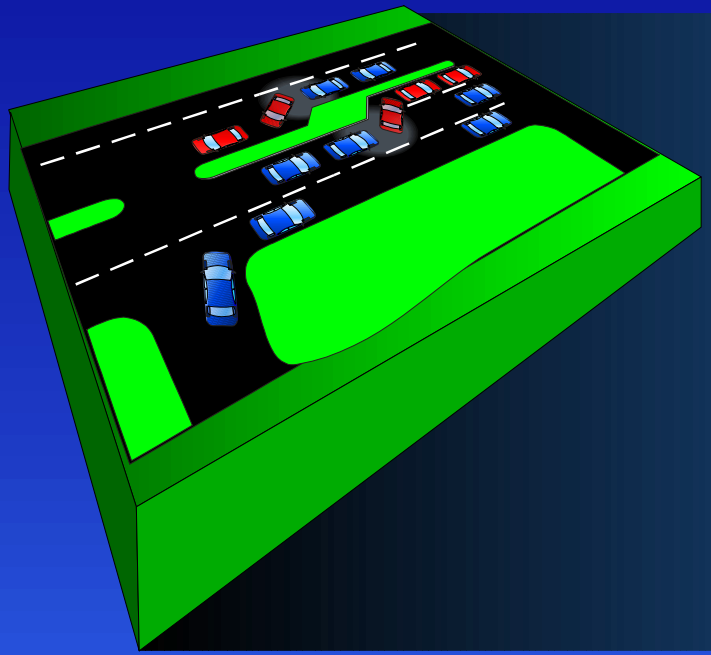
4:1 FDOT recommended taper



- More Storage
- Less chance of a vehicle blocking through lane
- Most appropriate in urban areas with "informed" drivers

8:1 Previously recommended





Some Median and Median Opening Principles

SPACING BETWEEN MEDIAN OPENINGS

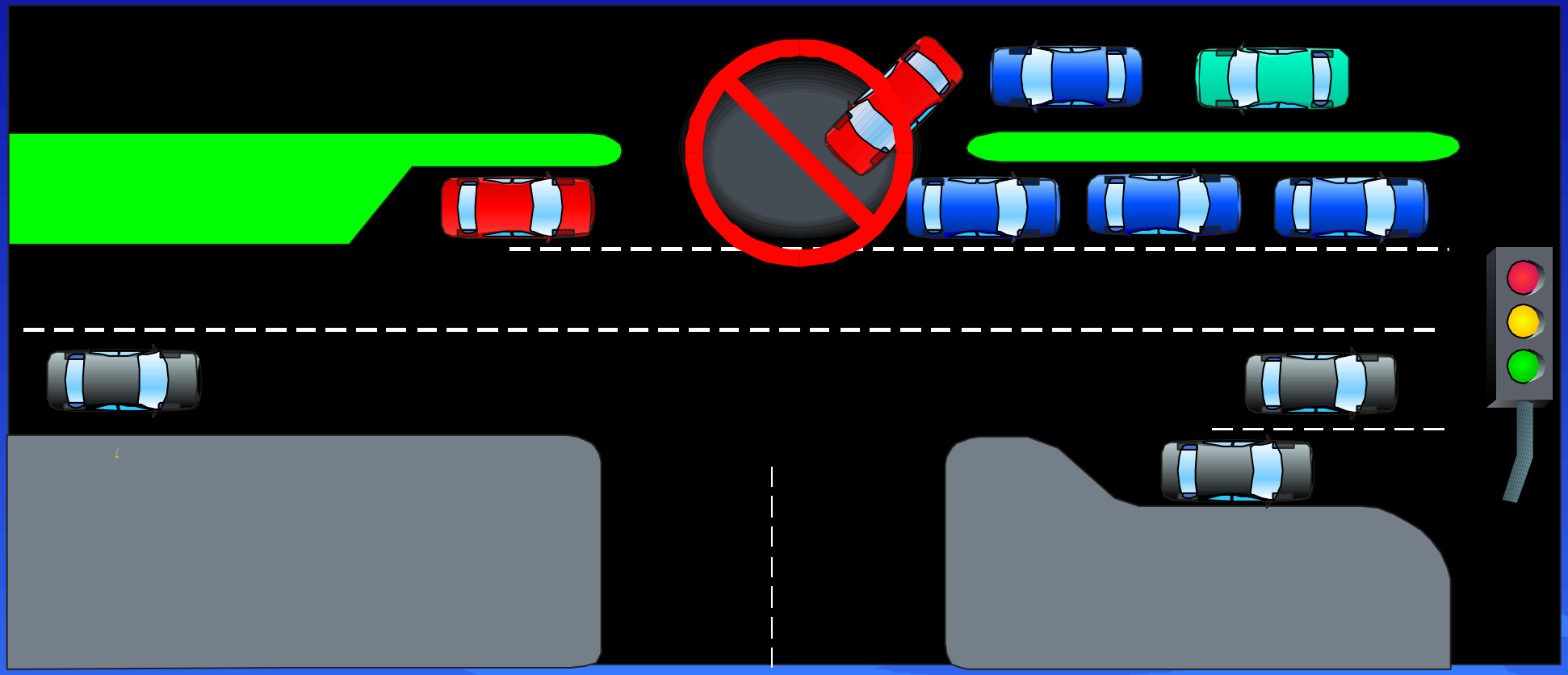
Access Class	Medians "Restrictive" physically prevent vehicles crossing "Non-Restrictive" allow turns across any point	Connection Spacing (feet)		Median Opening Spacing		Signal Spacing
		>45mph	≤45mph	Directional	Full	
2	Restrictive w/ Service Roads	1320	660	1320	2640	2640
3	Restrictive	660	440	1320	2640	2640
4	Non-Restrictive	660	440			2640
5	Restrictive	440	245	660	2640/ 1320	2640/ 1320
6	Non-Restrictive	440	245			1320
7	BothMedianTypes	125		330	660	1320

No More Median Removals

Note the medians on this road.

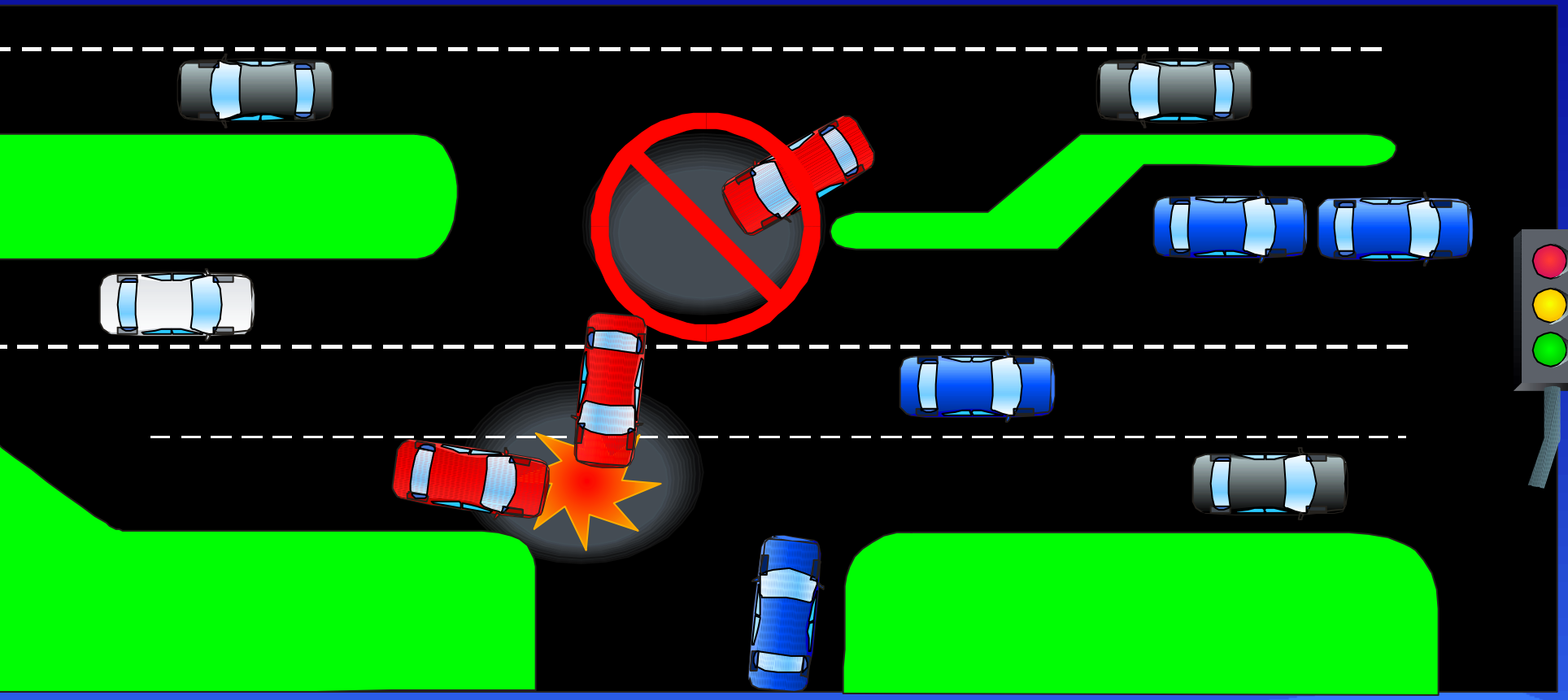

This median was taken out
south of the last photo.

No openings across left turn lanes

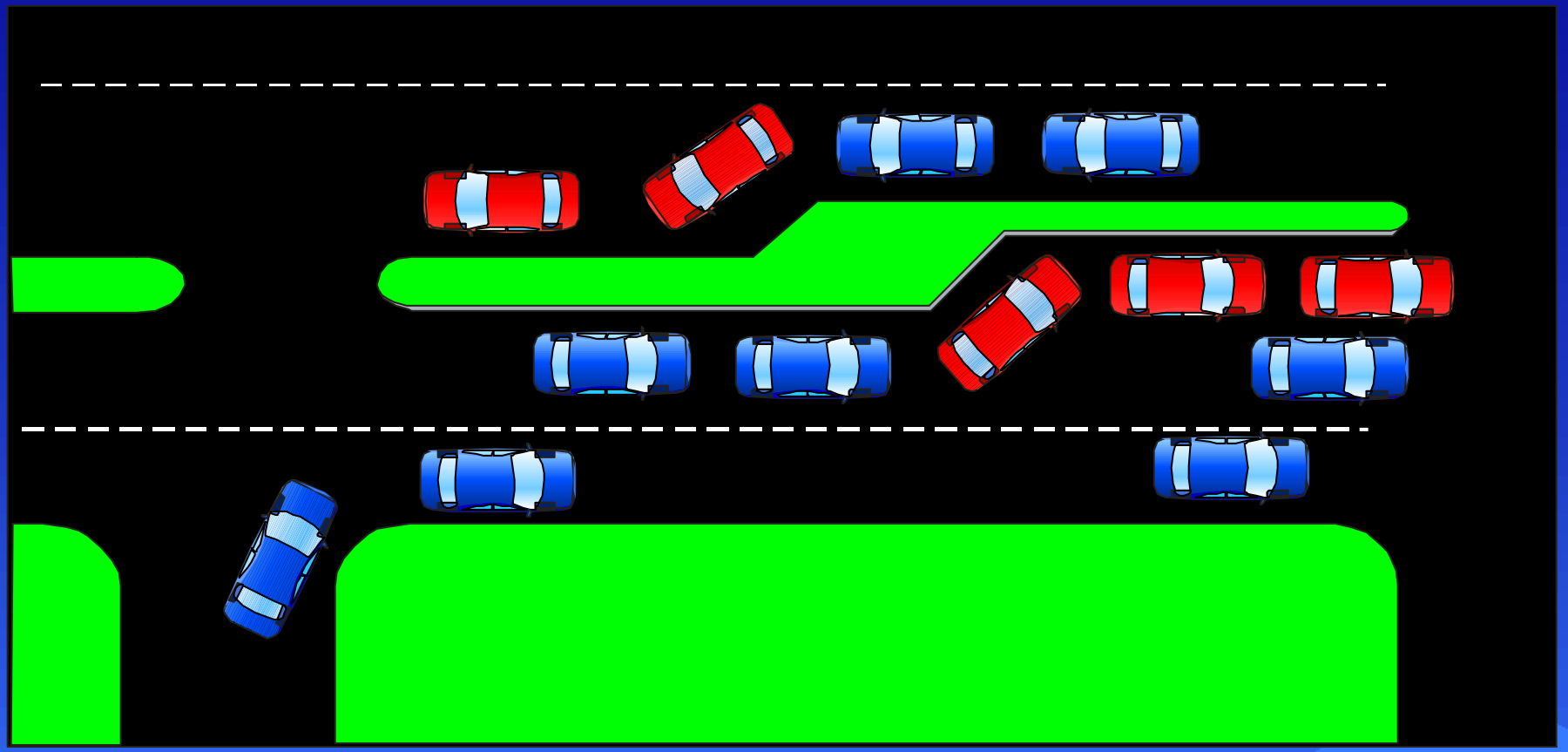


Do not allow turns across turn lanes. This violates driver expectancy.

