

Gathering Information for a SRTS Plan

Gathering Information

- School information and student travel modes
- Existing conditions and behaviors
- Behaviors and perceptions

School Information

- Location and grades served
- Attendance boundaries & where students live
- Arrival/dismissal times
- Student travel modes
- Student walk/bike routes
- Parent perceptions
- Policies/programs



Existing Conditions - Environment

- Traffic volume and speeds
- Pedestrian and bicyclist crash data
- Personal safety data and concerns
- Walking and bicycling environment



Existing Conditions - Behaviors

Observe school arrival and dismissal:

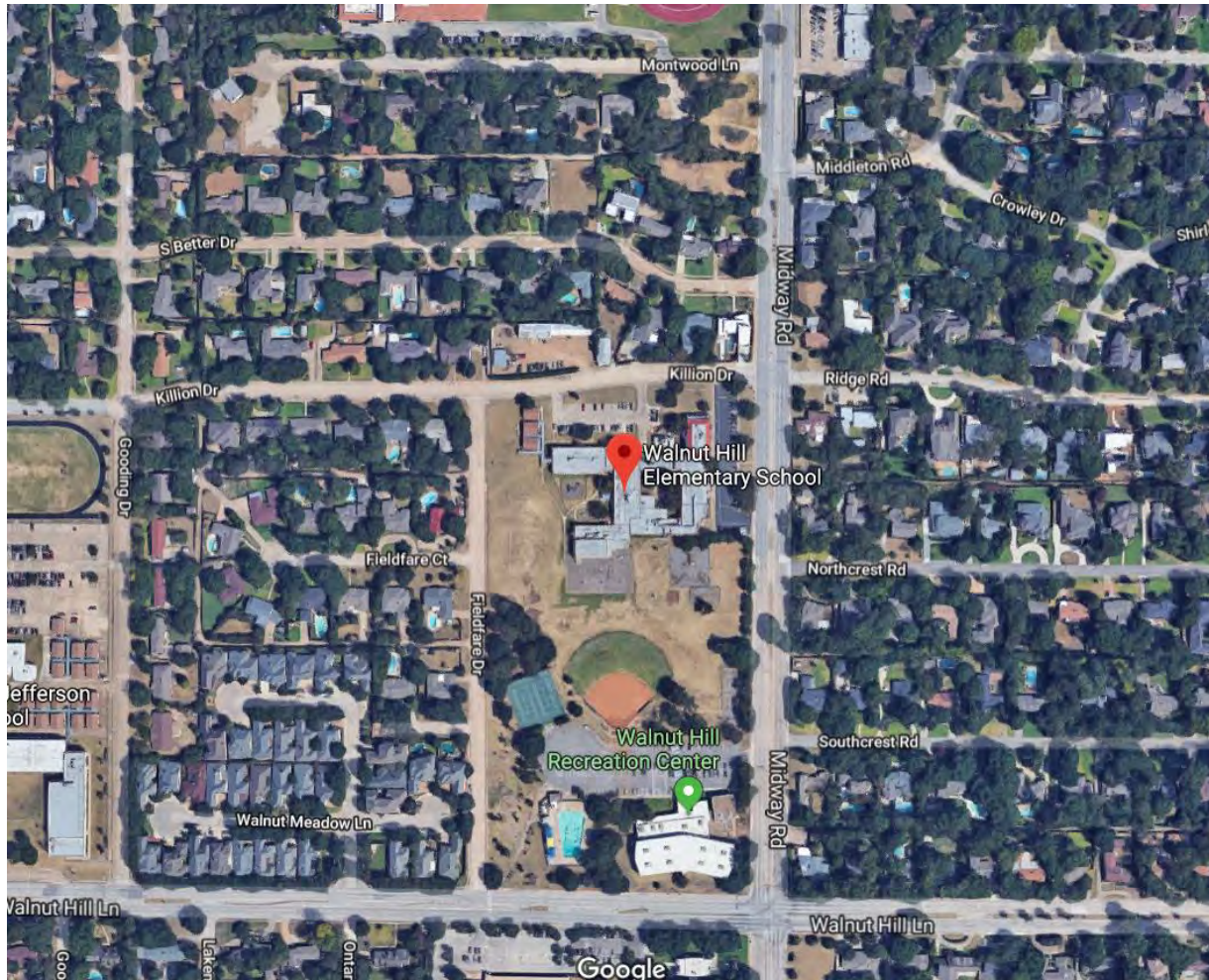
- Driver behaviors
- Pedestrian behaviors
- Bicyclist behaviors



Assessing the Ped/Bike Network



What infrastructure is important?



Engineering Treatments and Strategies



Creating safe routes with engineering

- Improve children's safety
- Improve accessibility
- Encourage more bicycling and walking



Walkways and crossings: Prerequisites for walking



Connect to the school

- Consider barriers to walking and biking
- Think about the complete route from door-to-door
- What message are we sending?



