TEM

Traffic Engineering Manual

JANUARY 2024

FDOT

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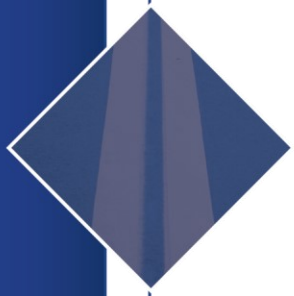

SPECIAL OPERATIONAL TOPICS

ADOPTION PROCEDURE

1.1 PURPOSE

The purpose of this manual is to provide traffic engineering standards and guidelines to be used on the State Highway System (SHS) by the Department's ***District Traffic Operations Offices***.

1.2 AUTHORITY

The ***Traffic Engineering Manual (TEM)*** has been adopted pursuant to the authority conferred within ***Sections 20.23(4)(a)*** and ***334.048(3)***, Florida Statutes (F.S.)

1.3 SCOPE

The ***Traffic Engineering Manual (TEM)*** is intended to be used by the Department, engineers, consultants, and contractors to develop projects that meet Florida policies and standards.

1.4 REFERENCES

Chapter 316, F.S. State Uniform Traffic Control

Rule 14-15.010, F.A.C. Manual on Uniform Traffic Control Devices (MUTCD)

Topic No. 025-020-002, Standard Operating System

1.5 DISTRIBUTION

The official recipients of this manual are the ***District Traffic Operations Engineers (DTOEs)*** and their staff, and the ***State Traffic Engineering and Operations Office*** managers and staff.

1.6 AVAILABILITY

The ***TEM*** is available on the Department's ***State Traffic Engineering and Operations Office website***.

1.7 REGISTRATION

Users of the ***TEM*** interested in receiving automatic notifications of revisions by e-mail can subscribe to the Department's website. As required by ***Section 283.55, F.S.***, by March 1st of each odd-numbered year, we will survey e-mail addresses from our current registration list and purge any outdated registrations.

1.8 REVISIONS

The ***State Traffic Operations Engineer (STOE)*** and the ***DTOEs*** constitute the **Manual Review Committee**.

Items warranting immediate change are made with the approval of the ***STOE***, after passing a majority vote of the **Manual Review Committee** and consultation with affected parties. Statewide ***DTOE*** meetings are held every six months, and a major agenda item will be any additions/changes either necessary or recommended to the ***TEM***.

Only substantive revisions or policy-related issues, as determined by the **Manual Review Committee**, will be reviewed for approval by the Chief Engineer.

The approved revisions are posted on the ***State Traffic Engineering and Operations Office*** website during the normal publishing cycle (first week of November).

An e-mail notification is sent to all registered ***TEM*** holders that cover revisions posted on the website.

1.9 TRAFFIC ENGINEERING VARIATIONS

The Department's traffic engineering criteria and standards contained in this manual are established by the recommended practice of the ***Manual on Uniform Traffic Control Devices (MUTCD)*** or the ***American Association of State Highway and Transportation Officials (AASHTO)*** guidelines or by specific research conducted. There may be site-specific conditions or certain circumstances that may warrant a variation from the criteria or standards referenced herein. A variation is a one-time event on a case-by-case basis. This may lead to updates for the ***TEM.*** A request for and subsequent approval of any variation from those contained in the ***TEM*** is subject to the procedure established below in ***Section 1.9.1***.

1.9.1 TRAFFIC ENGINEERING VARIATION PROCESS

Submit a formal written request from a local governmental agency, engineering consultant, or other interested party to the appropriate ***DTOE***. Include the following as appropriate:

- Proposed location (State Road ID, Mile Post).
- Applicable standard or criterion (Chapter & Section Number).

- Statement of the reasons why the required criteria or standards are not applicable to the site-specific conditions.
- Statement of the proposed variation.
- Statement of how the proposal can be as safe by not following the criteria or standard.
- Description of other impacts (operations, environmental and community needs).

The District Traffic Operations Staff will review and evaluate the proposed variation request according to the following guidelines:

- Whether the variation is necessary for completing a project.
- Whether other alternatives have been considered that would meet current
- TEM criteria or standards.
- Whether the proposed variation has been used in other areas – local, state, or national. Provide examples, including before and after data, if available.
- Whether the proposed variation will require ***Federal Highway Administration*** approval or coordination.

If the District Staff believes a variation may be warranted, the ***DTOE*** shall forward the request for variation to the ***State Traffic Engineering and Operations Office*** for review.

If the District Staff believes a variation is not warranted, the ***DTOE*** shall document the reasons and advise the requestor of the findings.

Upon review by the ***State Traffic Engineering and Operations Office*** Staff, the ***STOE*** shall submit a memorandum concerning the decision for requested variation, including any special conditions or requirements to the appropriate ***DTOE***. The ***STOE*** may consult with the ***DTOEs*** to obtain feedback prior to approving and authorizing the requested variation.

The ***https://www.fdot.gov/traffic/default.shtm*** memorandum serves as the formal document authorizing or denying the requested variation from the applicable ***TEM*** criteria or standard and shall be filed electronically on the ***State Traffic Engineering and Operations Office*** SharePoint site for future reference.

1.10 FORMS

See ***https://pdl.fdot.gov/*** for forms referenced in this manual.

1.11 RESOURCES

See all the Transportation Symposium presentations in the following link:
https://transportationsymposium.fdot.gov/

PROCEDURE

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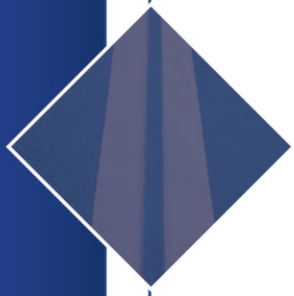
SIGNALS

MARKINGS



SPECIAL OPERATIONAL TOPICS

Section 2.1

USE OF SLIPPERY WHEN WET SIGNS

2.1.1 CONDITIONS FOR USE

The ***District Traffic Operations Engineer (DTOE)*** shall request the District Maintenance Engineer to erect SLIPPERY WHEN WET (***W8-5***) signs at locations where it has been determined there is a slippery pavement condition. A slippery pavement is defined when a standard friction test at 40 mph has determined the skid numbers are less than 25.

When the posted highway speed is above 45 mph, SLIPPERY WHEN WET signs should be installed when the skid numbers are less than 30, and also one of the following conditions is met:

(1) When the Safety Ratio (Actual Crash Rate divided by the Critical Crash Rate) is greater than or equal to one.

(2) Any downgrade greater than 3 percent.

(3) At intersections with traffic signals.

2.1.2 LOCATION AND PLACEMENT

Additional signs may be needed at locations with the following conditions:

(1) **Horizontal Curves**. SLIPPERY WHEN WET signs are to be placed prior to the CURVE sign with an advisory speed plate. The ball-bank indicator provides a reasonable speed through the curve; however, a lower speed may be desired if there are known extraordinary hazards such as hydroplaning.

(2) **Hydroplaning.** Generally, hydroplaning only occurs at speeds above 47 mph; however, excessive runoff across travel lanes may produce hydroplaning at lower speeds. Multi-lane facilities, rutted lanes, built-up shoulders, and downgrades are candidate locations. If excessive water buildup cannot be corrected, then SLIPPERY WHEN WET signs may be appropriate even when skid numbers are greater than 30.

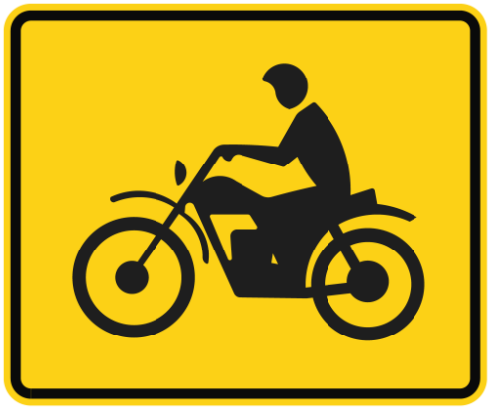
(3) **Ramp and Bridge Decks.** Interchange exit or entrance ramps on sharp curves and on a downgrade may present a hazardous condition if the pavement is also slippery. Special attention should be given to ramps with compound curves. A pavement friction inventory is normally maintained for interchange ramps; however, special tests, at speeds less than 40 mph can be requested. SLIPPERY WHEN WET signs should be used with an advisory exit speed sign, RAMP XX MPH (***W13-2***).

SLIPPERY WHEN WET signs shall be placed in advance of all moveable and non-moveable steel deck bridges. These signs should be placed in accordance with ***Table 2C-4 of the MUTCD***.

2.1.3 ENHANCEMENT

When roadway surface conditions exist that might adversely affect a motorcyclists' ability to maintain control of their motorcycle under wet conditions, a MOTORCYCLE ***(W8-15P)*** plaque as shown in ***Figure 2.1-1*** may be mounted below the warning sign. Additional warnings should be placed at appropriate intervals where the condition exists.

Figure 2.1-1. Motorcycle Plaque



2.1.4 NOTIFICATION

(1) The District Maintenance Engineers will promptly notify in writing the ***DTOE*** when SLIPPERY WHEN WET signs have been erected.

(2) The ***DTOE*** shall request the District Maintenance Engineer to remove SLIPPERY WHEN WET signs that are no longer warranted under the above provisions.

Section 2.2

OVERHEAD STREET NAME SIGNS

2.2.1 PURPOSE

This section defines guidelines for the installation of overhead street name signs at signalized intersections. Street name guide signs for most streets that intersect with a road on the state highway system are normally furnished, installed, and maintained by the appropriate local government. However, at signalized intersections on the state highway system, larger overhead street name signs should be used. These signs may be furnished and installed, by the Department.

2.2.2 STANDARDS

(1) Street name signs shall only be used to identify cross streets. They are not intended to identify destinations such as cities or facilities.

(2) The word Street, Boulevard, Avenue, etc., may be abbreviated or deleted to conserve sign panel length. However, if confusion would result due to similar street names in the area, for example Seminole Street and Seminole Avenue, this deletion should not be made.

(3) When a cross street is known by both route number and a local name, use of the local name is preferred on the overhead street name signs since the route number is identified on route markers along the route.

(4) When a cross street has dual local street name designations, for example N.W. 31 Avenue and Martin Luther King Jr. Boulevard, both names may be used on the overhead street name signs. However, the Department is responsible for the primary designation (i.e., name shown on the Official Florida Transportation Map). If a secondary designation is approved by local resolution, the local government shall be responsible for the installation of this secondary designation.

(5) When a cross street has a different name on each side of the intersection, both names shall be shown on the overhead street name sign, two signs should be used with one on the left and one on the right side of the intersection. In some instances, the type of signal span design may dictate the need for the use of a single sign with both names. When used, the names should be separated and accompanied by directional arrows, with the left name displayed over the right.

(6) The display of block numbers is not required when two street names with arrows are provided on a single panel.

2.2.3 INSTALLATION

(1) The location of the overhead street name sign on a signal strain pole and/or mast arm may vary. However, it shall not interfere in any way with the motorist view of the signal heads.

(a) For static signs, the preferred installation is shown in the ***Standard Plans, Index 659-010***.

(b) For internally illuminated signs, the preferred installation is shown in the ***Standard Plans, Index 700-050***.

(2) In the case of separate street names on each side of the street, one sign should be placed to the right of the centerline and signal heads and the other to the left side of the centerline and signal heads.

2.2.4 SIGN DESIGN

(1) Overhead street name signs shall be designed in accordance with ***Section 2D.43 of the MUTCD***.

(2) The sign panel used for overhead street name signs shall be 24 inches in height with length determined by legend.

(3) At a minimum, 8-inch upper and 6-inch lower case lettering for the street name and 6-inch all uppercase lettering for the block numbering text on the second line shall be used. The preferred font is Series E-Modified; however, Series E may be used to accommodate the amount of legend. An example of this design is shown in ***Figure 2.2-1***.

(4) When structurally possible, overhead street name signs should be designed in compliance with Federal Highway Administration (FHWA) recommendations for older drivers (***Section 2D.43 of the MUTCD*** and ***Recommendation I-J-2 of the FHWA Design Handbook for Older Drivers and Pedestrians***). When used, the minimum lettering size should be 12-inch upper case with 9-inch lower case.

(5) Internally illuminated signs should be used whenever possible to provide better night-time visibility, and to benefit older drivers. When used, the devices shall be on the ***Department's Approved Products List (APL)***. They shall be designed using a white message on a green background, and if a border is used it shall be white.

(6) Overhead street name signs using standard panels shall have a white message and border on a green background. If internally illuminated overhead street name signs are not installed, high intensity sheeting should be used for added visibility at night.

(7) Sign panels should be two-sided in order to provide for a sign display on both the right and left side of each intersection approach.

Figure 2.2-1. Overhead Street Name Sign

Section 2.3

SIGNS AND MARKINGS AT DIVIDED HIGHWAYS AND CROSSROADS

The Department's standards for this section are shown in the current edition of the ***Standard Plans, Indexes 711-001***, and in ***FDM 230***.

Section 2.4

SYMBOL SIGNS ON THE STATE HIGHWAY SYSTEM

2.4.1 DEFINITIONS

Symbol Sign. Sign used to inform, advise, regulate, or warn of an impending situation where a symbol depicts the approaching situation or information desired.

Word Message Sign. Sign used as an alternate to a symbol sign describing by word message an approaching situation or information desired.

Educational Plaque. A word message sign used jointly with a new symbol sign to familiarize the motoring public with the meaning of the symbol displayed.

Symbol signs are more easily recognized and better understood by the motoring public. The ***MUTCD*** encourages their use as the primary advisory or warning sign.

With Florida's large tourist population, a broader use of symbol signs is a desirable and important step toward the greater safety and facilitation of traffic. Accordingly, it is appropriate to require the use of symbol signs over word message signs.

2.4.2 CONDITIONS FOR USE

(1) A symbol sign, if available, shall be used where an advisory, regulatory, or warning sign is warranted to depict an approaching situation or provide information. Word message signs as alternates to symbol signs and educational plaques are generally less effective. However, there may be circumstances where a word message sign is more appropriate. In these cases, the ***DTOE*** should maintain documentation of the exception in district files.

(2) Any proposed new symbol will require approval as provided in ***Section 1A.10 of the MUTCD***. All requests for a new symbol shall be sent to the ***State Traffic Operations Engineer (STOE)*** for review and processing with the Federal Highway Administration.

(3) When a new symbol sign is utilized, an educational plaque may be used to explain the new symbol by word message as provided in ***Section 2A.12 of the MUTCD***.

Section 2.5

DESTINATION-DISTANCE SIGNS AT RURAL INTERSTATE AND FREEWAY EXIT RAMP TERMINALS

2.5.1 PURPOSE

The purpose of this section is to provide standards and statewide sign design consistency for Destination-Distance signs.

2.5.2 BACKGROUND

Destination signs (***D1*** series) provide guidance information in the form of a destination name and the direction to the destination. Distance Signs (***D2*** series) indicate the distance to the destination shown on the sign. Destination and distance signs are especially valuable to motorists unfamiliar with a particular area.

2.5.3 CONDITIONS FOR USE

(1) Combined DESTINATION-DISTANCE (***D1-1a, D1-2a,*** and ***D1-3a***) signs should be used at exit ramp terminals on rural interstates and freeways in lieu of DESTINATION (***D1-1***) signs.

(2) The combined DESTINATION-DISTANCE sign shall only be used facing exiting traffic from rural interstate and freeway ramps.

(3) Existing DESTINATION signs at exit ramp terminals should be replaced with the combination DESTINATION-DISTANCE signs during the course of routine sign replacement activities.

(4) Distances should be determined from the best information available and reflect the distance from the ramp terminal to a control point in the named destination. Control points for all Florida cities that are listed on the official ***Florida Distance Chart*** are maintained by the Transportation Data and Analytics Office.

(5) In the case of places not on the chart, a control point may be defined by the district, usually as the junction of two main routes within the urban area.

(6) Distance figures shall be shown just after the destination name. When a sign must accommodate destinations in different directions, a line should divide the destinations as shown in ***Figure 2D-7 of the MUTCD***.

(7) Signs shall have a white legend on green background. The signs shall be individually detailed in plans and use as a minimum 8-inch numerals and 8/6 upper/lower case lettering.

Section 2.6

BRIDGE SIGNS AND MARKINGS

2.6.1 BRIDGE AND SIGN STRUCTURE LOW CLEARANCE SIGNS

(1) A LOW CLEARANCE (***W12-2***) sign shall be placed at the Stopping Sight Distance of every bridge or structure having a minimum vertical clearance of 14 feet 6 inches or less except as noted below.

(2) In urban areas, where advance signs could be blocked by traffic or where competition with advertising signs make advance signs ineffective, the LOW CLEARANCE sign or marking should be placed on the bridge beam or equivalent.

(3) A LOW CLEARANCE sign or marking shall also be placed on the bridge beam or equivalent of every bridge or structure having a minimum vertical clearance of 13 feet 6 inches or less.

(4) LOW CLEARANCE signing and marking shall conform to additional criteria outlined in ***Section 2C.27 of the MUTCD***.

2.6.2 BRIDGE PIER MARKING

(1) Bridge piers shall be marked only when they are not protected by a guardrail or a barrier and are less than 30 feet from the near edge of pavement.

(2) The marking used shall be a Type 3 object marker 12 x 36-inch panel with alternating black and yellow stripes sloped down at an angle of 45 degrees toward the side of the pier which traffic is to pass.

(3) For additional emphasis, a large surface bridge pier may be treated with sheeting having diagonal stripes at least 12 inches wide and similar in design and application to the Type 3 object marker.

2.6.3 CROSS ROAD NAME SIGNS ON OVERPASSES

These signs will no longer be installed, except as requested by law enforcement agencies or emergency rescue organizations. This includes signs mounted on the bridge beam or on posts. When this request is approved, the signs should use 10.67-inch Series E Modified lettering.

2.6.4 NARROW BRIDGE TREATMENT

Signs and markings on narrow bridge approaches shall be as shown in the current edition of the ***Standard Plans, Index 700-106***.

2.6.5 GUIDE SIGNS ON OVERPASSES

See ***Section 2.6, Volume 3 of the Structures Manual*** for limitations on the use of bridge mounted signs.

2.6.6 SWING-STYLE PEDESTRIAN GATE SIGNS ON MOVABLE BRIDGES

Mount a NO PEDESTRIAN OR BICYCLES BEYOND GATE sign to the front of each swing-style pedestrian gate on movable bridges as shown in the ***Structures Design Guidelines, Section 8.1.9.*** Sign details are available in the ***Department's Sign Library***.

Figure 2.6-1 Swing Gate Sign

Section 2.7

PLACE NAME SIGNS ON THE STATE HIGHWAY SYSTEM

This section has been rescinded since it is now included in ***Rule Chapter 14-51, Part IV of the Florida Administrative Code***.

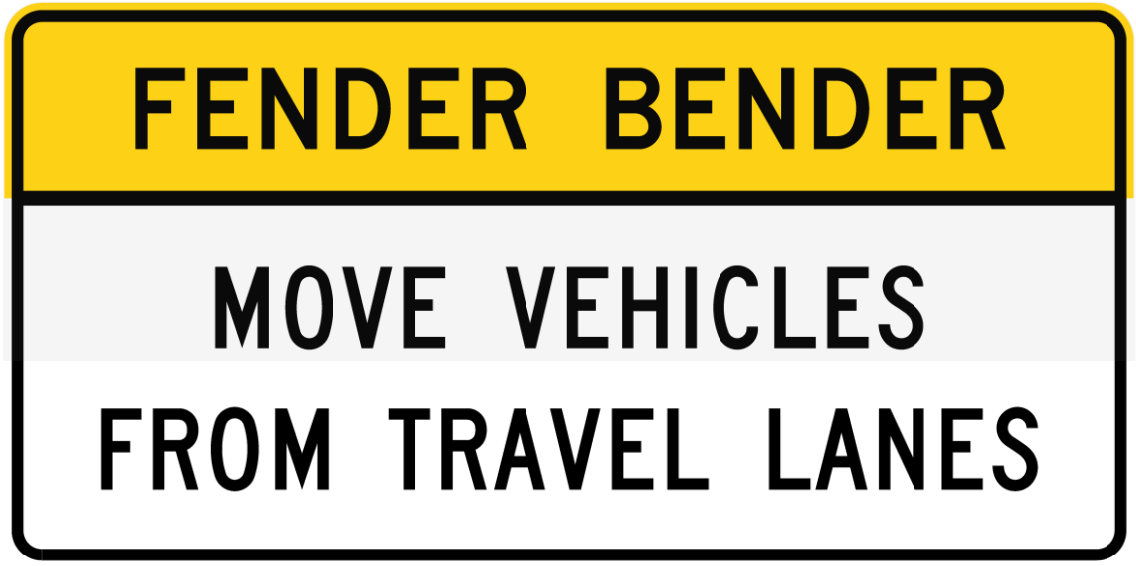
Section 2.8

MOVE VEHICLES FROM TRAVEL LANE SIGN

2.8.1 SIGN DESIGN

MOVE VEHICLES FROM TRAVEL LANE ***(R16-4)*** signs are found in ***Section 2B.65 of the MUTCD***. These signs are used in support of ***Section 316.061(2), F.S.*** and replaces the experimental MOVE ACCIDENT VEHICLES FROM TRAVEL LANE sign (formerly ***FTP 27-06 and FTP-28-06.***)

Figure 2.8-1. Move Vehicles from Travel Lane Sign



2.8.2 LOCATION AND PLACEMENT

(1) On non-limited access highways a MOVE VEHICLES FROM TRAVEL LANE ***(R16-4)*** sign may be used in urban areas when their use will reduce queue lengths and delays, remove interference with traffic signal vehicle detectors, or enhance intersectional capacity. The 42 x 84 inch standard panel uses 6-inch Series C lettering. The 24 x 52 inch standard sign panel has 4-inch Series C letters.

(2) On limited access highways, a 54 x 120 inch MOVE VEHICLES FROM TRAVEL LANE ***(R16-4)*** sign using 8-inch Series D lettering may be placed on the right side of urban freeways downstream from entrance ramps when their use will improve driver behavior concerning unnecessary and unlawful constriction of freeway travel lanes due to traffic crashes.

(3) The MOVE VEHICLES FROM TRAVEL LANE ***(R16-4)*** sign details are available in the ***Standard Highway Signs and Markings Book – Interim Releases for New and Revised Signs***.

(4) For permanent installations, specify yellow retroreflective background for the FENDER BENDER enhancement.

(5) Mounting heights and lateral clearances should adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards of frangibility.

Section 2.9

NO PASSING ZONE SIGNS

2.9.1 PURPOSE

This section defines guidelines on the use of NO PASSING ZONE pennant signs.

2.9.2 BACKGROUND

These signs are used in support of ***Section 316.0875, F.S.***, and ***Section 2C.45 of the MUTCD*** establishes the standards for NO PASSING ZONE pennant signs installed on public roadways.

2.9.3 CONDITIONS FOR USE

(1) The NO PASSING ZONE ***(W14-3)*** pennant sign, as shown in ***Figure 2.9-1*** shall not be used routinely at the beginning of all no passing zones.

(2) The NO PASSING ZONE pennant sign may be installed as a supplement to pavement markings that establish a no passing zone under the following circumstances:

(a) At locations where pavement markings indicating no passing zones are not visible sufficiently in advance to give the driver adequate warning such as on vertical or horizontal curves.

(b) Other locations where such signs are determined desirable for safety as a result of an engineering study.

(3) Proposed use of NO PASSING ZONE pennant signs at locations meeting the above criteria shall be reviewed and approved by the ***DTOE*** prior to installation.

Figure 2.9-1. No Passing Zone Pennant Sign

Section 2.10

VENDING MACHINE SIGNS

2.10.1 PHYSICAL CHARACTERISTICS

(1) The VENDING MACHINES sign ***(FTP-73-06)*** shall be 66 x 30 inches with two lines of legend in 8-inch Series D lettering. The legend and border shall be white on blue background.

(2) Sign details are available in the ***Standard Plans, Index 700-102***.

2.10.2 LOCATION AND PLACEMENT

(1) VENDING MACHINES signs will be appended at the bottom and between the supports of REST AREA 1 MILE ***(D5-1)*** signs. Such placement will not impair the breakaway characteristics of the sign.

(2) At some rest areas, the VENDING MACHINE message is designed into a sign with flip-up panel which reveals the message SAFETY BREAK / FREE COFFEE ***(FTP-74-06, FTP-75-06, and FTP-76-06)***.

(3) Normally, the VENDING MACHINES message will be displayed. However, when the safety break is in effect, the sign is to be folded up to read SAFETY BREAK FREE COFFEE.

(4) The SAFETY BREAK / FREE COFFEE sign detail is available in the ***Standard Plans, Index 700-102***.

Section 2.11

GUIDELINES FOR USE OF BICYCLE SIGNS

2.11.1 PURPOSE

The purpose of this section is to provide guidance on the use of bicycle signs when a documented need exists. The objective of using bicycle signs is to improve motorist awareness of people biking on State roadways.

2.11.2 GENERAL

(1) ***Chapter 9B*** and ***Section 2C.49 of the MUTCD*** establish the standards for bicycle signs installed on public roadways. The ***MUTCD*** must be reviewed and considered with bicycle sign requests.

(2) The use of bicycle signs as a warning is shown in ***Section 9B.18*** and ***Section 2C.49 of the MUTCD***. The use of bicycle signs as regulatory is shown in ***Section 9B.06 of the MUTCD***.

(3) Bicycle signs shall be installed only at locations reviewed and approved by the ***DTOE***.

(4) The District Bicycle/Pedestrian Coordinator and District Bicycle/Pedestrian Safety Specialist will provide recommendations for all bicycle sign requests and should consider the following conditions when reviewing requests for bicycle signs:

- **(a)** context classification
- **(b)** land use
- **(c)** volumes
- **(d)** crash data
- **(e)** geometric criteria

(5) Bicycle signs shall be mounted in accordance with existing Department standards.

2.11.3 BICYCLES MAY USE FULL LANE (R4-11) SIGN

(1) The BICYCLES MAY USE FULL LANE (***R4-11***) sign is used when it is important to inform road users that bicyclists might occupy the travel lane such as where commuter bicyclists are common users of the facility. The BICYCLES MAY USE FULL LANE (***R4-11***) sign may be installed on roadways when a shared lane

marking (***Standard Plans, Index 711-002***) is present or when all of the following conditions exist:

(a) where travel lanes are less than 14’ wide

(b) no bicycle lane is present

(c) no rideable paved shoulder of 4’ width or greater is present

(2) A shared lane marking is not required for use of the BICYCLES MAY USE FULL LANE (***R4-11***) sign.

(3) Requests to install BICYCLES MAY USE FULL LANE (***R4-11***) signs on multilane roadways must be submitted by the ***DTOE*** and shall be sent to the ***STOE*** for review and approval.

2.11.4 BICYCLE PASSING CLEARANCE SIGN

(1) ***Florida Statute 316.083*** requires that vehicles must pass bicycles at a safe distance of not less than three feet. The BICYCLE PASSING CLEARANCE sign (***Figure 2.11-1***) is intended to remind motorists of the three feet minimum clearance State law that a motorist must provide when passing a bicycle.

(2) The BICYCLE PASSING CLEARANCE sign shall not be installed where a bicycle lane is present.

(3) The BICYCLE PASSING CLEARANCE sign may be installed on roadways with the following characteristics:

(a) where there is a designated bicycle route

(b) where the BICYCLES MAY USE FULL LANE (***R4-11***) signs are installed

(4) The BICYCLE PASSING CLEARANCE sign should be installed where there is a documented history of crashes or near misses. Documented history may be obtained from citizen complaints, field observations or crash records.

(5) Placement of the BICYCLE PASSING CLEARANCE sign should not interfere with the visibility of any existing regulatory or warning signs.

(6) Sign details are available in the ***Department’s Sign Library***.

Figure 2.11-1 Bicycle Passing Clearance Sign

Section 2.12

RECYCLING COLLECTION CENTER SIGNS

2.12.1 DEFINITION

Recycling Collection Center. A facility open full time to the general public for the purpose of collecting items to be recycled, e.g., oil, aluminum, batteries, etc. The facility may operate as part of a recycling plant or may be a collection center for the distribution of these items to a recycling center elsewhere.

2.12.2 SIGN DESIGN

(1) The RECYCLING COLLECTION CENTER (FTP-48-06) sign shall be 42 x 60 inches. Lettering shall be 4-inch, Series C. The legend and border shall be white on green.

(2) The RECYCLING COLLECTION CENTER W/OPTIONAL MUNICIPALITY NAME (FTP-49-06) sign shall be 42 x 66 inches. Lettering shall be 4-inch, Series C. The legend and border shall be white on green.

(3) A Directional Arrow (M-Series) may be attached below the sign panel if desired.

(4) Sign details for both the FTP-48-06 and the FTP-49-06 are available in the ***Standard Plans, Index 700-102***, and in the ***Department's Sign Library***.

2.12.3 SIGN INSTALLATION

(1) Sign requests must be submitted by local government to the appropriate ***District Traffic Operations Office*** for review and approval.

(2) RECYCLING COLLECTION CENTER signs placed on the State Highway System should adhere to the mounting heights and lateral clearances specified in the ***Standard Plans, Index 700-101***. Support systems shall meet or exceed the standards shown in ***Standard Specifications, Section 700***.

(3) RECYCLING COLLECTION CENTER signs shall not be permitted in a location where the view of existing traffic control devices may be obscured or where they might otherwise compete for the motorist's attention, for example, next to a stop sign.

Section 2.13

SIGNING FOR SAFETY BELT USE AND CHILD RESTRAINT LAWS

2.13.1 PURPOSE

The intent of this section is to help reduce the number of highway deaths and injuries; to encourage compliance of motorists with the state's safety belt use and child restraint laws; and to establish uniform criteria for district implementation of signing for safety belt use and child restraint laws.

2.13.2 BACKGROUND

The Florida Safety Belt Law (***Section 316.614, F.S.***), mandates state agencies conduct a continuing safety and public awareness campaign and adopt programs designed to encourage compliance with usage requirements of the safety belt law. It is the intent of this procedure to support the actions of this statute and provide appropriate signing.

2.13.3 STATE HIGHWAY SYSTEM POINTS OF ENTRY

(1) Districts Two and Three shall install and maintain signing at all State Highway System points of entry, informing motorists of the statutory requirement for safety belt use in the State of Florida.

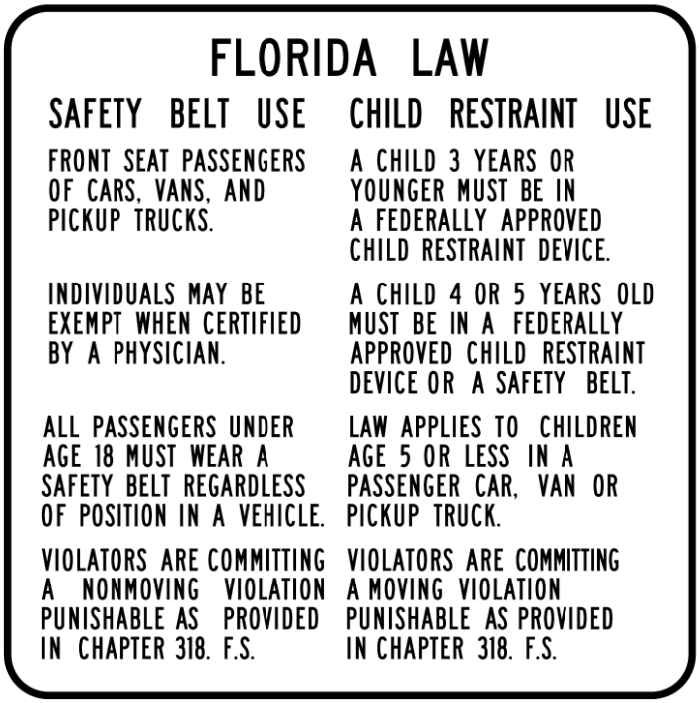
(2) On limited access highways, a FLORIDA SAFETY BELT AND CHILD RESTRAINT LAW sign ***(FTP-44-06)*** shall be installed downstream of existing "Welcome to Florida" and speed limit signs.

(3) On non-limited access highways, a FLORIDA SAFETY BELT AND CHILD RESTRAINT LAW sign ***(FTP-45-06)*** shall be installed downstream of existing "Welcome to Florida" and speed limit signs.

2.13.4 REST AREAS AND INTERSTATE WELCOME CENTERS

(1) A Rest Area Safety Belt Law sign ***(Figure 2.13-1)*** shall be installed and maintained in all rest areas and Interstate Welcome Centers informing motorists of the specific requirements of Florida's safety belt and child restraint laws. This sign shall be placed in a prominent location for easy viewing by pedestrians using the facilities.

Figure 2.13-1. Florida Safety Belt Law



(2) On the exit from these rest areas and Welcome Centers, the existing “Buckle Up” sign shall be replaced with the FLORIDA SAFETY BELT AND CHILD RESTRAINT LAW sign (***FTP-45-06)***, as signs need to be replaced.

2.13.5 OTHER LOCATIONS

The FLORIDA SAFETY BELT AND CHILD RESTRAINT LAW sign **(*FTP-44-06*** and ***FTP-45-06)*** may be used at other locations on the State Highway System at the discretion of the ***DTOE*** but should be limited to locations where:

(1) There is documented evidence of a high crash location; or

(2) A high percentage of the traffic is composed of tourists or visitors; and

(3) The sign will not interfere or detract from existing regulatory, guide, or warning signs or other traffic control devices.

2.13.6 STANDARD SAFETY BELT SIGN (FTP-46-06 AND FTP-47-06)

(1) This sign is to be used for general educational purposes.

(2) The 36 x 48 inch sign ***(FTP-46-06)*** should be installed on limited access facilities at county lines, based on space available. The ***DTOEs*** may also install this sign

where there is a documented need.

(3) The 24 x 30 inch sign ***(FTP-47-06)*** is to be installed on non-limited access highways and urban areas, based on space available and where there is a documented need.

2.13.7 SIGN DESIGN

(1) Specific sign details for all signs referenced in this section are shown in the ***Standard Plans, Index 700-102***.

(2) Sign details are available in the ***Department's Sign Library***.

2.13.8 SIGN AVAILABILITY

Maintenance may obtain new or replacement signs by requisition from the Lake City Sign Shop.

Section 2.14

SIGNING FOR EMERGENCY MANAGEMENT

2.14.1 PURPOSE

The objective of this section is to establish a uniform basis for installing and maintaining emergency management signs on the State Highway System.

2.14.2 BACKGROUND

The Florida Division of Emergency Management (DEM) plans for both natural and man-made disasters, as well as prepares and implements a statewide Comprehensive Emergency Management Plan (CEMP). The DEM is the state's liaison with federal and local agencies on emergencies of all kinds and works with local governments to provide technical assistance, as they prepare emergency plans and procedures.

The DEM requested the Department to install and maintain evacuation route signs on those portions of the State Highway System that comprise official evacuation routes to educate motorists as to the available routes and to ensure that signs are in place well in advance of the actual need to guide motorists away from high-risk areas. Evacuation Route and Zone Maps are located on the DEM website.

2.14.3 PROCEDURE

The ***DTOE*** shall initiate the actions necessary at the district level to implement these guidelines and to ensure that evacuation routes are properly and promptly signed upon request of the County Emergency Management Director. District Maintenance will ensure that the signs are installed and maintained in the field.

Provide information on subsequent signing changes or additions to the DEM for their records and shall be handled by the ***DTOE*** upon request of the regional counties and coordinated through the Department's Emergency Coordination Officer.

