PBIC Crash Types Series
Multiple Threat Crash

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Thursday, August 9, 2018

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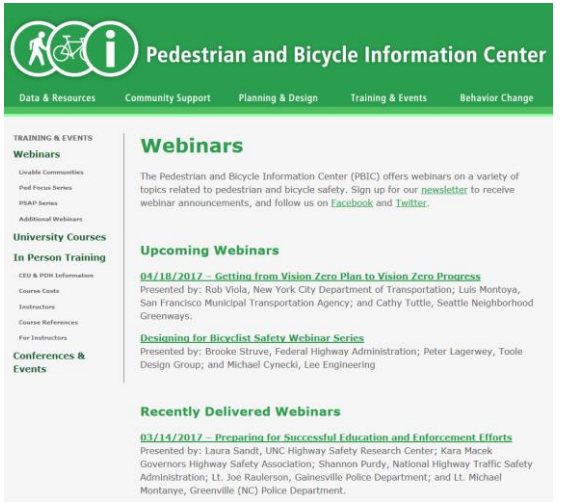

Crash Animations

Developed to portray crash scenarios and support…

- Development of behavioral messages and campaigns
- Changes to roadway design
- Policy changes
- Conversations between community members and stakeholders

- Driver Education Instructors
- Law Enforcement
- General Public
- Advocacy Organizations
- Planners and Engineers
- Health Professionals

…and others

Available at www.pedbikeinfo.org/crashvideos

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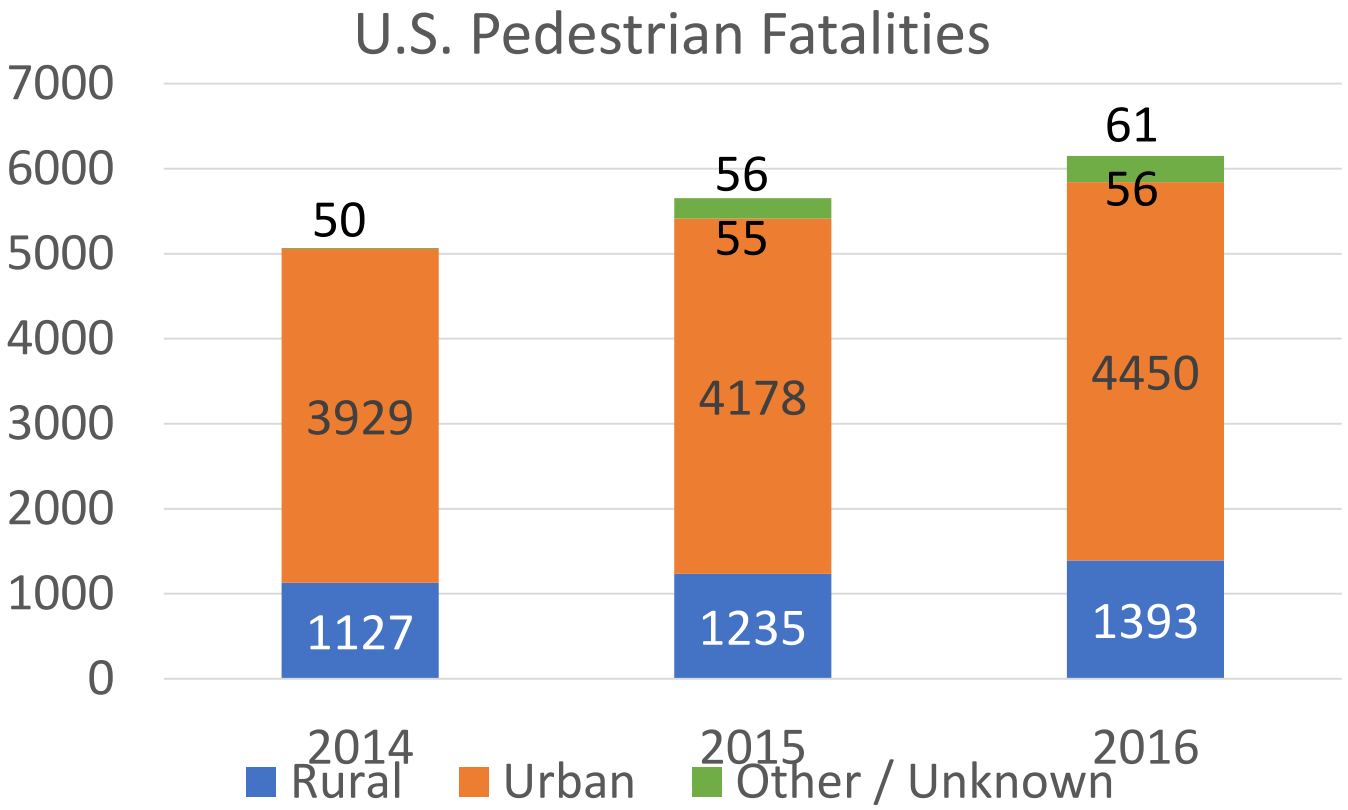
Multiple Threat Crash Type and related Factors

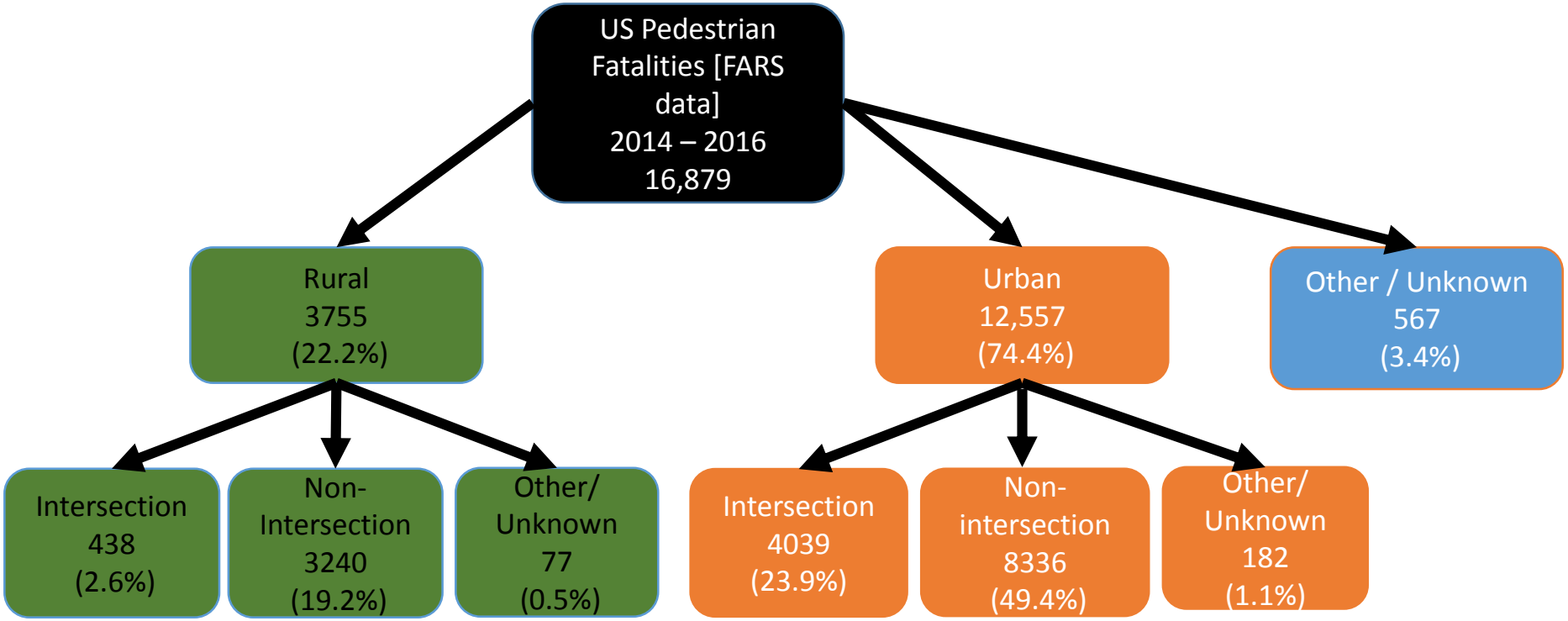
Libby Thomas
University of North Carolina Highway Safety Research Center

August 9, 2018



Data from Fatality Analysis Reporting System (FARS); https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars

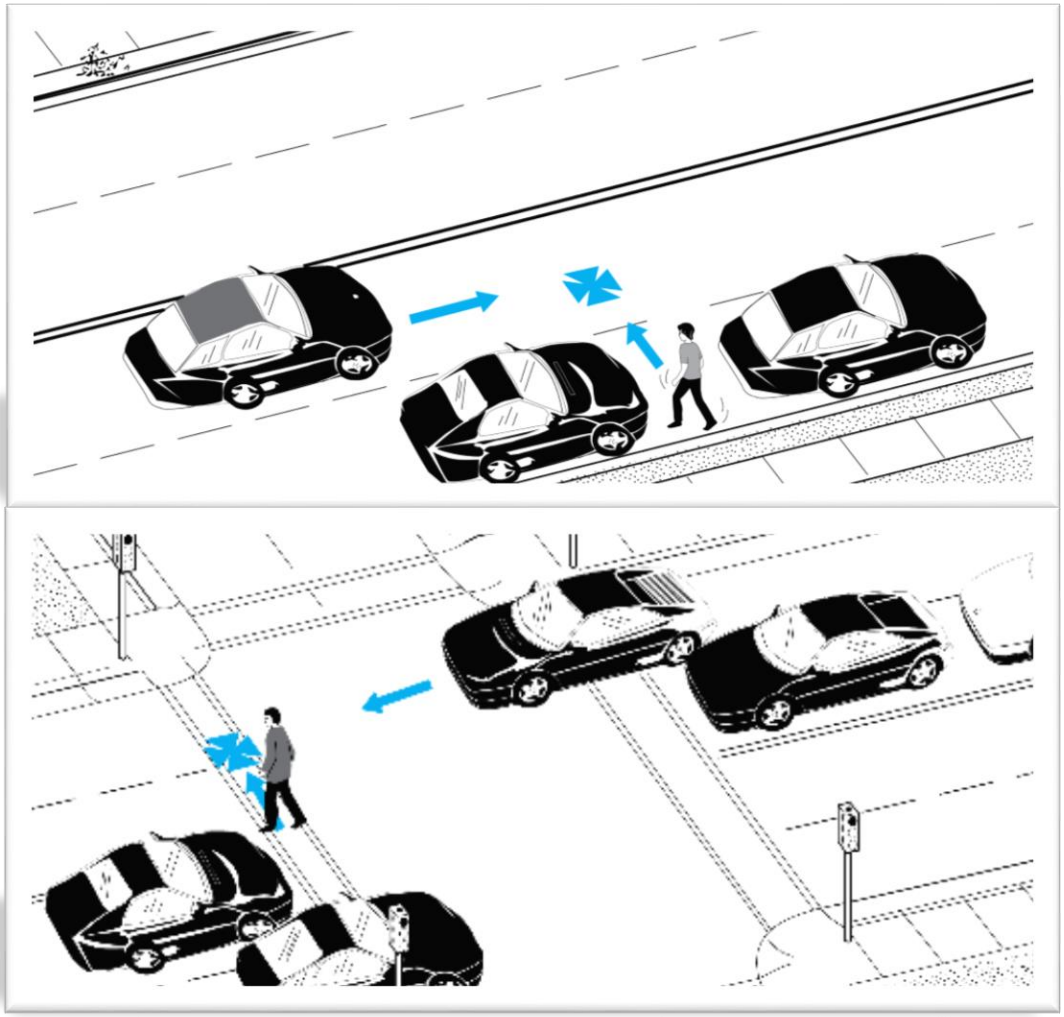
		Injury Severity of Pedestrians and Cyclists IN Fatal Crashes, Source: FARS data							
Crash Year	Person Type	No Apparent (O)	Possible (C)	Suspected Minor (B)	Suspected Serious (A)	Fatal Injury (K)	Injured, Severity Unknown	Unknown	Total
2014	Pedestrian	7	73	130	201	4910	2	2	5325
	Bicyclist	2	2	11	15	723	0	0	753
	Other Cyclist	0	0	0	0	6	0	0	6
	Persons on Personal Conveyances	0	0	5	5	158	0	1	169
	Total	9	75	146	221	5797	2	3	6253
2015	Pedestrian	15	63	132	213	5495	4	4	5926
	Bicyclist	1	3	14	18	828	1	0	865
	Other Cyclist	0	0	0	0	1	0	0	1
	Persons on Personal Conveyances	0	4	3	7	160	0	0	174
	Total	16	70	149	238	6484	5	4	6966
2016	Pedestrian	6	74	127	191	5987	7	6	6398
	Bicyclist	2	4	7	17	835	0	0	865
	Other Cyclist	0	0	0	1	5	0	0	6
	Persons on Personal Conveyances	1	5	0	4	169	0	0	179
	Total	9	83	134	213	6996	7	6	7448
All 3 years	Pedestrian	28	210	389	605	16392	13	12	17649
	Bicyclist	5	9	32	50	2386	1	0	2483
	Other Cyclist	0	0	0	1	12	0	0	13
	Persons on Personal Conveyances	1	9	8	16	487	0	1	522
	Total	34	228	429	672	19277	14	13	20667



Overall Location Types, 82.2% of Pedestrian Fatalities were associated with locations with No Traffic Control for the Motorist

Broad Pedestrian Crash Groups

Broad Groups of Pedestrian Crashes	Rural	Urban	Other / Unknown	Row Total (% of col. Total)
Combined Pedestrian Crossing Types (% of row total)	1228 (14.8%)	6838 (82.2%)	278 3.3%	8344 (49.4%)
Parallel Path Types (Pedestrian Walking Along Roadway)	836 (37.7%)	1315 59.3%	68 3.1%	2219 (13.1%)
Crossing Expressway	121 15.7%	646 83.9%	3 0.4%	770 (4.6%)
Pedestrian in Roadway – Unknown Circumstances	456 36.8%	747 60.3%	36 2.9%	1239 (7.3%)
Other / Unusual Types	1114 (25.9%)	3011 (69.9%)	1827 (4.2%)	4307 (25.5%)
Total	3755 (22.2%)	12,557 (74.4%)	567 (3.4%)	16,879



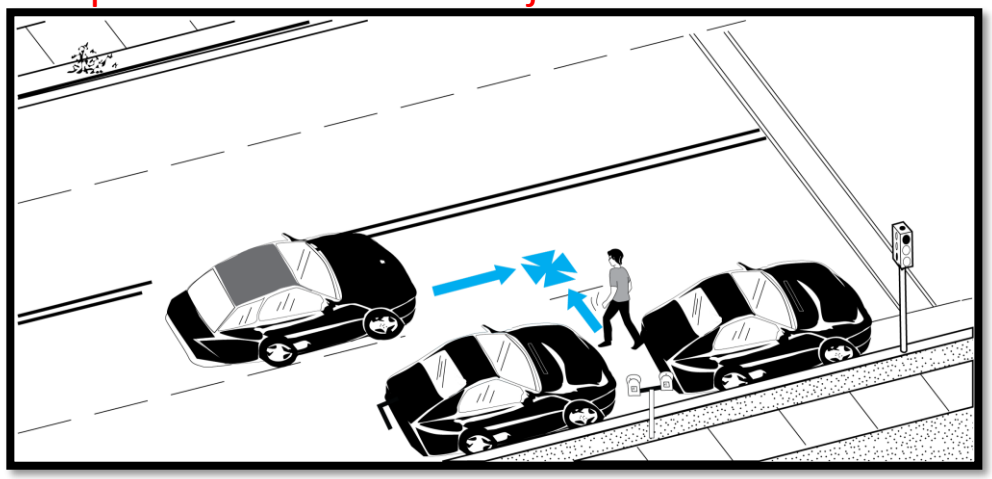
MULTIPLE THREAT – Pedestrian Crosses in front of Stopped/Slowing Traffic and is Struck by a Second Vehicle approaching in another lane in same direction as blocking vehicle

- *Unclear how often this scenario may be detected by officers reporting on a crash – no witnesses, etc.*

Pedestrian TRAPPED by Signal Change – may be struck by vehicle in same or opposite direction

Other Similar Types with Similar Risks – especially at multi-lane by direction crossings

DART-OUT – can be from behind parked car or other objects



PEDESTRIAN DASH, MOTORIST FAILED TO YIELD, PEDESTRIAN FAILED TO YIELD, BUS-Related – IF ON MULTI-LANE ROAD

Difficulty in knowing whether crash reporters noted other vehicles that may have blocked view of the pedestrian for the striking vehicle driver.

Low Percentage of the Problem or Problem with Reporting ?

