Safe Routes training

Developed by the National Center for Safe Routes to School

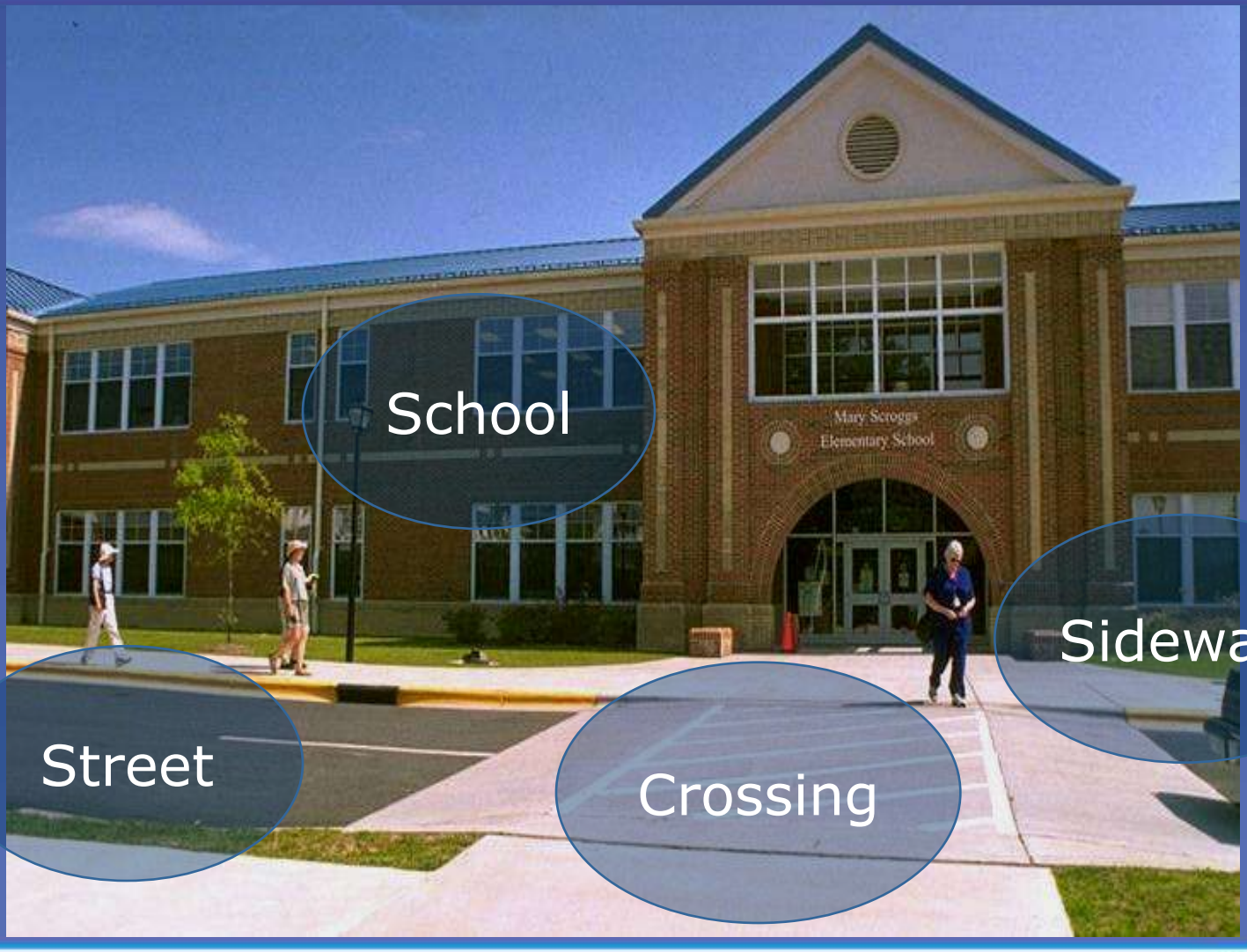
Engineering Treatments and Strategies

Creating safe routes with engineering

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

Walkways and crossings: Prerequisites for walking

Relationships are everything



Focus on low cost, easy to implement solutions

What's wrong with this picture?

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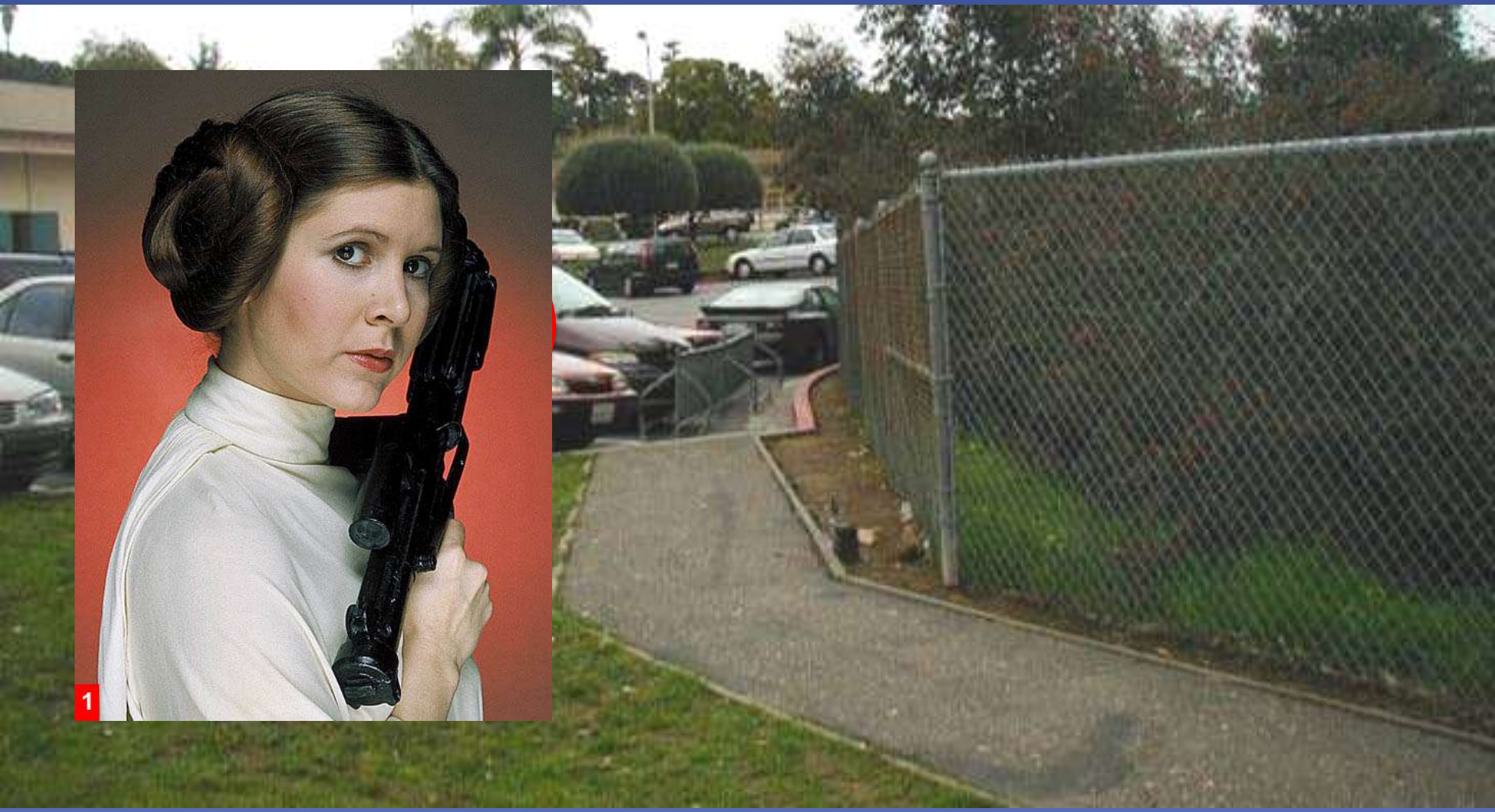
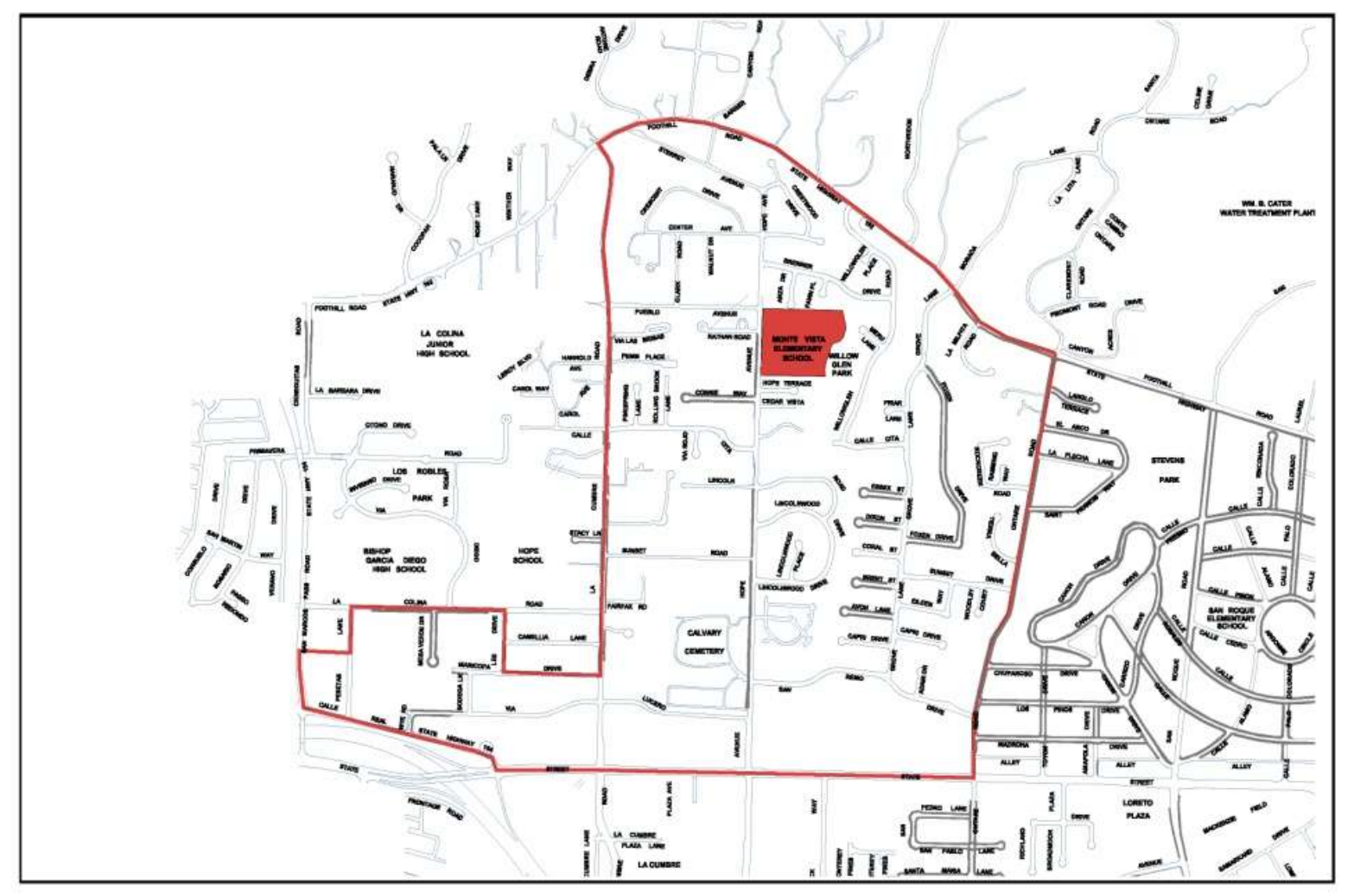