Relationships are everything



Focus on the basics



Signs

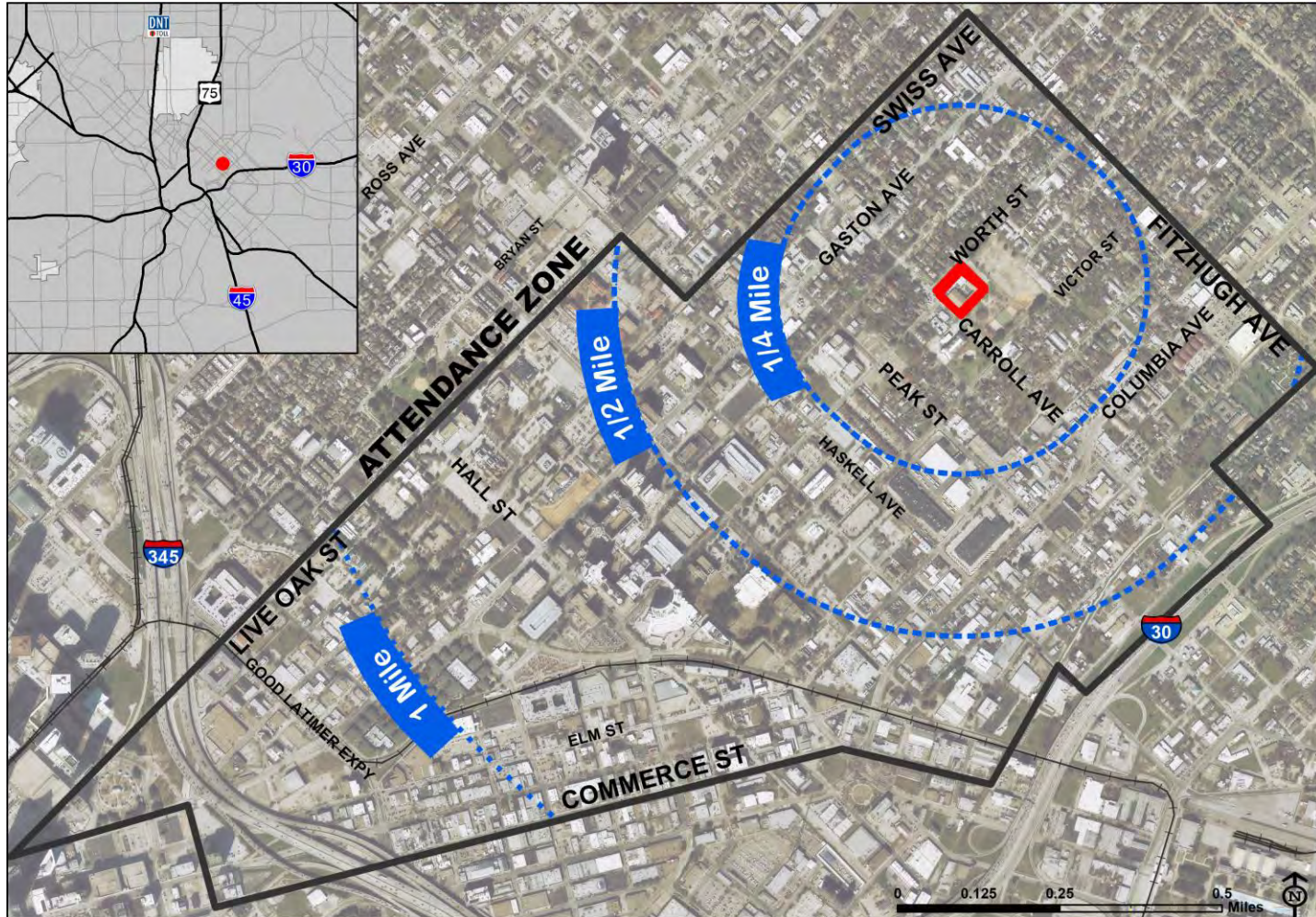
Paint

Ramps

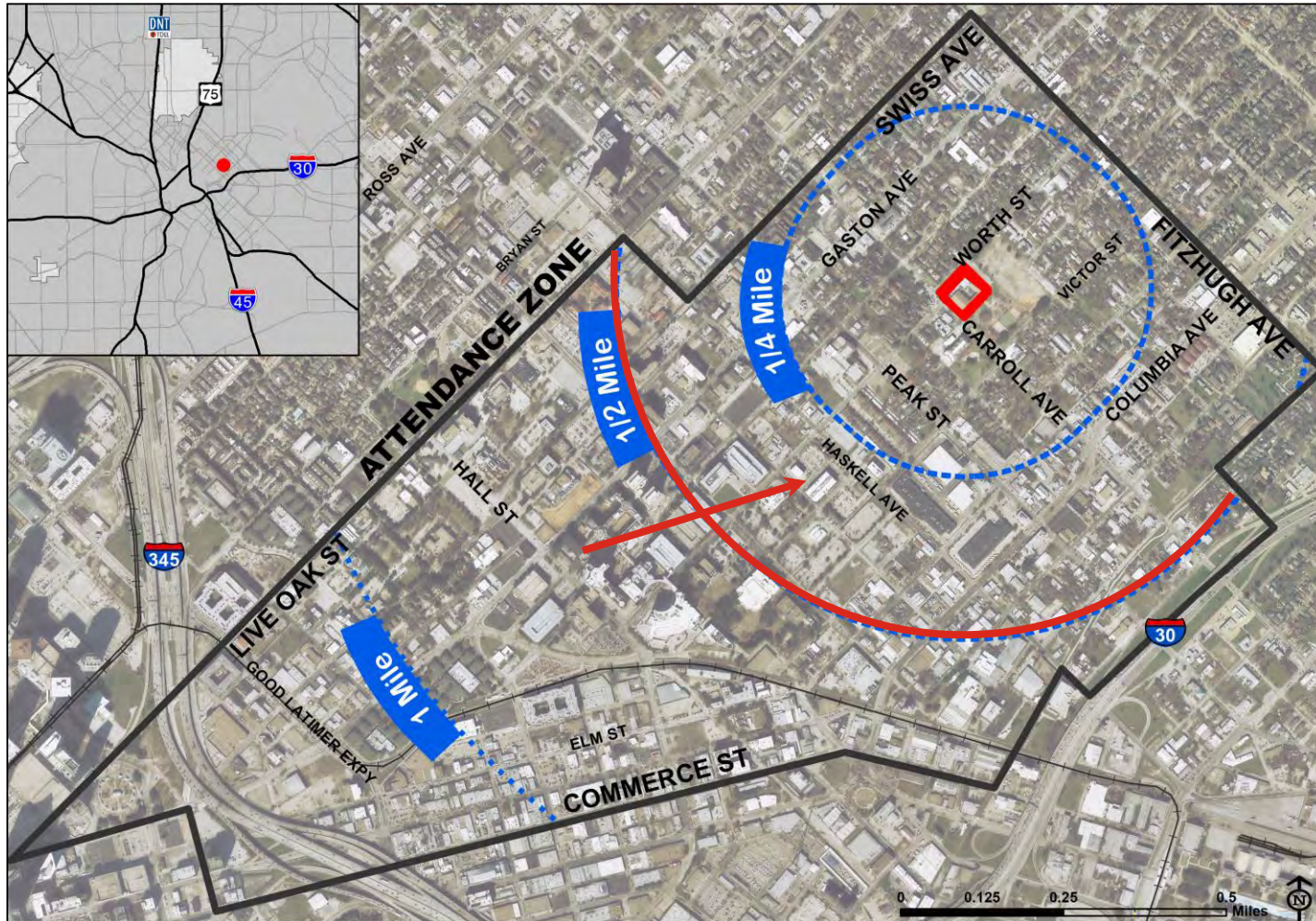
Engineering topic outline

- **Around the School**
- Along the School Route
- Crossing the Street
- Slowing Down Traffic