	U.S. Fatalities (2014-16)	NC Crashes T(2011-15)
Multiple Threat	57 (< 1%)	91 (< 1%)
Trapped	14 (< 1%)	35 (< 1%)
Total: All Types	16,879	14,498

- Many more “pedestrian crossing crashes” at both signalized and unsignalized locations could potentially involve “multiple threat type” circumstances, and we know from numerous studies that multiple lanes, especially at uncontrolled locations, are a risk for pedestrians

With those Caveats

- Following are some factors associated with Multiple Threat (and related) Types

Pedestrian Crash Type	Total	*Intersec. Total %	Struck on Far leg of Int.%	Struck on Near Leg %	Not at Inters. %	No Control for the MV %	Undivided, 2-way	Median-divided	TWLTL	Non-daylight Conds %	30-35 mph %	40-45 mph %
Trapped	14	92.9	35.7	50.0	7.1	0	28.6	57.1	7.1	57.1	57.1	28.6
Multiple Threat	57	42.1	21.1	19.3	57.9	82.5	42.1	49.1	5.3	66.7	42.1	47.4
Dart-Out	238	30.7	13.0	13.4	69.3	85.3	55.0	29.8	12.6	56.7	39.1	42.0
Motorist Failed-to-Yield	878	75.6	36.1	29.1	24.4	58.8	56.7	25.9	13.8	67.0	47.0	25.5
Pedestrian Failed to Yield	5073	31.9	14.9	13.1	68.1	82.1	35.8	40.2	20.3	85.7	28.8	61.9
All Pedestrian Crossing Type Crashes (turning/non-turning motor vehicle)*	8320	41.7	22.8	14.3	58.3	74	42.8	35.9	16.9	75.7	31.8	52.5

*For these analyses, 24 "Waiting to Cross' Crashes were omitted from the "All Crossing types"

Summary

- Multiple Threat / Trapped – appear to be a low % of both fatalities and total crashes
- It isn't known whether reporting issues affect the numbers
- Most Multiple Threat fatalities (58%)occur at non-intersection locations
- Lack of traffic control (at all location types) for motorist is over-represented in Multiple Threat Fatalities (83%), even more so than for all crossing type crashes (74%)
- Median-divided roads also seem over-represented for Multiple Threat and Trapped types compared to all crossing crashes
- Better data on number of lanes and environmental circumstances may help better define this type of crash

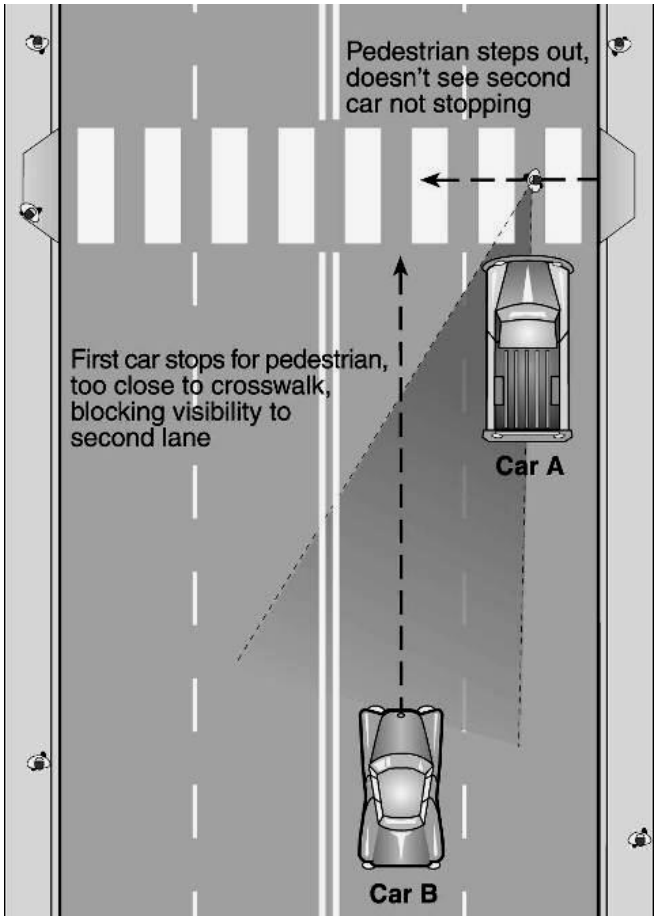
FACTORS CONTRIBUTING TO MULTIPLE THREAT CRASHES

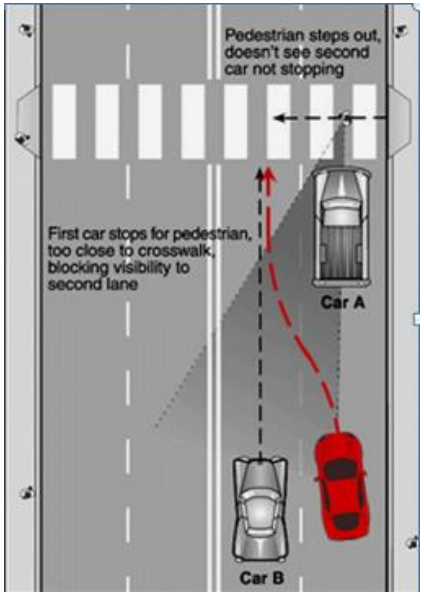
Certain Factors Increase Risk of Multiple Threat Crashes

- Driver and pedestrian visibility
- Speed
- Lane configuration
- Traffic volume
- Lighting

Multiple Threat Crash Problem

- 1st car stops to let pedestrian cross, blocking sight lines
- 2nd car doesn't stop, hits pedestrian at high speed
- Uniform Vehicle Code and legal requirements

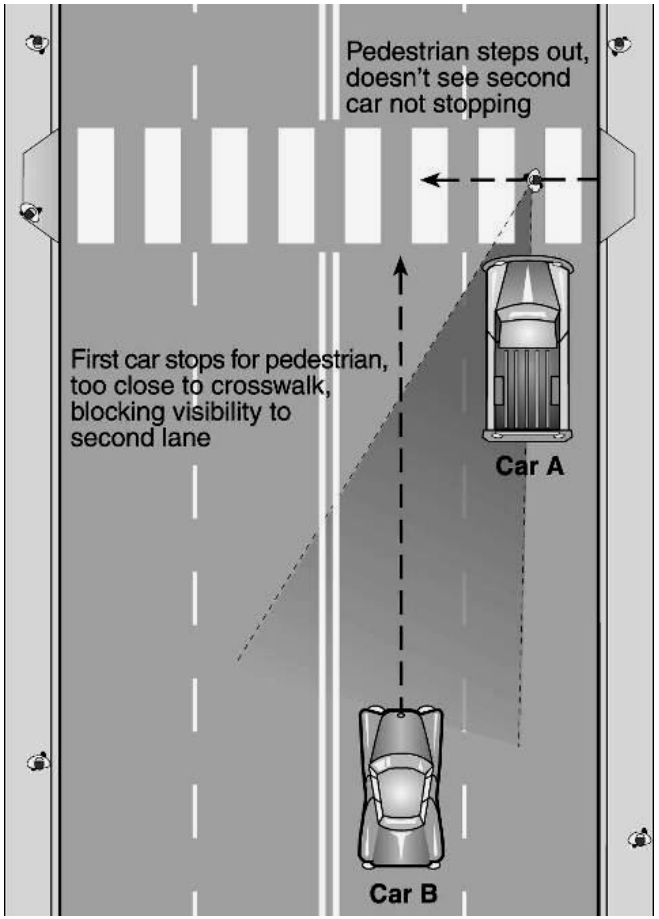


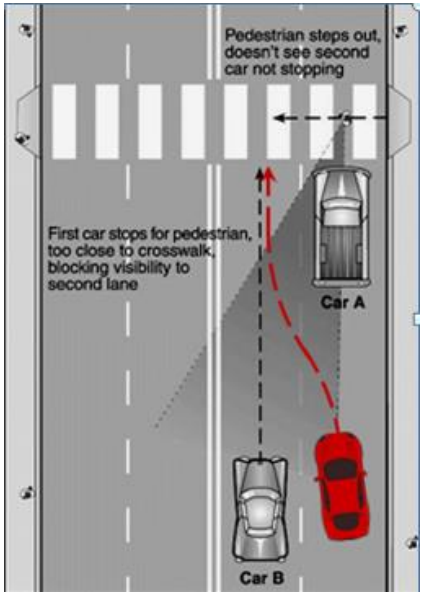


Multiple Threat Crash Problem

Uniform Vehicle Code
11-502

- (d) Whenever any vehicle is stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear shall not overtake and pass such stopped vehicle.





Visibility: Parked Vehicles

Salem OR

Visibility: Parking and Other Objects

- Provide open sight–lines to the crossing for approaching motorists
- The design and placement of street furniture, trees, and plantings on a curb extension must not impede pedestrian flow, obstruct a clear path, interfere with "daylighting" the crossing, or emergency operations.

Curb extensions
(Credit: Michele Weisbart)

Visibility: Large Vehicles

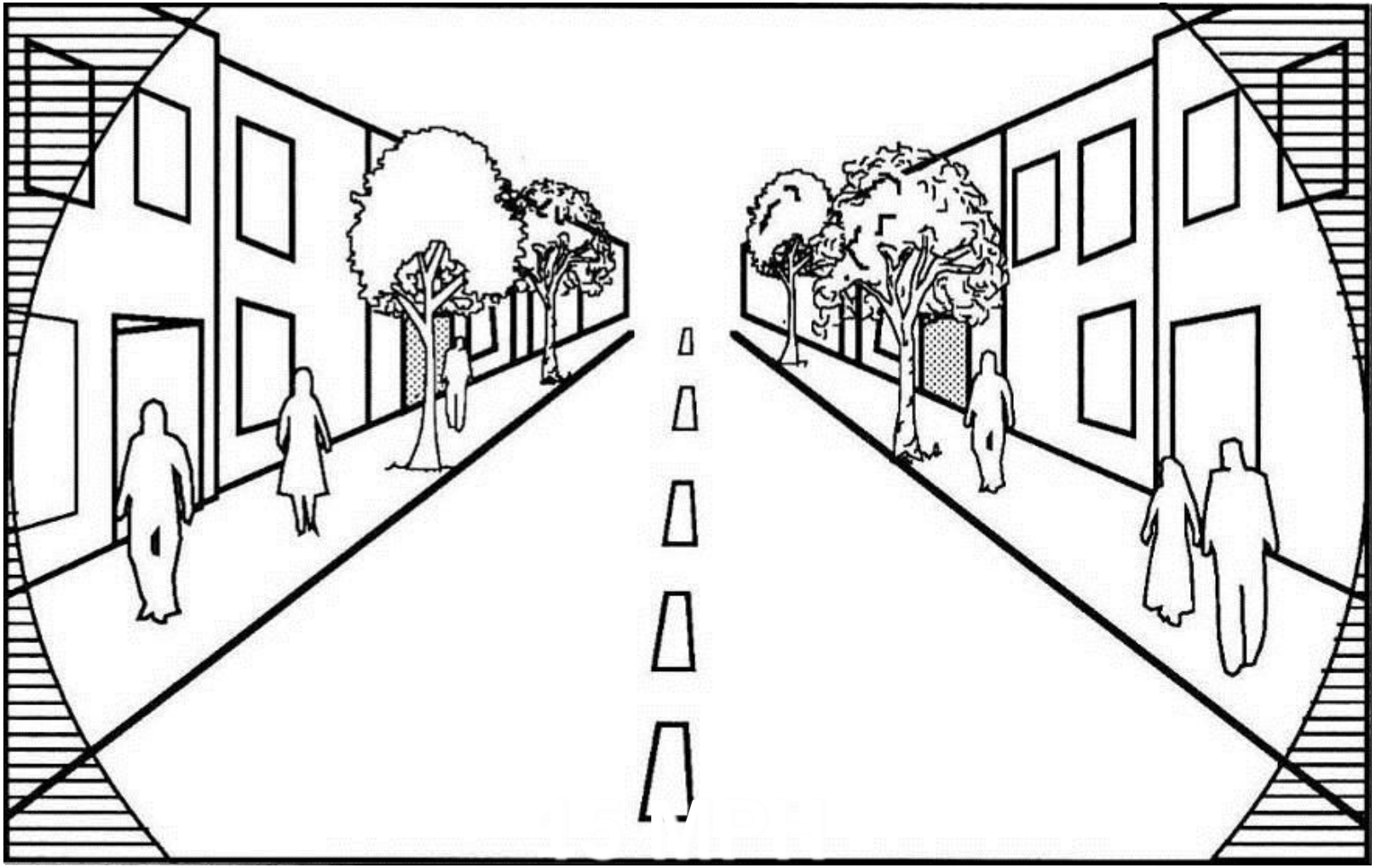
Visibility: Large Vehicles

FHWA Designing for Pedestrian Safety

Speed

- Drivers' field of vision & ability to see pedestrians
- Drivers' ability to react and avoid a crash
- Crash Severity

As speed increases, driver focuses less on surroundings



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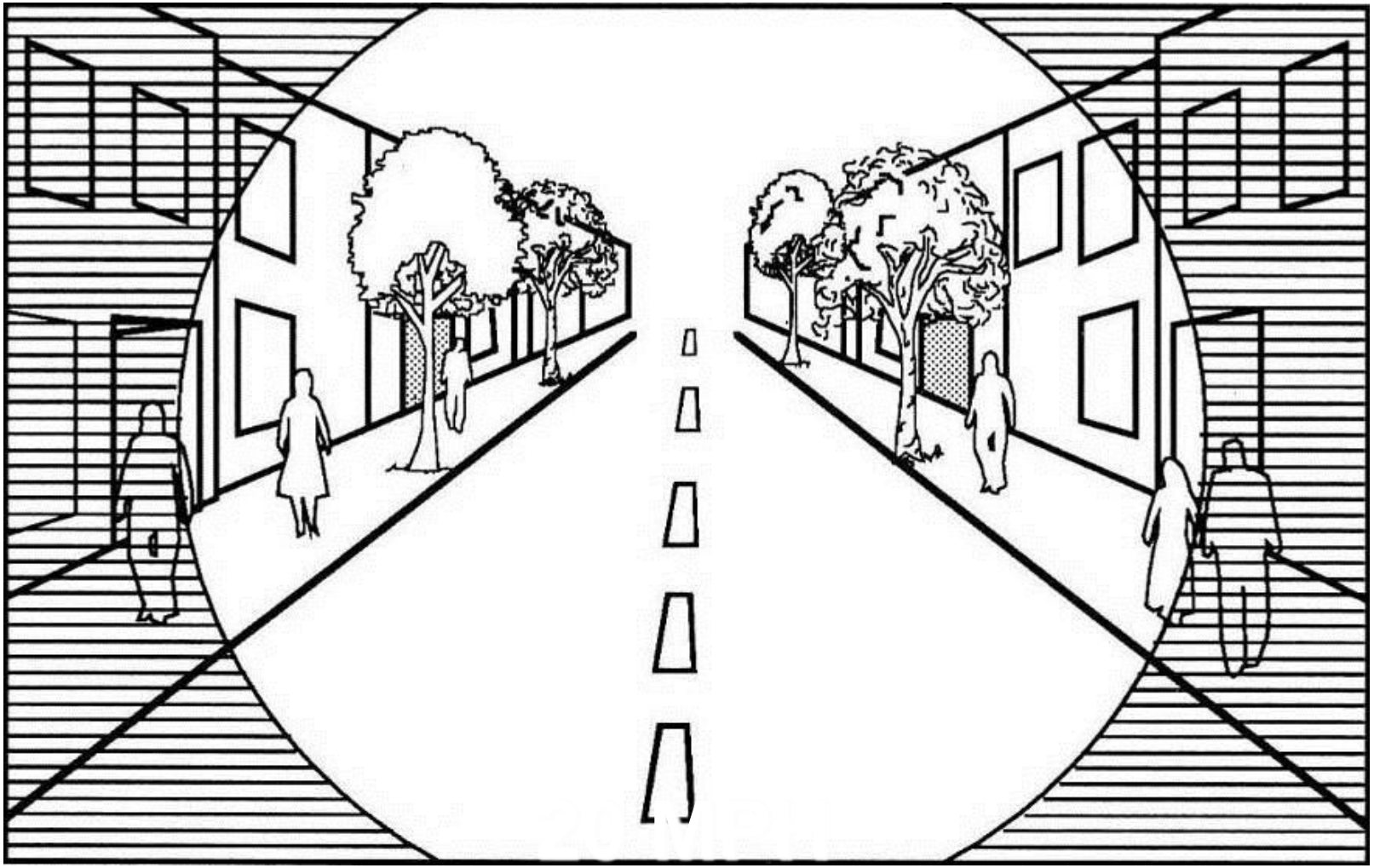

