

STEP

Safe Transportation for Every Pedestrian



Speaker

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every day counts 



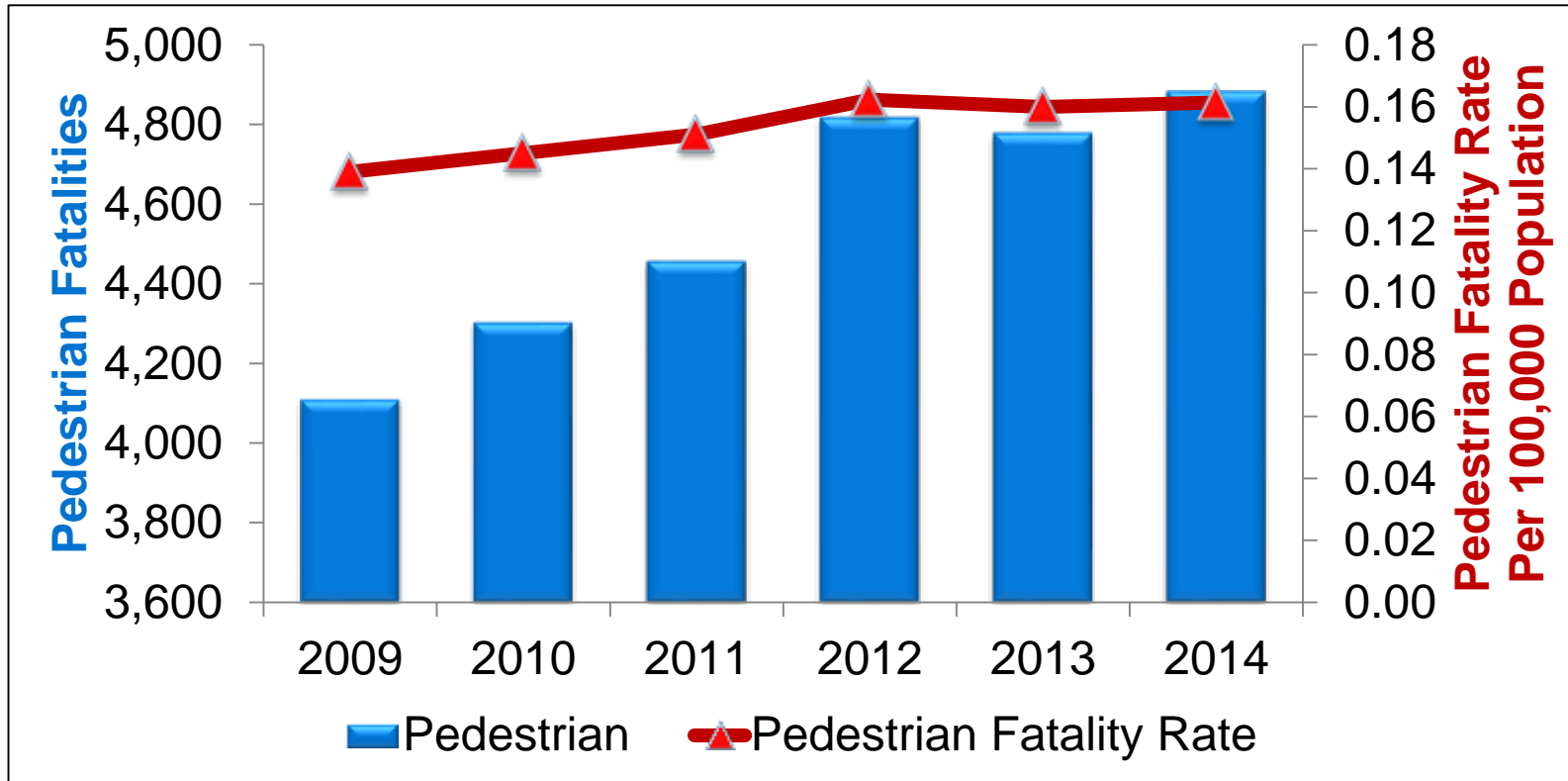
FHWA EVERY DAY COUNTS 4 / STEP

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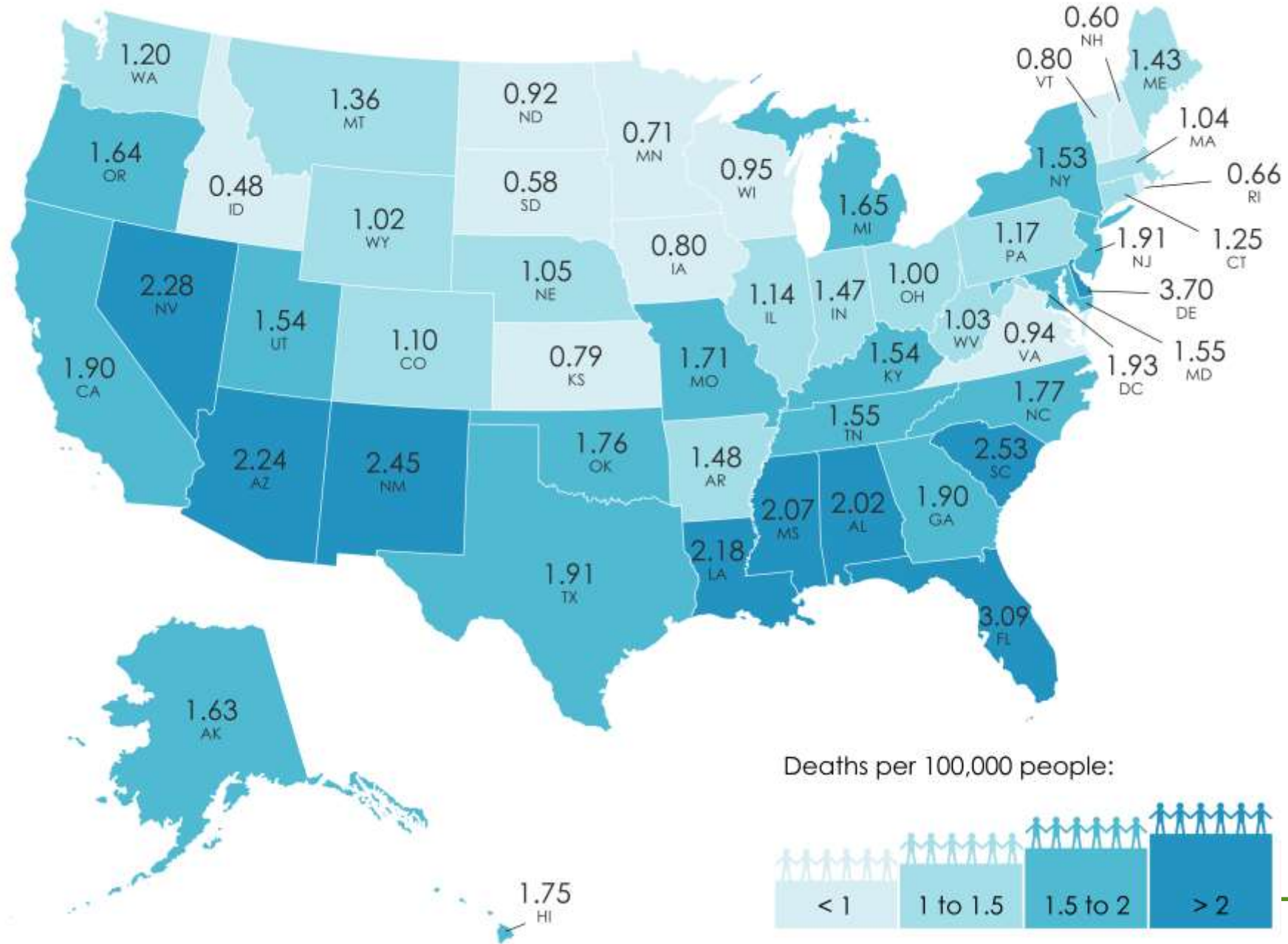
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Pedestrian Safety Trends



Data Source: FARS

2015 Pedestrian Fatalities by State





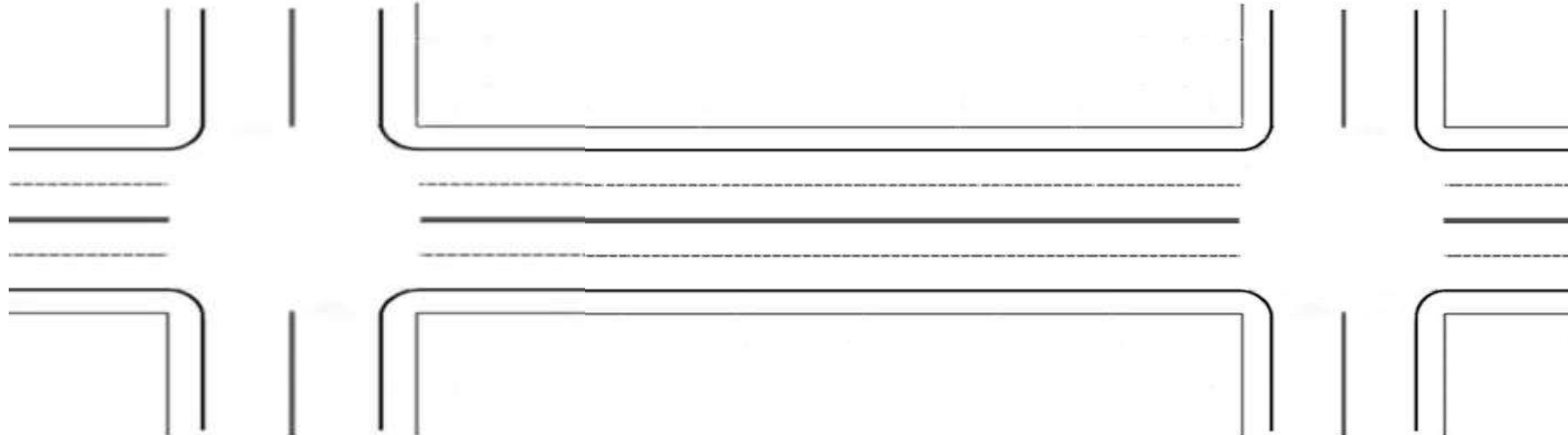
Nationally Why STEP?

- Over 66% of pedestrian fatalities occur at non-intersection locations
- Roughly 16% of pedestrian fatalities occur at uncontrolled intersections

every day counts 



What is the **STEP** innovation?
Enhanced Crossings @ Uncontrolled Locations



STEP Vision

Vision: Help agencies provide the safest possible pedestrian crossings to reduce fatalities and connect their communities.

Mission: Encourage and assist practitioners in providing safer crossings for all pedestrians through the implementation of appropriate safety treatments at uncontrolled crossing locations.



STEP UP

Goal: Empowering
People to Improve Their
Lives

STEP 3: Which countermeasure(s)
should be selected?