Avoid openings across right turn lanes



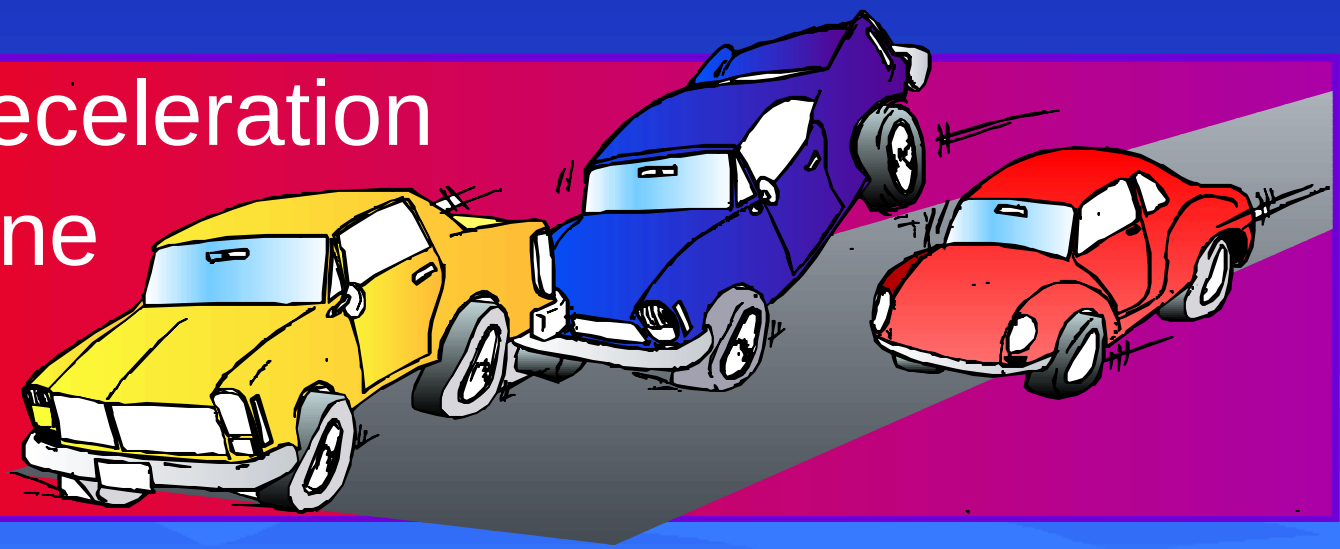
No openings that fail



What is Median Opening Failure?

Too many stored vehicles

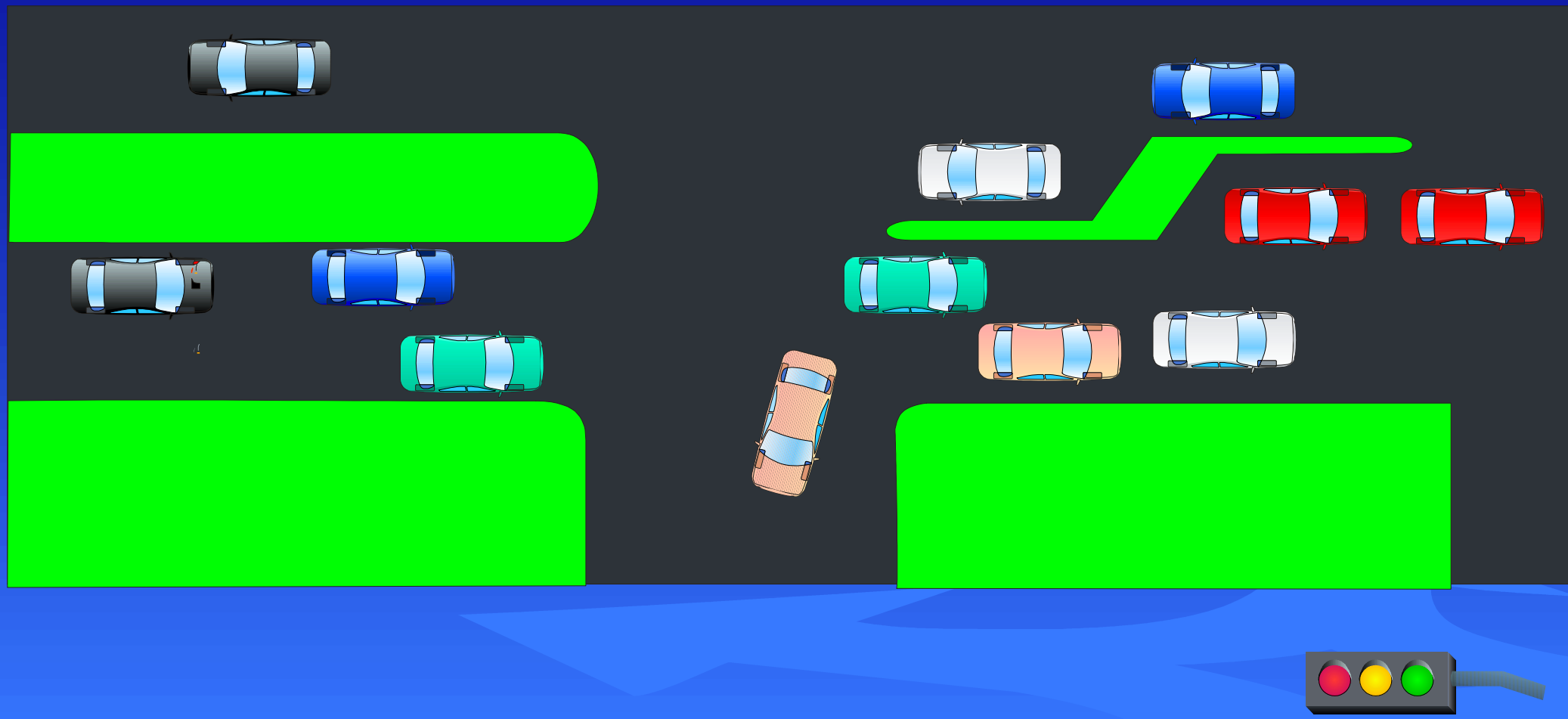
Excessive deceleration in through lane



Queues backed into through traffic.

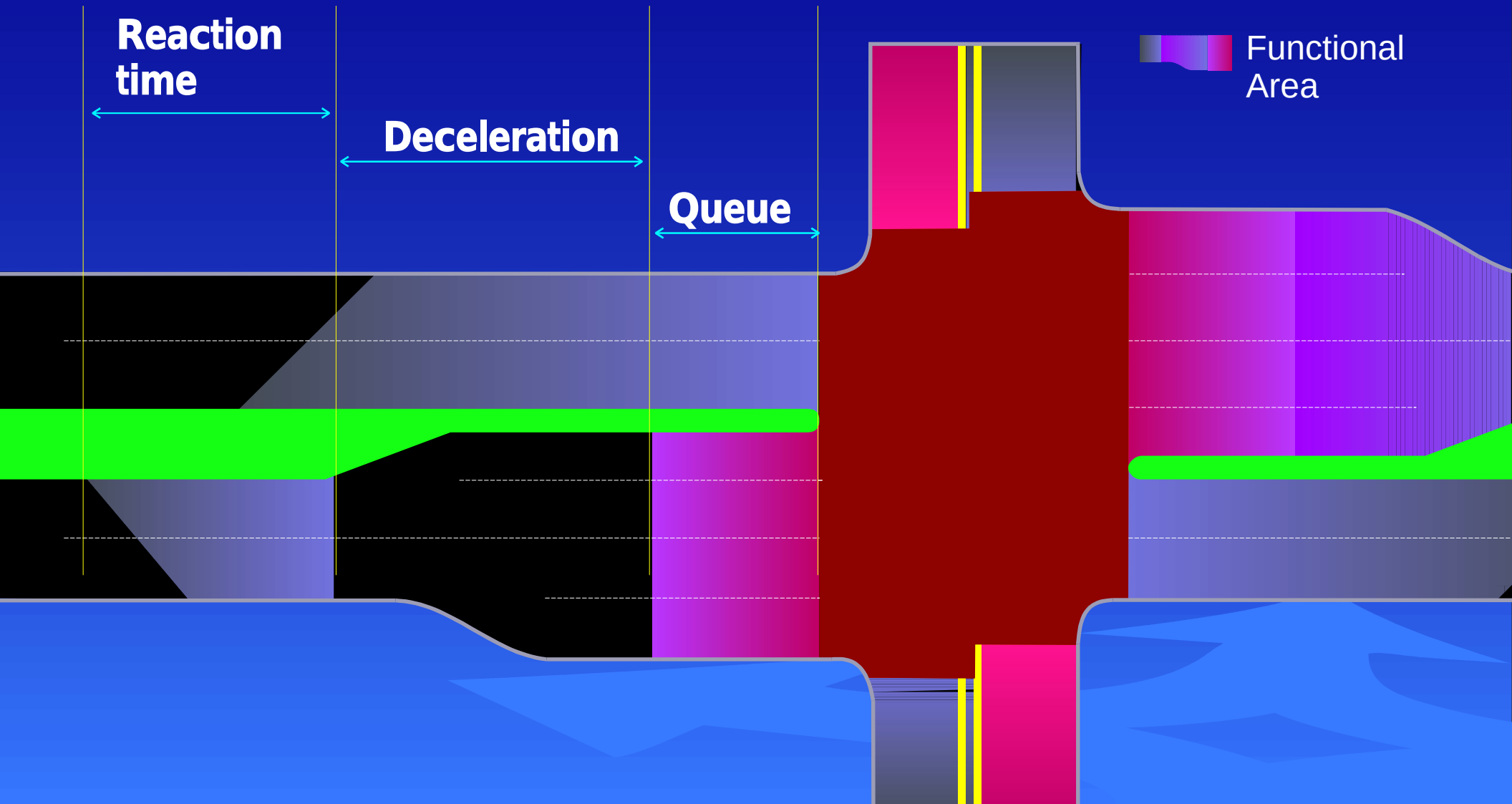
Queues backed into through traffic.

No openings in functional area



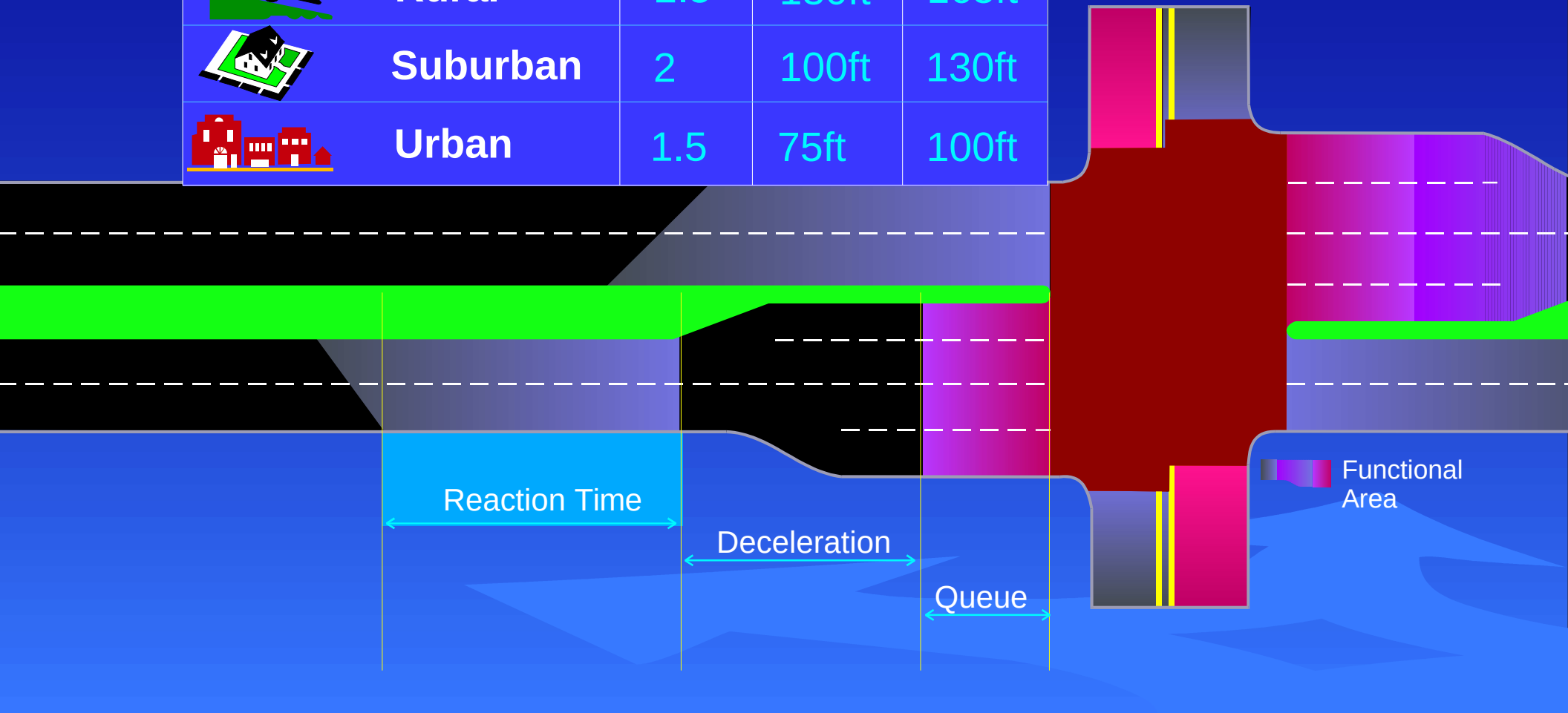
Cars stacked up near a signalized intersection.

What is the functional area?