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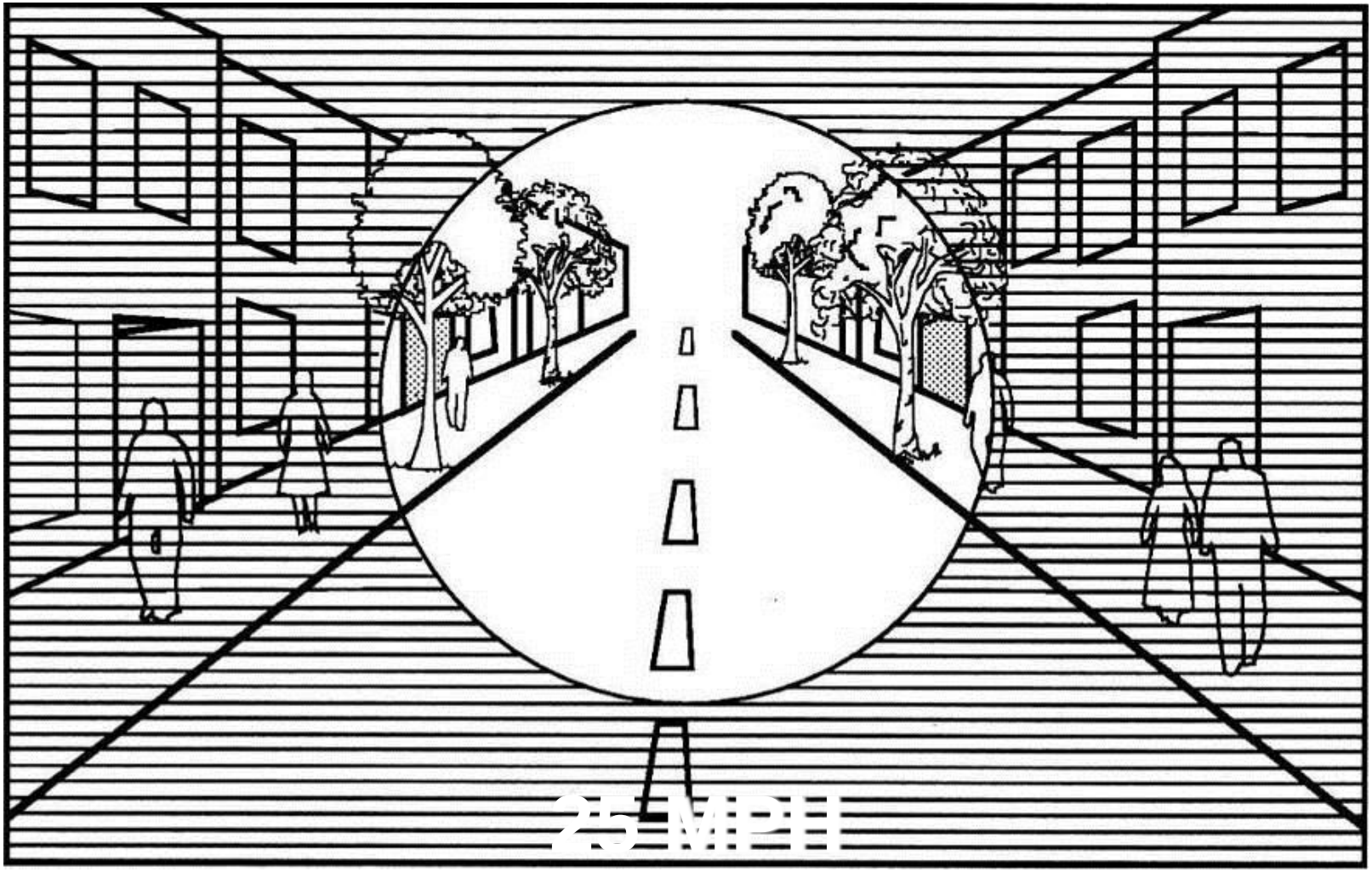

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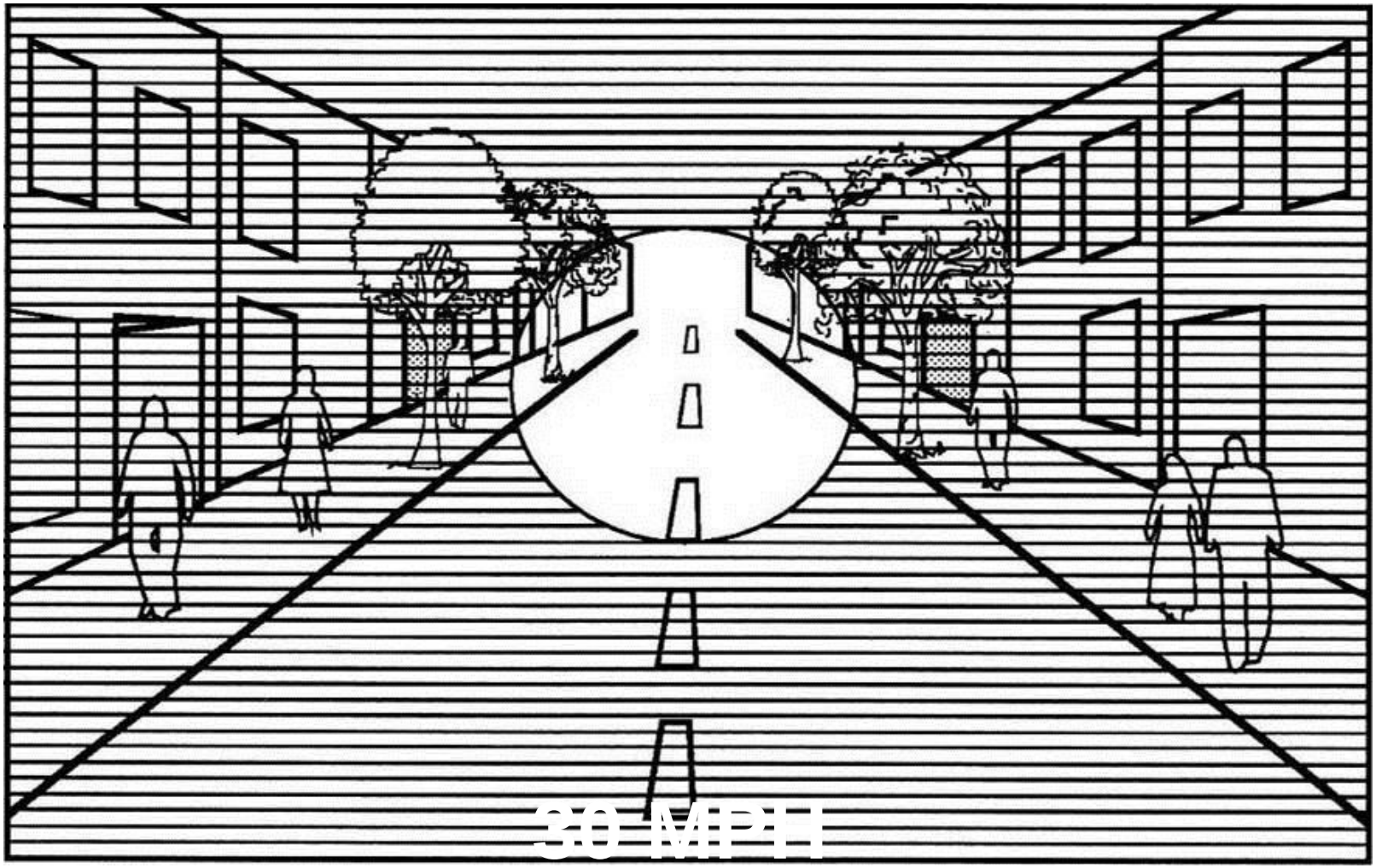
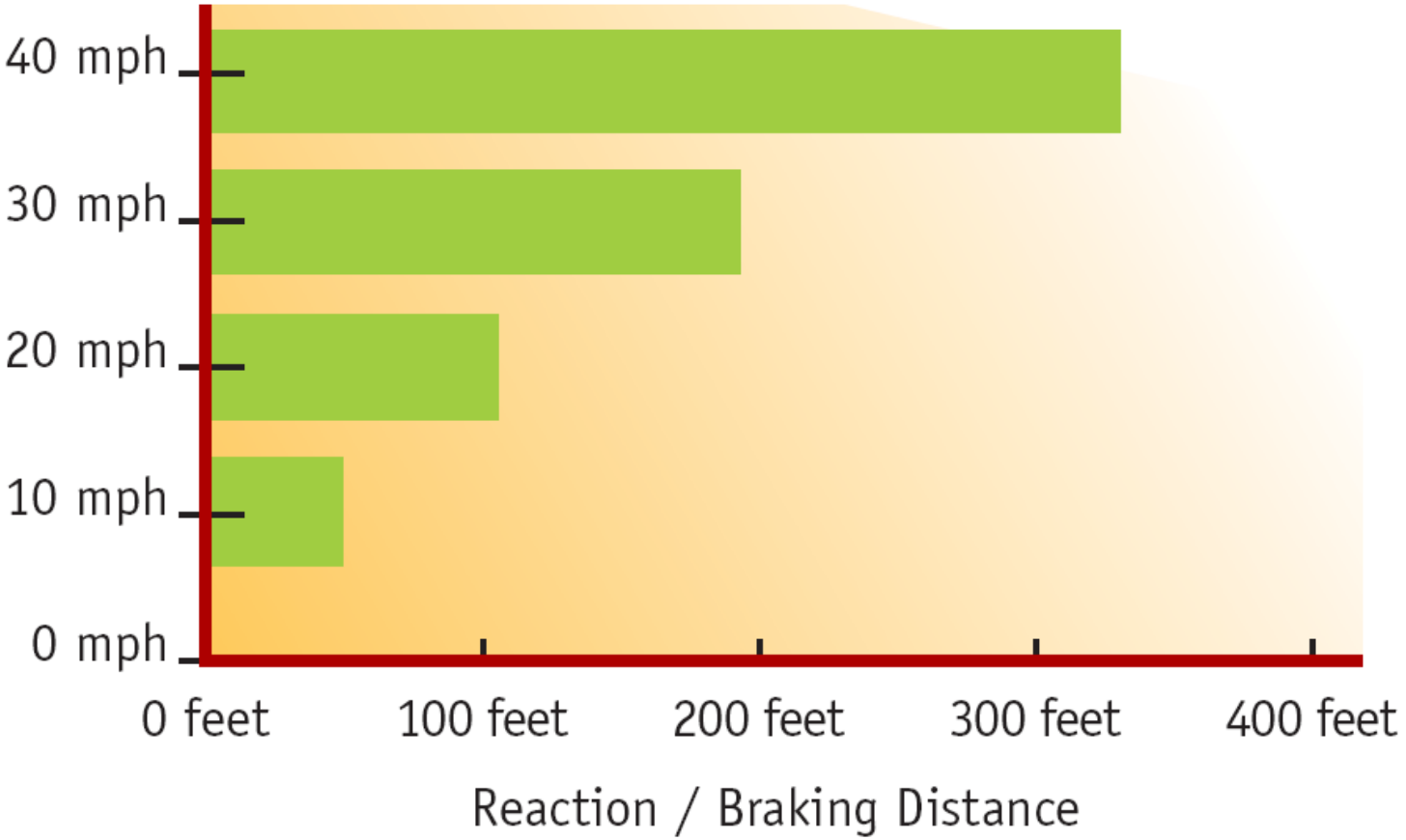


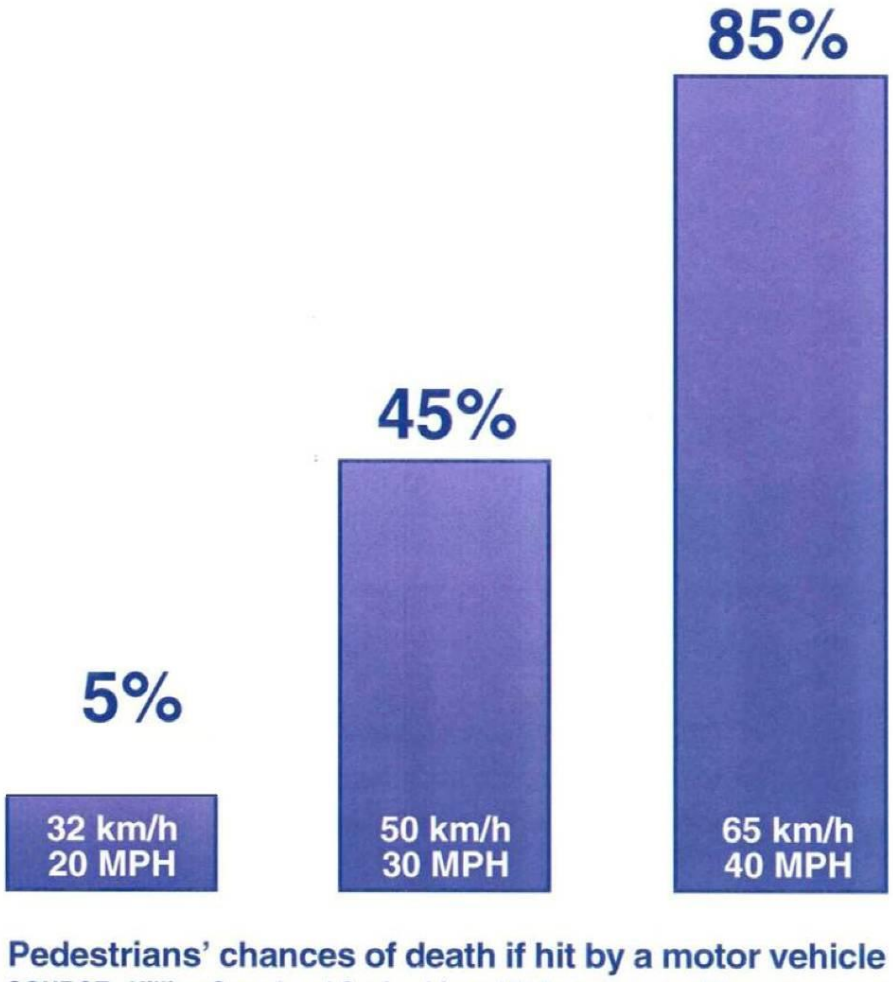
Speed Affects Crash Avoidance



High speeds equate to greater reaction and stopping distance

Speed Affects Crash Severity

- High speeds lead to greater chance of serious injury & death



Long Crossing Distances

- More travel lanes can:
  - Increase exposure time
  - Increase vehicle-pedestrian conflict
  - Increase vehicle delay
  - Decrease ability of slower pedestrians to cross

Traffic Volume

- More travel lanes at crossings can:
  - Increase exposure time
  - Increase vehicle-pedestrian conflict
  - Increase vehicle delay
  - Decrease ability of slower pedestrians to cross

- Lighting reduces the odds of pedestrian fatalities:
  - by 42% at midblock locations
  - by 54% at intersections