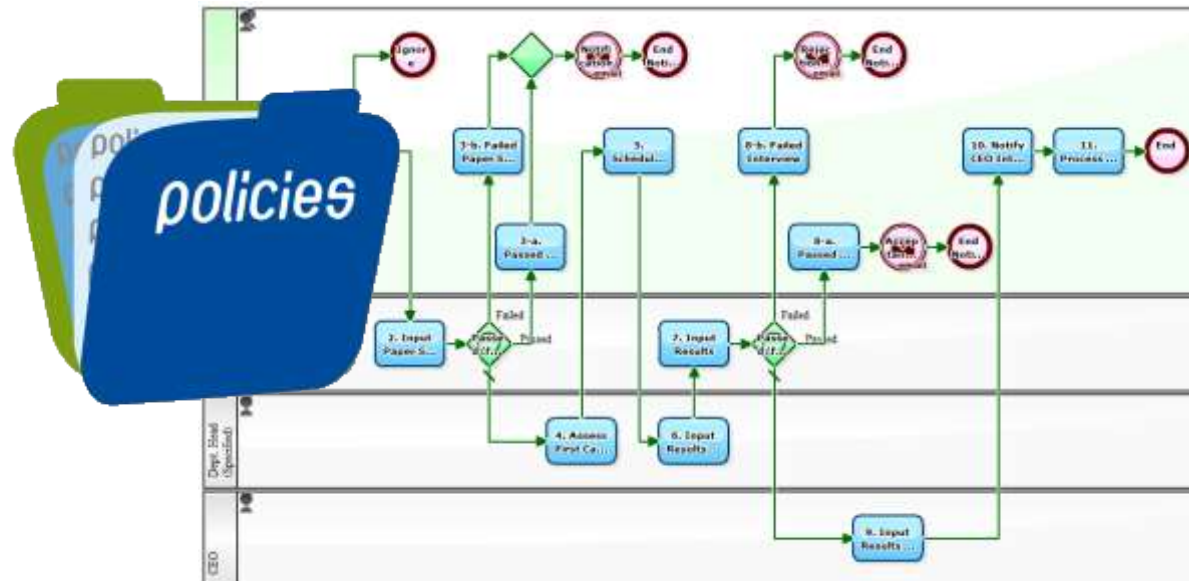
STEP 2: What type of roadways are
people trying to cross?

STEP 1: Does our agency want to get pedestrians
safely across the road?

STEP 1: Primary Question

Does your agency want to get pedestrians safely across the road?

- Does your agency have a policy?
- Does your agency have a process?



How to determine where to mark a crosswalk?

Consider origins and destinations



In this case, apartments across from bus stop & stores

STEP 2: What Type of Roadways are People trying to Cross?

- Number lanes
- Average Daily Traffic
- Speed limits/Actual speeds
- Median or Pedestrian Refuge Island in place

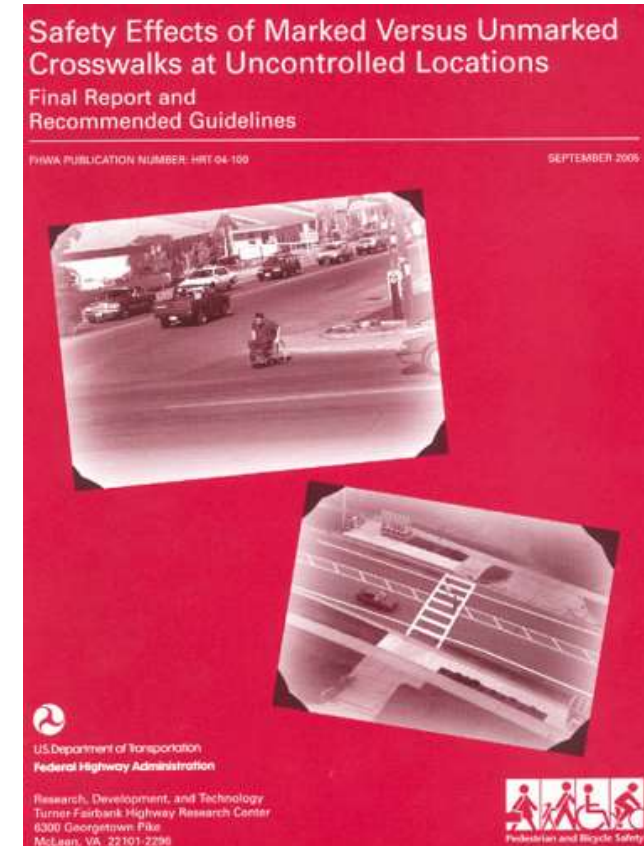


Marked vs. Unmarked Crosswalks at Uncontrolled Locations

Marked vs. Unmarked Analysis

Speeds $<$ or $=$ to 40 mph

- Two-lane roads: No significant difference in crash rate
- Multilane roads (3 or more lanes)
 - Under 12,000 ADT: no significant difference in crash rate
 - Over 12,000 ADT w/ no median: crashes marked $>$ crashes unmarked
 - Over 15,000 ADT & w/ median: crashes marked $>$ crashes unmarked

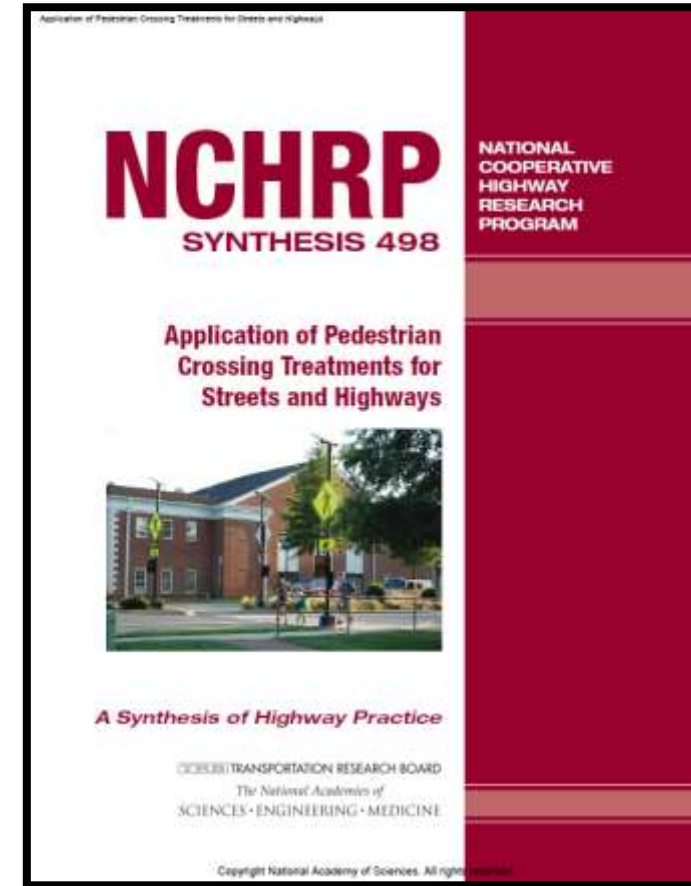


<https://www.fhwa.dot.gov/publications/research/safety/04100/>

STEP 3: What Countermeasures Should be Selected?