Engineering topic outline

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

School enrollment boundary

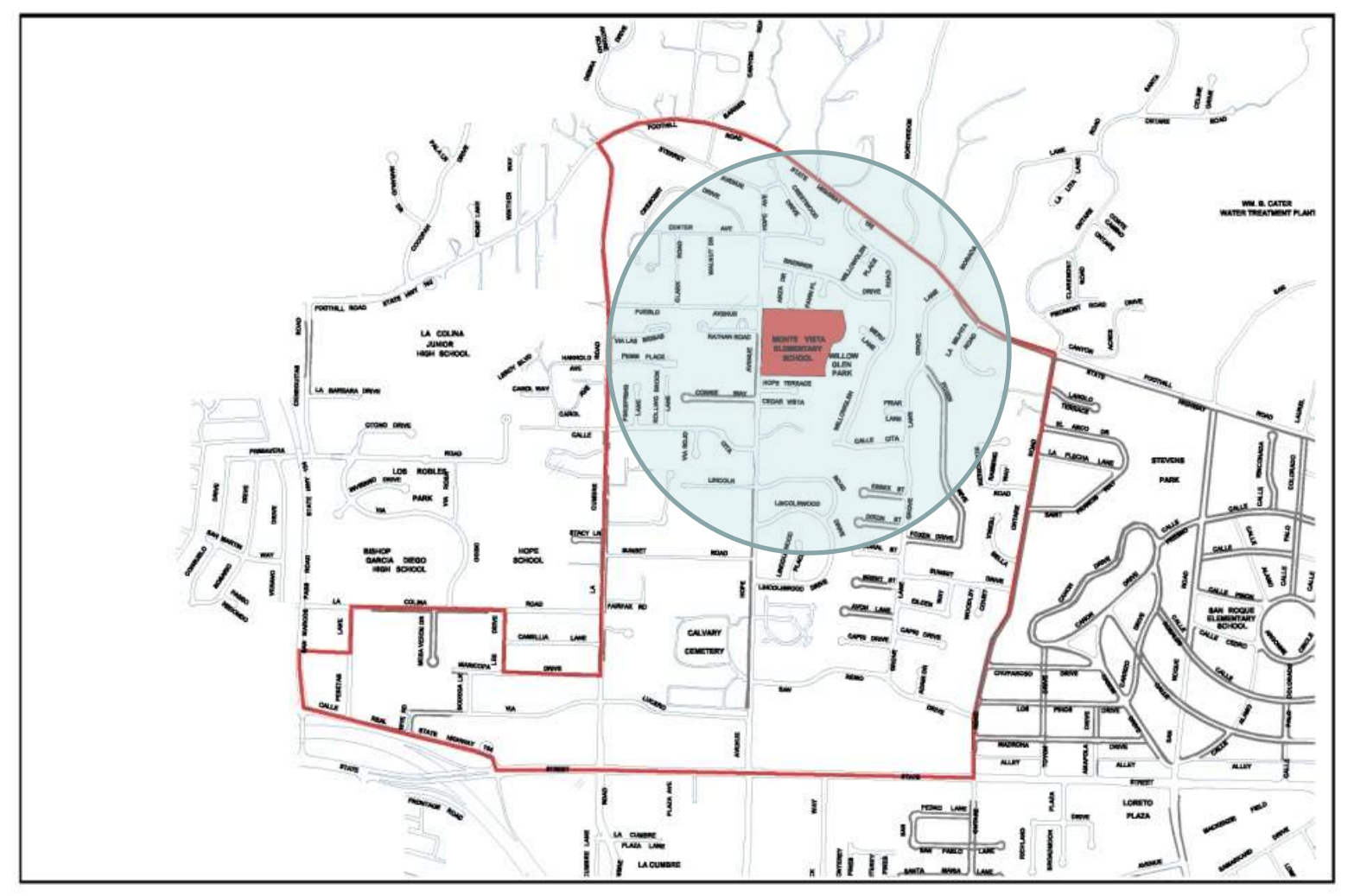


Walking and Biking to School, Physical Activity and Health Outcomes

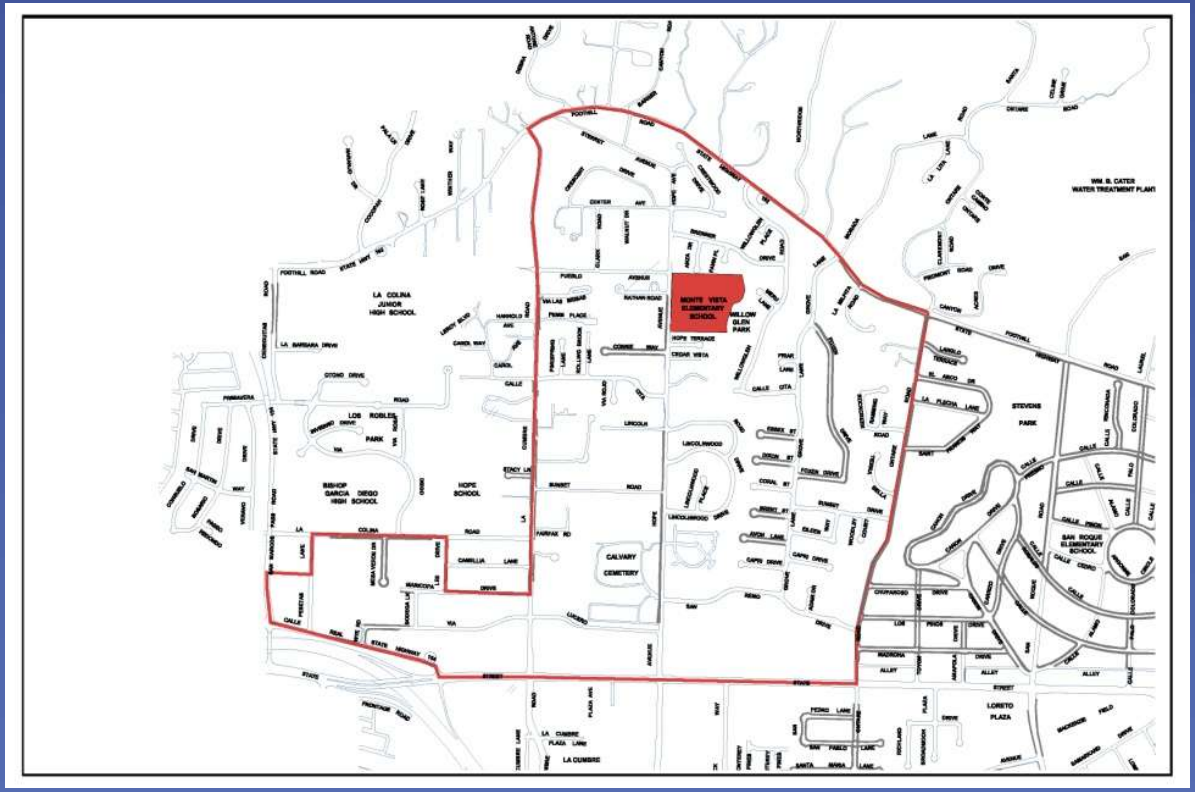
Proximity of homes and schools is the most important influence on walking and biking to school.

Active Living Research, May 2009

School walk zone



School zone




AVENUE
DRIVE
STATE
HIGHWAY
CRESTWOOD
DRIVE
HOPE AVE
CENTER
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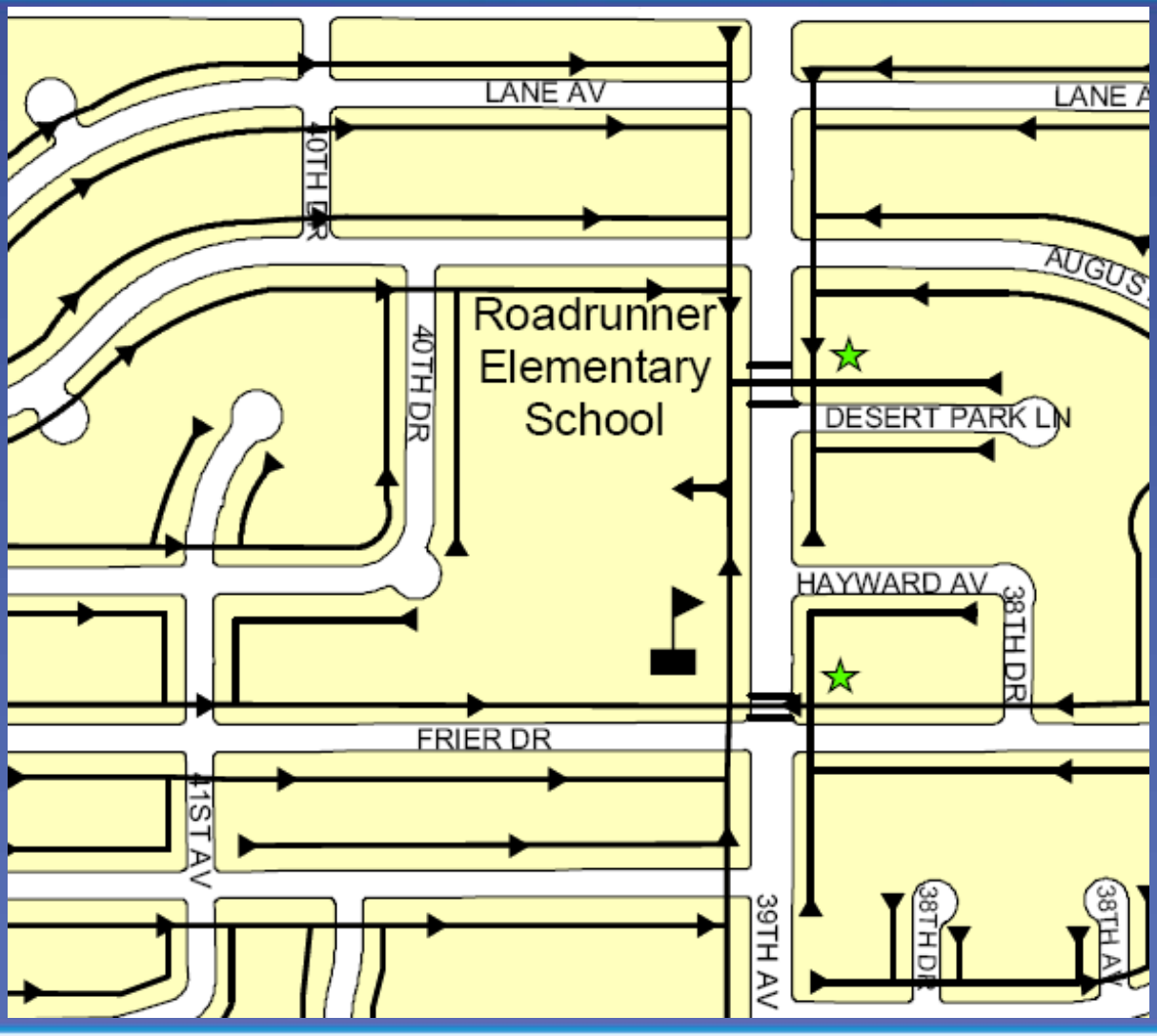
192
CLARK
ROAD
WALNUT DR
BRENNER
WILLOWGLEN
PLACE
ROAD
ANZA DR
FAWN PL
DRIVE
AVENUE
NATHAN ROAD
MONTE VISTA
ELEMENTARY
SCHOOL
MERU
LANE
AVENUE
WILLOW
GLEN
PARK
HOPE TERRACE
CONNIE
WAY
CEDAR VISTA
WILLOWGLEN
FRIAR
LANE
CALLE
CITA
VIA ROJO
CITA
LINCOLN
ROAD
ESSEX ST
LINCOLNWOOD
DIXON ST