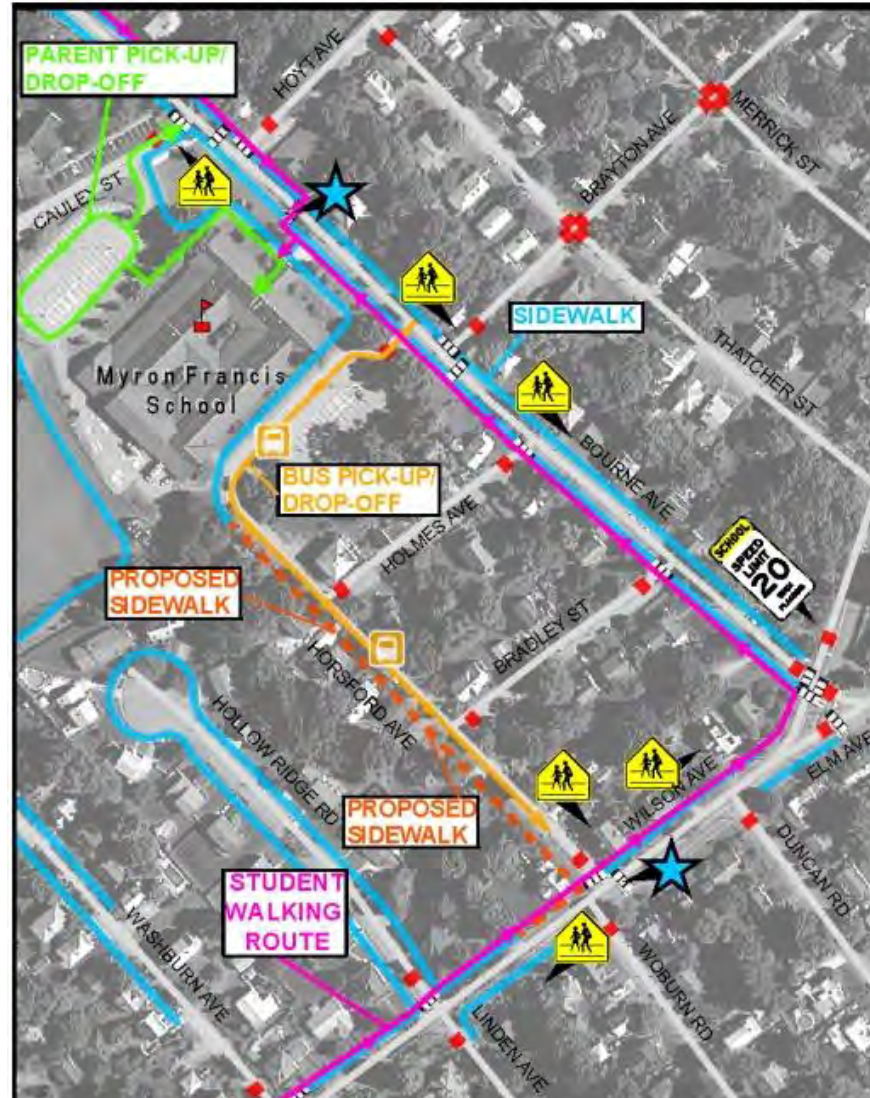
School enrollment boundary



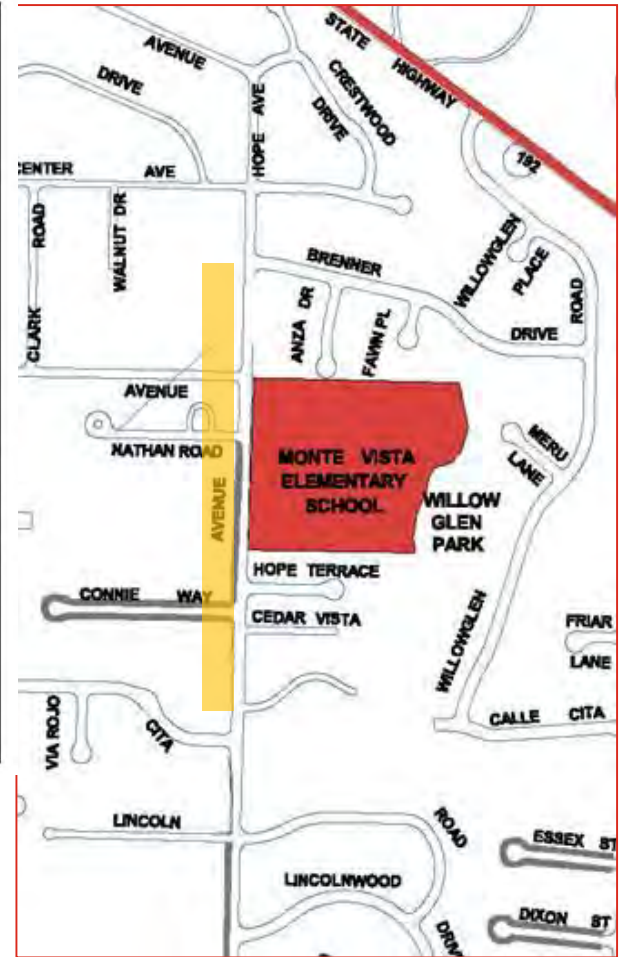
School walk zone



Existing conditions map

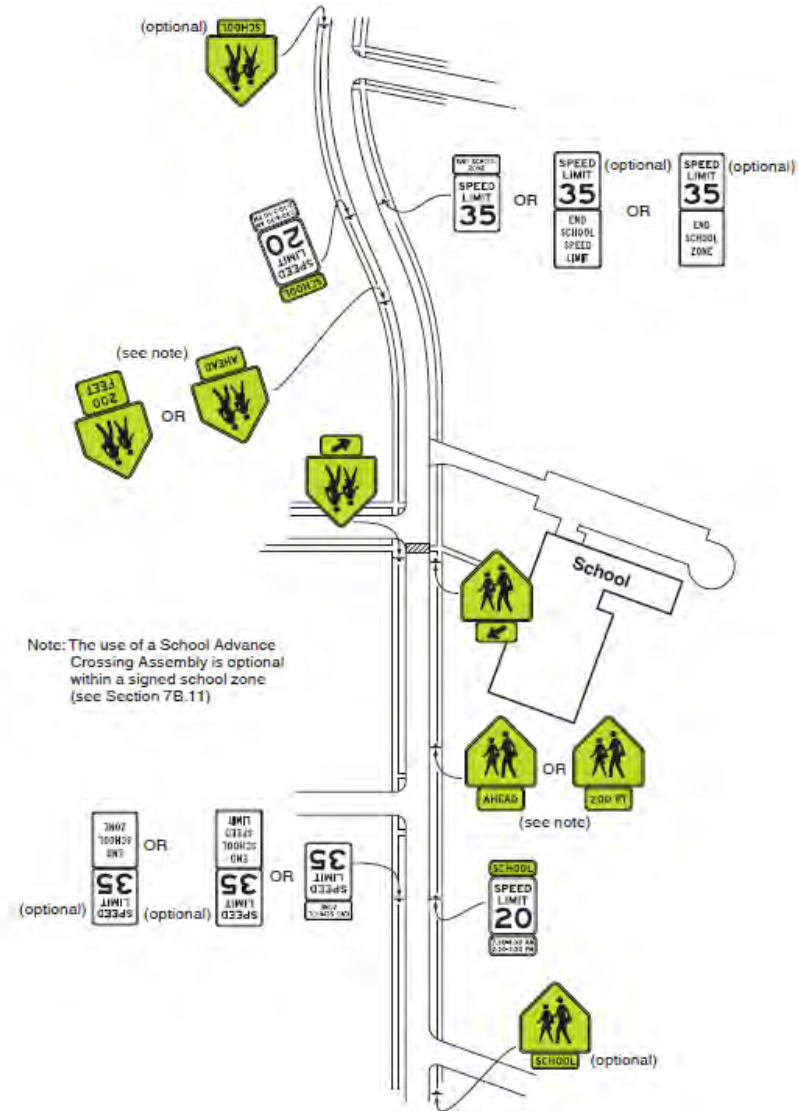


School zone



Signing and marking the school zone

- Manual on
- Uniform
- Traffic
- Control
- Devices



School area speed limit signing



Speed feedback signs



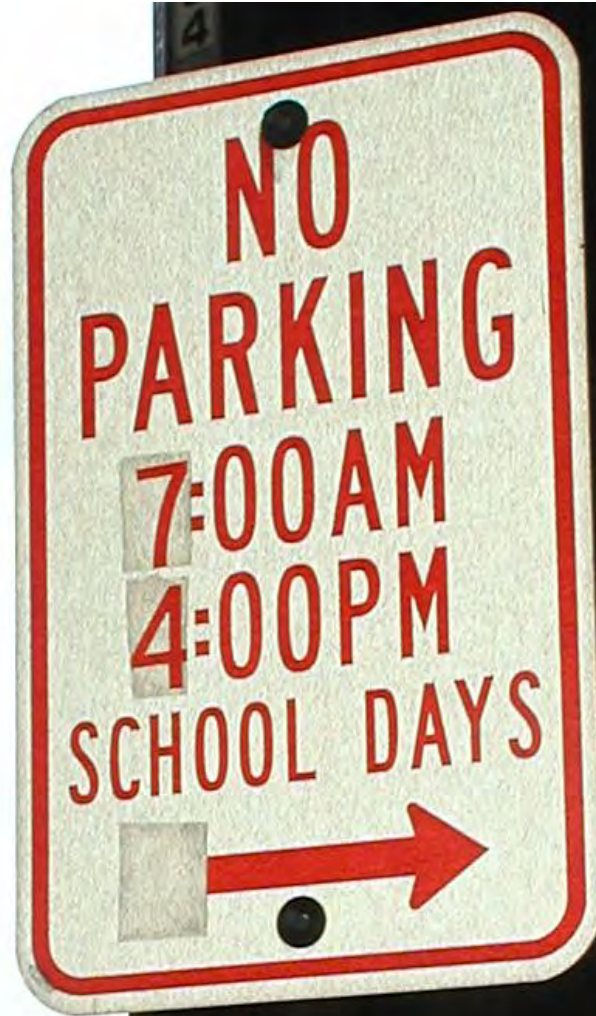
School crosswalk signs and warning signs



Fluorescent yellow-green post covers



Parking regulations



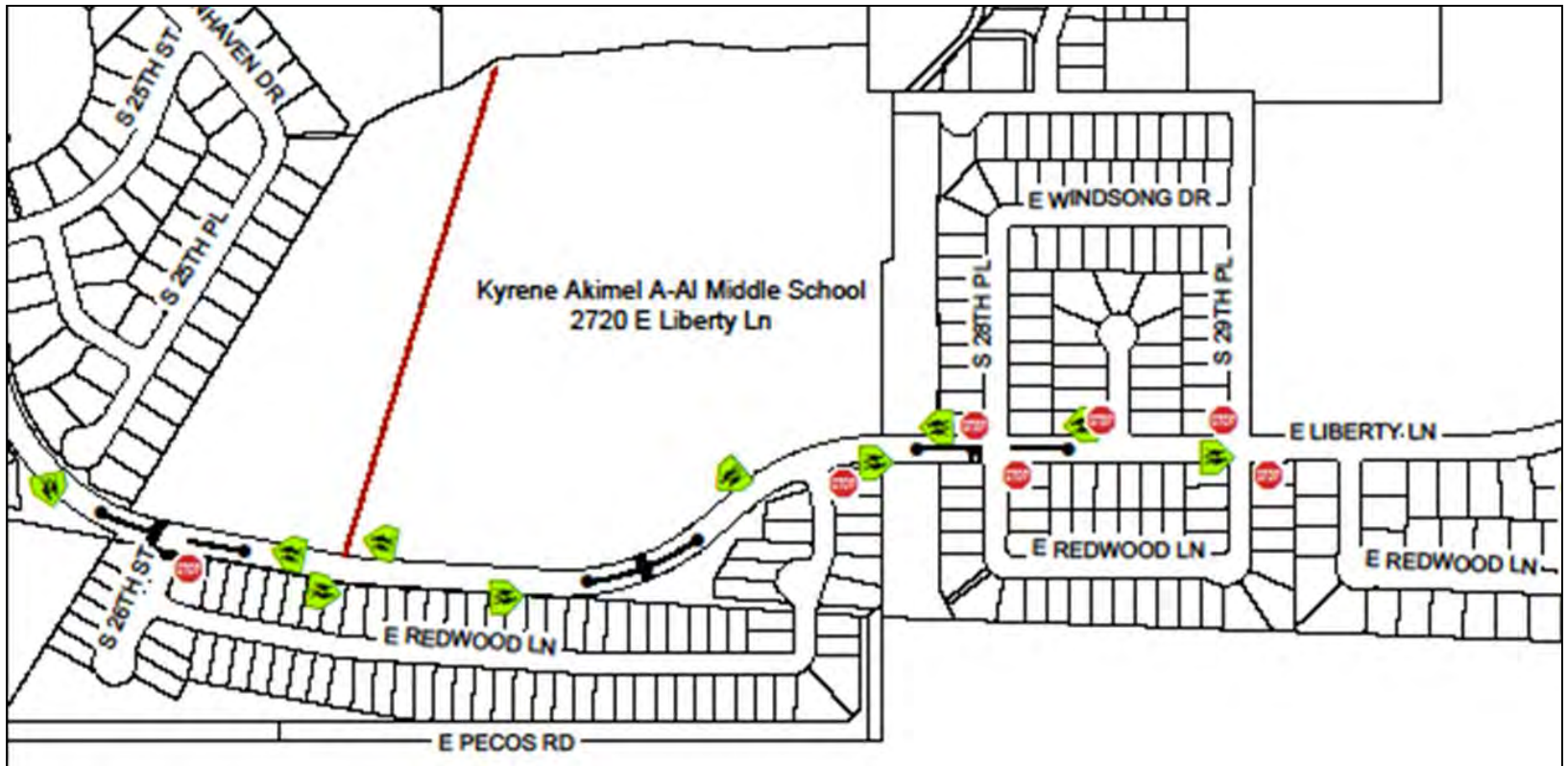
Keep signs simple



School pavement markings



Sample school traffic control plan



Engineering topic outline

- Around the School
- **Along the School Route**
 - Sidewalks
 - On-street bicycling
 - Pathways
 - Connectivity
- Crossing the Street
- Slowing Down Traffic

What's wrong with this picture?



What's wrong with this picture?



Perception versus reality



Sidewalks are essential



Sidewalks on both sides are preferred



Limit driveway crossings



Connections to the school



Sidewalk design criteria



Connect all sidewalks in the school walking route



Accommodate pedestrian desire lines outside of splash zones

Provide sidewalk buffers



No sidewalk buffer



Good sidewalk buffer



Provide wide enough sidewalks

- Recommended minimum: 5'
- Preferred minimum: 6'
- At schools: 8'-10'



Repair sidewalks



Maintain landscaping to provide clear walkways and sight distances



Remove obstacles from sidewalks



Install street lighting



Meet Americans With Disabilities Act (ADA) requirements for universal design



Curb ramp design

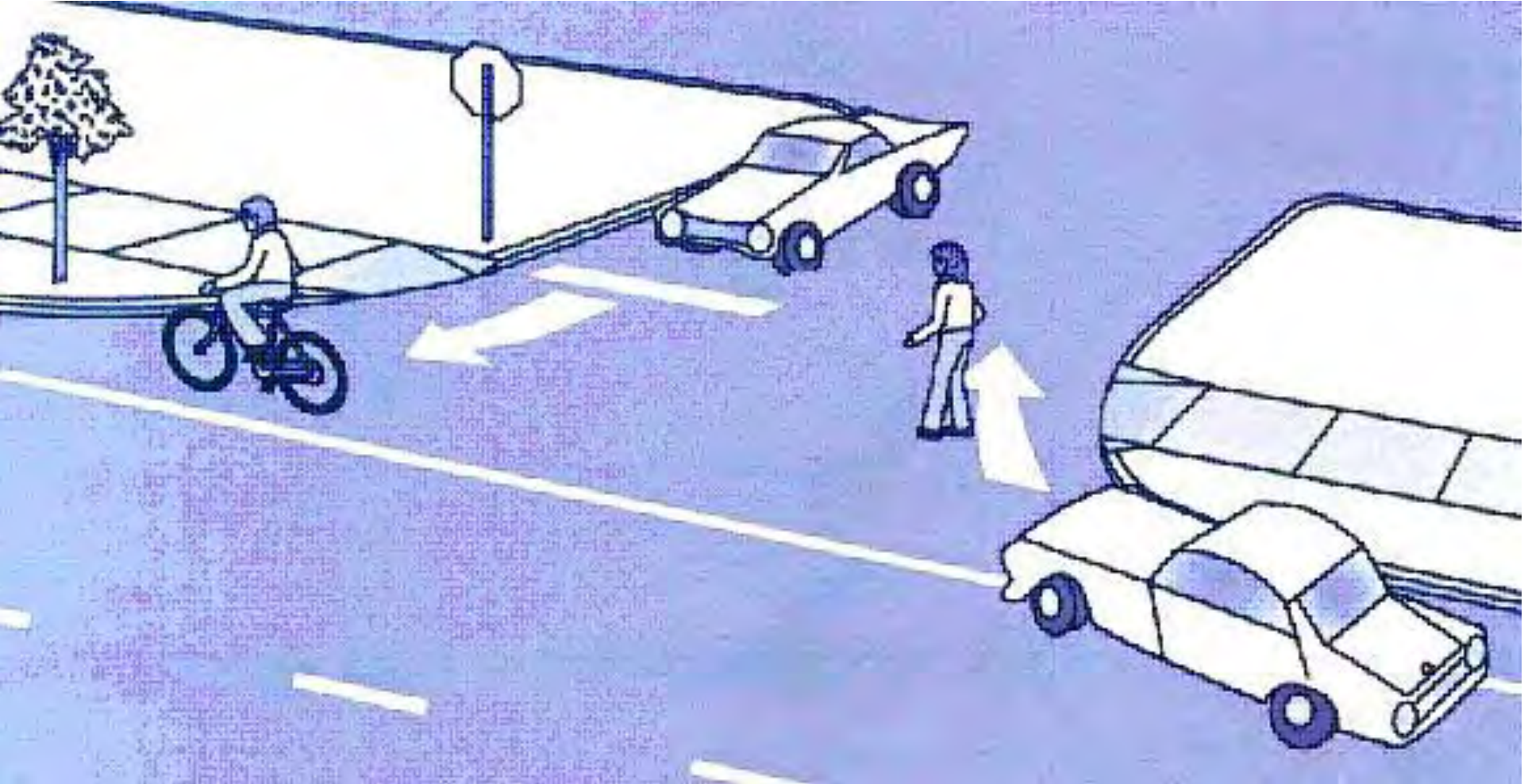
- Two ramps per corner
- Eight ramps per intersection