Developed by

1. Surveying State DOT's, Local Transportation Agencies
2. Identifying & synthesizing effective practices and policies
3. Comprehensive literature review of safety evidence for more than 25 pedestrian crossing treatments



<http://www.trb.org/Publications/Blurbs/175419.aspx>

The Fabulous Five



Crosswalk Visibility Enhancements



Pedestrian Refuge Islands



Raised Crosswalks



Pedestrian Hybrid Beacon (PHB)



Road Diets

Crosswalk Visibility Enhancements

High Visibility Crosswalk

What Pedestrians See



Photo Source all 4: Michael Ronkin

What Drivers See



- Advance yield line (shark's teeth) & sign
- Consider double white lines for no passing

Crosswalk Visibility Study

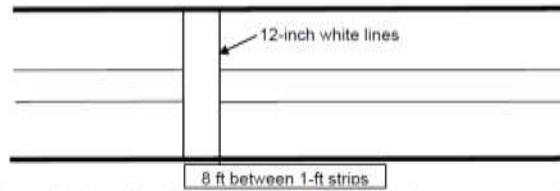


Figure 21. Graphic. Dimensions used for installed transverse markings.

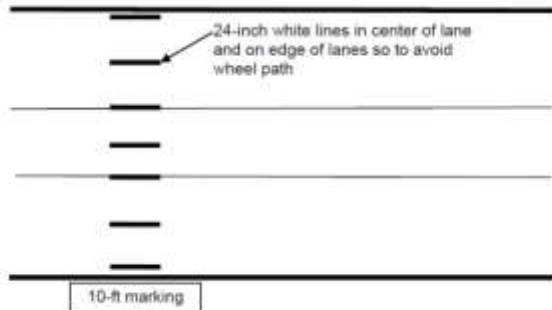


Figure 20. Graphic. Dimensions used for installed continental markings.

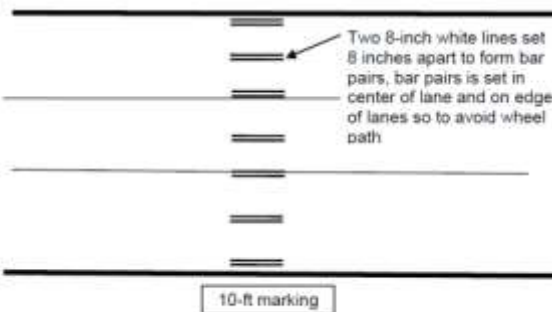
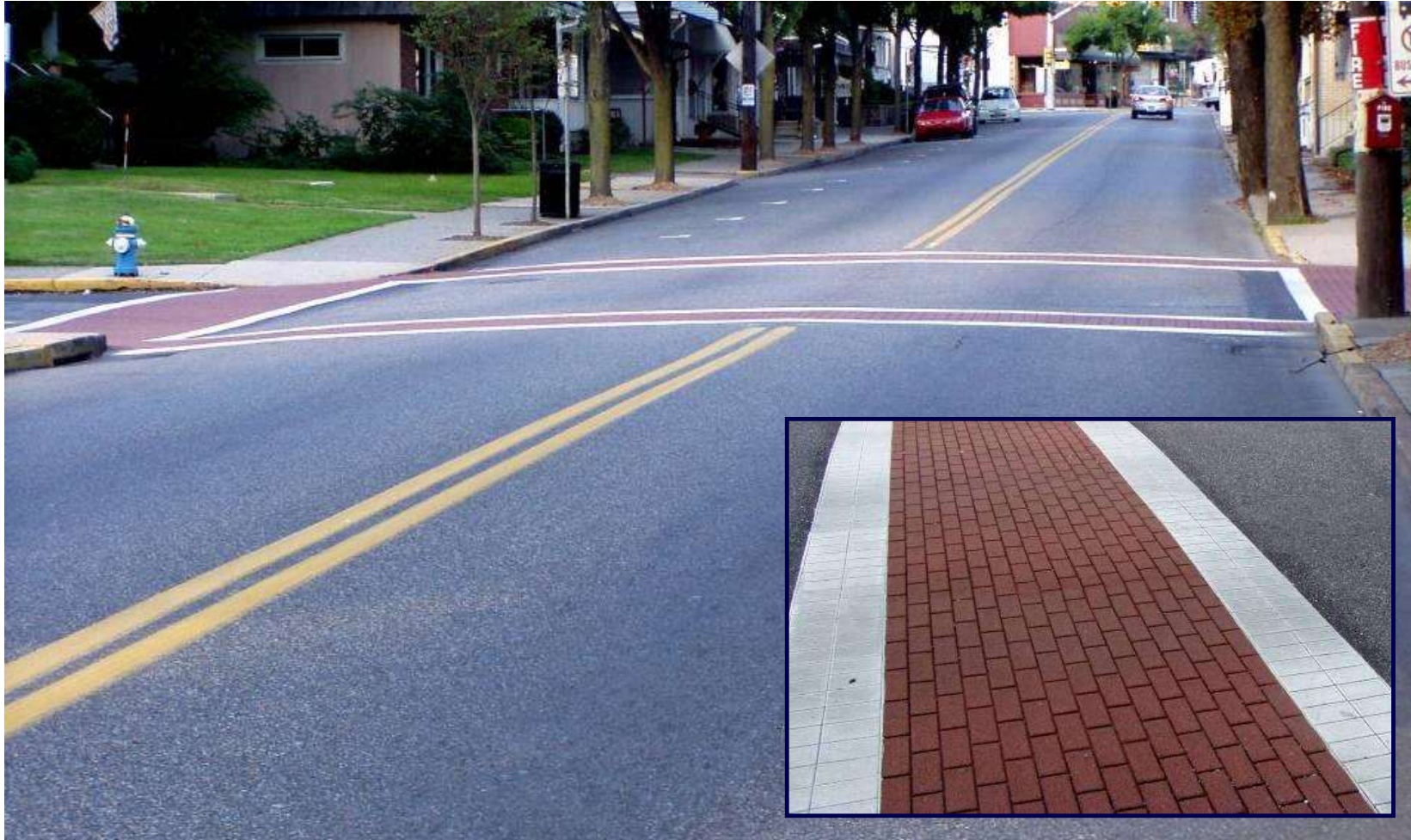


Figure 19. Graphic. Dimensions used for installed bar pair markings.