Lighting for Midblock Crosswalks

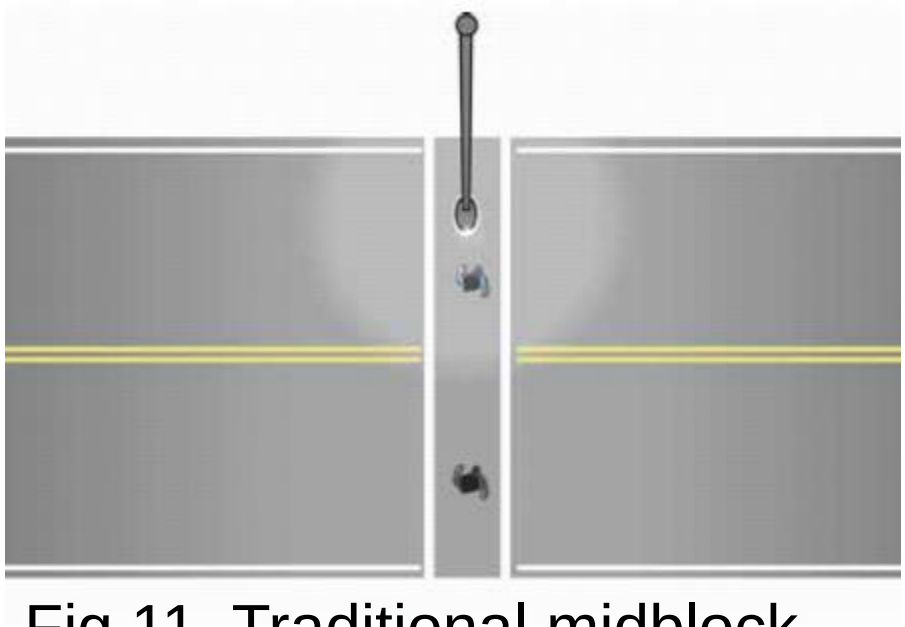


Fig 11. Traditional midblock crosswalk lighting layout

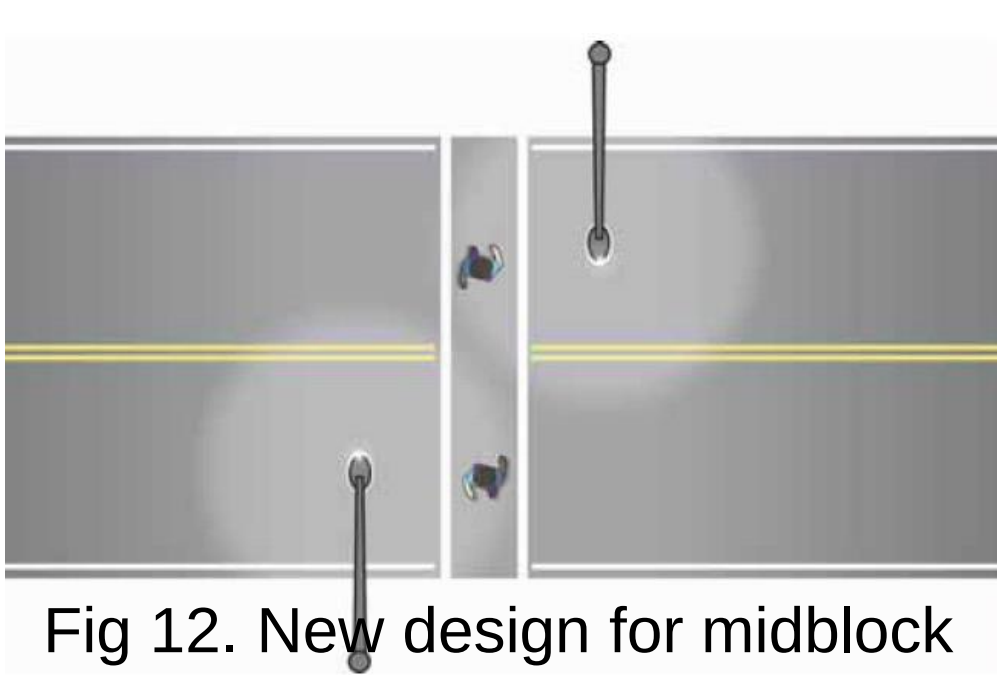
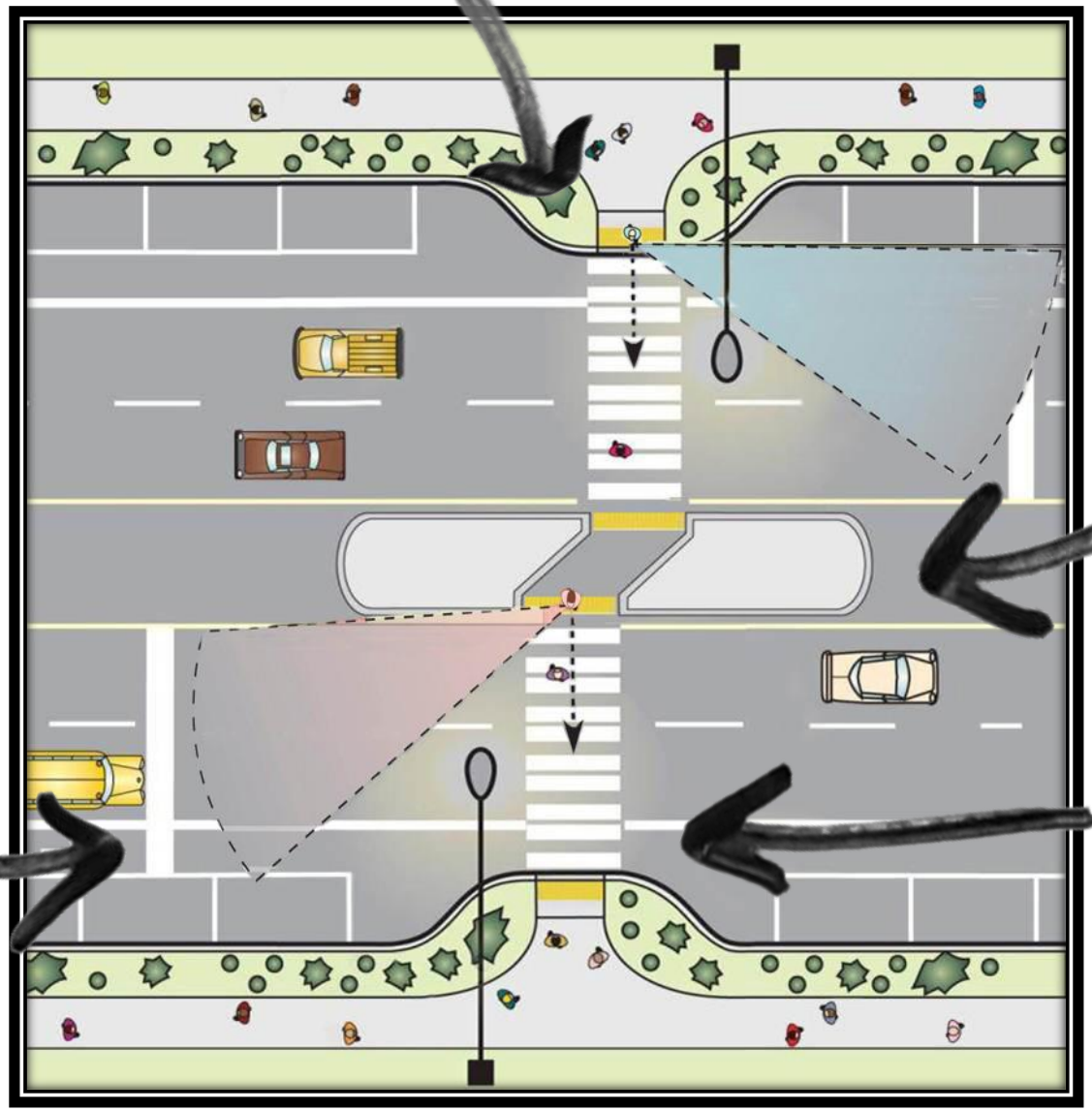


Fig 12. New design for midblock crosswalk lighting layout

Recommended lighting level: 20 lux at 5’ above pavement

Strategies to Reduce Multiple Threat Crashes

Shorten crossing and improve visibility



Median to divide up long crossing

Advance stop to improve sight distance

Additional lighting and signals/beacons

Multiple Threat Countermeasures

Improve Visibility/Conspicuity

- Curb Extensions/Bulb-Outs
- Advance Stop or Yield Lines
- Lighting
- Transit Stop Placement

Increase Yielding

- Raised Median Islands
- Rectangular Rapid Flashing Beacon
- Pedestrian Hybrid Beacon

Crosswalk Visibility Enhancements

Curb Extensions and Bulb Outs

- Pedestrians can observe oncoming vehicles
- Drivers can see crossing pedestrians
- Decrease crossing distance and time exposed to traffic
- Visually narrow street and calm traffic
- Appropriate where on-street parking could lead to multiple threat

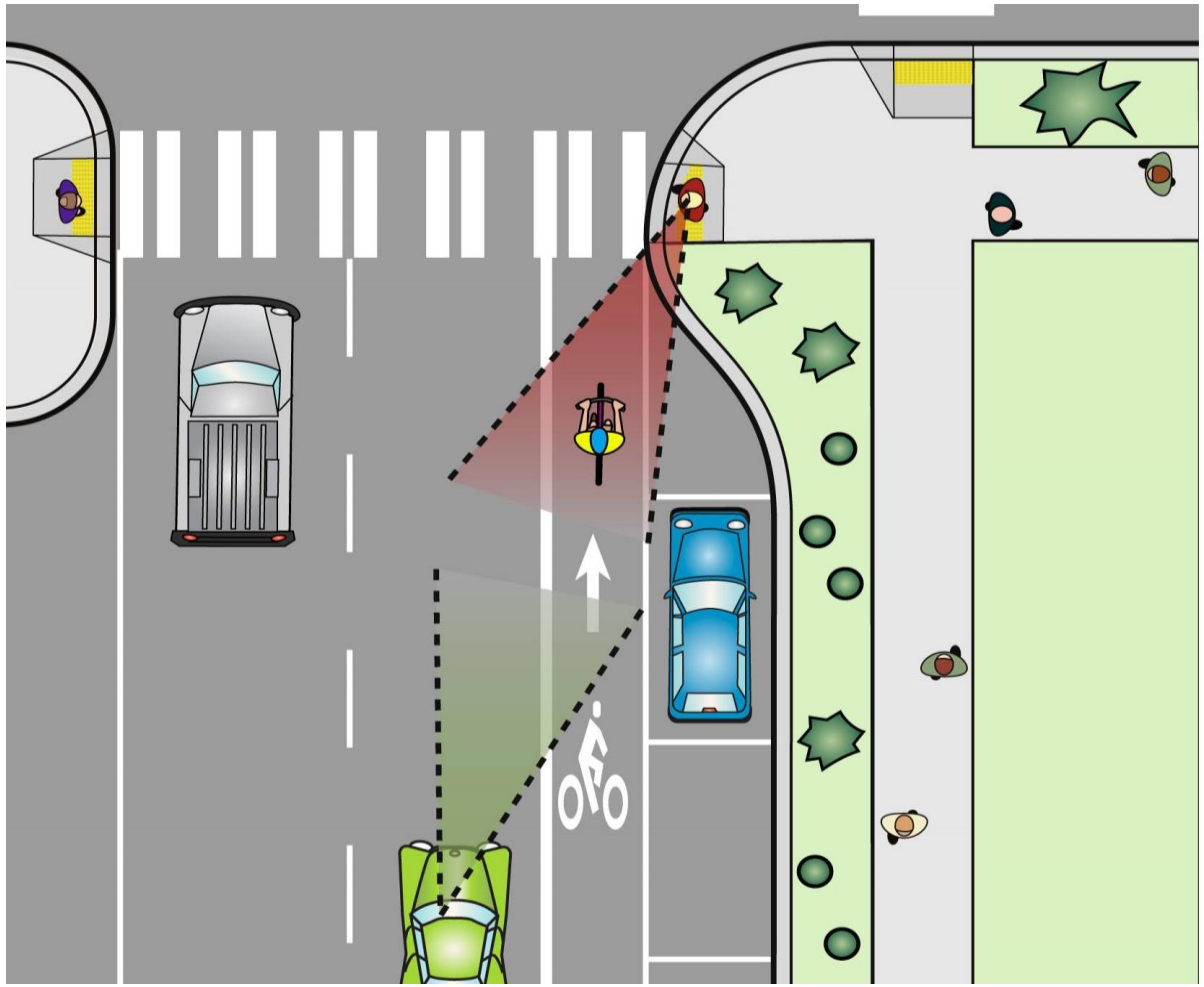


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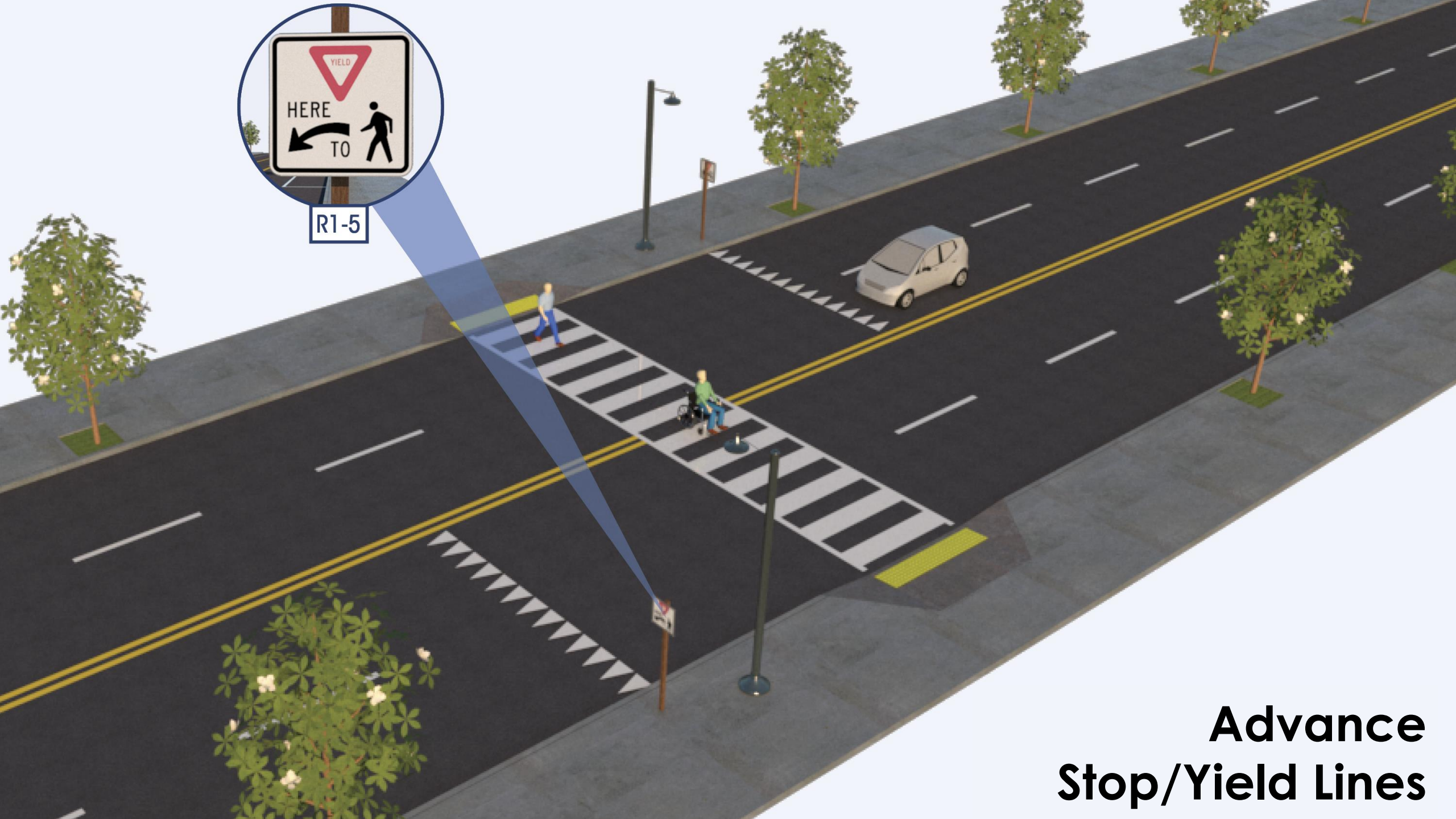
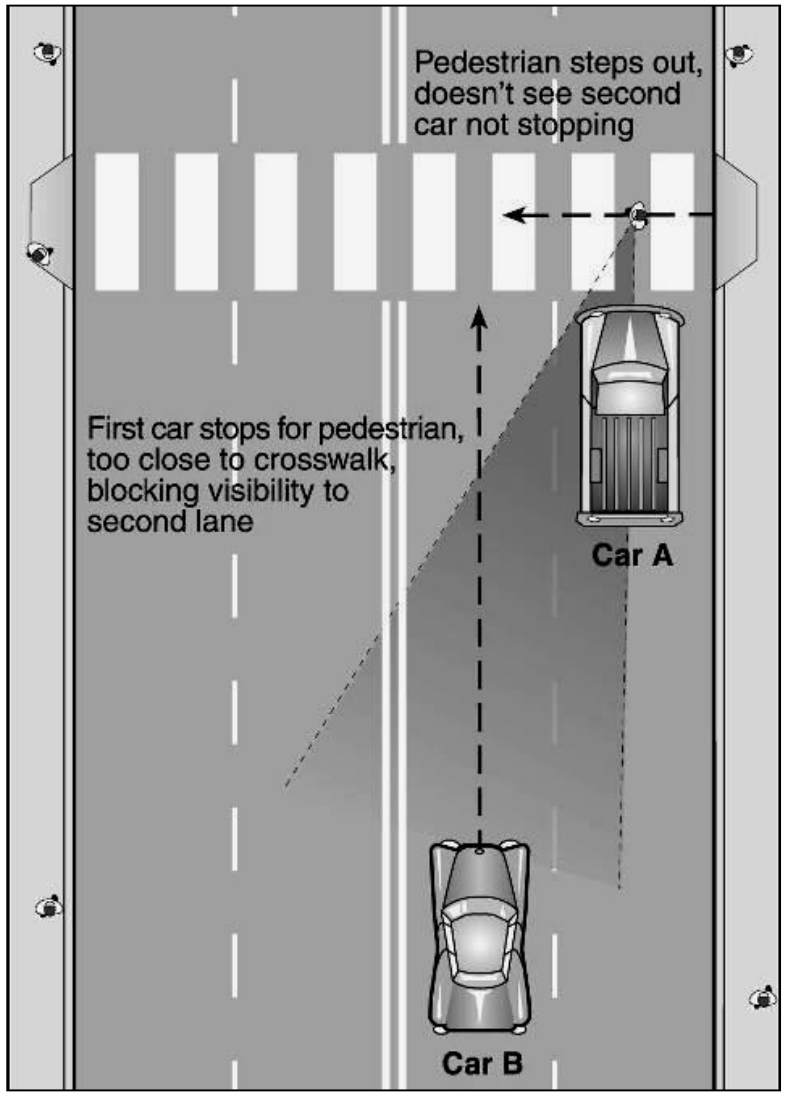
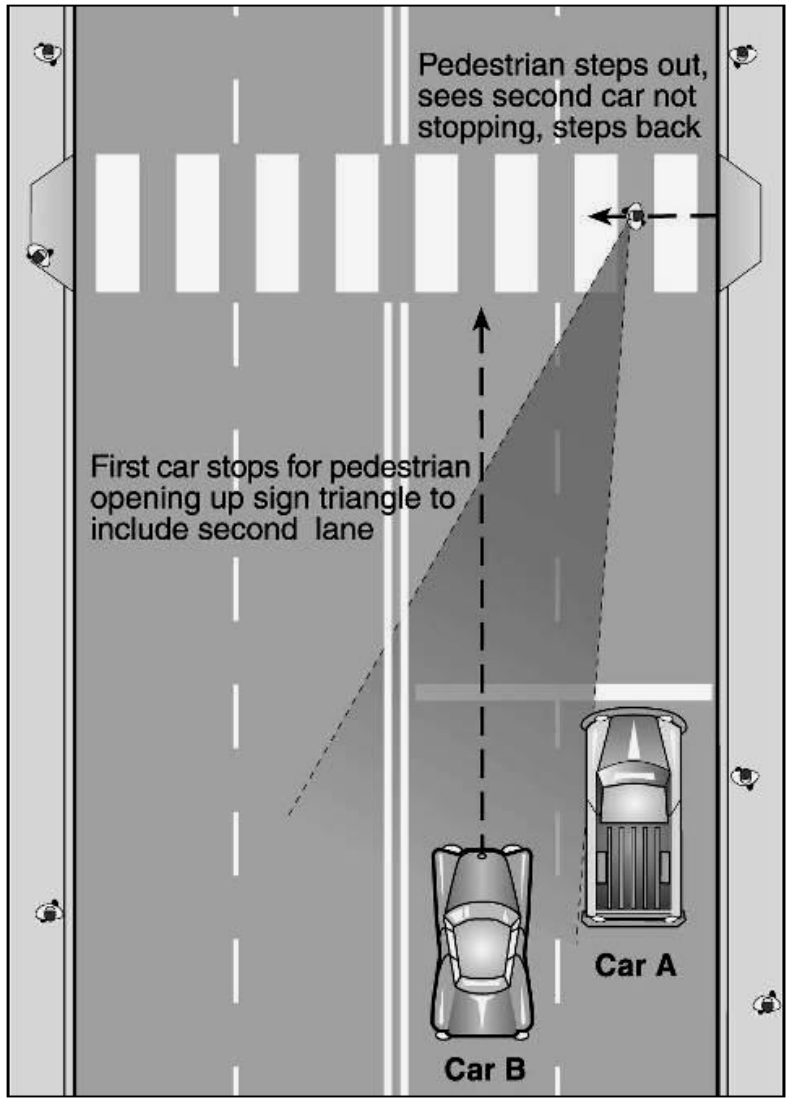
Image: New York City DOT



