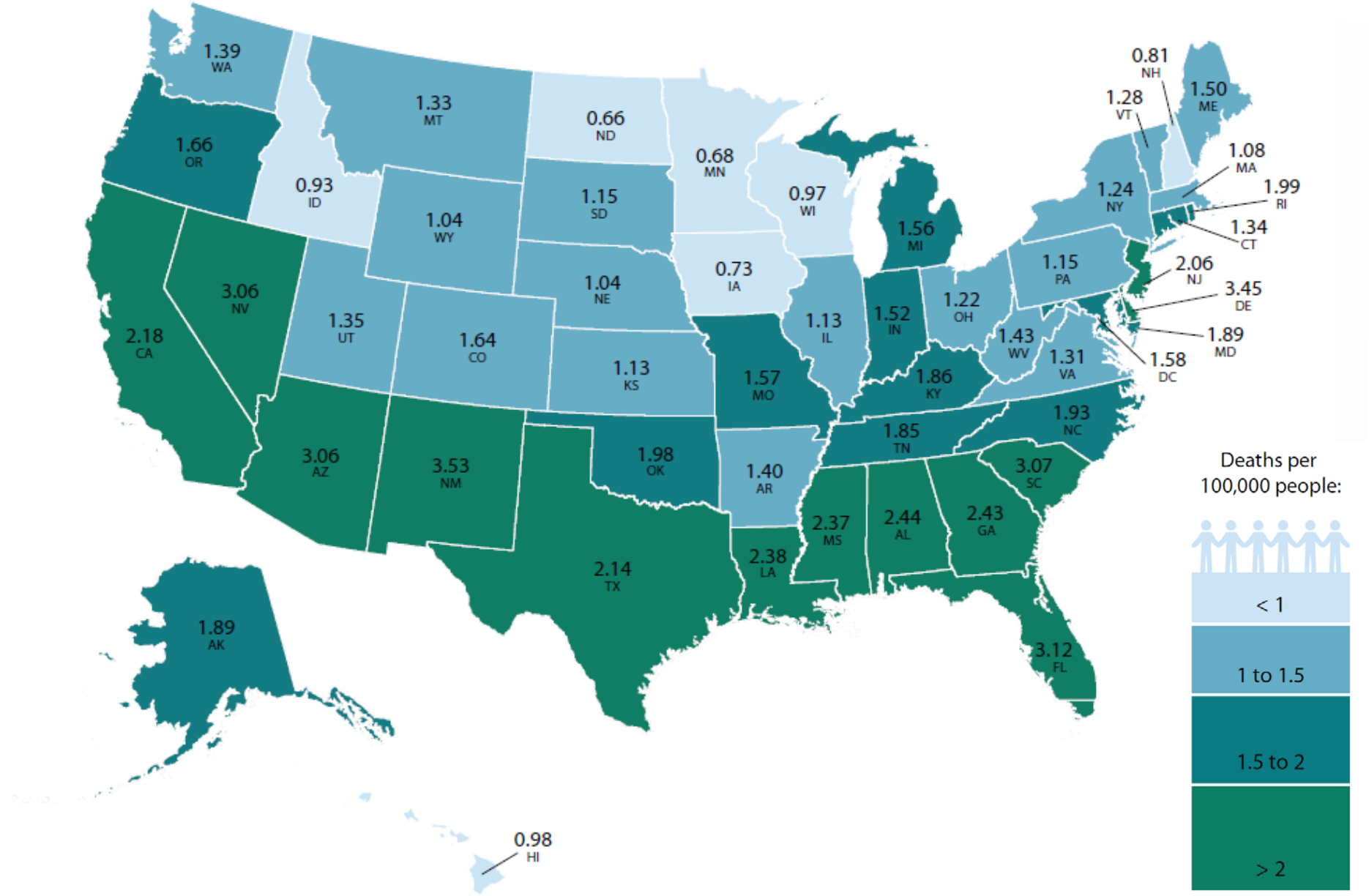
Complete Crossings

Proven Strategies for Improving Pedestrian Safety through Complete Streets

Lauren Blackburn, VHB

2017 Pedestrian Fatalities by State



U.S. Department of Transportation
Federal Highway Administration

EDC

STEP

Safe Transportation for Every Pedestrian

https://safety.fhwa.dot.gov/ped_bike/step/resources/

Where would you cross?