Photo and images from Crosswalk Visibility Study

Supplement textured crosswalks with white lines to increase visibility



In-street pedestrian crossing signs

Tampa FL



R1-6



R1-6a

MUTCD signs

Yield or Stop depends
on state law

Crosswalk Visibility Enhancements

Pedestrian Crossing signs



Crosswalk Visibility Enhancements

Crosswalk Lighting



Photo source: Youtube screen capture SWARCO

- CRF 42% to 59%
- Lighting at intersections
- 4 star rating
- Vehicle/ped crashes

Lighting Over Crosswalks

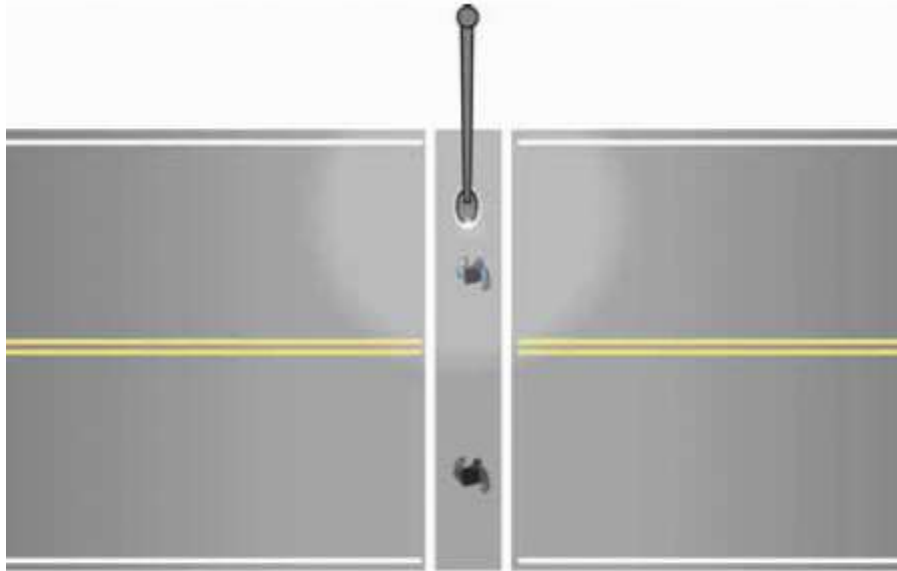


Fig 11. Traditional midblock crosswalk lighting layout

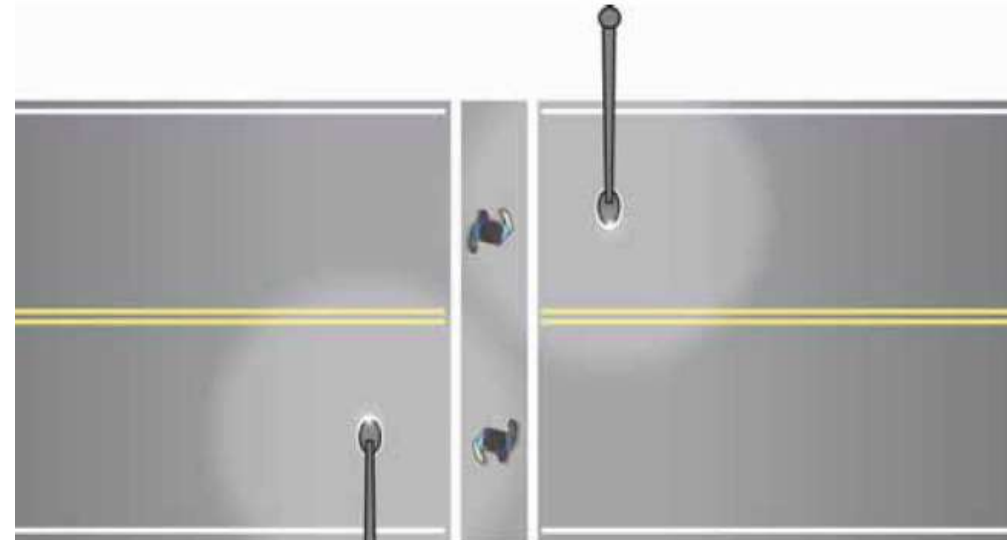


Fig 12. New design for midblock crosswalk lighting layout



Recommended lighting level: 20 lux at 5' above pavement

Raised Crosswalks



Photo Source: SRTS Guide



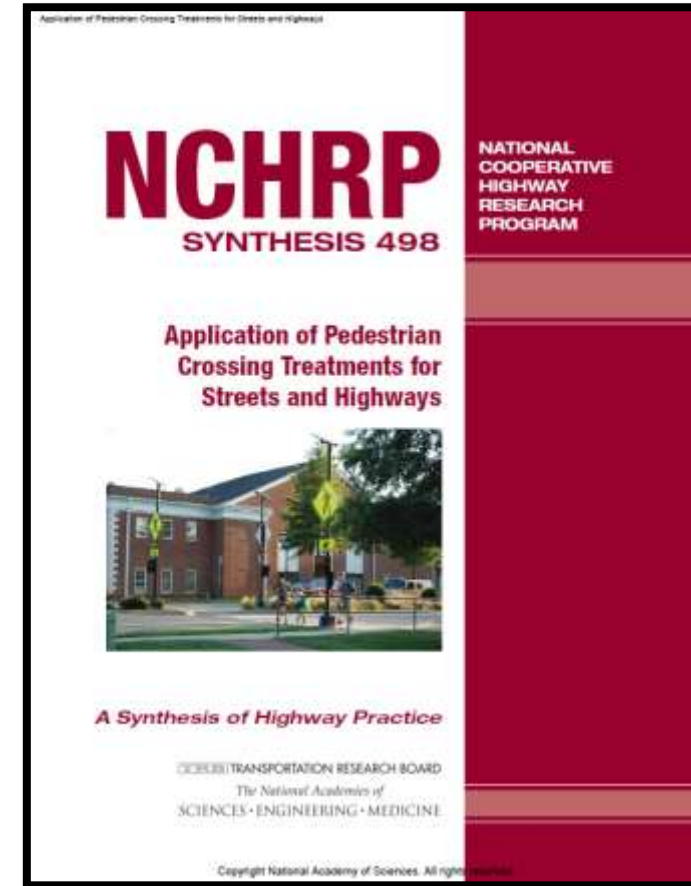
Photo Source: Seattle.gov Crosswalks