Safest route to school walking map
Mapas de rutas más seguras a la escuela



Signing and marking the school zone

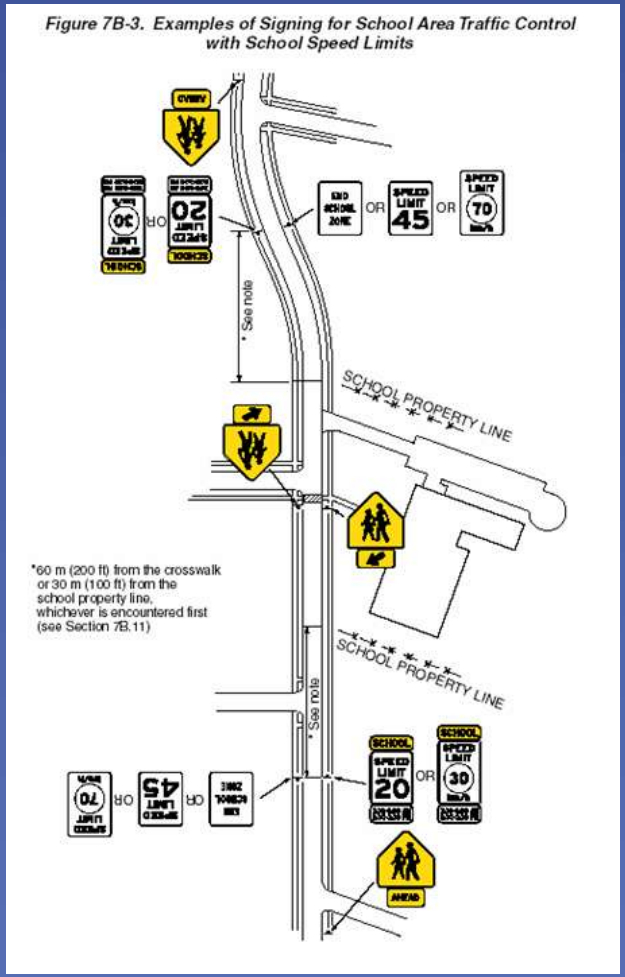
Manual on

Uniform

Traffic

Control

Devices

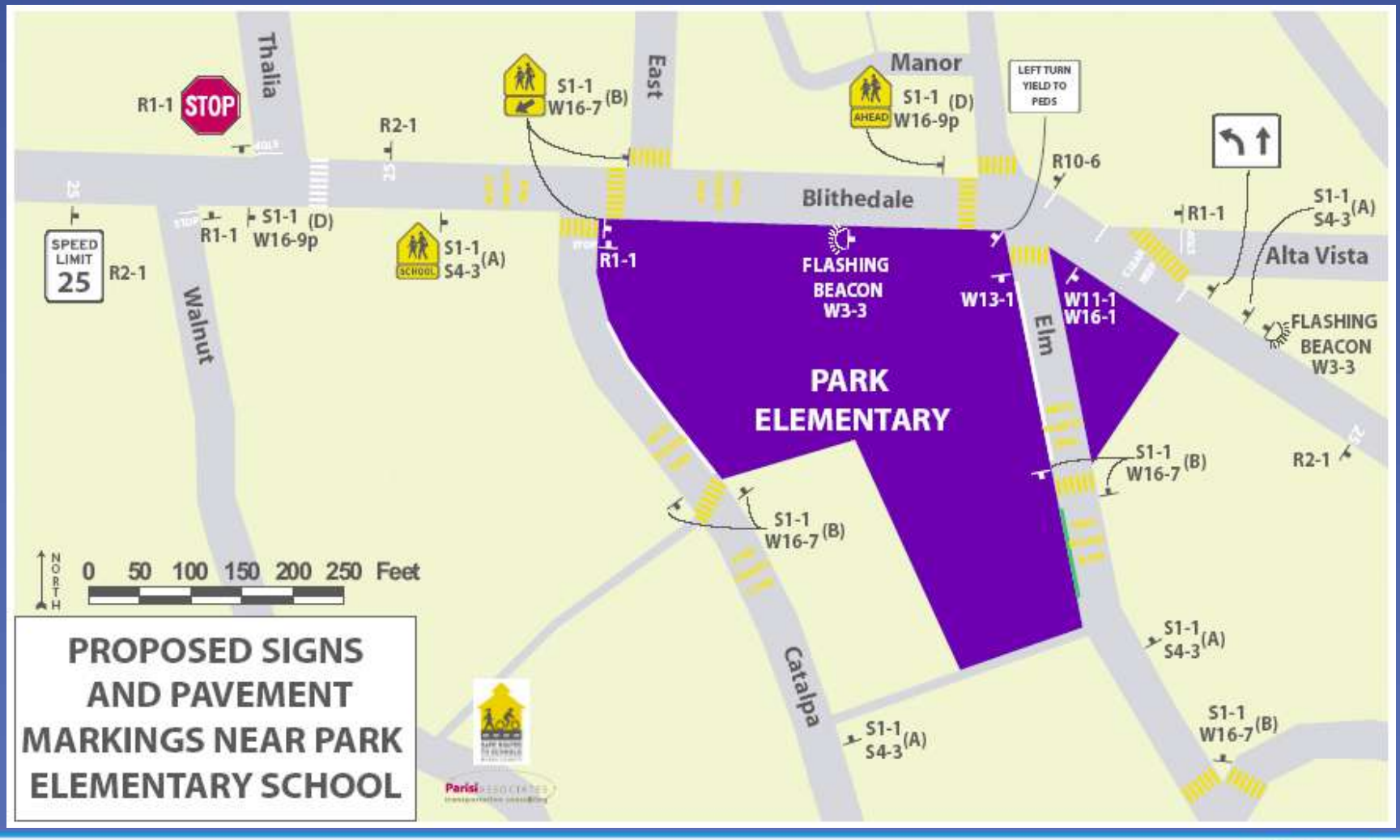


School area speed limit signing

School crosswalk signs and advance warning signs

Parking regulations

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

Sidewalks are essential

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

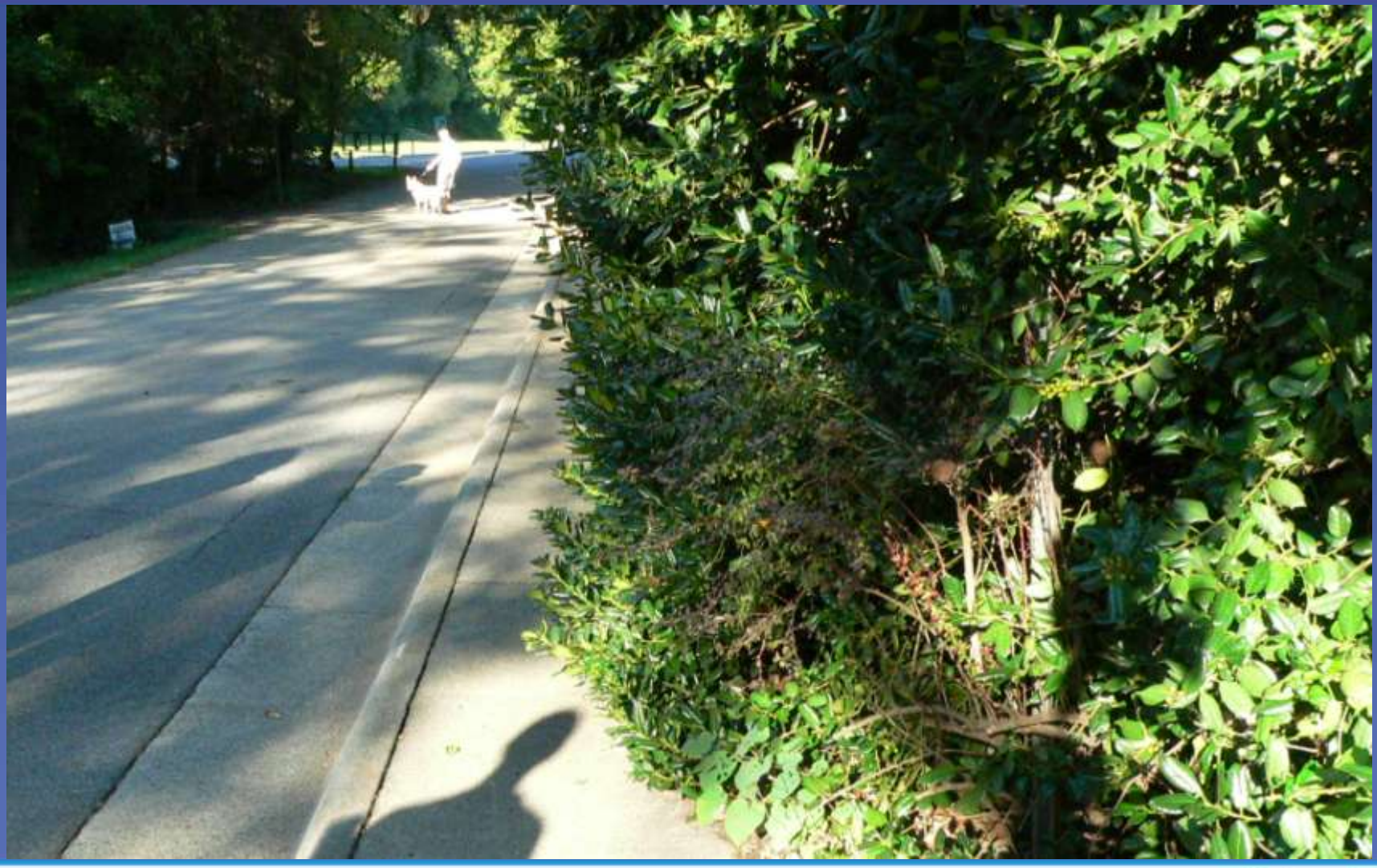
Good sidewalk buffer


STOP

Provide wide enough sidewalks

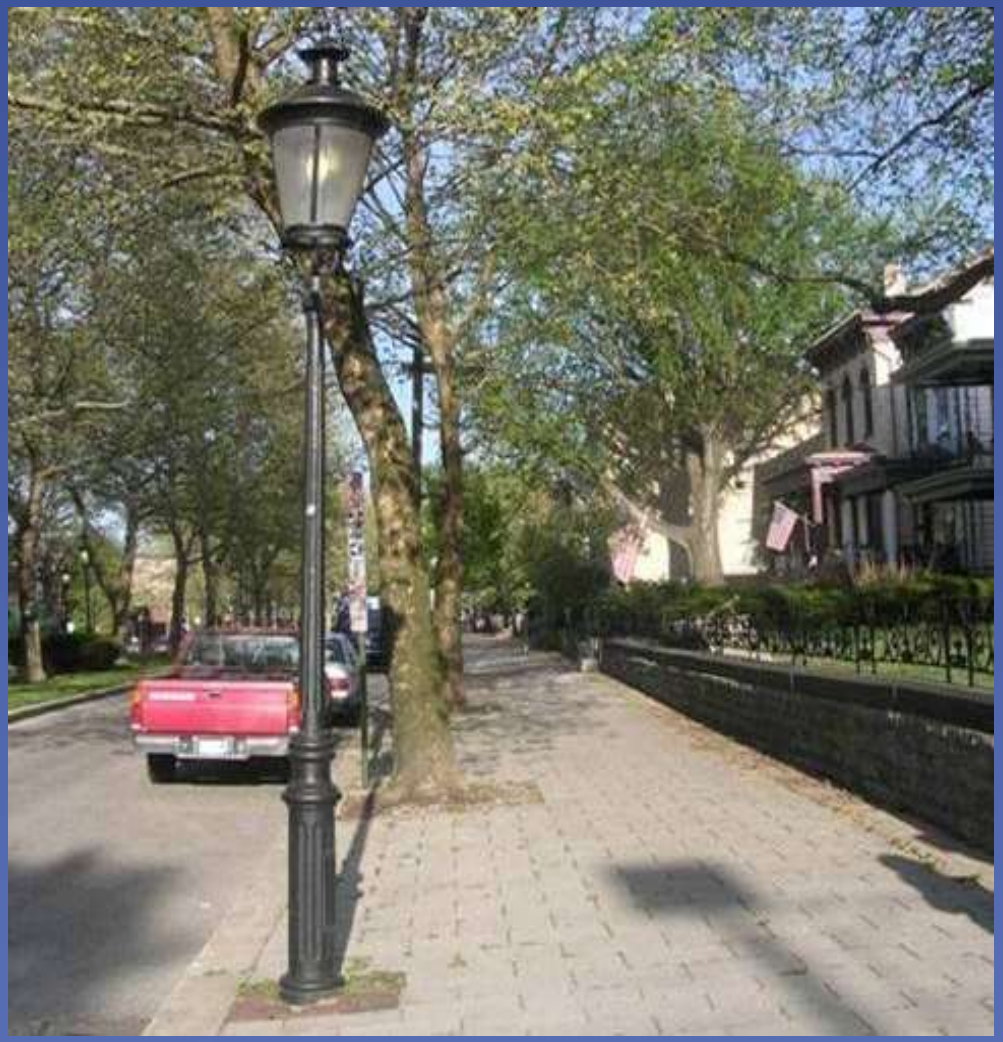
- Recommended minimum: 5’
- Preferred min: 6’
- At schools: 8’-10’