2.14.4 EVACUATION ROUTE SIGN DESIGN

Ensure that the EVACUATION ROUTE conforms to the ***Standard Plans, Index 700-102***.

A 24-inch diameter Evacuation Route sign ***(FTP-78-06)*** should be used by local governments to indicate roads or streets under local jurisdiction as official evacuation routes.

Use the 36-inch diameter Evacuation Route sign ***(FTP-77-06)*** on limited access facilities and use the 24-inch diameter Evacuation Route sign ***(FTP- 78-06)*** on non-limited access facilities.

Include a straight, vertical arrow pointing upward, a straight horizontal arrow pointing to the left or right, or a bent arrow pointing to the left or right for advance warning of a turn on the arrows designs on the ***FTP-77-06*** or ***FTP-78-06*** sign. Sign details are available in the ***Department's Sign Library***.

2.14.5 EVACUATION ROUTE SIGN USE

Exclusively use the EVACUATION ROUTE sign along regional evacuation routes that have been so designated on the approved statewide regional evacuation route plans recorded by the Florida Division of Emergency Management.

Use the EVACUATION ROUTE sign to guide motorists along the regional evacuation routes and away from potential high-risk areas. Comply with applicable provisions of the ***Section 2N.03 of the MUTCD***.

2.14.6 EVACUATION ROUTE SIGN PLACEMENT

Place signs in accordance with existing Department standards and consistent with ***Section 2N.03 of the MUTCD***.

Place the EVACUATION ROUTE sign 150 to 300 feet in advance of, and at, any turn on an approved evacuation route and elsewhere for straight- ahead confirmation, as needed. See ***Standard Plans, Index 700-101*** for mounting details.

2.14.7 SIGN INSTALLATION

Signs shall be furnished, installed, and maintained by the Department on official evacuation routes that are on the State Highway System.

Install signs only at locations reviewed and approved by the ***DTOE*** to ensure that such signs do not interfere with existing traffic control devices.

2.14.8 SHELTER AND TRAVELER INFORMATION SIGNING

The ***STOE*** will coordinate, address, and implement operational concerns on evacuation route signing and related operational needs within the Department and with the Florida Division of Emergency Management.

The ***DTOEs*** will coordinate evacuation shelter signing efforts on a districtwide basis. If signing for shelters or evacuation traveler information is required, the use of the signs must be included in the CEMP area/regional evacuation plan.

Install shelter signing highways at key locations. The locations are determined by a joint effort between the ***DTOE*** and the local agencies.

Install signs under the following conditions:

- the shelter location is part of the regional plan.
- the local agency purchases the signs.
- the local agency takes responsibility to "flip-up" or "flip-down" the signs.

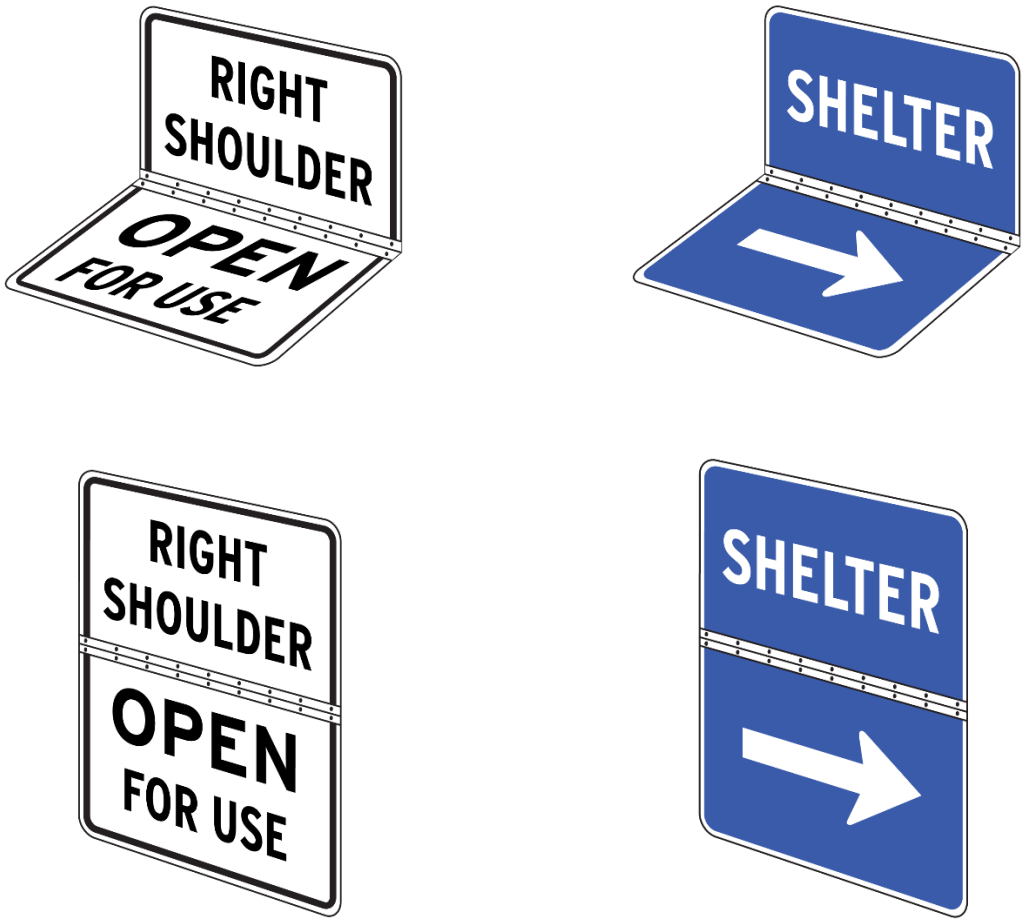
2.14.9 SHELTER SIGN DESIGN AND USE

Design shelter signs with a white background in accordance with ***Section 2N.09 of the MUTCD***.

The ***DTOE*** determines the type of shelter signing support used on the State Highway System, portable (temporary), or permanent.

The signs designs for shelters may be permanent or temporary. The permanent design to use a “flip down” design as shown in ***Figure 2.14-1***. This means that the bottom panel is flipped down to reveal the shelter message or “Right Shoulder Open For Use” during Emergency Shoulder Use (ESU) operations. The sign is not a dual-purpose message sign, so maintain the undeployed sign face blank. The CEMP assigns responsibility for turning down the “flip down” signs (***Figure 2.14-1***) during emergency conditions, and back up when conditions return to normal.

Figure 2.14-1. Flip Down Sign



2.14.10 TRAVELER INFORMATION SIGNING DESIGN AND USE

Design the Traveler Information sign with a blue background and a white legend in accordance with the ***MUTCD Standard Signs D12 series*** and ***Section 2I.09 of the MUTCD***. See ***Figure 2.14-2*** for an example.

When the local/regional CEMP plan includes the use of traveler information on local shelters and other evacuation information, and a local radio station has a written agreement to be the official traveler information station, the frequency of the station may be signed for on the interstate system. This can be done with Changeable Message Signs, or with permanent flip down signs as shown in ***Figure 2.14-1***.

Figure 2.14-2. Traveler Information Sign

2.14.11 CONTINUOUS HINGE REQUIREMENTS

See ***Standard Plans, Index 700-010*** for continuous hinge requirements.

2.14.12 RADIO FREQUENCY INFORMATION SIGNS

The addition of radio frequency information signs along evacuation routes on the State Highway System has been approved by the Department as an important communication link for public safety during evacuation periods. The addition of these signs was made possible when Florida Public Radio Stations volunteered to partner with other state and local agencies in the state's evacuation efforts.

2.14.12.1 Radio Frequency Information Sign Design

Design the Radio Frequency Information sign with a blue background and a white legend in accordance with the ***MUTCD Standard Signs D12 series*** and ***Section 2I.09 of the MUTCD***.

2.14.12.2 Radio Frequency Information Sign Placement

Place the Radio Frequency Information Sign ***(Figure 2.14-3)*** at the following locations:

- All limited access highways classified as evacuation routes.
- Principal non-limited access highways in areas where limited access highways are not the main evacuation routes.
- Principal non-limited access highways that are critical links leading to limited access highways.

Place an Evacuation Route sign (***FTP-77-06)*** and a 36-inch x 24-inch Radio Frequency Information sign ***(FTP-70-06)*** on limited access facilities. See ***Standard Plans, Index 700-102*** for sign details.

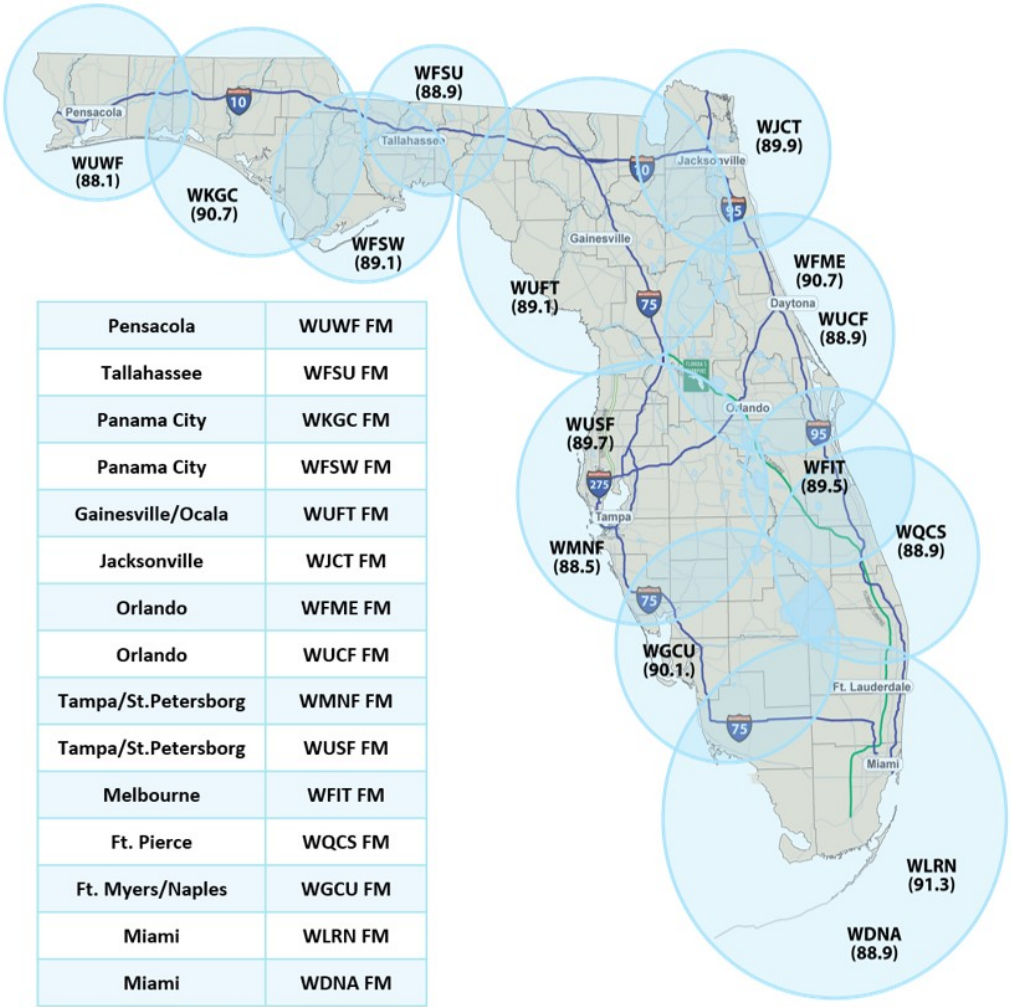
Position these sign assemblies near county lines (where radio coverage is present) and where radio frequency coverage changes. When overlap occurs, the frequency motorists would be driving into is the correct frequency to sign.

Place an Evacuation Route sign (***FTP-77-06)*** on the State Highway System non-limited access facilities. Attach a 24-inch x 18-inch Radio Frequency Information sign ***(Figure 2.14-3)*** to the existing sign assembly in the above-mentioned locations erected close to the county lines or coverage area. Modify with the addition of the radio frequency panel as appropriate. Additional locations to be modified are the beginning and termination points of qualifying links.

When long segments occur on both limited access and non-limited access facilities, install confirmation Radio Frequency Information signs at 10-mile increments. ***Figure 2.14-4*** represents the general statewide radio coverage area for this program.

Figure 2.14-3. Radio Frequency Information Sign

Figure 2.14-4. Radio Coverage Area



Pensacola	WUWF FM
Tallahassee	WFSU FM
Panama City	WKGC FM
Panama City	WFSW FM
Gainesville/Ocala	WUFT FM
Jacksonville	WJCT FM
Orlando	WFME FM
Orlando	WUCF FM
Tampa/St.Petersborg	WMNF FM
Tampa/St.Petersborg	WUSF FM
Melbourne	WFIT FM
Ft. Pierce	WQCS FM
Ft. Myers/Naples	WGCU FM
Miami	WLRN FM
Miami	WDNA FM

Note: WXEL-FM call letters have changed to WPBI-FM

WFIT-FM has been added to the Florida Public Broadcast membership.

2.14.12.3 Radio Frequency Information Sign Installation

DTOE to determine the exact sign locations. Prepare Work Orders using the usual procedures for installation by Department Maintenance forces. See ***Standard Plans, Index 700-101*** for mounting details.

In some cases, the mounting height resulting from attaching an additional panel to an existing sign may be less than the required 7 feet. In rural roadside areas, this situation still meets requirements; however, in urban areas where pedestrians are present, modify the support to maintain the required height.

Section 2.15

SMOKE ON HIGHWAY SIGNS

2.15.1 GENERAL

(1) Fires in proximity to highways in Florida can be wildfires or controlled burns under prescribed conditions. In either case, the Florida Department of Agriculture and Consumer Services (FDACS) Florida Forest Service (FFS) is most knowledgeable about smoke conditions.

(2) A Cooperative Agreement For Response To and Management of Smoke Intrusion On Florida Highways has been developed to provide a cooperative policy and process to warn and advise travelers about roadway visibility conditions resulting from wildfires and prescribed burns. This agreement is between the FFS, FDOT and the Florida Highway Patrol (FHP).

(3) The use of signs for controlled burns is shown in ***Part 5 of the MUTCD***. The use of signs for incident management is shown in ***Chapter 6I of the MUTCD***.

2.15.2 TEMPORARY SMOKE ON THE HIGHWAY SIGN

(1) FDOT will supply as needed, temporary incident management signs for use during smoke emergencies.

(2) FDOT has the authority to place the signs. FFS is authorized, but has no duty, to place the signs to warn motorists of an existing smoke hazard.

(3) FFS will notify FHP whenever FFS has knowledge that smoke may impact traffic on the state highway system. FDOT and FFS will assist when requested by FHP.

(4) FFS will coordinate the removal of such signs with FHP or FDOT.

(5) The signs and support hardware must comply with the Department standards.

(6) Sign details are available in the ***Department's Sign Library*** under Temporary Smoke on Highway and reads: REDUCE SPEED SMOKE AHEAD.

2.15.3 PRESCRIBED BURN SIGN

(1) Prescribed burns are pre-planned and approved through the FFS authorization process. Precautionary warning signs on non-limited access roadways may be supplied, erected, and removed by the prescribed fire practitioner planning and executing the burn. The use of temporary precautionary warning signs for prescribed burns is optional.

(2) Prescribed fire practitioners shall not place precautionary warning signs on limited access public roadways without written approval by FDOT.

(3) Sign details are available in the ***Department's Sign Library*** under Prescribed Burn and temporary precautionary warning signs will read as follows: PRESCRIBED BURN AHEAD.

(4) Sign materials shall comply with the current edition of the ***Standard Specifications, Section 994***.

(5) Signs shall be mounted in accordance with the current edition of the ***Standard Plans, Index 102-600***.

(6) Mounting heights and lateral clearances should adhere to those specified in the current edition of the ***Standard Plans, Index 700-101***:

Case II (rural locations)	Sign edge 12' minimum from driving lane edge
Case V (urban locations)	Sign edge 2' minimum from face of curb

Section 2.16

SUPPLEMENTAL GUIDE AND MOTORIST SERVICES SIGNS ON LIMITED AND NON-LIMITED ACCESS HIGHWAYS

This section has been rescinded since it is now adopted as Florida's Highway Guide Sign Program in ***Rule Chapter 14-51, F.A.C.***

Section 2.17

EMERGENCY HIGHWAY TRAFFIC PLAN

This section of the ***TEM*** has been rescinded and replaced with the ***Emergency Management Program (Topic Number 956-030-001)***, which is sponsored by the Emergency Management Office.

Section 2.18

*FHP HIGHWAY ASSISTANCE PROGRAM

2.18.1 PURPOSE

This section provides standards for the use of FHP signs. The *FHP (347) Highway Assistance Program is a statewide program where motorists wishing to report highway related information to the Florida Highway Patrol or summon roadside assistance in a Road Ranger service area, can do so by using their cellular phone. Signs will be erected to inform motorists of the cellular phone number. The signing program extends to all Interstate, Toll, U.S. Routes, and other major State Highway System roadways.

2.18.2 SIGN LOCATION

The location of these signs should correspond to areas where cellular service is available. The service is available in all counties of the state; however, there are areas in some counties which are not covered.

2.18.3 SIGN DESIGN AND INSTALLATION

(1) The *FHP sign ***(FTP-43-06)*** is 48 x 48 inches, has a white legend on blue background, and the exact sign detail is shown in the ***Standard Plans, Index 700-102***.

(2) Sign details are available in the ***Department's Sign Library***.

(3) The*FHP sign has been revised to provide motorists the number interpretation of FHP (347), in order to quicken the calling process. This new sign design will be used on all new projects and as signs need to be replaced.

(4) Mounting heights and lateral clearances should adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards of frangibility.

(5) Specific sign placement details should be developed by the ***District Traffic Operations Offices*** using the following guidelines.

2.18.3.1 Interstate and Other Limited Access Routes

(1) At state and county lines

(2) At approximately 30 mile intervals

(3) Following major freeway to freeway interchanges

2.18.3.2 Major Arterial Routes

(1) At state and county lines

(2) At approximately 30 mile intervals

(3) Downstream from intersections formed by junctions of U.S./Major State Highway System roadways

2.18.4 SIGN AVAILABILITY

Maintenance may obtain new or replacement signs by requisition from the Lake City Sign Shop.

Section 2.20

CALL BOX/MILE MARKER SIGNS

This section has been rescinded in accordance with the ***Department's DME Memo 13-05, Call Box Removal Plan***. Information on the use of reference markers can be found in ***TEM 2.28***.

Section 2.21

FLORIDA LITTER LAW SIGNS

2.21.1 PURPOSE

This section defines guidance on the use of the FLORIDA LITTER LAW sign which was the outcome of the ***Solid Waste Act*** that was legislated in 1988, which provided for a comprehensive solution to Florida's solid waste problems by involving state and local governmental entities and the private sector. ***Section 55 of the Solid Waste Act*** provided that there must be a coordinated effort to a cleaner environment through sustained programs of litter prevention. ***Subsection 5*** provided that the Department of Transportation must place signs discouraging litter at all off-ramps on the interstate highway system.

2.21.2 SIGN DESIGN AND PLACEMENT

(1) The FLORIDA LITTER LAW sign is to be installed in compliance with ***Section 403.413(4), F.S***.

(2) The Department shall install the FLORIDA LITTER LAW sign (***FTP-41-21***) on interstate off-ramps as required by statute (***Section 403.4131(2), F.S.***). They should be installed a minimum of 100 feet in advance of the first motorist services sign, or a minimum of 100 feet in advance of directional signs on the off-ramps without motorist service signs.

Figure 2.21-1. FLORIDA LITTER LAW Sign (FTP-41-21)

(3) The off-ramp sign shall be 30 x 36 inches with a white background and black legend (***FTP-41-21***). The specific sign detail is shown in the ***Standard Plans, Index 700-102***.

(4) The Department may also install the FLORIDA LITTER LAW sign (***FTP-40-21***) on the interstate where there is excessive littering. This sign shall be 42 x 48 inches with a white background and black legend. The specific sign detail is shown in ***Standard Plans, Index 700-102***.

(5) Sign details are available in the ***Department's Sign Library***.

2.21.3 SIGN INSTALLATION

(1) Installation of these signs should be completed through the normal methods of locating the sign positions and notifying District Maintenance. Maintenance will order the signs from the Sign Shop and install them.

(2) The FLORIDA LITTER LAW sign (***FTP-41-21***) may also be installed on the State Highway System either by the ***DTOE*** or by local government through the Department's permit process.

(3) Mounting heights and lateral clearances should adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards of frangibility.

Section 2.23

FLORIDA'S TURNPIKE AND TOLL ROAD NUMBERING AND SIGNING PROGRAM

2.23.1 PURPOSE

This section establishes standards for systematic numbering and signing of Florida's emerging toll road system.

2.23.2 BACKGROUND

(1) Florida's toll road system was originally made up of a complex network of locally developed expressways and the Florida Turnpike. The toll roads were developed largely through the efforts of local expressway authorities to serve regional transportation needs, seldom extending into adjacent counties. As locally funded and developed projects, the expressway's authorities developed a sense of community ownership for the toll road and gave it a locally pleasing name. These names have traditionally been used when referring to the roadway even though state road numbers were assigned to each facility.

(2) ***Section 338.01, F.S.***, which has created an intrastate highway system, changed the local flavor of the toll roads. Now considered a major component of the intrastate system, the toll roads perform a necessary function in transporting the motorist through urban areas in the shortest possible time. Consequently, the Turnpike District of the Department is responsible for the administration and expansion of many of the toll roads. Some of these are already open, others are in the planning stages.

(3) As toll roads have expanded and developed over time into a statewide toll network, a systems approach has been adopted to include connections to other systems. This includes accessibility to local streets, county roads, state system routes, and connections between other limited access systems. An integral part of this interconnected system is the road numbering and signing program.

2.23.3 ROAD NUMBERING PROGRAM

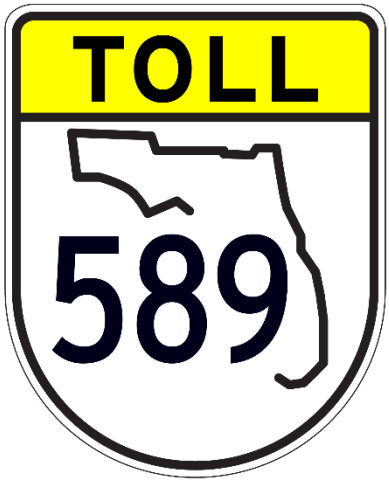
(1) Because of the expanding size of the toll system, the convention of identifying toll roads only by local names is not acceptable. The high number of toll roads and their interconnected nature causes navigation problems for tourists and other non-familiar motorists. A worst case can develop where one expressway joins another and the route name suddenly changes without changing roadways. The solution is to use a route numbering system, similar to that used on interstate routes, U.S. routes, and other state highways.

(2) Local names or logos will be retained for identification and a local sense of ownership only. Local names or logos will continue to be used by resident motorists, but those not familiar with the local system will rely on the numbering system to navigate the statewide system of toll facilities.

(3) The numbering system will be consistent with the statewide numbering systems for all state and county roads. In most cases the existing state road numbers will be used to refer to the toll roads. For new tollways, a number will be assigned by the Transportation Data and Analytics Office, consistent with the official numbering program. In cases where future facilities will result in the completion of a loop or beltway, connecting a series of shorter toll road segments, a single road number will be retained, often requiring a change of road numbers on older links.

(4) To express membership in the statewide toll system, and provide a consistent method of identification throughout the State, a sign has been developed ***(Figure 2.23-1)*** which depicts the toll road number on a unique sign shape. This sign is similar to an interstate shield and is used as a route marker and as part of the trailblaze assembly.

Figure 2.23-1. Toll Route Marker



2.23.4 SIGNING PROGRAM

(1) The toll route marker ***(Figure 2.23-1)*** is available in three sizes, depending on application. To identify the facility along the mainline a 48 x 60-inch toll route marker may be used. This sign may be used when leaving the toll plaza to confirm the route and also erected periodically along the mainline.

(2) To maintain the local identity of the toll road, and provide for local area motorists, the toll road name or logo may be erected on a confirmation guide sign downstream from the mainline toll plazas. If used, the logo panel shall be

furnished by the local expressway authority. These local name or logo signs are for identification purposes only. No attempt shall be made to use only the local toll road name or logo in guide signing, direction signing or trailblazing to the facility. A combination of route number signs and expressway names or logos may be necessary to accommodate local concerns, but the principal identification is the toll route marker.

(3) To identify a toll facility at a freeway to freeway interchange, both the advance guide sign and exit direction guide sign shall use the 36 x 48-inch toll route shield. This size is available as an overlay, and should also be used in other freeway type guide signs and overhead direction sign applications. The local toll road name or 36-inch logo panel may be used in a guide sign or direction sign application. If used, this logo panel shall be furnished by the local expressway authority.

(4) To identify a toll facility from a conventional road, (state, county, or local systems), or to provide trailblazing to a toll facility a 24 x 30-inch toll route marker shield shall be used in conjunction with the appropriate cardinal direction information, arrows, junctions, etc. The local toll road name or a 24-inch logo panel may be used in conjunction with the toll route marker. If used, this logo panel shall be furnished by the local expressway authority. Confirmation assemblies should be used in trailblazing beyond intersections of numbered routes. Sign details are available in the ***Department's Sign Library***.

(5) Although trailblazing to toll facilities is an effective method of advertising for the facility, the intent of signing is to guide the motorist. The ***MUTCD*** is very specific on this issue. General limits on the maximum distance from a toll facility to parallel routes are recommended for rural and urban density development as follows.

2.23.5 RECOMMENDED MAXIMUM TRAILBLAZE DISTANCE

Rural density	5 miles
Urban density	2 miles

Due to the cost of signing and the possibility of overloading the motorist with information, the engineer must use care in locating these signs. Acceptable locations are along major parallel routes, and at the junction of roadways which have exits on the toll road.

2.23.6 LIMITED ACCESS SIGN DESIGNS

(1) For general issues relating to guide signs and the use of regulatory and warning signs, the toll system shall be interpreted as functioning as a fully access controlled roadway with corresponding criteria such as clear zone requirements, letter height, sign placement, etc. (See ***Section 2E.02 of the MUTCD***). The

engineer must keep in mind that this level of signing is purposefully kept simple and dignified, using large lettering, and concise messages that can be read, comprehended, and acted upon while traveling at a high rate of speed.

(2) The procedures used for guide sign sequences shall be as for other limited access facilities. The use of supplemental guide signs for traffic generators shall follow ***Rule 14-51.020, F.A.C.***.

Section 2.24

PLACEMENT OF CRIME WATCH SIGNS ON THE STATE HIGHWAY SYSTEM

2.24.1 PURPOSE

The purpose of this section is to aid districts in evaluating and responding to requests for erecting Crime Watch Signs within the State Highway System rights-of-way.

2.24.2 DEFINITIONS

Crime Watch Sign. A sign used to identify a neighborhood, community, or other geographical area within which there exists a Crime Watch Program.

2.24.3 BACKGROUND

(1) Crime prevention is an issue of critical concern to both government and its citizens. With the assistance of law enforcement agencies, local citizens have organized Crime Watch Programs to enhance the safety and security of persons and property within their communities. According to law enforcement officials, the erection of Crime Watch Signs indicative of the adoption of a Crime Watch Program can be a deterrent to crime. Generally, local governments erect these signs along residential streets and in business districts.

(2) Crime Watch Signs shall not be considered official traffic control devices and accordingly are not governed by the ***MUTCD***. However, they do aid in law enforcement and contribute to public safety.

2.24.4 REQUESTS FOR SIGNING

(1) Requests for permitting the erection of Crime Watch Signs within State Highway System rights-of-way should be reviewed by the ***DTOE***.

(2) Only requests submitted by local government traffic engineering or law enforcement agencies should be considered. Others should be referred to their local governmental agencies.

2.24.5 SIGN LOCATIONS

(1) Crime Watch Signs may be permitted along a state highway only in the vicinity of strip residential or commercial development which is directly accessed from the state highway.

(2) Crime Watch Signs should not be permitted on state highway right-of-way when

the area of concern is adequately served by side streets connecting to the state highway. In such cases, the signs should be placed on the side street right-of-way and be readily visible to someone entering the side street from the state highway.

(3) Excessive posting of Crime Watch Signs along a state highway should not be permitted. Prudent judgment must be exercised in reviewing signing strategies with respect to the spacing of successive signs. For example, on highways passing through isolated small rural or suburban communities, single signs at the limits of the communities may be appropriate. In heavily developed areas, additional signs at moderate spacing may be needed.

(4) Crime Watch Signs shall not be permitted in a location where the view of existing traffic control devices may be obscured or where they might otherwise compete for the motorists' attention (e.g., next to a STOP Sign).

2.24.6 SIGN DESIGN AND PLACEMENT

(1) Since Crime Watch Signs are not official traffic control devices, requests for the Department to design or establish standards for these signs should be declined. However, the ***DTOE*** should review sign designs proposed for use on the State Highway System. Designs which resemble an official traffic control device or which may be confusing to or misconstrued by the motorists should be rejected.

(2) Sign designs should be simple and dignified, devoid of any advertising. Panel design and quality should be adequate to maintain a high level of appearance and legibility under anticipated environmental conditions, both day and night.

(3) Mounting heights and lateral clearances should adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards of frangibility.

(4) Crime Watch Signs shall not be affixed to any sign support maintained by the Department.

2.24.7 INSTALLATION AND MAINTENANCE

(1) A local governmental agency must agree to assume full responsibility for the installation and maintenance of any Crime Watch Signs permitted by the Department for installation on the State Highway System.

(2) The installing agency should be advised that the Department reserves the right to remove any Crime Watch Signs not in conformance with these instructions or which are not properly installed or maintained.

2.24.8 SPECIAL CONSIDERATIONS

Unusual requests or designs, or problems associated with Crime Watch Signs on the State Highway System should be discussed with the ***STOE*** prior to permitting.

Section 2.25

DISTANCE SIGNING FOR NON-LIMITED ACCESS HIGHWAYS

2.25.1 PURPOSE

The intent of this section is to establish a consistent distance signage system for all non-limited access state roads in conformance with ***Section 2D.41*** and ***Section 2D.42 of the MUTCD***.

2.25.2 BACKGROUND

(1) ***Section 2D.37 of the MUTCD*** does address the application of distance signage. However, there is no statewide procedure for distance signage on non-limited access roads. This perpetuates the situation of signing for a destination on a non-limited access state road that may be several hundred miles away. Also, the current distance signage practice does not take into consideration the use of Interstate and Florida's Turnpike System for long distance driving by motorists.

(2) The Department's current non-limited access distance signs do not provide adequate destination information for motorists who are looking for the variety of tourist attractions which are accessible from non-limited access highways in addition to destinations accessible from the Interstate and Florida's Turnpike System.

2.25.3 PROCEDURE

(1) Distance signs should have the names of three cities, towns, significant geographical identity, route, or community, and the distance (to the nearest mile) to those places.

(2) The top name should be the next place on the route having a post office, railroad station, route number (name) of an intersecting highway, or other significant geographical identity.

(3) The middle name should be used to indicate communities along the route or important route junctions. This name may be varied on successive distance signs to give motorists maximum information concerning communities along the route to the next control city.

(4) The bottom name must a major destination control city. The control city should remain the same on all successive distance signs throughout the length of the route until that destination qualifies to be the top or middle name on the distance sign. Once the control city moves up, the next control city must be shown as the bottom name. There should always be a control city shown as the bottom name.

(5) ***Figure 2.25-1, Figure 2.25-2, Figure 2.25-3***, and ***Figure 2.25-4*** are examples of distance signs for non-limited access highways.

(6) Placement of distance signs are specified in ***Section 2D.42 of the MUTCD***.

(7) Control cities have populations of 10,000 or more and include county seats. A matrix that includes the centroid defined for each municipality on the list can be found on the ***Intercity Mileage Spreadsheet***, maintained by the Transportation Data and Analytics Office.

(8) The implementation of this distance signing program should be through normal construction projects. The ***DTOE*** must develop corridor distance signage plans for inclusion into existing work program projects. Stand-alone distance signage projects are not required or desired.

Figure 2.25-1

Figure 2.25-2

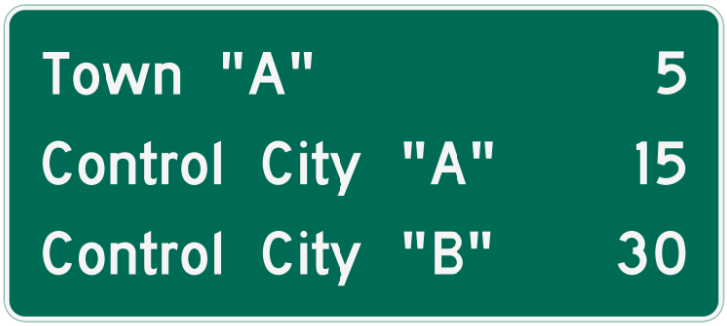


Figure 2.25-3

Figure 2.25-4

Section 2.26

ADVANCE GUIDE SIGNS ON LIMITED ACCESS HIGHWAYS

2.26.1 PURPOSE

This section provides uniform statewide advance guide sign applications that ensure motorists are provided advance notification of interchange exits on limited access highways.

2.26.2 BACKGROUND

The Department's ***International Signing Practices Study*** recognized the need of the international tourist for advance notification of exit direction information. The most frequently cited problem of international visitors navigating in Florida was the lack of information about exits. Since this need is not limited to the international tourist, but to every unfamiliar motorist and also older drivers from both in and out-of-state this section was developed. The application for interchange guide signs is currently addressed in ***Section 2E.30 of the MUTCD***.

2.26.3 DEFINITIONS

The following definitions apply to this section and are in accordance with ***Section 2E.32 of the MUTCD***:

Intermediate Interchange. An interchange with urban and rural routes not in the category of major or minor interchanges.

Major Interchange. Subdivided into two categories: (a) interchanges with other expressways or freeways, or (b) interchanges with high-volume multi-lane highways, principal urban arterials, or major rural routes where the volume of interchanging traffic is heavy or includes many road users unfamiliar with the area.

Minor Interchange. An interchange where traffic is local and very light, such as interchanges with land service access roads. Where the sum of the exit volumes is estimated to be lower than 100 vehicles per day in the design year.

2.26.4 PROCEDURE

(1) For urban areas, two advanced guide signs are required for every major and intermediate interchange on the Interstate, Florida's Turnpike System, and other limited access roadways.

(2) The two advance guide signs should be placed 1/2 mile and 1 mile upstream of the exit. If interchange spacing prohibits the placement of these two advanced guide signs, then the interchange sequential series signs (***Section 2E.40 of the MUTCD***) should be used. Left hand exit interchanges should utilize diagrammatic signs.

(3) For major and intermediate interchanges, the two advance guide signs must be mounted overhead in urban areas. For rural interchanges either cantilever or ground mounted signs are adequate.

(4) For major interchanges in the rural area and freeway-to-freeway interchanges, three (3) advance guide signs must be provided and located approximately 1/2 mile, 1 mile, and 2 miles upstream from the exit. For rural intermediate interchanges, two advance guide signs are to be installed.

(5) Implementation of this advance guide sign program should be through construction projects scheduled in the work program. The ***DTOE*** must develop a list of interchanges for inclusion into the work program projects. Stand-alone advance guide sign projects are not required to comply with this standard.

Section 2.27

COMMUTER ASSISTANCE SIGNS

2.27.1 PURPOSE

The purpose of this section is to provide statewide sign design consistency for the Department's Commuter Assistance Program, ***Topic Number 725-030-008***.