Reaction Time

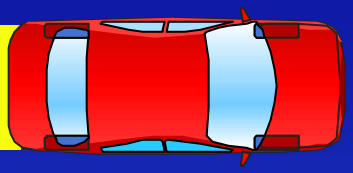
Areas	Sec.	35mph	45mph
Rural	2.5	130ft	165ft
Suburban	2	100ft	130ft
Urban	1.5	75ft	100ft



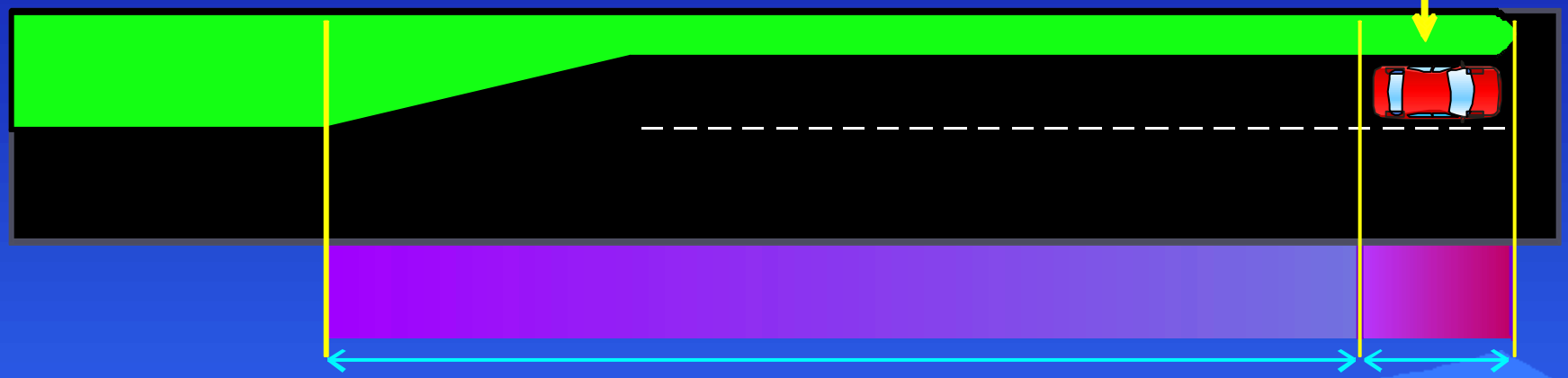
Standard Index #301

Storage and deceleration requirements

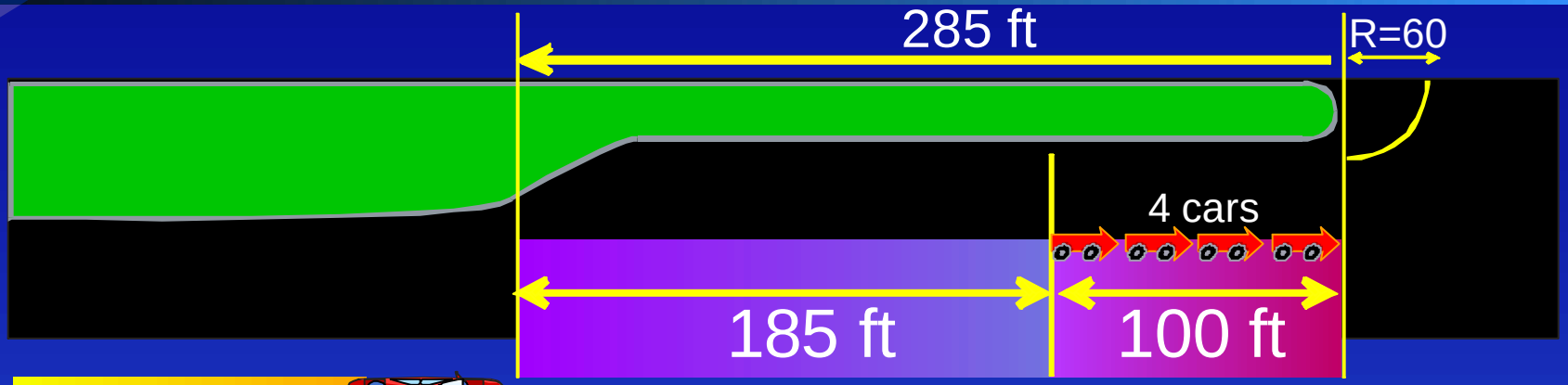
@ **45 mph**



#301 has no standard for min. queue



Standard Index #301



45 mph example

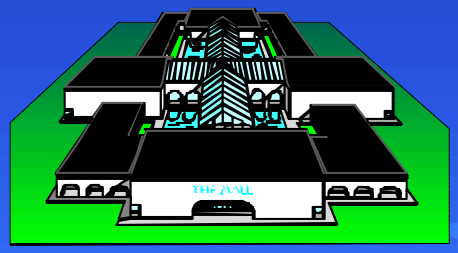
Design Speed mph	Entry Speed mph	Total Decel distance "L" ft
35	25	145
45	35	185
50 Urban	40/44	240
50 Rural	40/44	320
55 Rural	48	385

Recommended Queues

As measured or projected by traffic study

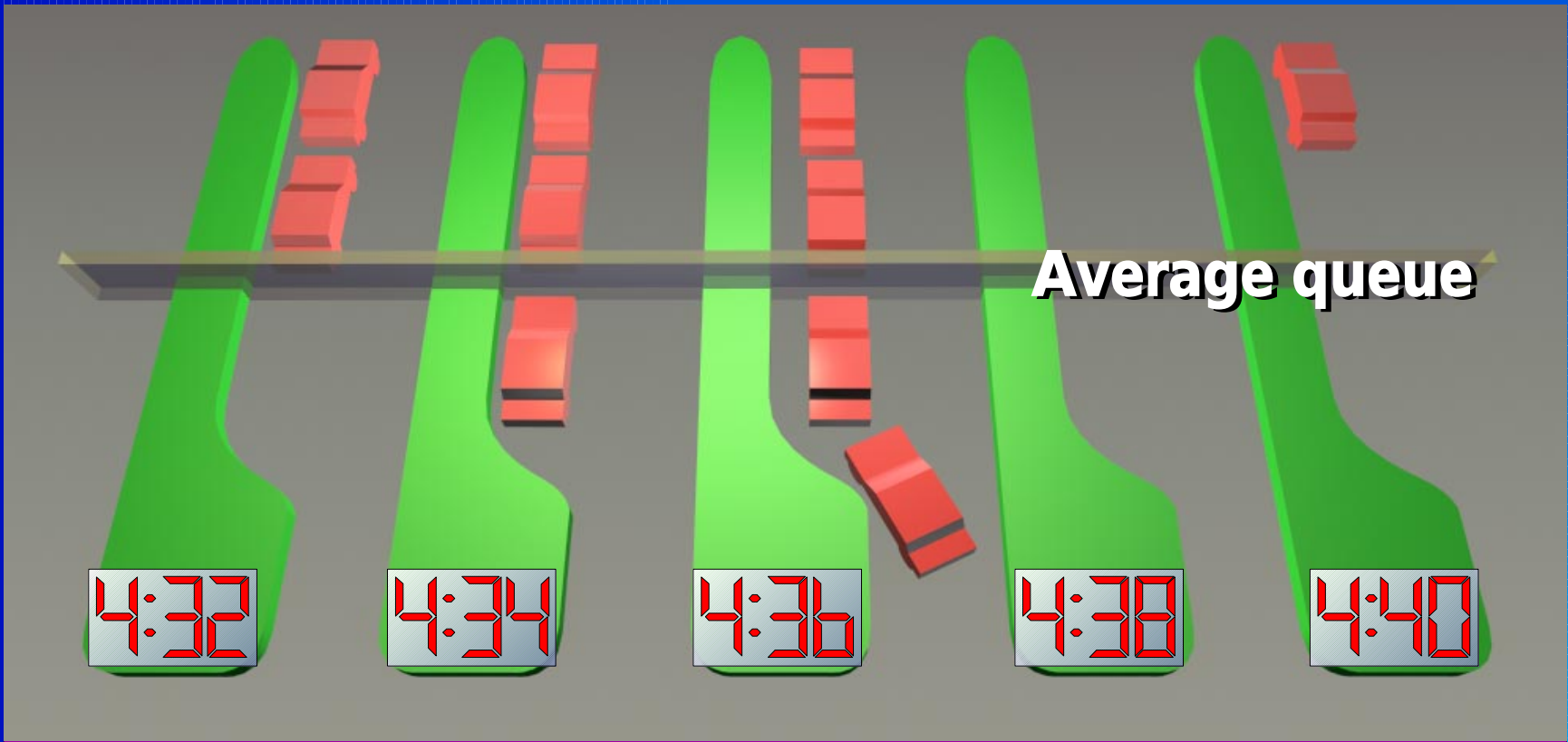
4 cars urban minimum

2 cars rural or small town



unless is serves a major generator (large discount store, shopping center, etc.)

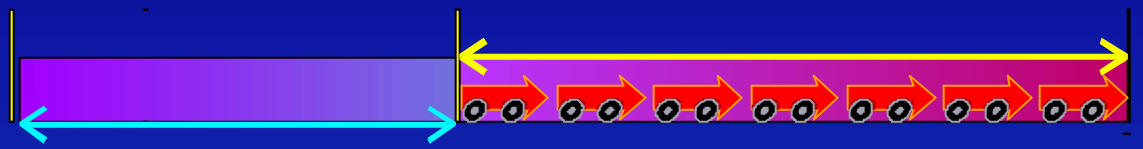
How can designing to the average fail?



average queue = 2 cars

40% failure rate

Recommended Left Turn Queue
for Unsignalized Openings



Lefts/Hour	Average Demand Per Interval	Recommended Queue	Recommended Queue FIHS
50	1.7	3	4
60	2.0	4	5
80	2.7	5	6
100	3.3	6	7
120	4.0	7	8

Rural or Small town

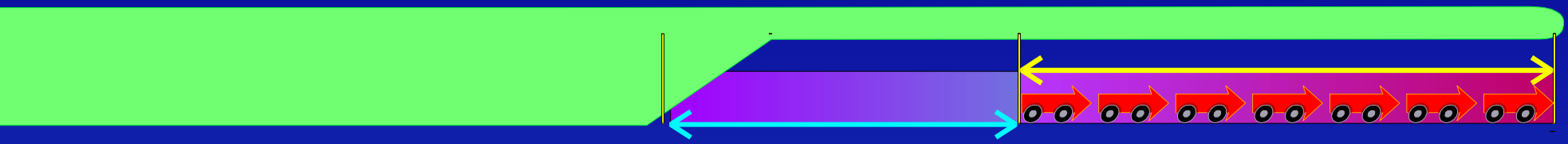
Assumptions:

1. 120 second interval
2. Approx. probability of "success" (storing all vehicles)
   90% non-FIHS, 95% FIHS

Adjustment for Large Vehicles

Percent Trucks	Average Storage Length per Vehicle	
<2%	25 ft	7.6m
5%	27ft	7.7m
10%	29ft	9.0m
15%	32ft	10.0m
20%	35ft	10.7m

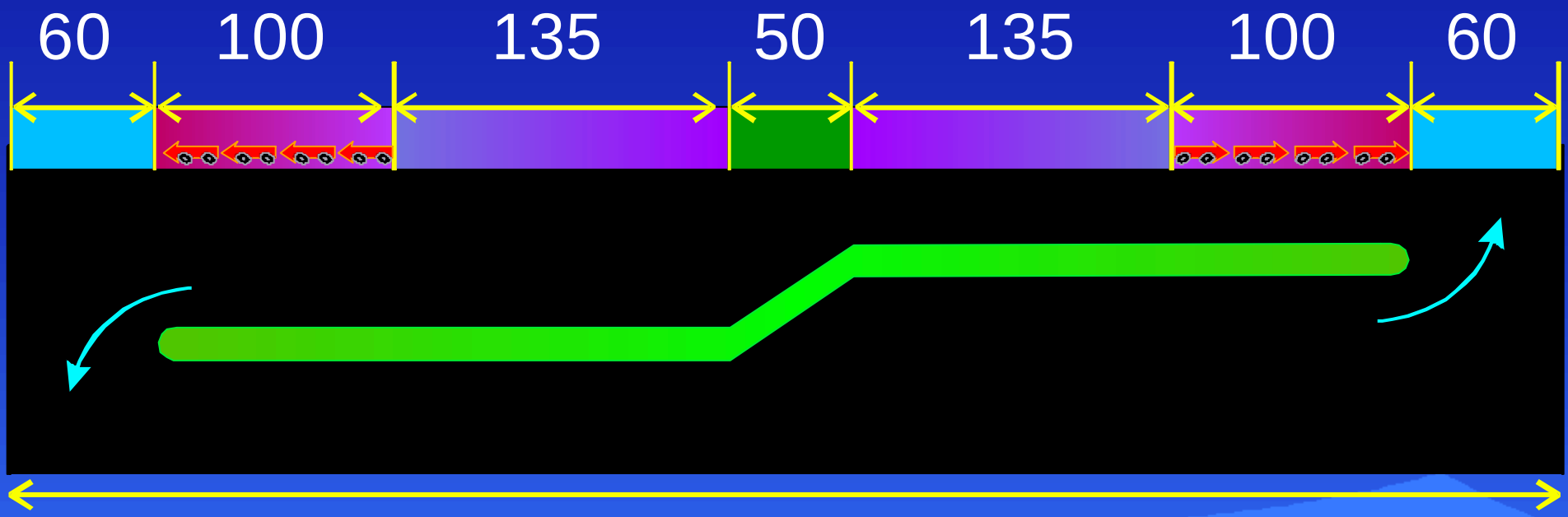
Small Town Queues



- Be aware that major shopping centers and traffic generators exist here, too
- They may require more than the minimum
- At a minimum:
  Check the traffic studies done by the developer or city