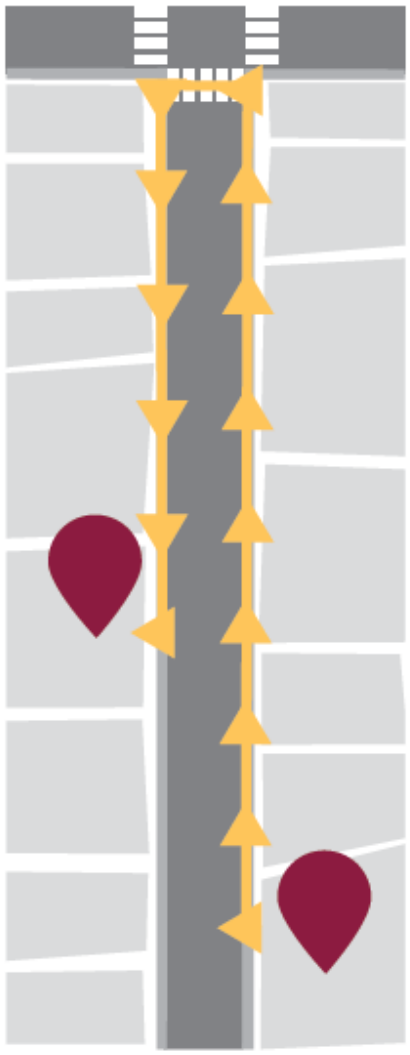
1000 ft +

2000 ft +

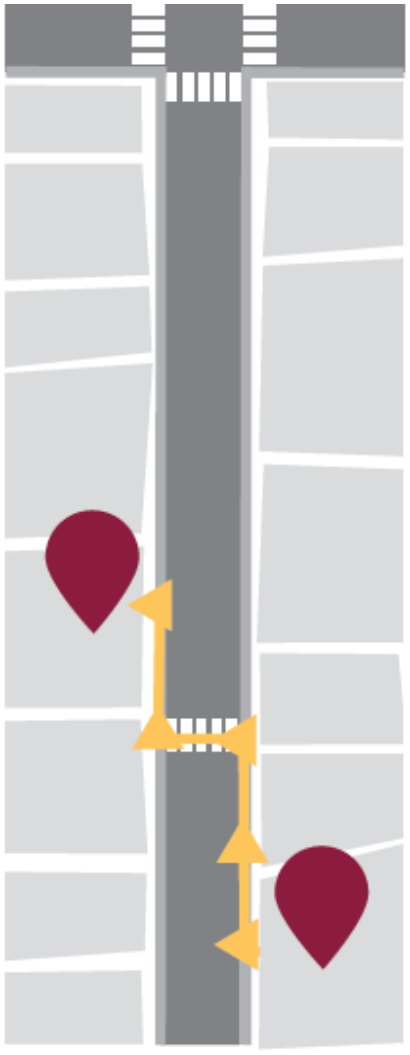
72% of pedestrian fatalities occur at non-intersection locations

Midblock Crosswalks

- Shorten travel distance
- Follow travel routes
- Connect destinations
- Highlight low-risk crossing locations
- Avoid busy intersections