Advance Stop/Yield Lines

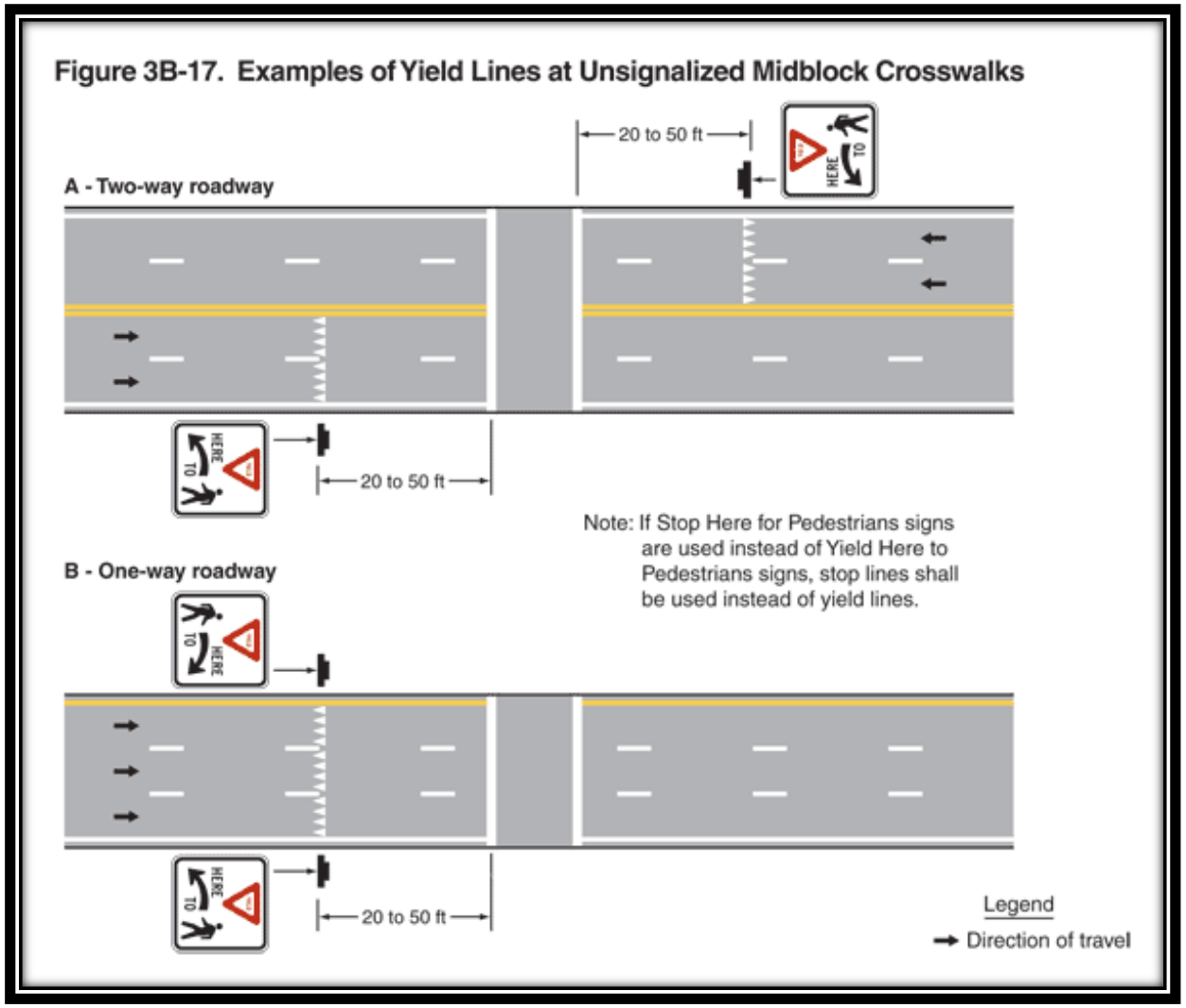
Advance Stop/Yield Lines





Advance Stop/Yield Lines

- Vehicles yield or stop further from crosswalk
- Opens up sight lines to improve visibility
- Shown to reduce vehicle/pedestrian crashes by 25%



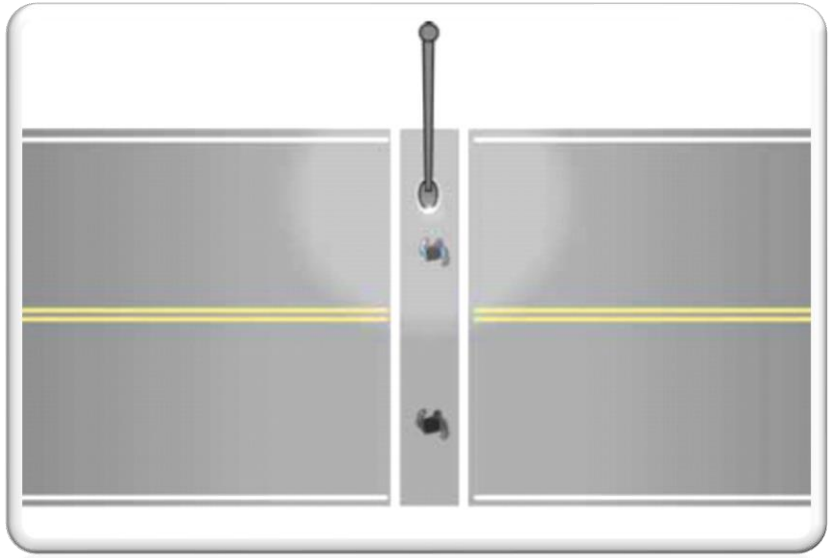
Lighting

- Coordinate lighting placement with crosswalk markings
- Lights on both sides of street provide better uniformity
- Street lights should be installed on approaches to crosswalks for best results

Image: FHWA, Designing for Pedestrian Safety

Lighting

Informational Report on Lighting Design for Midblock Crosswalks FHWA-HRT-08-053 April 2008



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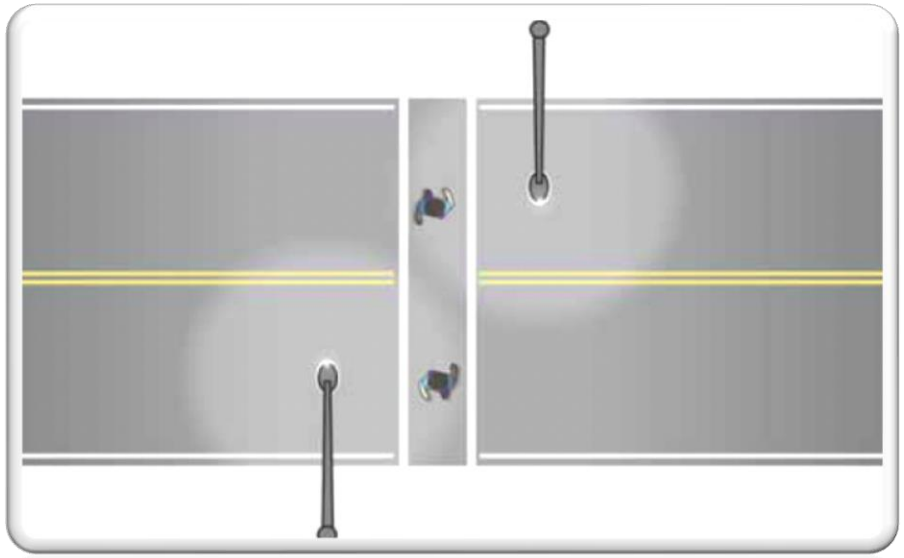


Fig 12. New design for midblock crosswalk lighting layout

Recommended lighting level: 20 lux at 5' above pavement

FHWA Report http://www.tfhrc.gov/safety/pubs/08053/08053.pdf

Bus Stop Placement

Proper stop location can decrease risk of multiple threat crash

For midblock locations, place crosswalk behind bus

Image: Madison, WI

Bus Stop Placement

Proper stop location can decrease risk of multiple threat crash

For midblock locations, place crosswalk behind bus

Image: University Place, WA


STATE LAW
STOP
FOR
WITHIN CROSSWALK
R1-6a
W-11-2, W16-7P
Refuge Island

Refuge Island

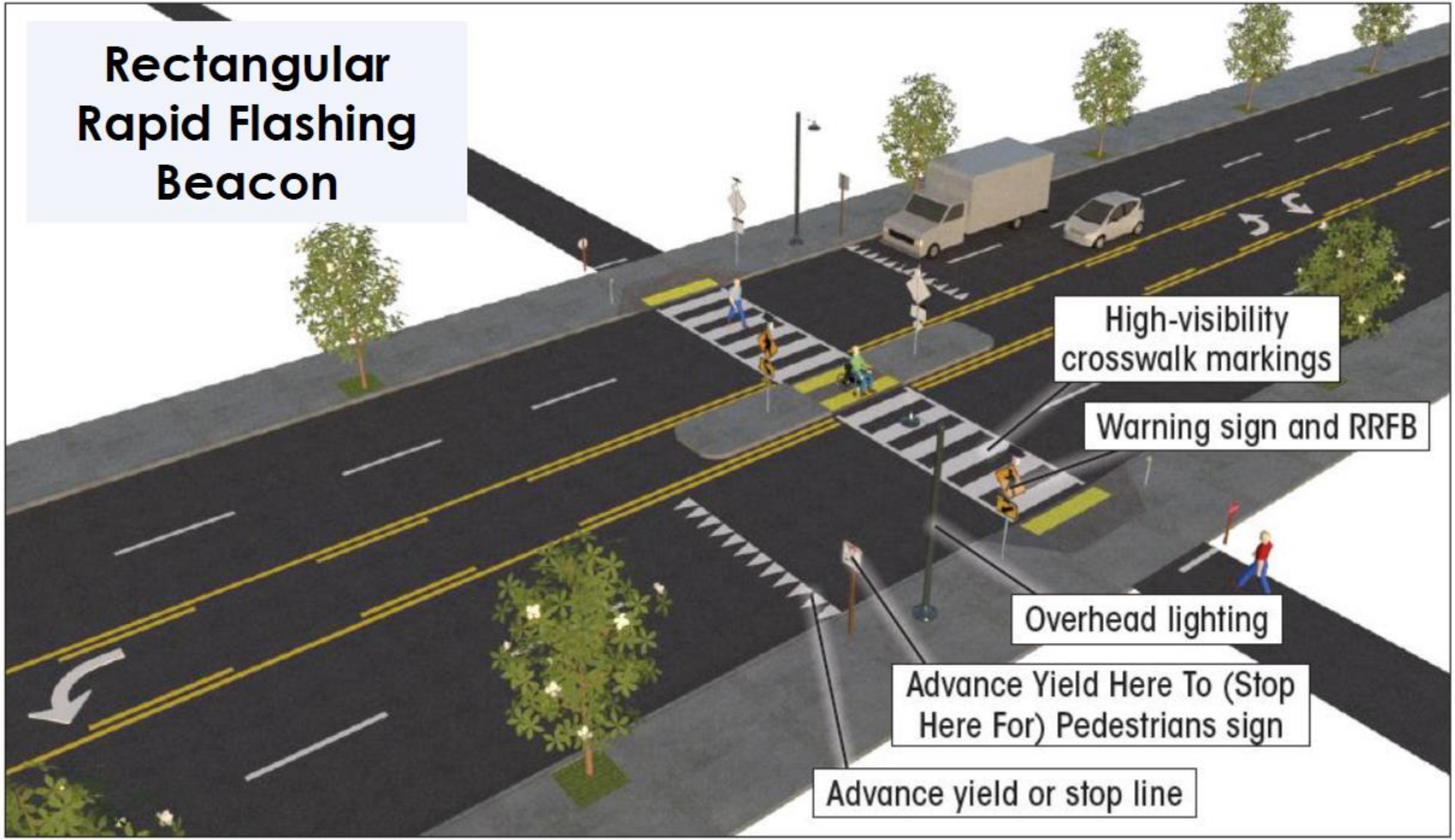
Enhances visibility of crossing pedestrians

Allows pedestrians to break up long crossing distances

Can reduce pedestrian crashes by 32%

Image: Bellevue, WA (Dan Burden, PBIC Image Library)

Rectangular Rapid Flashing Beacon



Rectangular Rapid Flashing Beacon

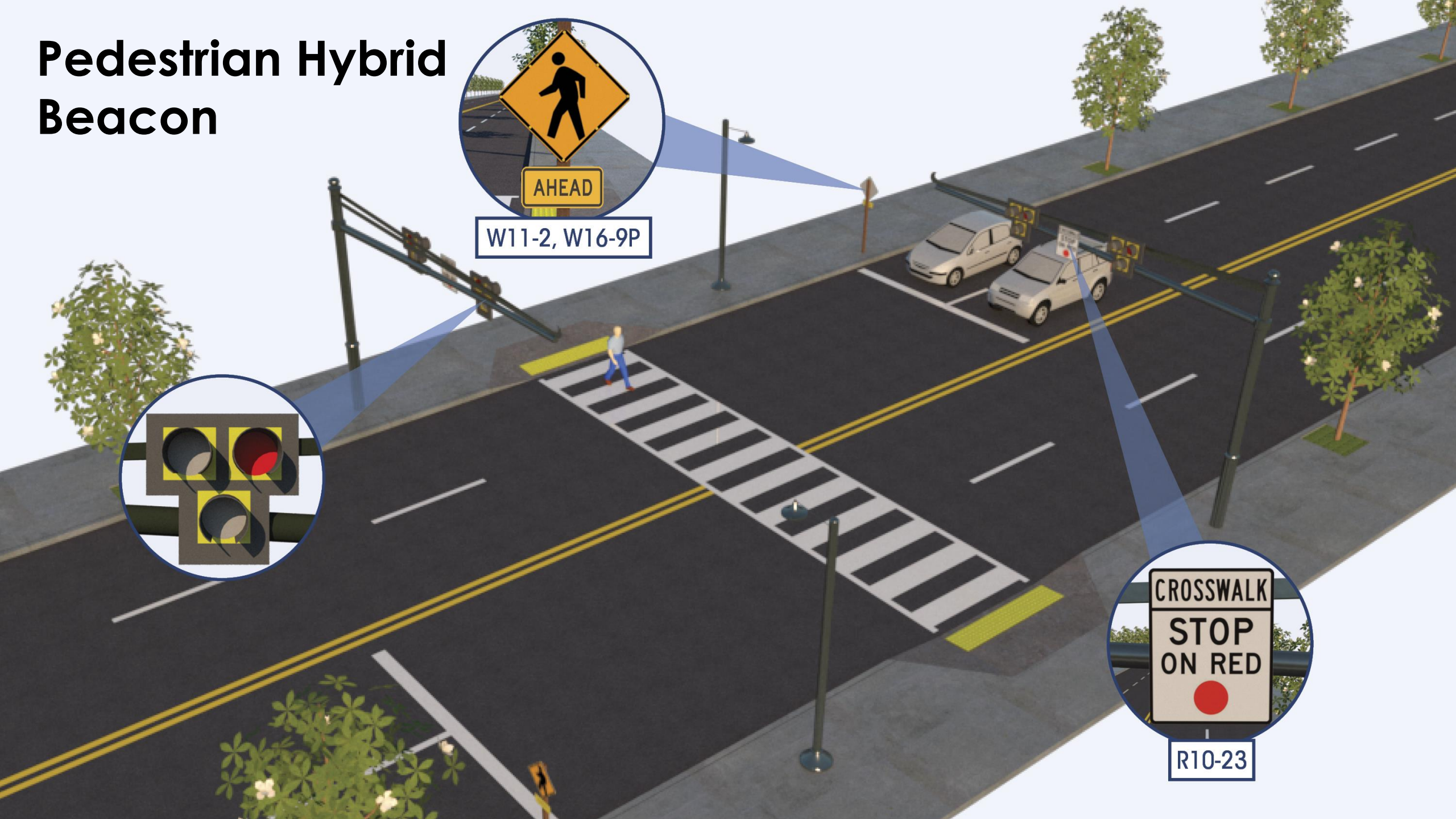
Push-button activated stutter flash system