2.27.2 BACKGROUND

Coordinated use of existing transportation resources can provide a responsive, low cost alternative for alleviating urban highway congestion and improving air quality, thereby reducing the need for costly highway improvements. The Commuter Assistance Program focuses on the single occupant commuter trip which is the greatest cause of peak hour highway congestion. A coordinated effort to provide alternatives to these commuters, using existing or low-cost resources, can be beneficial to the development of a transportation demand management program and public transit statewide. The State's Commuter Assistance Program encourages a public/private partnership to provide services to employers and individuals for: carpools, vanpools, express bus service, subscription transit service, group taxi services, heavy and light rail, and other systems which are designed to increase vehicle occupancy.

2.27.3 SIGN DESIGN AND INSTALLATION

(1) ***Section 2I.11 of the MUTCD*** provides guidance for the installation of a carpool information sign.

(2) Signing requests received from the Department's Public Transit Office or local transit agencies must be approved by the ***DTOEs***.

(3) Sign placement will be determined by District Traffic Operations based on field review and space availability.

(4) The Department's Commuter Assistance Program also includes two additional modes of services (vanpooling and transit) and there are different signs for each of these services.

(5) There are two different sizes for each sign design. The arterial sign shall be 36 x 24 inches. The interstate sign shall be 78 x 48 inches. All signs shall be blue reflective background with white lettering.

(6) Exact sign details for the TRY CARPOOLING ***(FTP-56-06 and FTP-56A-06)*** TRY TRANSIT ***(FTP-59-06 and FTP-60-06)*** and TRY VANPOOLING ***(FTP-57-06 and FTP-58-06)*** are available in the ***Standard Plans, Index 700-102***.

(7) Sign details are available in the ***Department's Sign Library***.

(8) Mounting heights and lateral clearances should adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards of frangibility.

Section 2.28

REFERENCE LOCATION SIGNS (MILE-MARKERS)

2.28.1 PURPOSE

The objective of this section is to establish consistent criteria and signing methods for reference location signs (mile markers) on both limited and non-limited access roadways.

2.28.2 STANDARDS

(1) Reference location signs shall be as described in ***Section 2H.05*** and ***Section 2H.06 of the MUTCD***. These signs consist of a vertical panel containing the mile-marker number. The sign shall have 6-inch white letters on a green reflective background and be placed on the right side of the roadway at 1-mile or 1/2-mile increments as detailed in ***TEM 2.28.3*** and ***TEM 2.28.4***.

(2) The zero distance shall be established at the southern or western state line or at junctions where the route begins. ***MUTCD*** standards shall be followed for overlap routes.

2.28.3 CRITERIA FOR LIMITED ACCESS ROADWAYS

Reference Location Signs and Enhanced Reference Location Signs shall be used on limited access facilities. The following criteria shall be used when selecting reference location signs along limited access facilities:

(1) Reference location signs (***Section 2H.05 of the MUTCD***) shall be used every 1.0 mile outside urban boundary facilities.

(2) Enhanced reference location signs (***Section 2H.06 of the MUTCD***) shall be used every half mile inside urban boundary facilities.

2.28.4 CRITERIA FOR NON-LIMITED ACCESS ROADWAYS

(1) While reference location signs will be helpful on many roadways, those with existing positioning systems, i.e., good building numbers, adequate landmarks, and signed cross streets will not benefit significantly. In addition, there may be many requests from municipalities to provide these signs on qualifying roadways. The following criteria shall be used when selecting roadways to use reference location signs:

(a) Cross at least two municipalities or two county jurisdictions within three miles.

(b) Relatively devoid of named landmarks, cross streets, or building addresses that would serve as navigation aids for motorists in the area.

(c) Can be identified by local Emergency Medical Services (911) program to assist in address location.

(d) The proposed reference location sign should not interfere in any manner with other traffic control devices.

(2) Requests for the reference location signing must be initiated by local jurisdictions. In all cases, requests shall be directed to the ***DTOE*** and must meet all the criteria listed above.

(3) The local jurisdiction must, through the permit process, erect and maintain reference location signs on state system roadways, but the ***DTOE*** is responsible for the route signing plan.

Section 2.29

USE OF FLUORESCENT YELLOW-GREEN SIGN SHEETING

This section was rescinded on 11/1/18 and is now included in ***Standard Specifications, Section 700***.

Section 2.30

SIGNING FOR ONE-STOP CAREER CENTERS

2.30.1 PURPOSE

The intent of this section is to provide guidance on the installation of One Stop Career Center Signs. This sign is to assist Floridians locate full-service One-Stop Career Centers located statewide.

2.30.2 BACKGROUND

In 1995, the State of Florida began taking steps toward a new future for workforce development. Florida has committed significant resources to the development and integration of its workforce development system, perhaps most significant is the development of the One-Stop Career Centers. These centers offer universal services to all Floridians, not just those eligible for specific programs.

2.30.3 DEFINITIONS

Full-Service One-Stop Career Center. A physical location designated by the Regional Workforce Development Board which provides access to legislatively mandated partner agencies, and on-site delivery of core services, i.e., job search, placement assistance, skills assessment, and information on supportive services.

2.30.4 SIGN DESIGN AND INSTALLATION

(1) The One-Stop Career Center sign ***(FTP-36-06)*** shall be 36 x 36 inches and is white on green in color. The exact detail is shown in the ***Standard Plans, Index 700-102***.

(2) Sign details are available in the ***Department's Sign Library***.

(3) Sign requests must be submitted by a local representative of the ***Workforce Regional Development Boards*** to the appropriate ***DTOE***. The Department will only sign for full-service One-Stop Career Centers as defined above.

(4) One-Stop Career Center signs will only be installed and maintained by the Department on Non-Limited Access Highways.

(5) Signs will be placed, based on availability of suitable space, at the nearest intersection along the State Highway System to the One-Stop Career Center.

(6) Mounting heights and lateral clearances shall adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards for frangibility.

Section 2.31

UNIQUE TRANSPORTATION SYMBOL SIGNS

2.31.1 PURPOSE

This section provides standards for the use of FHWA approved transportation symbol signs on the State Highway System.

2.31.2 BACKGROUND

(1) Florida has a unique traveler composition compared to other states, in that a significant proportion of motorists are not familiar with our roadways. This is mainly due to the very large number of tourists, both domestic and international.

(2) We have found through research in our International Signing Study that non-familiar motorists respond very well to symbol signs.

(3) We have enhanced our signing program by implementing the following innovative symbol signs that describe transportation related services or destinations.

2.31.3 SCOPE

The use of the symbol signs in this section must meet the criteria for motorist services signing established in ***Rule Chapter 14-51, F.A.C., Florida's Highway Guide Sign Program.*** More specifically, ***Rule 14-51.021(1)(f), F.A.C.*** for Limited Access Highways and ***Rule 14-51.031(1)(f), F.A.C.*** for Non-Limited Access Highways.

2.31.4 PASSENGER SHIP SIGN

(1) The passenger ship transportation mode forms an important destination for both Florida residents and visitors to the state. This symbol sign will be used throughout the state to trailblaze the routes to passenger seaports and cruise ship ports that meet criteria specified in ***TEM 2.31.3***.

(2) The PASSENGER SHIP sign ***(Figure 2.31-1)*** is a white symbol on green background.

(3) A 30-inch sign panel should be used on limited access highways and a 24-inch panel on non-limited access highways.

(4) Sign details are available in the ***Department's Sign Library***.

Figure 2.31-1. Passenger Ship Sign

2.31.5 AMTRAK SIGN

(1) This AMTRAK symbol sign is currently approved for use on guide signs and trailblazing to Amtrak stations.

(2) Approval to place the AMTRAK sign shall be in accordance with criteria specified in ***TEM 2.31.3***.

(3) The AMTRAK sign ***(Figure 2.31-2)*** is a white symbol on green background.

(4) A 30-inch sign panel should be used on limited access highways and a 24-inch panel on non-limited access highways.

(5) Sign details are available in the ***Department's Sign Library***.

Figure 2.31-2. Amtrak Sign

2.31.6 GREYHOUND SIGNING

(1) This 3-color sign will be used as a motorist service sign and also to trailblaze to intra-city bus stations. Currently, there is no good way to sign for small bus stations that may be located within a building used for other businesses. The use of this symbol sign will make it easier to trailblaze to these locations.

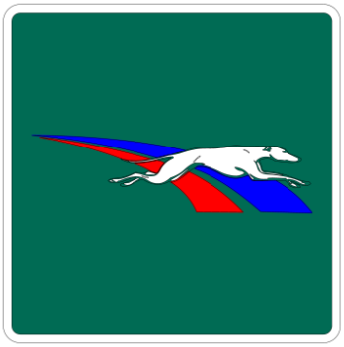
(2) Approval to place the GREYHOUND sign shall be in accordance with criteria specified in ***TEM 2.31.3***.

(3) The GREYHOUND sign is ***(Figure 2.31-3)*** a 3-color symbol with a white border on a green background

(4) A 30-inch panel should be used on limited access highways and a 24-inch panel on non-limited access highways.

(5) Sign details are available in the ***Department's Sign Library***.

Figure 2.31-3. Greyhound Sign



2.31.7 INSTALLATION AND PLACEMENT

(1) Where these signs are approved for use as trailblazer signs they shall be installed in accordance with height and lateral clearance requirements shown in the ***Standard Plans, Index 700-101***.

(2) Where these signs are approved for use as general service signs appended to freeway guide signs, they must conform to the ***Standard Plans, Index 700-104*** except for color scheme.

Section 2.32

511 TELEPHONE SERVICE SIGN

2.32.1 PURPOSE

This section defines criteria and guidelines for the installation of the CALL 511 Sign. The 511 Telephone Service is part of a nationwide program where motorists who wish to obtain traffic and transportation information can do so by dialing 511 from either their cell or regular phones in areas where the service is available. Signs will be erected to inform motorists of the phone number for this service. The sign extends to all Interstate and major State Highway System roadways throughout the state that have the 511 Telephone Service.

2.32.2 SIGN DESIGN AND PLACEMENT

(1) The CALL 511 sign ***(Figure 2.32-1)***, as found in ***Section 2I.10 of the MUTCD***, has two standard sizes. Signs installed on limited access highways shall be 48 x 60 inches ***(FTP-66-06)*** while signs installed on non-limited access highways shall be 36 x 48 inches ***(FTP-67-06)***.

Figure 2.32-1. TRAVEL INFO CALL 511 Sign

(2) The CALL 511 signs ***(FTP-66-06 and FTP 67-06)*** shall have a white legend on blue background and the exact sign details are shown in the ***Standard Plans, Index 700-102***.

(3) Sign details are available in the ***Department's Sign Library***.

(4) When the 511 Telephone Service becomes available, specific sign placement details shall be reviewed by the appropriate ***District Traffic Operations Office*** using the guidelines shown in ***TEM 2.32.2.1*** and ***TEM 2.32.2.2.***

2.32.2.1 Interstate and Other Limited Access Routes

(1) At state and county lines

(2) At approximately 10 mile intervals in urban/metro areas

(3) At approximately 30 mile intervals in rural areas

(4) Preceding major freeway to freeway interchanges

2.32.2.2 Major Arterial Routes

(1) At state and county lines

(2) At approximately 10 mile intervals in urban/metro areas

(3) At approximately 30 mile intervals in rural areas

(4) Recommended locations should be upstream from intersections formed by junctions of U.S./Major State Highway System Roadways at the discretion of the ***DTOE***.

Section 2.33

SIGNING FOR NATURE-BASED TOURISM AND HERITAGE TOURISM TRAILS

2.33.1 PURPOSE

The purpose of this section is to identify for prospective sponsors of nature-based and/or heritage trails the type of support the Department can offer and the signs that are appropriate for installing along public roadways.

2.33.2 BACKGROUND

(1) The concept of nature-based and heritage tourism is best explained as a statewide effort to promote the natural and historic resources of our state. These resources include natural spaces of our State Parks, lakes, rivers, beaches, and woodlands, as well as the rich historical and cultural sites across Florida.

(2) The Department is an active participant in the effort to promote Florida's natural assets through nature-based tourism and heritage tourism programs. The Department's role is to provide a mechanism for using public right of way for the needed signs and provide engineering guidance to ensure that effective signing plans are developed.

(3) Some examples of approved trails are the Historic Heritage Trail sponsored by the Department of State, the Birding Trail sponsored by the Fish and Wildlife Conservation Commission, and the Gulf Coast Heritage Trail sponsored by the Sarasota Bay National Estuary Program.

2.33.3 PILOT PROGRAM

(1) The Gulf Coast Heritage Trail was the first regional nature-based tourism trail program within the state and the Department approved the signing plan as a pilot program. It is a true trail system in that trail-blaze signs identify the route to follow to access the sites, which are also described in the auto tour map and brochure. The program was pioneered and coordinated by the Sarasota Bay National Estuary Program in Sarasota and Manatee Counties.

(2) The success of this pilot is such that the Department is using the Gulf Coast Heritage Trail as a model for other regional plans to follow.

2.33.4 CRITERIA FOR SIGNING PROGRAM

In developing a trail system, several criteria must be followed by the sponsor of the proposed nature-based or heritage tourism trail.

(1) The sponsor must develop grassroots support including local input into establishing routes.

(2) The program must include use of a land-based brochure with auto tour map - the signs are not the primary guidance method.

(3) Attraction selection should be restricted to public ownership, non-profit, or for those charging admission, a primary educational purpose (this includes museums and art galleries).

(4) Promotional posters and an Internet website are strongly suggested.

2.33.5 DOT PARTICIPATION

(1) The Department will participate in the development of nature-based and heritage tourism programs by providing advisory services as the programs are proposed, offer preliminary route recommendations, and approve routes upon which signs may be erected.

(2) The Department's ***State Traffic Engineering and Operations Office*** (850-410-5600) must be contacted early in the process to assure proper coordination with all districts affected by the proposed trail.

(3) Upon selection of the final route, the District Traffic Operations personnel will determine appropriate locations for trail-blaze signs and mark the locations so that a sign contractor can erect the signs. It is the sponsor's responsibility to have the signs manufactured and erected through the Department's general use permitting process. Department staff can provide the names of sign manufacturers and contractors who are experienced in providing these services.

2.33.6 SIGN APPROVAL AND DESIGN

(1) The ***STOE*** in Tallahassee must approve the sign design to be used for this program.

(2) Logo signs are encouraged for this program, and several criteria apply:

(a) Signs installed on non-limited access highways shall be 24-inch panels. The name of the trail should be in white highway sign type, upper case lettering (Helvetica). A sample logo is shown in ***Figure 2.33-1***.

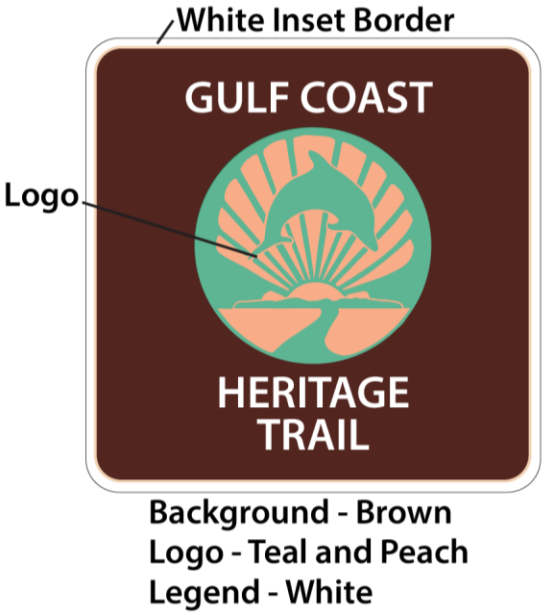
(b) Signs shall be devoid of advertising.

(c) Signs logos may use colors, but must contain a brown background of Type III retro-reflective sheeting, per ***Standard Specifications, Section 994***. Inks must be transparent highway sign types.

(d) Signs should be installed along the State Highway System route with an

arrow pointing in the appropriate direction where cross streets must be used to access the attraction. Confirmation signs, with straight-ahead arrows, are used at appropriate intervals to let motorists know they are on the right path (usually 3-5 miles depending upon length of the route segments).

Figure 2.33-1. Logo for Gulf Heritage Trail



2.33.7 SIGN MAINTENANCE

(1) The sponsors of the proposed nature-based and/or heritage trails are responsible for the maintenance of the signs used throughout the trail.

(2) A contract with a private sign installation contractor should be executed or a maintenance agreement with local government secured for signs on the State Highway System.

(3) Evidence of the contract or agreement must be presented to the appropriate ***District Traffic Operations Office*** prior to installation of the signing program.

Section 2.34

SIGNING FOR THE FLORIDA SCENIC HIGHWAYS PROGRAM AND THE NATIONAL SCENIC BYWAYS PROGRAM

2.34.1 PURPOSE

The objective of this section is to establish statewide signing standards for designated Florida Scenic Highways and/or National Scenic Byways.

2.34.2 BACKGROUND

(1) The intent of both the Florida Scenic Highways Program (FSHP) and the National Scenic Byways Program (NSBP) is to designate paved public roads as scenic corridors to preserve, enhance, and maintain the intrinsic resources for the enjoyment of the traveling public.

(2) For a roadway to be designated under either or both these programs, the roadway must possess at least one of the following six intrinsic resources:

(a) **Cultural Resources.** Include the traditions, values, customs and arts of social groups.

(b) **Historical Resources.** Reflect human actions evident in past events, sites or structures.

(c) **Archaeological Resources.** Embody the physical evidence or remains of human life, activities, or cultures.

(d) **Recreational Resources.** Highlight activities dependent upon the natural elements of the landscape.

(e) **Natural Resources.** The natural landscapes showing little or no-disruption by humans.

(f) **Scenic Resources.** Combinations of natural and manmade features that give the visual landscape remarkable character and significance.

(3) Benefits of designation as a Florida Scenic Highway and/or a National Scenic Byway include:

(a) **Resource Protection.** FSHP/NSBP designation provides the opportunity to preserve and enhance the significant intrinsic resources along public roads.

(b) **Community Recognition.** The posting of the FSHP/NSBP logo signage

along the designated highways will identify the corridors as “special places” with important resources worth noting.

(c) **Economic Development/Tourism.** Designation provides an opportunity for the millions of tourists traveling by car in Florida to visit these communities along a designated highway corridor.

(d) **Community Visioning.** The FSHP/NSBP designation can complement and support a community’s vision thereby instilling a sense of pride.

(e) **Partnering.** This concept comes from public and private cooperation of agencies and corporate sponsorships, which provide support to the community and the overall corridor’s focus.

2.34.3 PROGRAM COORDINATION

(1) FDOT’s ***Environmental Management Office (EMO)*** oversees the Statewide Florida Scenic Highways Program.

(2) Each FDOT District Office has a designated District Scenic Highways Coordinator that represents the district in all matters pertaining to the FSHP or NSBP. The District Scenic Highways Coordinators are the initial point of contact for questions about the Program and provide the link between the Department and the community.

2.34.4 SIGN CRITERIA

(1) In signing a designated Florida Scenic Highway (FSH) or National Scenic Byway (NSB), the following criteria must be followed:

(a) Signing shall not interfere with or distract from adjacent traffic control devices or from the resources of the area.

(b) Signing shall conform to the ***MUTCD***, which is incorporated by reference in ***Rule 14-15.010, F.A.C.***

(c) Highways that lose designation under the FSHP or the NSBP shall have all FSH and NSB signs removed.

(2) Designated FSH, and NSB (as applicable), shall be signed at entrance points to a route. Signing along a designated highway will be installed approximately every five miles in both directions. However, during the review by District Traffic Operations, exceptions can be made based on frequency of intersections and/or directional needs.

(3) Signs shall be installed for both FHS and NSB in accordance with the approved sign standards shown in ***TEM 2.34.5*** and ***TEM 2.34.6***.

2.34.5 FLORIDA SCENIC HIGHWAY SIGNS

2.34.5.1 COORDINATION

(1) The Department of Transportation provides advisory services when highway corridors are proposed for eligibility or designation to the FSHP. Once the highway corridor is designated, the District Scenic Highway Coordinator(s) facilitates the coordination of the sign implementation process.

(2) The proper sign coordination process for a FSH is detailed below:

(a) The District Coordinator(s) will coordinate the preferred location(s) for the FSHP signs with the ***District Traffic Operations Office***, along with the Corridor Management Entity (CME).

(b) The ***District Traffic Operations Office*** will finalize the location(s) of the signs and send a work request to the appropriate District Maintenance Yard for installation.

(c) One additional sign will be ordered along with all the other signs. This sign is to be used as a display at the ceremony and is not to be placed along the corridor.

(d) The CME and its partners may host a dedication ceremony to celebrate the designation of the particular corridor as a Florida Scenic Highway.

2.34.5.2 SIGN DETAIL

(1) The standard sign design to be used to designate a Florida Scenic Highway is shown in ***Figure 2.34-1***. There are two sign sizes available, and they are to be used in the specific applications shown in ***TEM 2.34.5.3***.

(2) Sign details are available in the ***Department's Sign Library***.

2.34.5.3 SIGN INSTALLATION

(1) The 24 x 36 FSH sign (***Figure 2.34-1***) shall be installed at the entrance points to a designated Florida Scenic Highway route along with a supplemental panel with the scenic highway's name.

Figure 2.34-1. Florida Scenic Highway Sign Design

(2) When appropriate, the Florida Scenic Highway Sign shall be co-located with existing route confirmation signs. The 16 x 24 sign panel should be installed on top of this sign. The exact application is shown in ***Figure 2.34-2***.

Figure 2.34-2. Co-Location on Route Confirmation Marker

(3) When the designated scenic highway intersects with another state road, the 16 x 24 sign panel should be installed on existing route directional signs. The exact application is shown in ***Figure 2.34-3***.

(4) The Department is responsible for the installation of the FSH signs on the State Highway System.

(5) The local government is responsible for the installation of the FSH signs on their system.

2.34.5.4 MAINTENANCE

(1) The maintenance of the FSH signs used throughout the scenic highway corridor depends on the government entity that is responsible for the roadway.

(a) The Department is responsible for the maintenance of FSH signs on the State Highway System.

(b) Local government is responsible for the maintenance of FSH signs on their roads.

Figure 2.34-3. Co-Location on Route Direction Marker

2.34.6 NATIONAL SCENIC BYWAY SIGNS

2.34.6.1 COORDINATION

(1) The Department provides advisory services when highway corridors are proposed for eligibility or designation to the NSBP. Once the highway corridor is designated, the District Scenic Highway Coordinator(s) facilitates the coordination of the sign implementation process similar to the FSH process outlined in ***TEM 2.34.5.1***. The only difference will be no need for an extra NSB sign panel for the dedication ceremony.

(2) The District Scenic Highways Coordinator(s) will work with the Statewide Scenic Highways Coordinator to submit applications for National Scenic Byway or All-American Road designation to the Federal Highway Administration.

(3) Once designated as National Scenic Byway or All-American Road, the District Scenic Highway Coordinator(s) will facilitate the following process.

(a) The District Scenic Highway Coordinator(s) will coordinate the location of the NSBP signs with the ***District Traffic Operations Office***.

(b) District Traffic Operations will locate the signs and send a work request to the appropriate District Maintenance Yard for installation.

(c) The District Scenic Highway Coordinator(s) will contact the respective District Maintenance Office or local government to coordinate the installation of the signs along the corridor.

2.34.6.2 SIGN DETAIL

(1) The FHWA developed and approved the ***America's Byways (D6-4 and D6-4a)*** sign shown in ***Section 2D.55 of the MUTCD***. This sign is approved for use on National Scenic Byways.

(2) The exact sign details for the National Scenic Byways Sign can be found in the FHWA's ***Standard Highway Signs Manual***.

2.34.6.3 INSTALLATION

(1) The NSB sign shall be installed at the entrance points to a designated byway. When possible, this sign shall be mounted below the FSH sign on a standard sign pole.

(2) When an existing designated Florida Scenic Highway becomes a National Scenic Byway, District Traffic Operations will review the existing signing on the designated roadway for possible ways to accommodate both designations on the corridor. If unable, to place both, then the FSH will have the priority on the roadway.

(3) The Department is responsible for the installation of the NSB signs on the State Highway System.

(4) The local government is responsible for the installation of the NSB signs on their system.

2.34.6.4 MAINTENANCE

(1) The maintenance of the NSB signs used throughout the National Scenic Byway corridor depends on the government entity that is responsible for the roadway.

(a) The Department is responsible for the maintenance of the NSB sign on the State Highway System.

(b) Local government is responsible for the maintenance of the NSB sign on their roads.

Section 2.35

SIGNING FOR MEMORIAL ROADWAY DESIGNATIONS

2.35.1 PURPOSE

The purpose of this section is to provide guidance to the districts on the installation of signs when a roadway has been given a memorial designation by the Florida Legislature.

2.35.2 BACKGROUND

(1) Over the years, the Florida Legislature has dedicated, named, and otherwise titled roadways in Florida. The designated roads can be under the jurisdiction of either the Department or local government.

(2) Records kept in the Department's Systems Implementation Office identify the earliest dedicated roadway as the W.W. Clark Memorial Bridge on State Road 580 between Safety Harbor and Oldsmar. This was dedicated by the State Road Board on July 6, 1922. Since that time, every county and most cities have participated in officially naming some roadway feature.

2.35.3 SIGNING PROCESS

(1) The Florida Legislature designates the roadways based on recommendations from a city or county commission, individual state agencies, or civic groups.

(2) Upon official designation by the Florida Legislature, it is the responsibility of the legislative sponsors of the designation to obtain local resolutions in accordance with ***Section 334.071(3), F.S.***

(3) After receiving a copy of the local resolution, the Department shall begin the process to have the signs installed on the State Highway System.

(4) Within the Department, the process for the installation of these signs involves the following offices:

(a) District Public Information Office

(b) ***District Traffic Operations Office***

(c) District Maintenance Office

(d) ***State Traffic Engineering and Operations Office***

(e) Transportation Data and Analytics Office

(5) Each district has their own signing process in place, and it varies as to which of the above district offices initiates the process. However, it is important that all the above district offices are notified and kept informed as to the status of roadway designations within their district after each legislative session.

(6) Each district will coordinate the installation of the signs with the legislative sponsor of the designation.

(7) Memorial names may not appear on guide signs or on any other than the standard sign, in accordance with ***Section 2M.10 of the MUTCD***.

2.35.4 SIGN INSTALLATION AND MAINTENANCE

(1) Signs shall be installed and maintained by the Department on the State Highway System.

(2) On non-limited access facilities, one sign per direction shall be installed in accordance with ***Section 2M.10 of the MUTCD***.

(3) On limited access facilities, one sign per direction shall be installed in accordance with ***Section 2M.10 of the MUTCD***.

2.35.5 SIGN DESIGN

(1) The signs used for Memorial Roadway Designations shall be a brown panel with yellow lettering. An example of this sign is shown in ***Figure 2.35-1***.

Figure 2.35-1. Memorial Roadway Designation Sign

(2) Sign details are available in the ***Department's Sign Library***.

Section 2.36

COMMUNITY WAYFINDING GUIDE SIGNS

2.36.1 PURPOSE

The intent of this section is to provide guidance to the districts on the process for approving Community Wayfinding Guide Signs on the State Highway System.

2.36.2 BACKGROUND

(1) The Department, in cooperation with the Florida League of Cities, has developed statewide criteria for Community Wayfinding Guide Signs on our State Highway System. These standards as shown in ***Rule 14-51, Part V, F.A.C.,*** (Florida's Highway Guide Sign Program) provide local governments the flexibility to design their own Community Wayfinding Guide Sign System while still maintaining federal and state sign standards to safely guide motorists to their destinations.

(2) The standards shown in ***Rule 14-51, Part V, F.A.C.*** allow local governments to have a better understanding of what can and cannot be approved for use on the State Highway System based on the requirements of the ***MUTCD***.

2.36.3 STANDARDS

(1) All Community Wayfinding Guide Signs on the State Highway System must be in conformance with ***Rule 14-51, Part V, F.A.C.*** prior to any installation.

(2) In conformance with ***Rule 14.51.051(8), F.A.C.,*** the design, installation, and maintenance of Community Wayfinding Guide Signs on the State Highway System are the responsibility of local government.

2.36.4 REVIEW PROCESS

(1) A pre-planning meeting between District Traffic Operations and local government is recommended to assist in compliance with ***Rule 14-51, Part V, F.A.C.***

(2) After a Community Wayfinding Guide Sign System Plan has been developed, local governments or their representative must provide one set of the Community Wayfinding Guide Sign System Plans to the appropriate ***District Traffic Operations Office***.

(3) Once received, the Community Wayfinding Guide Sign System Plan shall be reviewed by the ***District Traffic Operations Office*** for compliance with ***Rule 14-51, F.A.C.***

(4) If compliance is not met, District Traffic Operations staff will contact local

government with the changes that need to be made to their Community Wayfinding Guide Sign System Plan in order to meet the criteria shown in the ***Rule 14-51, F.A.C.***

(5) Once the Community Wayfinding Guide Sign System Plan is approved, the ***District Traffic Operations Office*** shall issue a letter of compliance signed by the ***DTOE*** to the local government.

Section 2.37

ADVANCE STREET NAME SIGNS

2.37.1 PURPOSE

The objective of this section is to provide guidance on the design, placement, and installation criteria for advance street name signs on the State Highway System.

2.37.2 BACKGROUND

(1) The use of advance street name signs is one of the recommended roadway improvements and safety countermeasures in the Department's Safe Mobility for Life Program. This recommended improvement is based on the ***FHWA's Handbook for Designing Roadways for the Aging Population*** to provide advance notification to drivers to help them in making safer roadway decisions.

(2) In 2002, FDOT conducted an effectiveness study on the roadway improvements that were implemented in our aging road user program, including advance street name signs. Data from that study showed that advance street name signs with larger lettering were read at a greater distance from the intersection being announced which led to significantly more decision time. The research supports our decision to continue to use advance street name signs as an effective safety countermeasure for FDOT's ***Safe Mobility for Life Program***.

2.37.3 DEFINITIONS

Critical or Significant Cross Street. A signalized or unsignalized intersection or cross street classified as a minor arterial or higher, that provides access to a traffic generator or possesses other comparable physical or traffic characteristics deemed to be critical or significant and having an AADT greater than 2000.

2.37.4 STANDARDS

The standards shown in this section apply to each of the three different types of advance street name sign applications. Specific criteria for the installation of advance street name signs at signalized intersections (NEXT SIGNAL) is shown in ***TEM 2.37.5,*** for non-signalized intersections (NEXT INTERSECTION) in ***TEM 2.37.6*** and for advance street name plaques on intersection warning signs in ***TEM 2.37.7.***

(1) Advance street name signs and Advance Street Name plaques shall only be used to identify critical or significant cross streets. They are not intended to identify destinations such as cities, facilities, or residential neighborhoods.

(2) Whenever possible the word Street, Boulevard, Avenue, etc., should be abbreviated (St, Blvd, Ave) or letter height reduced to conserve sign panel length. In special cases it may be deleted; however, if confusion would result due to similar street names in the area, for example Orange Street and Orange Avenue, this deletion should not be made.

When a subdivision or community in the area also goes by that name these words (Street, Boulevard, Avenue, etc.) or their abbreviations should not be deleted.

(3) When a cross street is known by both route number and a local name, use of the local name is preferred on the advance street name sign since the route number is identified on route markers along the route.

(4) When minor cross streets intersect the State Highway between the advance street name and the intersection, additional legend such as NEXT SIGNAL or XX FEET may be added to the advance street name sign.

(5) The legend used on the advance street name sign or plaque shall be consistent with the legend on either the overhead street name or post mounted street name sign.

(6) Sign sheeting materials shall comply with the current edition of the ***Standard Specifications, Section 994***.

(7) Mounting heights and lateral clearances should adhere to those specified in the ***Standard Plans, Index 700-101*** and support systems shall meet or exceed Department standards of frangibility.

(8) Signs should be installed in advance of the intersection in accordance with the distances shown in ***"Condition A" of Table 2C-4 of the MUTCD***. These distances are to be considered the minimum for a single lane change maneuver and should be measured from the begin taper point for the longest auxiliary lane designed for the intersection. The degree of traffic congestion and the potential number of lane change maneuvers that may be required should also be considered when determining the advance placement distance.

2.37.5 ADVANCE STREET NAME SIGNS AT SIGNALIZED INTERSECTIONS

(1) Requests to install advance street name signs ***(Figure 2.37-1)*** must be initiated by District Traffic Operations or based on a request received from the local agency having jurisdiction over the approaching cross street. The ***DTOE*** is responsible for the review and approval of these signs.

(2) Advance street name signs shall be white lettering on green background and designed in accordance with ***Section 2D.05*** and ***Section 2D.39 of the MUTCD***.

Figure 2.37-1. Advance Street Name Sign at Signalized Locations

(3) The use of advance street name signs at signalized intersections as a safety countermeasure are recommended and should be installed if any of the following conditions occur:

(a) There is a documented history of side-swipe or rear-end crashes or;

(b) There are high volume approaches.

(c) There is a high 65 and older population.

(d) Roadway with 4 lanes or greater.

(e) Rural high speed roadways (50 mph or greater).

(f) The intersection is located in a ***Safe Mobility for Life Coalition Priority County***.

(4) At a minimum, letter height (legend) shall conform to ***Table 2.37-1, Design Guidelines for Advance Street Name Signs.*** When street name legends are lengthy, or there is limited right-of-way the sign font shall be modified from ***Table 2.37-2*** using the standard font sizes shown in ***Figure 2.37-4.***

Table 2.37-1. Design Guidelines for Advance Street Name Signs

Posted Speed Limit	STREET NAME LEGEND Letter Size (inches) Upper/Lower Case Letters	NEXT SIGNAL or NEXT INTERSECTION Letter Size (inches) Upper Case Letters
35 mph or less	8EM	6D
40 mph or greater	10.67EM	8E

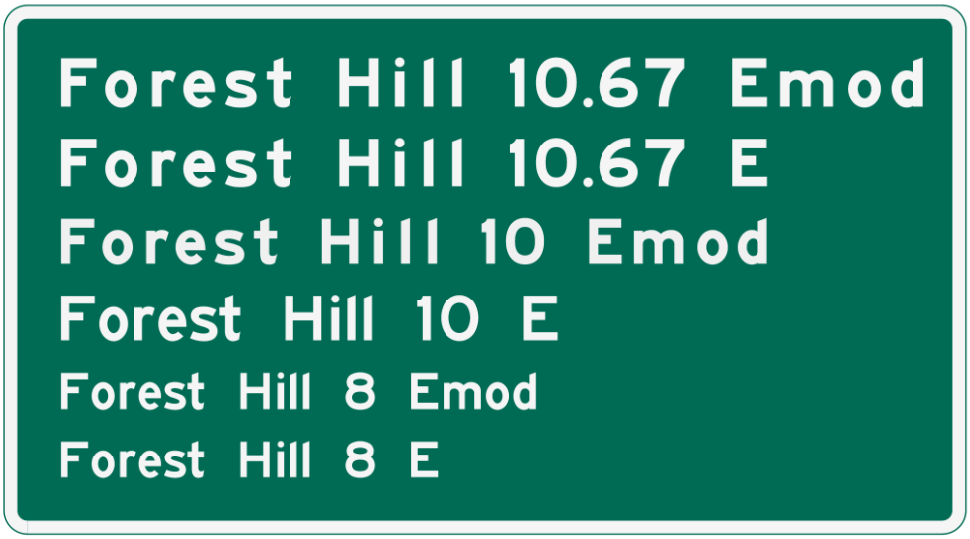
(5) Roadways posted at 35 mph or less, or when limited right of way is available a single post sign design ***(Figure 2.37-2)*** shall be installed.