Raised Crosswalks

NCHRP Synthesis 498 (December 2016)

Key Measured Effects

- Lower speeds
- Improved motorist yielding at some locations
- 30% CRF for all crashes
- 36% CRF for all fatal injury crashes



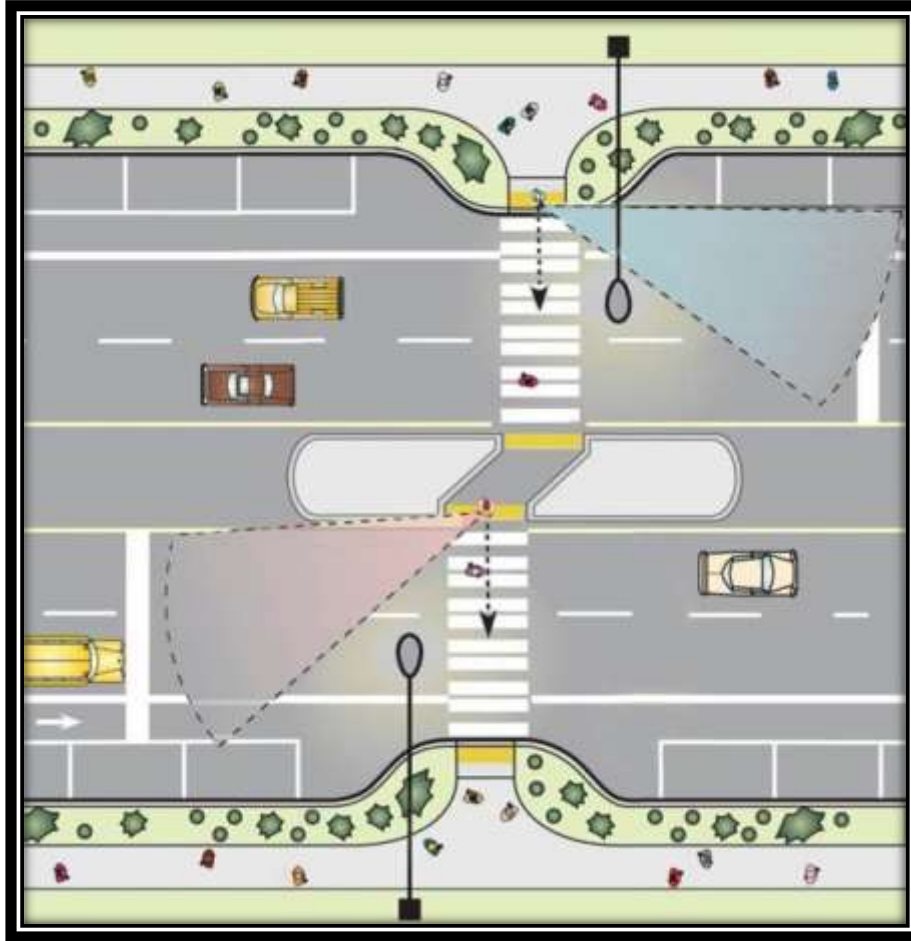
Considerations

- May not be appropriate if street is a bus route or emergency route
 - Emergency services consulted
 - Snow Plowing public works consulted
- 1 may be necessary & serve primary need Several may be disruptive, so other measures should be considered
- Visually impaired pedestrians need truncated domes
- Drainage
- May be inappropriate for crossings on curves or steep roadway grades

Pedestrian Refuge Islands



Raised median- Breaks complex crossing into two simpler crossings



CRF: V/P 39%
unmarked
crosswalks
(uncontrolled)

CRF: V/P 46%
marked
crosswalks
(uncontrolled)

Pedestrian Hybrid Beacons (PHB)