Lower cost than PHB

Can reduce pedestrian crashes by 47%

Image: Atlanta, GA (Joshua Mello / PBIC Image Library)

Pedestrian Hybrid Beacon



Pedestrian Hybrid Beacon

Appropriate for higher speed, higher volume corridors

Installed in conjunction with advance stop/yield lines and other crossing enhancements

Can reduce pedestrian crashes by 55%

STEP

Safe **T**ransportation for
Every **P**edestrian

EDC

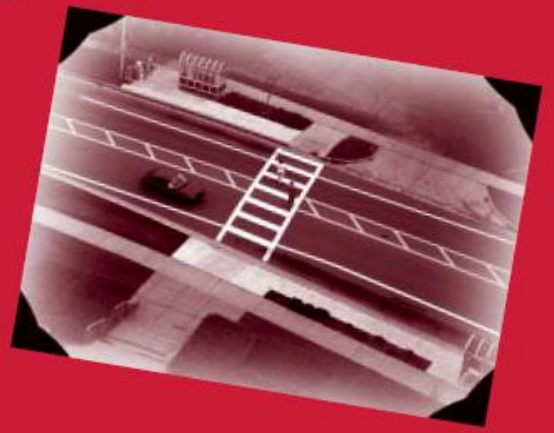
STEP provides guidance for selecting the correct countermeasure combinations for a given site.

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

2005

Pedestrian and Bicycle Safety

U.S. Department of Transportation
Federal Highway Administration

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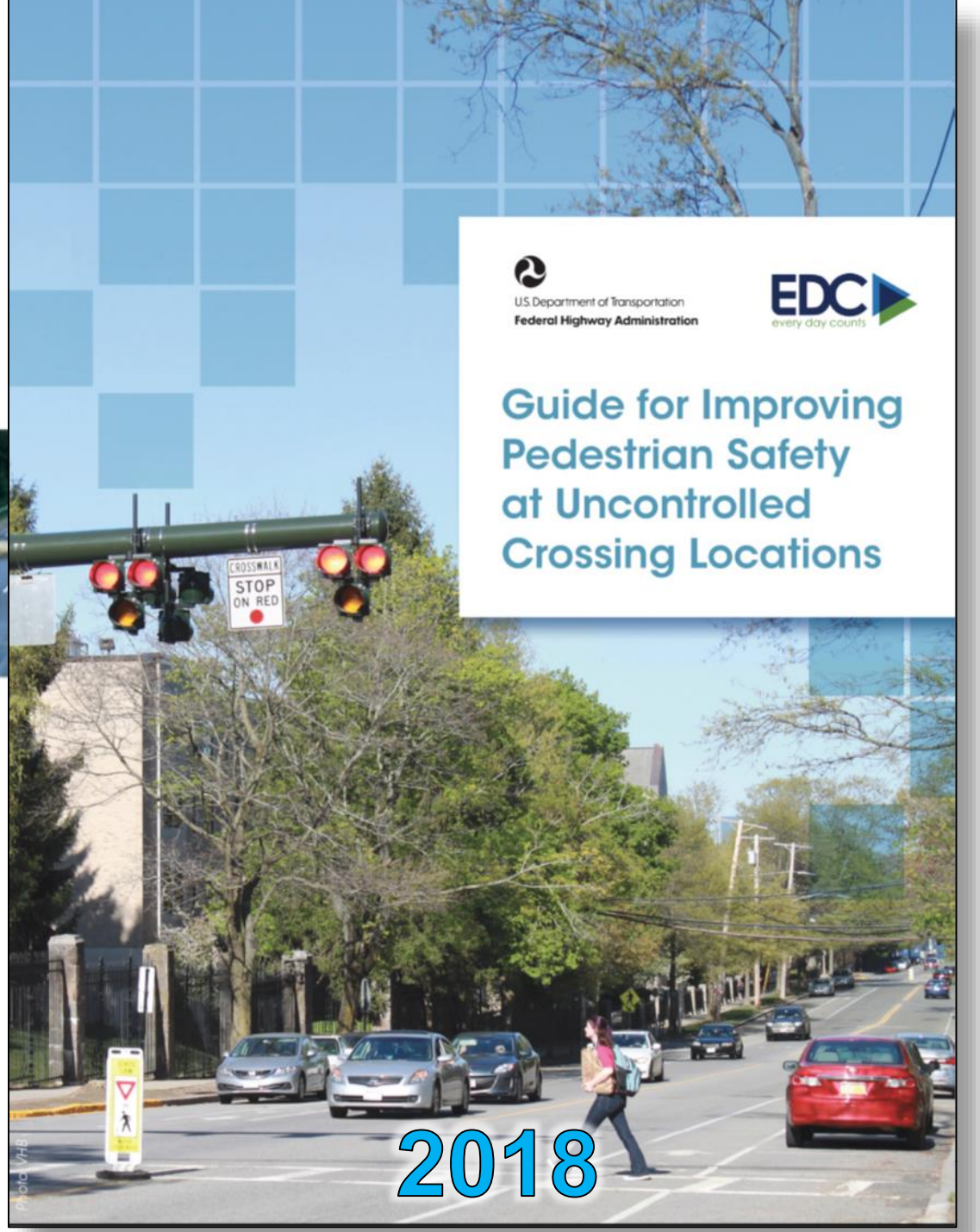
Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations



2018

STEP Countermeasures


Crosswalk Visibility Enhancements


Raised Crosswalk

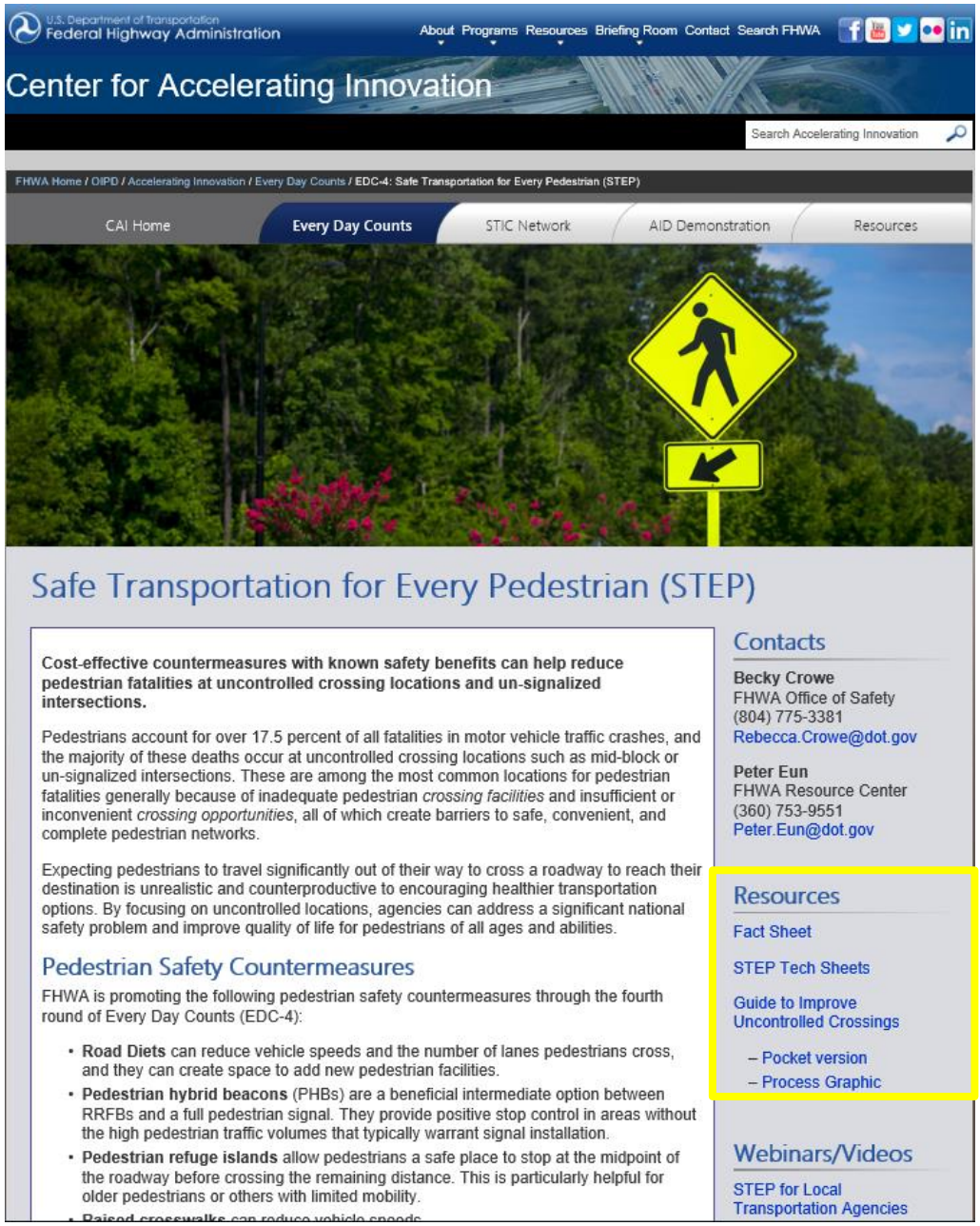

Pedestrian Refuge Island

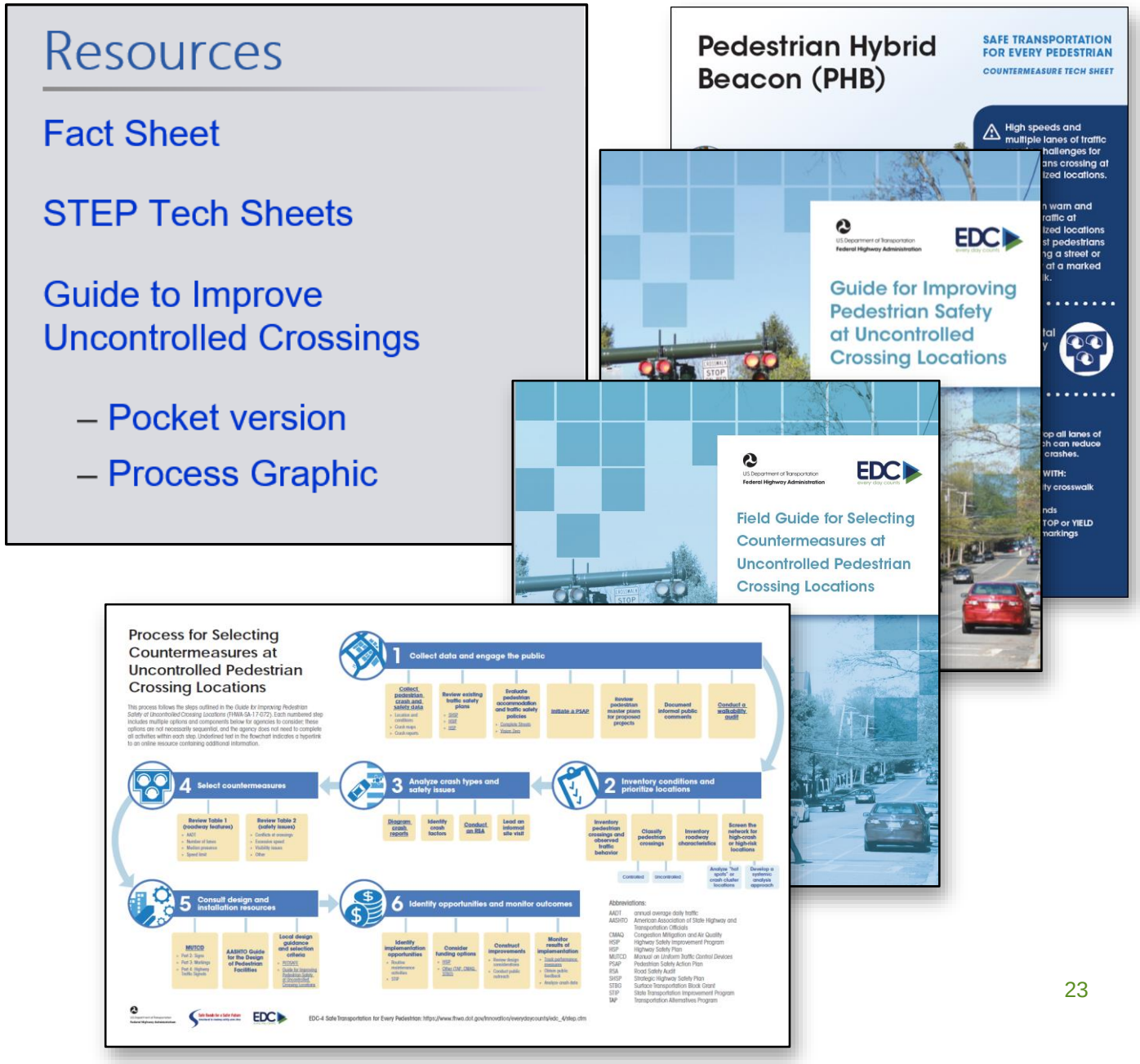

Pedestrian Hybrid Beacon (PHB)


Road Diet

- Rectangular Rapid Flashing Beacon (RRFB)

www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm



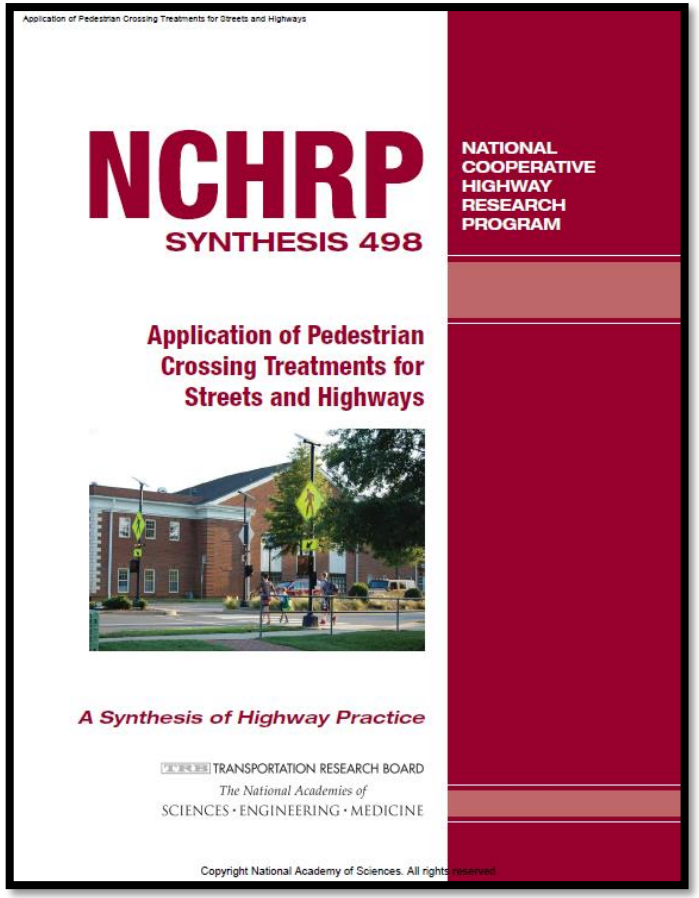


Resources Referenced

- Manual on Uniform Traffic Control Devices (MUTCD)
- Local and State agency countermeasure selection policies
- Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE)
- Crash Modification Factors (CMF) Clearinghouse
- National Cooperative Highway Research Program (NCHRP) and FHWA Reports
- Input from local and State practitioners