Total Distance:
850 feet



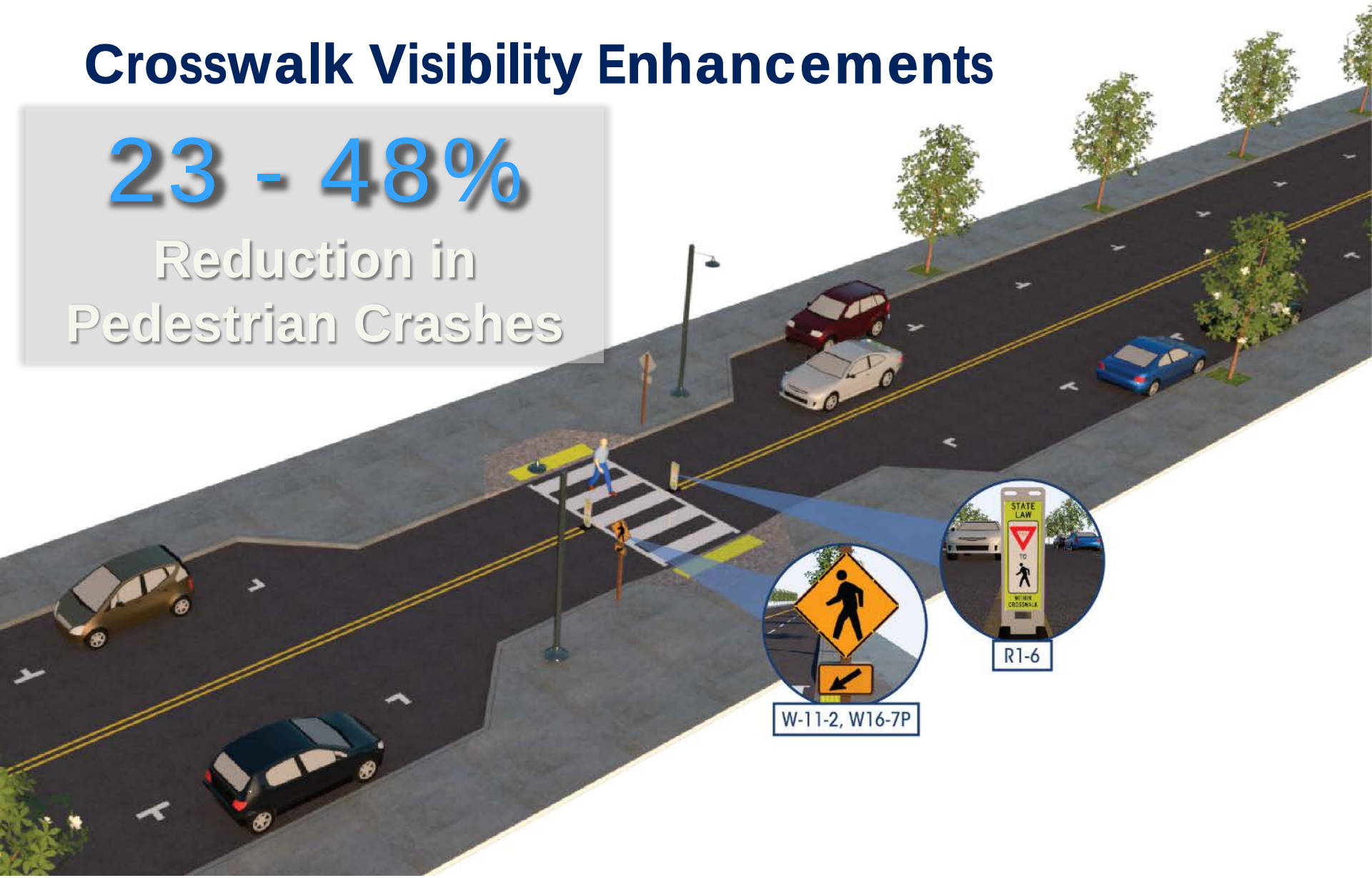
Total Distance:
250 feet

The Spectacular Seven

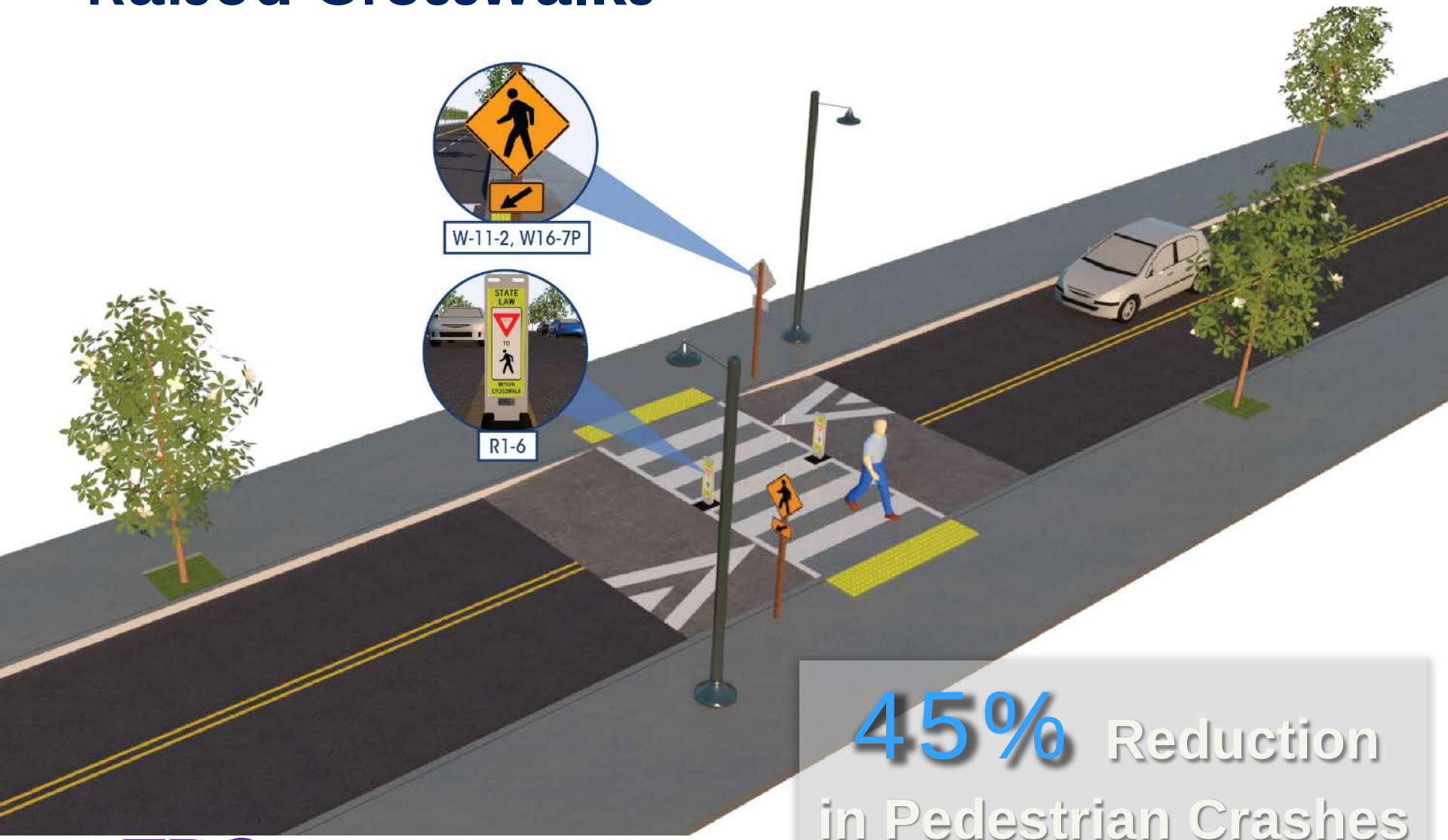
Crosswalk Visibility Enhancements

