Informational Brief: Treatments for Uncontrolled Marked Crosswalks

Federal Highway Administration • Office of Operations • December 2017

The FHWA provides this information to practitioners about acceptable methods of enhancing pedestrian safety that can be implemented at uncontrolled marked crosswalks. The FHWA continues to be committed to helping practitioners reduce the number of pedestrian injuries and fatalities that occur at uncontrolled marked crosswalks each year.

There are numerous treatments that comply with the current edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD, see https://mutcd.fhwa.dot.gov/) that can be employed either individually or in varying combinations to enhance safety at uncontrolled marked crosswalks. These treatments range from various types of crosswalk markings to enhancing the edge of a standard Pedestrian Crossing warning sign with light-emitting diodes that can be activated by pedestrians. In addition to traffic control devices, roadway treatments, such as lighting or roadway narrowing, can enhance the safety of pedestrians using the crosswalk. The most appropriate treatment, or combination of treatments, will depend on the specific conditions of each site. Conducting a Road Safety Audit (see https://safety.fhwa.dot.gov/rsa/) is one way to identify potential treatments based on the roadway and user characteristics. Additional information to help in the selection of treatments for varying site conditions can be found in the following FHWA resources:

- **Pedestrian & Bicycle Safety Web site (http://safety.fhwa.dot.gov/ped_bike/)**
- **PEDSAFE Web site (http://www.pedbikesafe.org/PEDSAFE/)**
- **Safe Transportation for Every Pedestrian (STEP), an Every Day Counts initiative (https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm)**

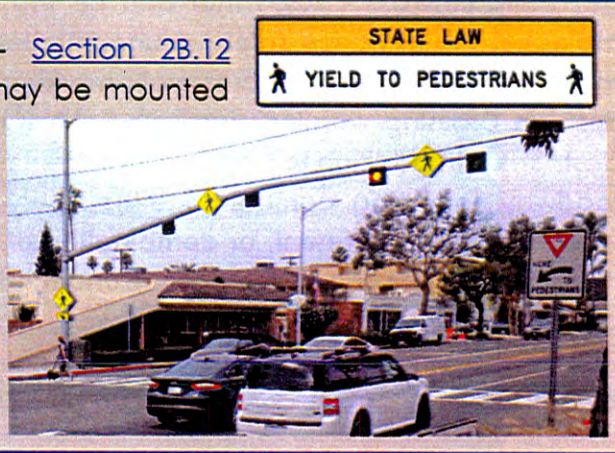
The following traffic control devices comply with the provisions of the 2009 Edition of the MUTCD and can be implemented for a particular crossing if their use would be appropriate based on the specific conditions at the site, such as roadway geometrics and traffic volumes and speeds:

Pedestrian-activated Flashing LEDs in the Border of a Warning Sign – Section 2A.07 describes the use of flashing white or yellow LEDs in the border of a pedestrian crossing warning sign. The flashing LEDs may be pedestrian activated to increase their effectiveness in making the crossing sign more conspicuous when a pedestrian desires to cross the roadway.

Enhanced Conspicuity of Pedestrian Crossing Signs – Section 2A.15 describes numerous methods that may be used to improve the conspicuity of regulatory or warning signs that are associated with pedestrian crossings.

Yield Here to (or Stop Here for) Pedestrians signs – Section 2B.11 describes pedestrian crossing signs that may be placed upstream from a crosswalk to inform drivers on multi-lane roadways that they are legally required to stop a specified distance in advance of the crosswalk if a pedestrian is crossing the roadway.

Overhead Pedestrian Crossing Signs – Section 2B.12 describes pedestrian crossing signs that may be mounted over the roadway to make it easier for drivers to notice that a crosswalk is present, especially from a greater distance than they would for post-mounted signs, and to inform them of their legal obligation to stop if a pedestrian is waiting to cross or in the process of crossing the roadway.