Maintain landscaping to provide clear walkways and sight distances



Remove obstacles from sidewalks

Install street lighting



Meet ADA requirements for universal design

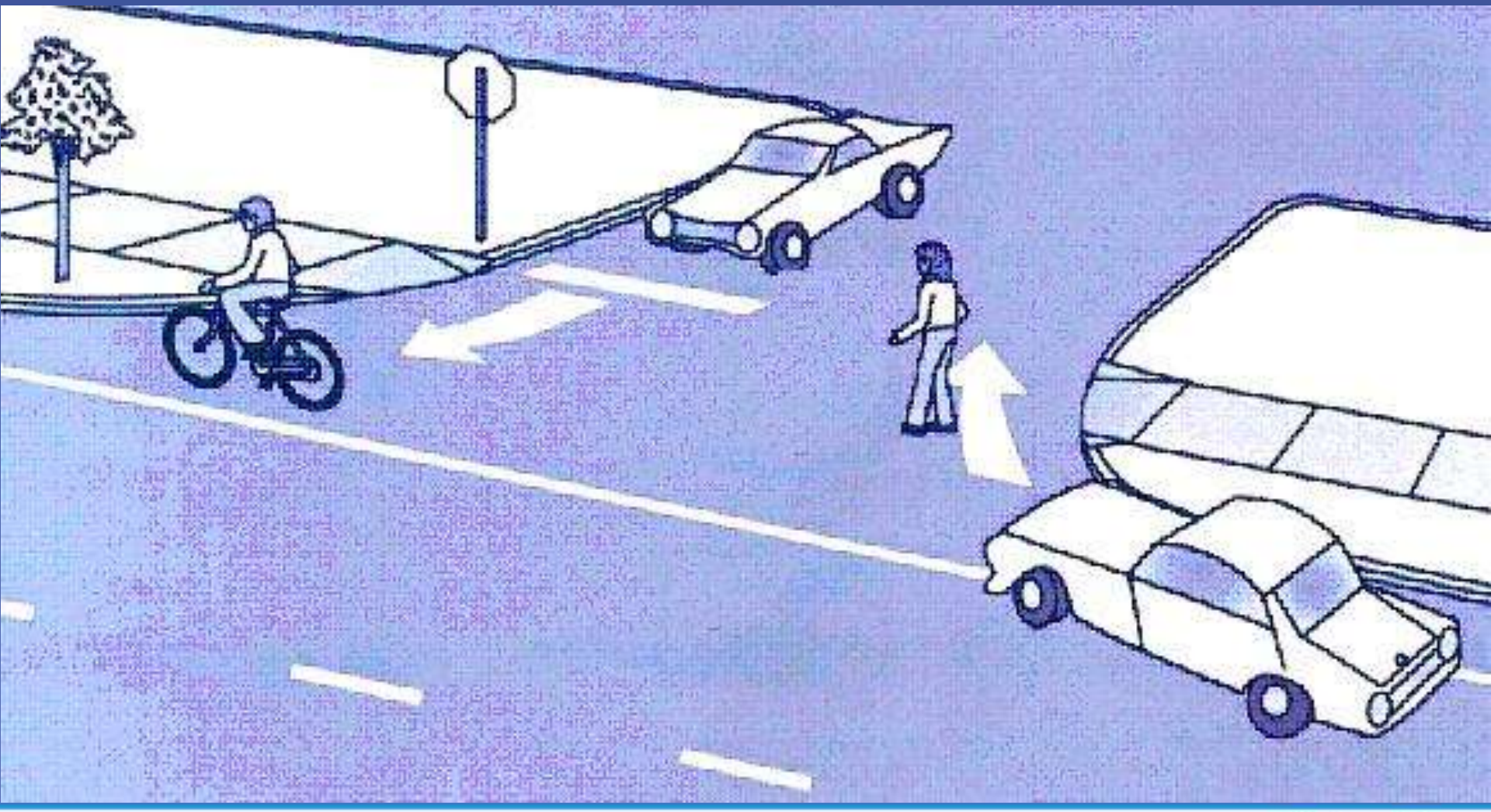
Curb ramp design

- Two ramps per corner
- Eight ramps per intersection

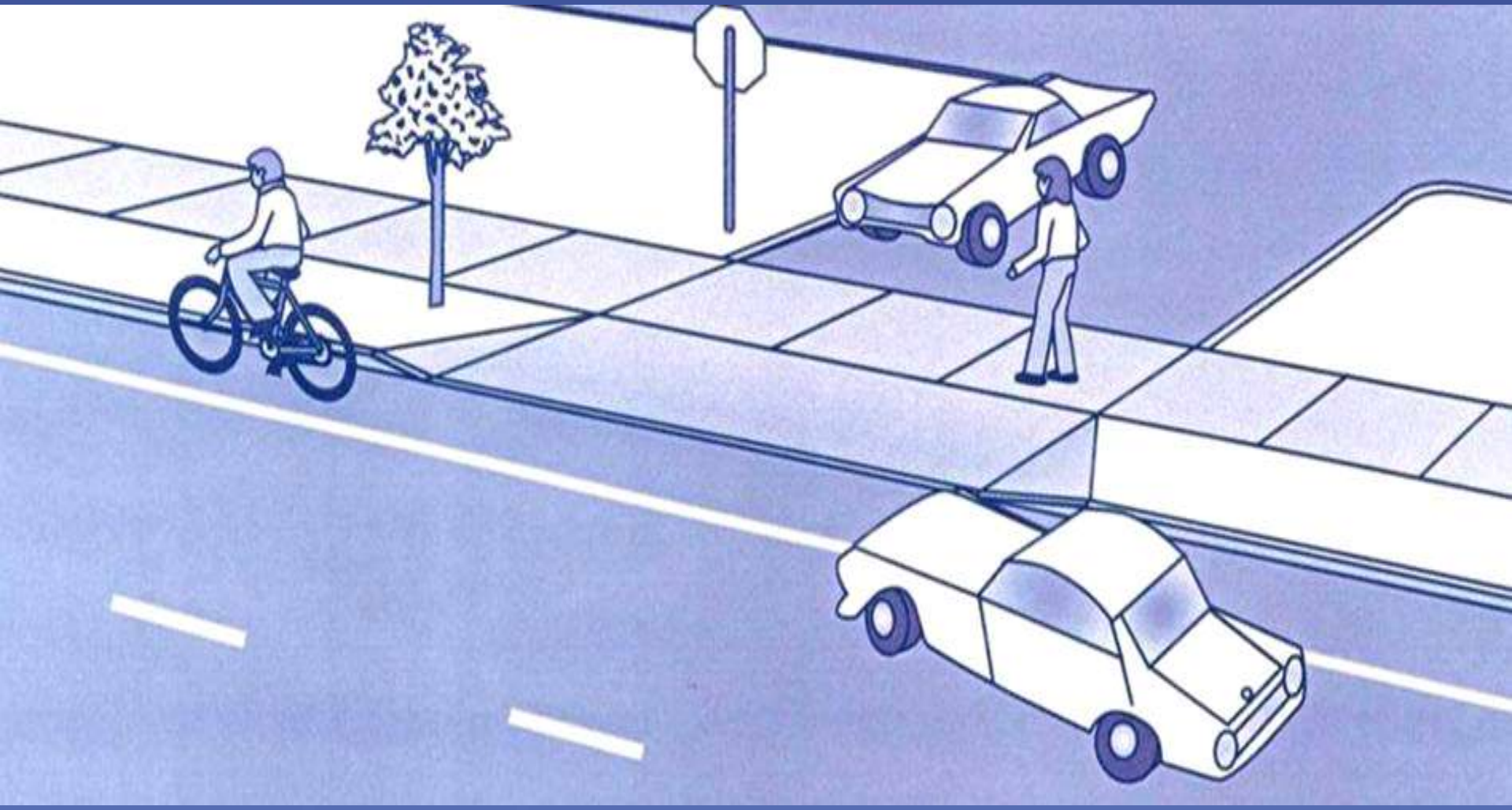
Limit driveway crossings

Connections to the school

Don’t build driveways like intersections



Build driveways like driveways



Along the school route: Bikeways

- Local streets
- Bike lanes
- Shoulders
- Pathways

Local streets – where most kids ride

Bicycle lanes

Shoulders benefit cyclists and motorists

Along the school route: Pathways

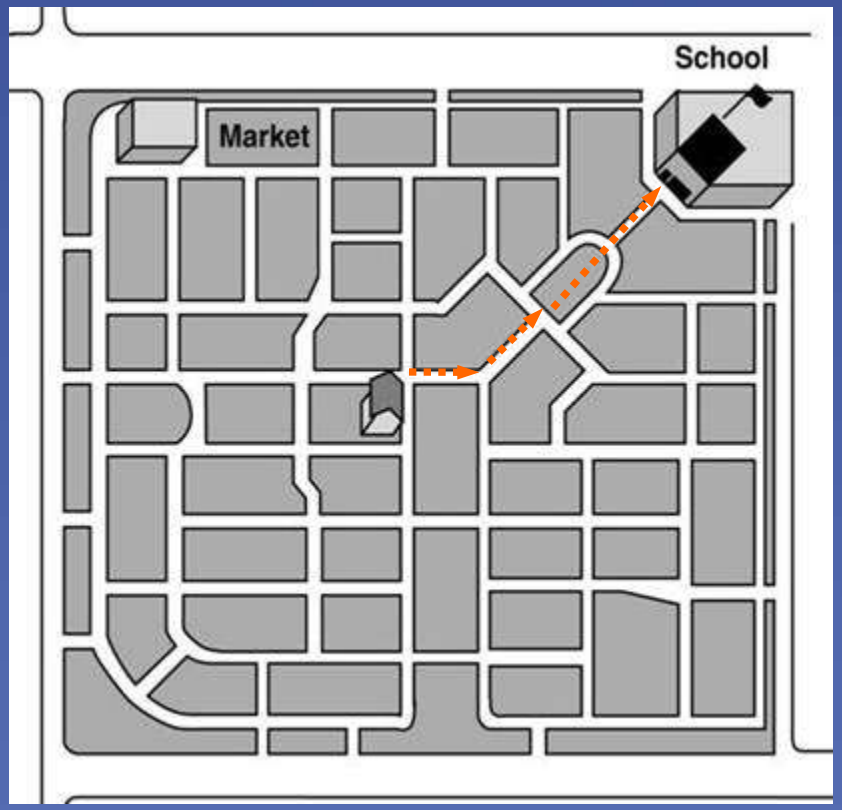
Yes – high school students will bike given the opportunity

Install bicycle racks

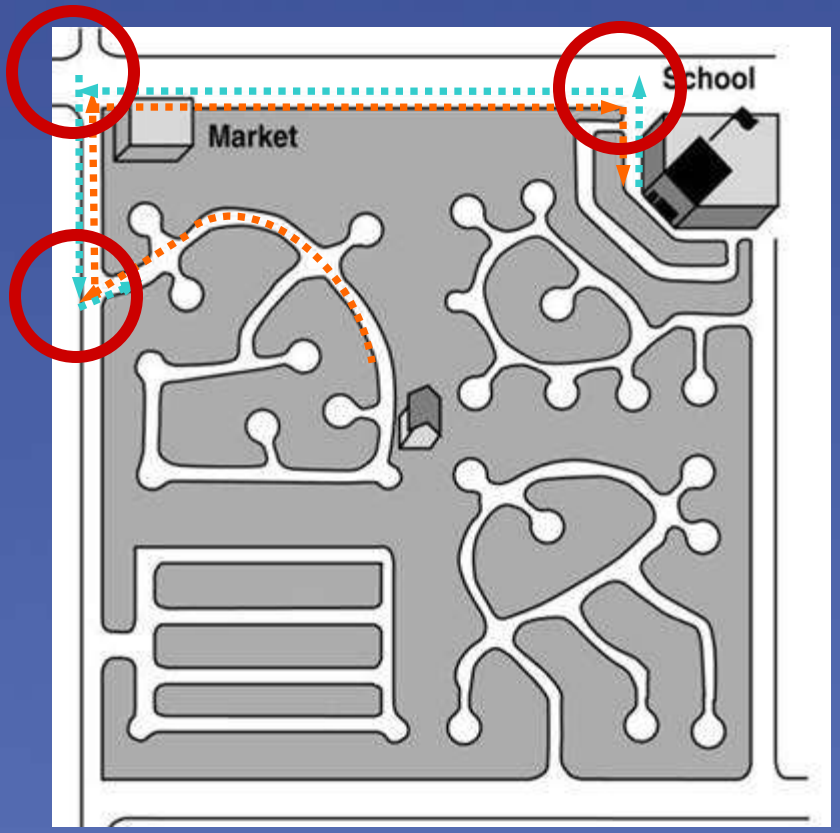
Connectivity creates a pedestrian-friendly street system