CRF: Vehicle/Pedestrian 69%



1
Blank for
drivers



2
Flashing
yellow



3
Steady yellow



4
Steady red



5
Wig-Wag



Return
to 1

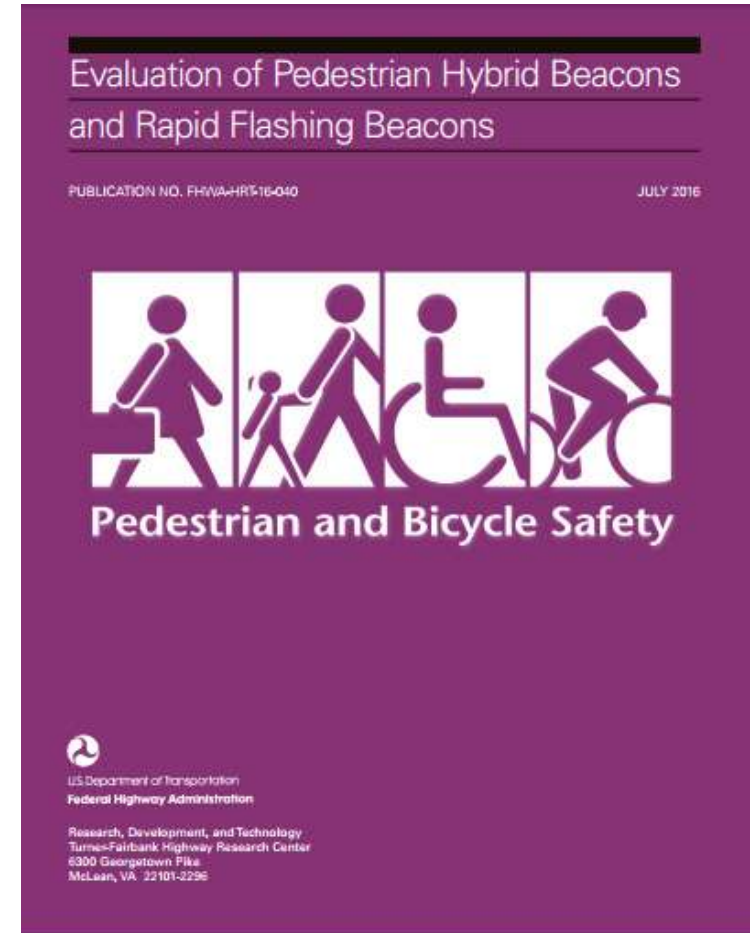


Early PHB Research

- 102 control sites / 21 PHB sites (~3 yrs before/after)
- 69% CRF involving pedestrians
 - Statistically significant at a 95% confidence level
- 15% reduction in severe crashes that result in injury
 - This was not statistically significant at a 95 % confidence level, probably because of the low number of these types of crashes
- A 29% reduction in total crashes
 - Statistically significant at a 95% confidence level

Research of PHB

- 20 PHB sites open-road study
- Driver yielding to pedestrians avg 96%
- Overall, 91% pedestrians pushed pushbutton to activate the PHB in the crosswalk
- A greater percentage number of pedestrians activated the device when on 45 mph posted speed limit roads as compared to roads with posted speed limits of 40 mph or less

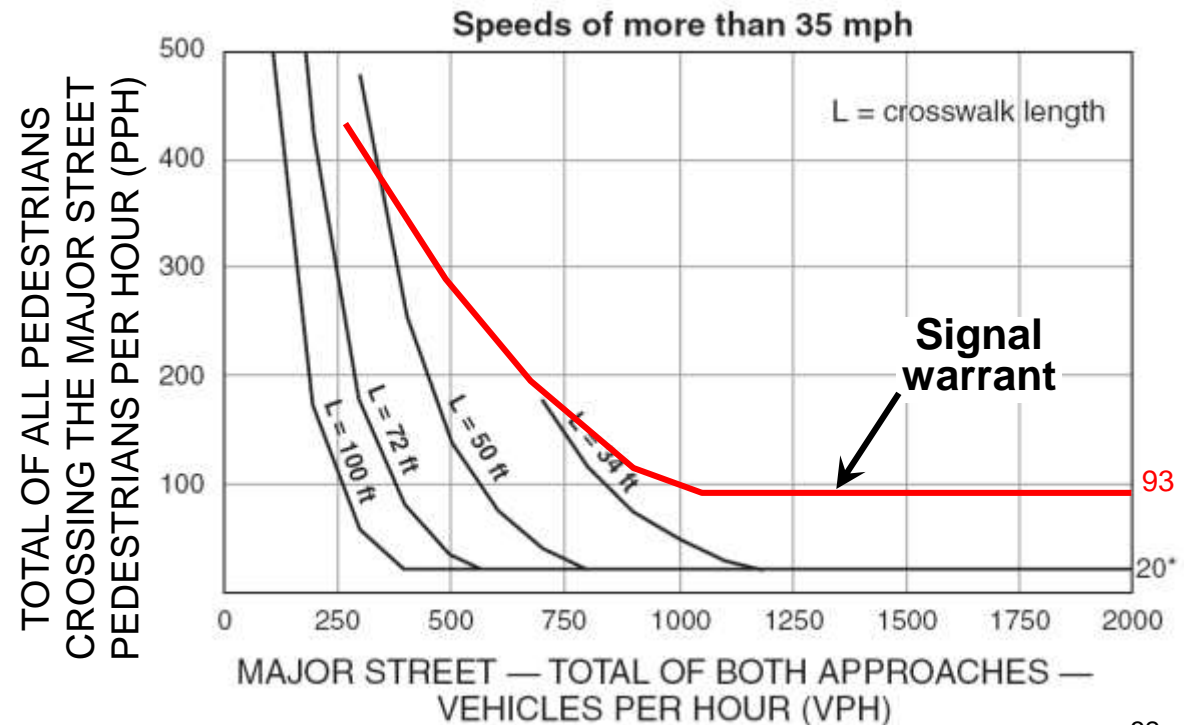


<https://www.fhwa.dot.gov/publications/research/safety/16040/16040.pdf>

Excerpts from 2009 MUTCD Chapter 4F For Pedestrian Hybrid Beacons

The CROSSWALK STOP ON RED sign shall be used
There are Guidelines (similar to signal warrants) for Pedestrian Hybrid Beacons – variables include:

- Pedestrian volume
- Traffic speeds
- Traffic volumes
- Crosswalk length



Road Diet / Roadway Reconfiguration



Photo Source: Complete Streets

- Reduce crossing distance
- Eliminate /reduce “multiple threat” crash types
- Install crossing island to cross in 2 simple steps

Road Diet / Roadway Reconfiguration



- Reduce top end travel speeds
- Buffer sidewalk from travel lanes (parking or bike lane)
- Reclaim street space for “higher and better use” than moving peak hour traffic

Road Diets



Figure 12. Road Diet Implementation Maximum Volume Thresholds by Agency

Considerations

- Safety
- Operations
 - Peak Hour
- Design
 - Signalized Intersection Adjustments
- Resurfacing
- Context Sensitive Solutions/Complete Streets

Road Diet Evaluation

- ✓ Minimal Impacts on Side Streets
- ✓ Reduce Speeding
- ✓ Increase Bicyclist Volumes
- ✓ Increase Pedestrian Volumes
- ✓ Reduce Crashes
- ✓ Increase On-Street Parking Use Rates
- ✓ Increase Pedestrian Satisfaction
- ✓ Increase Parking Satisfaction

This 5-lane Main Street was converted to...