Figure 2.37-2. Advance Street Name Sign Design (Single Post)

(6) Roadways posted at 40 mph or greater and have no limited right of way, a double post design (***Figure 2.37-3)*** shall be installed.

Figure 2.37-3. Advance Street Name Sign Design (Double Post)

Figure 2.37-4. Standard Font Sizes for Advance Street Name Sign Legends



(7) When a cross street has a different name on each side of the intersection, both names shall be shown on the advance sign with an arrow beside each name to designate direction ***(Figure 2.37-5)***.

Figure 2.37-5. Advance Street Name Sign Using Different Names

2.37.6 ADVANCE STREET NAME SIGNS AT NON-SIGNALIZED INTERSECTIONS

(1) Requests to install advance street name signs ***(Figure 2.37-6)*** at non-signalized intersections must be initiated by District Traffic Operations or based on a request received from the local agency having jurisdiction over the approaching cross street. The ***DTOE*** is responsible for the review and approval of these signs.

(2) These signs may be installed on multi-lane divided highways that have a

dedicated left turn lane, not just a median opening for the approaching critical or significant cross street. The posted speed of the roadway shall not be lower than 45 mph.

(3) Advance street name signs shall be designed in accordance with ***Section 2D.05*** and ***Section 2D.39 of the MUTCD*** and the ***Standard Highways Signs Manual***.

(4) At a minimum, letter height (legend) shall conform to ***Table 2.37-1, Design Guidelines for Advance Street Name Signs***.

Figure 2.37-6. Advance Street Name Signs at Non-Signalized Locations

2.37.7 ADVANCE STREET NAME PLAQUES ON INTERSECTION WARNING AND ADVANCE TRAFFIC CONTROL SIGNS

(1) Intersection Warning Signs (***W2*** series) ***(Figure 2.37-7)*** and Advance Traffic Control Signs (***W3*** series) ***(Figure 2.37-8)*** should be installed when there is a documented need based on sight restriction, crash history, or engineering judgment.

(2) Advance street name plaques ***(Section 2C.49 of the MUTCD)*** should be installed on these warning signs when there is:

(a) Minimum of 2000 AADT

(b) No street lighting along main arterial

(c) Documented history of turning, entering, or side-swipe crashes

(d) Limited sight distance due to horizontal or vertical curves

(e) A high 65 and older population

(f) The intersection is located in a ***Safe Mobility for Life Coalition Priority County***.

(3) It is recommended that wherever a new or replacement Intersection Warning Sign (***W2*** series) is installed on a rural roadway it is accompanied by an advance street name plaque designed in accordance with this section.

(4) Requests must be initiated by District Traffic Operations or may also be received from the local agency having jurisdiction over the approaching cross street.

(5) Advance street name plaques shall be black lettering on yellow background using an 8-inch D series lettering size mounted below a 48-inch warning sign panel, with upper/lower case lettering in accordance with the ***FHWA's Handbook for Designing Roadways for the Aging Population***. If not structurally possible, lettering size may be decreased to a minimum of 5-inch D series.

(6) Roads not currently signed with an advance route marker may be considered for an Intersection Warning Sign (***W2*** series) and an advanced street name plaque when they meet the criteria referenced in this section.

(7) Roads with an advanced route marker (JCT shield) ***(Figure 2.37-9)*** may have the street name plaque placed below to better identify the roadway to unfamiliar travelers. The panel color should match the route marker. If used, the lettering on the street name plaque shall be no less than 4-inch C series.

Figure 2.37-7. Advance Street Name Plaque on Intersection Warning Sign

Figure 2.37-8. Advance Street Name Plaque on Advance Traffic Control Warning Sign

Figure 2.37-9. Advance Street Name Plaque on Advanced Route Marker

Section 2.38

USE OF GENERATORS AND PORTABLE STOP SIGNS AT NON-FUNCTIONING SIGNALIZED INTERSECTIONS

2.38.1 PURPOSE

This section provides guidelines on deploying generators and portable stops signs at non-functioning signalized intersections after an emergency event. The Department's guiding principles on deploying generators and portable or part-time (folding) stop signs shall conform to ***Section 316.1235, F.S.*** and to the ***MUTCD***.

2.38.2 CONDITIONS FOR USE

(1) The ***DTOE*** shall request the installation of generators or the placement of portable stop signs after an emergency event at locations where a signalized intersection is not functioning. A non-functioning signalized intersection is defined herein as an intersection that is equipped with traffic signals which are damaged and/or without power after an emergency event.

(2) When the signalized intersection is without power and restoration of power using a generator is not possible, portable stop signs should be placed as directed by the ***DTOE***.

(3) When portable stop signs are utilized at a signalized intersection that is not functioning due to a power outage, the power shall be disconnected to avoid traffic control conflicts when power is restored.

(4) When generators are used at a signalized intersection due to a power outage and power is restored, the traffic signals shall continue to function in the same operation. If the traffic signals were in flashing operation, the traffic signals shall continue in flashing operation. If the traffic signals were in normal cycle and phasing operations, the traffic signals shall continue in the normal operation.

2.38.3 LOCATION AND PLACEMENT

(1) The locations for placement of generators or portable stop signs shall be at the discretion of the ***DTOE***. They shall, in coordination with local agencies, develop and maintain a list of critical signalized intersections to establish a priority for generator or portable stop sign installation.

(2) The placement of the portable stop signs shall be in accordance with ***Figures 2.38-1 through 2.38-6*** of this section. Placement of the portable stop signs for any intersection design not represented in ***Figures 2.38-1 through 2.38-6*** shall be done in accordance with the direction of the ***DTOE***, the ***Standard Plans***, and

the ***MUTCD***.

(3) Each critical signalized intersection control cabinet shall be wired with a transfer switch and capable of switching to an alternate generated power source in the event of a power outage and shall conform to ***Standard Specifications, Section 676***.

2.38.4 STORAGE AND DISTRIBUTION

(1) Each District shall have access to and be capable of deploying portable generators to provide an alternate power source to 12 percent of the signalized intersections on the State Highway System in the District. The District Maintenance Office shall determine the deployment locations.

(2) The District Maintenance Office shall be responsible for maintenance and storage of the generators.

(3) Each District shall have access to and be capable of deploying portable stop signs to non-functioning signalized intersections on the State Highway System in the District that are not equipped with a generator.

2.38.5 REMOVAL AND RECOVERY

(1) The generators should be removed upon restoration of power and proper signals operation. The portable stop signs should be removed prior to normal operations of the traffic control signal. The recovery of the generators and portable stop signs should be accomplished using District emergency response teams or emergency contractors by either of the following:

(a) Complete removal from each intersection.

(b) Stockpiling the portable stop signs in one corner of the intersection for removal later.

(2) The Districts shall determine the method of recovery and develop a recovery plan for their intersections.

Figure 2.38-1. Temporary Signing for Power Outage – Major Dual Left Intersection

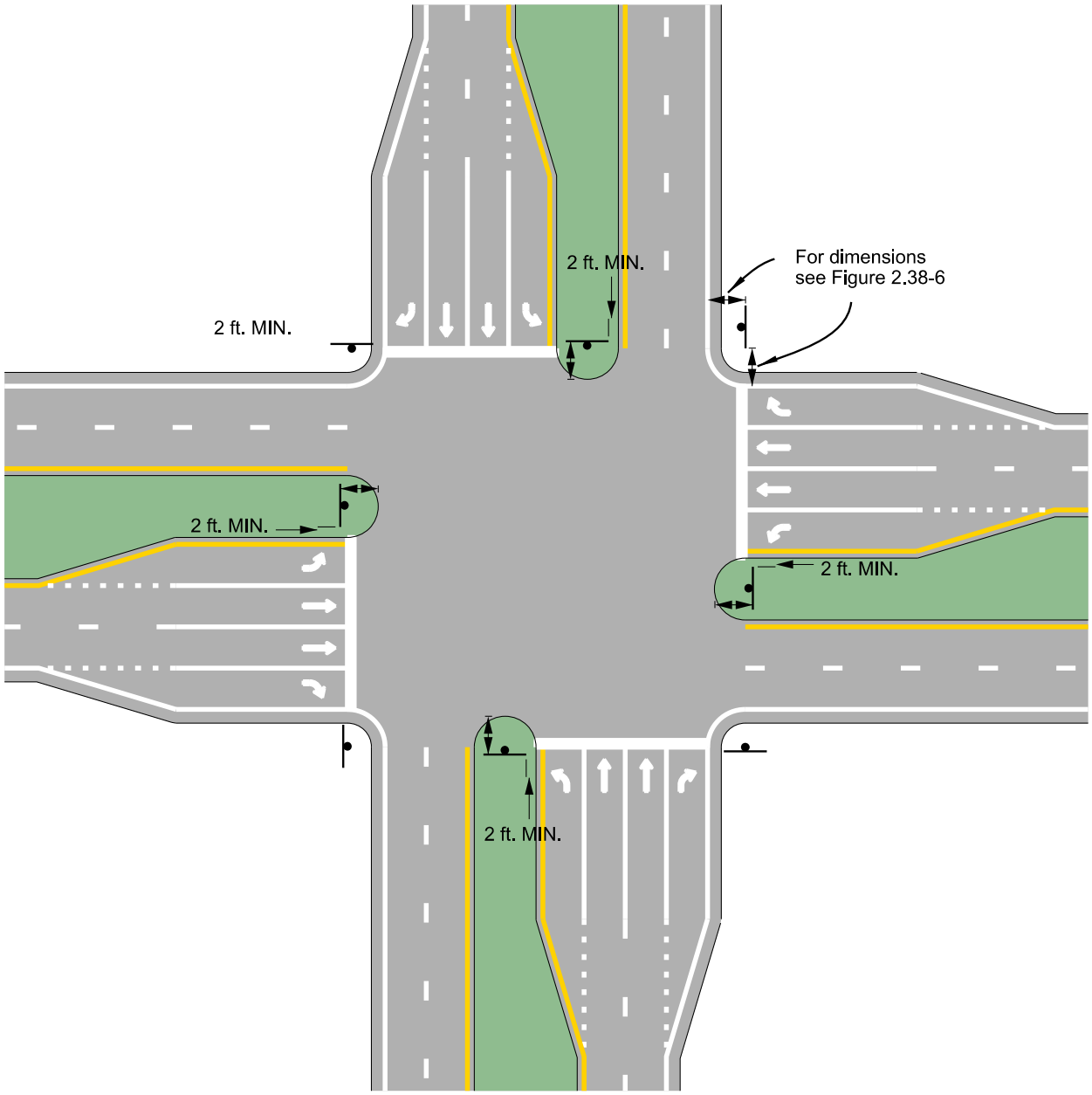


Figure 2.38-2. Temporary Signing for Power Outage – Major Single Left Intersection

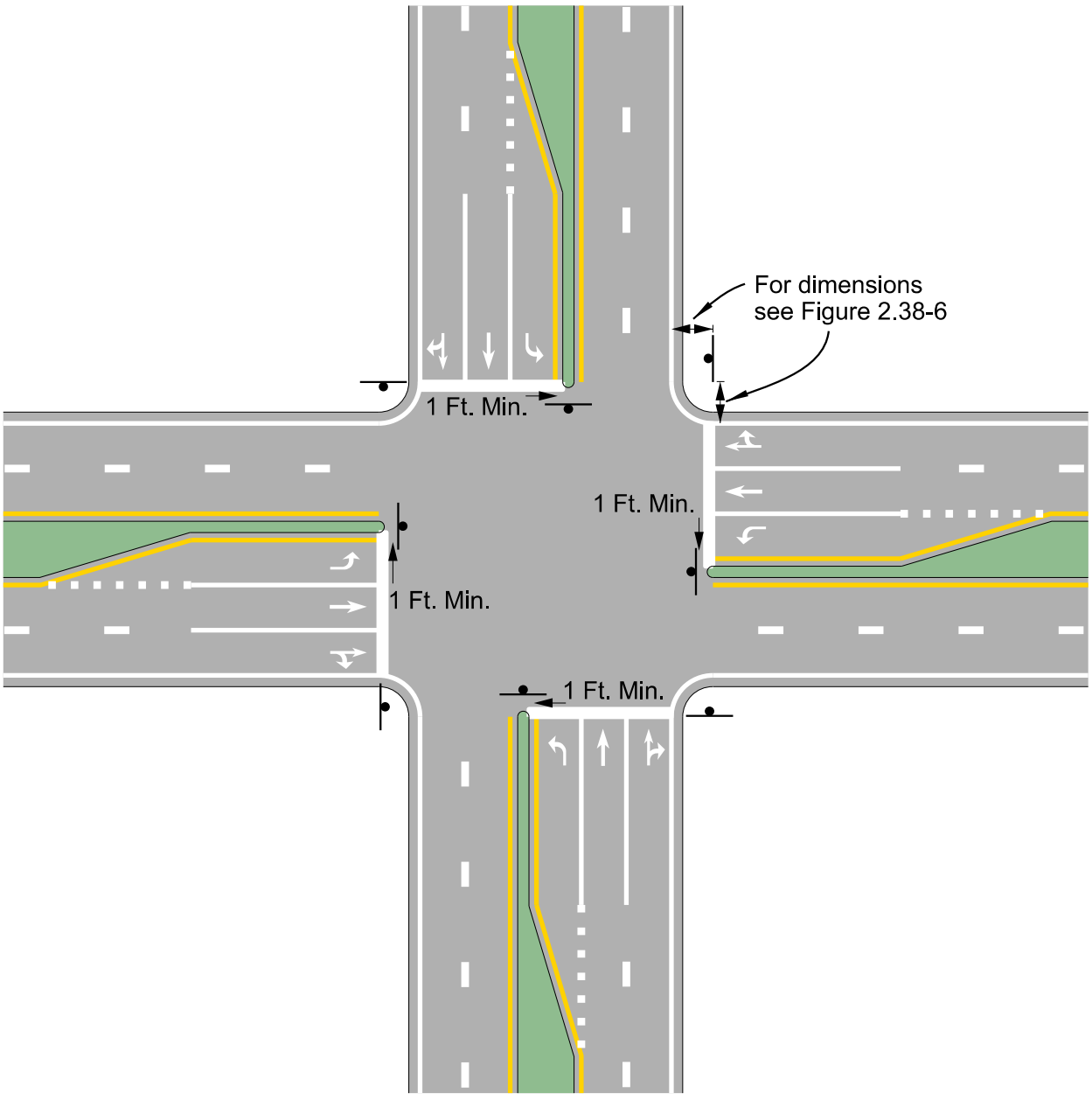


Figure 2.38-3. Temporary Signing for Power Outage – Major Thru Intersection

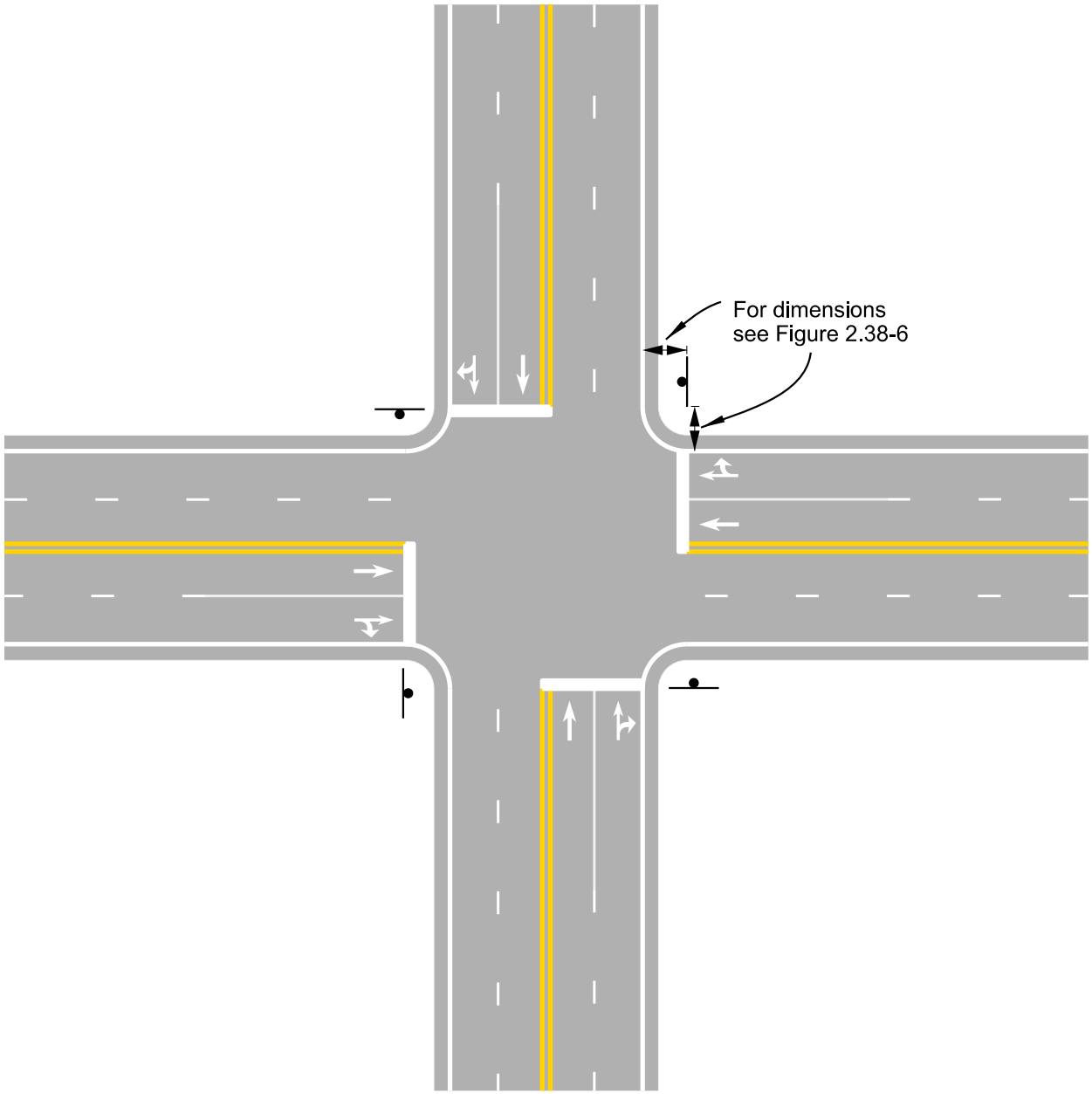


Figure 2.38-4. Temporary Signing for Power Outage – Major to Minor Intersection

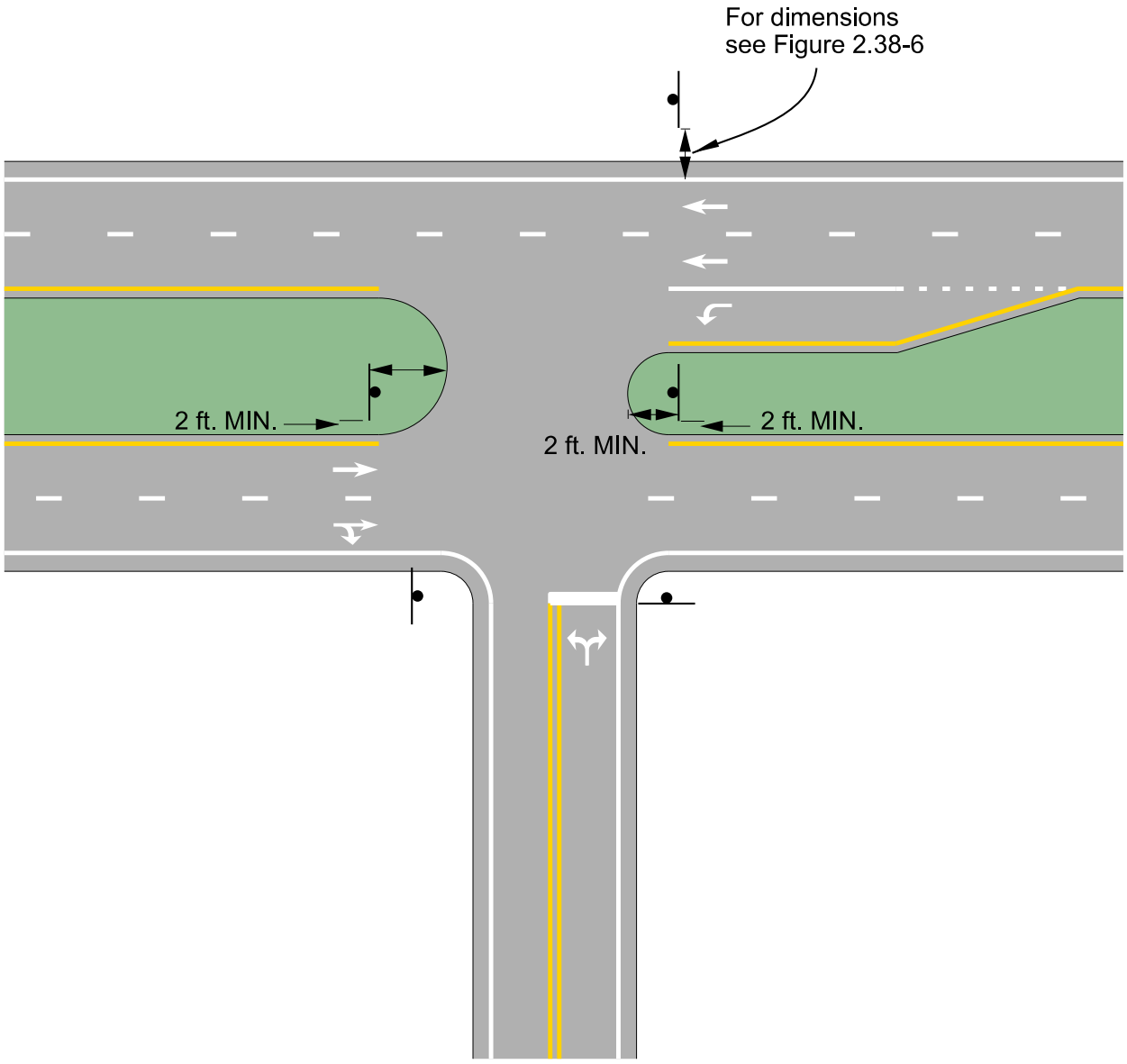


Figure 2.38-5. Temporary Signing for Power Outage – Minor Intersection

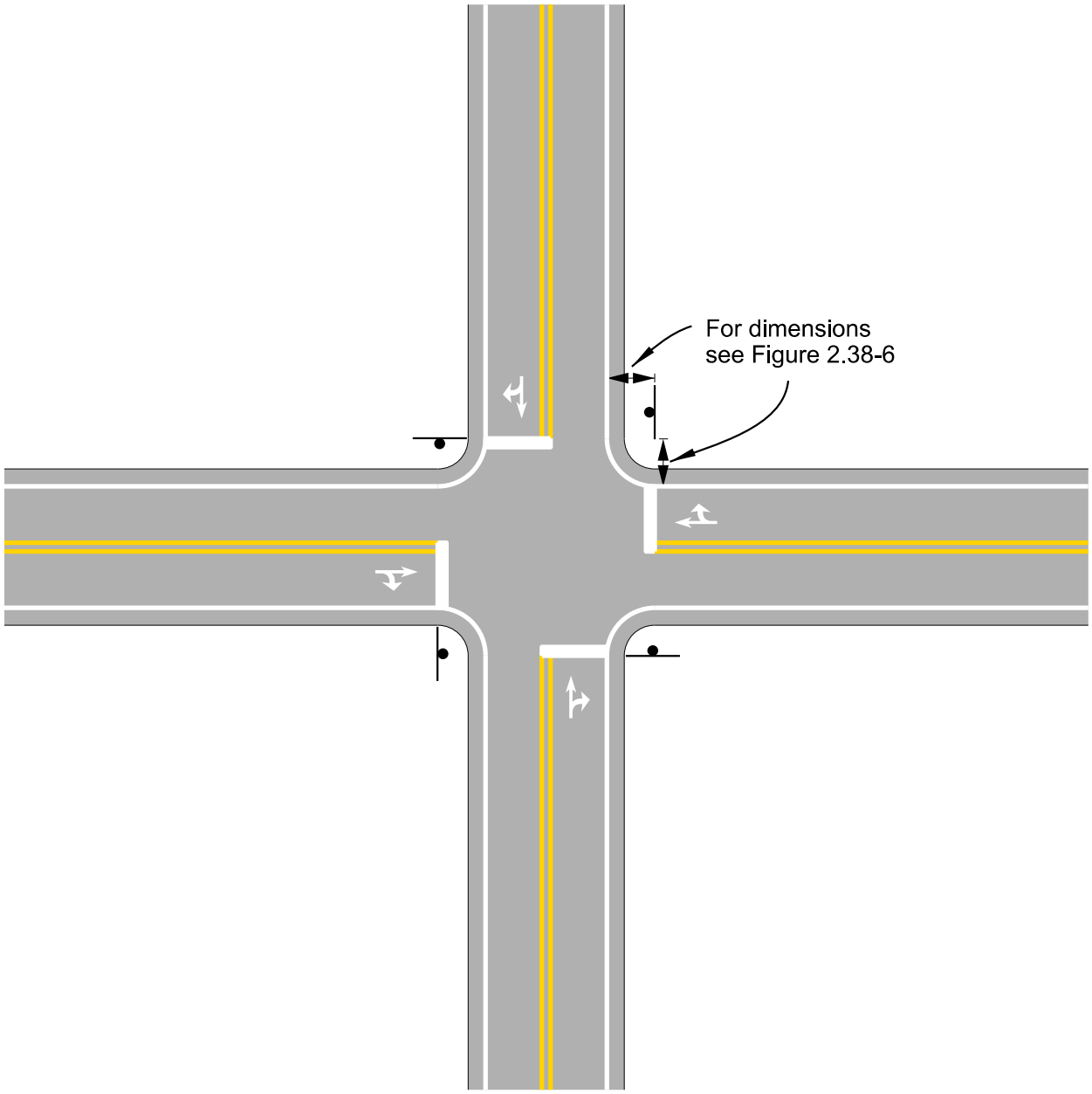
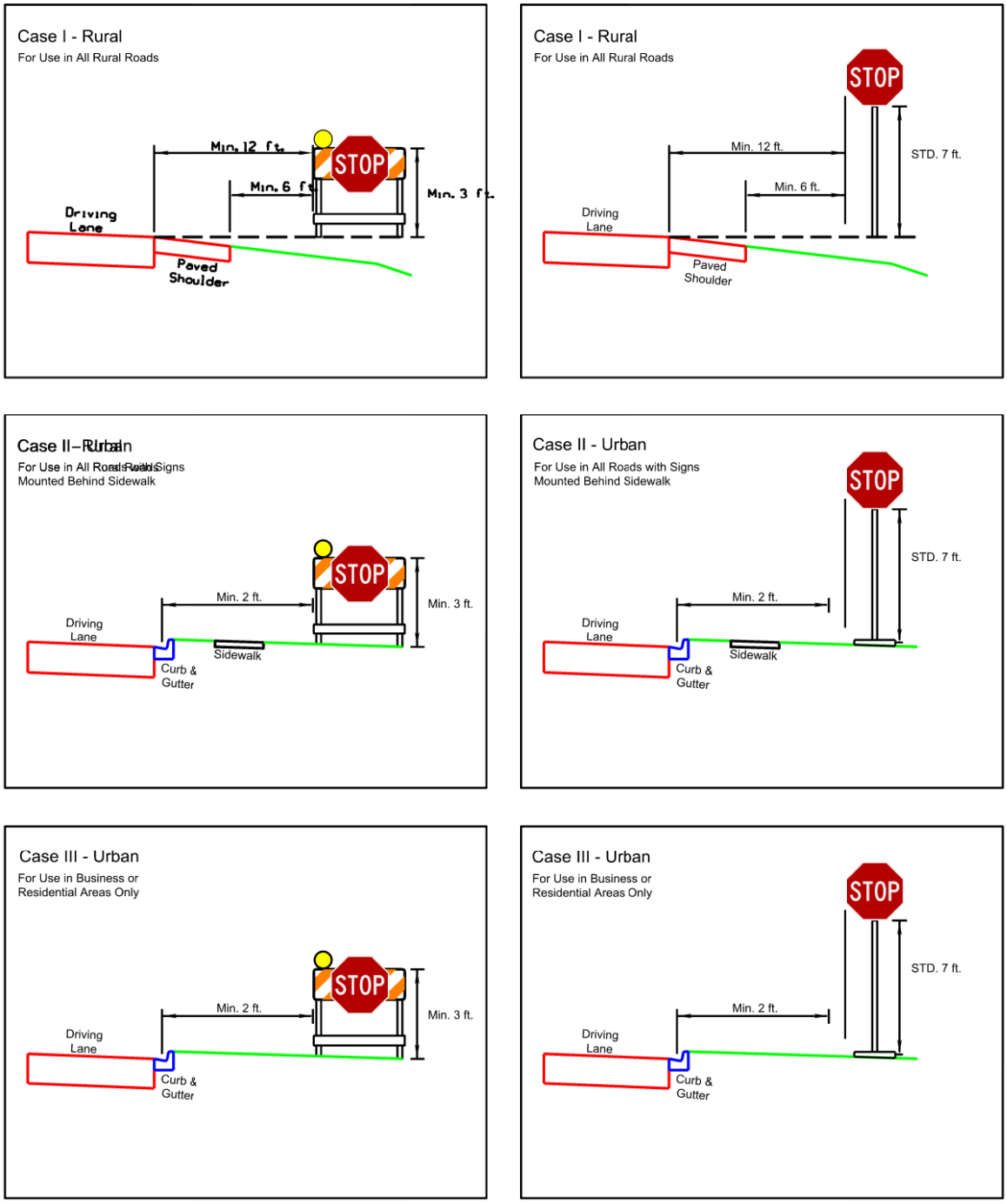


Figure 2.38-6. Temporary Signing for Power Outage – Sign Dimensions



The above sign offset distances and height measurements are from the ***MUTCD***. During a Governor's emergency declaration, these distances may vary at the discretion of the ***DTOE***.

Section 2.39

WARNING, STOP, AND YIELD SIGN SIZES

2.39.1 BACKGROUND

(1) Drivers (65 years and older) experience visual decline and slower reaction time and reduced visual acuity is associated with crash rates. Warning, STOP, and YIELD signs are critical to the safe operation of motor vehicles by all drivers. In order to determine the appropriate sizes that should be used for these critical signs, the ***State Traffic Engineering and Operations Office*** conducted a study.

(2) The minimum required corrected visual acuity to obtain a driver's license in the State of Florida is 20/70. Therefore, this value was selected as the design visual acuity goal for these critical signs. Based on this design goal, the required sizes of Warning, STOP, and YIELD signs were determined and are presented in this section.

(3) The minimum sign sizes referenced in this section shall be used on all future projects and as replacements when necessary due to sign damage or expiration of useful sign life.

2.39.2 RECOMMENDED WARNING SIGN SIZES

(1) The recommended symbol warning sign sizes in ***Table 2.39-1, Recommended Symbol Warning Sign Sizes*** meet the design goal for 20/70 visual acuity**.**

Table 2.39-1. Recommended Symbol Warning Sign Sizes

SIGN CODE	SIGN SIZE (Inches)	SIGN SYMBOL
W3-1	36	Stop Ahead
W3-2	36	Yield Ahead
W3-3	36	Signal Ahead
W3-5	36	Speed Reduction
W11-10	36	Truck Crossing

(2) The recommended word message warning sign sizes in ***Table 2.39-2, Recommended Word Message Warning Sign Sizes*** meet either the minimum design goal of 20/70 visual acuity or the most acuity available by using a 48-inch diamond shape sign.

Table 2.39-2. Recommended Word Message Warning Sign Sizes

SIGN CODE	SIGN SIZE (Inches)	LETTER SERIES	PRIMARY LETTER HEIGHT (Inches)	MINIMUM REQUIRED ACUITY 20/x	SIGN MESSAGE
W5-1	48	D	8	64	Road Narrows
W5-2	48	D	8	64	Narrow Bridge
W5-3	48	C	8	54	One Lane Bridge
W8-1	36	D	10	80	Bump
W8-2	36	E	10	88	Dip
W8-3	48	C	8	54	Pavement Ends
W8-4	48	C	8	54	Soft Shoulder
W8-6	48	C	8	54	Truck Crossing
W8-7	48	D	8	64	Loose Gravel
W8-8	48	D	8	64	Rough Road
W8-9	48	C	8	54	Low Shoulder
W9-1	48	D	8	64	Right Lane Ends
W9-2	48	D	8	64	Lane Ends Merge Left
W13-1	24	E	10	88	35 MPH
W13-2	36 x 48	E	12	106	Exit 25 MPH
W13-3	36 x 48	E	12	106	Ramp 30 MPH
W14-1	48	D	9	72	Dead End

(3) A No Passing Zone sign (***W14-3***) shall be 36 x 48 inches with 5-inch Series D lettering on the words NO and PASSING and 5-inch Series C lettering on the word ZONE.

(4) Right-of-way constraints may sometimes limit the size of warning signs. When this occurs, the largest sign that will fit shall be used**.**

(5) For any sign that isn't designed for 20/70 visual acuity there will be less legibility distance and therefore less time to perceive and understand the message before passing the sign. However, by adding the following additional distances to the sign placement distances shown in ***Table 2C-4. Guidelines for Advance Placement of Warning Signs*** and referenced in ***Section 2C.05 of the MUTCD***, the same total distance from the point where the sign is just legible to the condition must be maintained. Add 25 feet for 8-inch Series C and 8-inch Series D letters; 50 feet for 5-inch Series D, 6-inch Series C, and 6-inch Series D letters; and 75 feet for 5-inch Series C letters.

2.39.3 RECOMMENDED STOP SIGN SIZES

(1) The 48-inch STOP sign provides a minimum required acuity of 20/45. In addition, use of the larger STOP signs, in areas with restricted right-of-way, may present problems. Installation of the STOP AHEAD symbol warning sign will alleviate both of these problems.

(2) ***Table 2.39-3, Stop and Stop Ahead Sign Sizes and Placement*** was produced to determine the required size for the STOP and STOP AHEAD sign, and the sign placement distance for the STOP AHEAD sign.

Table 2.39-3. Stop and Stop Ahead Sign Sizes and Placement

POSTED SPEED (mph)	STOPPING SIGHT DISTANCE (feet)	STOP SIGN SIZE[1] (inches)	STOP SIGN RECOGNITION DISTANCE (20/70) (feet)	STOP AHEAD SYMBOL SIGNS [2] (inches)	STOP AHEAD SIGN PLACEMENT DISTANCE (feet)
20	150	30	178	–	–
25	200	30	222	–	–
30	250	36	267	36*	125*
35	300	36	267	36*	175*
45	450	36	267	36	325
50	550	48	356	36	425
55	625	48	356	36	500
*If needed for restricted sight distance locations in urban areas.					
[1]On state highways, the 48-inch STOP sign should be considered for 45 mph or greater. STOP signs on roads intersecting the state highway are usually replaced in FDOT construction projects. The sizes in this section are recommended for the replacement signs. Motorists traveling on local roads, in urban areas, expect to encounter STOP signs. STOP signs larger than 36-inches should be used when greater emphasis or visibility is needed.					
[2] On state highways, in rural areas, motorists may not expect to encounter a STOP sign. As an enhancement, the STOP AHEAD sign should be used for speeds equal to or greater than 45 mph. On local roads, in rural areas, motorists usually expect to stop as they cross a state highway. Where sight distance restrictions exist, a STOP AHEAD sign should be used.					