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

Connectivity can reduce walking distances and crossings required



Connected streets



Lollipop pattern

Engineering topic outline

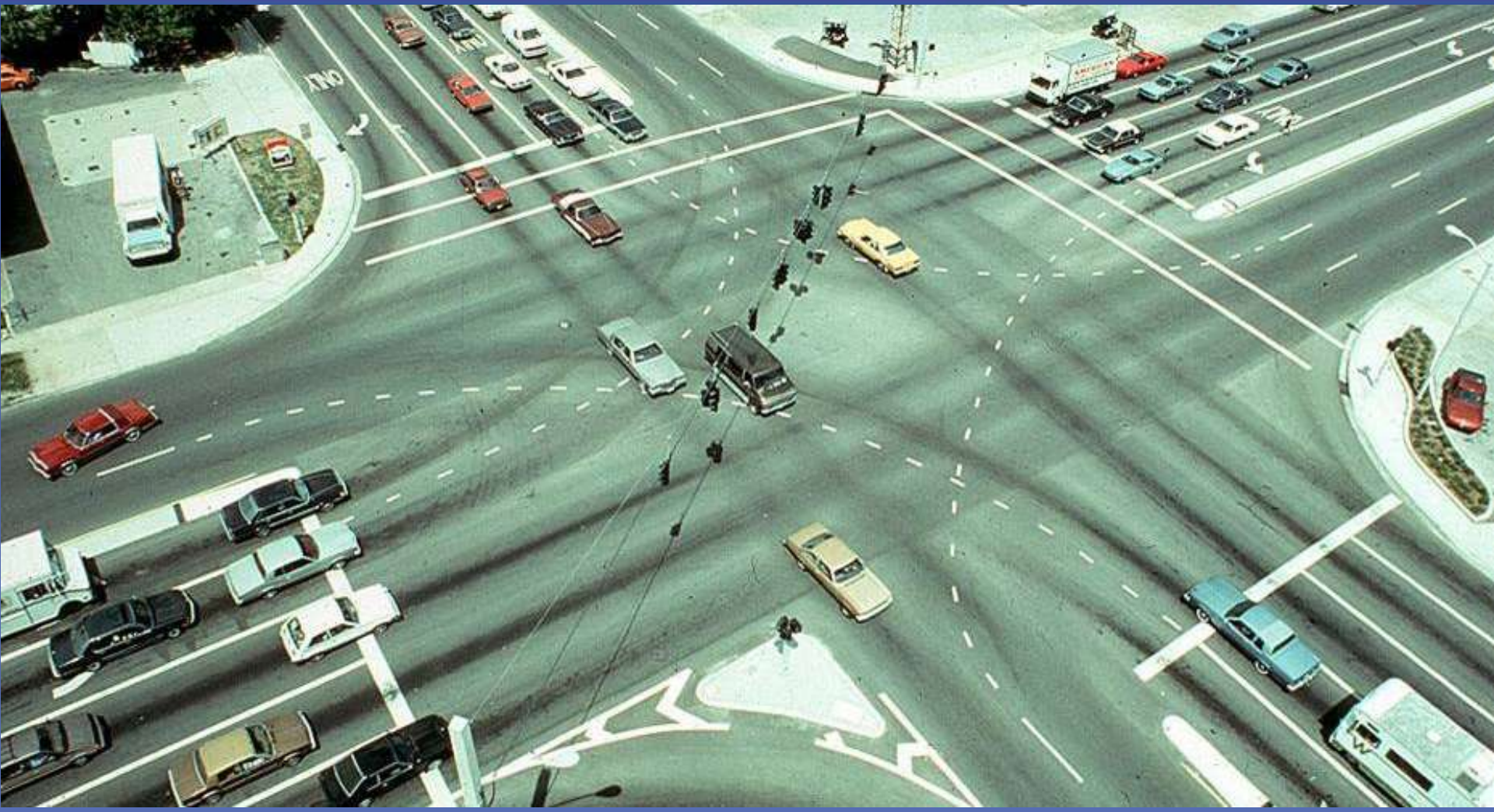
- Around the School
- Along the School Route
- **Crossing the Street**
  - **Introduction**
  - **Shortening crossing distances**
  - **Marking crosswalks**
  - **Creating visible crossings**
  - **Using stop signs and traffic signals**
- Slowing Down Traffic