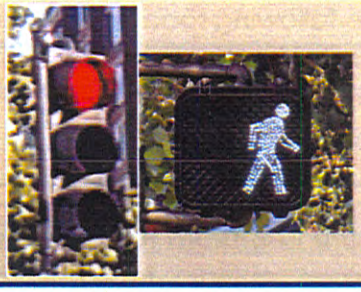


In-street Pedestrian Crossing Signs – Section 2B.12 describes pedestrian crossing signs that may be placed in the street to notify drivers that a crosswalk is present and to inform them of their legal obligation to stop if a pedestrian is waiting to cross or in the process of crossing the roadway.

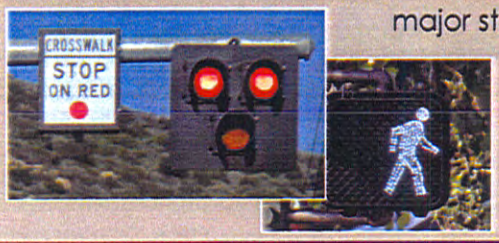
High-visibility Crosswalk Markings – Section 3B.18 describes the various types of crosswalk markings that may be used, including those that include diagonal or longitudinal lines to increase the visibility of the crosswalk to approaching drivers.

Additional information on crosswalk marking patterns is available in a recent study, *Crosswalk Marking Field Visibility Study* (Report No. FHWA-HRT-10-068).

Midblock Pedestrian Signals – Sections 4C.05 and 4C.06 describe warrant criteria that can be used in a signal needs study of a marked crosswalk location to determine if the installation of a midblock pedestrian signal is justified to assist pedestrians or schoolchildren in safely crossing the major street.



Pedestrian Hybrid Beacons – Section 4F.01 describes warrant criteria that can be used to determine if the installation of a pedestrian hybrid beacon is justified to assist pedestrians in safely crossing the major street.



Pedestrian-activated Warning Beacons – Section 4L.03 describes the use of a flashing yellow warning beacon to supplement a pedestrian crossing warning sign. The warning beacon may be pedestrian activated to increase its effectiveness in making the crossing sign more conspicuous when a pedestrian desires to cross the roadway.

In-roadway Warning Lights – Section 4N.02 describes pedestrian-activated yellow lights that may be installed in the roadway surface at an uncontrolled marked crosswalk location to warn drivers that a pedestrian is waiting to cross or in the process of crossing the roadway.

The following roadway features, which are not considered to be traffic control devices, can be implemented for a particular crossing if their use would be appropriate based on the specific conditions at the site, such as roadway geometrics and traffic volumes and speeds:

Curb Extensions (bulb-outs, neckdowns) – This feature, which is particularly beneficial in urban settings where on-street parking (either parallel or diagonal) is present, shortens the crossing distance and allows the pedestrian waiting to cross to be more visible to the approaching driver. Where physical construction is not immediately feasible, neckdown of the street width at the crosswalk can be accomplished on an interim basis using markings and flexible delineator posts to achieve a traffic calming effect similar to that of a curb extension.

Pedestrian Refuge Islands (median islands) – This feature, which is particularly beneficial on wide multi-lane roadways, allows pedestrians to cross a two-way street in two stages by finding a gap in one direction, and then stopping on a median island of sufficient width to wait while searching for a gap in the other direction of traffic.

Raised Crosswalks – This feature improves pedestrian safety by forcing drivers to slow down when traversing the crosswalk location.

Crosswalk Lighting – This feature improves pedestrian safety by allowing the pedestrian waiting to cross or in the process of crossing to be more visible to the approaching driver during nighttime conditions.

2018 Tell the TPO Survey

DRAFT REVISIONS TO 2016 SURVEY

The River to Sea Transportation Planning Organization (TPO) wants your input as we plan transportation improvements for Volusia County and parts of Flagler County. Please complete our survey online at www.TelltheTPO.com or mail back this copy. All responses received by ~~5/31/2016~~06/30/2018 will be eligible to enter a drawing for a free ~~iPad Mini~~2 night getaway for 2!

1a. Home Zip _____ If applicable: **Work/School Zip (if applicable)** _____

1b. Have you taken a River to Sea TPO "Tell the TPO" survey in the past? (Check one)

~~2014~~ ~~2016~~ Yes No

2~~4~~. What forms of transportation do you use regularly (3~~4~~ or more times per week)? Select all that apply.