(3) The stopping sight distance shown in the table above were calculated using the equation on Page 113 of AASHTO's ***A Policy on Geometric Design for Highways and Streets (Green Book, 2004 edition)***, and is for level, wet pavement. The brake reaction time was increased from 2.5 to 3.5 seconds to accommodate drivers aged 65 years and older.

(4) Both the stopping sight distance and the STOP AHEAD sign placement distance should be increased to compensate for longer stopping sight distance on downgrades.

(5) The increase due to downgrades as steep as 6 percent does not change the results in ***Table 2.39-3*** for speeds up to and including 35 mph. ***Table 2.39-4*** gives the required additional distance due to downgrade. This increase should be added to both the stopping sight distance and the STOP AHEAD sign placement distance in ***Table 2.39-3***.

(6) The STOP AHEAD symbol sign should be placed according to Table 2.39-3, rather than ***Table 2C-4. Guidelines for Advance Placement of Warning Signs***, referenced in ***Section 2C.05 of the MUTCD*** for Condition B (Stop). The 36-inch size sign has 141 foot legibility for 20/70 visual acuity, which is greater than the required 125 feet.

(7) If restricted right-of-way requires a STOP sign smaller than shown in this table, the largest possible size should be used and a 36-inch STOP AHEAD symbol sign should be placed according to ***Table 2.39-3*** and ***Table 2.39-4***.

(8) If restricted right-of-way demands a STOP AHEAD symbol sign smaller than 36-inch, the 30-inch sign will provide approximately 117 foot legibility. This sign should be placed 10 feet further from the STOP sign than the distance shown in ***Table 2.39-3*** and ***Table 2.39-4***.

Table 2.39-4. Additional Stopping Sight Distance and Stop Ahead Sign Placement Distance Due to Downgrade

POSTED SPEED (mph)	ADDITIONAL DISTANCE (3% GRADE) (feet)	ADDITIONAL DISTANCE (6% GRADE) (feet)
45	25	50
50	50	75
55	50	100

(9) When flashing beacons are used on the STOP sign, the STOP AHEAD sign is optional unless required because of restricted sight distance.

2.39.4 RECOMMENDED YIELD SIGN SIZES

The sizes for YIELD signs shall be as shown in ***Table 2B-1 of the MUTCD*** with a target compliance date of December 22, 2013.

Section 2.40

APPROVED SAFETY MESSAGES FOR PERMANENTLY MOUNTED DYNAMIC MESSAGE SIGNS

2.40.1 PURPOSE

The purpose of this section is to provide a listing of approved standard safety messages that can be displayed on permanently mounted Dynamic Message Signs.

2.40.2 DEFINITIONS

Dynamic Message Sign (DMS). Dynamic, changeable or variable message signs defined as programmable traffic control devices that display messages composed of letters, symbols/graphics or both. DMS are used to convey timely and important en route and roadside information to motorists and travelers about changing highway conditions to improve operations and reduce crashes. DMS may inform drivers to change travel speed, change lanes, divert to a different route, or to be aware of a change in current or future traffic conditions.

2.40.3 APPROVED STANDARD SAFETY MESSAGES FOR DISPLAY ON PERMANENTLY MOUNTED DMS

Approved standard safety messages for display on a permanently mounted DMS can be found on the ***Department's Highway Signing Program website***.

Section 2.41

GUIDELINES FOR USE OF RETROREFLECTIVE STRIPS

2.41.1 PURPOSE

This section provides guidance on the use of retroreflective strips on sign posts when the material is required or a documented need exists to draw attention to the sign, especially at night-time. The objective of providing the retroreflective strips is to improve the conspicuity and presence of the signs.

2.41.2 DEFINITIONS

Conspicuity. Easily seen or noticed; readily visible or observable.

2.41.3 CONDITIONS FOR USE

(1) Retroreflective strips should be used where a documented need exists to enhance sign visibility. The requirement for enhanced conspicuity as referenced in ***Section 2A.15 of the MUTCD***, for standard signs is generally based on the need to make a sign more visible. Retroreflective strips should only be used when there is a need for extra emphasis.

(2) The following sign types require the use of retroreflective strips:

- **(a)** WRONG WAY sign posts
- **(b)** Crossbuck sign blades at all rail crossings and posts at all passive rail crossings

(3) Use retroreflective strips on sign posts where a documented need exists or application has been proven to significantly reduce crashes for a given condition. The following sign types are appropriate based upon engineering judgement:

- **(a)** Curve Warning Signs (***Section 2C.06 of the MUTCD***)
- **(b)** Do Not Enter Signs (***Section 2B.37 of the MUTCD***)
- **(c)** Stop, Yield or Other Regulatory Signs (***Section 2B.05 of the MUTCD***)

(4) For the more critical signs that happen to be placed in a less desirable location (in curves where headlamps don't align optimally, etc.), engineering evaluations may lead to a sign being upgraded with retroreflective strips. Engineering judgment includes considering high crash locations where the use of retroreflective strips on sign supports could improve sign visibility and provide better guidance to motorists.

2.41.4 SIGN DESIGN

The specifications for retroreflective requirements are referenced in ***Standard Specifications, Section 700***.

Section 2.42

EXPRESS LANES SIGNING

2.42.1 PURPOSE

The purpose of this section is to establish a uniform basis for the design of express lanes signing.

2.42.2 BACKGROUND

(1) Express lanes design criteria are found in the ***FDOT Design Manual (FDM)***.

(2) Express lanes signs shall comply with applicable provisions of ***Section 2G of the MUTCD***. Express lanes are referred to as Priced Managed Lanes in the ***MUTCD***.

2.42.3 CRITERIA

Express lanes signs include the following sign types:

(1) Regulatory Signs

- **(a)** Vehicle Eligibility Sign
- **(b)** Express Lanes Termination Sign
- **(c)** Toll Amount Sign
- **(d)** Periods of Operation Sign (R3-44)

(2) Advanced Guide Signs

- **(a)** Point of Entry/Ingress signing
- **(b)** Point of Exit/Egress signing

2.42.3.1 Vehicle Eligibility Sign

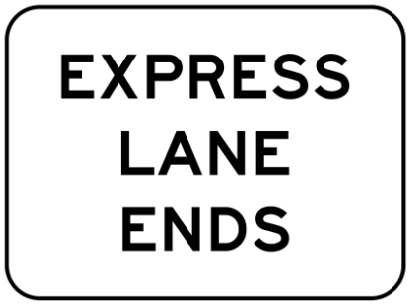
The purpose of this sign is to convey the vehicle eligibility criteria established in ***Rule 14-100.003, F.A.C.*** regarding the number of axles and vehicle types permitted to use the express lanes. This sign shall be mounted overhead and over the lane to which it applies. An example of the Vehicle Eligibility Sign is shown in ***Figure 2.42-1***.

Figure 2.42-1. Vehicle Eligibility Sign

2.42.3.2 Express Lanes Termination Sign

The purpose of this sign is to inform motorists that the express lanes are ending. This sign shall be mounted overhead and over the express lanes to which it applies. If space permits, three signs are preferred, at sequential spacing. Due to the large number of drivers over the age of 65 in Florida, increased letter height of 15 inches shall be used. Examples of the Express Lanes Termination Sign are shown in ***Figure 2.42-2***.

Figure 2.42-2. Express Lane Termination Signs



2.42.3.3 Toll Amount Sign (TAS)

(1) As required by ***Rule 14-100.003, F.A.C.*** the TAS is used to display real-time toll amount information to users by identifying the cost of using the express lanes to a specific destination and the fee for toll violations. Since the TAS posts information that influences driver decisions to use the express lanes, it is important that the sign be clear, legible, and straightforward. Examples of the TAS are shown in ***Figure 2.42-3***.

(2) No more than three destinations shall be displayed on the TAS.

(3) The toll violation message shall be black on white and displayed on the TAS.

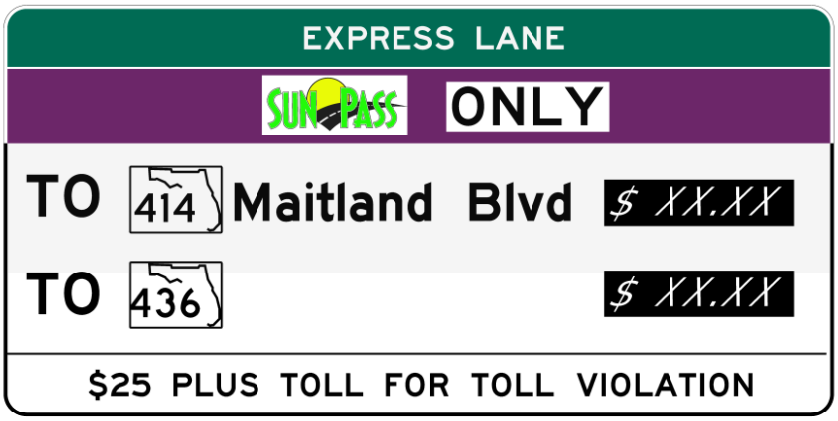
(4) The TAS shall be mounted overhead and over the lane to which it applies. See ***TEM 2.42.4*** for TAS sign placement and sequencing.

(5) The TAS sign structures shall be designed to hold the maximum size panel of three destinations.

(6) Destinations shall not be repeated on any TAS within the express lanes.

(7) Two TASs, indicating the toll amounts for the next set of toll destinations, shall be installed (space permitting) over the express lanes prior to the last point of egress to the general use before beginning the new sequence of tolling trips.

Figure 2.42-3. Toll Amount Sign



2.42.3.4 Periods of Operation Sign (R3-44)

(1) The purpose of this sign is to inform motorists of the beginning or entry point of an access-restricted express lane. This sign shall be installed at the beginning or entry point to the express lane in accordance with ***Section 2G.17 of the MUTCD***. An example of the R3-44 is shown in ***Figure 2.42-4***.

(2) The physical gore shall be used as the point of reference for the distance message on advance guide signs except when the physical gore and theoretical gore are separated by more than 500 feet. The theoretical gore shall be used as the point of reference when the physical gore and theoretical gore are separated by more than 500 feet.

Figure 2.42-4. Periods of Operation Sign (R3-44)

2.42.3.5 Advanced Guide Signs

(1) Per ***Section 2G.10 of the MUTCD***, if the Entry/Ingress or Exit/Egress is on the left side of the roadway, a LEFT plaque shall be added to the top left edge of the Advance Guide Signs. If the Entry/Ingress or Exit/Egress is a lane drop situation, the ONLY panel with down arrow shall be installed.

(2) A “NO TRUCKS”, black on white, panel shall be added to the top of the advanced guide signs as shown in ***Figure 2.42-5***.

(3) SunPass, or other interoperable transponders, is the only form of payment for the express lanes. The “SUNPASS ONLY” panel with purple background shall be included on the Advanced Guide Signs.

2.42.3.6 Point of Entry/Ingress Signs

(1) The access types for managed lanes are defined in the ***FDM 211***. The Point of Entry/Ingress Signs shall be installed at each access point. Examples of the Point of Entry/Ingress Signs are shown in ***Figure 2.42-5***.

(2) When the point of entry is the initial entrance to the express lanes network, the advance overhead signing shall begin two miles prior to the express lanes entrance, space permitting. In addition to the initial entry/ingress express lanes signing, sequential overhead guide signs shall be located at one mile, ½ mile, and at the express lanes point of entry. For intermediate express lanes entry/ingress points the advance signing shall begin one mile prior to the express lanes ingress location and continue with the remaining sequence of signs.

Figure 2.42-5. Examples of Ingress Signing

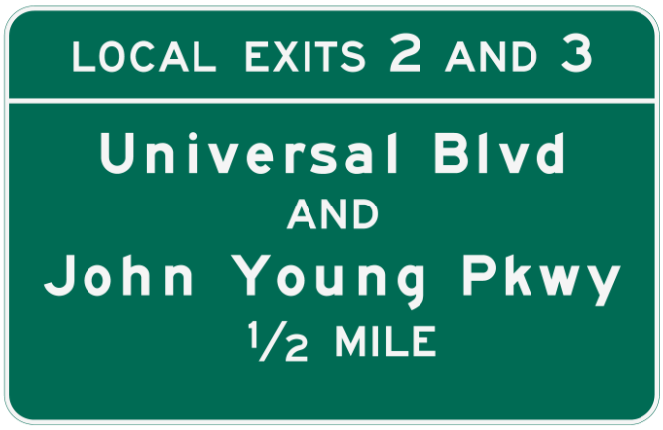
2.42.3.7 Point of Exit/Egress Signs

(1) Intermediate point of exit/egress guide signs, or local exit signs, inform express lanes users which express lanes egress ramp serves their destination. Local exit signs shall be mounted overhead and over the lane to which it applies.

(2) The destinations on the TASs shall be displayed the same way on the corresponding general use exit sign.

(3) If three or more general use exits occur before the next opportunity to exit the express lanes, the egress signing should reflect this as shown in ***Figure 2.42-6***.

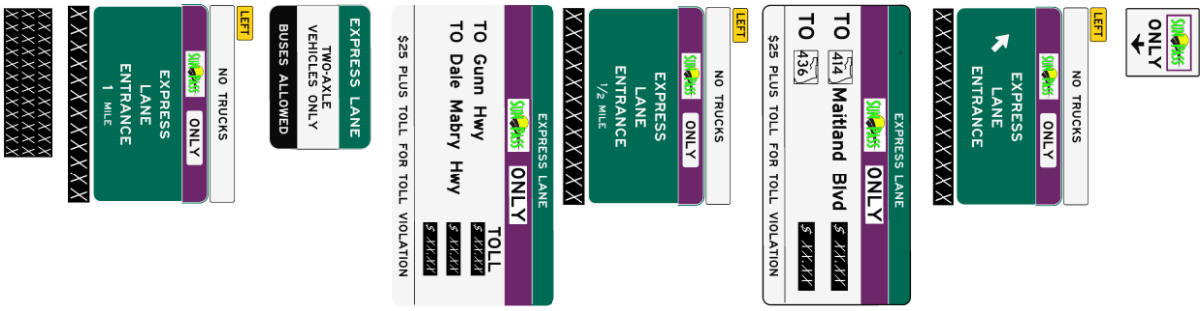
Figure 2.42-6. Examples of Egress Signing



2.42.4 SIGN SEQUENCE

(1) There shall be seven signs installed for an express lane entrance, as follows: three advanced guide signs, two TASs, one vehicle eligibility sign, and one regulatory ***R3-44*** (***Section 2G.17 of the MUTCD***). One 3-line full-matrix Dynamic Message Sign (DMS) shall also be included if space is available. The order in which the signs should be installed is shown in ***Figure 2.42-7***. ***Note: The R3-44 sign shall be the last sign in the sequence. The DMS shall be the first sign in the sequence, if installed***.

Figure 2.42-7. Express Lanes Entrance Sign Sequence



(2) A minimum of two TASs shall be installed with the legend showing destination and price, prior to the entrance to the express lanes. The ***MUTCD*** provides minimum spacing requirements for express lanes signs including TASs.

(3) If the information on the sign is intended for the general use lanes, the sign shall be installed over the general use lanes. If the information on the sign is intended for the express lanes, the sign shall be installed over the express lanes.

2.42.5 SPECIAL CONSIDERATION FOR ARTERIAL ENTRANCE/INGRESS CONNECTIONS WITH EXPRESS LANES

(1) For direct entrance/ingress access into the express lanes from an arterial road, one (1) TAS for each travel direction is acceptable, provided the sign includes a 1-Line DMS to serve as a backup, with separate power and separate communication.

(2) The letter height for arterial signs may be reduced per ***MUTCD***.

(3) If there are Right-Of-Way constraints and the Vehicle Eligibility Sign is unable to be placed on multi-post supports, a single post version of the sign is acceptable.

Section 2.43

RAMP ONLY SIGN PANEL

2.43.1 PURPOSE

The intent of this section is to establish a uniform basis for incorporating the 'RAMP ONLY' sign panel.

2.43.2 BACKGROUND

Section 2E.24 of the MUTCD provides signing guidance for expressway and freeway lane drops at interchange exits. However, the ***MUTCD*** only provides limited guidance for signing a lane drop for a conventional road approach to interchanges onto a limited access facility. ***Section 2D.45 of the MUTCD*** states that "consistently applied signing for conventional road approaches to freeway or expressway interchanges is highly desirable." The use of the 'RAMP ONLY' sign panel supports consistency for drivers on roadways with a through lane drop that carries an interchange entrance ramp.

2.43.3 CONDITIONS FOR USE

(1) The 'RAMP ONLY' sign panel (***Figure 2.43-1)*** is used when it is important to inform motorists on low volume conventional crossroads that the through lane is being terminated (dropped) at the interchange entrance ramp. When used, this sign shall be mounted overhead and over the lane to which it applies.

(2) The sign details for the 'RAMP ONLY' sign panel can be found in the ***FHWA's Standard Highway Signs Manual 2012 Supplement*** for the 'EXIT ONLY' (down arrow) (E11-1) sign. The number of arrows displayed on the sign panel shall correspond to the number of terminated lanes at the location of each sign. Placement of the down arrow shall comply with the provisions shown in ***Section 2E.19 of the MUTCD***.

(3) The use of the 'RAMP ONLY' sign panel shall be coordinated with the ***DTOE***.

Figure 2.43-1. RAMP ONLY Sign Panel

Section 2.44

TURNING VEHICLES STOP FOR PEDESTRIANS SIGN

2.44.1 PURPOSE

This section provides guidelines on the use of the TURNING VEHICLES STOP FOR PEDESTRIANS (***R10-15***) sign series on the State Highway System (SHS). See ***Section 316.130(7)(a) and (b), F.S.*** for more information. These signs are used in support of ***Section 316.130(7), F.S.***, which requires a driver to stop before entering the crosswalk to allow the pedestrian to cross at a signalized intersection or a free-flow channelized turn lane. The objective of the ***R10-15a*** sign is to improve driver awareness to reduce pedestrian fatalities.

2.44.2 GENERAL

Use the ***R10-15*** sign series at signalized intersections that warrant additional emphasis to drivers turning at a signal where potential pedestrian conflicts might not be apparent. The ***FHWA MUTCD letter of interpretation 2(09)-165(I)-R10-15 Modified with Stop Signal Symbol*** allows the STOP sign symbol with the legend "FOR" (***R10-15a***) to be used in place of the YIELD sign symbol with legend "TO" on the ***R10-15*** sign.

2.44.3 GUIDANCE

Install the ***R10-15a*** sign on signalized intersections with a right-turn lane or intersections with a free-flow channelized turn lane.

Replace existing ***R10-15*** signs with the ***R10-15a*** signs during routine sign replacement activities. An example of the ***R10-15a*** sign is shown in ***Figure 2.44-1.*** Sign details are available in the ***Department's Sign Library***.

Figure 2.44-1. R10-15a Signs

R10-15a for left-turn

R10-15a for right-turn

PROCEDURE

SIGNS

SIGNALS

MARKINGS

SPECIAL
OPERATIONAL
TOPICS

Section 3.1

USING FLASHING MODE AT SIGNALIZED INTERSECTIONS AND DEPLOYING FLASHING BEACONS

3.1.1 DEFINITIONS

Flashing Beacon: A highway traffic signal with one or more signal sections that light up intermittently. It can be used at an intersection to control traffic or elsewhere as a warning beacon.

Signal Face: An assembly of one or more signal sections that controls one or more traffic movements on a single approach.

Signal Indication: The illumination of a signal lens.

Operating Traffic Control Signals in Flashing Mode

- **Non-Programmed Flashing Mode Operation:** The automatic shift from an intersection signal's normal operating mode (stop and go, steady red-yellow-green) to flashing mode (stop or caution, flashing red-yellow, or red) because of signal controller malfunction, a conflict in signal displays, or maintenance personnel or police manually selecting the flashing mode.
- **Programmed Flashing Mode Operation:** The automatic shift from an intersection signal's normal operating mode (stop and go, steady red-yellow-green) to flashing mode (stop or caution, flashing red-yellow or red) at set times during the day.

3.1.2 RECOMMENDATIONS FOR SIGNALIZED INTERSECTIONS

3.1.2.1 Programmed Flashing Mode Operation

Flashing mode is energy efficient and can save effort, money, and time. Consider the following before using this mode at a signalized intersection:

- Flashing yellow-red may be used when two-way traffic volumes on the main street are below 200 vehicles per hour.
- Flashing yellow-red may be used at any hour of the day or night when ***Manual of Uniform Traffic Control Devices (MUTCD) Warrants 1 and 2*** are not met and two-way main street volume is greater than 200 vehicles per hour, provided the ratio of main street to side street volume is greater than 4:1.
- If crashes or conflicts at an intersection increase after changing to flashing mode or if crash severity increases, return the signal to normal operation.

- Signals set to normal operating mode (cycling through steady red, green, and yellow phases at intervals that maintain signal progression at an appropriate speed) can help prevent a "speedway effect."
- Use flashing mode only at intersections where side street drivers can easily see approaching main street traffic. Avoid using it at intersections that have more than four legs, skewed intersections (greater than 15 degrees), or railroad-preempted signals.
- Limit the use of flashing signal mode to a maximum of three non-consecutive periods within 24 hours.

3.1.2.2 Non-Programmed Flashing Mode

When a signal at an intersection malfunctions during normal operation, it will immediately switch to flashing mode without a clearance interval.

3.1.3 FLASHING MODE APPLICATIONS

Use the following signal flashing mode and start-up sequences:

3.1.3.1 Yellow-Red Flashing Mode

Main Street: Flashing yellow during flashing mode, then steady green on start-up sequence.

Arrow Turn signals: Flashing red signal arrows during yellow-red flashing mode, then steady red arrow on start-up sequence.

Side Street: Flashing red during flashing mode, then steady red on the start-up sequence.

3.1.3.2 Red-Red Flashing Mode

Main Street: Flashing red during flashing mode, then steady green on the start-up sequence.

Arrow Turn signals: Flashing red signal arrows during red-red flashing mode, then steady red arrow on start-up sequence.

Side Street: Flashing red during flashing mode, then steady red on the start-up sequence.

3.1.4 SIGNAL FACES IN FLASHING MODE

MUTCD Section 4D.30 requires all signal faces on an approach (including yellow or red turn signal indications) to be flashed when the signal is in flashing mode.

Do not illuminate pedestrian signal indications (*WALK* and *DON'T WALK*) at a signalized intersection when flashing mode is on.

3.1.5 FLASHING INDICATION COLORS

Consider the following when determining whether to flash red or yellow circular or arrow:

- Set flashing display for each signal-controlled approach, including separately-controlled turn movements.
- Flash the same color on all signal faces at an approach. Separate signal faces for separately-controlled turn movements may be flashed as described in ***MUTCD Section 4D.30***.
- There is no need to shield or position flashing yellow indications for through traffic from drivers in separately-controlled turn lanes, but do shield separate protected turn movement signals from through traffic. See ***MUTCD Section 4D.22***, ***Section 4D.23***, and ***Section 4D.24*** for additional guidance.
- When programming a signal that has only arrow indications to flashing mode, flash the appropriate red or yellow arrow indication.
- When a signal face includes both circular and arrow indications of the desired color, flash only the circular indication of that color. When a five-section head is used, flash the same color as for the approach through lanes. When the traffic signal is in flashing mode, only circular red or circular yellow indications will flash.
- Do not immediately follow a steady green or flashing yellow indication with a steady or flashing red indication without displaying the steady yellow indication. Transitioning from a steady green to a flashing yellow indication is acceptable without displaying the steady yellow indication. This applies to both the circular and arrow indications. A transition from stop-and-go to flashing mode, whether initiated by a signal conflict monitor or by a manual switch, may be made at any time.

Main Street, Through Traffic: From flashing yellow to steady green.

Main Street, Separate Left Turn: From flashing red to steady red.

Side Street, Through Traffic: From flashing red to steady red.

Keep green arrow indications that are continuously illuminated during normal operations continuously illuminated during flashing mode.

3.1.6 INTERSECTION CONTROL BEACONS INSTALLATION AND OPERATION REQUIREMENTS

When replacing or installing new intersection control beacons (ICB), design the traffic control devices with a minimum of two 12-inch signal indications for all approaches. Place the indications facing each intersection approach and center the indications within the approach lanes as much as possible. Separate the approach indications laterally by a minimum of 8 feet. Flash the horizontally-aligned indications simultaneously to avoid confusion with grade crossing signals.

Treat each intersection approach independently. For instance, on a divided highway, use a single dual-indication beacon assembly for each approach.

Two vertically-aligned signal faces for each of the ICB signal indications may be used and flashed alternately to improve driver awareness of the intersection control.

Figure 3.1-1. Intersection Control Beacon

3.1.7 OTHER FLASHING BEACONS APPLICATIONS

Flashing beacons may be used to increase conspicuity of warning, posted speed limit, and stop signs in accordance with ***MUTCD Sections 4L.03, 4L.04, and 4L.05***, respectively. These beacons may have one or more signal sections of a standard traffic signal control face and flashed accordingly.

Section 3.2

GUIDELINES FOR LEFT-TURN TREATMENTS

3.2.1 PURPOSE

This section provides guidelines on selecting the type of left-turn treatment, as defined in ***MUTCD Section 4D.17***.

3.2.2 LEFT-TURN SIGNAL PHASING

When selecting the type of left-turn phasing at an intersection approach with an established need for this type of control, apply the guidelines below and exercise sound traffic engineering judgment. The types of left-turn treatments include:

Permissive-only mode: turns can be made after yielding to opposing traffic and pedestrians. When a circular green indication is displayed, both directional turns are permitted unless otherwise prohibited by another traffic control device. A flashing yellow arrow may be displayed to indicate a permissive turning movement in either protected/permissive mode or permissive-only mode. When a flashing yellow or red arrow is displayed, the turn indicated by the arrow is permitted.

Protected-only mode: turns can be made when a green arrow indication is displayed.

Protected/permissive mode: A combination of protected and permissive modes can occur during the same cycle. Turning vehicles have the right of way during the protected phase and can complete the turn "permissively" when the adjacent through movement receives its circular green indication.

Split phasing: Assigns right of way to all movements on a particular approach, followed by all of the movements on the opposing approach.

Variable Left-Turn Mode: The operating mode changes among protected-only, protected/permissive, or permissive-only modes during different periods of the day or as traffic conditions change.

Use the protected/permissive mode for all intersection approaches requiring a left-turn phase unless there is a compelling reason to use another mode. If it is not obvious whether protected/permissive or protected-only mode is best, use protected/permissive mode on a trial basis. If operations are satisfactory, retain it. If they are not, convert to protected-only mode.

Engineers may vary the left-turn mode on an approach throughout the day between the permissive-only, protected/permissive, or protected-only left-turn modes, where an engineering study shows this type of operation can improve safety and operations.

Apply protected-only mode at an intersection approach if any of the following conditions are present:

- There are two or more left-turn-only lanes.
- Geometric conditions (e.g., horizontal and vertical curve, intersection skew angle, cone of vision requirements cannot be met) and resulting sight distance make protected-only mode necessary.
- The approach is the lead portion of a lead/lag intersection phasing sequence.
- Offset left-turn lanes do not meet the ***MUTCD Section 4D.13*** cone of vision requirements for a shared signal display.

Consider a protected-only mode under any of the following conditions:

- Opposing traffic speed limit is higher than 45 mph.
- Left-turning traffic must cross three or more lanes of opposing through traffic.
- A protected/permissive mode is in use, and there are more than six left-turn angle crashes caused by left-turning drivers on the approach within a 12-month period.
- Unusual intersection geometry, such as restricted sight distance, makes permissive left turning confusing or hazardous.

A permissive/protected mode can be used for some intersection approaches if the traffic engineer determines that better progression, as demonstrated in a traffic signal analysis, is worth violating driver expectations. However, limit the use of this type of left-turn phasing and restrict it to the following situations, which will not create a left-turn trap:

- T-intersections where U-turns are prohibited.
- Four-way intersections where the opposing approach prohibits left turns or has protected left-turn phasing.
- Four-way intersections where left-turn volumes from opposing approaches do not change substantially throughout a normal day, so that overlap phasing is not beneficial or required.

Split phasing can be used effectively if any of the following conditions apply:

- Opposing approaches are offset so far from each other that simultaneous left turns from opposing directions are not viable or hazardous.
- Left-turn volumes are extremely heavy on opposing approaches and both are nearly equal in volume to the adjacent through movement critical lane volume.
- Left-turn volume is extremely heavy on an approach that does not have a separate left-turn lane.
- Drivers are allowed to turn left from more than one lane and may also use the rightmost left-turn lane to travel through.

3.2.3 LEFT-TURN SIGNAL DISPLAYS

The signal displays to be used with the various types of left-turn phasing are listed below. See ***MUTCD Section 4D.17*** for additional guidance.

Protected/Permissive Mode: Use a five-section signal head centered over the lane line between the left-turn lane and the leftmost through lane. The five-section signal head can serve as one of the two required through traffic signal heads. Do not provide supplemental signing for a five-section signal head. A four-section signal head with flashing yellow arrow (FYA) can also be used for protected/permissive mode. Use arrows with the red, yellow, and green signal faces with the four-section signal head. See ***TEM Section 3.10*** for additional guidance on FYA display.

Protected-Only Mode with a Single Left-Turn Lane: Center a three-section vertical or horizontal signal head over the left-turn lane. From top to bottom—or left to right on a horizontal signal head—display the left-turn arrows in the following order: red, yellow, and green.

Protected-Only Mode with Two or More Left-Turn Lanes: Use at least two three-section vertical or horizontal signal heads, as described in the paragraph above, centering one signal head over each left-turn lane.

Split Phasing: Center a five-section signal head over the lane line between the left-turn lane and the leftmost through lane. The five-section signal head can serve as one of the two required through traffic signal heads. Do not provide supplemental signing.

Variable Left-Turn Mode: Follow the display guidance above dependent on the left-turn modes being programmed (permissive-only, protected/permissive, or protected-only).

3.2.4 SIGNAL DISPLAY FOR EXCLUSIVE LEFT-TURN LANE

Do not place a three-section (red, yellow, and green) signal head over an exclusive left-turn lane unless the signal phasing sequence allows a protected left-turn movement during the cycle.

3.2.5 LEFT-TURN PHASES FOR SEPARATED LEFT AND THROUGH LANES

Left-turn lanes at signalized intersections that are separated from through lanes by raised islands or painted gores may operate in several modes: protected-only, protected/permissive, or permissive-only. When choosing protected/permissive mode, use a five-section signal or a four-section FYA signal. Make it clear the signal is shared by placing it overhead on the lane line between the through lane and the island. In all cases, follow the cone of vision requirements in ***MUTCD Section 4D.13***.

Figure 3.2-1 uses standard lane widths for a four-lane divided highway. ***Table 3.2-1*** shows the maximum island or gore width allowed for the indicated signal head distance from the stop line without shifting the signal head.

Figure 3.2-1. Signal Head/Left-Turn Treatment

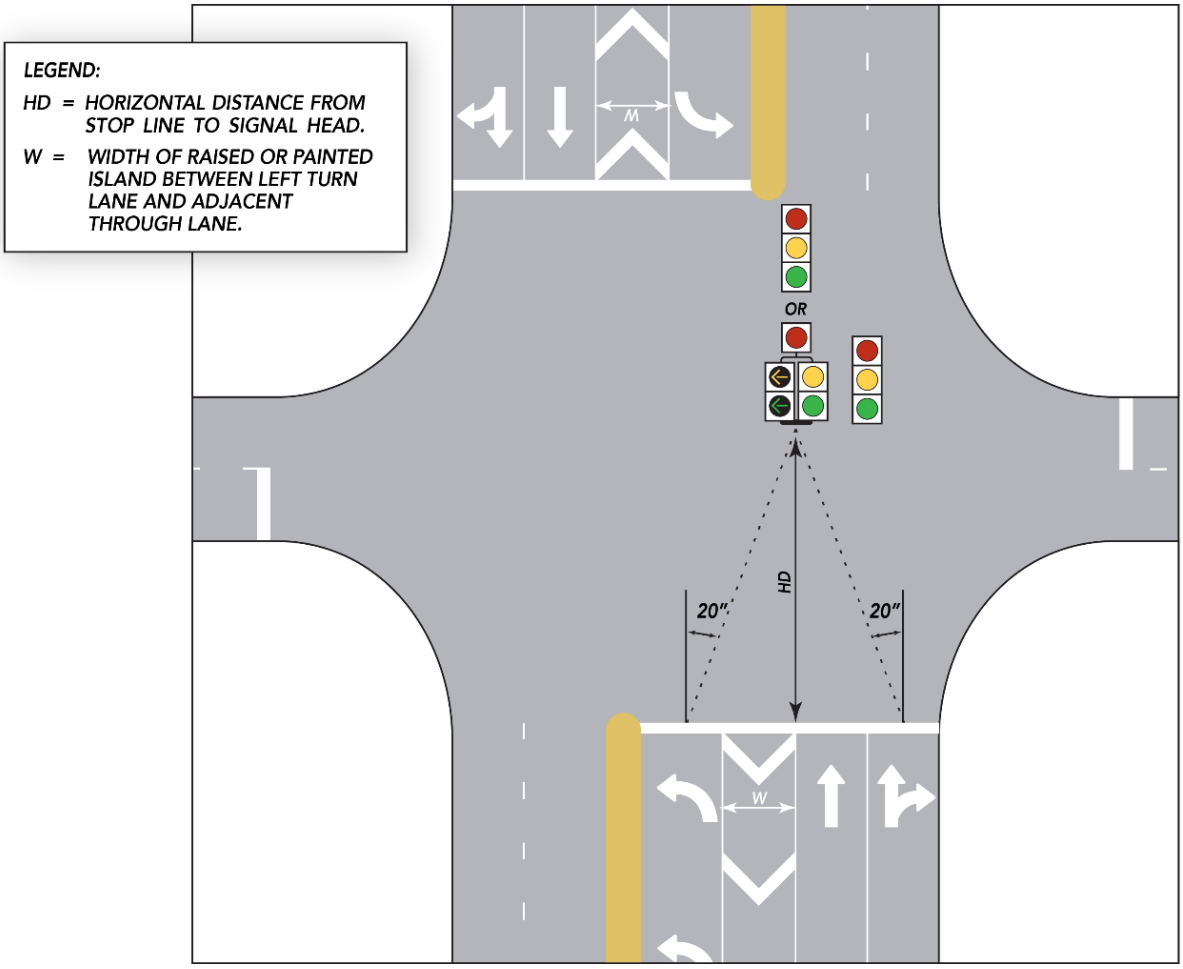


Table 3.2-1. Maximum Width of Island or Gore Without Shifting Signal Head

Horizontal Distance (feet)	Width (feet)
40	8
50	12
60	15
70	19
80	23
90	26
100	30
110	34
120	37
130	41
140	44
150	48

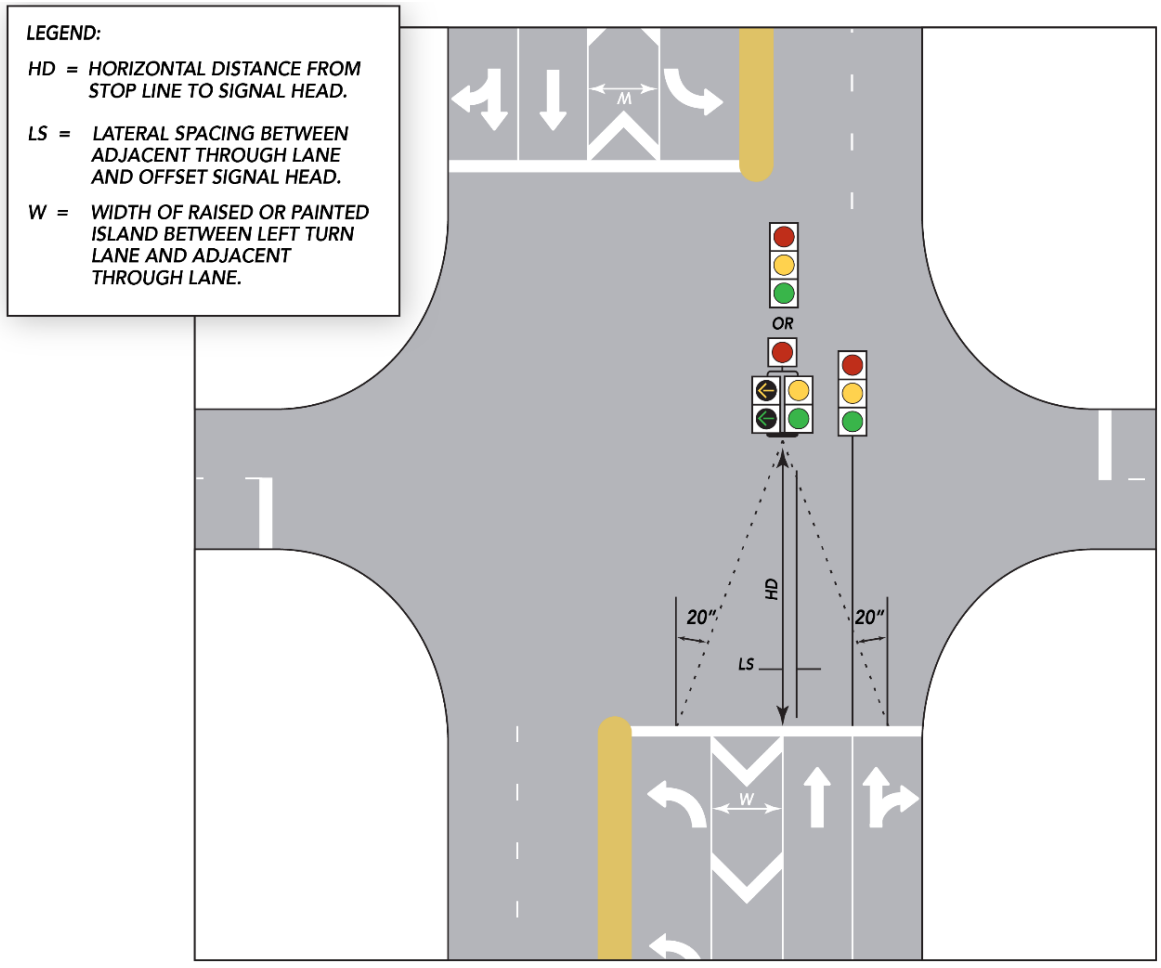
Do not use signals with circular green indications above an exclusive left-turn lane or the extension of the lane for a permissive-only left turn. Do not post-mount the signals on the far side median in front of the left-turn lane.