23 - 48%

Reduction in Pedestrian Crashes

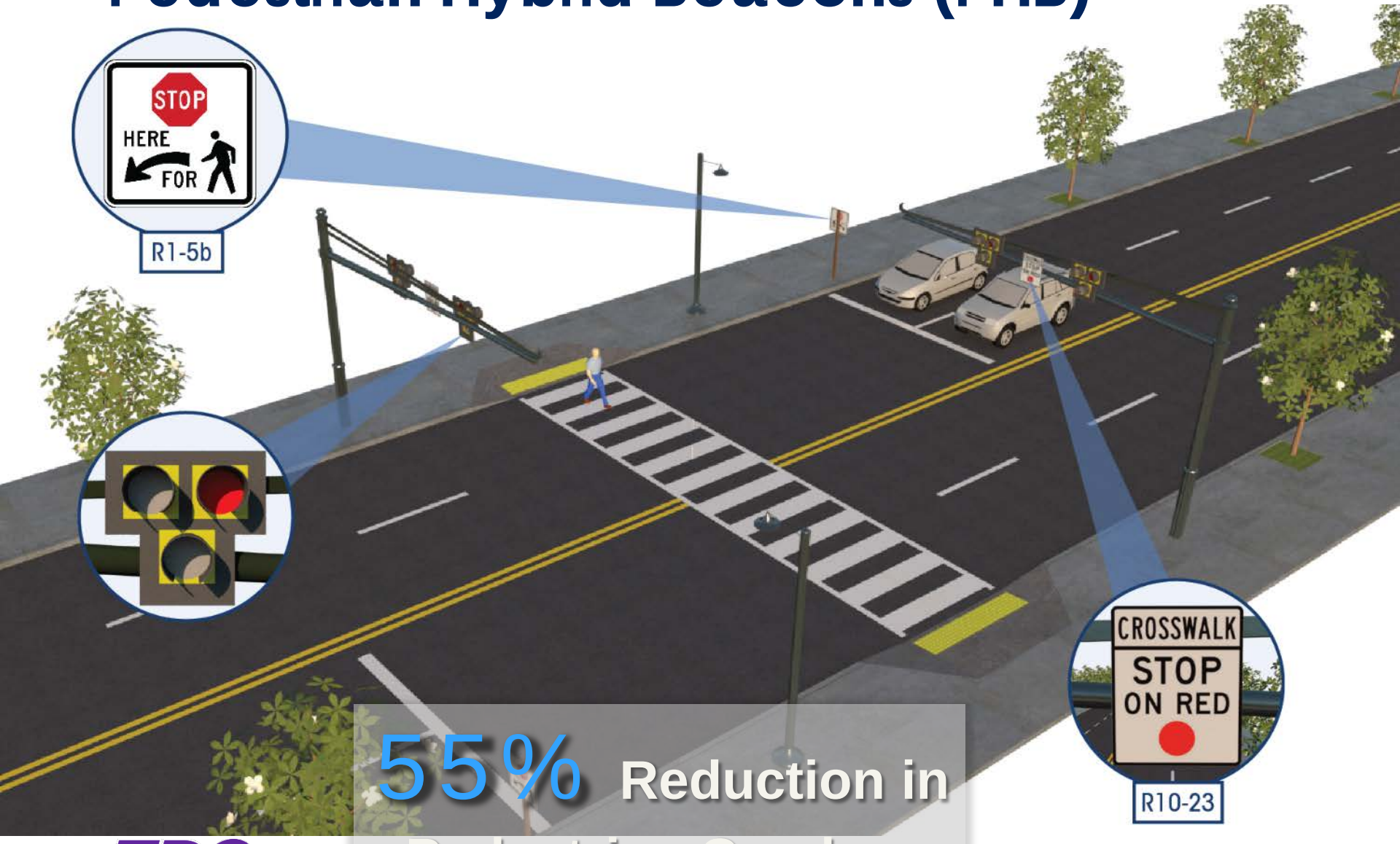


Raised Crosswalks



Pedestrian Refuge Islands

Pedestrian Hybrid Beacons (PHB)