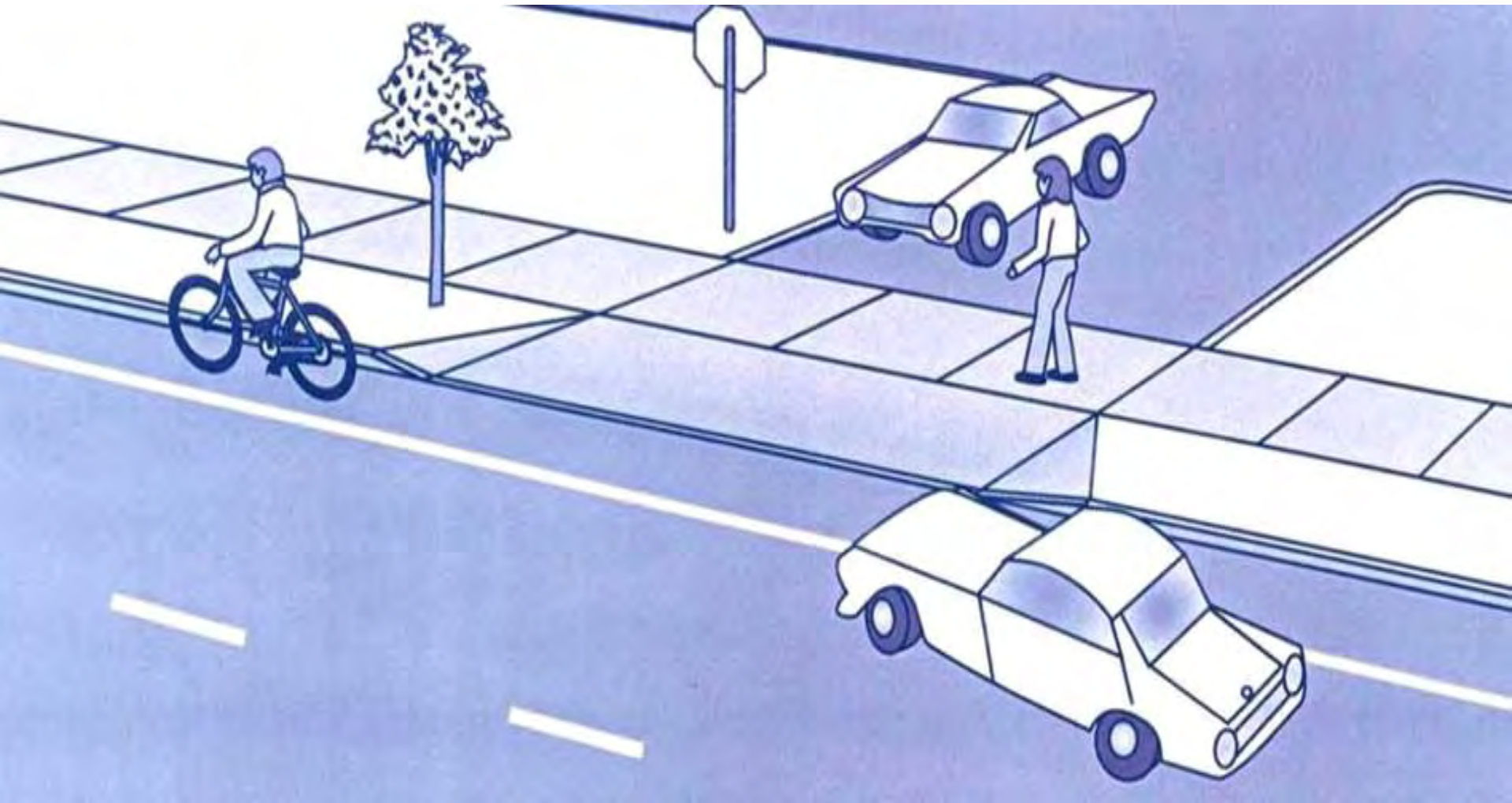
Warning strip – 4' x 2'



Don't build driveways like intersections



Build driveways like driveways



Along the school route: Bikeways

- Local streets
- Bike lanes
- Shoulders
- Pathways



What's wrong with this picture?



What's wrong with this picture?



What's wrong with this picture?



Local streets – where most kids ride



Bicycle lanes



Install bicycle racks



Yes – high school students will bike given the opportunity



Along the school route: Pathways



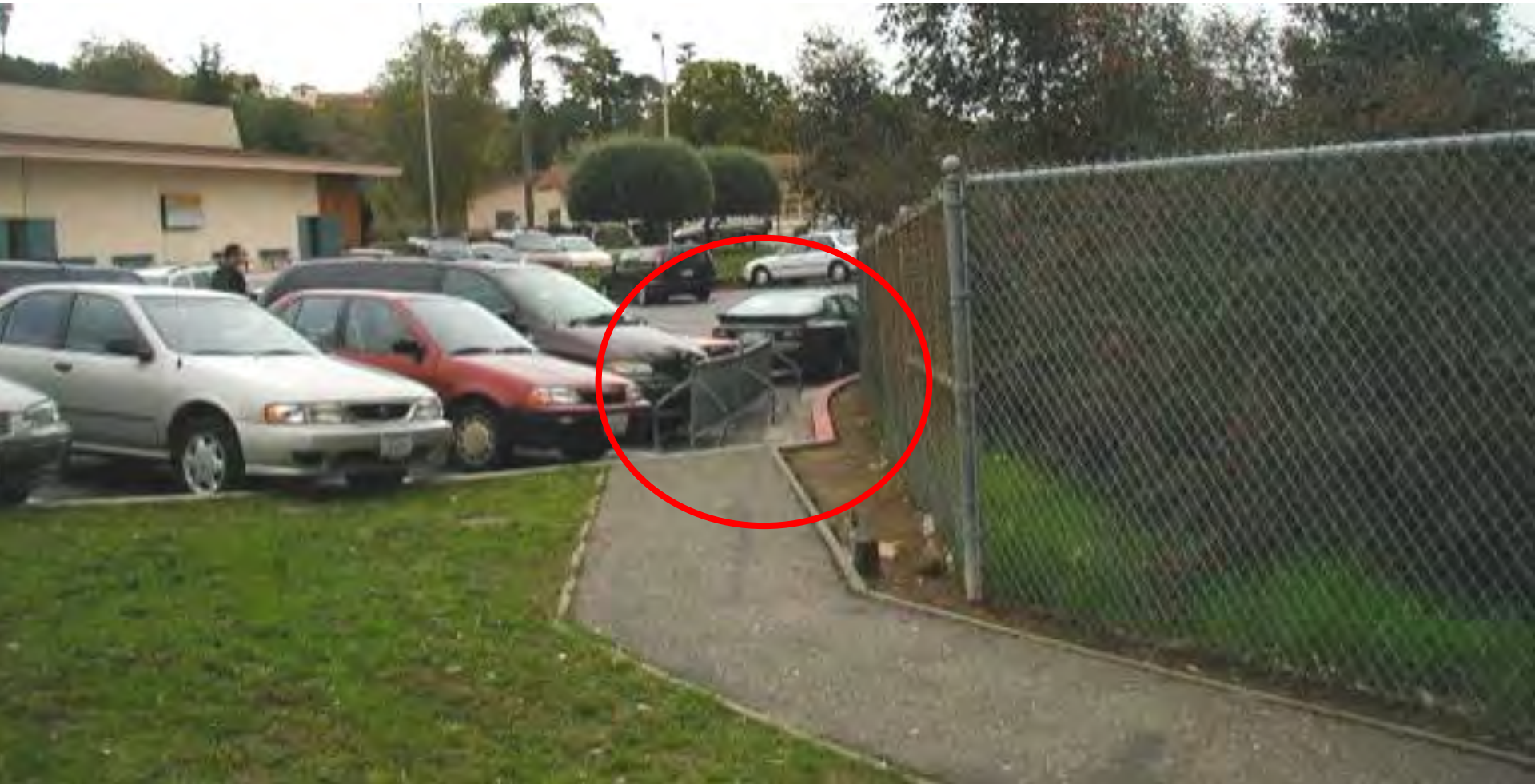
Success story: Mill Valley path



What's wrong with this picture?



What's wrong with this picture?