If positioning a shared signal head on the lane line adjacent to the nearest through lane does not meet cone of vision requirements due to an offset left-turn lane's separation or geometric conditions, the shared signal face may be offset to the left from the adjacent through lane line. This will ensure cone of vision requirements are met for the rightmost through lane and the left-turn lane. See ***Figure 3.2-2*** for a schematic representation of this offset.

Use this lateral offset spacing only after other options, such as increasing the horizontal distance to the signal heads, have been considered. Place the signal so it is obvious to drivers that it is shared. Generally, keep the lateral offset spacing of the shared signal head from the adjacent through lane no greater than one-half the width of the island (½W).

If the lateral shift is too great, the cone of vision may not be adequate for the driver in the rightmost through lane. This may be due to a large parallel offset left-turn lane or a tapered or curved offset left-turn lane. When cone of vision requirements cannot be met, protected-only mode must be used.

Figure 3.2-2 Left-Turn Lane Signal Head Shift



3.2.6 PERMISSIVE-ONLY MODE IN MULTI-LEFT-TURN-LANE APPROACHES

Do not use a permissive green interval for two or more left-turn lane approaches.

Section 3.3

SCHEDULING INTERSECTION CONTROL EVALUATIONS AND SECURING FUNDING

3.3.1 PURPOSE

This section establishes criteria for responding to requests for traffic signal installations; conducting related studies, such as intersection control evaluation (ICE), to determine need and appropriate intersection control strategy; and securing funding and arranging implementation for warranted signals.

3.3.2 GENERAL

The Department is responsible for developing and maintaining uniform statewide traffic control devices to regulate, manage, guide, and protect all State Highway System users. The Department must respond uniformly to all signal requests and schedule and conduct traffic studies accordingly. If an intersection is found to meet signal warrants, follow the procedure described in the Department's ***Manual on Intersection Control Evaluation*** to determine the appropriate intersection control strategy.

3.3.3 RESPONSE TO SIGNAL REQUESTS AND SCHEDULING TRAFFIC SIGNAL STUDIES

Before committing resources for a signal warrant study, the ***District Traffic Operations Office*** reviews all traffic signal installation requests the Department receives. This initial screening includes reviewing existing information and local knowledge of the intersection and may require a brief site visit to confirm field conditions. All data collected during the initial screening is kept on file in writing. Reviewers will attempt to relate all data and analysis to ***MUTCD*** standards.

If the initial screening prompts the Department to conduct a signal warrant study, the appropriate District Traffic Operations Office will contact the local government traffic engineering agency, advise them of the Department's decision, and obtain their views and input. The District Traffic Operations Office will also advise the local agency that if signal warrants are met, an ICE analysis will be required to determine the appropriate intersection control strategy.

If the Department decides not to consider further a signal warrant study based on the initial screening results, the District Traffic Operations Office will document the reasons and share a copy of the findings with the requestor and local agency.

Though local government support is ideal, the Department may commit resources to a signal warrant study and subsequent ICE analysis without it, if a signal is warranted.

The District Traffic Operations Office normally conducts signal warrant studies for intersections on the State Highway System, but a local government traffic engineering agency may conduct a signal warrant study and submit it to the District Traffic Operations Office for review. All studies must follow the procedure and standards in this document and be signed and sealed by a Florida-licensed professional engineer.

If the signal warrant study shows installing a new traffic signal is warranted, the District Traffic Operations Office or local government traffic engineering agency will conduct an ICE analysis to determine the appropriate intersection control strategy.

Formal legal resolutions from local agencies may form the basis of their concurrence in the need for a signal warrant study. Additionally, the availability of implementation funds is not a prerequisite to assessing traffic signalization needs (conducting a study).

The District Traffic Operations Office keeps a log of requests for signal warrant studies and their outcomes. To the extent practical, they will prioritize signal warrant study scheduling based on request date, traffic volumes, crashes (frequency, type, injury levels), and the degree of local government interest.

3.3.4 TRAFFIC SIGNAL STUDIES AND ENGINEERING

Traffic signal studies, ICE analyses, and other required planning and engineering services for traffic signals or alternative intersections on the State Highway System can be undertaken by Department staff, local agency engineers, or qualified consulting engineers. The Department, however, is responsible for requiring and overseeing all such work.

All traffic signal studies must be completed in accordance with the Department's ***Manual on Uniform Traffic Studies (MUTS)***, specifically ***Chapter 2***. ICE analyses must comply with the Department's ***Manual on Intersection Control Evaluation***. Plans and specifications, if required, need to comply with established Department procedures.

The developer must cover the cost of traffic signal studies, ICE analyses, or engineering analyses for new private access points to major traffic generators or proposals to significantly revise access points. Qualified traffic engineers must conduct all studies. These studies are typically part of the Driveway Permit Application, as laid out in the requirements of ***Rule 14-96***. A Driveway Permit Application for Categories E, F, and G standard connection categories is required to conduct ICE analysis and have the analysis approved by both the District Design Engineer and the ***District Traffic Operations Engineer (DTOE)***, in accordance with ***Section 2.3(1)(d)*** of the Department's ***Manual on Intersection Control Evaluation***.

In addition to evaluating the need for signal control at unsignalized intersections and alternative intersection forms from the ICE analyses, these studies must also consider enhanced features at upstream and downstream signalized intersections as needed. All studies and reports must be signed and sealed by a Florida-licensed professional engineer.

The developer is also normally responsible for engineering costs associated with preparing implementation plans and specifications. In some cases, specific critical design needs may require Department forces to perform engineering work. In these cases, the District Secretary may direct the Department to complete the engineering work at no cost to the developer.

Engineering studies at existing private access points due to normal traffic growth are usually made by qualified traffic engineers hired and paid by the requestor. In extraordinary situations the Department may elect to do this work.

3.3.5 FUNDING ARRANGEMENTS FOR WARRANTED NEW SIGNAL INSTALLATIONS

Funding for new traffic signals or alternative intersections recommended by an ICE analysis on the State Highway System may come from any combination of private, local, state, or federal sources.

If the improvements are required by a new or revised Driveway Permit or local government Development Order, the developer must fully fund them. This includes planning, engineering, and construction for any new traffic signal, alternative intersection, or enhancements to existing traffic signals specified in the Permit or Order.

If the developer's proposals to install signals or alternative intersections or to modify existing signalization exceed the minimum required by the Permit or Order and improve the State Highway System substantially beyond mitigating development impacts, the Department may be willing to carry some of the cost. In that event, the Department's District Secretary will determine an appropriate financial participation formula and assign a percentage to the developer related to the specific conditions at each site.

The Department is responsible for installing traffic signals and constructing alternative intersections on the State Highway System, but local agencies can voluntarily cover some or all of the costs based on their cooperative agreements with the Department's District Offices. Local funds are most often used to advance the implementation schedule. When local funds are accepted by the Department, both parties must execute a formal joint project agreement.

Most local governments in Florida's urban areas have qualified traffic engineering agencies with experienced traffic signal field crews. Local agency crews have installed new signals on the State Highway System with control hardware supplied by the Department. The Department encourages this approach when the local agency is

agreeable. Since most of these agencies maintain and operate these sites themselves, this partnership should be encouraged. No formal agreement is needed since no money is changing hands, but the Department needs to request a letter from the local agency agreeing to install Department-supplied hardware.

3.3.6 OTHER CONSIDERATIONS

Follow the study guidelines provided in the ***Manual on Intersection Control Evaluation*** before finalizing an intersection improvement recommendation.

Follow the ***Approved Product List Submittal Process*** provisions before purchasing, using, or installing traffic signals.

If a local agency agrees to maintain the signal, add the signal to the Exhibit A of the ***Traffic Signal Maintenance and Compensation Agreement*** with that agency.

Section 3.4

EMERGENCY TRAFFIC CONTROL SIGNALS

3.4.1 PURPOSE

This section provides guidance for warranting, designing, and operating emergency traffic control signals at locations where emergency vehicles—most commonly fire trucks—enter the street system.

3.4.2 BACKGROUND

The Department's district offices often receive local public agency requests for traffic signal control for departing emergency vehicles. This section offers comprehensive guidance to determine if an emergency signal is warranted.

3.4.3 PROCEDURE

An emergency traffic control signal shall be considered necessary if an engineering study finds that one of the following warrants is met:

- When minimum traffic volumes are met for the peak hour or for 24 hours (both travel directions based on Signal Warrant 2), as shown in **Table 3.4-1**.

Table 3.4-1. Minimum Traffic Volumes

Roadway	Peak Hour (VPH)	24 Hours (ADT)
Two lanes	750	7,500
Four lanes	900*	9,000*
Six lanes or more	1,200*	12,000*

*Increase values by 1/3 when the arterial has traffic signal system coordination with signals located within 1,000 feet in both directions of the emergency signal location.

- When the emergency vehicle facility requires returning emergency vehicles to back in, blocking the roadway, and emergency vehicle lights and flaggers are inadequate to control traffic volume or speeds.
- When the emergency vehicle driveway is consistently blocked by traffic queues from adjacent signalized intersections. Consider using a *DO NOT BLOCK INTERSECTION* sign (***R10-7***) in conjunction with installing the emergency signal.

- On all approaches when vertical or horizontal curvature or other obstructions do not provide adequate stopping sight distance for traffic approaching an emergency vehicle driveway.

3.4.4 EMERGENCY SIGNAL CONFIGURATION AND OPERATION

MUTCD Section 4G.03 defines the operational requirements for locating an emergency signal mid-block. The ***MUTCD*** allows either a steady green or flashing yellow signal when emergency vehicles are not entering the roadway.

For new or reconstructed emergency signal installations, follow the criteria below, which are based on the ***MUTCD Section 4G.04*** requirements .

- Provide dual signal faces for each roadway approach. Install a minimum of one signal face for the emergency vehicle driveway. Two signal faces are preferred for the emergency vehicle driveway.
- If the emergency service is off the main roadway and emergency vehicles access it by the minor street, emergency signals may be installed at the intersection of these roadways. Use dual signal faces on the minor street, with the signals resting on the flashing red mode.
- Operate mid-block emergency signals in flashing yellow mode when emergency vehicles are not entering the roadway. Use a three-section roadway signal head operated as shown in ***Figure 3.4-1***. The engineer may use LEDs or solar-powered signals. Check permitting requirements before installation.
- Design signal operation at intersections near or at the intersection preempted by emergency vehicles entering the roadway on an individual basis.

During the evaluation of an emergency signal, consider site-specific factors for its implementation. These may include the route distance between the intersection and emergency vehicle driveway, intersection geometrics, number of lanes, normal queue length, and traffic volumes.

3.4.5 EMERGENCY SIGNAL SIGN (R10-13)

As emergency signals are installed at locations along major arterials where emergency vehicles enter the roadway, place *EMERGENCY SIGNAL* signs (***R10-13***) on the span wire or mast arm to alert drivers to the signal's purpose.

Mount the *EMERGENCY SIGNAL* sign (***R10-13***) adjacent to each signal face for legibility, and locate it between the dual signal faces on each roadway approach.

No sign is required for the emergency vehicle driveway approach.

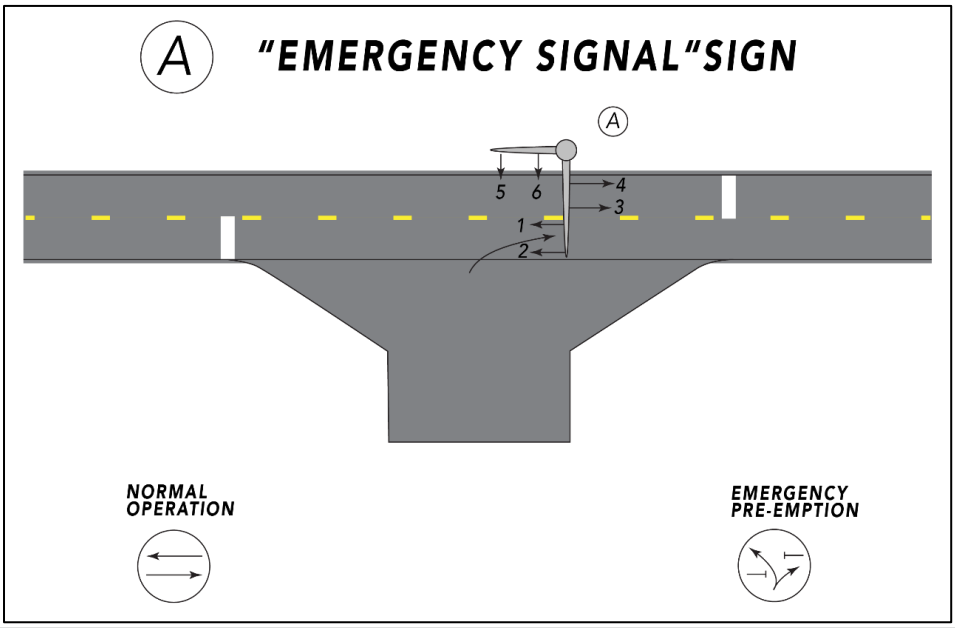
3.4.6 OTHER REQUIREMENTS

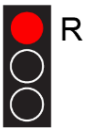
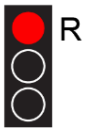
Include a controller timing chart in the contract plans.

The Department requires a Traffic Signal Maintenance and Compensation Agreement for all emergency signals on the State Highway System.

The Department requires a signal timing study to determine proper clearance intervals.

Figure 3.4-1. Mid-Block Emergency Signal Operation



NORMAL OPERATION	CHANGE TO EMERGENCY PREEMPTION	EMERGENCY PREEMPTION	CHANGE FROM EMERGENCY PREEMPTION	RELEASE
Signal 1, 2, 3, 4 	Signal 1, 2, 3, 4 	Signal 1, 2, 3, 4 	Signal 1, 2, 3, 4 	Signal 1, 2, 3, 4 
Signal 5, 6, 	Signal 5, 6, 	Signal 5, 6, 	Signal 5, 6, 	Signal 5, 6, 

Section 3.5

TRAFFIC SIGNAL MAST ARM SUPPORT BOUNDARIES

3.5.1 GENERAL

Comply with the Mast Arm Structures Boundary Maps when selecting the appropriate support for traffic signal installations on the State Highway System. See ***FDM 232.8.1*** for more information.

3.5.2 IMPLEMENTATION

3.5.2.1 Mast Arm Structures Boundary Maps

The Mast Arm Structures Boundary Map follows an alignment of state roads to the coastline. Official mapping of district-specific boundaries is available at this location: ***https://www.fdot.gov/traffic/trafficservices/pdfs/districts***.

Section 3.6

YELLOW CHANGE AND RED CLEARANCE INTERVAL STANDARDS FOR SIGNALIZED INTERSECTIONS

3.6.1 PURPOSE

This section outlines standards for timing yellow change and red clearance intervals at signalized intersections. These intervals are used to provide a consistent transition between conflicting traffic signal phases. A yellow change interval warns drivers they will soon need to stop and allow conflicting traffic the right of way. A red clearance interval allows time for drivers to clear the intersection before conflicting traffic is given a green indication.

According to the ***MUTCD Section 4D.26***, program a yellow change interval to last 3 seconds as a minimum but no more than 6 seconds, and program a red clearance interval to not exceed 6 seconds. These standards apply to the following conditions on the State Highway System:

- New traffic signal installations
- All traffic infraction detectors installations
- Signal phasing changes
- Geometric changes affecting timing or phasing
- Corridor retiming projects

3.6.2 STANDARD

Section 316.075(3)(a), F.S. prohibits the use of any traffic control signal that does not display a yellow or "caution" indication between the green or "go" indication and the red or "stop" indication. The Statute is silent on the how long the yellow indication should last and does not mention or mandate the use of a red clearance interval.

3.6.2.1 Yellow Change Interval

To calculate the yellow change interval, use the formula from the Institute of Transportation Engineers (ITE) publication ***Determining Vehicle Signal Change and Clearance Interval*** (1994), shown below as ***Formula 3.6-1***.

Formula 3.6-1 was used to calculate the Florida yellow change intervals shown in ***Table 3.6-1***. These intervals are the required standard minimum values. The calculations use a perception reaction time of 1.4 seconds and a grade of 0%. Do not use a perception

reaction time shorter than 1.4 seconds per ***Traffic Engineering and Operations Bulletin 02-13***.

The approach speed in ***Table 3.6-1*** and ***Formula 3.6-1*** is the posted speed limit for the approach being analyzed.

If ***Formula 3.6-1*** produces a value lower than the one in ***Table 3.6-1*** for a given posted speed limit, use the corresponding value in ***Table 3.6-1***. Do not program yellow change intervals shorter than the standard values in ***Table 3.6-1***.

Yellow change intervals longer than the standards for posted speed limits in ***Table 3.6-1*** are allowed, but base them on ***MUTCD Section 4D.26***, engineering practice, and ***Formula 3.6-1***. Do not program a yellow interval longer than 6 seconds.

Do not use the extended kinematic model included in ITE's ***Guidelines for Determining Traffic Signal Change and Clearance Intervals*** (2020) to calculate the minimum yellow change interval.

Round up yellow change and red clearance interval times to the nearest 0.1 second.

Table 3.6-1. Florida Yellow Change Interval (0.0% Grade) Standard *

Approach Speed (mph)	Yellow Interval (seconds)
25	3.4
30	3.7
35	4.0
40	4.4
45	4.8
50	5.1
55	5.5
60	5.9
65	6.0

* For approach grades other than 0%, use ***Formula 3.6-1***.

Formula 3.6-1

$$Y = t + \frac{1.47v}{2(a + Gg)}$$

Where:

Y = Length of yellow interval, in seconds

t = Perception-reaction time (use 1.4 seconds)

v = Speed of approaching vehicles, in mph

a = Deceleration rate in response to the onset of a yellow indication (use 10 ft/sec^2)

g = Acceleration due to gravity (use 32.2 ft/sec^2)

G = Grade, with uphill positive and downhill negative (percent grade/100)

3.6.2.2 Red Clearance Interval

Always include a red clearance interval at a signalized intersection. Allowing enough time for drivers to clear the intersection after their signal phase turns red can reduce the number of angle crashes, even if some drivers run the red indication.

Compute the red clearance intervals using the appropriate formula from ITE's ***Determining Vehicle Signal Change and Clearance Interval*** (1994), which is shown below as ***Formula 3.6-2.***

Formula 3.6-2

$$R = \frac{W + L}{1.47v}$$

Where:

R = Length of red interval, in seconds

W = Width of the intersection, in feet, measured from the near-side stop line to the far edge of the conflicting traffic lane along the actual vehicle path

L = Length of vehicle (use 20 feet)

v = Speed of approaching vehicles, in mph

The red clearance interval must be between 2 and 6 seconds long. Engineers may program red clearance intervals longer than the values calculated using ***Formula 3.6-2*** at their discretion. A longer red clearance interval may be appropriate for wide or complex intersections or those with a crash history or limited sight distance. Any interval extension must meet the minimum/maximum guidance for red clearance intervals.

National Cooperative Highway Research Partnership (NCHRP) ***Report 731: Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections*** recommends using a modified ITE formula that allows for a 1.0-second reduction in the red clearance interval values computed using ***Formula 3.6-2***. This accounts for reaction time delay from conflicting traffic. Use engineering judgment when exercising this option, but do not program a red clearance interval shorter than 2.0 seconds.

Section 3.7

ACCESSIBLE PEDESTRIAN SIGNALS

3.7.1 PURPOSE

This section establishes criteria for installing and operating accessible pedestrian signals (APS) on the State Highway System. These traffic control devices provide information non-visually, using audible tones, speech messages, or vibrating surfaces.

3.7.2 GENERAL

The standards for APS on public roadways are established in ***MUTCD Sections 4E.09 to 4E.13***. Additional guidance for their installation can be found in ***MUTCD Section 4E.06***. Review these ***MUTCD*** sections when addressing APS installation requests.

3.7.3 PROCEDURE

Obtain ***DTOE*** approval to install APS at signalized intersections and signalized midblock crossings on the State Highway System.

The DTOE reviews requests from the public, maintaining agencies, public agencies, or support groups for people with visual impairments to install APS. The DTOE may request input from public agencies and organizations that support people with visual impairments to determine if a given APS installation would be effective and safe for users.

An engineering study will follow if the DTOE's preliminary review supports its installation. When conducting the engineering study, consider the needs of all pedestrians, not just those with visual impairments.

Consider the following features when reviewing requests for APS installation:

- Potential demand for APS
- Right-on-red movements
- Free-flow right-turn movements
- Signal phasing complexity
- Intersection geometry complexity
- Traffic volumes during times when pedestrians might be present
- Audible tones or sounds that may cause confusion
- Verbal messages instead of tones or sounds

- Vibrotactile pedestrian devices
- Pushbutton versus passive pedestrian detectors
- APS automatic volume adjustment, not to exceed 100 dBA (decibels), in response to ambient traffic sound level
- Additional geometrics, operations, and pedestrian safety considerations at locations with more than four lanes or posted speed limits greater than 35 mph

3.7.4 APS REQUEST REVIEW PROCESS

DTOEs review all requests for APS installations on the State Highway System, either directly or through engineering studies. The ***DTOEs*** consider the needs of all pedestrians in the review, not just those with visual impairments.

The initial review may require site visits to verify field conditions. The Department records and maintains all data gathered during the initial screening. Reconcile all data and analysis with ***MUTCD Sections 4E.09 to 4E.13*** standards. Although local government concurrence is desirable, it is not a prerequisite for committing Department resources for an APS installation.

If the ***DTOE*** denies an APS installation after the initial review, document the reasons, advise the requestor of the review findings, and provide the local government with a copy.

Section 3.8

CALCULATING RAILROAD TRAFFIC SIGNAL PREEMPTION TIME

3.8.1 PURPOSE

This section describes how to determine the required preemption time for a traffic signal adjacent to a highway at-grade rail crossing with an active warning system.

3.8.2 GENERAL

This comprehensive guidance on calculating signal preemption time adheres to ***Rule 14-57.013(5), F.A.C.***

A preemption phase is required at any signalized intersection within 200 feet of a grade crossing. Set this as part of the active grade crossing traffic control device design.

For signalized intersections within 200 to 500 feet from a grade crossing, complete an engineering study to determine if preemption is needed.

Consider preemption for signalized intersections more than 500 feet from a grade crossing if traffic queues past the grade crossing or there is potential for that condition to develop.

Consult and coordinate with the appropriate railroad agency, the ***District Rail Office***, and the ***DTOE*** before implementation.

3.8.3 DEFINITIONS

Advance Preemption (AP): The length of time before activation of railroad warning devices that a highway traffic signal controller unit or assembly is notified of an approaching train.

Clear Storage Distance (CSD): The distance available for vehicle storage measured between 6 feet from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway.

Controller's Equipment Response Time to Preempt (CERTP): The time that elapses while the controller electronically registers the preempt call.

Design Vehicle (DV): The longest vehicle permitted by statute of the road authority (State or other) on a given roadway.

Design Vehicle Clearance Distance (DVCD): How far, in feet, the design vehicle must travel to enter and completely pass through the railroad crossing's minimum track clearance distance. This is the sum of the minimum track clearance distance and the total design vehicle's length. Design vehicle length can be found in ***FDM 201***.

Design Vehicle Clearance Time (DVCT): How long it takes for the design vehicle to accelerate from a stop and travel through and clear of the minimum track clearance distance.

Desired Minimum Separation Time (DMST): A time buffer between the departure of the last vehicle (the design vehicle) from the railroad crossing and the arrival of the train.

Maximum Highway Traffic Signal Preemption Time (MHTSPT): The maximum time a highway traffic signal needs after initiating the preemption sequence to finish timing the right of way transfer time, queue clearance time, and separation time.

Minimum Green Time During Right of Way Transfer (MGTRT): The minimum number of seconds any existing phase will display a green indication before the controller unit terminates the phase through its yellow change and red clearance intervals and transitions to the track clearance green interval. A 5-second interval is recommended to make the transition to the track clearance green interval as rapid as possible.

Minimum Track Clearance Distance (MTCD): The length along the highway at one or more railroad tracks, measured from the portion of the railroad crossing automatic gate arm farthest from the near rail to 6 feet beyond the tracks measured perpendicular to the far rail.

Minimum Walk Time During Right of Way Transfer (MWTRT): The minimum pedestrian WALK indication time before the preemption sequence begins. FDOT recommends a 5-second interval to make the transition to the track clearance green interval as rapid as possible.

Other Green Time During Right of Way Transfer (OGTRT): Any additional green time beyond the preempt minimum green time for the worst-case vehicle phase.

Pedestrian Clearance Time During Right of Way Transfer (PCTRT): The pedestrian clearance (i.e., flashing *DON'T WALK* indication) time for the worst-case pedestrian phase. A zero value is allowed for the most rapid transition to the track clearance green interval.

Preemption: The transfer of normal operation of a traffic control signal to a special control mode of operation.

Preempt Delay Time (PDT): The number of seconds the traffic signal controller is programmed to wait from the initial receipt of a preempt call until the call is verified and considered a viable request for transfer into preemption mode.

Preempt Trap: A potential hazard condition that happens when the gates do not block vehicle access to the crossing before the expiration of the track clearance green. Vehicles can continue to cross the tracks and possibly stop on the tracks. In a preempt trap, the track clearance green interval has already expired, so there will be no further opportunity to clear the tracks.

Preempt Verification and Response Time (PVRT): The number of seconds between when the controller unit receives a preempt call from the railroad's grade crossing warning equipment and the controller software begins to respond to the preempt call.

Queue Clearance Time (QCT): The time it takes the design vehicle to start up, move through, and clear the entire minimum track clearance distance when it is stopped just inside.

Queue Start-up Time (QST): Time from the beginning of the track clearance green until the design vehicle can start moving.

Red Clearance Time (RCT): The required red clearance interval time during right of way transfer before transitioning to track clearance.

Required Preemption Time (RPT): The time provided by the engineer of record to the railroad signal designer.

Right of Way Transfer Time (RTT): The maximum amount of time needed for the worst-case condition, prior to display of the track clearance green interval. This includes any railroad or light rail transit or highway traffic signal control equipment time to react to a preemption call, and any traffic control signal green, pedestrian walk and clearance, yellow change, and red clearance intervals for conflicting traffic.

Separation Time (ST): The portion of maximum highway traffic signal preemption time when the minimum track clearance distance is clear of vehicles before the arrival of a train.

Track Clearance Distance (TCD): The length along a highway at one or more railroad tracks, measured from the highway stop line, warning device, or 12 feet perpendicular to the track center line, to 6 feet beyond the track(s) measured perpendicular to the far rail, along the center line or edge line of the highway, as appropriate, to obtain the longer distance.

Track Clearance Time (TCT): Time needed to travel through the track clearance distance plus a 4-second separation time.

Vehicle-Gate Interaction: When the automatic gate descends on a stationary or slow-moving vehicle as it moves through the minimum track clearance distance.

Yellow Change Time (YCT): The required yellow change interval time during right of way transfer prior to the track clearance.

3.8.4 PROCEDURE

Engineers may calculate the maximum preemption time for highway-rail grade crossings as follows.

- Calculate the Right of Way Transfer Time.

  The components of right of way transfer time include the *preempt verification* and *response time* and *the worst-case conflicting vehicle or pedestrian time*. Calculate these through the following steps:

  Step 1: Calculate *preempt verification* and *response time* (seconds).

  Collect the preempt delay time (seconds) and the controller response time to preempt (seconds). Calculate the preempt verification and response time by adding the preempt delay time and the controller response time.

  Step 2: Calculate the *worst-case conflicting vehicle time* (seconds).

  Add the minimum green time during right of way transfer (seconds), other green time during right of way transfer (seconds), yellow change time (seconds), and red clearance time (seconds). The worst-case conflicting vehicle time is the total.

  Step 3: Calculate the *worst-case conflicting pedestrian time* (seconds).

  Add the minimum WALK time during right of way transfer, pedestrian clearance time during right of way transfer, vehicle yellow change time, and vehicle red clearance time. The worst-case conflicting pedestrian time is the total.

  Step 4: Determine the worst-case conflicting vehicle or pedestrian time.

  The worst-case conflicting vehicle or pedestrian time is whichever is longer between the worst-case conflicting vehicle time (**Step 2**) and the worst-case conflicting pedestrian time (**Step 3**).

  Step 5: Calculate the right of way transfer time.

  The right of way transfer time is the sum of the *preempt verification* and *response time* (**Step 1**) and the worst-case conflicting vehicle or pedestrian time (**Step 4**).

- Calculate the queue clearance time.

  The queue clearance time includes the time it takes the design vehicle to start moving and to accelerate through the clearance distance. Calculate this through the following steps:

  Step 1: Determine the queue start-up distance.

Measure the clear storage distance and minimum track clearance distance for the highway-rail grade crossing. Calculate the queue start-up distance, L (feet), by adding the clear storage distance with the minimum track clearance distance.

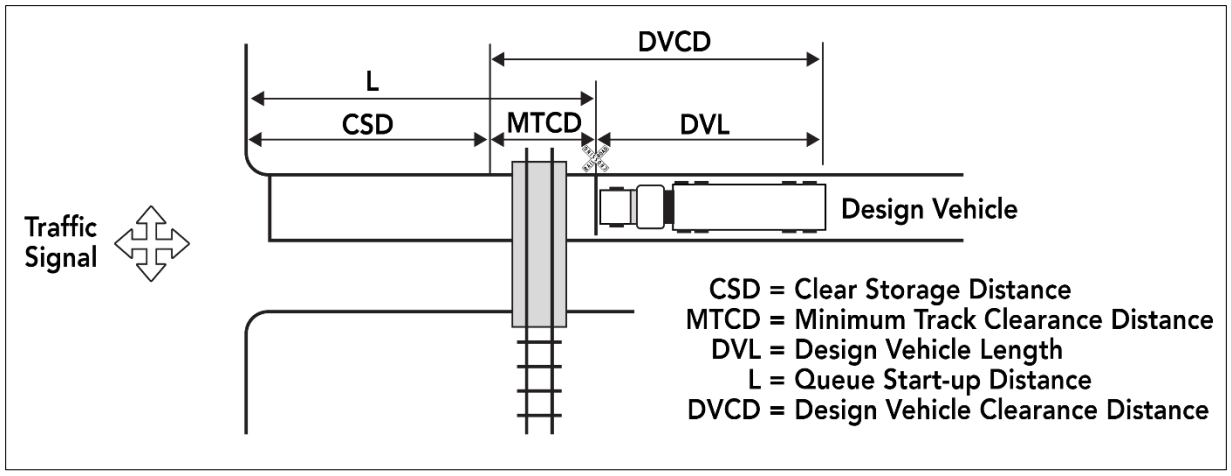
Step 2: Calculate the time the design vehicle needs to start moving.

Calculate the time the design vehicle needs to start moving, in seconds, as 2 plus the queue start-up distance, L, divided by the speed of 20 feet per second.

Step 3: Determine the design vehicle clearance distance.

Combine the minimum track clearance distance and the total design vehicle's length, as shown in ***Figure 3.8-1***.