Name 4 things that changed



Fewer travel lanes; added bike lanes; parallel to back-in diagonal parking on one side; new pavement

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State Policies and Implementation

Oregon

- *All Roads Transportation Safety (ARTS) pedestrian and bicycle funding program (initiated in 2017)*
- *Pedestrian and Bicycle Implementation Plan (February 2014) – emphasis on corridor projects*
- Focus on Raised Median Islands

Oregon

ARTS program:

- based on benefit cost analysis
- uses a risk factor matrix process to identify spot and systemic treatments



Florida

- *Florida DOT Median Handbook*
- *Integration into other guidance*
 - *Florida DOT Plan Preparation Manual*
 - *Florida DOT Design Standards*
- *Focus on raised medians*

Florida

Florida DOT Median Handbook

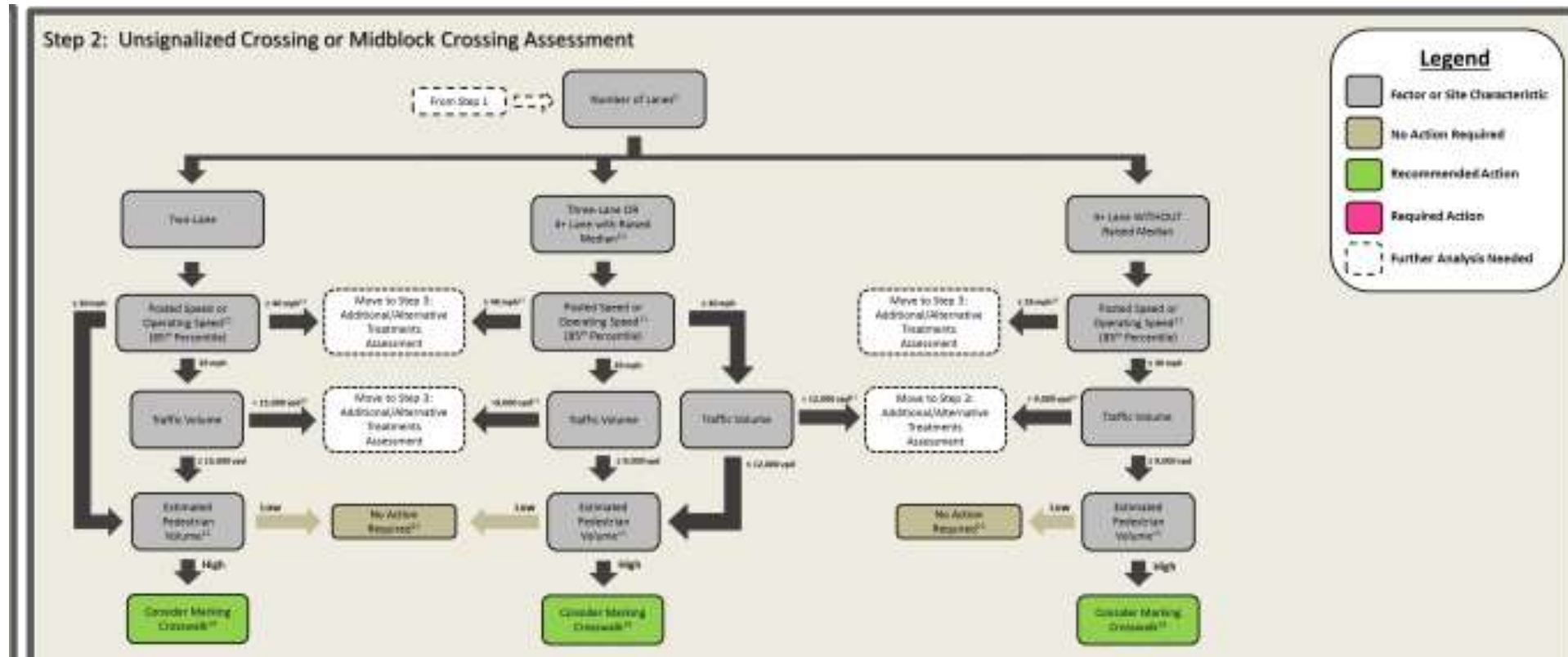
- Evidence-based
- Integrated into other design guidance
- Considers benefits to traffic operations, pedestrian safety, vehicular safety and traffic flow/operations

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North Carolina

Pedestrian Crossing Guidance Decision Support Tool



North Carolina

Focus on mid-block
unsignalized crosswalks

Classroom training and
implementation support



Arizona

- *Pedestrian Hybrid Beacons (PHB/ HAWKS) Installations and Operation*
- Tucson had over 114 PHB's installed as of June 2012.

Arizona

Implementation has been complimented by outreach and promotion

Instructional Video

<https://www.azdot.gov/media/blog/posts/2015/04/23/understanding-the-pedestrian-hybrid-beacon>



Key Elements for Pedestrian Countermeasure Policies

- Evidence/Data Driven
- Documented Procedures
- Outreach and training
- Integration into broader transportation programs and design guidance



Next Steps

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- Develop a “Model Policy” for implementation
- Webinars and Outreach
- Pedestrian Safety Action Plans
- Road Safety Audits
- Marketing Materials
- Track State Implementation
- Additional technical assistance

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Q & A Discussion