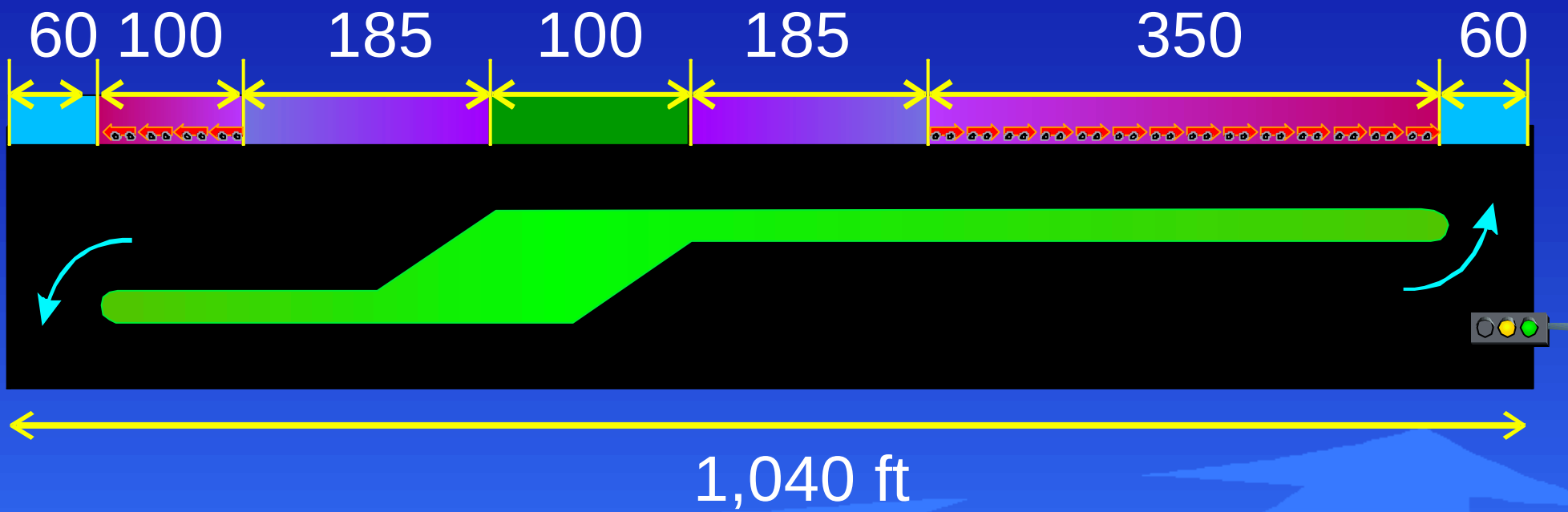
One Very Tight Possible Scenario

Urban conditions @ 45 mph design



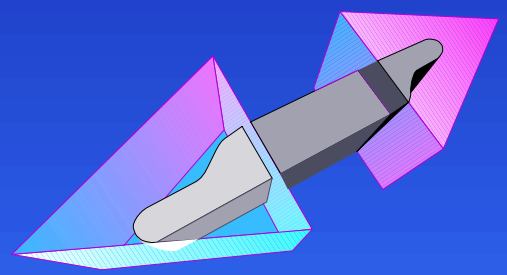
More realistic minimum scenario

Urban conditions @ 45 mph design



District Median Access Management Team in Each District

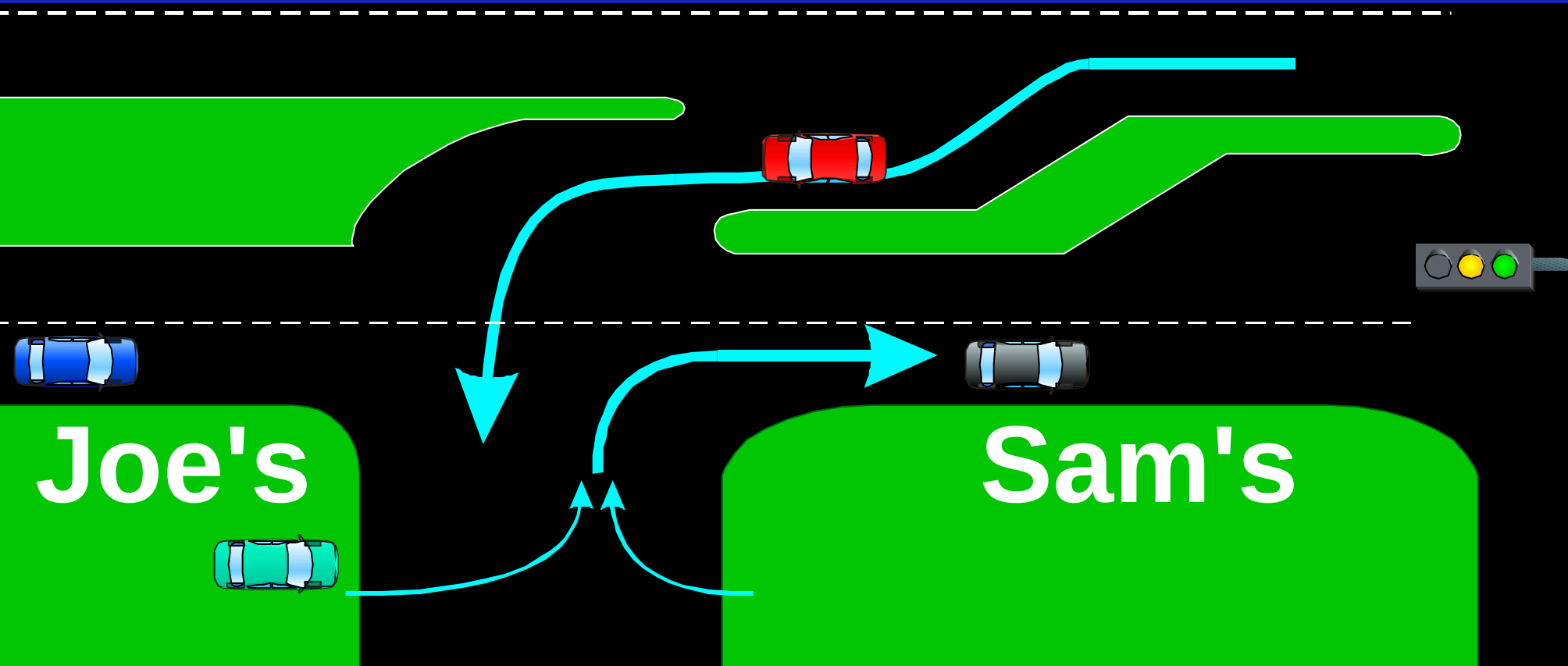
- Decision can be made by responsible engineer
- 10% for "Full" openings
  - District can be more strict
- Directional openings - "case-by-case"



Remember:
even less than 10% deviations might be a problem

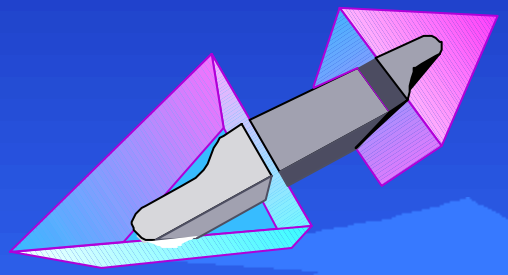
Favorable Conditions for Variance

- Alleviate **significant** congestion?
- Joint access



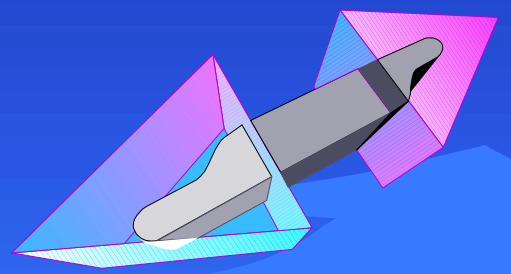
Other Conditions for Variance

- Un-relocatable or unique historic features
- Where strict adherence would cause safety problem
- Where a directional would replace a "full" opening
- Emergency vehicle openings

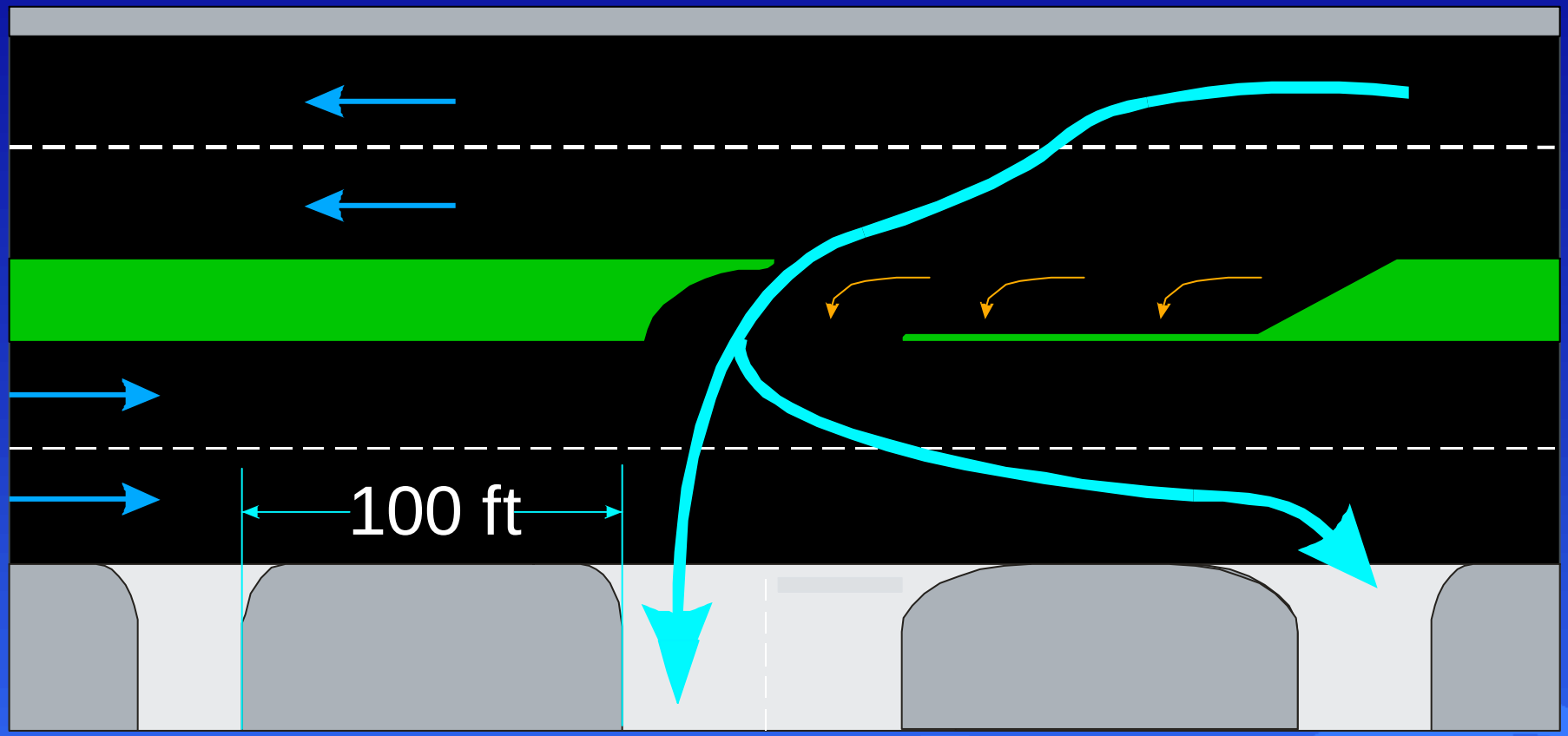


Unfavorable Conditions for Variance

- ✗ Intrastate system
- ✗ Where any opening is unsafe
  example: SR 436 near I-4
- ✗ Openings in functional area of intersection
- ✗ High crash locations
- ✗ Where alternatives exist



Placement of Driveways Near Median Openings



Staying ahead of problems

Rural multilane in suburbanizing areas

- Change bullet nose to storage
- Close under-used openings

Note extra pavement to make u-turns easier.

Summary of Standards and Recommendations

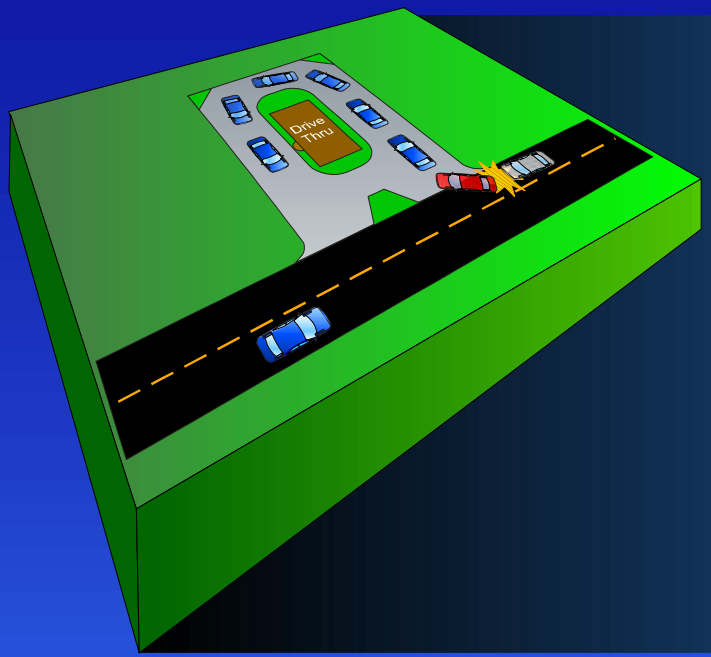
Minimum	40 mph or less	15.5 feet	Reconstruction Projects
Minimum	45 mph	19.5 feet	
Minimum	55 mph or less	22 feet	
Guidance from Plans Preparation Manual	55 mph or greater	40 feet	
Recommended	4 lane highways	30 feet for single lefts 42 feet for dual lefts	
Recommended	6 lane highways	22 feet for single lefts 34 feet for dual lefts	

Median Width

Minimum	**40 mph or less**	**15.5 feet**	**Reconstruction Projects**
Minimum	**45 mph**	**19.5 feet**	
Minimum	**55 mph or less**	**22 feet**	
Guidance from Plans Preparation Manual	**55 mph or greater**	**40 feet**	
Recommended	**4 lane highways**	**30 feet for single lefts 42 feet for dual lefts**	
Recommended	**6 lane highways**	**22 feet for single lefts 34 feet for dual lefts**	

A wide median allows for a good directional median opening design. This design discourages wrong way movements.