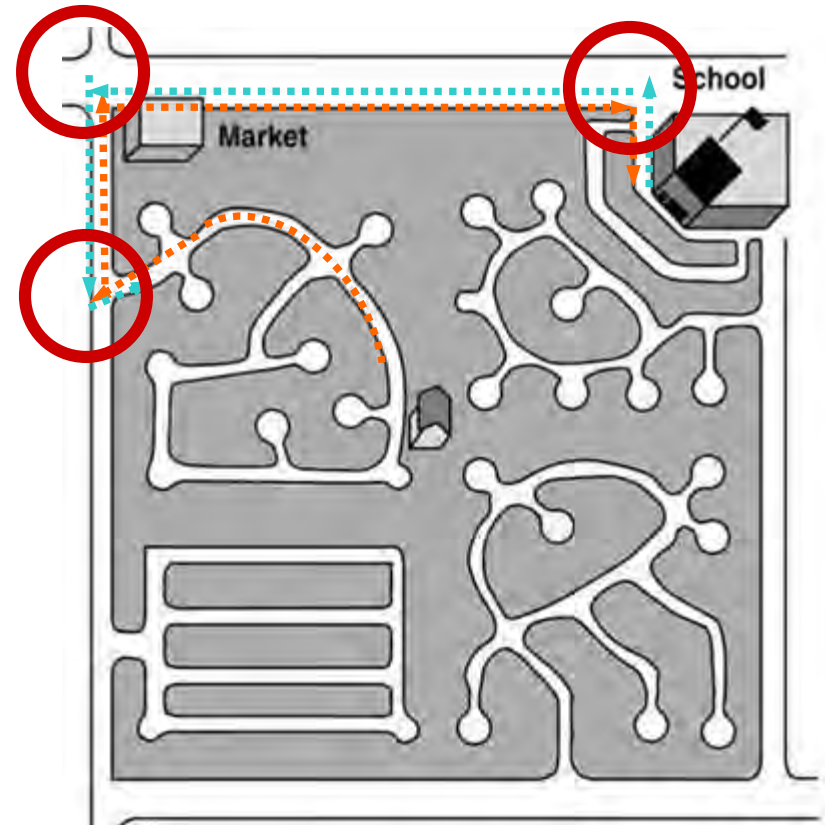
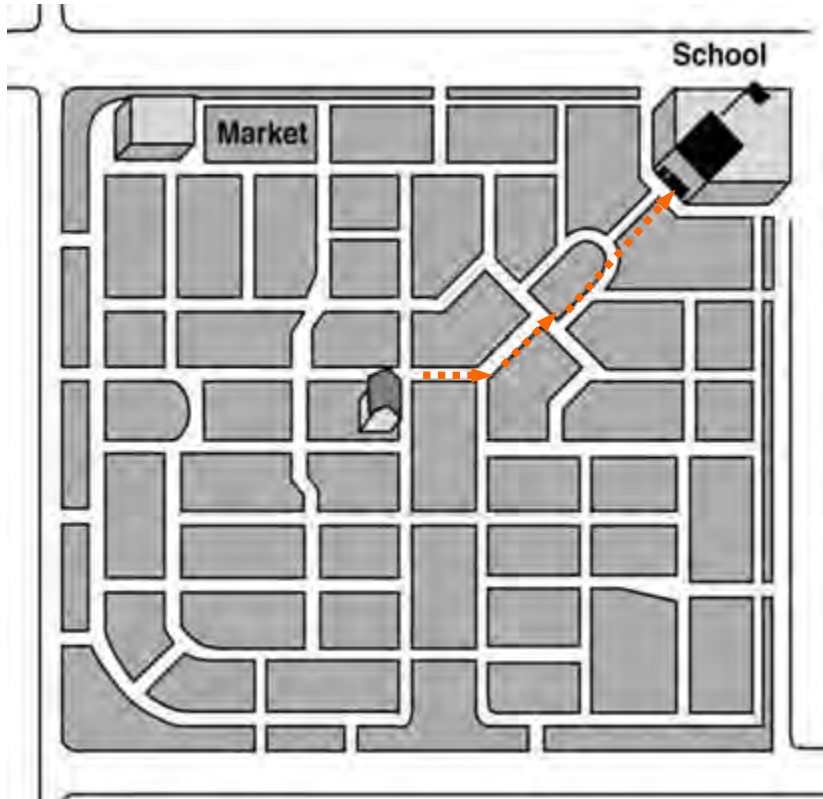


Connectivity creates a pedestrian-friendly street system

- Reduces walking distance
- Offers more route choices – disperses traffic
- Less traffic = more pedestrian friendly



Connectivity can reduce walking distances and crossings required



Connecting cul-de-sacs

No connection between
school and neighborhood

School



Formal and informal connections



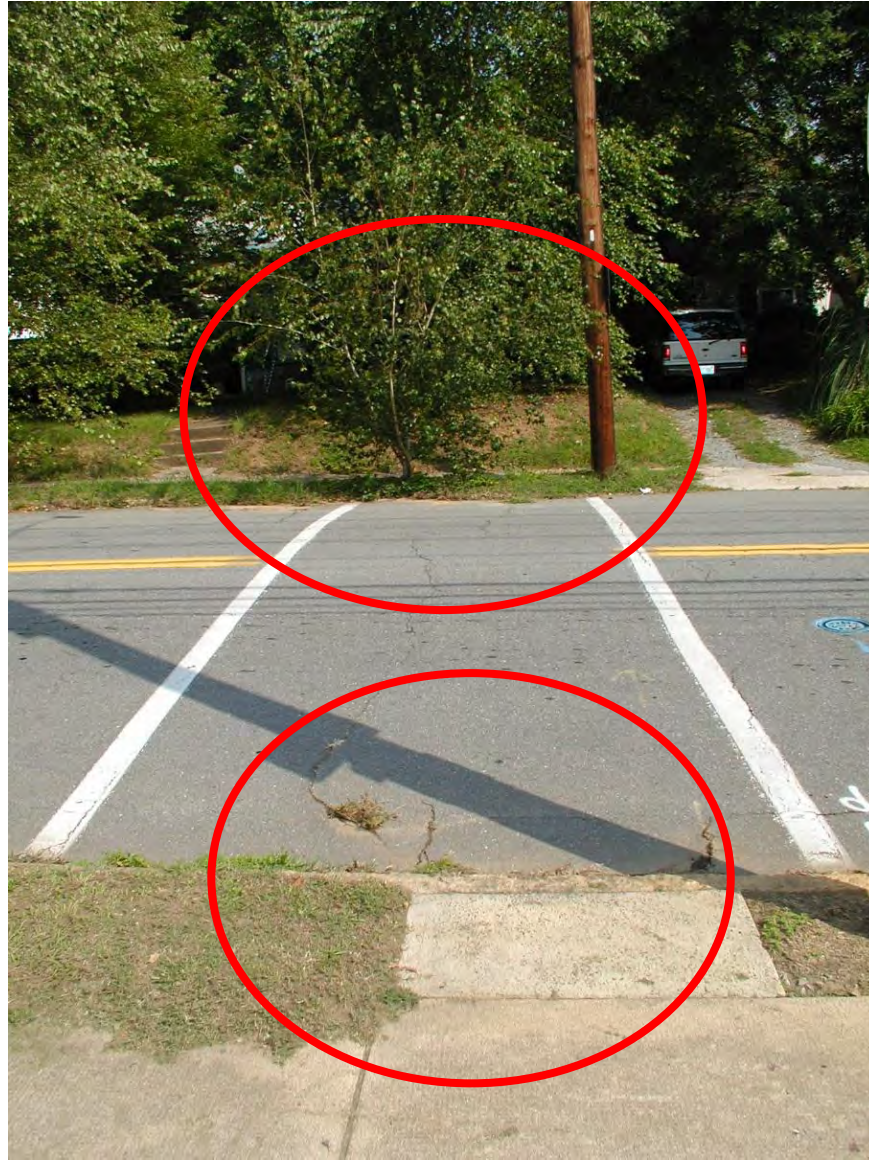
Engineering topic outline

- Around the School
- Along the School Route
- **Crossing the Street**
 - Shortening crossing distances
 - Marking crosswalks
 - Creating visible crossings
 - Using stop signs and traffic signals
- Slowing Down Traffic

What's wrong with this picture?



What's wrong with this picture?



Principles for creating safe crossings

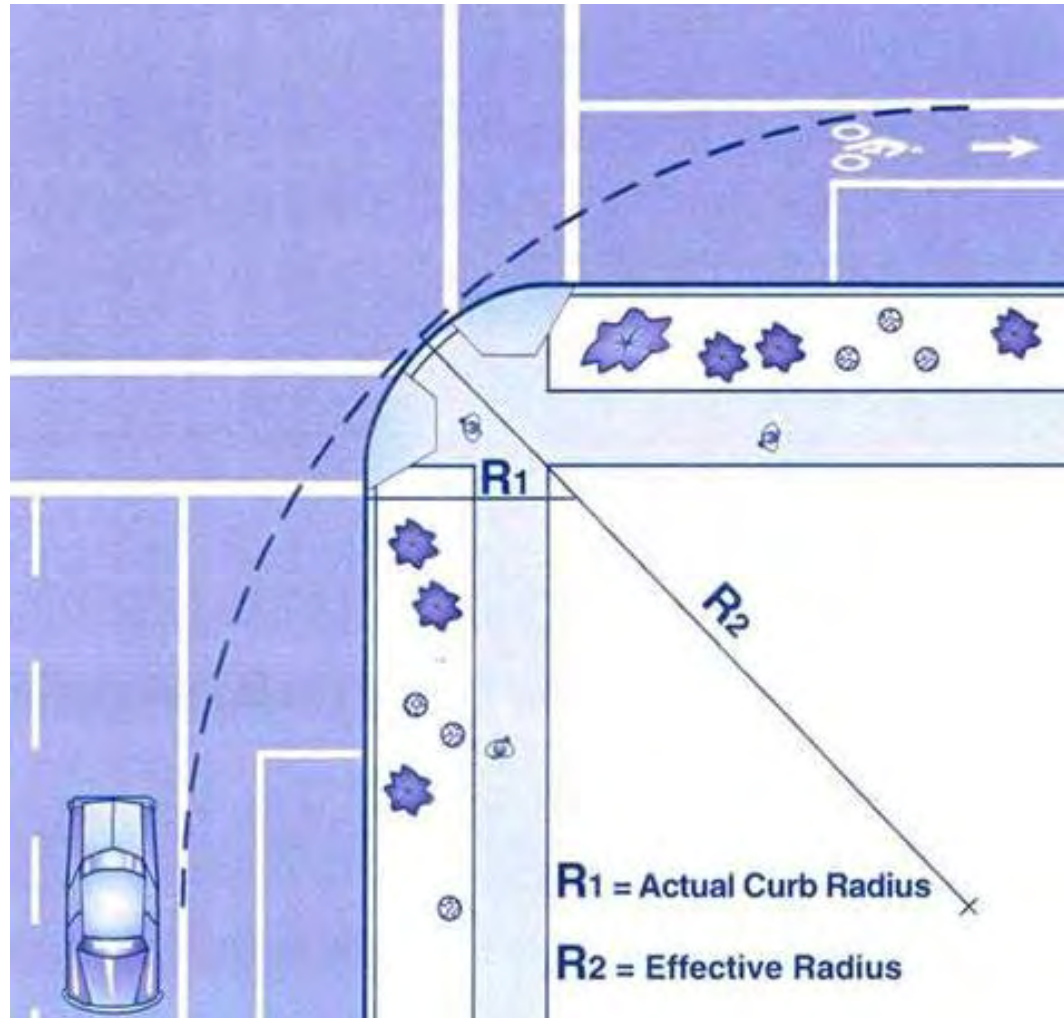
- Reduce crossing distance
- Use appropriate traffic control
 - Marked crosswalks
 - Warning signs or flashers
 - Stop signs and traffic signals
 - Crossing guards
- Slow vehicle speeds