Principles for creating safe crossings

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

Wide, multi-lane roads are barriers

School walking routes and big roads do not mix



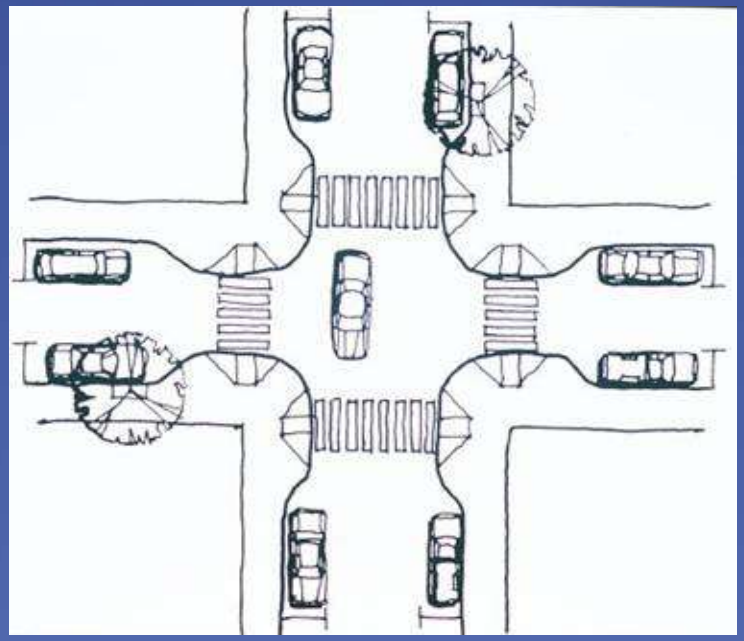
Pedestrian and bicycle bridges

- Expensive
- Often not used
- Consider topography and circumstances

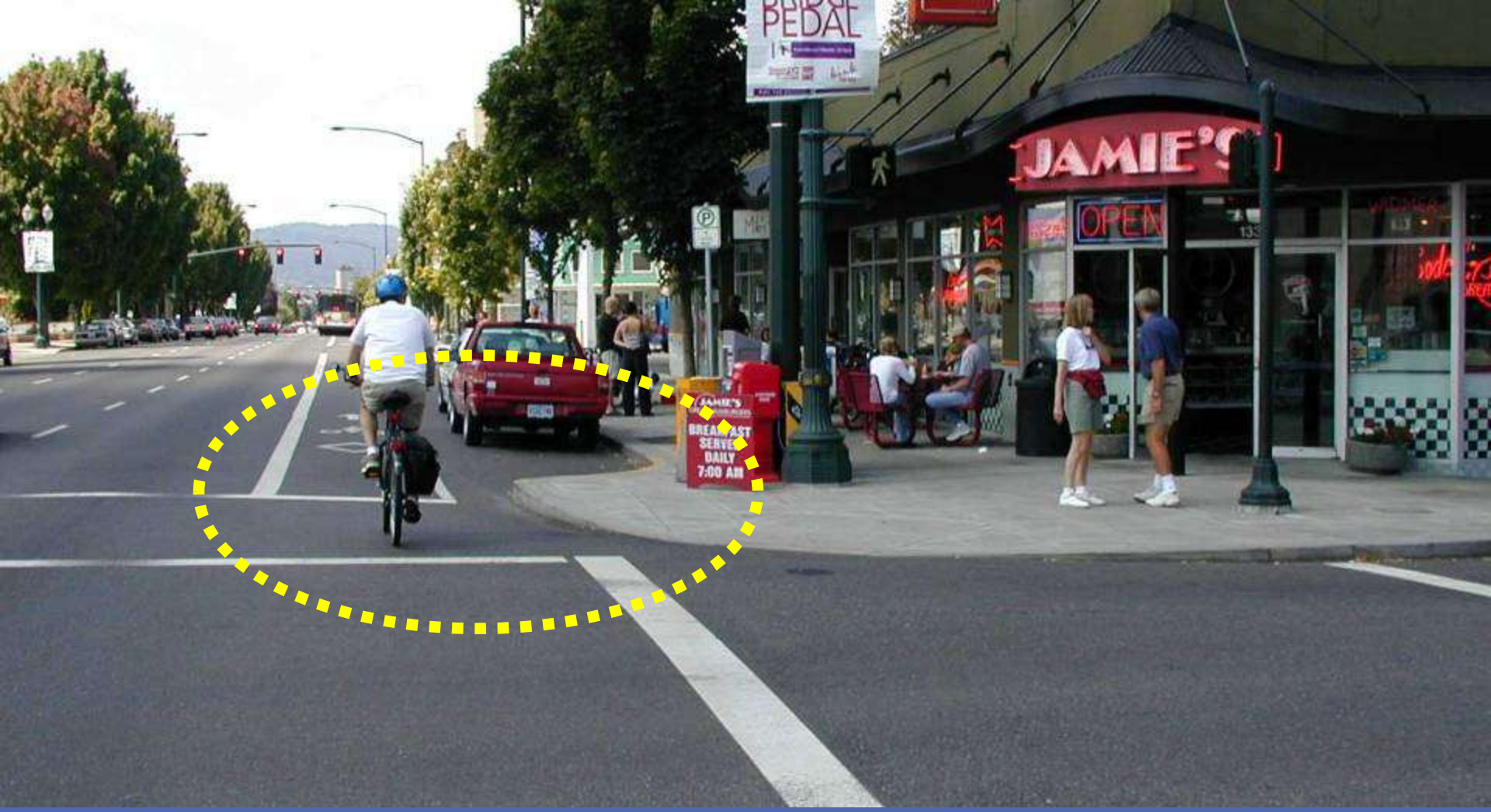
Pedestrian underpasses and bridges

Tools to reduce crossing distance

Curb extensions at crossings

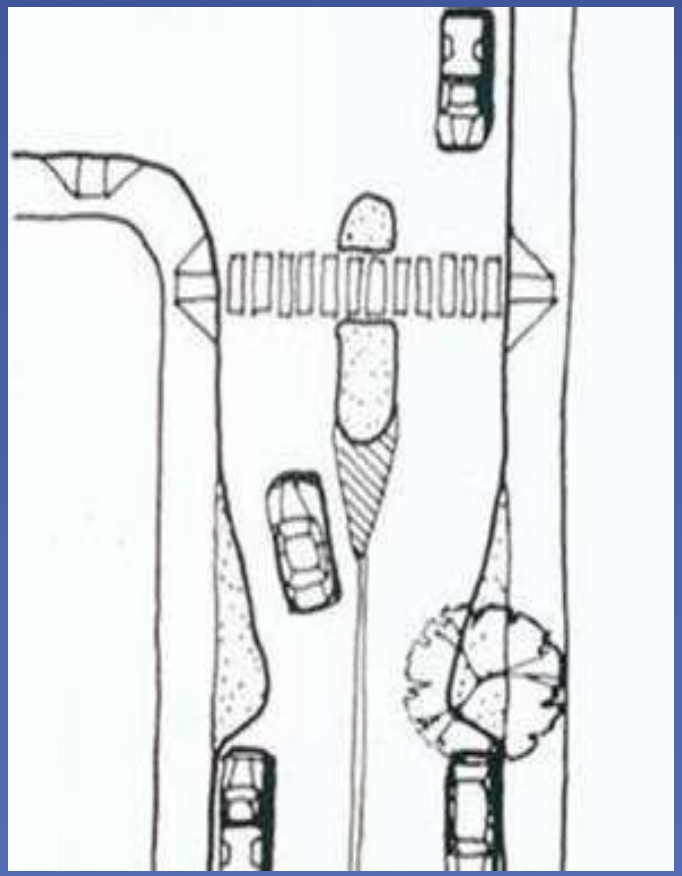


Reduce the crossing distance



Portland OR

Crossing islands



Two-stage crossing island

Road diet – watch it happen

Road diet – watch it happen

Road diet – watch it happen

Marking crosswalks

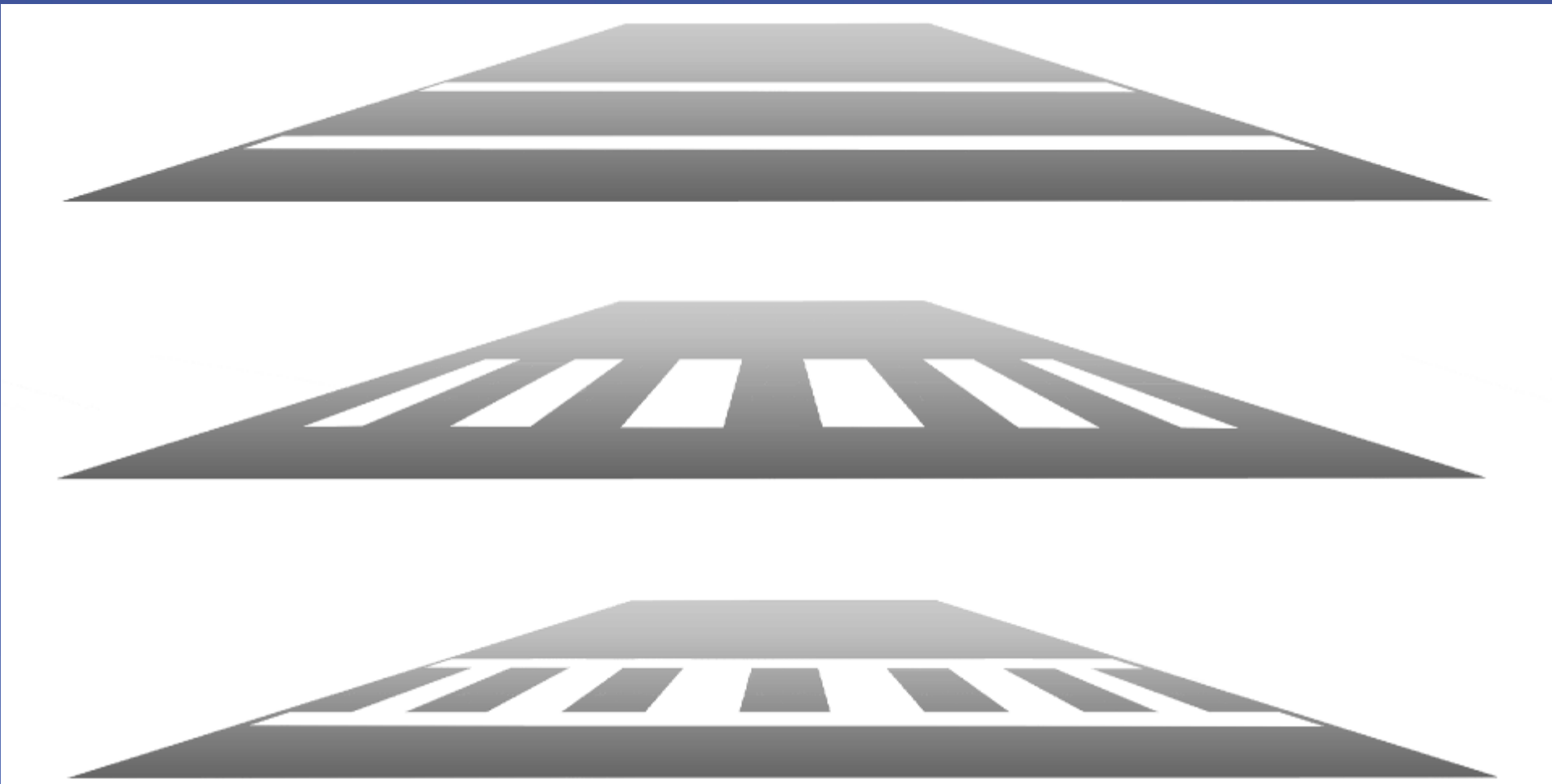
Why install marked crosswalks?

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

This crosswalk meets guidelines

This one doesn't meet guidelines

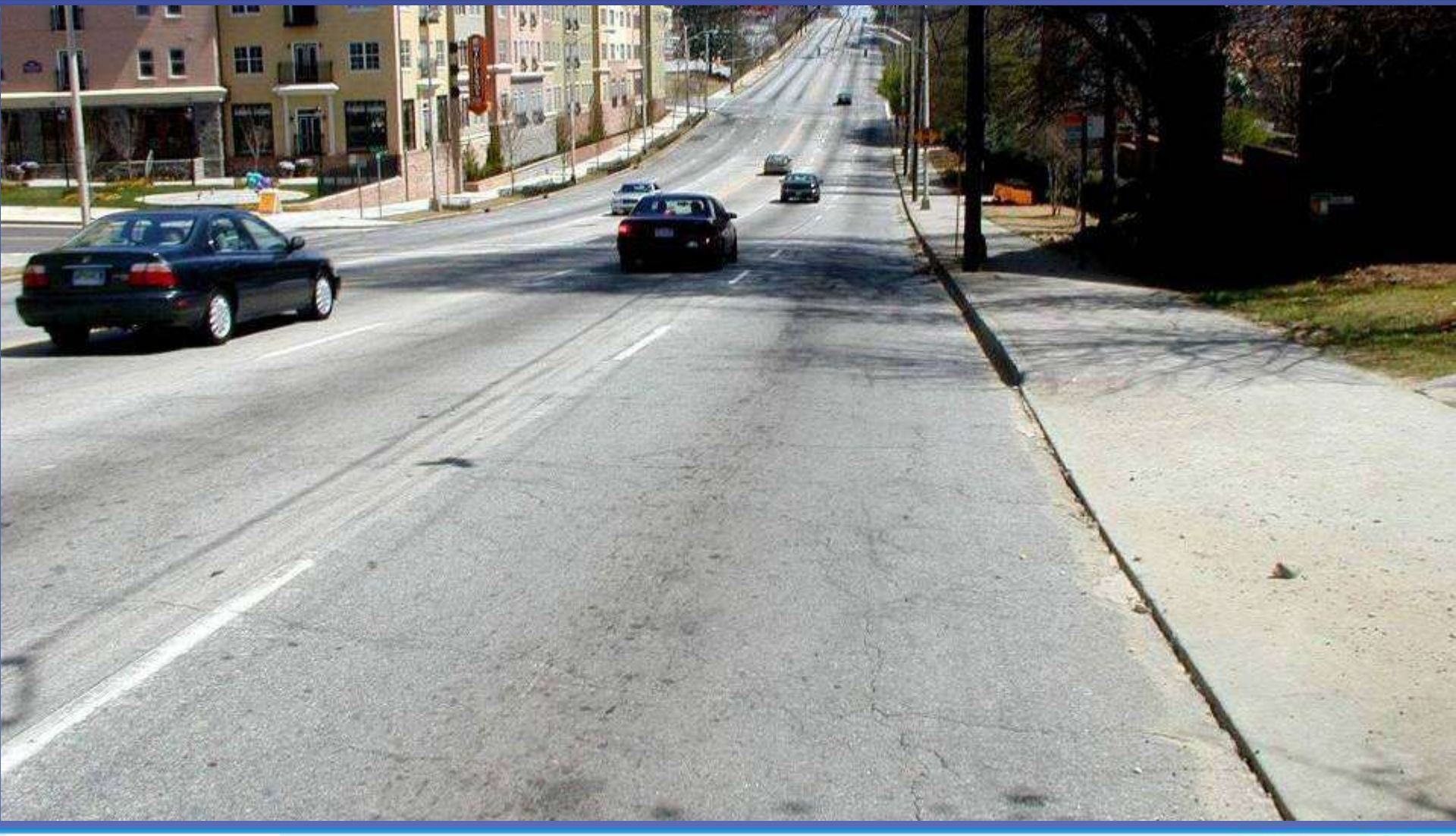
Install high-visibility markings



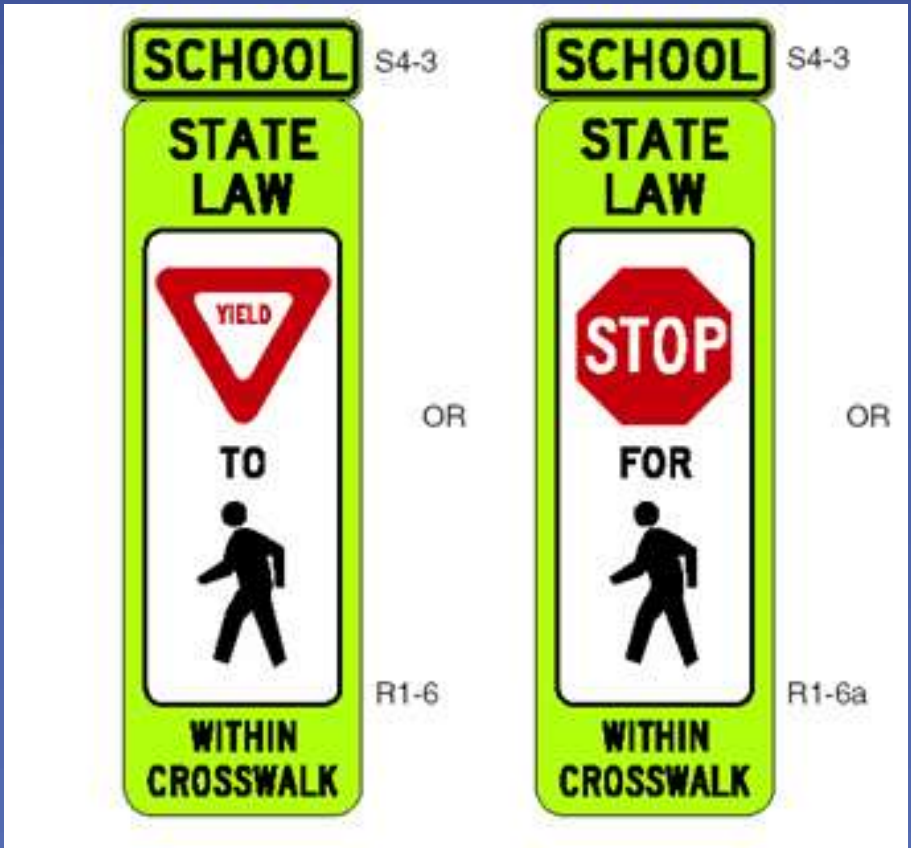
Ladder-style is easier to see.