55% Reduction in Pedestrian Crashes

EDC

Pedestrian Hybrid Beacons (PHB)

1

Blank for drivers

2

Flashing yellow

3

Steady yellow

4

Steady red

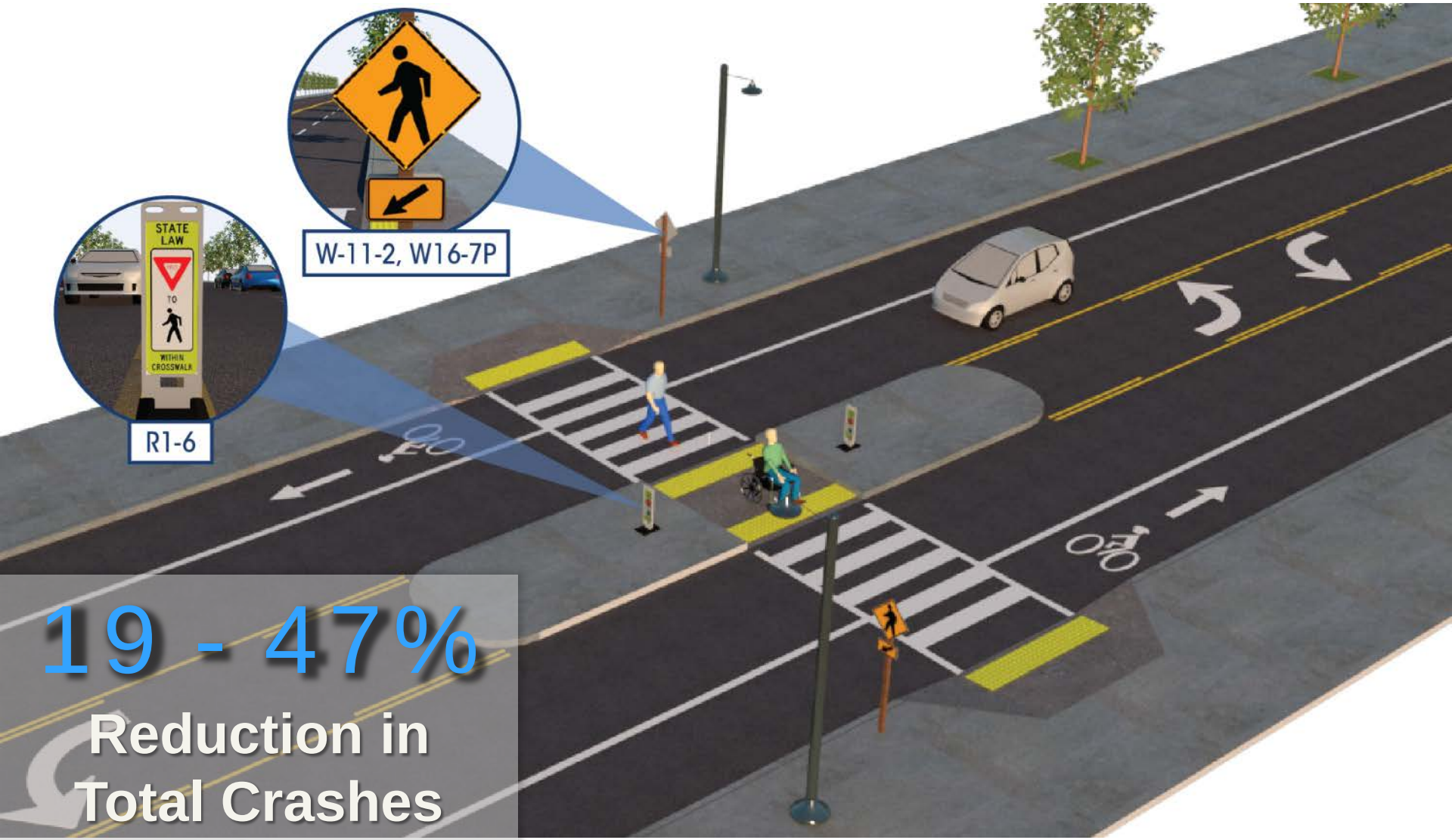
5

Wig-Wag

Return to 1

Road Diet: Before

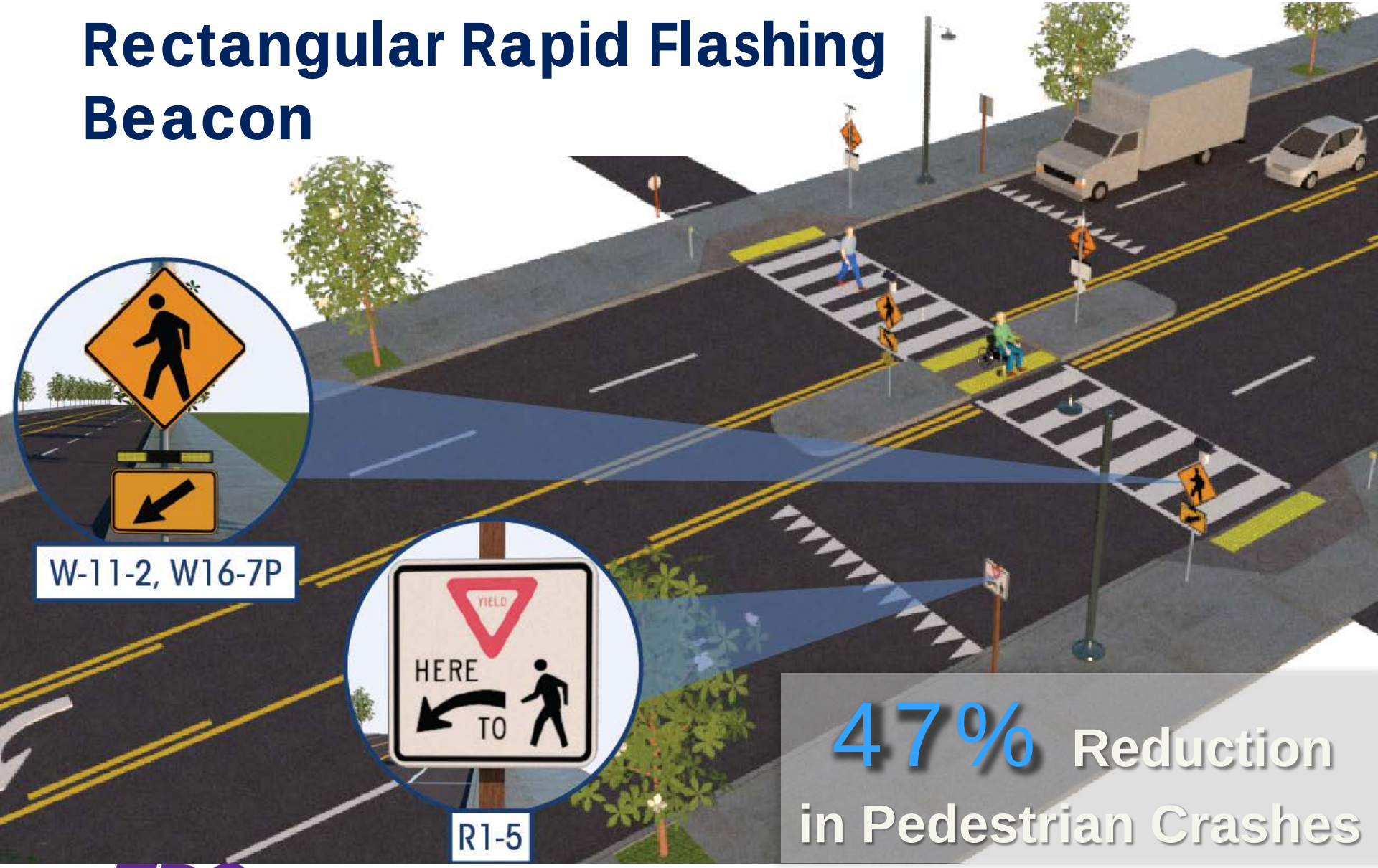
Road Diet: After



19 - 47%

Reduction in Total Crashes

Rectangular Rapid Flashing Beacon



Leading Pedestrian Interval

Countermeasure Selection Process

Following the process suggested in the guide offers countermeasure options based on road conditions, crash causes, and pedestrian safety issues.