Large turn radius



Curb radii: Keeping it tight



Wide, multi-lane roads are barriers



Pedestrian and bicycle bridges

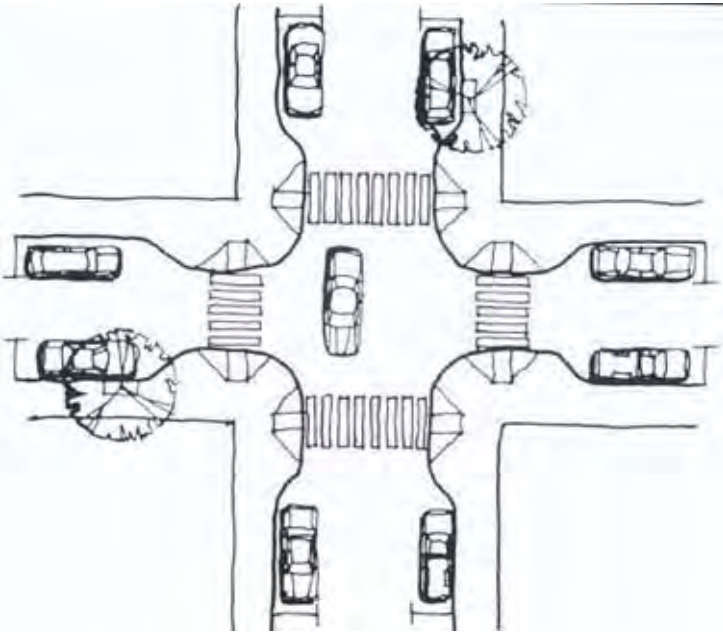
- Expensive
- Often not used
- Consider topography and circumstances



Tools to reduce crossing distance

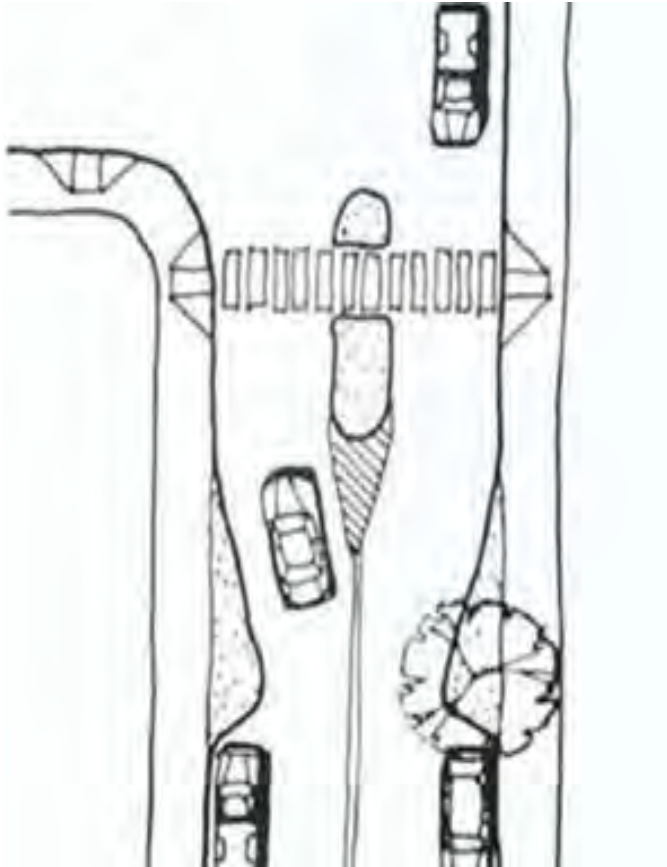


Curb extensions at crossings

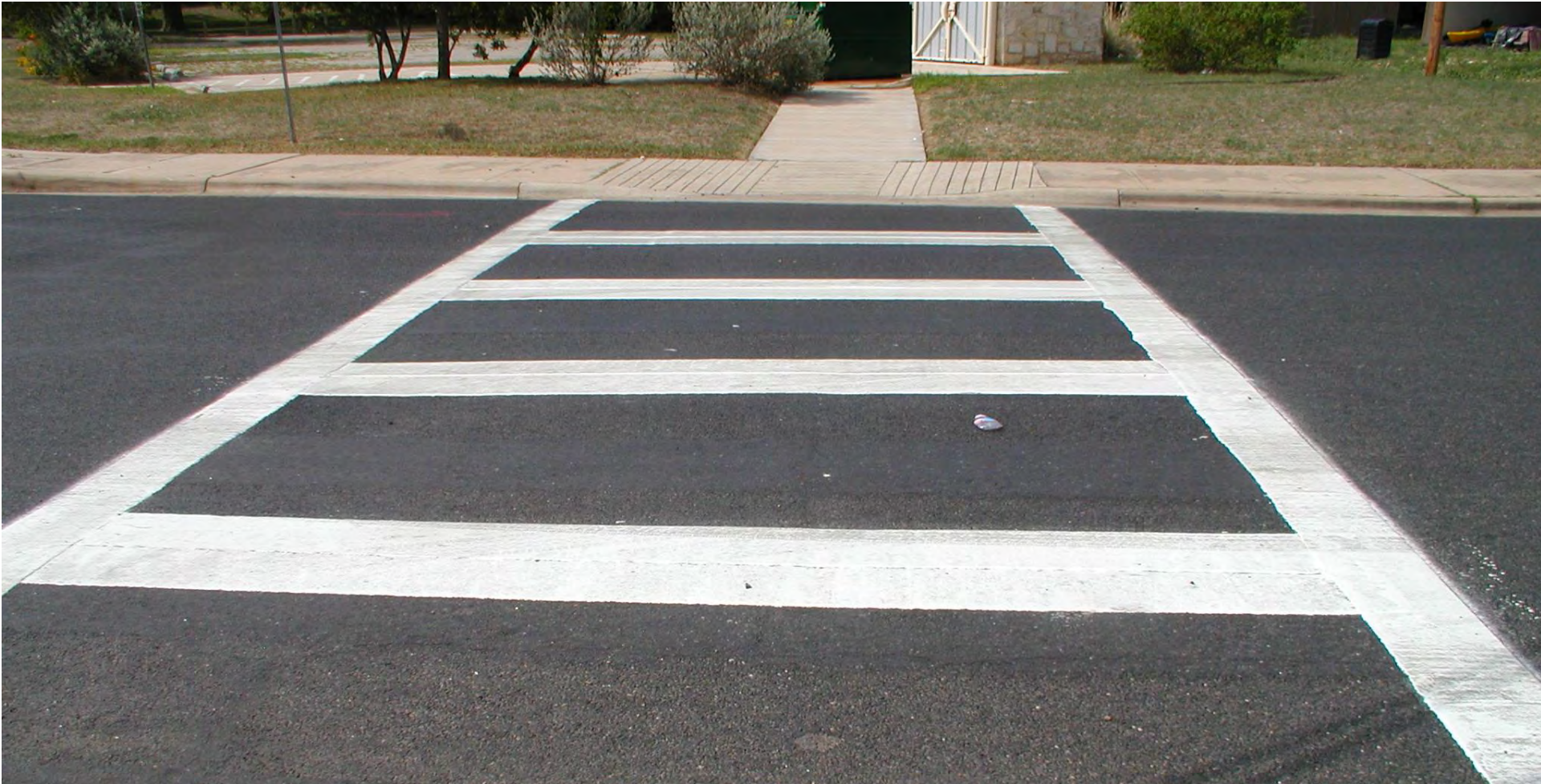


Reduce the crossing distance

Crossing islands



Marking crosswalks



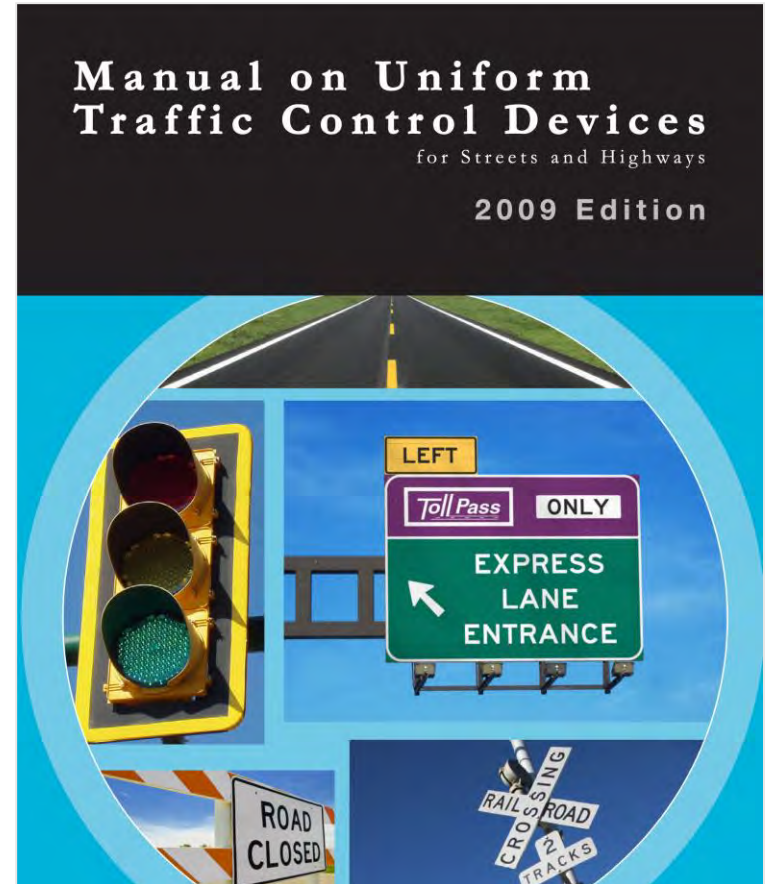
Why install marked crosswalks?