What the pedestrian sees

What the driver sees (same crosswalk)



In-street signing



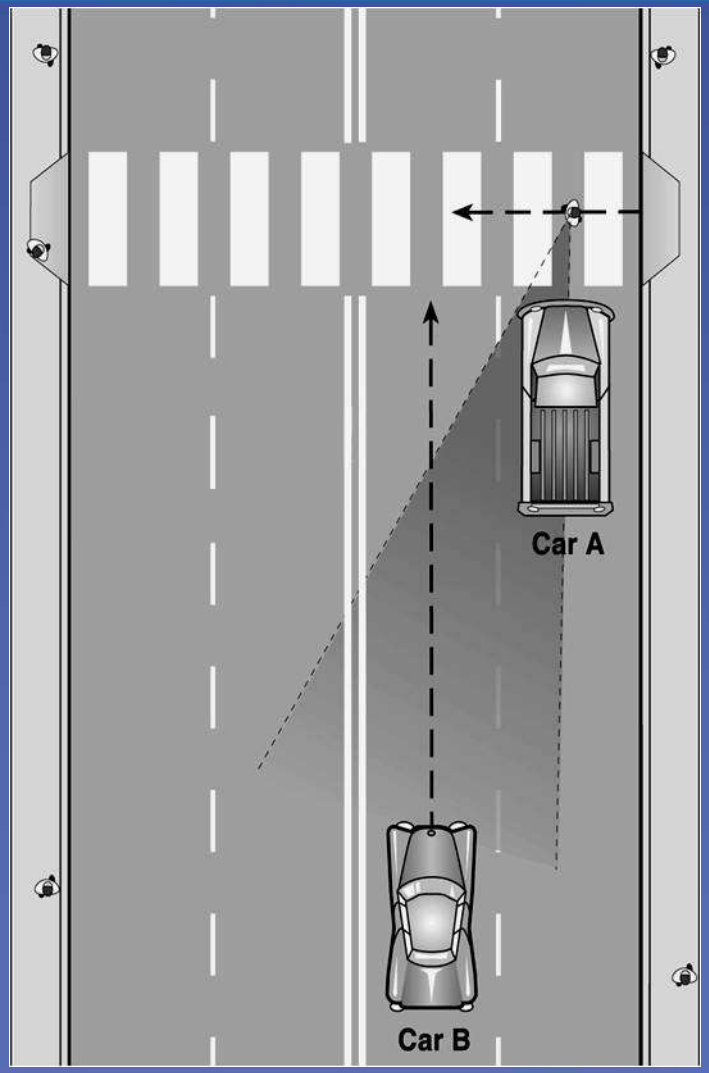
In-pavement flashing crosswalks

- Possible maintenance problems
- Visible primarily at night
- Unknown crash effects
- Expensive treatment

“Multiple threat” crashes

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

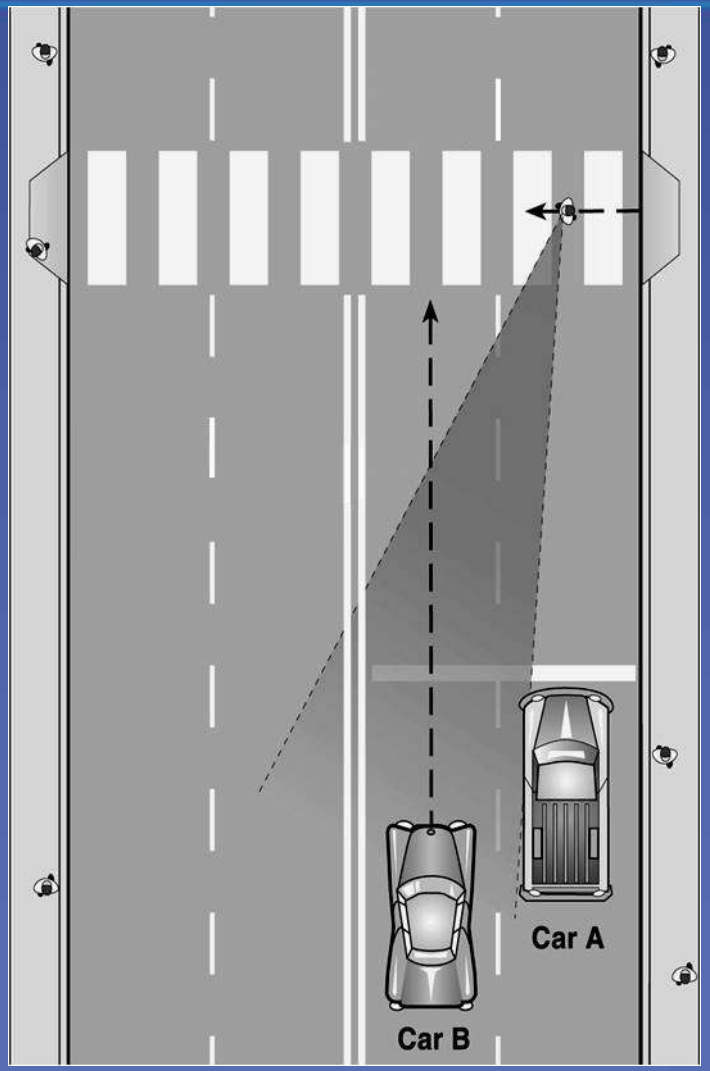
2nd car doesn’t stop, hits pedestrian at high speed



Solution: Advance stop/yield line

1st car stops further back, opening up sight lines

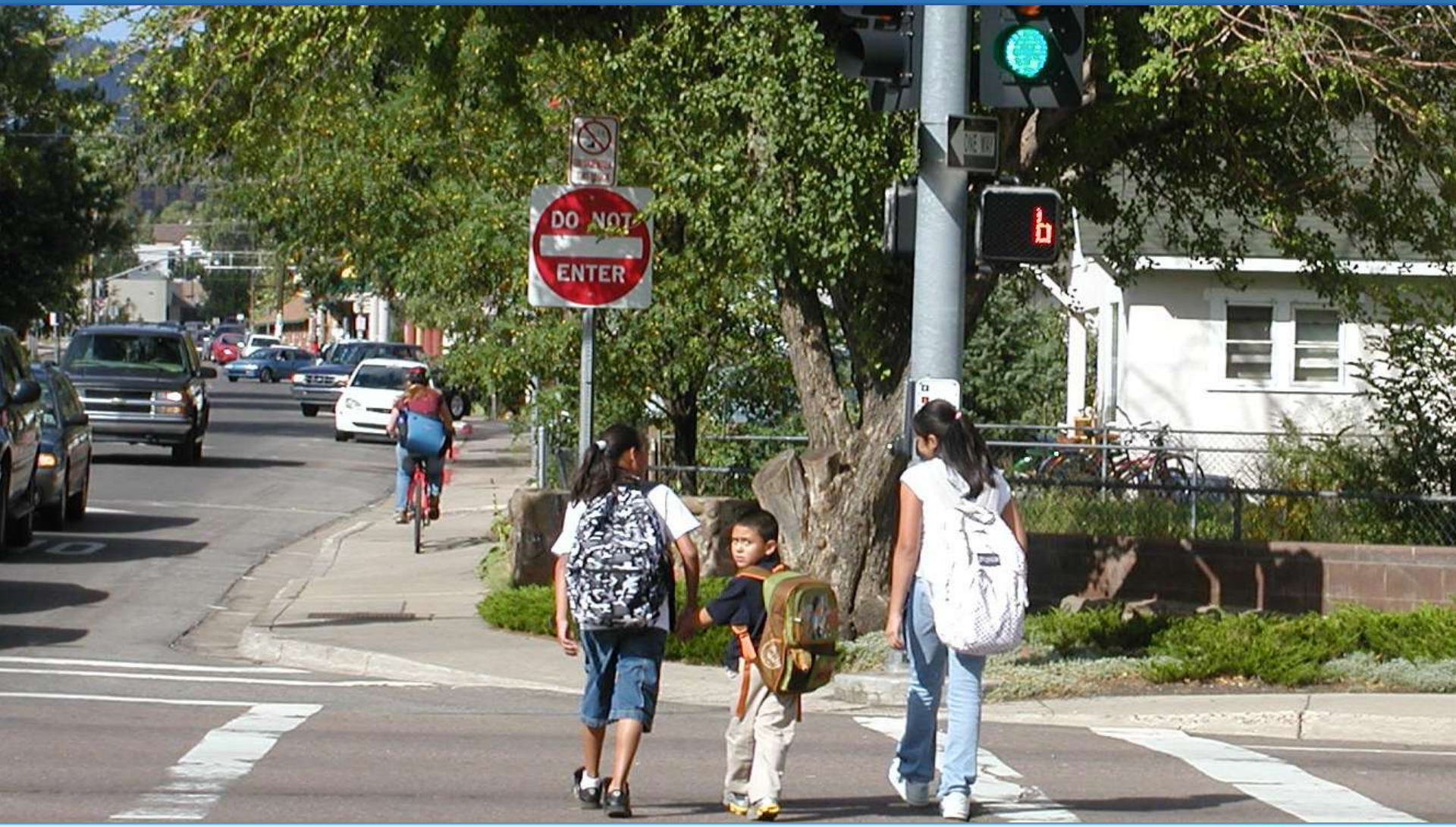
2nd car can be seen by pedestrian



Parking restrictions at corners

Better visibility for both drivers and pedestrians

Modify traffic signal timing



Traffic signal guidelines

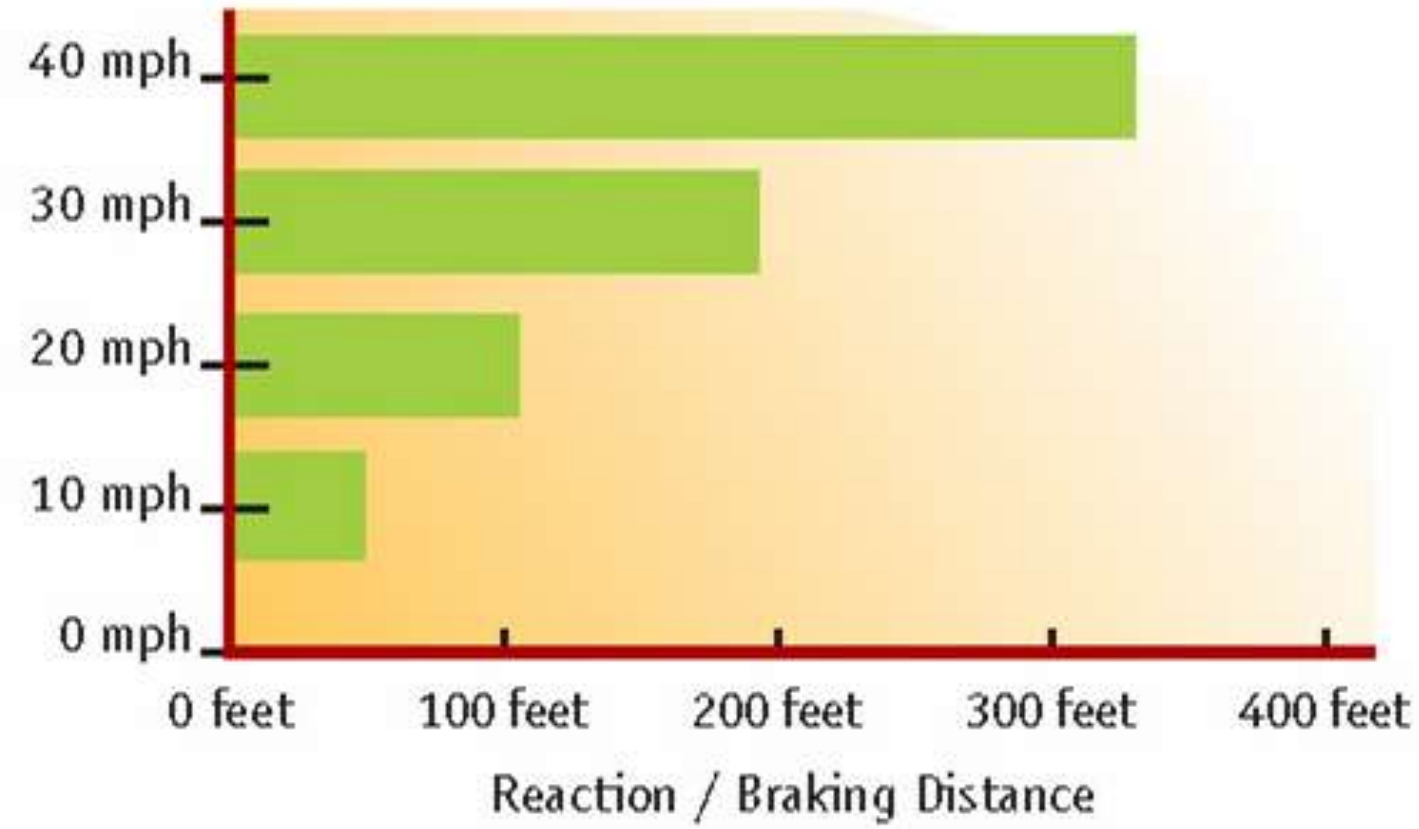
- Mark all crosswalks where pedestrians cross
- Pedestrian signals in all directions
- Adequate crossing time for pedestrians
- Stop bars for vehicles on all approaches