- Walk
- Bicycle
- Drive Alone
- Carpool
- Bus
- SunRail

3~~5~~. If you do not walk or bicycle now, what prevents you from doing so? Select all that apply.

- Lack of pedestrian or bicycle facilities (sidewalks, marked crosswalks, paths, bike lanes, etc.)
- Safety concerns (too much traffic, roads too busy, vehicles too fast, sidewalks too close to roadway, etc.)
- Distance too far or takes too long to walk or bicycle
- No matter how many sidewalks or bicycle lanes are improved, I do not care to walk or bicycle
- I am not comfortable with my bicycle riding/walking ability
- I will not walk or ride a bicycle, even if pedestrian and bicycle facilities are improved ~~No matter how many sidewalks or bicycle lanes are improved, I do not care to walk or bicycle~~

4~~6~~. If you do not regularly use public transit buses, what improvements might make them a more attractive option for you? Select all that apply.

- More convenient bus stops or route locations
- Faster or more direct bus service
- More frequent and/or expanded hours for bus service
- Cleaner buses
- Lower fares
- I do not know enough about public bus service to make that choice
- I will not ride the bus, even with public transportation improvements

5~~7~~. If you do not regularly use SunRail, what improvements might make it a more attractive option for you? Select all that apply.

- More frequent and/or expanded hours for SunRail service
- Expand SunRail service to DeLand station
- Expand SunRail service beyond DeLand station
- Lower fares
- More parking at stations
- More effective feeder bus service
- I will not ride SunRail, even with public transportation improvements

6~~2~~. What is your overall level of satisfaction with the current transportation facilities in Volusia/Flagler Counties? *(Select one answer for each category. If you select 'dissatisfied' for any category, please provide specifics in the text block available at the end of this survey.)*

Rank 1-5: ~~Completely d~~Dissatisfied * Somewhat dissatisfied * Neutral * Somewhat satisfied * ~~Completely~~ Satisfied

- Sidewalks and crosswalks *(availability, maintenance conditions, etc.)*
- Trail system *(availability, trail conditions, logical connections, etc.)*
- Bicycle lanes *(accessibility, bicycle lane markings, pavement conditions, etc.)*
- Public transit service *(accessibility, routes connecting destinations, etc.)*
- Public transit shelters/benches *(availability, conditions)*
- Local neighborhood streets *(traffic, maintenance conditions, etc.)*
- Major streets *(traffic, maintenance conditions, etc.)*
- Interstate highways *(traffic, maintenance conditions, etc.)*

7.~~9.~~ As we prioritize spending on transportation projects, do you think we should invest more, the same, or less than we are spending now on the following?

Much more – More – The Same – Less – Much less ~~Less * The Same * More~~

- Improving roadway operations *(better traffic signal timings, adding or extending turn lanes, etc.)*
- Implementing technology to improve safety and efficiency of traffic operations *(e.g. variable message signs on highways, coordinated traffic signals, real-time mobile traffic information, etc.)*
- Building new roadways
- Adding lanes to existing roadways
- Traffic calming measures *(e.g. roundabouts, speed tables, etc.)*
- Improving/adding bus service
- Improving/adding SunRail service
- Encouraging carpooling *(e.g. communication and/or incentives)*
- Adding/Improving multi-use trails
- Improving walking conditions *(e.g. sidewalks and crosswalks)*
- Improving bicycling conditions *(bike lanes, wayfinding, paved shoulders, etc.)*
- ~~Sidewalks and crosswalks~~
- ~~Trails~~
- ~~Bicycle facilities~~

- ~~Bus service~~
- ~~SunRail~~
- ~~Improving conditions on existing roadways~~
- ~~New roadways~~

8~~10~~. New transportation technology is ~~most~~ important for which of the following *(~~Rank~~ Score each option from 1 to 5, with 1 being the most important and 5 being the least important. Scores ~~Rankings~~ may be used multiple times.)* ~~*(Rank from 1 to 5 where 1 is most important and 5 is least important)*~~