- Indicate a preferred pedestrian crossing location
- Alert drivers to an often-used pedestrian crossing
- Indicate school walking routes



Where to install marked crosswalks

- Signalized intersections
- School routes
- Uncontrolled crossings (see MUTCD guidelines)



Install high-visibility markings



What the pedestrian sees



What the driver sees (same crosswalk)



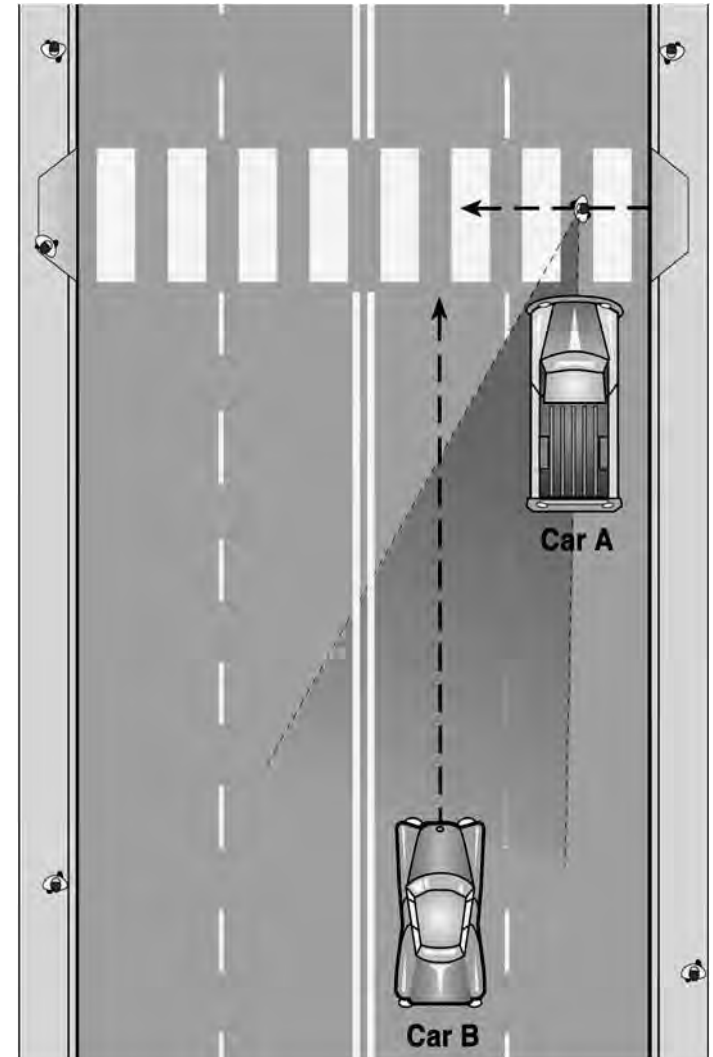
High visibility markings



“Multiple threat” crashes

1st car stops to let pedestrian cross, blocking sight lines

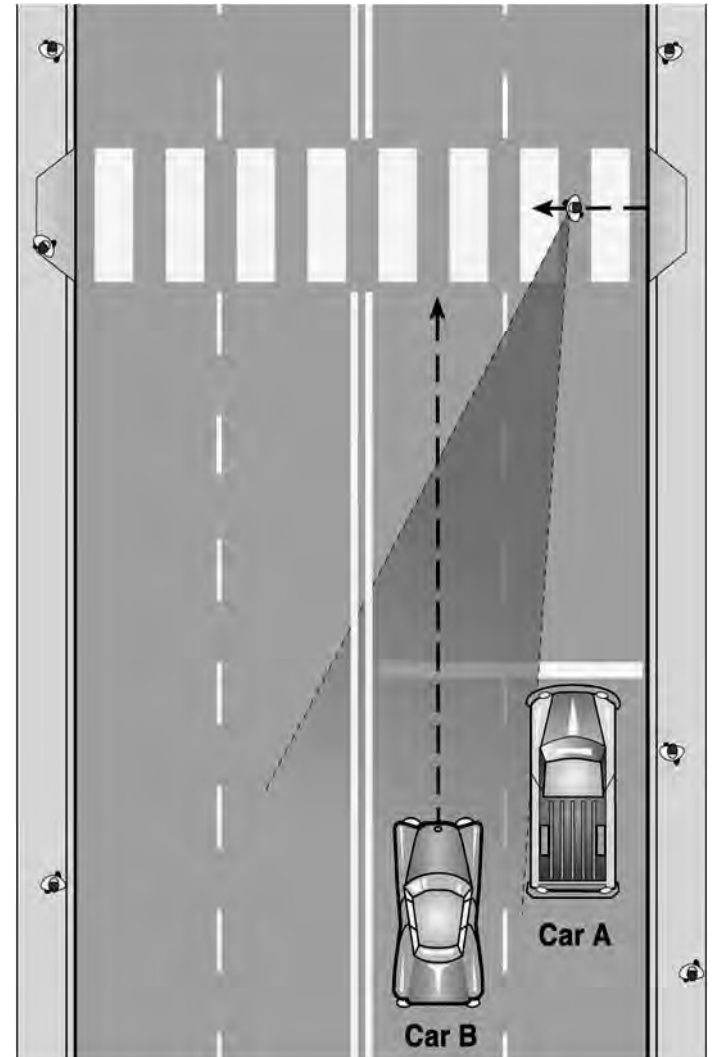
2nd car doesn't stop, hits pedestrian at high speed



Solution: Advance stop/yield line

1st car stops further back,
opening up sight lines

2nd car can be seen by
pedestrian



'Yield here for pedestrian' signs



In-street signage



Source: City of McKinney, 2019

Rectangular rapid flash beacon (RRFB)

- Pedestrian activated (push button or passive detection)
- Beacon is yellow and has a rapid flash
- Yield rates increased from approx. 20% to 80% (CMF = 0.53)
- Not yet in MUTCD – FHWA gave interim approval in 2008.



Rectangular rapid flash beacon



Pedestrian hybrid beacon



- Pedestrian activated
- Solid red phase brings all cars to a stop
- Can reduce pedestrian crashes by 55% (CMF = 0.45) (FHWA)
- In the MUTCD
- Should be strongly considered for all crossings where speed limits are ≥ 40 mph

What's wrong with this picture?



What's wrong with this picture?



Parking restrictions at corners

Better visibility
for both drivers
and pedestrians



Engineering topic outline

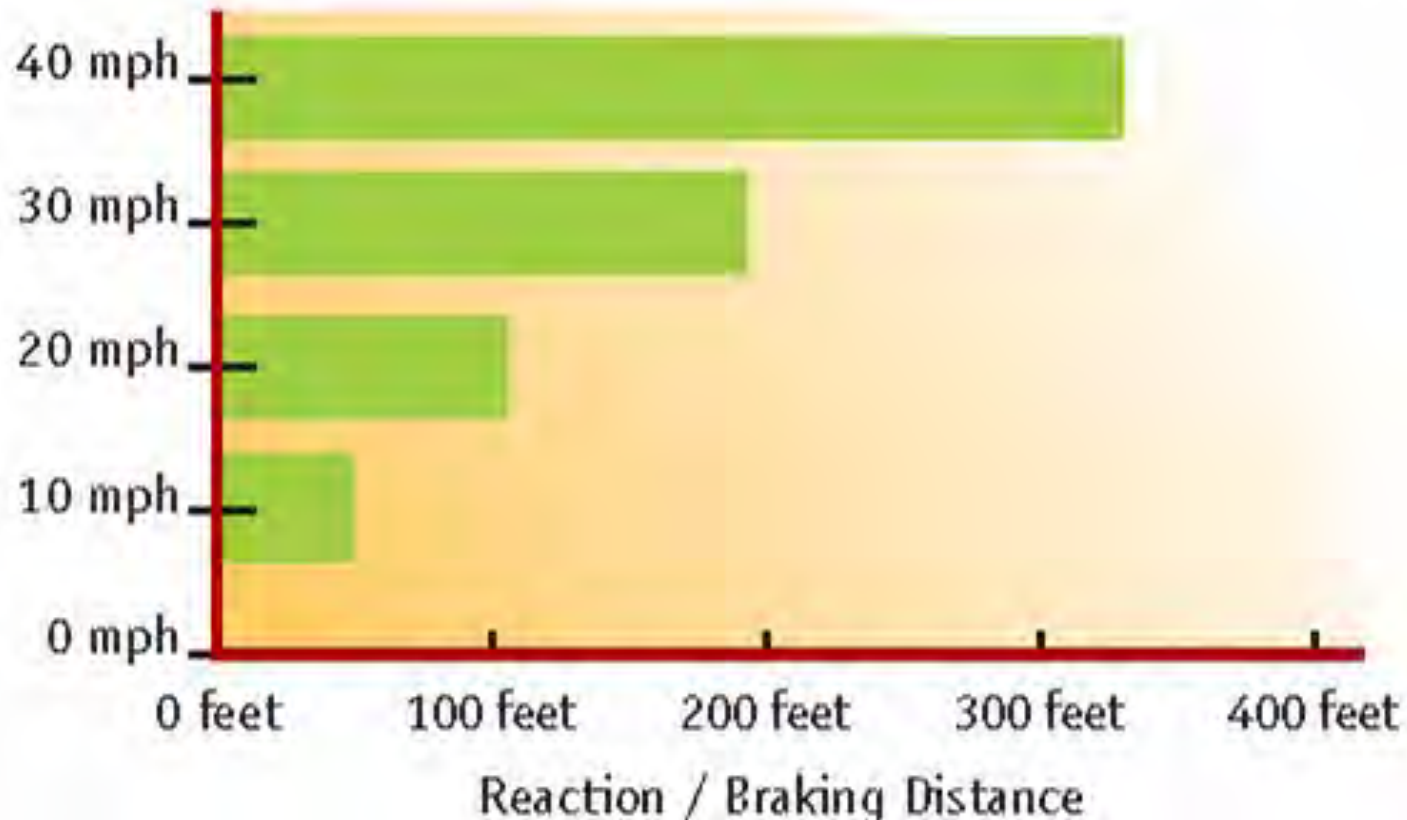
- Around the School
- Along the School Route
- Crossing the Street
- **Slowing Down Traffic**