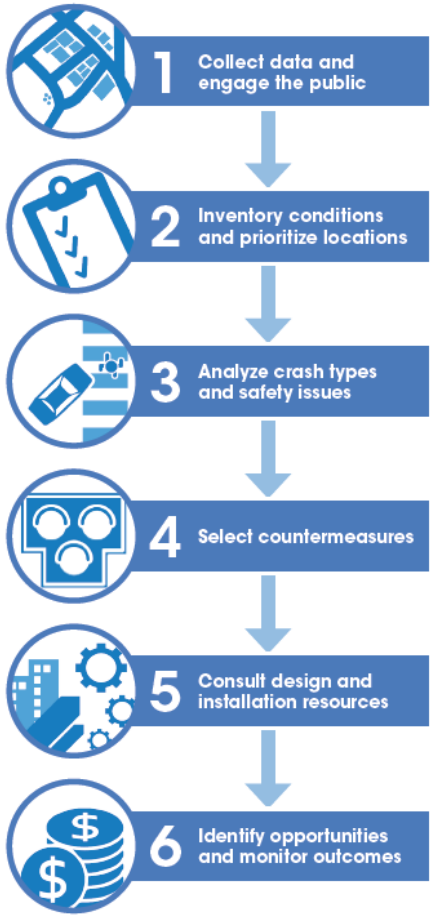


Figure 1. Process diagram for selecting countermeasures at uncontrolled pedestrian crossing locations.

1 Collect data and engage the public

Collect pedestrian crash and safety data
- Location and conditions
- Crash maps
- Crash reports

Review existing traffic safety plans
- SHSP
- HSIP
- HSP

Evaluate pedestrian accommodation and traffic safety policies
- Complete Streets
- Vision Zero

Initiate a PSAP

Review pedestrian master plans for proposed projects

Document informal public comments

Conduct a walkability audit

2 Inventory conditions and prioritize locations

- Inventory pedestrian crossings and observed traffic behavior
- Classify pedestrian crossings
  - Controlled
  - Uncontrolled
- Inventory roadway characteristics
- Screen the network for high-crash or high-risk locations
  - Analyze "hot spots" or crash cluster locations
  - Develop a systemic analysis approach

3 Analyze crash types and safety issues

- Diagram crash reports
- Identify crash factors
- Conduct an RSA
- Lead an informal site visit

Summarize pedestrian crash types and observed traffic safety issues

4 Select countermeasures

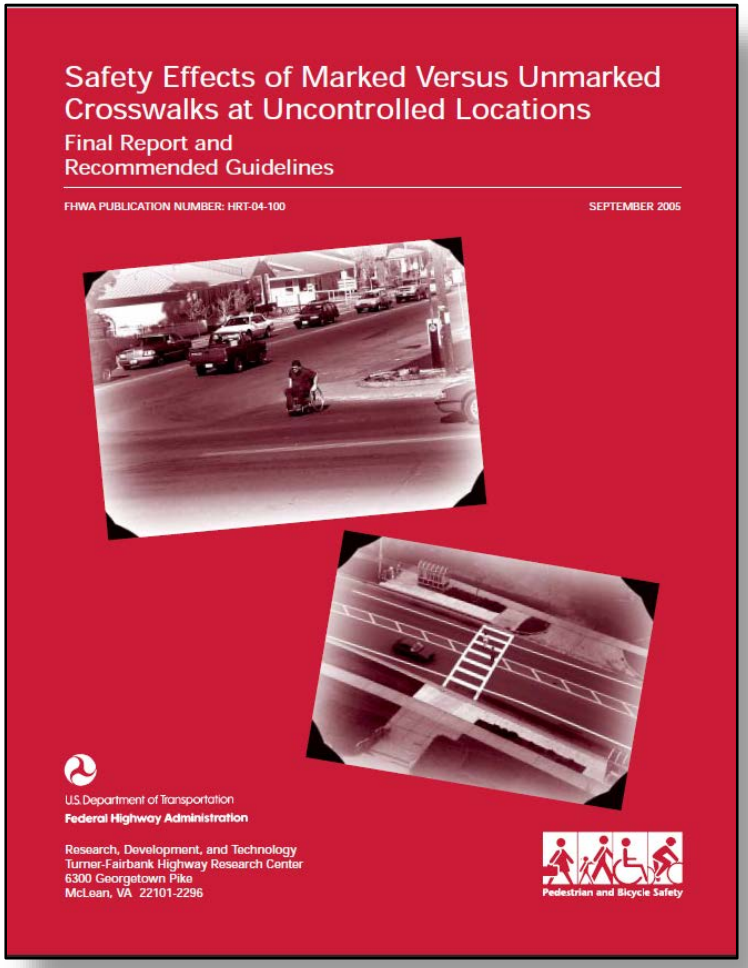
Review Table 1 (roadway features)