1 2 3 4 5

- Improving the flow of vehicle traffic
- Helping transit vehicles arrive on time or have shorter travel times
- Reducing freight shipping travel times
- Providing real-time information to drivers / transit riders / pedestrians *(e.g. via mobile devices, variable message signs on roadways, etc.)*
- Decreasing roadway crashes

~~**3. In order to improve driving in our area, do you think we should invest more, the same, or less in the following? (Select one for each):**~~

~~Less * The Same * More~~

- ~~Improving roadway operations *(better traffic signal timings, adding or extending turn lanes, etc.)*~~
- ~~Implementing technology to improve safety and efficiency of traffic operations (e.g., variable message signs on highways, coordinated traffic signals, real-time mobile traffic information, etc.)~~
- ~~Building new roadways~~
- ~~Adding lanes to existing roadways~~
- ~~Encouraging carpooling~~
- ~~Improving walking conditions~~
- ~~Improving bicycling conditions~~
- ~~Improving transit~~

~~**8. Local funding is required to pay for additional public transit (SunRail and buses). What funding sources would you support to expand transit service? Check one.**~~

- ~~Increased Ad valorem taxes (property taxes)~~
- ~~A transit impact fee for new development~~
- ~~An overlay tax district for urban areas to support mass transit~~
- ~~A general sales tax of one cent per dollar~~
- ~~A general sales tax of ½ cent per dollar~~
- ~~Yes, I support additional funding sources for transit, but would need more information to suggest a preferred method of funding~~
- ~~No, I do not support consideration of a dedicated funding source for transit~~

~~11.~~ **Optional Questions** **Please describe yourself** *(This is optional, but important information that helps us know if we've reached all types of travelers within our area):* ~~**(This information helps us know if we've reached all types of travelers within our area):**~~

a. Age __<16 __16 to 25 __26 to 40 __41 to 65 __>65
b. Gender ___Female ___Male
c. Work Status: ___Employer ___Employee ___Student ___Retiree ___Other _____
d~~c~~. Race/Ethnicity
___White ___Hispanic/Latino __Black/African American __Asian __Other
e~~d~~. Annual income
_<$25,000 $25,000 to $45,000 $45,001 to $100,000 $100,001 to $150,000 >$150,000

If you want to be eligible to win a free ~~iPad Mini~~2 Night Getaway for 2, please provide your name, ~~and~~ email address and phone number below. PUBLIC RECORDS NOTICE: The River to Sea TPO is governed by the State of Florida public records law. Information we receive may be disclosed to any person making a public records request in accordance with Chapter 119 Florida Statutes. This information is for prize notification purposes only.~~ ~~, and for contact info purposes if you would like additional information from the TPO.~~

Name_____ Email_____ Phone number_____

Please let us know if you would like additional information on: (Select all that apply*)
____ River to Sea Transportation Planning Organization *(meetings, issues and events)*
____ reThink Your Commute *(ridesharing, carpooling, park-and-ride services, etc.)*
____ Votran *(bus schedules, updates, route changes, etc.)*
____ Flagler County Public Transportation *(news, updates, etc.)*
____ SunRail *(news, updates, schedule, etc.)*
____ *No thank you*
** If you check any box other than the last one, your email address will be shared with the agency you indicated.*

As we plan transportation improvements in Volusia and Flagler Counties, do you have any additional concerns, suggestions, problems, and/or recommendations for us? _____
_____ BLOCK OF SPACE FOR ANSWER

2018 CANDIDATE QUESTIONS – NEW QUESTIONS

CANDIDATE QUESTION A

How impactful is sea-level rise on our community's current transportation system *(e.g. loss of roadway use due to flooding/erosion, interruptions to evacuation routes, degrading of transportation infrastructure, loss of access to/use of facilities, storm and drain flooding)?*

Very impactful – Somewhat Impactful – No Opinion – Minimally Impactful – Not at all impactful