Engineering topic outline

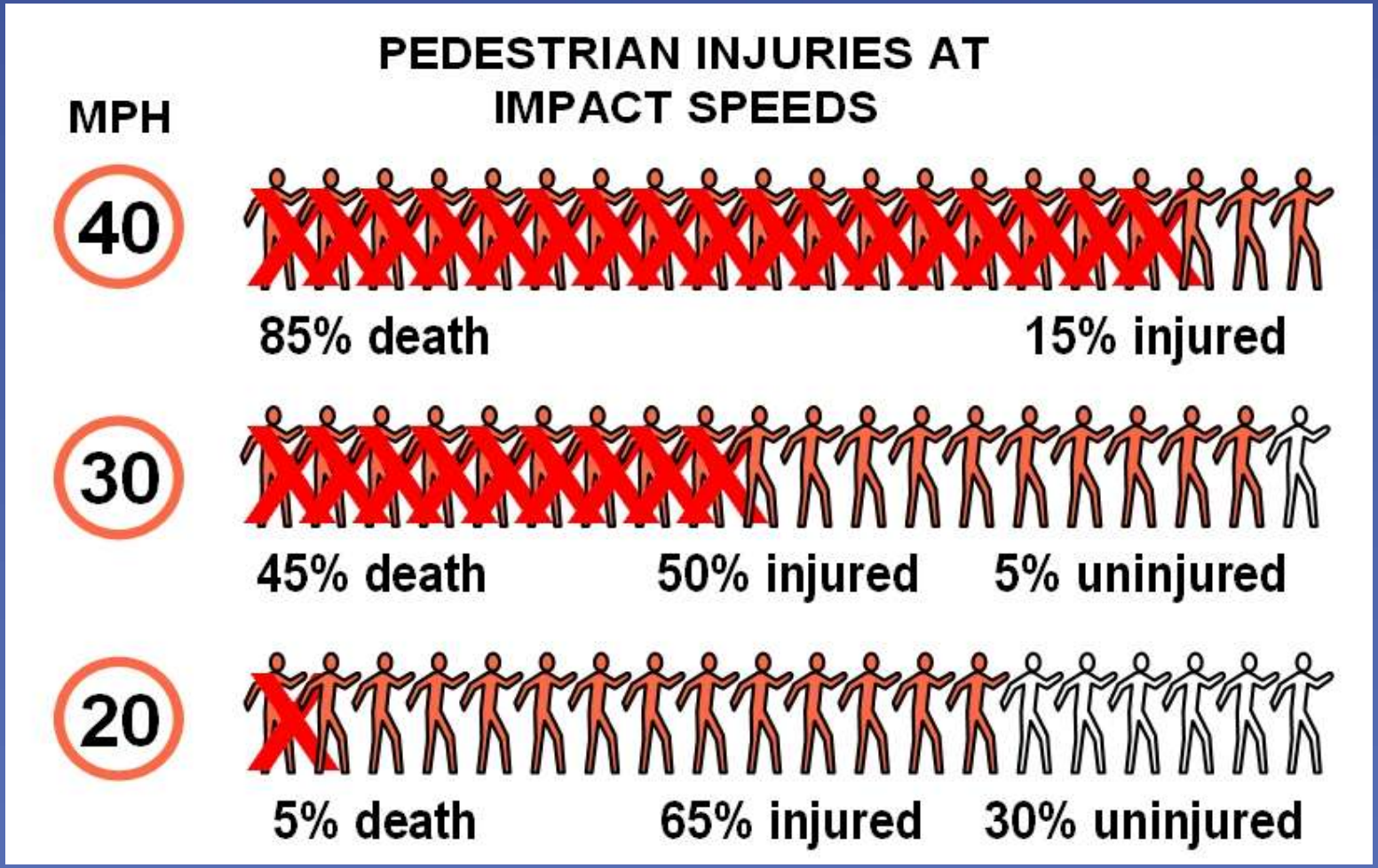
- Around the School
- Along the School Route
- Crossing the Street
- **Slowing Down Traffic**

Slowing down traffic

High speeds increase stopping distance



High speeds increase ped injuries



Correct design invites correct use

Which street has lower speeds?

Narrow lanes reduce speeds

Use paint to reduce lane width

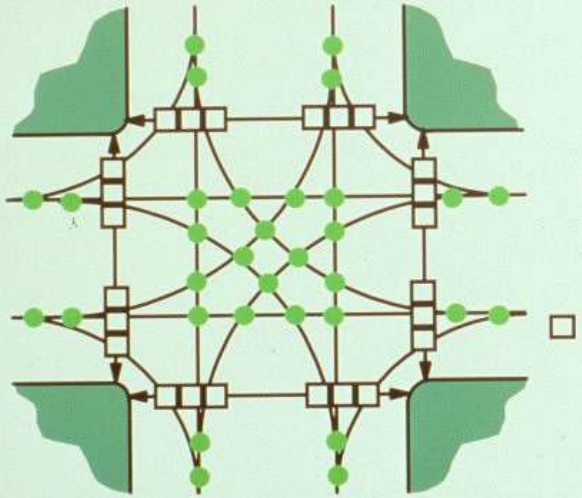
Speed humps slow traffic on local streets

Raised pedestrian crosswalks

Raised crossings in school parking lot

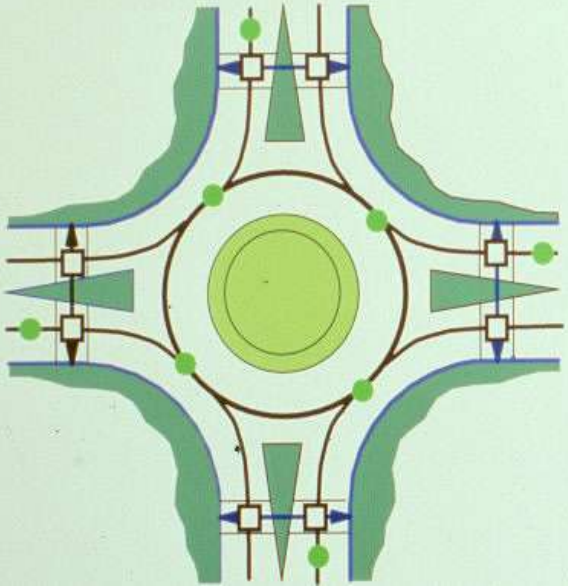
Roundabouts are safer

Conflicts At a Four-Way Interection



- 32 vehicle-to-vehicle conflicts
- 24 vehicle-to-pedestrian conflicts

Conflicts At Roundabouts



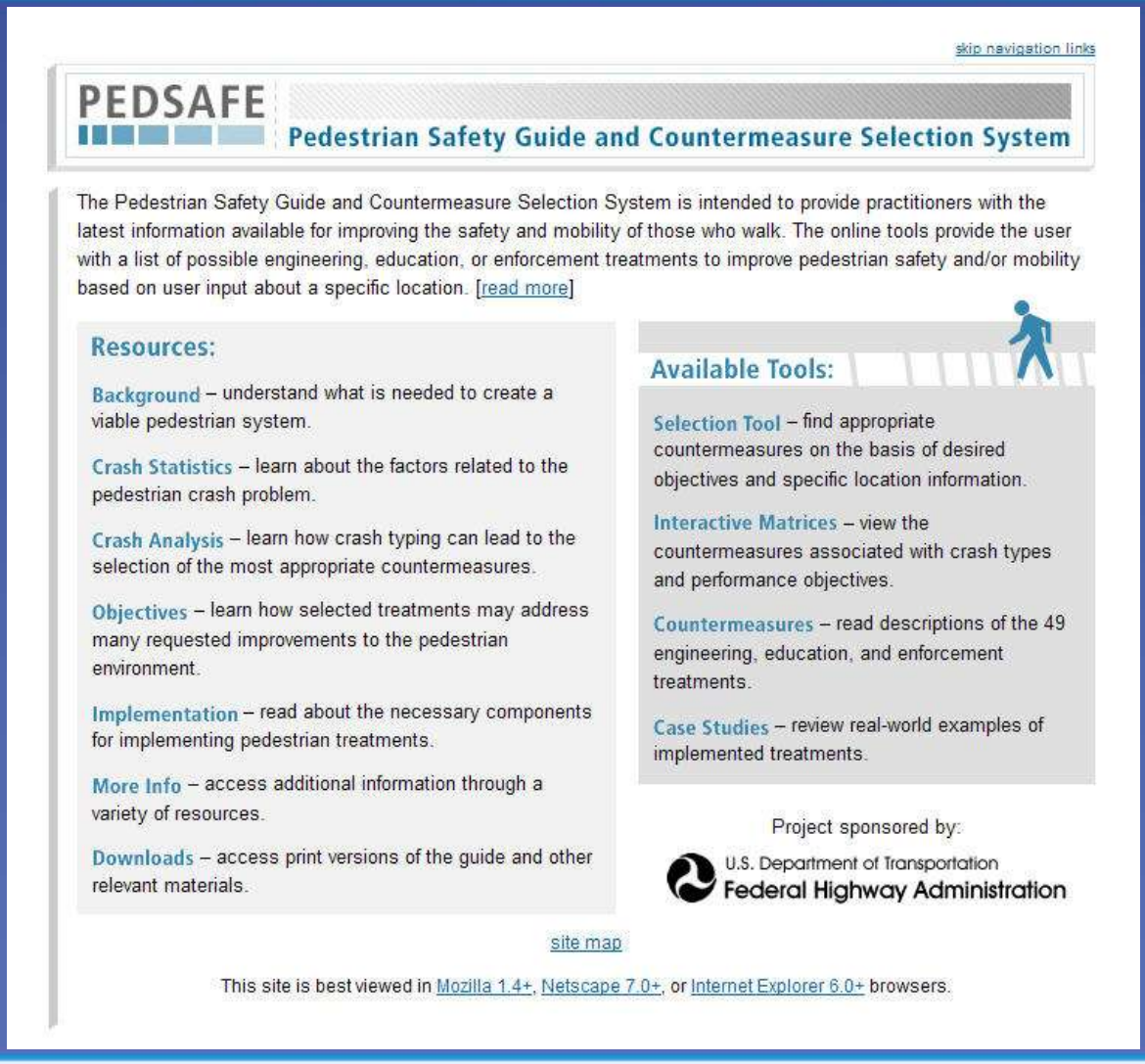
- 8 vehicle-to-vehicle conflicts
- 8 vehicle-to-pedestrian conflicts

"Results of this study indicate that converting conventional intersections from stop sign or traffic signal control can produce substantial reductions in motor vehicle crashes."

March 2000 Study by the Insurance Institute for Highway Safety

Safe Routes training

PED SAFE


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:
U.S. Department of Transportation
Federal Highway Administration
site map
This site is best viewed in Mozilla 1.4+, Netscape 7.0+, or Internet Explorer 6.0+ browsers.

Summary

1. Focus first on easy-to-implement and low-cost solutions

2. Also identify and program longer-term improvement needs (e.g. sidewalks)

3. Match the treatment to the type of problem

Summary

4. Provide and maintain facilities along the school route:

   - Sidewalks
   - On-street bicycle facilities
   - Paths
   - Connections
   - Pedestrian and bicycle bridges

Summary

5. Provide safe street crossings:
    - Keep it simple
    - Shorten crossing distances
    - Carefully select crossing locations and marked crosswalks
    - Create visible crossings
6. Slow down traffic speeds

Safe Routes: F.A.Q.

How do I deal with more rural or suburban schools?

- Wide shoulders or separate walking paths
- Manage parking/traffic flow
- Neighborhood access/multiple access points
- Enforcement