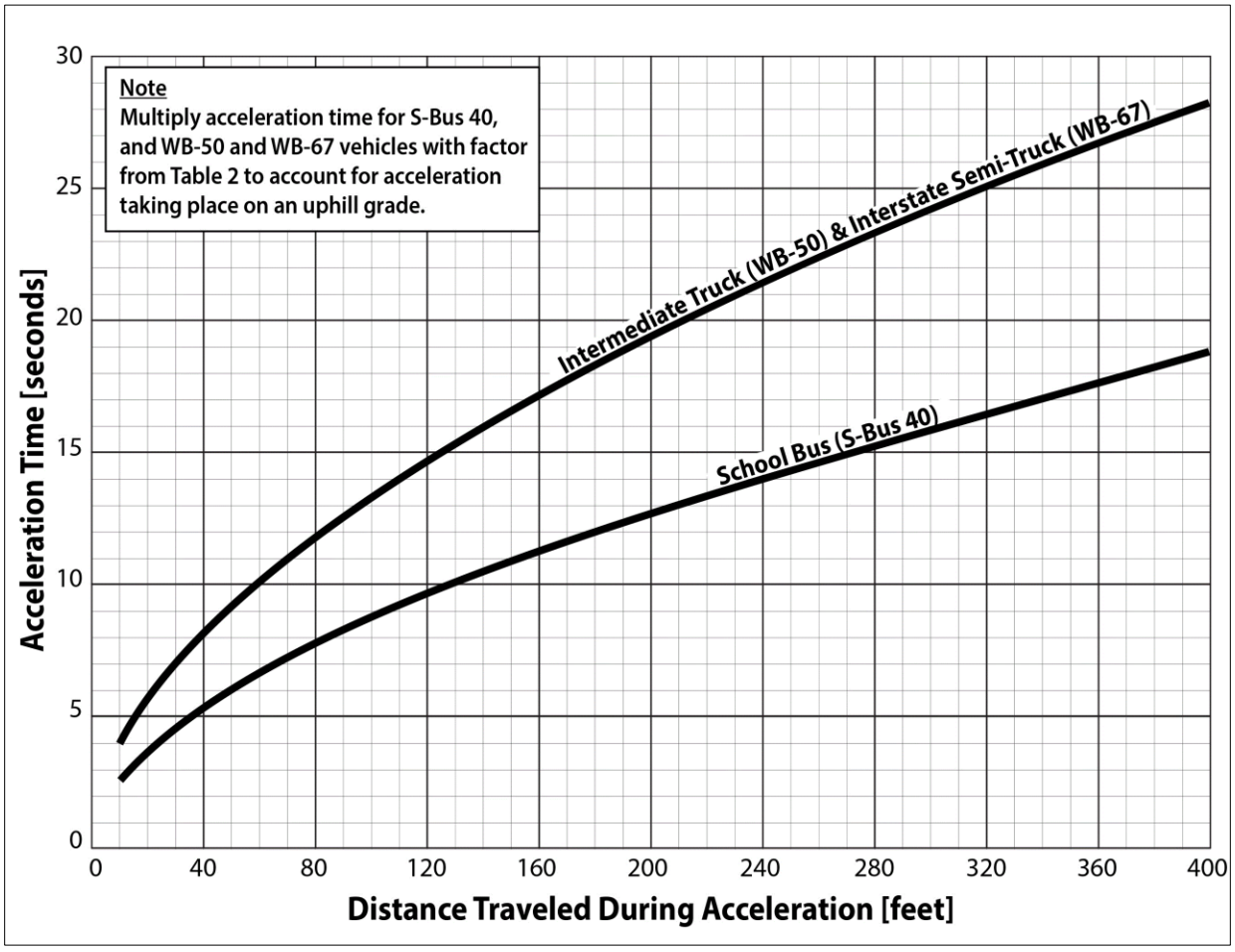
Figure 3.8-1. Geometric Data at the Highway-Rail Grade Crossing



Step 4: Calculate the time the design vehicle needs to accelerate through the design vehicle clearance distance on level terrain.

Select the design vehicle for the analysis. Use ***Figure 3.8-2*** to determine the time the design vehicle needs to accelerate through the design vehicle clearance distance on level terrain.

Figure 3.8-2. Acceleration Time Over a Fixed Distance on a Level Surface



Step 5: Calculate the time the design vehicle needs to accelerate through the design vehicle clearance distance on an uphill grade.

If the design vehicle clearance distance is on an uphill grade, calculate the approach grade factor to account for slower acceleration. Determine the approach grade factor, shown in ***Table 3.8-1***, based on design vehicle clearance distance, design vehicle, and slope grade.

To calculate the time needed for the design vehicle to accelerate through the design vehicle clearance distance on an uphill grade, multiply the time it needs to accelerate through the design vehicle clearance distance on level terrain by the approach grade factor.

Table 3.8-1. Factors to Account for Slower Acceleration on Uphill Grades

Acceleration Distance (feet)	Design Vehicle and Percentage Uphill Grade									
	School Bus (S-BUS 40)					Intermediate Truck (WB-50) and Interstate Semi-Truck (WB-67)				
	≤1%	2%	4%	6%	8%	0%	2%	4%	6%	8%
25	1.00	1.01	1.10	1.19	1.28	1.00	1.09	1.27	1.42	1.55
50	1.00	1.01	1.12	1.21	1.30	1.00	1.10	1.28	1.44	1.58
75	1.00	1.02	1.13	1.23	1.33	1.00	1.11	1.30	1.47	1.61
100	1.00	1.02	1.14	1.25	1.35	1.00	1.11	1.31	1.48	1.64
125	1.00	1.03	1.15	1.26	1.37	1.00	1.12	1.32	1.50	1.66
150	1.00	1.03	1.16	1.28	1.40	1.00	1.12	1.33	1.52	1.68
175	1.00	1.03	1.17	1.29	1.42	1.00	1.12	1.34	1.53	1.70
200	1.00	1.04	1.17	1.30	1.43	1.00	1.13	1.35	1.54	1.72
225	1.00	1.04	1.18	1.32	1.45	1.00	1.13	1.35	1.56	1.74
250	1.00	1.04	1.19	1.33	1.47	1.00	1.13	1.36	1.57	1.76
275	1.00	1.05	1.20	1.34	1.49	1.00	1.14	1.37	1.58	1.77
300	1.00	1.05	1.20	1.35	1.50	1.00	1.14	1.37	1.59	1.79
325	1.00	1.05	1.21	1.36	1.52	1.00	1.14	1.38	1.60	1.81
350	1.00	1.05	1.22	1.37	1.54	1.00	1.15	1.39	1.61	1.82
375	1.00	1.06	1.22	1.38	1.55	1.00	1.15	1.39	1.62	1.84
400	1.00	1.06	1.23	1.40	1.57	1.00	1.15	1.40	1.63	1.85

Step 6: Calculate the queue clearance time.

The queue clearance time is the sum of the time the design vehicle needs to start moving and the time it needs to accelerate through the design vehicle clearance distance.

- Select the desired minimum separation time (seconds).

  The separation time is added for safety reasons and to avoid driver discomfort. ITE (in an article by Marshall and Berg in February 1997) recommends a minimum separation time of 4 seconds. This value may be reduced to as low as 0 seconds if the necessary warning time is not available.

- Calculate the maximum preemption time.

To get the required preemption time, add the right of way transfer time, queue start-up time, and desired minimum separation time. If using advance preemption, check using the worst-case scenario that the preemption phase does not end before the activation of the grade crossing warning devices. Consider variability in train arrival times. Submit the calculated maximum preemption time to the ***DTOE*** and ***District Rail Office*** for approval.

- Coordinate with the appropriate railroad agency and the railroad signal designer.

  After approval by the DTOE and ***District Rail Office***, provide the required preemption time to the railroad signal designer so they can determine the required rail warning system and timings.

3.8.5 PREEMPT TRAP CHECK

A preempt trap happens when the track clearance phase ends before the active railroad grade crossing warning lights start to flash or the gates start to descend. Vehicles may cross or stop in the crossing after the end of the track clearance phase without the opportunity to clear before a train arrives. Variable actual warning time or an insufficient track clearance green interval cause preempt traps.

A preempt trap can be checked using the following procedures.

- Request the advance preemption time from the railroad.

  Use the actual value provided by the railroad. If no advance preemption time is provided, a value of 0 seconds can be used.

- Determine a multiplier for maximum advance preemption time due to train handling.

  Use field measurements. Divide the longest advance preemption time observed by the advance preemption time provided by the railroad.

  If no field observations are available or the advance preemption time is not provided, the multiplier for maximum advance preemption time can be estimated as 1.60 if warning time variability is high or 1.25 if warning time variability is low. High warning time variability is typical in the vicinity of switching yards, branch lines, or anywhere low-speed switching maneuvers take place.

- Calculate maximum advance preemption time.

  Multiply advance preemption time by the multiplier for maximum advance preemption time.

- Calculate the minimum duration for the track clearance green interval.

Subtract the minimum time for a flashing-light signal before the arrival of any train from the minimum time between the gate arm reaching its horizontal position and the arrival of a train.

- Calculate the time for gates down after start of preemption.

  Add the maximum advance preemption time to the minimum duration for the track clearance green interval.

- Calculate the minimum right of way transfer time.

  Add preempt verification and response time with best-case conflicting vehicle or pedestrian time. The best-case conflicting vehicle or pedestrian time is usually 0 seconds.

- Calculate the minimum track clearance green interval.

  Subtract the minimum right of way transfer time from the time for gates down after preemption begins. The minimum track clearance green interval has to be as long as it takes for a car to clear the tracks after the gates are lowered to avoid a preempt trap.

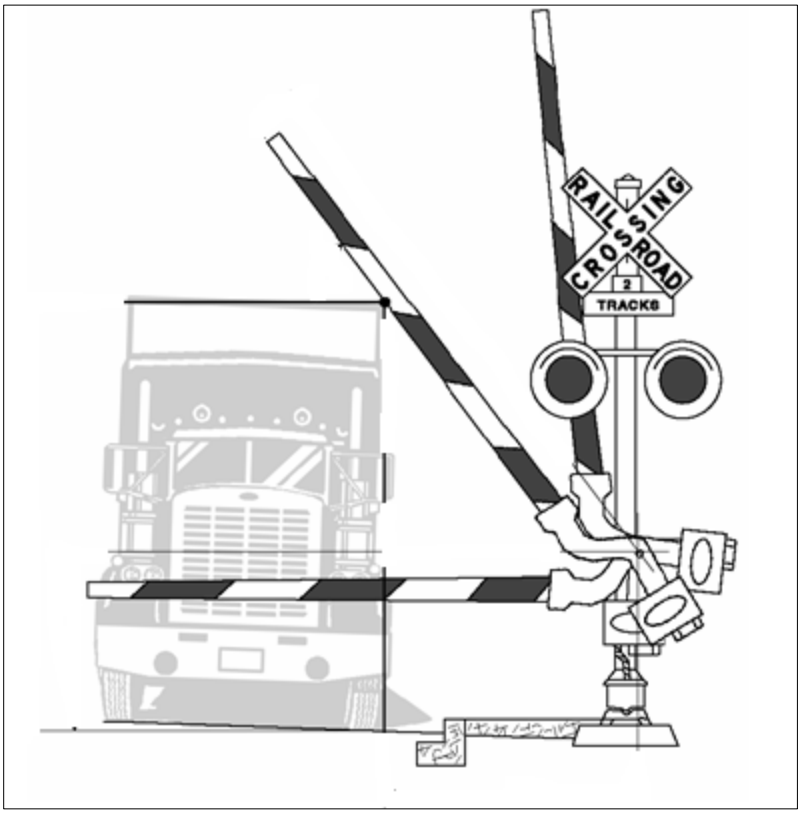
  If the actual track clearance green interval is shorter than the minimum track clearance green interval, a preempt trap will occur.

3.8.6 VEHICLE-GATE INTERACTION CHECK

Even if there is sufficient warning time and the preempt trap has been addressed, the automatic gates may still descend on slow-moving or stationary vehicles, causing panic, confusion, or other unsafe actions from drivers.

Long, high vehicles that accelerate slowly, such as tractor-trailers, are most exposed. The gates may “clip” the rear of the trailer as the vehicle crosses the track during the clear track phase. ***Figure 3.8-3*** shows the passing vehicle-descending gate - relationship. The vehicle-gate interaction can be checked as follows:

Figure 3.8-3. Relationship between Descending Gate and Passing Vehicle



- Calculate the time the design vehicle needs to clear the descending gate.

  Collect the right of way transfer time and the time the design vehicle needs to start moving from previous steps. Calculate the time the design vehicle needs to accelerate through the design vehicle length using ***Figure 3.8-2*** and ***Table 3.8-1***.

  Add the right of way transfer time, time the design vehicle needs to start moving, and time the design vehicle needs to accelerate through the minimum track clearance distance.

- Collect the flashing light duration before the gate starts to descend.

  This value typically ranges from 3 to 5 seconds and must be obtained from the railroad. The railroad's value may be verified through field observations.

- Calculate non-interaction gate descent time.

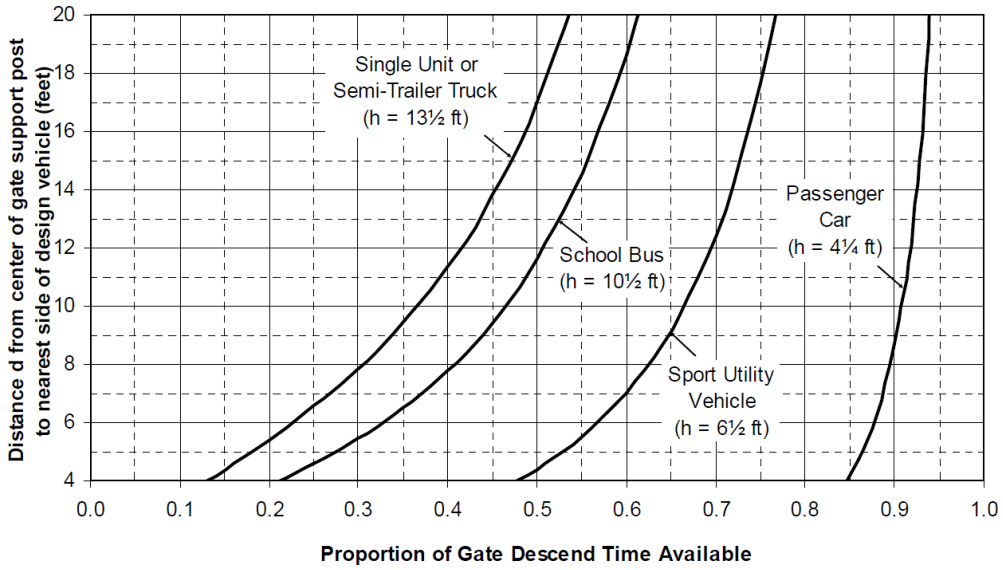
  Step 1: Collect the full gate descent time from the railroad.

  The value obtained from the railroad may be verified through field observations. In the case where multiple gates descend at different speeds, use the descent time of the gate that reaches the horizontal position first.

Step 2: Determine the proportion of non-interaction gate descent time.

Select the distance from the center of the gate mechanism to the nearest side of the design vehicle, *d*, on the vertical axis of ***Figure 3.8-4***, draw a horizontal line until you reach the curve that represents the design vehicle (*h* is the vehicle height). Next, draw a vertical line down to the horizontal axis and read off the value of the proportion of non-interaction gate descent time.

Figure 3.8-4. Proportion of Gate Descent Time Available



Step 3: Calculate the non-interaction gate descent time.

Multiply the full gate descent time with the proportion of non-interaction gate descent time.

- Calculate time available for the design vehicle to clear the descending gate.

  Add the duration of flashing lights before gate descent starts with the non-interaction gate descent time.

- Vehicle-gate interaction check.

  Compare the time the design vehicle needs to clear the descending gate with the time available.

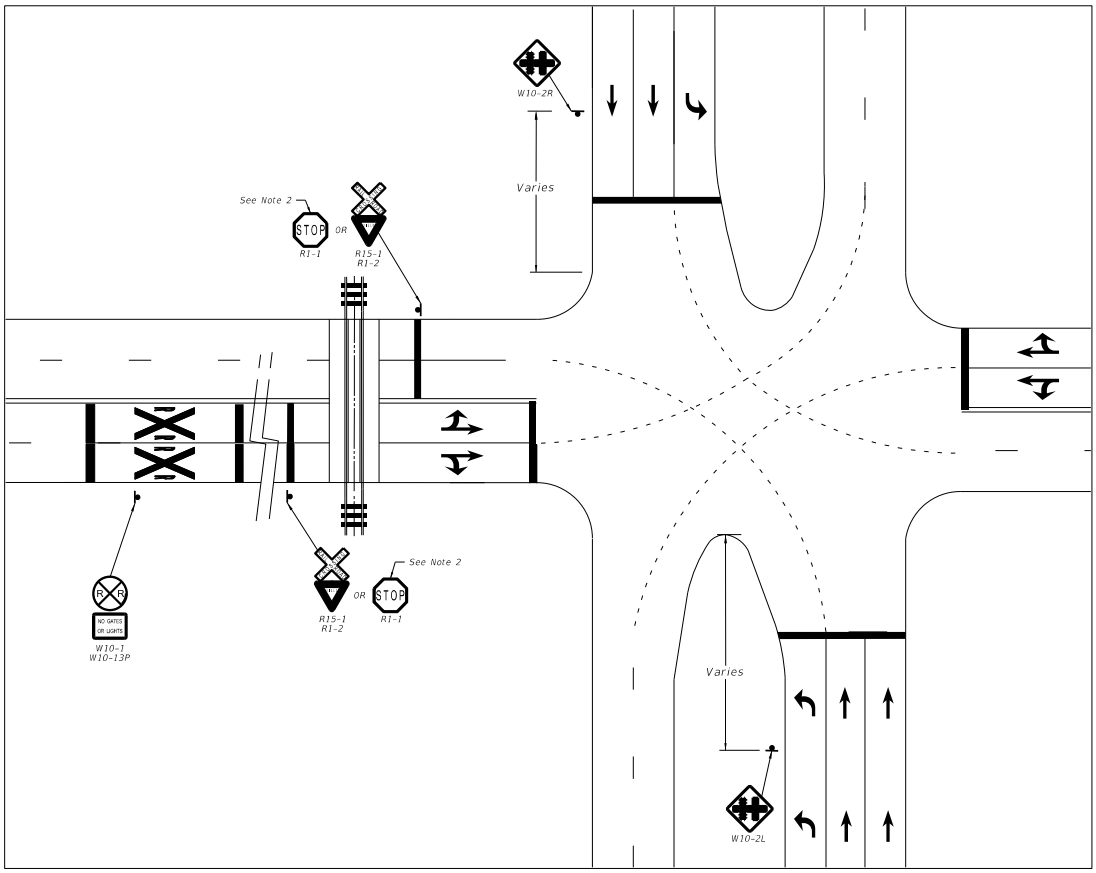
  If the time available is greater than or equal to the time needed, there will be no vehicle-gate interaction.

  If the time available is less than the time needed, provide advance preemption time to avoid vehicle-gate interaction.

3.8.7 EXAMPLE

This example illustrates the step-by-step procedure for calculating the preemption time for a highway-rail grade crossing. The crossing shown in ***Figure 3.8-5*** is within 200 feet of an existing signalized intersection, and requires a preemption phase.

Figure 3.8-5. Intersection for Preemption Time Calculation



- Calculate the Right of way Transfer Time.

  Step 1: Calculate the preempt verification and response time.

  The preempt delay time is 0 seconds. The controller response time to preempt provided by the controller manufacturer is 0 seconds. The preempt verification and response time is 0 seconds, which is calculated by adding the preempt delay time and controller response time.

  Step 2: Calculate the worst-case conflicting vehicle time.

  The worst-case conflicting vehicle phase number is *Phase 8* for this intersection. The minimum green time during right of way transfer is 5 seconds. The other green

time during right of way transfer is 1 second. The yellow change time for *Phase 8* is 4 seconds, and red clearance time for *Phase 8* is 1 second. The worst-case conflicting vehicle time is 11 seconds.

Step 3: Calculate the worst-case conflicting pedestrian time.

The worst-case conflicting pedestrian phase number is *Phase 8* for this intersection. The minimum walk time during right of way transfer is 5 seconds. The pedestrian clearance time during right of way transfer is 0 seconds. The vehicle yellow change time is 4 seconds, and vehicle red clearance time is 1 second. The worst-case conflicting pedestrian time is 10 seconds.

Step 4: Determine the worst-case conflicting vehicle or pedestrian time.

The worst-case conflicting vehicle or pedestrian time is 11 seconds based on results from **Steps 2** and **3**.

Step 5: Calculate the right of way transfer time.

The right of way transfer time is 11 seconds based on results from **Steps 1** and **4**.

- Calculate the queue clearance time.

  Step 1: Determine the queue start-up distance.

  The measured clearance storage distance is 54 feet. The measured minimum track clearance distance is 55 feet. The queue start-up distance is 109 feet.

  Step 2: Calculate the time the design vehicle needs to start moving.

  2+109÷20=8 seconds

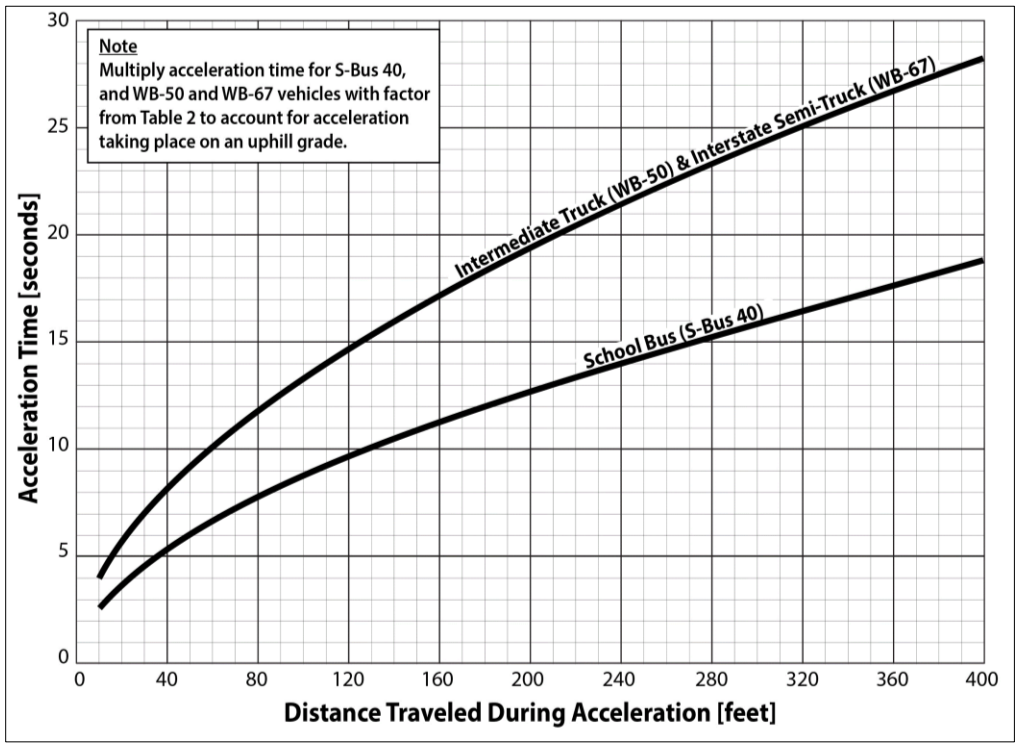
  Step 3: Determine the design vehicle clearance distance.

  The minimum track clearance distance is 55 feet and the design vehicle length is 48 feet. The design vehicle clearance distance is 103 feet based on minimum track clearance distance and design vehicle length.

  Step 4: Calculate the time the design vehicle needs to accelerate through the design vehicle clearance distance on level terrain.

The design vehicle is WB 50 & WB-67. The time the design vehicle needs accelerate through the design vehicle clearance distance on level terrain is 14 seconds based on ***Figure 3.8-6***.

Figure 3.8-6. Calculation of Time for Design Vehicle to Accelerate through the Design Vehicle Clearance Distance on Level Terrain



Step 5: Calculate the time the design vehicle needs to accelerate through the design vehicle clearance distance on an uphill grade.

The terrain for the selected intersection is level, so there is no need to calculate acceleration time for an uphill grade.

Step 6: Calculate the queue clearance time.

The time the design vehicle needs to start moving (**Step 2**) is 8 seconds, and the time it needs to accelerate through the design vehicle clearance distance on level terrain (**Step 4**) is 14 seconds. The queue clearance time is 22 seconds based on results in **Steps 2** and **4**.

- Select the desired minimum separation time.

  The minimum separation time is 4 seconds, based on ITE's recommendation.

- Calculate the maximum preemption time.

  The right of way transfer time is 11 seconds. The queue clearance time is 22 seconds. The desired minimum separation time is 4 seconds. The maximum preemption time is 37 seconds.

The final calculated maximum preemption time is 37 seconds for this intersection.

Section 3.9

INSTALLING RETROREFLECTIVE SIGNAL BACKPLATES ON EXISTING STRUCTURES

3.9.1 PURPOSE

This section describes how to retrofit existing signal structures on the State Highway System with retroreflective signal backplates. Follow the guidelines in this section for installing flexible retroreflective backplates (FRBs) on existing mast arm and span wire structures at signalized intersections without backplates.

3.9.2 BACKGROUND

Retroreflective signal backplates improve the contrast between the traffic signal indications and their surroundings, making them easier to see during both day and night conditions and during power outages.

Installing retroreflective signal backplates can enhance safety at intersections. They have a crash modification factor in FHWA's ***Crash Modification Factor (CMF) Clearinghouse***.

All new or reconstructed traffic signal structures for all approaches are required to have rigid retroreflective backplates.

Some existing signal support structures have unknown structural capacity limits and retrofitting their signal heads with rigid retroreflective backplates would result in needing structural analysis. Research and structural evaluations using FRBs have shown negligible wind loading impacts to mast arm and span wire support structures, making them suitable for signal retrofits.

3.9.3 DEFINITIONS

Flexible Retroreflective Backplate (FRB): A signal backplate that allows portions of the panels to fold back when subjected to high winds and return to their original position when the wind subsides.

Mast Arm: A structure that is rigidly attached to a vertical pole and used to provide overhead support for highway traffic signal faces or grade crossing signal units.

Rigid Retroreflective Backplate: A signal backplate that remains fixed in one position when subjected to wind loading.

Signal Face: An assembly of one or more signal sections that controls one or more traffic movements on a single approach.

Signal Head: An assembly of one or more signal faces that controls traffic movements on one or more approaches.

3.9.4 PROCEDURE

For existing mast arm and span wire structures, the use of FRBs listed on the ***Department's Approved Product List (APL)*** is exempt from the ***FDM 261*** structural capacity analysis requirements. This exemption applies only when the elements to be added to an existing signal structure are FRBs.

The ***District Traffic Operations Offices*** track and document locations and implementation dates within the signalized assets by district found in ***eTraffic*.**

All other signal hardware, features, and attachments proposed for retrofitting existing traffic signal structures must undergo structural analysis in accordance with ***FDM 261*** to determine if structural capacity is adequate. Examples of signal hardware, features and attachments requiring structural analysis include, but are not limited to:

- Rigid retroreflective backplates (RRBs)
- Signal heads
- Overhead street name signs
- Static signs
- Blank-out signs

Perform any required structural analysis of existing traffic signal structures in accordance with ***FDM 261***. Refer to the ***FDOT Structures Manual, Volume 3, Section 18.3*** for additional information regarding the analysis of existing structures. The ***FDOT*** Structures Manual recommends installing FRBs to alleviate loading capacity.

Section 3.10

FLASHING YELLOW / RED ARROW SIGNAL APPLICATION

3.10.1 PURPOSE

This section provides criteria, guidelines, and best practices for installing and operating flashing yellow arrow (FYA) and flashing red arrow (FRA) signals as directed by ***MUTCD Sections 4D.18*** and ***4D.20***.

3.10.2 BACKGROUND

For many years, engineers have been concerned that drivers turning left on a permissive circular green signal will mistakenly believe they have right of way over opposing traffic. Geometric conditions can contribute to this impression.

FYA and FRA indications have been used to mitigate the “yellow trap” condition, where a left-turning driver completes their turn on a yellow indication assuming oncoming traffic also has a yellow.

Based on the intuitive understanding of FYA for permissive turning movements and to ensure uniformity across the state, the Department encourages the use of FYA over FRA. Per ***MUTCD Section 4D.18***, FRA may be used during the permissive left-turn movement for unusual geometric conditions, such as wide medians with offset left-turn lanes, but only when an engineering study determines that each and every vehicle must successively come to a full stop before making a permissive left turn.

To date, research studies have been conducted and guidelines developed only for left-turning FYA treatments. However, right-turn FYA treatments may be used, per the ***MUTCD*** and this section. Further guidance for right-turn FYA treatments may be included in this manual in response to research findings, implementation, and case studies.

In 2003, ***NCHRP*** published ***Report 493: Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control***. Its key findings are as follows:

- The FYA is a good overall alternative to the circular green as the permissive signal display for a left-turn movement.
- Left-turn drivers are highly likely to understand and correctly respond to the FYA. The FYA has a lower fail-critical rate than the circular green.
- Making the FYA display a separate signal face for the left-turn movement allows more versatility in field application. It can be operated in any of the various modes

of left-turn operation by time of day and is easily programmed to avoid the yellow trap associated with some permissive turns at the end of the circular green display.

FHWA's ***Crash Modification Factor (CMF) Clearinghouse*** reports a CMF for installation of left-turn FYA signals and supplemental traffic signs.

3.10.3 OPERATIONAL REQUIREMENTS

The following design and operational requirements apply, according to ***MUTCD Section 4D.20***, when a separate left-turn signal phase operates in a protected/permissive left-turn mode and a flashing left-turn yellow arrow signal is provided.

Left-Turn Operation Mode(s):

The FYA signal may be displayed to indicate a permissive left-turn movement in either protected/permissive or permissive-only modes.

Engineers may vary the left-turn operation mode (i.e., permissive-only, protected-only, or protected/permissive) during different periods of the day when the following conditions apply:

- The calculated critical gap is a minimum of 7 seconds during non-peak hours. The Department's ***Manual on Uniform Traffic Studies (MUTS)*** provides additional guidance on conducting vehicular critical gap studies.
- Fewer than 240 vehicles turn left per hour, or the product of left-turning vehicles and opposing through vehicles is fewer than 50,000 (one opposing through lane) or 100,000 (two opposing through lanes). Product being defined as the multiplication of one hour of left-turning volume times the corresponding opposing through hourly volume.
- There are no fatalities and two or fewer left-turn crashes per year attributed to permissive left-turning movement.

Signal Head Arrangement: Provide at least one separate four-section signal head for the left-turn movement, in addition to the minimum of two signal heads for other traffic on the approach. The signal face must be able to display, from top to bottom (or left to right), a steady left-turn red arrow, steady left-turn yellow arrow, flashing left-turn yellow arrow, and steady left-turn green arrow.

Signal Head Location: In an exclusive left-turn lane, center the signal head over the lane or its extension. If centering the signal head is not practical, do not position it any further to the right than the lane line (or the extension of the lane line) between the left-turn lane and the adjacent through lane or any further to the left than the left edge of the left-turn lane (or extension of the lane line).

Signal Displays: Signal head displays must meet the following requirements:

- Display the following signal heads: Steady left-turn red arrow, steady left-turn yellow arrow, flashing left-turn yellow arrow, and left-turn green arrow. Display only one of the four indications at any given time.
- During the protected left-turn movement, display a left-turn green arrow signal.
- Display a steady left-turn yellow arrow signal following the left-turn green arrow signal.
- During the permissive left-turn movement, display a flashing left-turn yellow arrow signal.
- Display a steady left-turn yellow arrow signal after the flashing left-turn yellow arrow signal if the permissive left-turn movement is ending and the separate left-turn signal head will subsequently display a steady left-turn red arrow indication. At locations where a history of drivers failing to yield to pedestrians during permissive left-turn phases has been documented, the following countermeasures may be implemented:
    - Omit the FYA when the pedestrian phase is actuated.
    - Implement leading pedestrian interval (LPI) in accordance with ***TEM 3.11***.
- The engineer may choose to display a flashing left-turn yellow arrow signal for a permissive left-turn movement while the signal heads for the adjacent through movement display steady circular red indications and the opposing left-turn signal heads display left-turn green arrow signals for a protected left-turn movement.
- Before the FYA begins, provide a start-up delay (2 seconds) for all opposing through movements to establish position in the intersection.
- When changing phase from a permissive left-turn movement to a protected left-turn movement, display a left-turn green arrow signal immediately after the flashing left-turn yellow arrow indication. Do not display a steady left-turn yellow arrow signal between the display of the flashing left-turn yellow and the display of the steady left-turn green arrow indications. See ***TEM 3.10.4*** for further guidance.
- Use a four-section signal head unless constrained by height limitations (or lateral positioning limitations for a horizontally mounted signal head). In constrained conditions, the engineer may use a three-section signal head with a dual-arrow signal section. The dual-arrow signal section, where used, must display a green arrow for the protected left-turn movement and a flashing yellow arrow for the permissive left-turn movement. The ***DTOE*** must concur and approve the installation of any three-section FYA signal head.
- During steady mode (stop-and-go), the signal section that displays the steady left-turn yellow arrow signal during change intervals must not be used to display the flashing left-turn yellow arrow signal for permissive left turns.

- During flashing mode, display a flashing left-turn yellow arrow signal only from the signal section that displays a steady left-turn yellow arrow signal during steady mode (stop-and-go) (see ***MUTCD Section 4D.30***).

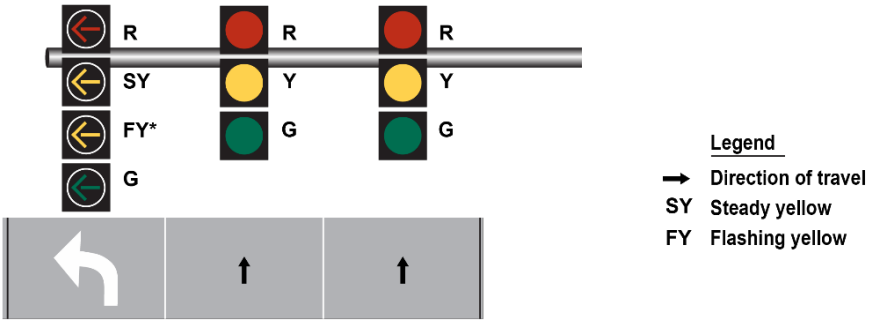
Yellow Trap: FYA can be used to reduce the risk of a left-turn yellow trap. The signal timing sequence may allow the permissive left-turn phase (FYA) to continue until the opposing traffic's through phase ends, even if the adjacent through phase has already ended.

When implementing FYA, review all potential sequencing combinations to determine if a yellow trap could occur. Include those that skip phases due to lack of demand and special patterns such as preemption. If a yellow trap appears possible, modify the sequencing and controller programming parameters as necessary to eliminate it. The design engineer has primary responsibility for including adequate information in design plans for others who may establish sequences and program controllers.

The four-section signal protected/permissive left-turn mode (***Figure 3.10-1***), is illustrated in ***MUTCD Figure 4D-12***.

Figure 3.10-1. Four-Section Signal Protected/Permissive Left-Turn Mode

A – Typical Position



B – Typical Arrangements

Installation Guide:

The FYA is an option for permissive/protected left-turn phasing. However, as with protected/permissive operation in general, careful consideration is needed when deciding where to install the FYA.

It is recommended that districts obtain local agencies agreement before recommending and installing FYA to a signalized intersection.

To ensure statewide consistency for FYA installation:

- Consider and prioritize four-section FYA signal displays for new signal installations and candidate retrofit locations that meet the criteria below:
  - Corridors where changing to lead/lag from lead/lead left-turn phasing would improve progression.
  - Locations where left-turn demand is low during off-peak periods and variable modes of left-turn phasing will improve safety and operations.
- Center the signal display for the left-turn movement over the corresponding exclusive left-turn lane for new and retrofit FYA installations.
- For locations with high populations of people 65 years or older or intersections in a ***Safe Mobility for Life Coalition Priority County***, conduct an intersection operations and crash history evaluation before implementing FYA.
- The supplemental *LEFT-TURN YIELD ON FLASHING YELLOW ARROW* sign (***FTP-85-13***) may be used to educate motorists about FYA operations.
- If the structural loading capacity meets the minimum requirements to withstand the wind loading under the Department's established design criteria, engineers may install the supplemental *LEFT TURN YIELD ON FLASHING YELLOW ARROW* sign (***FTP-85-13***). Please see ***TEM 3.10.4*** for further guidance on loading.
- If using FYA for permissive-only, protected/permissive, permissive/prohibited phasing, consider time-of-day applications.
- When recommending replacing a five-section signal head with a four-section FYA signal head for the left-turn lane and a three-section signal head for the inside through lane, the engineer must confirm the Department's structural loading capacity requirements are met.
- Avoid FYA installation under the following conditions:
  - Crash patterns involve left-turning vehicles and could be attributed to driver misunderstanding of shared signal indications.
  - Frequent railroad or emergency vehicle preemption activations happen, resulting in higher risk of a left-turn trap condition.