Recent Research Cited

- NCHRP Synthesis 498: *Application of Pedestrian Crossing Treatments for Streets and Highways*
- NCHRP Report 841: *Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments*



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

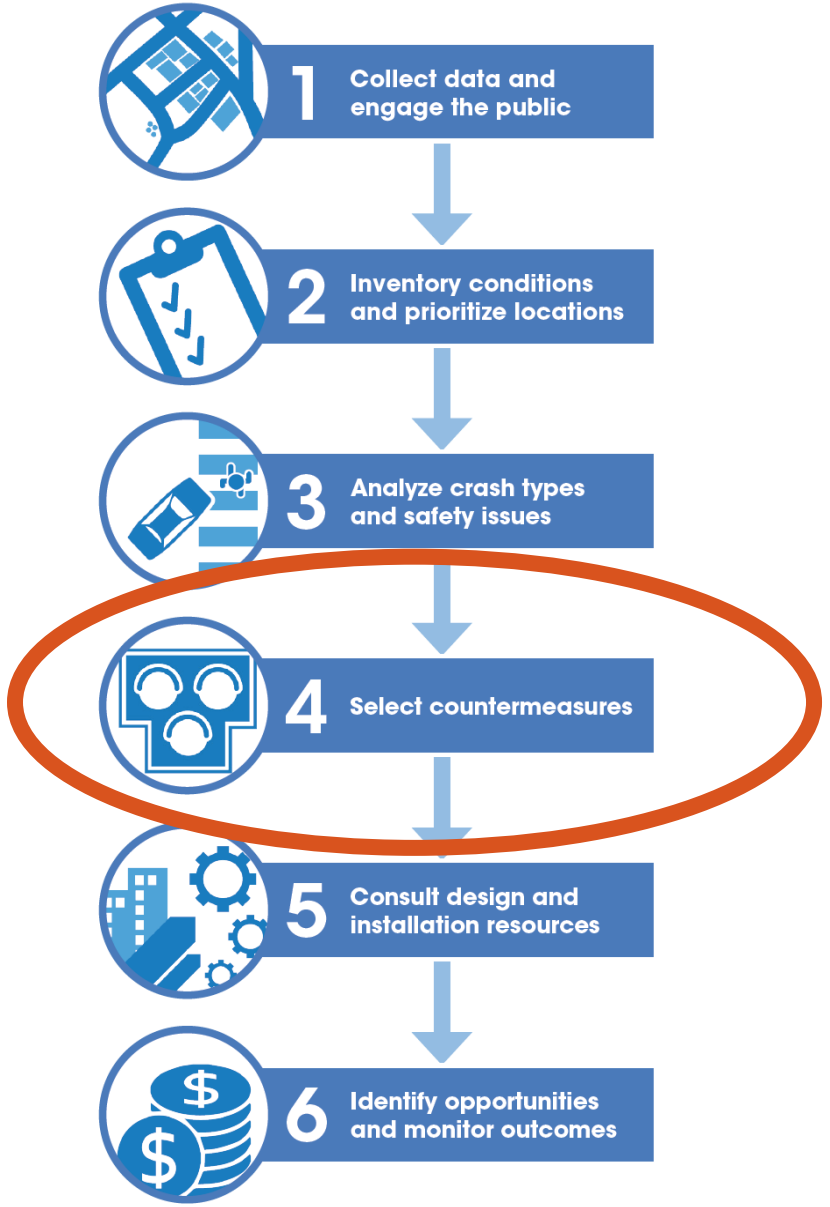
Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

January 2018

Follows a 6-step process

Guides the selection of countermeasures to improve pedestrian safety

Supported by a "Field Guide for Selecting Countermeasures at Uncontrolled Pedestrian Crossing Locations"



4 Select countermeasures

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 7 9	① ❸ 5 ❼ ❾	① ❸ 5 6 ❼ ❾	① ❸ 5 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 ❼ ❾	① ❸ 5 6 ❼ ❾	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	❸ 5 8 ❾	① ❸ 5 8 ❾
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	❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

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.*

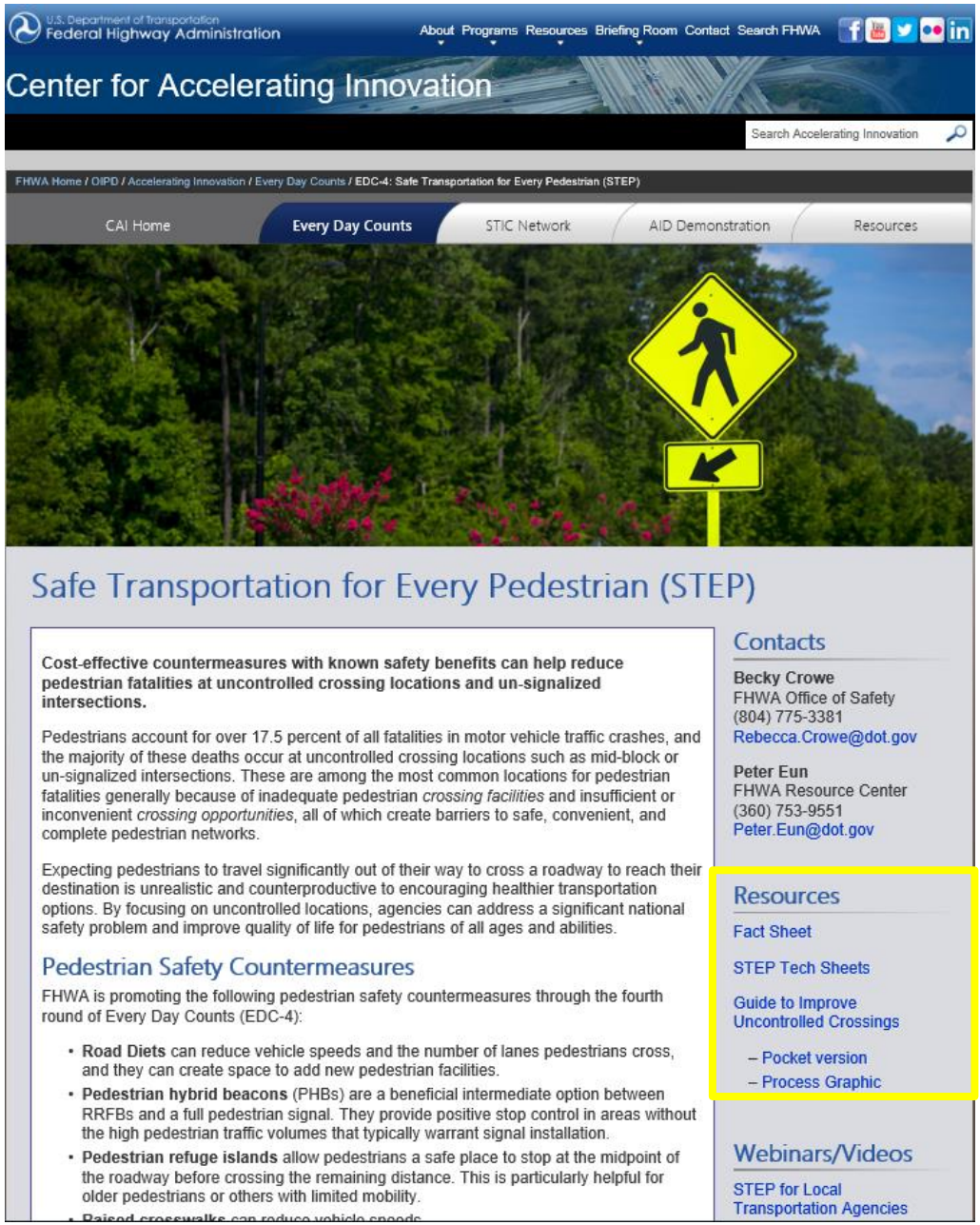
The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

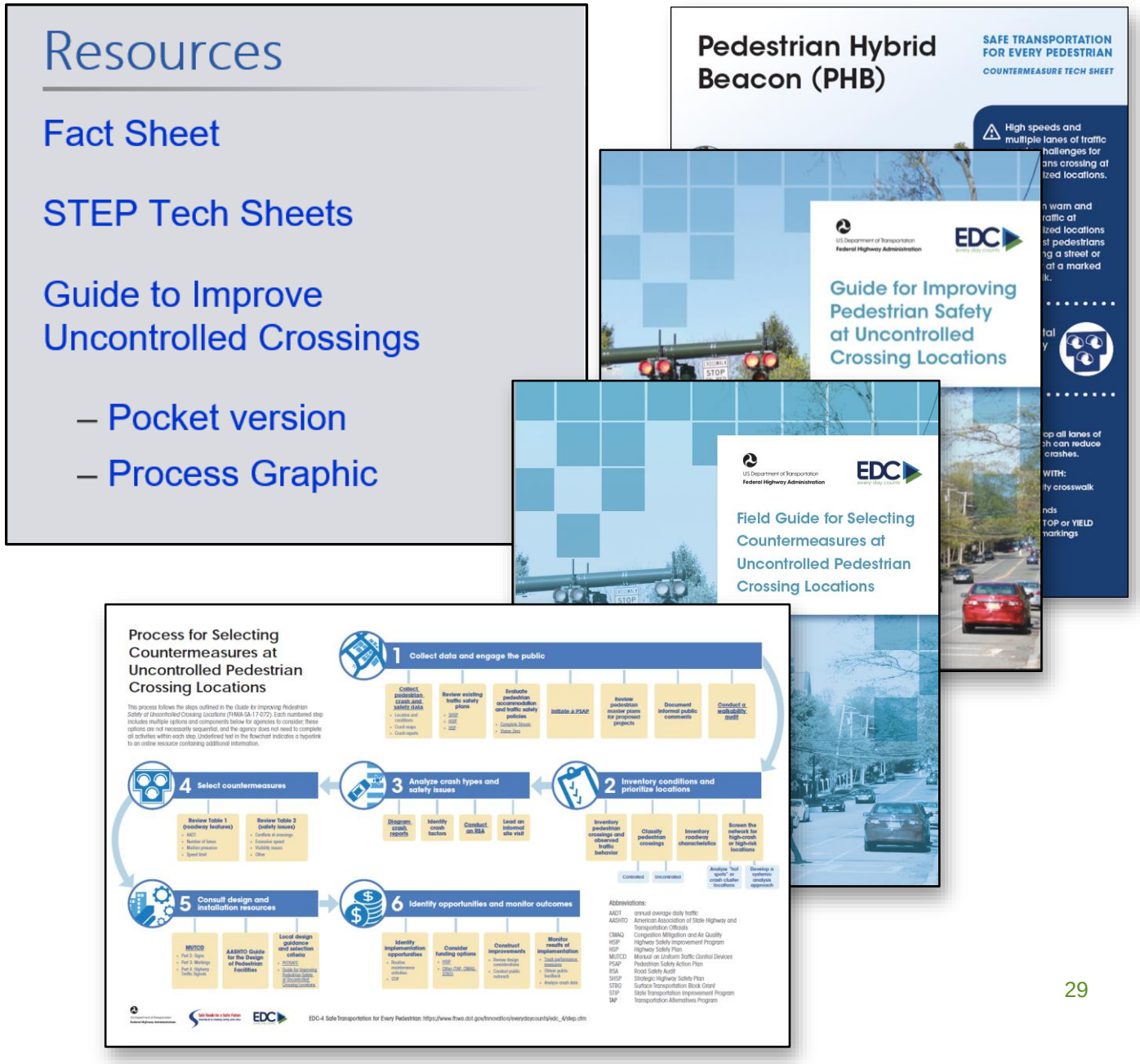
1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian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

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	✓		✓	✓	✓

Table 2: Safety Issues Addressed per Countermeasure

www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm





Supplementing Engineering with Campaigns

Education

Provide drivers with information about laws related to yielding at multilane crossings

On-road practice should reinforce this information

Supplementing Engineering with Campaigns

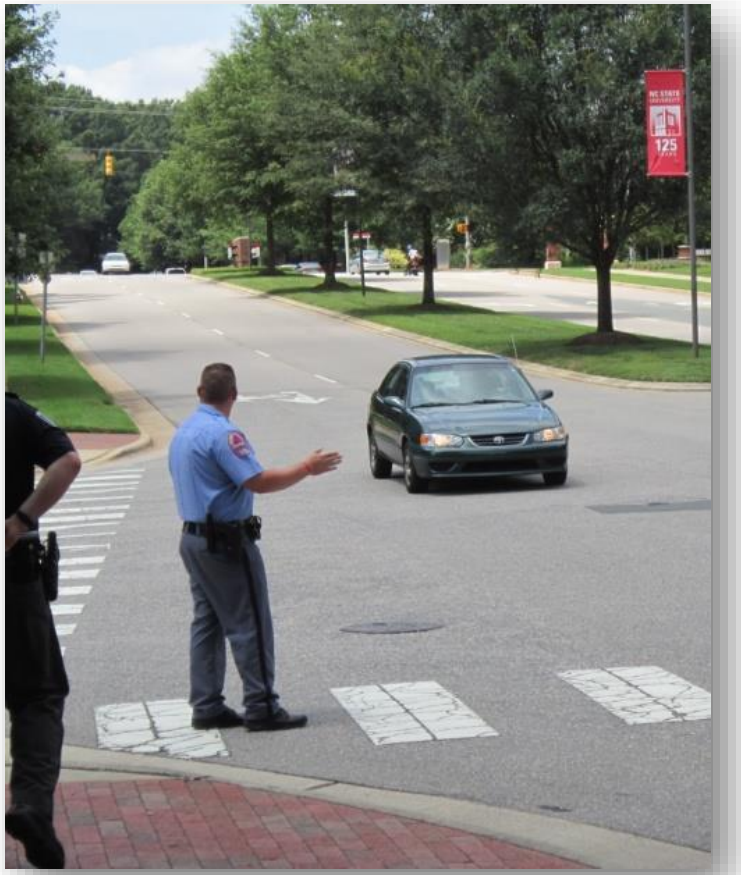
Education

Provide drivers with information about laws related to yielding at multilane crossings

On-road practice should reinforce this information

Image: FHWA Public Roads, March/April 2015

Supplementing Engineering with Campaigns



Enforcement

High visibility enforcement can specifically target yielding behavior and speed

Monitor multilane crossings and enforce laws related to changing lanes/passing

Multi-Threat Pedestrian Crashes: Examples from Washington DC

PBIC Webinar

August 9, 2018

George Branyan
Active Transportation Projects Team Manager
District Department of Transportation

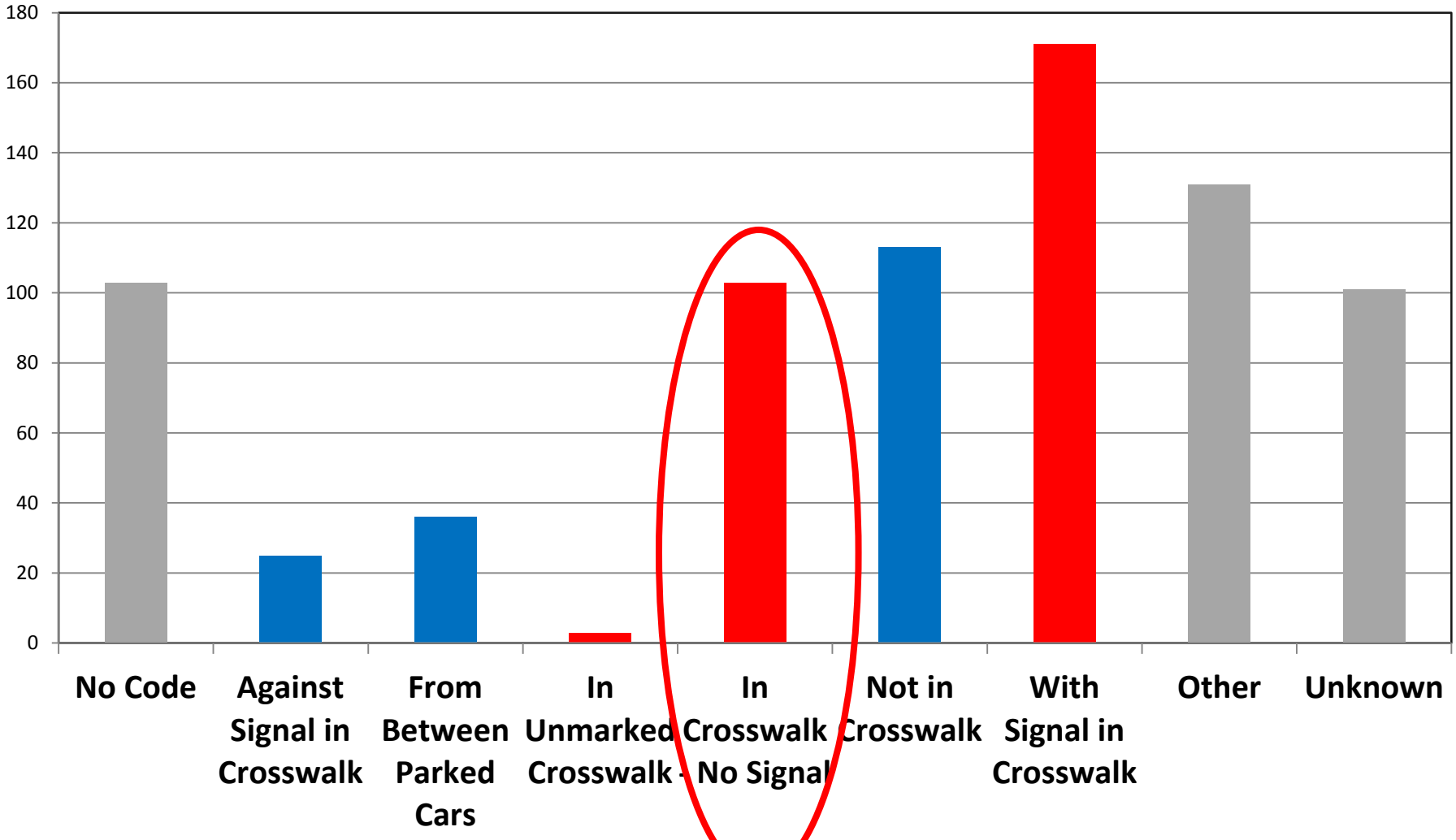
Local Data and Countermeasure Approaches

Under-Reporting Issue

- A DDOT research project being conducted by Morgan State University is looking at 3000 pedestrian crashes from 2014-2016 and has identified only 20 crashes that appeared to be “multi-threat”
- This may be a rare crash and there may be “near-misses” that are never reported

DC Pedestrian Crash Types

Pedestrian Action, 2015



DC Pedestrian Crash Types and Severity

Pedestrian Action by Severity, 2015

Pedestrian Action	Fatal	Disabling	Non Disabling	Complaint Not Visible	Other	No Injury	N/A	Unknown	Summary
With Signal In X-walk	0	6	41	86	6	22	5	5	171
Not In X-Walk	4	10	33	49	1	7	2	7	113
In X-Walk - No Signal	1	8	27	49	3	10	3	2	103
From Between Parked Cars	0	1	12	15	0	5	2	1	36
Against Signal In X-Walk	0	5	9	6	0	4	0	1	25
In Unmarked X-Walk	0	0	1	2	0	0	0	0	3
N/A	1	1	4	13	2	62	20	0	103
Other	3	8	27	54	5	23	1	10	131
Unknown	4	6	24	33	8	10	6	10	101

Pedestrians stuck in a crosswalk without a signal have the second highest crash severity.