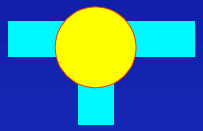
Directional openings in a narrow median requires the use of painted areas to encourage the allowed movements.



ON-SITE CIRCULATION & PARKING

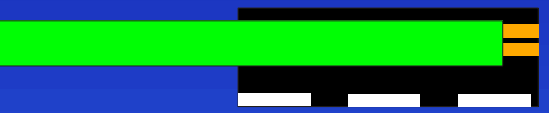
On-Site Characteristics to Evaluate

Vehicular conflict points



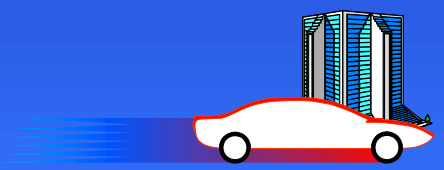
"T" intersections on-site

Sight distances



Delineation of roadways

Width of roadways

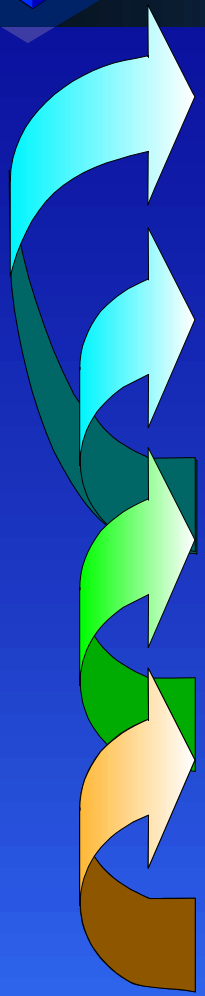


Potential for high speeds
- especially next to buildings

Source: Virgil Stover

Do you really want people backing out of parking in the major aisle of the site?

PUBLIC STREET SITE CIRCULATION

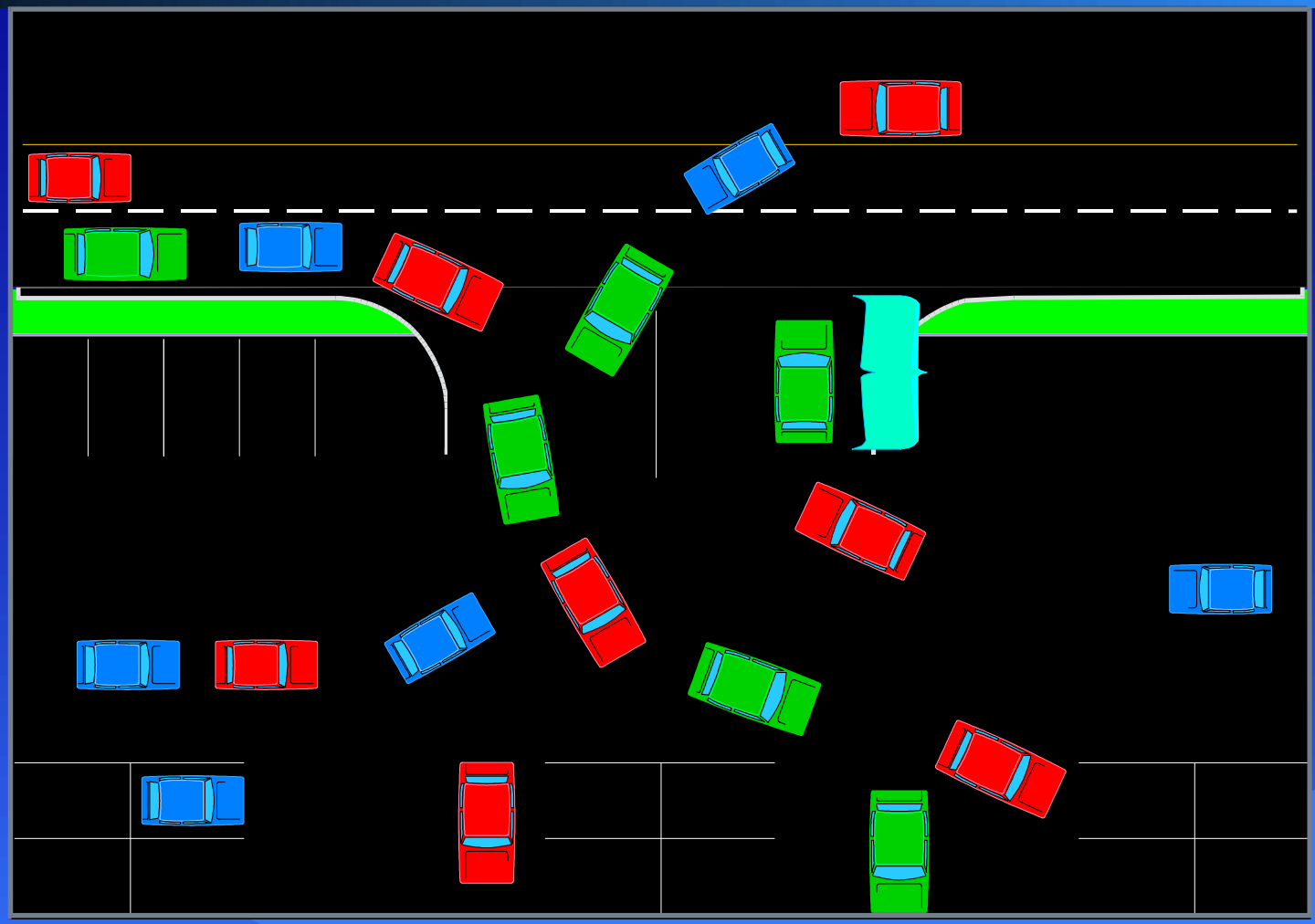


Major Arterial	**Access drive of a very large development (shopping center of 1,000,000 GLA)**
Minor Arterial	**Access drive of a medium size development (500,000-750,000 GLA); Ring road for a very large development**
Major Collector	**Circulation road connecting parking areas of a large development; Access drive of a medium development**
Minor Collector	**Circulation at end of parking rows; access drive to convenience development**
Local	**The aisles between parking stalls; Driveway of neighborhood shopping center**

Source: Virgil Stover

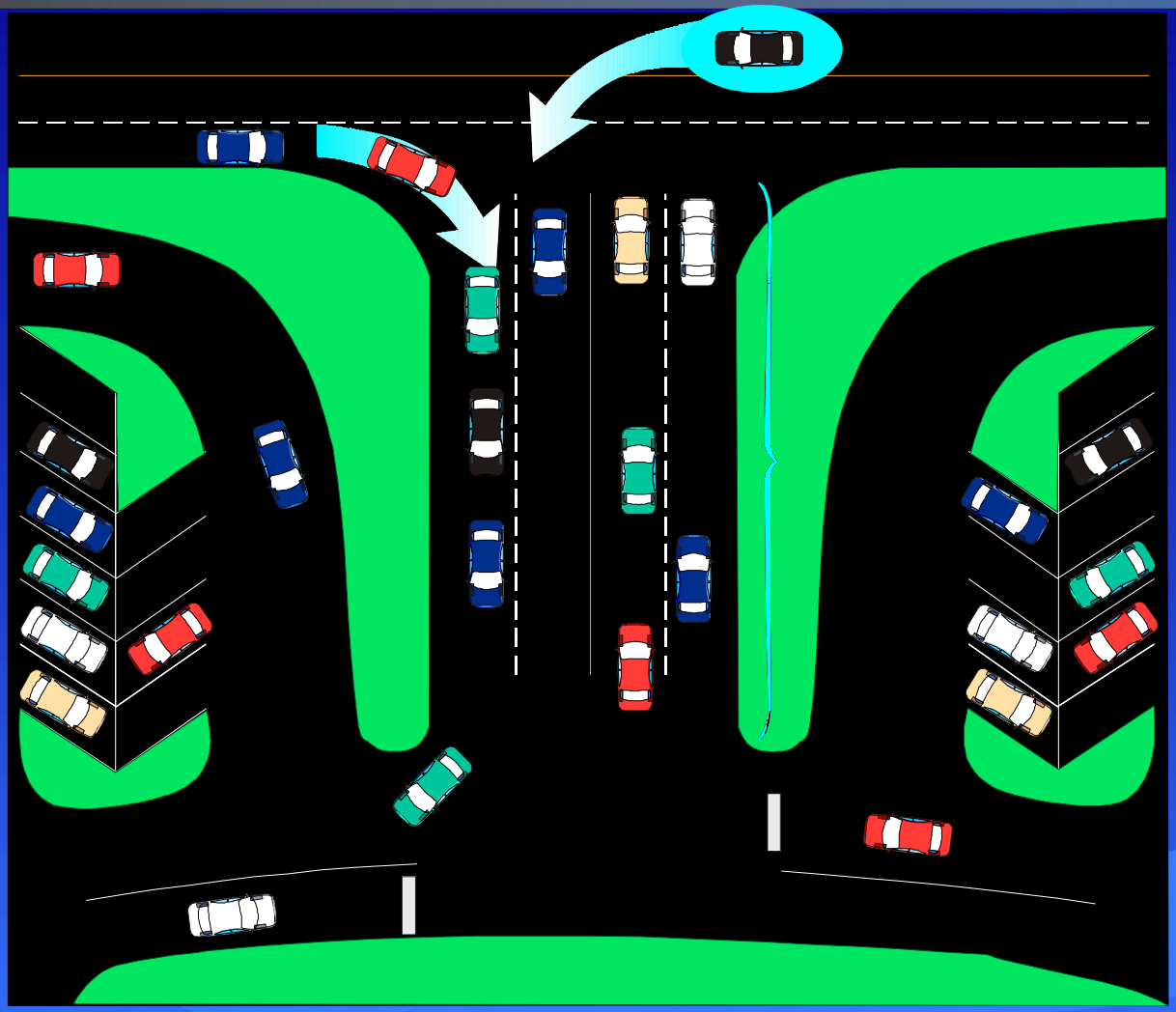

Note the "Throat length" on
this design.

Insufficient Connection Depth

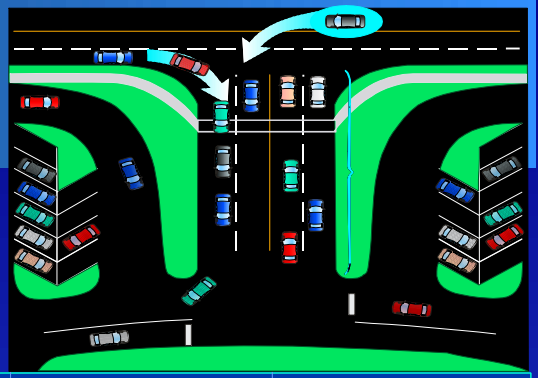


Connection Depth

Priority should be given to inbound traffic



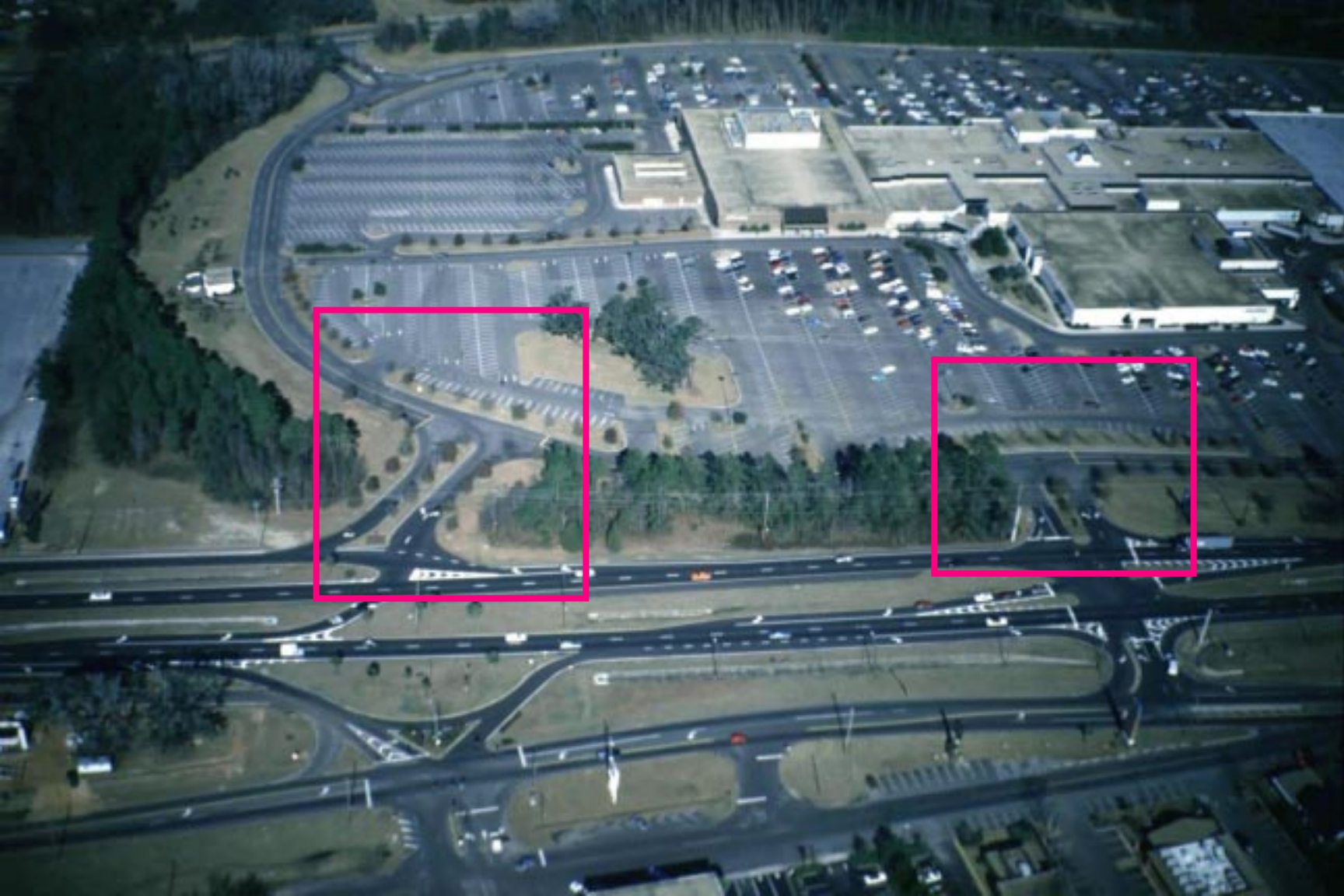
Generally adequate driveway connection depth for major entrances