Slowing down traffic

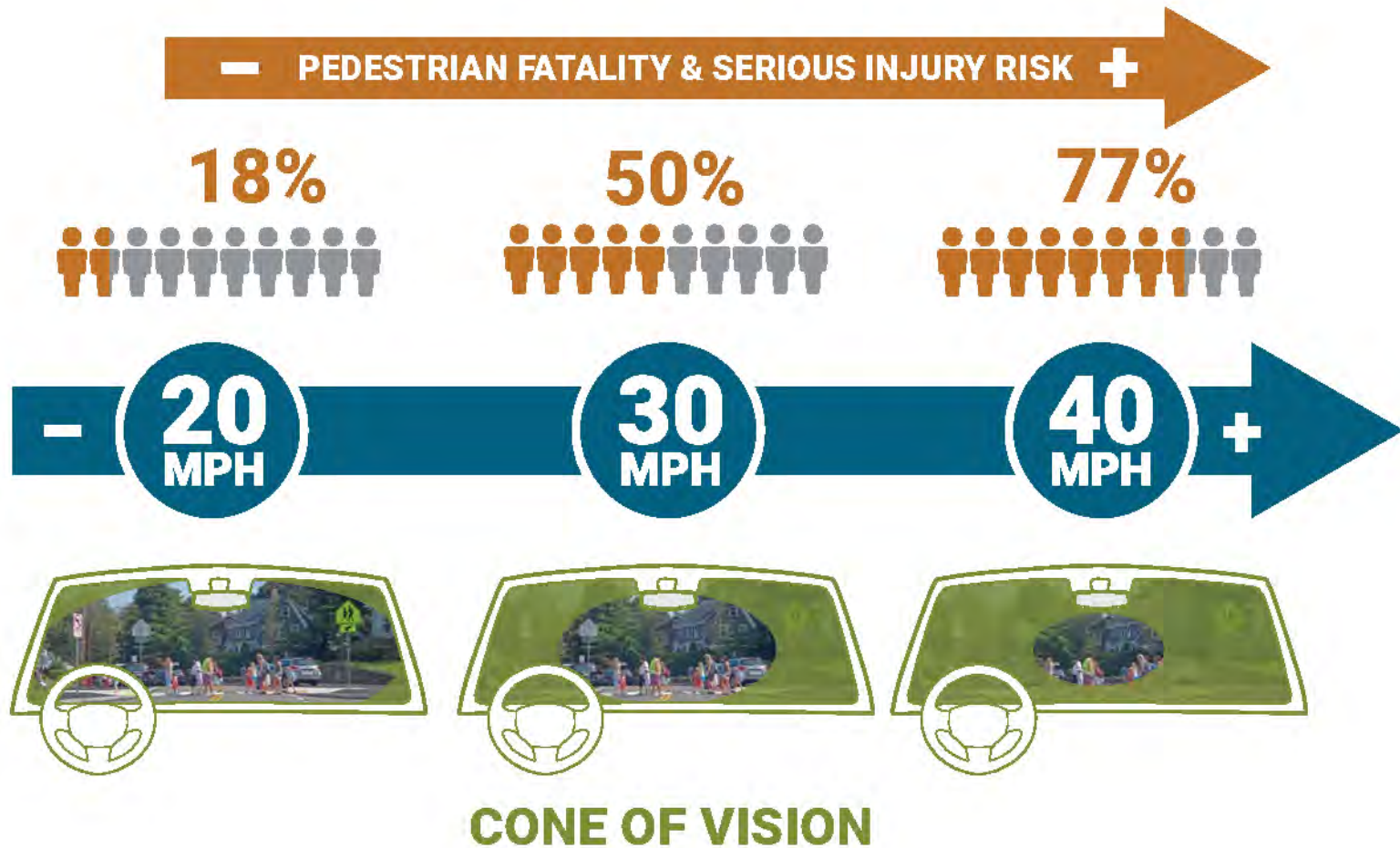


High speeds increase stopping distance

Travel Speed vs. Reaction and Braking Distance



High speeds increase ped injuries



Design can invite desired use



Modern roundabout

- Slows vehicles as they enter, travel through and exit.
- Reduces potential conflict points.



Narrow lanes reduce speeds

Use paint to
reduce lane
width



Speed humps slow traffic on local streets



Raised crosswalks



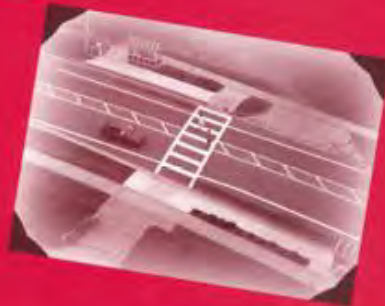
FHWA references

Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations

Final Report and Recommended Guidelines

FHWA PUBLICATION NUMBER: HRT-04-100

SEPTEMBER 2005



U.S. Department of Transportation
Federal Highway Administration

Research, Development, and Technology
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, VA 22101-2296



An Analysis of Factors Contributing to "Walking Along Roadway" Crashes: Research Study and Guidelines for Sidewalks and Walkways



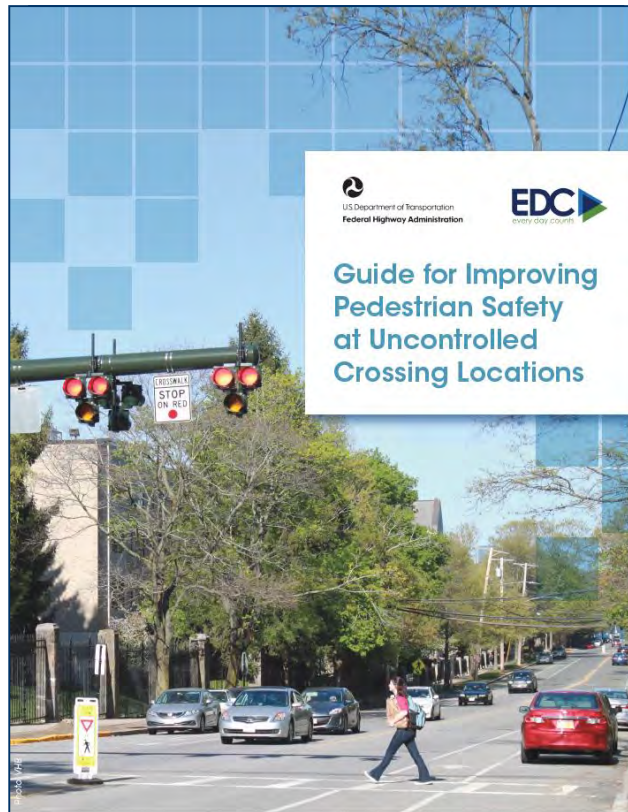
REPORT NO. FHWA-RD-01-101

U.S. Department of Transportation
Federal Highway Administration
Research and Development
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, VA 22101-2296

February 2002



FHWA references



FHWA-SA-18-041
September 2018

Toolbox of Pedestrian Countermeasures and Their Potential Effectiveness

Introduction

This issue brief documents estimates of the crash reduction that might be expected if a specific countermeasure or group of countermeasures is implemented with respect to pedestrian crashes. The crash reduction estimates are presented as Crash Modification Factors (CMFs). Some of the crash reduction estimates are also presented in terms of left-turn crashes, certain crash severities, or total crashes.

Traffic engineers and other transportation professionals can use the information contained in this issue brief when asking the following types of question: What change in the number of pedestrian crashes (and/or other crash types) can be expected with the implementation of the various countermeasures?

Crash Modification Factors (CMFs)

A CMF is the proportion of crashes that are expected to remain after the countermeasure is implemented. For example, an expected 20 percent reduction in crashes would correspond to a CMF of $(1.00 - 0.20) = 0.80$. In some cases, the CMF is negative, i.e. the implementation of a countermeasure is expected to lead to a percentage increase in crashes.

One CMF estimate is provided for each countermeasure. Where multiple CMF estimates were available from the literature, selection criteria were used to choose which CMFs to include in the issue brief:

- First, CMFs from studies that took into account regression to the mean and changes in traffic volume were preferred over studies that did not.
- Second, CMFs from studies that provided additional information about the conditions under which the countermeasures was applied (e.g. road type, area type) were preferred over studies that did not.

Where these criteria could not be met, a CMF may still be provided. In these cases, it is recognized that the estimate of the CMF may not be as reliable, but is the best available at this time. The CMFs in this issue brief may be periodically updated as new information becomes available.

U.S. Department of Transportation
Federal Highway Administration

Proven Safety Countermeasures

ROADWAY IMPROVEMENTS

1. Enhanced Delineation and Friction for Horizontal Curves
2. Longitudinal Rumble Strips and Stripes
3. SafetyEdgeSM
4. Roadside Design Improvements at Curves
5. Median Barriers

PEDESTRIANS/BICYCLES

13. Leading Pedestrian Intervals
14. Medians and Pedestrian Crossing Islands in Urban and Suburban Areas
15. Pedestrian Hybrid Beacons
16. Road Diets/Reconfigurations
17. Walkways

INTERSECTIONS

6. Backplates with Retroreflective Borders
7. Corridor Access Management
8. Left- and Right-Turn Lanes at Two-Way Stop-Controlled Intersections
9. Reduced Left-Turn Conflict Intersections
10. Roundabouts
11. Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections
12. Yellow Change Intervals

CROSSCUTTING

18. Local Road Safety Plans
19. Road Safety Audits
20. Unlimits²

→ For more information on these countermeasures and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.

U.S. Department of Transportation
Federal Highway Administration
FHWA-SA-18-041

PEDSAFE

[skip navigation links](#)

PEDSAFE



Pedestrian Safety Guide and Countermeasure Selection System

The Pedestrian Safety Guide and Countermeasure Selection System is intended to provide practitioners with the latest information available for improving the safety and mobility of those who walk. The online tools provide the user with a list of possible engineering, education, or enforcement treatments to improve pedestrian safety and/or mobility based on user input about a specific location. [\[read more\]](#)

Resources:

Background – understand what is needed to create a viable pedestrian system.

Crash Statistics – learn about the factors related to the pedestrian crash problem.

Crash Analysis – learn how crash typing can lead to the selection of the most appropriate countermeasures.

Objectives – learn how selected treatments may address many requested improvements to the pedestrian environment.

Implementation – read about the necessary components for implementing pedestrian treatments.

More Info – access additional information through a variety of resources.

Downloads – access print versions of the guide and other relevant materials.

Available Tools:



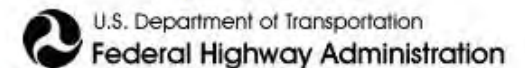
Selection Tool – find appropriate countermeasures on the basis of desired objectives and specific location information.

Interactive Matrices – view the countermeasures associated with crash types and performance objectives.

Countermeasures – read descriptions of the 49 engineering, education, and enforcement treatments.

Case Studies – review real-world examples of implemented treatments.

Project sponsored by:



Summary

1. Focus first on the basics
2. Identify and program longer-term improvement needs (e.g. sidewalks)
3. Match the treatment to the type of problem
4. Provide and maintain facilities along the school route
5. Provide safe street crossings
6. Slow down traffic speeds