CANDIDATE QUESTION B

Please indicate below whether you agree or disagree with the following statement:

When considering transportation improvements in our local community, those that directly benefit tourism should be a priority *(e.g. beautification in key tourism areas, increasing visitor safety, easing event-related congestion, better wayfinding/signage).*

Strongly Agree – Agree – No Opinion – Disagree – Strongly Disagree

CANDIDATE QUESTION C1

Please select what you feel are the three best features of our current transportation system:

- Traffic flow
- Roadway conditions
- Traffic signal timing
- Bicycle lanes/facilities
- Sidewalks/crosswalks
- Bus service
- SunRail service
- Roadway lighting/landscaping
- Other _____

CANDIDATE QUESTION C2

Please select one frustration you have with our current transportation system:

- Traffic flow
- Roadway conditions
- Traffic signal timing
- Bicycle lanes/facilities
- Sidewalks/crosswalks
- Bus service
- SunRail service
- Roadway lighting/landscaping
- Other _____

CANDIDATE QUESTION D

If you had $100 to fund transportation, how would you spend it? *(You may choose more than one and allocate portions of the $100 in the column to the right of the checkbox.)*

- Improved transit service (bus and SunRail)
- Widen existing roadways
- Construct new bike lanes and trails/greenways
- Pedestrian/bicycle connectivity
- Improve roadway safety
- Maintain existing facilities
- Street appearance (lighting and landscaping)
- Build new streets and roadways

CANDIDATE QUESTION E

Does the local community provide adequate transportation options for:

- Seniors
- Low-income travelers
- Tourism workers
- Students
- Commuters
- Disabled travelers

GLUE STRIP

2016 Tell the TPO...

A Community Transportation Survey

The River to Sea Transportation Planning Organization (TPO) wants your continued input as we plan transportation improvements for Volusia County and parts of Flagler County. Please complete our survey online at www.TelltheTPO.com or mail back this copy. ***All responses with contact information received by 5/31/2016 will be eligible to enter a drawing for a free iPad Mini!***

1. Home Zip _____ If applicable: **Work/School Zip** _____

2. What is your overall level of satisfaction with the current transportation facilities in Volusia/Flagler Counties?
(Rank: 1 = completely dissatisfied; 2 = somewhat dissatisfied; 3 = neutral; 4 = somewhat satisfied; 5 = completely satisfied):

a. Sidewalks and crosswalks *(availability, maintenance conditions, etc.)*	1	2	3	4	5
b. Trail system *(availability, trail conditions, logical connections, etc.)*	1	2	3	4	5
c. Bicycle lanes *(accessibility, bicycle lane markings, pavement conditions, etc.)*	1	2	3	4	5
d. Public transit service *(accessibility, routes connecting destinations, etc.)*	1	2	3	4	5
e. Public transit shelters/benches *(availability, conditions)*	1	2	3	4	5
f. Local neighborhood streets *(traffic, maintenance conditions, etc.)*	1	2	3	4	5
g. Major streets *(traffic, maintenance conditions, etc.)*	1	2	3	4	5
h. Interstate highways *(traffic, maintenance conditions, etc.)*	1	2	3	4	5

3. In order to improve driving in our area, do you think we should invest more, the same or less in the following? *(Select one for each):*

a. Improving roadway operations *(better traffic signal timings, adding or extending turn lanes, etc.)*	More	The same	Less
b. Implementing technology to improve safety and efficiency of traffic operations *(e.g. variable message signs on highways, coordinated traffic signals, real-time mobile traffic information, etc.)*	More	The same	Less
c. Building new roadways	More	The same	Less
d. Adding lanes to existing roadways	More	The same	Less
e. Encouraging carpooling	More	The same	Less
f. Improving walking conditions	More	The same	Less
g. Improving bicycling conditions	More	The same	Less
h. Improving transit	More	The same	Less