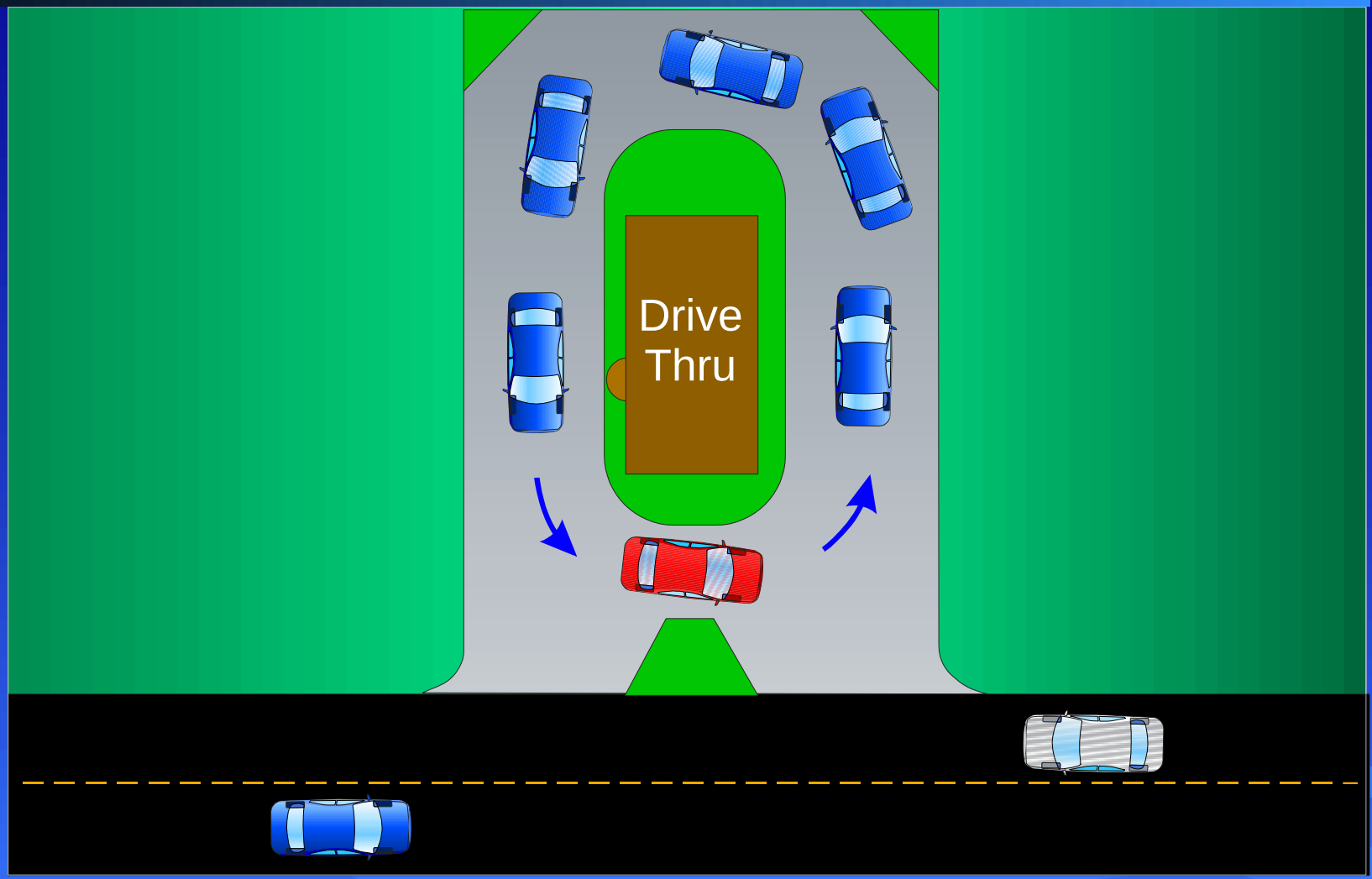
	Meters	Feet
Regional Shopping Centers (malls)	75	250
Community Shopping Center (supermarket, drug store, etc.)	25	80
Small Strip Shopping Center	10	30
Regional Office Complex	75	250
Office Center	25	80
Other Smaller Commercial Developments	10	30

Source: Virgil Stover

Throat depth for small shopping center.



Provide For On-site Circuity



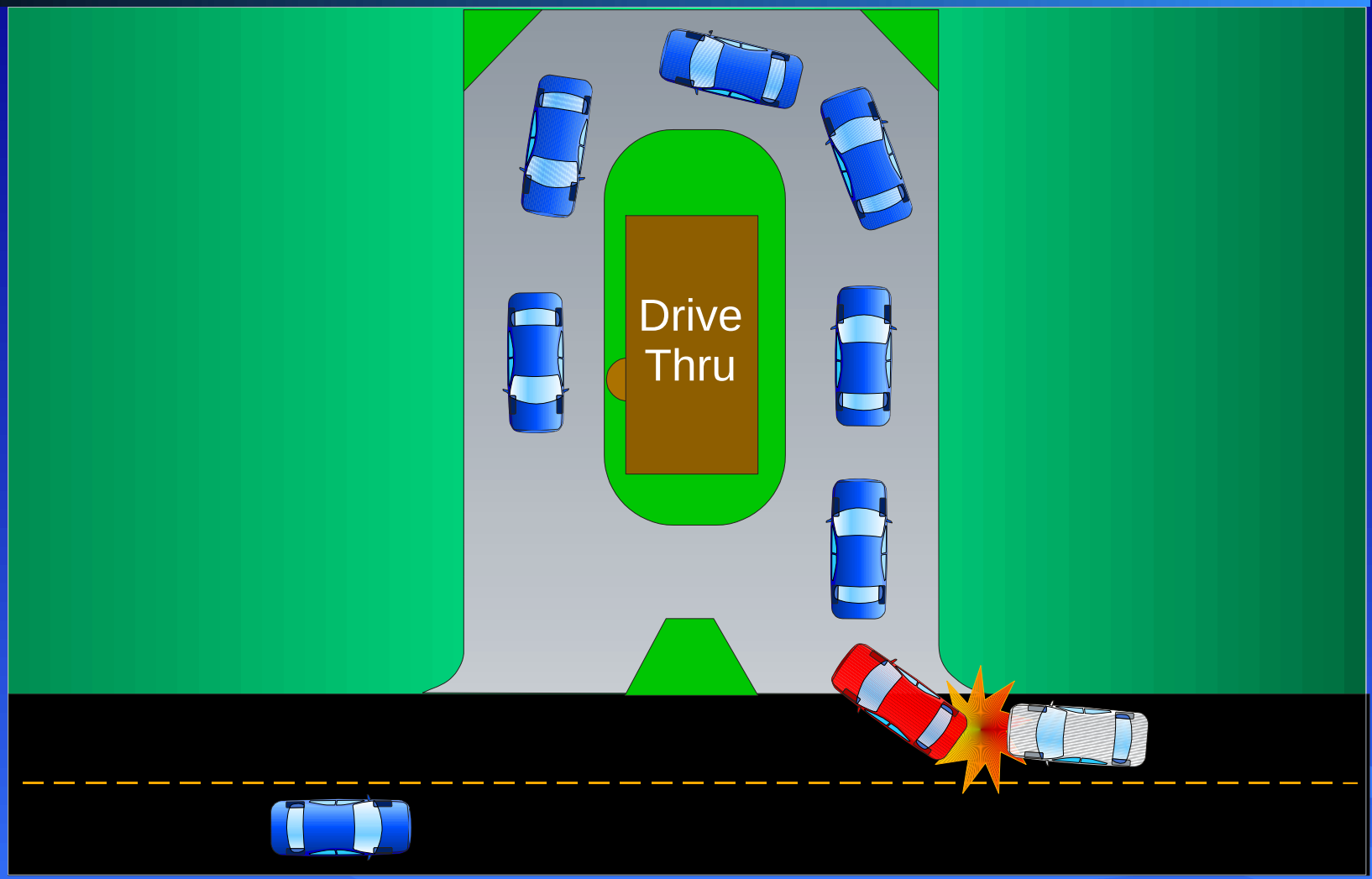
On-Site Characteristics to Evaluate

- Pedestrian Concerns
- Special Concerns
  - Fire Lanes
  - Large Vehicle Concerns
  - Loading Docks
  - Solid Waste
  - Treament of Outparcels

Provide a way for pedestrians to walk "through" the development.

The view the pedestrian sees as they walk to the development through the back.

Excessive Queues at Drive-Through



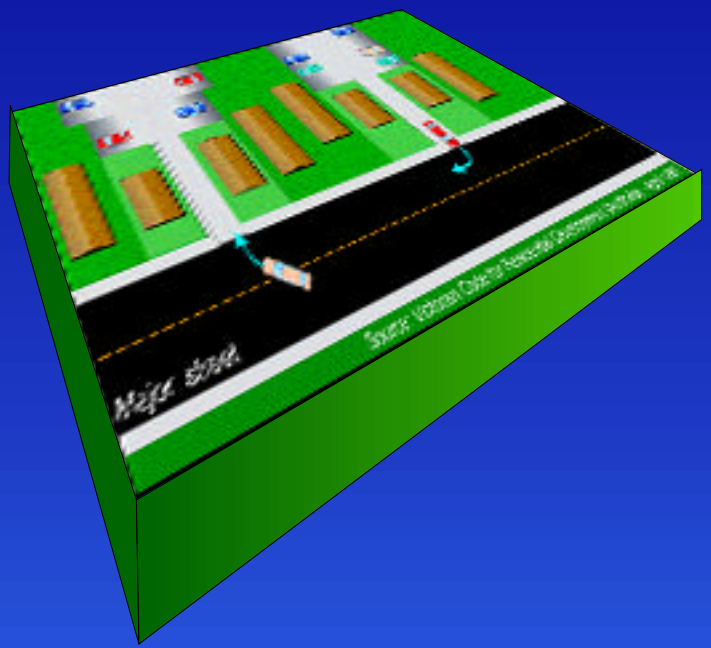
Lunch hour queue. Yo quiero Taco Bell.

Drive-Thru Facility Queue Distances

Use	Observed Queue	Lane Length Required
Fast-Food (hamburger)	9	60m (198ft)*
Bank	7	47m (154ft)
Car Wash (self-service)	2	13m (44ft)
Day Care	9	60m (198ft)
Dry Cleaner	2	13m (44ft)

Source: Queuing Areas For Drive-Thru Facilities, ITE Journal, May 1995.