Pedestrians Rally for Change on Wisconsin Ave. After Deaths

By Jackie Bensen and Andrea Swalec

Published at 11:37 PM EDT on Jun 18, 2015

The pedestrian safety group All Walks DC organized a pedestrian safety walk Thursdsay night to remember George Mina, 31, and Margaret Ruth Dickie, 79. They were hit and killed on Wisconsin Avenue in two separate crashes. News4's Jackie Bensen reports. (Published Thursday, June 18, 2015)

PHB install after multi-threat ped fatal –Wisconsin Ave. and Veazey Street, NW

DDOT stop line spec for PHBs:
20 ft. advance stop lines min.

FHWA Guidance on Uncontrolled Crosswalks

New marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:

A. The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or

B. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.

- 2009 MUTCD, Section 3B-18 (page 384)

FHWA Crosswalk Compliance Matrix

Table 1. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT >9000 to 12,000			Vehicle ADT >12,000 - 15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h
2 Lanes	C	C	P	C	C	P	C	C	N	C	P	N
3 Lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multi-Lane (4 or More Lanes) With Raised Median***	C	C	P	C	P	N	P	P	N	N	N	N
Multi-Lane (4 or More Lanes) Without Raised Median	C	P	N	P	P	N	N	N	N	N	N	N

- Zegeer Study, FHWA, 2002

DDOT Uncontrolled Crosswalk Policy Matrix

District Department of Transportation

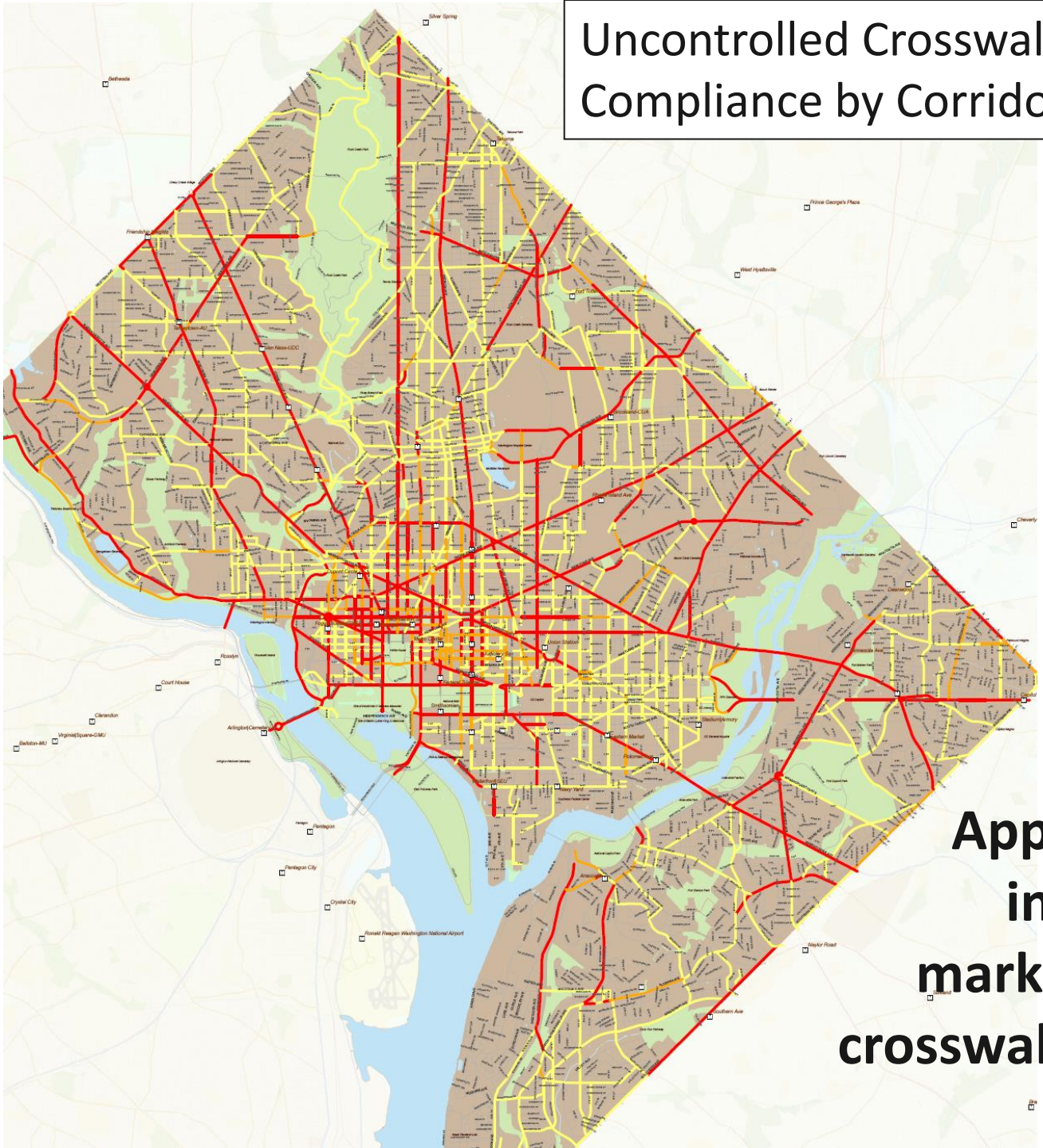
Table 1 - Proposed DC Uncontrolled Crosswalk Engineering Treatments

For roadways posted 30mph or less

Roadway Configuration	1,500 - 9,000 vpd	9,000 - 12,000 vpd	12,000 - 15,000 vpd	> 15,000 vpd
2 Lanes[1]	A	A	A or B	B or C
2 Lanes with CTL[1]	A	A	B	B or C
2 Lanes One Way	B	B	C	C
4 Lanes w/Raised Median[2]	B	B	C	C
3 Lanes No Median[3]	B	B	C	C
5 Lanes w/Raised Median[3]	B	B	C	C
6 Lanes w/Raised Median[4]	B	B	C	D
4 Lanes No Median[4]	B	B or C	C	D
5 Lanes No Median[3]	B	B or C	D	D
6 Lanes No Median[4]	B	B or C	D	D

Volumes Below 1500 vpd	Parallel Crosswalk and/or W11-2 assembly
Treatment A	High Visibility Crosswalk and Side of Street Ped Law Sign
Treatment B	In-Street Stop For Peds Sign and/or Traffic Calming
Treatment C	Activated Pedestrian Device (RRFB, In-road LEDs, etc.)
Treatment D	Something with a red signal (Ped Hybrid, Full Signal)

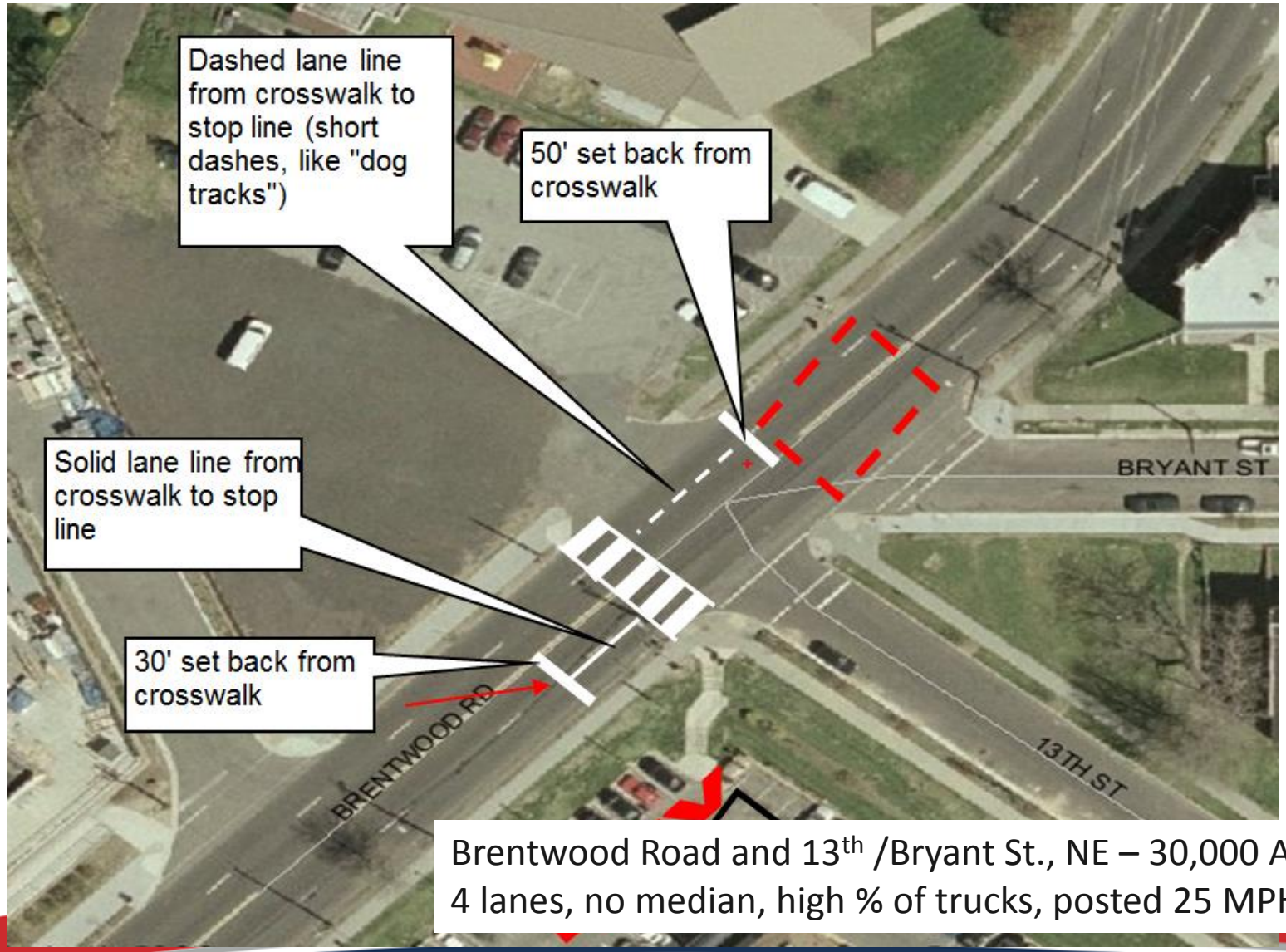
Uncontrolled Crosswalk Compliance by Corridor



Approximately 1000 intersections with marked, uncontrolled crosswalks in the District

Experience with Advance Stop Lines in the District

Advance Stop Line Test Location, 2008



Brentwood Road and 13th /Bryant St., NE – 30,000 ADT, 4 lanes, no median, high % of trucks, posted 25 MPH.

Advance Stop Line Test Location, 2008

RRFB-Advance Stop Line Evaluation Results- Baseline

BASELINE

Location: Brentwood Rd. & 13th St. NE Treatment: HiViz CW (w/ ped pylon) Day_X_ Night ___

Date: 4/23/08 Time: 9:30-10:30 am Observers: Branyan/Goodno/Hefferan
4/25/08 Time: 4:30-5:20 pm

Date/Crossings	Cars Yielding	Cars Not Yielding	Distance Cars yielded from crosswalk							Driver Passed Stopped Veh or Attempt	Car Behind Yielding Car Jams Brakes
			< 10 ft	Red 10ft-20ft	Orange 20ft-30ft	Yellow 30ft-50ft	Green 50ft-70ft	Blue 70ft-100ft	Red >100ft		
4/23:20	34	66	0	4	5	13	12	0	0	1	0
4/23:20	39	60	0	11	12	7	6	3	0	2	1
4/25:20	38	158	0	10	13	8	6	0	1	7	0
4/25:20	35	128	10	14	7	4	0	0	0	11	0
Totals	146	412	7%	27%	25%	22%	16%	2%	1%	21	1

Total vehicles: 558

41% of vehicles yielding 30' or farther from crosswalk

Overall Compliance rate: 26%

Best 20 crossings: 39%

Worst 20 crossings: 19%

Crosswalk Evaluation Protocol by Ron Van Houten

RRFB-Advance Stop Line Evaluation Results- 100 days

100-DAY FOLLOW UP

Location: Brentwood Rd. & 13th St. NE

Treatment: 2RFB + 1 Advance RFB Day_X_ Night ___

W/ advance stop lines. No Pylon

Dates: 8/14/08 Time: 9:30-10:30 am

8/21/08 Time: 4:30-5:07 pm

Obsrvs: Branyan/Goodno/Hefferan/Deutsch

Date/ Crossings	Cars Yielding	Cars Not Yielding	Distance Cars yielded from crosswalk							Driver Passed Stopped Veh or	Car Behind Yielding Car Jams
			< 10 ft	Red 10ft-20ft	Orange 20ft-30ft	Yellow 30ft-50ft	Green 50ft-70ft	Blue 70ft-100ft	Red >100ft		
8/14:20	50	11		3	7	2	16	8	4		
8/14:20	48	13	3	1	8	18	17	1	4	2	
8/21:20	58	13		3	10	23	20	1	1		
8/21:20	54	21		3	11	8	27	2	3		
Totals	210	58	1%	5%	17%	24%	38%	6%	6%	2	0

Total vehicles: 268

74% of yielding vehicles 30' or farther from crosswalk

Overall Compliance rate: 78%

Best 20 crossings: 82%

Worst 20 crossings: 72%

Other Approaches to Reduce Multi-threat crashes

- Good: Speed enforcement (automated or manual), lighting, refuge islands, curb extensions, advance stop/yield lines
- Better: More substantial countermeasures for multi-lane approaches- PHBs, RRFBs with advance stop/yield lines
- Best: Look for opportunities to eliminate multi-lane roadways (road diets/reconfigurations), 4 to 2, or 6 to 4

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d. delivers

Discussion

- Send us your questions 
- Follow up with us:
  - Libby Thomas thomas@hsrc.unc.edu
  - Mike Cynecki mcynecki@lee-eng.com
  - Charlie Zegeer zegeer@hsrc.unc.edu
  - George Branyan zegeer@hsrc.unc.edu
  - General Inquiries pbic@pedbikeinfo.org
- Archive at www.pedbikeinfo.org/webinars

Crash Animations

Developed to portray crash scenarios and support…

- Development of behavioral messages and campaigns
- Changes to roadway design
- Policy changes
- Conversations between community members and stakeholders

- Driver Education Instructors
- Law Enforcement
- General Public
- Advocacy Organizations
- Planners and Engineers
- Health Professionals

…and others

Available at www.pedbikeinfo.org/crashvideos