4. What forms of transportation do you use regularly (4 or more times per week)? *(Check all that apply):*

☐ Walk ☐ Bicycle ☐ Drive alone ☐ Carpool ☐ Bus ☐ SunRail

5. If you do not walk or bicycle now, what prevents you from doing so? *(Check all that apply):*

- ☐ Lack of pedestrian or bicycle facilities *(sidewalks, marked crosswalks, paths, bike lanes, etc.)*
- ☐ Safety concerns *(too much traffic, roads too busy, vehicles too fast, sidewalks too close to roadway, etc.)*
- ☐ Distance too far or takes too long to walk or bicycle
- ☐ No matter how many sidewalks or bicycle lanes are improved, I do not care to walk or bicycle

6. If you do not regularly use public transit buses, what improvements might make them a more attractive option for you? *(Check all that apply):*

- ☐ More convenient bus stops or route locations
- ☐ Faster or more direct bus service
- ☐ More frequent and/or expanded hours for bus service
- ☐ Cleaner buses
- ☐ Lower fares
- ☐ I will not ride the bus even with public transportation improvements

7. If you do not regularly use SunRail, what improvements might make it a more attractive option for you? *(Check all that apply):*

- ☐ More frequent and/or expanded hours for SunRail service
- ☐ Expand SunRail service to DeLand station
- ☐ Expand SunRail service beyond DeLand station
- ☐ Lower fares
- ☐ I will not ride SunRail even with public transportation improvements
- ☐ More parking at stations
- ☐ More effective feeder bus service

Continue Survey »

To complete this survey online visit www.TelltheTPO.com

8. Local funding is required to pay for additional public transit (SunRail and buses). What funding sources would you support to expand transit service? *(Check one):*

- ☐ Increased Ad valorem taxes *(property taxes)*
- ☐ A transit impact fee for new development
- ☐ An overlay tax district for urban areas to support mass transit
- ☐ A general sales tax of one cent per dollar
- ☐ A general sales tax of ½ cent per dollar
- ☐ Yes, I support additional funding source for transit, but would need more information to suggest a preferred method of funding
- ☐ No, I do not support consideration of a dedicated funding source for transit

9. As we prioritize spending on transportation projects, do you think we should invest more, the same, or less than we are spending now on the following? *(Select one for each):*

a. Sidewalks and crosswalks	More	The same	Less
b. Trails	More	The same	Less
c. Bicycle facilities	More	The same	Less
d. Bus service	More	The same	Less
e. SunRail	More	The same	Less
f. Improving conditions on existing roadways	More	The same	Less
g. New roadways	More	The same	Less

10. New transportation technology is most important for which of the following:
(Rank from 1 to 5 - where 1 is most important and 5 is least important):

a. Improving the flow of vehicle traffic	1	2	3	4	5
b. Helping transit vehicles arrive on time or have shorter travel times	1	2	3	4	5
c. Reducing freight shipping travel times	1	2	3	4	5
d. Providing real-time information to drivers / transit riders / pedestrians *(e.g. via mobile devices, variable message signs on roadways, etc.)*	1	2	3	4	5
e. Decreasing roadway crashes	1	2	3	4	5

11. Optional Questions *(This information helps us know if we've reached all types of travelers within our area):*

a. Age ☐ <16 ☐ 16 to 25 ☐ 26 to 40 ☐ 41 to 65 ☐ >65

b. Gender ☐ Female ☐ Male

c. Race/ Ethnicity ☐ White ☐ Hispanic/Latino ☐ Black/African American ☐ Asian ☐ Other

d. Annual income ☐ <$25,000 ☐ $25,000 to $45,000 ☐ $45,001 to $100,000 ☐ $100,001 to $150,000 ☐ >$150,000

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Name _____ Email _____

Please let us know if you would like additional information on:

a. River to Sea Transportation Planning Organization *(meetings, issues, and events)*	☐ Yes	☐ No
b. ReThink *(ridesharing, carpooling, park-and-ride services, etc.)*	Yes	No
c. Votran *(bus schedules, updates, route changes, etc.)*	☐ Yes	☐ No
d. SunRail *(news updates, schedule, etc.)*	Yes	No

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RIVER TO SEA TPO
Transportation Planning Organization
VISION · PLAN · IMPLEMENT

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