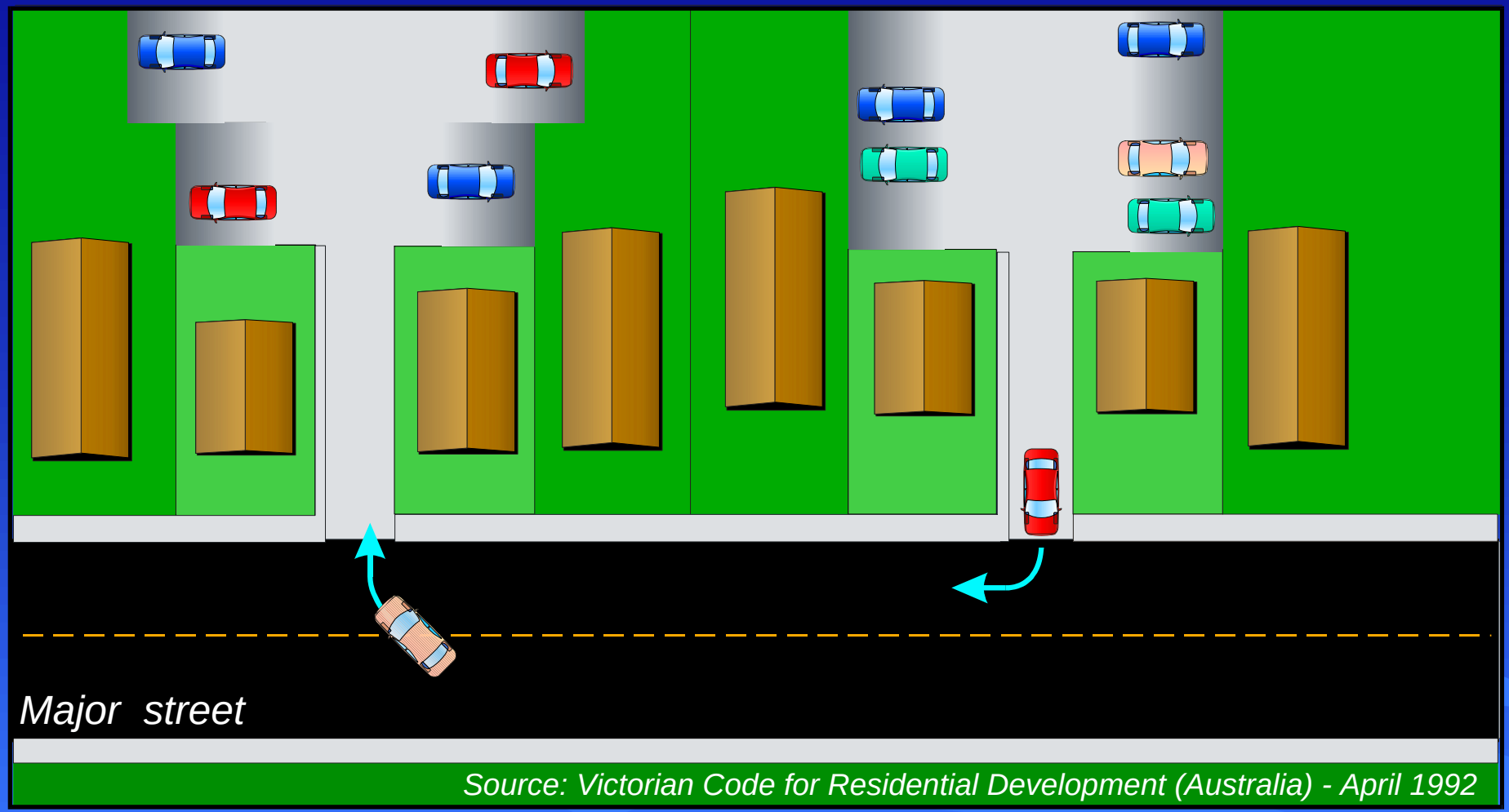
*Queue length per vehicle is 6.5m (22ft), which is less than the average 7.5m (25ft) used for queues on the road system.



Some Site Planning Techniques

Shared Rear Lot Minimizes Driveways

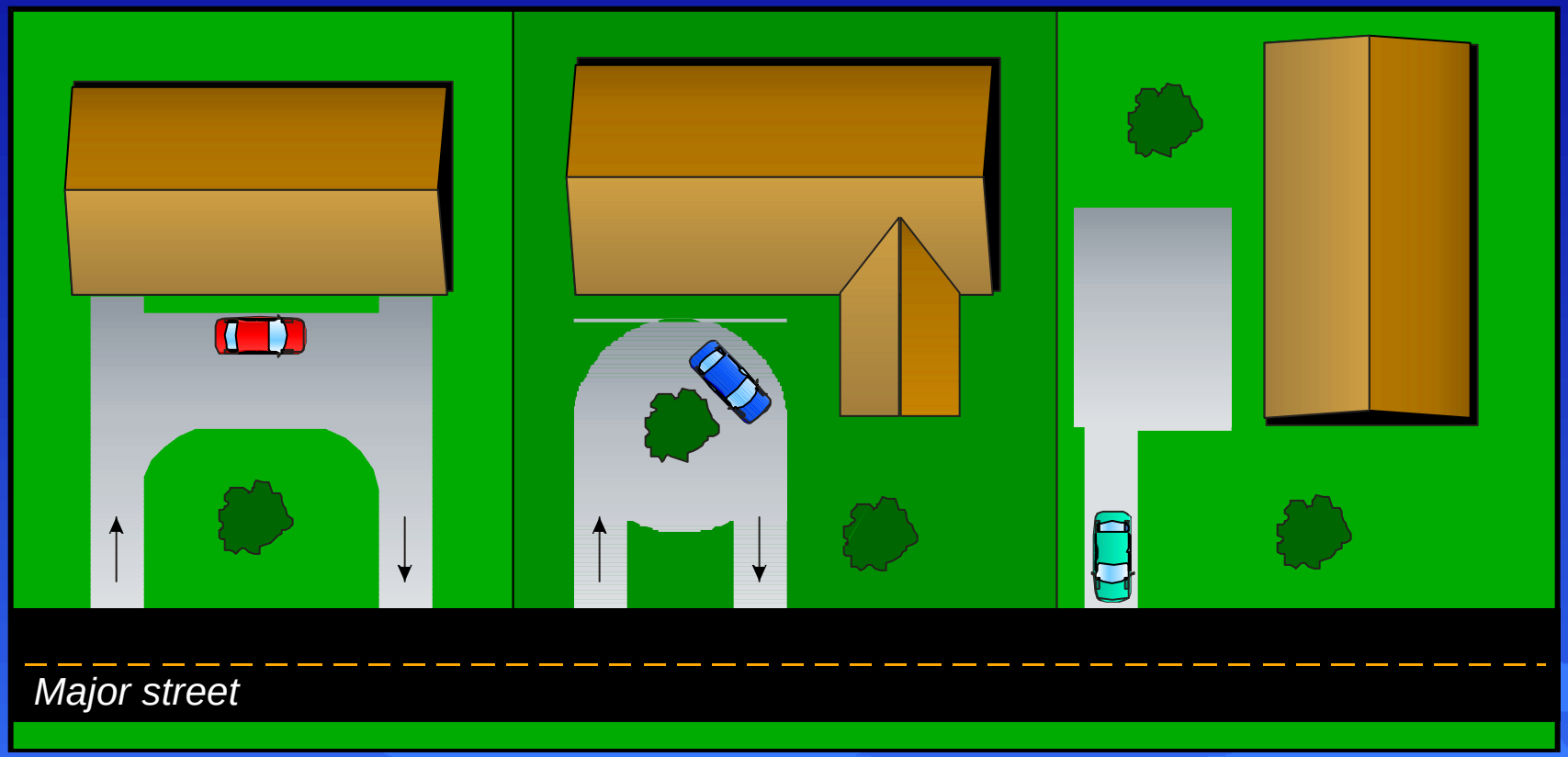
Car courtyards allow vehicles to enter and exit forwards



Source: Victorian Code for Residential Development (Australia) - April 1992

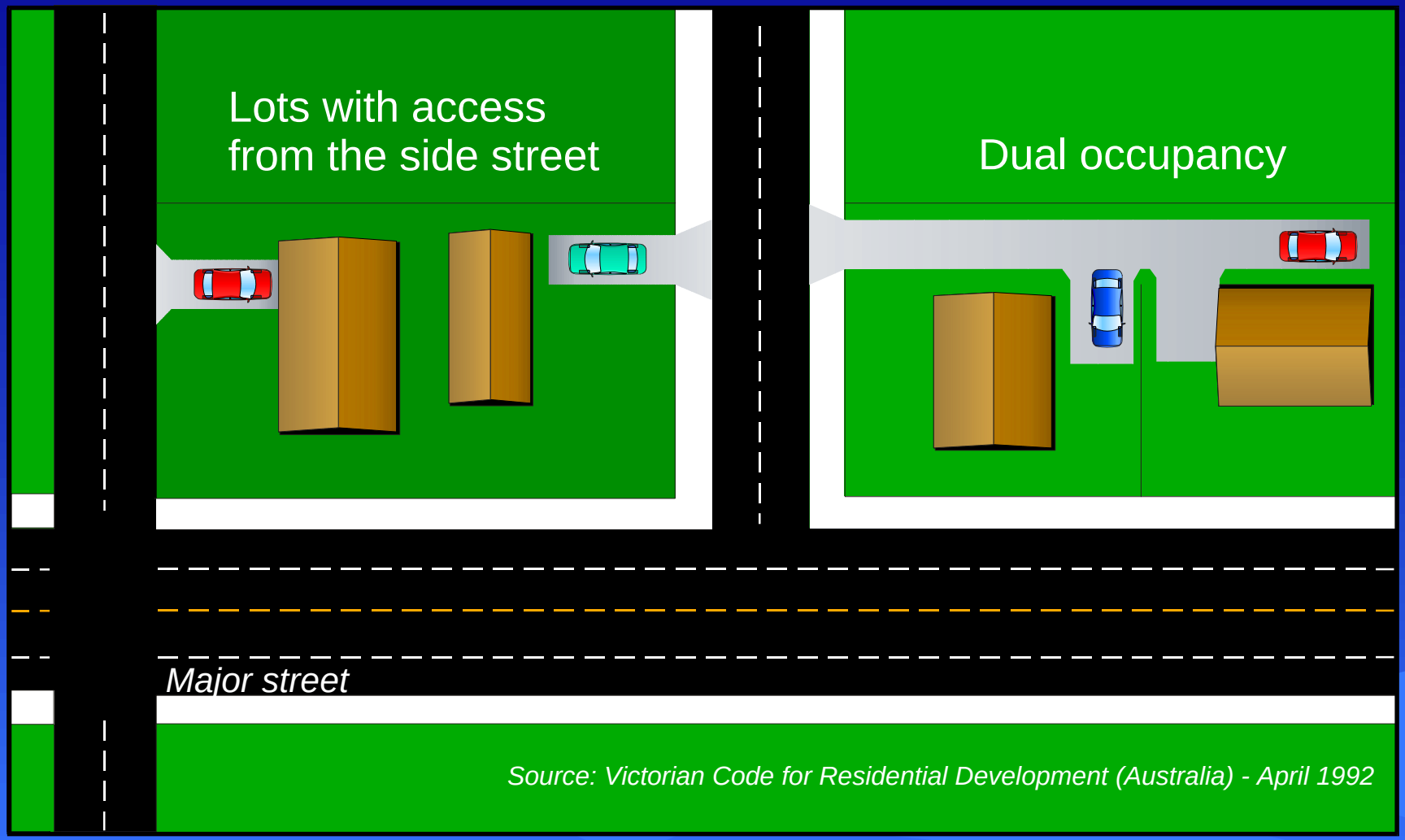
Wide Lots Give More Flexibility

Wide lots allow for large driveways
so vehicles can enter and exit forwards



Source: VictorianCode for Residential Development(Australia)- April 1992

Use of Side Street Access



Source: Victorian Code for Residential Development (Australia) - April 1992

Development without direct driveway access.

Development without direct driveway access.

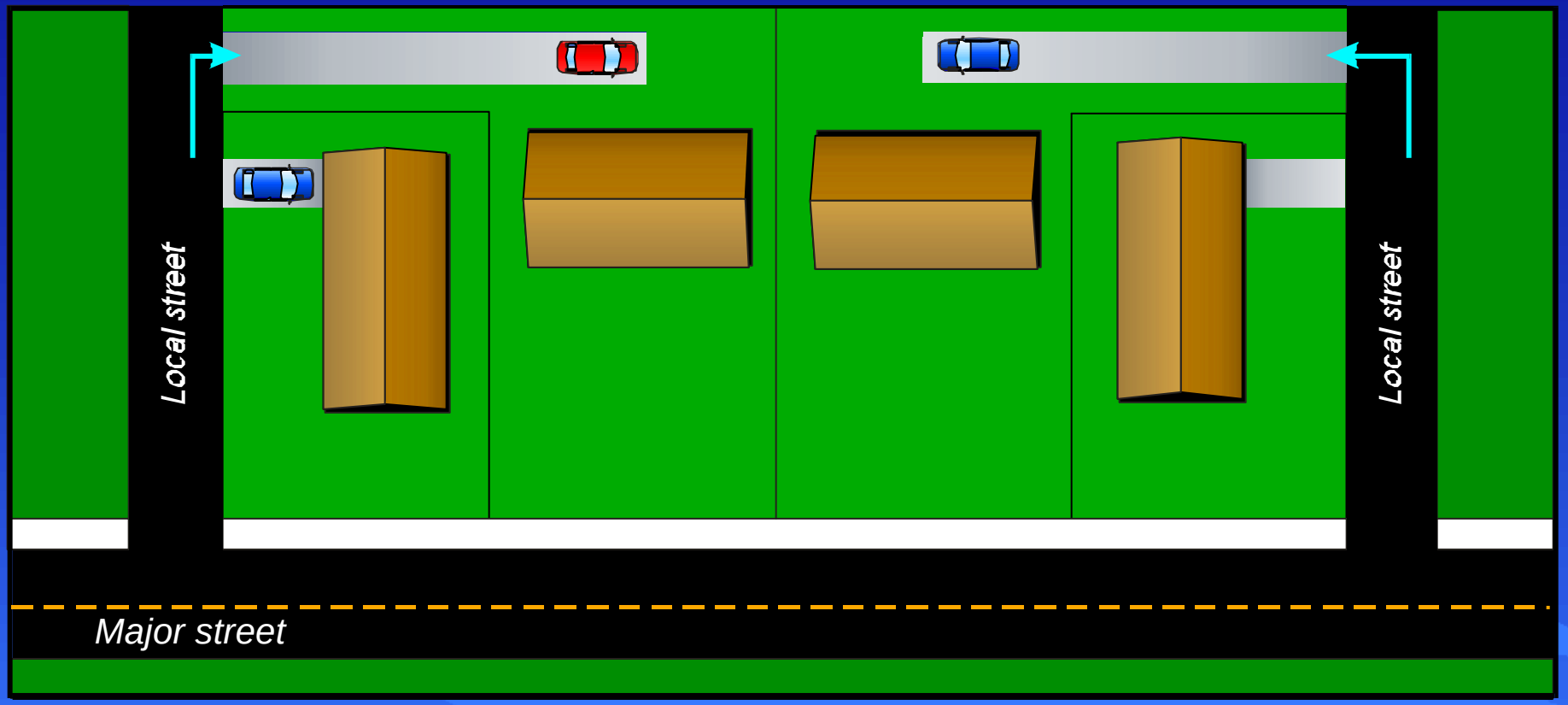
The previous Subway allows easy pedestrian access between neighboring parcel.