- AADT
- Number of lanes
- Median presence
- Speed limit

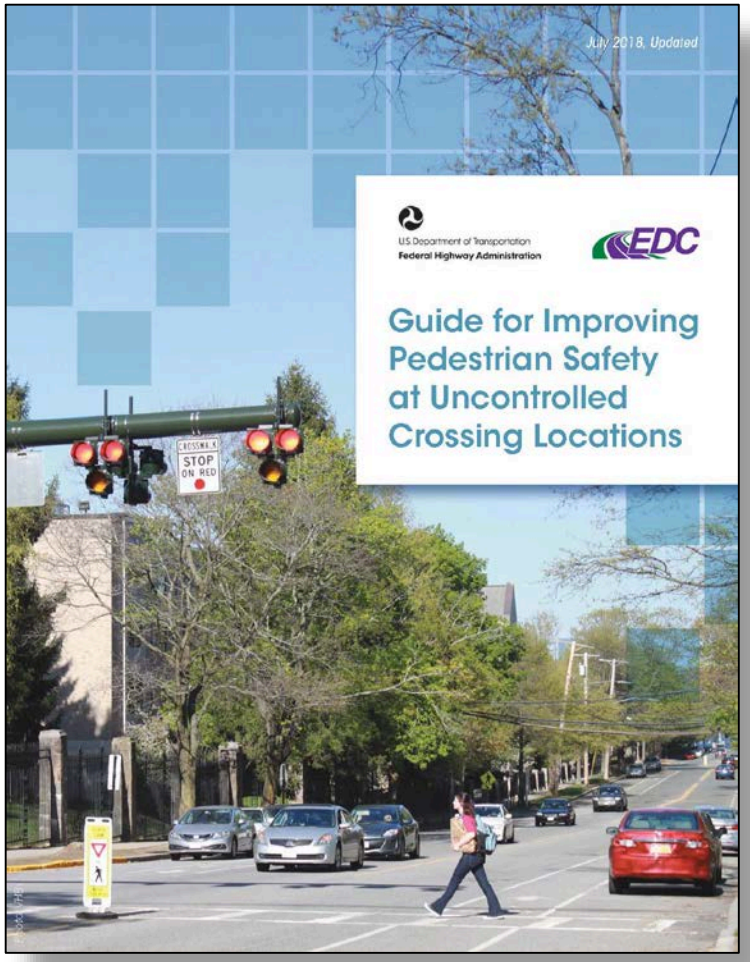
Review Table 2 (safety issues)

- Conflicts at crossings
- Excessive speed
- Visibility issues
- Other

Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations



2005



2018

https://safety.fhwa.dot.gov/ped_bike/step/resources/

Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5	① ❸ 5 7 ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8	① ❸ 5
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① 5 ❻ 8	

Given the set of conditions in a cell,

\# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking r… crosswalk approach, adequate nighttime lig… and crossing warning sign
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

① ❸ 5 ❻ 8 ❾

*Refer to Chapter 4, "Using Table 1 and Table 2 to Select Countermeasures," for more information about using multiple countermeasures.

Table 2. Safety issues addressed per countermeasure.

Pedestrian Crash Countermeasure for Uncontrolled Crossings	Safety Issue Addressed				
	Conflicts at crossing locations	Excessive vehicle speed	Inadequate conspicuity/ visibility	Drivers not yielding to pedestrians in crosswalks	Insufficient separation from traffic
Crosswalk visibility enhancement	✓	✓	✓	✓	✓
High-visibility crosswalk markings*	✓		✓	✓	
Parking restriction on crosswalk approach*	✓		✓	✓	
Improved nighttime lighting*	✓		✓		
Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line*	✓		✓	✓	✓
In-Street Pedestrian Crossing sign*	✓	✓	✓	✓	
Curb extension*	✓	✓	✓		✓
Raised crosswalk	✓	✓	✓	✓	
Pedestrian refuge island	✓	✓	✓		✓
Pedestrian Hybrid Beacon	✓	✓	✓	✓	
Road Diet	✓	✓	✓		✓
Rectangular Rapid-Flashing Beacon	✓		✓	✓	✓

5 Consult design and installation resources

MUTCD

- Part 2: Signs
- Part 3: Markings
- Part 4: Highway Traffic Signals

AASHTO Guide for the Design of Pedestrian Facilities

Local design guidance and selection criteria

- PEDSAFE
- Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

6 Identify opportunities and monitor outcomes

Identify implementation opportunities

- Routine maintenance activities
- STIP

Consider funding options

- HSIP
- Other (TAP, CMAQ, STBG)

Construct improvements

- Review design considerations
- Conduct public outreach

Monitor results of implementation

- Track performance measures
- Obtain public feedback
- Analyze crash data

STEP in North Carolina

Wilson (May 7)

Marion (May 15)

Southport (May 20)

Sylva (May 31)

Edenton (June 11)

Albemarle (June 17)

https://www.completestreetsnc.org/training/

Thanks!

Lauren Blackburn

VHB, Raleigh

lblackburn@vhb.com

Becky Crowe

FHWA Office of Safety

Rebecca.Crowe@dot.gov