Development without direct driveway access.

Development without direct driveway access.

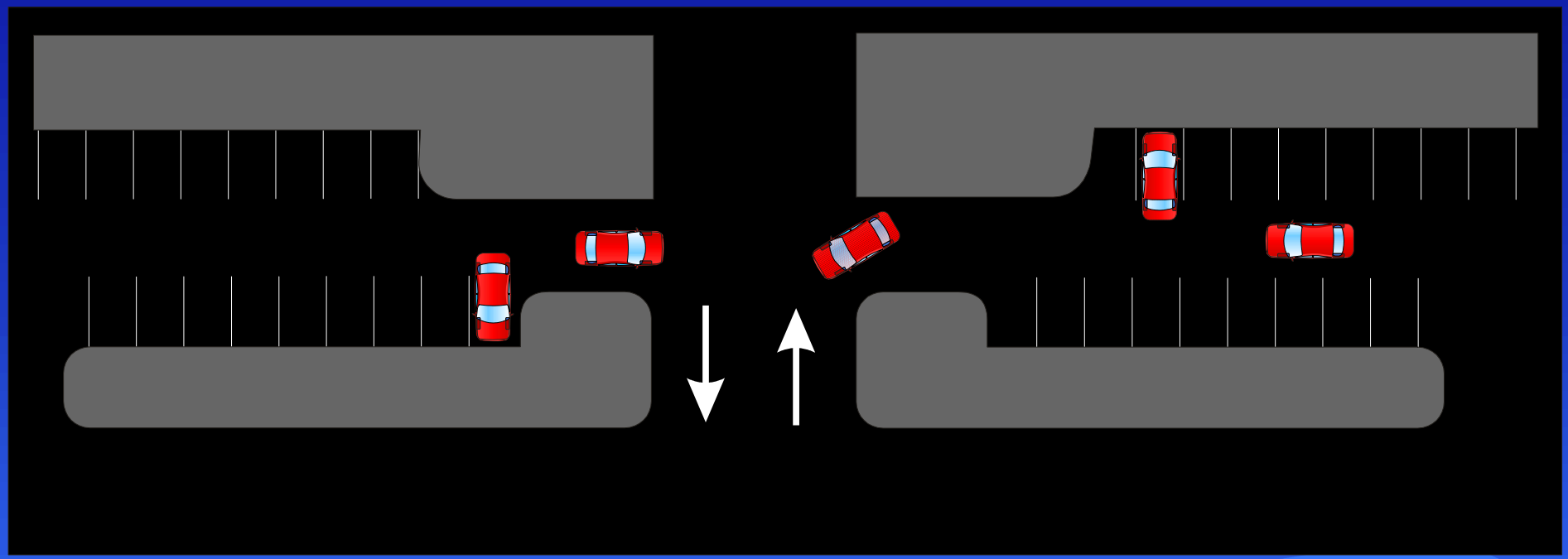
Use of Side Street Access To Serve Inside Lots

Lots fronting major street
with hammerhead car access



Source: VictorianCode for ResidentialDevelopment (Australia)- April 1992

Joint Access Issue



Sometimes lack of depth causes conflict.

Joint access example

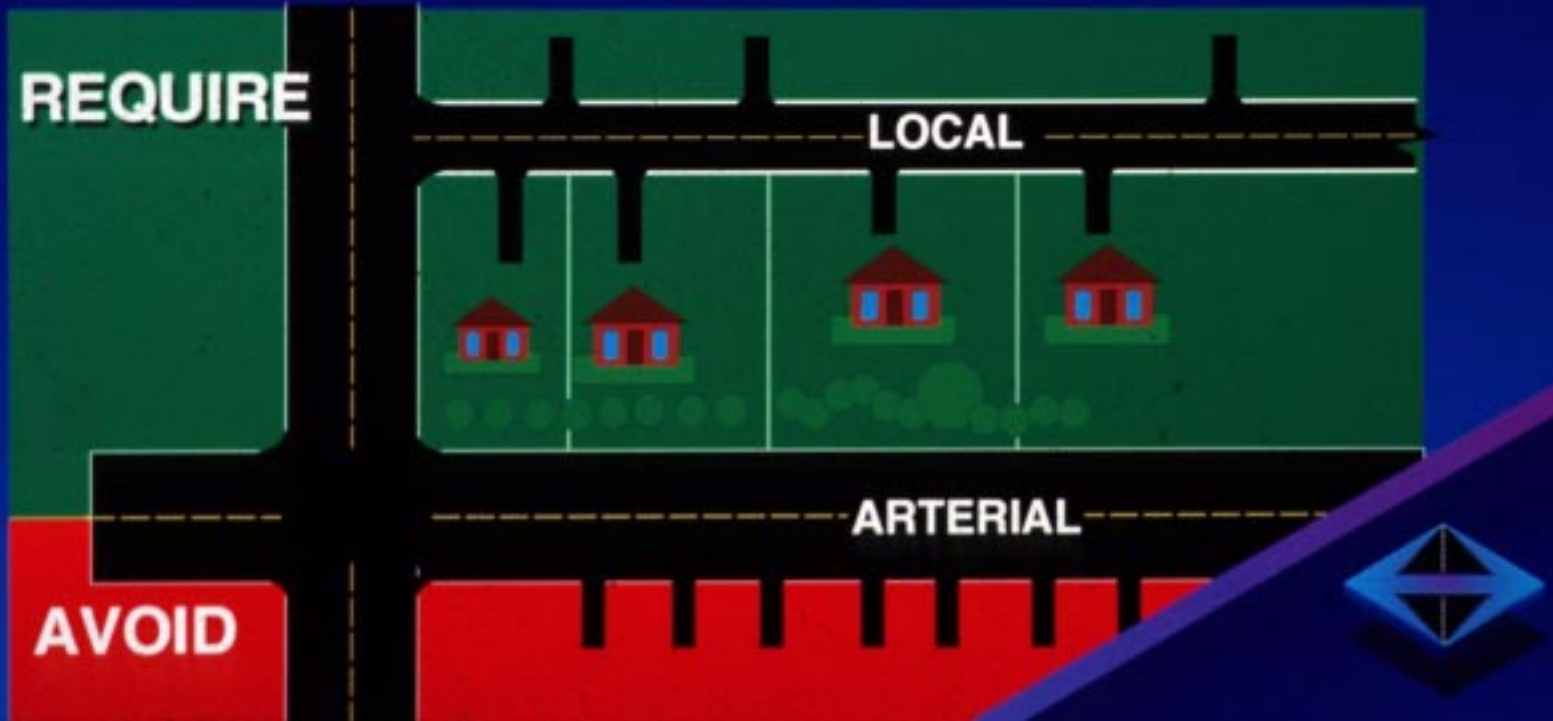
Joint access example

Joint access example

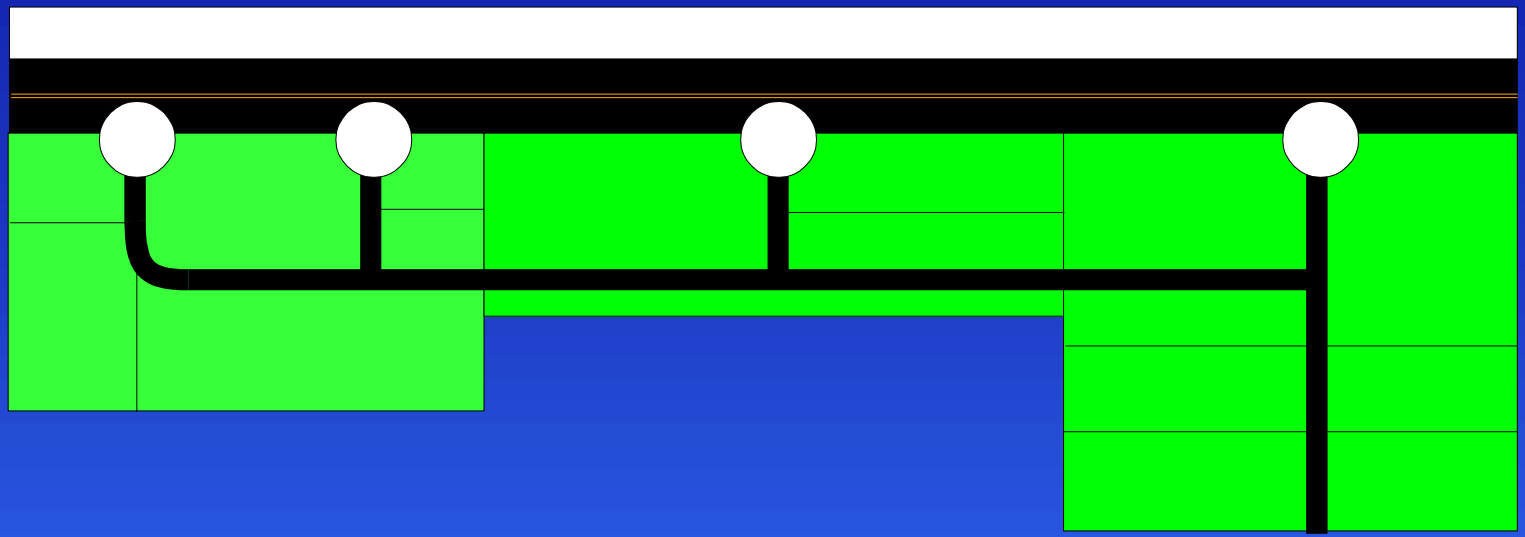
Joint access example

Strategies for Residential Site Planning

- Require reverse frontage
- Primary access should be to local streets



Require Connectivity with Neighbors



Example of property interconnectivity through parking circulation.

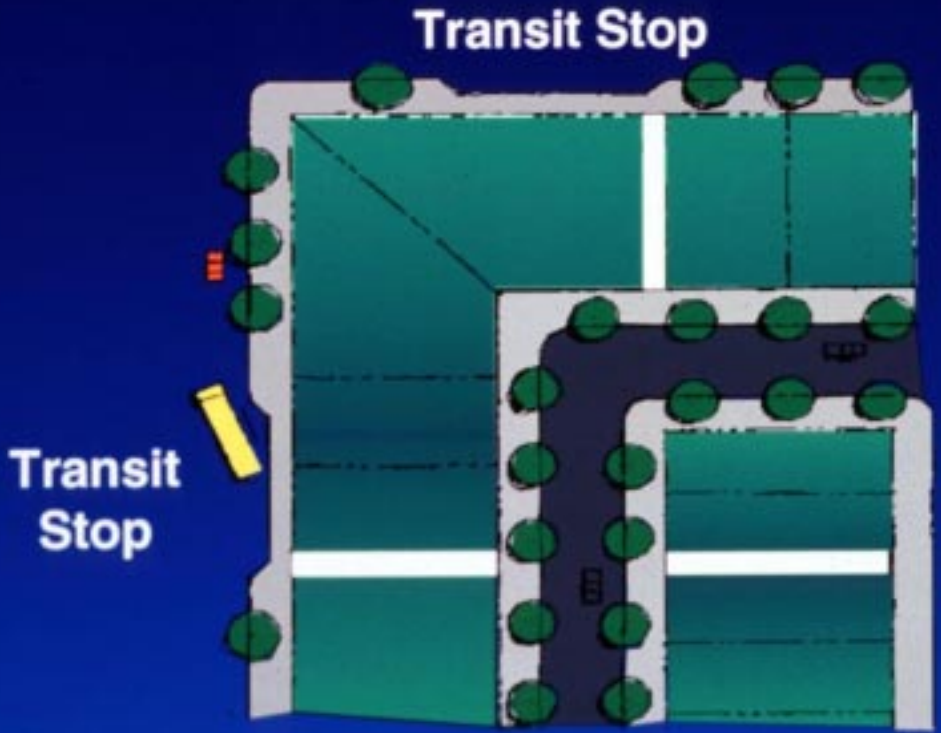
Where the developer does not provide connectivity, the drivers may.

Encourage Transit-Friendly Site Design

Discouraged

Preferred

Coordinate transit and pedestrian access

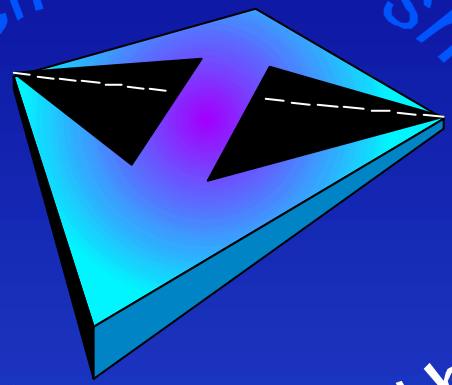


Non-Highway Corridors
14-96.007(10)

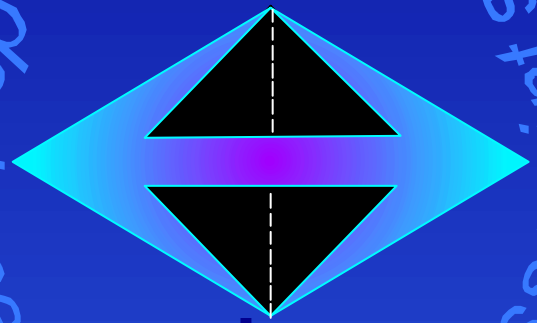
- No automatic right to access
- Corridor considered an "intervening property"

Design Outside to In

Access Management & Site Planning



Internal circulation should be designed around access points . . .



Access Management

NOT the other way around