3.10.4 INSTALLATION CRITERIA

Engineers may consider installing FYA at signalized intersections with the following characteristics:

- FYA installation is facilitated by intersection geometry and traffic operations characteristics, including:
  - Opposing left-turn paths that do not conflict.
  - Available sight distance that is greater than the required site distance based on approach speeds and left-turn lane offset conditions.
  - The approach has only one left-turn bay.
  - There are one or two opposing through lanes. Engineers may consider intersections with three opposing through lanes on a case-by-case basis supported by an engineering study.
- The intersection has a protected/permissive mode and less than three left-turn-related crashes per year have been recorded over a three-year period that may have been avoided with protected-only phasing.
- Fewer than 240 vehicles turn left per hour, or the product of left-turning vehicles and opposing through vehicles is fewer than 50,000 (one opposing through lane) or 100,000 (two opposing through lanes). Product being defined as the multiplication of one hour of left-turning volume times the corresponding opposing through hourly volume.
- Signal coordination plans indicate operations improved with the installation of FYA permissive-protected operation based on volume criteria and crash pattern during peak periods.

Using a consistent left-turn treatment along a corridor makes it easier for drivers to navigate, but it may not be practical due to the potential associated costs for its implementation. FYA left-turn protected/permissive mode often requires installing an additional left-turn signal head and could require a mast arm replacement (e.g., wind loading requirements not met, longer mast arms needed). The cost of replacing signal poles to accommodate FYA can be prohibitive.

Some FYA implementations have resulted in a mix of FYA and five-section circular green display protected/permissive operation. In these cases, FDOT recommends installing FYA at any new signalized intersection on the corridor that meets the criteria for protected/permissive left-turn mode operation without immediately modifying the other intersections along the corridor. Avoid installing FYA at intersections that are within view of other intersections with the five-section circular green display.

At locations with protected-only mode, consider using FYA protected/permissive mode only after conducting an intersection engineering study. Do not remove protected-only

left-turn phasing if opposing sight distance is inadequate for permissive left turns, high operating speed are reported, roadway geometry is complicated, or there are too many opposing through lanes. For more information on sight distance, refer to the ***FDM 212***.

3.10.5 VARIABLE MODE

Variable mode operation—changing between protected-only and protected/permissive mode or between protected/permissive and permissive-only mode by time of day—is possible with the four-section FYA signal head. It can be applied where an engineering study shows this type of operation can improve safety and operations. It is important to ensure the traffic signal controller can switch between modes so the flashing yellow arrow indication and the opposing through movement indication terminate together.

When switching between protected/permissive and permissive-only, ensure that the controller can reassign the left-turn detectors to call the associated through phases by time of day.

3.10.6 PUBLIC NOTIFICATION

Coordinate installation of an FYA left-turn operation with the ***District Public Information Office***. Consider issuing press releases letting the public know when they can expect to see the new indications. Send out press releases at least two weeks before implementation.

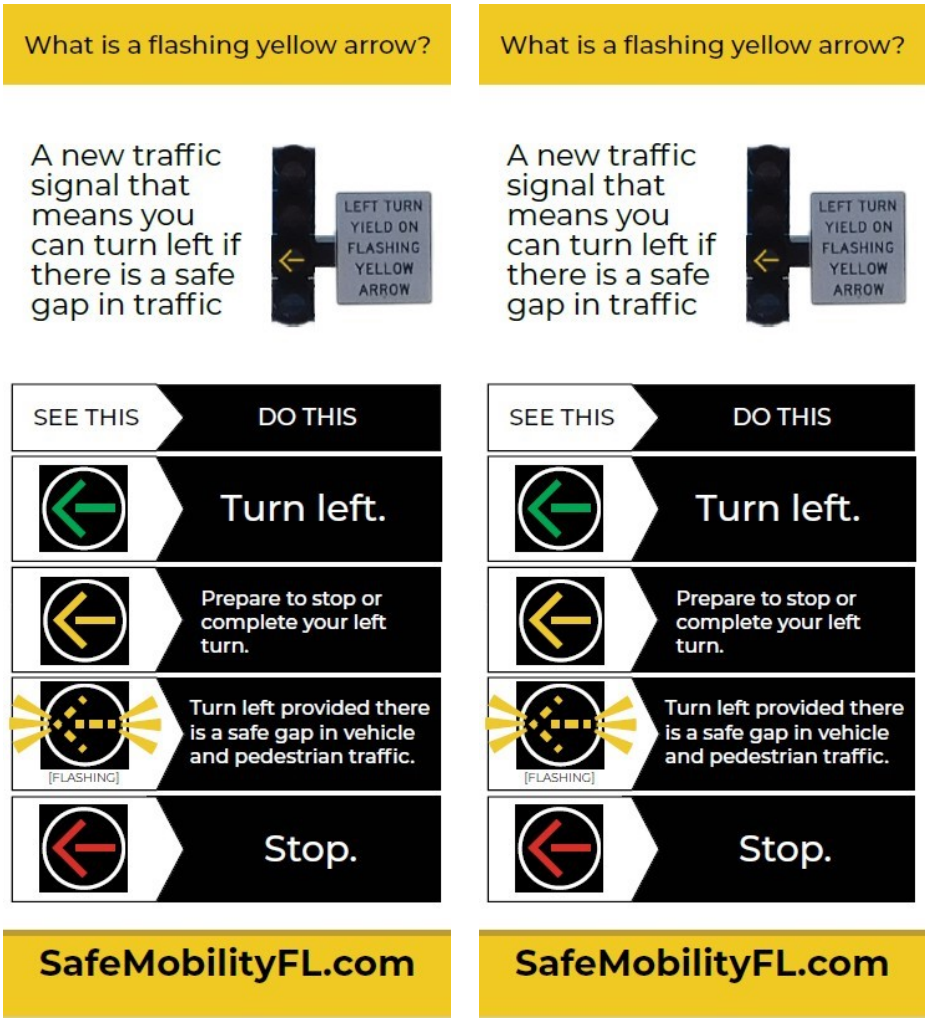
3.10.7 EDUCATION

The Department's Safe Mobility for Life Program/Coalition developed an FYA tip card (***Figure 3.10-2***) to inform and educate the public about this traffic control device. The tip card was developed using human factors studies and uses plain language to help the public understand what to do when encountering a FYA on the roadway system. This tip card is part of the Roadway Safety Series, designed to be used by district staff for public outreach. To obtain digital or print versions of the FYA educational materials, visit ***SafeMobilityFL.com***.

Conduct location-specific education using portable changeable message signs. Display the following alternating messages both before implementation (minimum one week) and after (maximum six weeks):

- Phase 1: NEW SIGNAL DISPLAY
- Phase 2: YIELD ON FLASHING ARROW

Figure 3.10-2. Flashing Yellow Arrow Tip Card



3.10.8 SIGNAL RETROFIT CHECKLIST

Use the following checklist to examine hardware conditions at an intersection before programming an FYA signal in the field. Knowing the hardware conditions makes a smooth FYA implementation more likely.

Signal Retrofit Checklist:

- Check that the mast arm is long enough to center the FYA signal head over the exclusive left-turn lane.
- Check replacement head size/mounting. It may be necessary to raise wire spans to install vertical four-section signal heads to replace five-section signal heads.
- Ensure signal equipment is in working order. A malfunctioning load switch or bad load switch socket may lead to problems during FYA implementation.

- Make sure the available cables are sufficient to install FYA signals. Protected/permissive left-turn phasing often uses a circular green display for the permissive interval, which is illuminated by the same means as the green through phase. Additional cabling may be needed for the flashing yellow display to be controlled by its own circuit.
- Verify with the signal equipment manufacturer that the controller and management malfunction unit are applicable and confirm the programming method. Leading signal equipment manufacturers have developed new controller models and management malfunction units that support FYA signal operations. Controllers must have the correct firmware to enable FYA operations.
- Check if the controller cabinet needs modification. The industry has not standardized FYA controllers. Contact the manufacturer representative for information. The controller make and model will determine whether the cabinet needs to be modified. Make sure the management malfunction unit you select is capable of FYA operation. Install a management malfunction unit recommended by the controller manufacturer. The cabinet flash programming must be modified.
- The ***MUTCD*** does not include a standard explanatory sign for FYA installation since the signal's meaning is intuitively obvious to drivers. However, the Department has designed a 36 x 30-inch LEFT TURN YIELD ON FLASHING YELLOW ARROW sign (***FTP-85-13***) with a white background and black lettering, as shown in ***Figure 3.10-3***. The sign details are shown in ***Standard Plans, Index 700-102*** and can be installed adjacent to the new FYA signal head for additional clarification. If the FYA signal module is to be installed at a location with a five-section head, verify the sign can be installed and ensure any conflicting signs such as the LEFT TURN YIELD ON GREEN sign (***R10-12***) are removed.

Do NOT use other FYA signs as an alternative to ***FTP-85-13***, including sign variations that replace the text with symbols.

Figure 3.10-3. Flashing Yellow Arrow Sign (*FTP-85-13*)

Section 3.11

SIGNAL TIMING APPLICATIONS FOR PEDESTRIAN MOVEMENTS

3.11.1 PURPOSE

This section defines signal timing applications used to improve safety and enhance mobility for pedestrians. It covers considerations for implementing a leading pedestrian interval (LPI), a flashing yellow arrow (FYA) omit by ped, and delayed turn applications at signalized intersections.

3.11.2 BACKGROUND

Signal timing features are used to make traffic easier to see and enhance pedestrian safety. ***NCHRP*** ***Report 812: Signal Timing Manual*** and ***Report 969: Traffic Signal Control Strategies for Pedestrians and Bicyclists*** highlight signal timing applications for pedestrian movements. Signal timing and signal timing adjustments are evaluated, determined, and documented by a traffic engineer.

3.11.3 DEFINITIONS

Concurrent Yet Protected: A variation on the *Delayed Turn* timing treatment, where left and right-turning movements are not permitted during the conflicting *WALK* and *flashing DON'T WALK* intervals. This treatment requires exclusive turn lanes, signal heads, and *NO TURN ON RED* signage.

Flashing DON'T WALK: A warning to pedestrians that the *WALK* indication has ended and the *DON'T WALK* indication is active.

Flashing Yellow Arrow Omit by Ped (FYA Omit by Ped): A signal controller option that omits a permissive left-turn movement during the conflicting *WALK* and *flashing DON'T WALK* intervals.

Delayed Turn: A signal controller option that releases through vehicles and pedestrians concurrently while holding turning movements with a red indication and *NO TURN ON RED* signage. This treatment requires exclusive turn lanes, signal heads, and *NO TURN ON RED* signage.

Lagging Pedestrian Interval: The pedestrian walk interval starts several seconds after the adjacent through movement phase. This option allows a waiting right-turn queue to clear before the *WALK* indication is presented and reduces conflicts with right-turning

vehicles. It is applicable at intersections where there is either an exclusive right-turn lane (or lanes) or the two intersecting roads have one-way traffic.

Leading Pedestrian Interval (LPI): A pedestrian interval option, also known as "pedestrian head start" or "delayed vehicle green," which gives pedestrians an advance *WALK* indication before a green signal is provided to vehicles. This allows pedestrians to establish a presence in the crosswalk, reducing conflicts with turning vehicles. LPI is a proven safety countermeasure to reduce vehicle-pedestrian crashes at signalized intersections.

Pedestrian Detector Call: An input into the associated phase of the controller when a pedestrian is detected and actuates service of the pedestrian *WALK* indication.

Pedestrian Omit: A command that ignores pedestrian calls for service and prevents a pedestrian phase. This feature is a consideration at intersections with rail preemption. Activation does not affect a pedestrian movement in the process of timing.

Pedestrian Recall: This mode eliminates the need for a push button or passive detection and ensures that pedestrian *WALK* and clearance intervals are provided in each cycle.

Pedestrian Recycle: A signal controller option that allows a pedestrian phase to be served multiple times within the same vehicle phase when pedestrian demand exists and the split time remaining is greater than or equal to the time needed to serve the pedestrian phase.

- In the actuated mode, if a serviceable pedestrian call exists on the subject and the *Hold* input is active, the pedestrian movement is recycled when the *Pedestrian Recycle* input is active, regardless of whether a serviceable conflicting call exists.
- In the non-actuated mode, if the subject phase has reached the *Green Dwell/Select* state, the *Pedestrian Omit* is not active on the phase and a serviceable conflicting call does not exist, the pedestrian movement is recycled when the *Pedestrian Recycle* input is active.

Pedestrian Scramble/Barnes Dance: An exclusive pedestrian phase with no concurring vehicular movement in any direction. Pedestrians may cross all intersection legs or cross diagonally. Walking time is extended for diagonal movement. Ped heads, accessible pedestrian signals, and pavement markings indicate pedestrians may cross diagonally.

Pedestrian Walk Interval: A signal providing initial right of way to pedestrians during a pedestrian phase and prior to the pedestrian clearance interval.

Rest in Walk: The pedestrian phase is set to rest in the *WALK* interval to maximize the *WALK* display during a vehicle green. This pertains whether the *WALK* signal is initially activated by the pedestrian push button, passive pedestrian detection, or automatic pedestrian recall. The flashing *DON'T WALK* interval times prior to the yield point.

Walk Rest Modifier: When activated, modifies non-actuated operation only. Upon activation, the non-actuated phase(s) remain in the timed-out *WALK* state (*Rest In Walk*) in the absence of a serviceable conflicting call without regard to the *Hold* input status. With the input inactive, non-actuated phase(s) do not remain in the timed-out *WALK* state unless the *Hold* input is active. The controller recycles the pedestrian movement when reaching the *Green Dwell/Select* state in the absence of a serviceable conflicting call.

3.11.4 GENERAL CONSIDERATIONS

To reduce wait times and increase compliance with pedestrian signals, avoid lengthy traffic signal cycles. The ***INRIX*** ***Smart Signal Dashboard*** can be used to identify efficiencies in cycle lengths. Consider automatic pedestrian recall that allows vehicles at least the same amount of time as the sum of the *WALK* and flashing *DON'T WALK* intervals.

3.11.5 LPI CONSIDERATIONS

Comply with ***MUTCD Section 4E.06*** when considering LPI signal applications.

Review all new signalized intersections and existing intersections as timing changes are made for LPI implementation. See ***TEM 3.11.5.1*** for considerations that indicate an LPI may be appropriate.

LPI implementation is at the discretion of the ***DTOE***. Document the decision process for LPI implementation in the project file as an email or technical memorandum.

3.11.5.1 LPI LOCATION SCREENING CONSIDERATIONS

LPIs are generally used for pedestrian phases that are timed concurrently with a conflicting right turn. Research has demonstrated LPIs can be beneficial at intersections with any pedestrian volume.

The following conditions indicate an LPI may improve conditions for pedestrians. Do not exclude locations based on these considerations:

- Field observations, citizen complaints, crash history, near misses, or risk analysis indicating conflicts between turning vehicles on green and pedestrians.
- Marked school crossings.
- Drivers' view of pedestrians is blocked due to obstructions or poor sight distance. At a minimum, consider the following:
    - Intersection geometry that obscures pedestrians from motorists or vice versa.
    - Lighting problems that cannot be adequately addressed through standard lighting requirements.

- Sun angle that blocks drivers' view at certain times of day or times of the year.

- Approaches where the time needed to serve vehicular demand is less than the associated *WALK* and flashing *DON'T WALK* intervals.

Consider the following points at intersections with low to medium pedestrian volumes:

- LPIs can increase visibility in areas where pedestrian volume is low and drivers may not expect to see them.
- Where the pedestrian phase is actuated, LPIs can benefit pedestrians when they are present without timing every cycle.
- Combining LPI with automatic pedestrian recall for low pedestrian volume phases may increase vehicular impacts of the LPI with limited added benefit for pedestrians.
- With medium pedestrian volume (particularly on corridors with more signals), actuated LPIs delay vehicular traffic as progression is lost. Implementing automatic pedestrian recall in these cases can generally recover the vehicle delay as it is often not caused by capacity constraints but by lack of progression.

Consider the following points at high pedestrian volume intersections:

- Vehicular impacts of LPIs may be lower where a high volume of crossing pedestrians may inhibit right-turn movements.
- LPIs may not provide the desired level of protection at very high-volume pedestrian crossing locations. A pedestrian scramble may be more appropriate where any of the following conditions exist:
  - Very high volume of pedestrian crossings.
  - High volume of right turns.
  - High demand for diagonal pedestrian crossings.

3.11.5.2 LPI IMPLEMENTATION CONSIDERATIONS

Most modern controllers support LPI natively. At intersections where the controller does not support LPI programming, consider replacing the controller. For information on how to program an LPI, refer to the ***FDOT Leading Pedestrian Interval Programming Primer***.

Set LPI timing to allow pedestrians to clear at least the width of one lane in the direction of moving traffic, including the width of a parking and bicycle lane, to increase the visibility of pedestrians to turning traffic. A minimum 3-second LPI duration is required by the MUTCD.

A maximum LPI duration limits drivers' tendency to disobey the signal.

- With an actuated pedestrian phase, the optimal maximum LPI duration is 10 seconds. If more time is needed, either based on ***Formula 3.11.5.2-1*** or due to sight distance concerns, consider geometry updates such as curb bulb-outs to shorten the distance pedestrians need to cross to get through one through lane. Alternatively, consider using an exclusive pedestrian phase or concurrent yet protected signal timing if site conditions allow.
- With a pedestrian phase on automatic recall, the maximum LPI time is 7 seconds.

Consider a 3-second LPI duration when an intersection operates close to capacity.

Use ***Formula 3.11.5.2-1*** to calculate LPI duration for each crosswalk:

Formula 3.11.5.2-1

$$LPI = \frac{ML + B}{W} + PS$$

Where:

LPI = Number of seconds rounded up to the nearest interval allowed by the controller between the onset of the *WALK* signal for pedestrians and the green indication for vehicles.

ML = Distance on the crosswalk to clear the width of one through lane from the edge of the curb, in feet. Consider large corner radii as per ***MUTCD Section 4E.06.22***.

B = Distance from the pedestrian detector location to the edge of curb, in feet. Use 6 feet if no pedestrian detector is present. This measures the distance a pedestrian travels to arrive at the curb.

W = Walking speed (3.5 ft/s for pedestrian clearance interval calculation suggested by the MUTCD). The Department's ***Manual on Uniform Traffic Studies (MUTS)*** provides additional guidance on conducting individual pedestrian walking speed studies.

PS = Pedestrian start-up lost time (FDOT recommends using 1.6 seconds). This term can be omitted if an accessible pedestrian signal is provided.

Consider the use of an accessible pedestrian signal (***MUTCD Sections 4E.09 to 4E.13***) with LPI applications, as vision-impaired pedestrians use the sound of moving traffic to start crossing. Accessible pedestrian signals alert pedestrians that the *WALK* indication has initiated. Refer to ***TEM Section 3.7*** for accessible pedestrian signal applicability and implementation.

When an LPI is used, consider concurrent turning movements across the crosswalk.

Right Turn

Use either of the following options:

- A static or dynamic *No Turn On Red* sign (***R10-11***) to prohibit turns on red. If using a dynamic sign, display the message during the LPI interval and the preceding yellow and red intervals.
- A shared lane with through vehicles totaling more than two-thirds of the traffic within the lane.

Protected Left Turn

Do not time LPIs concurrent with the opposing protected left-turn interval. Protected left turns may be leading or lagging, but lagging the opposing left-turn movement is preferred to reduce pedestrian conflicts with late turning vehicles.

For opposing leading left-turn movement, time the LPIs after the opposing protected left-turn movement and before the green through vehicle interval. For opposing lagging left-turn movement, time the LPIs before the green interval for through vehicle movements.

Protected/Permissive Left Turn

Do not time LPIs concurrent with the opposing protected left-turn interval. Protected/permissive left turns may be leading or lagging. Lagging the opposing left-turn movement is preferred to reduce pedestrian conflicts with late turning vehicles.

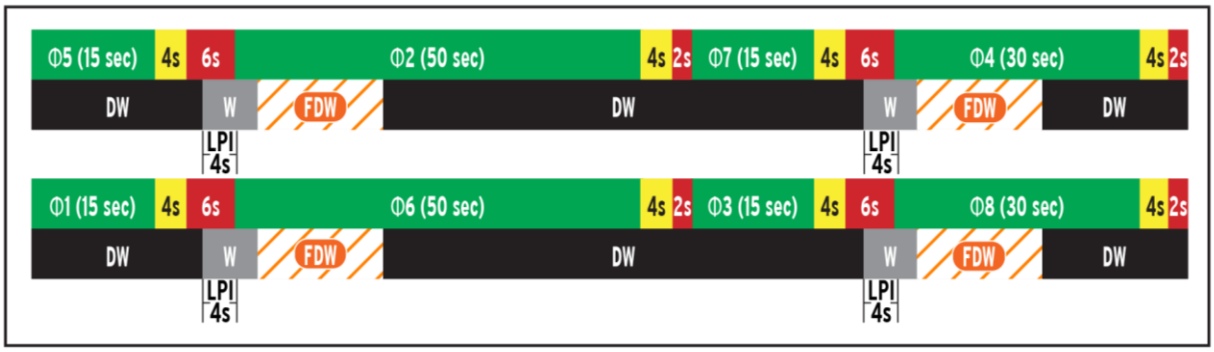
Time the pedestrian phases with LPIs concurrently, unless FYA signal heads are used for the conflicting left-turn movements. This prohibits permissive left-turning movements during the LPI.

Permissive Left Turn

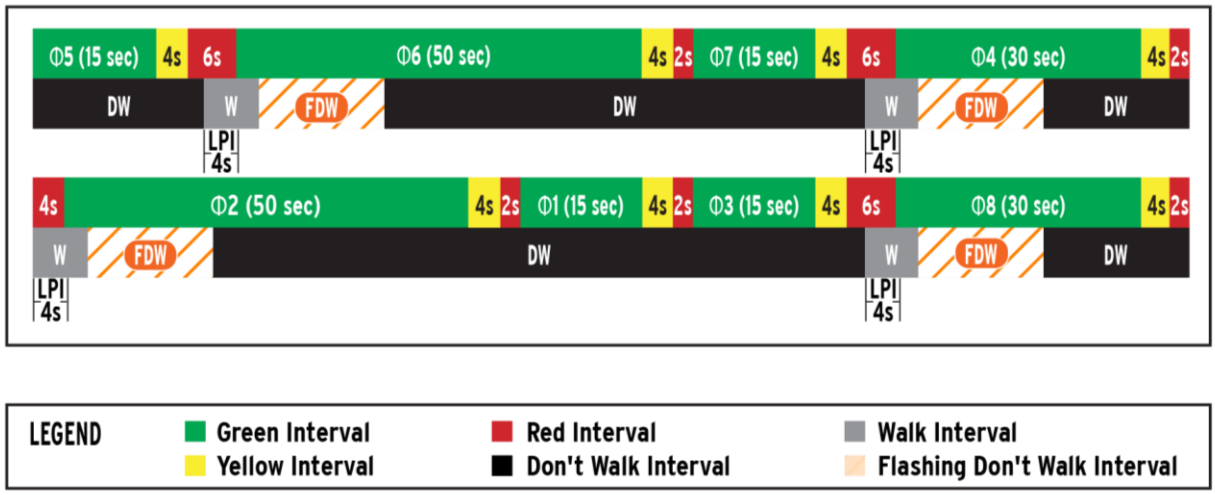
LPIs may be implemented with permissive left turns. Time the pedestrian phases with LPIs concurrently, unless FYA signal heads are used for the conflicting left-turn movements. This prohibits permissive left-turning movements during the LPI. See ***Figure 3.11-1*** for examples.

Figure 3.11-1. Schematic Diagram for Signal Timing with LPI

A - Lead/Lead Left Turn



B - Lead/Lag Left Turn



For corridors with LPIs at multiple intersections, consider using automatic pedestrian recall in conjunction with LPIs to maintain progression along the corridor.

FDOT recommends conducting field observations to evaluate improvements to safety and overall intersection operations after implementing LPI. Engineers may adjust signal timing further based on safety needs and engineering judgement.

3.11.6 FYA OMIT BY PED

Consider implementing *FYA Omit by Ped* at locations with protected/permissive signal phasing and four-section signal heads.

Engineers may program *FYA Omit by Ped* for times of day with higher pedestrian volumes that can inhibit permissive left turns. This may be useful in the following cases:

- Intersections with high permissive left turning conflicts with pedestrians
- School arrival and dismissal periods
- Arrival and dismissal periods at event venues

Use of *Rest in Walk* is not recommended with *FYA Omit by Ped* as it results in a protected-only left-turn phase.

3.11.7 DELAYED TURN

Consider implementing *Delayed Turn* on approaches with dedicated lanes and signal heads for turning movements. This treatment also requires *No Turn On Red* signage. Left- and right-turn movements may be held for the duration of the *WALK* and flashing *DON'T WALK* intervals to achieve concurrent yet protected phasing. Use ***Formula 3.11.5.2-1*** and engineering judgement to calculate turning movement duration.

Section 3.12

TRAFFIC SIGNAL RETIMING

3.12.1 PURPOSE

This section provides guidance on how frequently to retime a traffic signal to reduce travel delays, crash frequency, and pollution from fuel consumption and emissions.

3.12.2 GENERAL

Signal retiming is a low-cost approach to keeping traffic moving safely and smoothly while also helping:

- Reduce traffic congestion.
- Reduce aggressive driving behavior/red light running.
- Reduce the number of fatalities and serious-injury crashes.
- Reduce fuel consumption and emissions.
- Reduce the need to increase road capacity through construction.
- Reduce speeding along a corridor through context-sensitive considerations.

Retiming traffic signals every three to five years has become standard practice. Signal timing may need to be reexamined due to:

- Increased capacity or turning movements.
- Increased traffic congestion.
- More trucks as a percentage of traffic.
- Construction activities (road or development).
- New traffic signals along the corridor.

3.12.3 PROCEDURE

Urban signals are retimed every three years and rural signals are retimed every five years. Retiming runs in cycles, so 33 percent of urban and 20 percent of rural signals are retimed each year. This approach follows a regularly scheduled system for retiming signals on the State Highway System.

Alternate approaches districts can take include:

- Traffic study based on observation of performance loss (queues not fully discharged, spillback, and unused green time).
- Perform analysis of the existing timing against optimized timing performance developed through signal timing software.

These alternate approaches have been adopted for areas where traffic flows have matured and stabilized. Analyze traffic signals every three to five years whether or not the signal is being retimed.

PROCEDURE

SIGNS

SIGNALS

MARKINGS

SPECIAL
OPERATIONAL
TOPICS

Section 4.1

Crosswalks in Areas with Heavy Pedestrian Traffic

4.1.1 PURPOSE

This section provides guidelines on the application of pavement markings and signing in the vicinity of marked crosswalks.

Near destinations along the State Highway System that draw a lot of pedestrians, such as beaches or hotels, engineers may consider adding crosswalks at locations other than intersections to encourage a defined path for pedestrian crossings. Consider the vicinity of sidewalks, paths, guardrails, retaining walls, or shrubbery for marked crosswalks.

4.1.2 MARKINGS

Design crosswalks as two parallel 1-foot-wide white lines. Place these lines no less than 6 feet apart at intersections and no less than 10 feet at midblock locations. Locate the crosswalk where it provides the shortest crossing distance whenever practical. Use special emphasis markings to make the crosswalk more visible to pedestrians and motorists. See the ***Standard Plans, Indexes 522-002 and 711-001*** for more information.

4.1.3 SIGNING

Install a *PEDESTRIAN CROSSING* sign (***W11-2***) with a downward diagonal arrow plaque (***W16-7p***) immediately adjacent to each marked pedestrian crossing. This installation can be ground-mounted or mounted overhead on a mast arm or span wire.

Install a *PEDESTRIAN CROSSING* sign (***W11-2***) with an *AHEAD* plaque (***W16-9P***) before a marked crosswalk. Engineers may install these in advance of each crosswalk in areas with heavy pedestrian activity. Use engineering judgment to determine if advance crossing sign assemblies are needed. Consider the relative spacing of crosswalks, roadside development, and other factors. Consult the ***FDOT Design Manual (FDM) Exhibit 230-9*** for the suggested sign placement distance based on approach speeds.

Engineers may install an *END PEDESTRIAN CROSSING* sign to notify motorists that the pedestrian zone has ended. Use 8-inch letters on an 8 x 4 feet sign panel for overhead mounted signs. Use 4-inch letters on a 2 x 2.5 feet sign panel for ground-mounted signs. This will resemble the *END SCHOOL ZONE* sign (***FTP-32-06*** or ***FTP-34-06***) shown in the ***Standard Plans, Index 700-102***. Install the sign approximately 200 to 300 feet downstream of the last marked crosswalk.

Section 4.2

Pavement Word, Symbol, and Arrow Markings

4.2.1 PURPOSE

This section provides guidelines on the application of roadway pavement word, symbol, and arrow markings to supplement existing highway signing and provide additional emphasis for regulatory, warning, or guidance messages (***Figure 4.2-1*** and ***Figure 4.2-2***).

Figure 4.2-1. Pavement Word Markings

Review ***MUTCD Section 3B.20*** for the minimum requirements for roadway pavement word, symbol, and arrow markings. For additional requirements, consult the ***Manual on Speed Zoning for Highways, Roads, and Streets in Florida*** and ***Standard Plans, Indexes 711-001 and 711-002***.

Design route shields in accordance with ***Standard Plans, Index 711-001***.

Only use roadway pavement word, symbol, and arrow markings as a substitute for vertical signs when overhead signing is impractical or impossible to install, such as when it would impose on navigable airspace.

To recommend non-standard word or symbol pavement markings, complete the following:

1. Conduct an engineering study documenting how these markings would improve safety or operations efficiency and submit it to the ***District Traffic Operations Engineer (DTOE)*** for concurrence.
2. Once the DTOE has concurred, the ***District Traffic Operations Office*** will submit the study to the ***State Traffic Operations Engineer (STOE)*** for concurrence.
3. Once the STOE has concurred, the ***State Traffic Engineering and Operations Office*** will submit an FHWA Request to Experiment (RTE) for approval.
4. If the RTE is approved by FHWA, the ***District Traffic Operations Office*** recommending the design will be responsible for submitting the required interim and final reports to the ***State Traffic Engineering and Operations Office*** for review and submission to FHWA.

Figure 4.2-2. Pavement Symbol and Arrow Markings

4.2.2 LANE USE ARROW AND 'ONLY' PAVEMENT MARKINGS ON INTERSECTION APPROACHES

Use lane-use arrow symbols only in through lanes at intersections with overhead lane-use control signs or where unusual geometrics or through lane alignment may confuse drivers. In the latter case, use a straight arrow symbol in through lanes as additional driver guidance.

The roadway pavement word *ONLY* is not required for an exclusive turn lane if the arrow symbol is used under the following conditions:

- Lane is developed at a midblock location
- Lane is clearly delineated by appropriate channelization
- Lane requires lateral vehicle movement from an established lane for proper positioning to execute the turn

Use the roadway pavement word *ONLY* with the roadway pavement arrow symbol where unusual geometrics or exclusive turn lane alignment may confuse drivers.

Where an established through lane becomes an exclusive turn lane, use the roadway pavement word *ONLY* with the roadway pavement arrow symbol indicating the allowed turning movement.

When using the roadway pavement word *ONLY* with an arrow symbol, pair the pavement markings with the appropriate signs specified in ***MUTCD*** ***Section 2B-18***, ***Section 2B-19***, ***Section 2B-20***, and ***Section 3B-20***.

Review the ***Standard Plans, Index 711-001*** for design and placement details for roadway pavement arrows and the *ONLY* message.

4.2.3 ROUTE SHIELD PAVEMENT MARKINGS

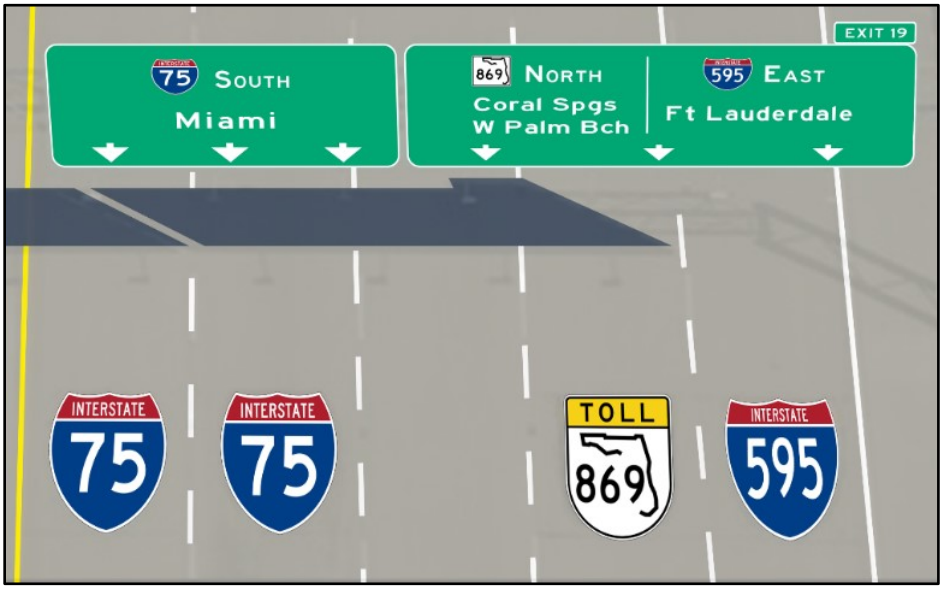
Route shield pavement markings are costly (***Figure 4.2-3***) and engineers need to coordinate with the ***District Maintenance Office*** before the DTOE approves their use. Consider public feedback about the intended location.

Route shield pavement markings are justified under any of the following conditions:

- Crashes have increased because traffic volumes have worsened the effects of complex lane assignments such as lane drops, double lane exits with optional lanes, gores where crash cushions are frequently hit, or unusual geometries.
- The optional or excess lane is underutilized and weaving maneuvers may cause unexpected congestion identified by volume/capacity analyses.

- Lane assignments are complex or alignment shifts are present.
- An overhead sign structure is not practical and the turn lane from an arterial to a limited access on-ramp may appear to provide access to other destinations.

Figure 4.2-3. Route Shield Pavement Markings



Consider the following when deciding where to install route shield pavement markings:

- Install route shield pavement markings where they will be most visible to drivers.
- Place the markings after at least one interchange overhead guide sign.
- Place the markings far enough upstream of the decision point to allow drivers to safely change lanes.
- Install the markings 1 mile in advance of the decision point, taking into consideration existing signs and other traffic control devices.
- Limit installations to two sets of markings (shield with arrow or message) before the gore or decision point.
- Avoid placing the markings under or immediately adjacent to overpasses, as they can cast shadows on the shields. Placing markings on downhill slopes may reduce their effectiveness.

Install route shield pavement markings as follows:

- Use pre-formed thermoplastic.
- Use 20-foot-long shields for limited access roadways and 15-foot-long shields for arterials and collectors.

- Align a route shield in the center of the lane.
- Install the route shields horizontally across the roadway; do not stagger them.
- If including arrows or messages to supplement the route shields (*TO*, *LEFT*, *RIGHT*, *NORTH*, *SOUTH*), place them after the route shield. See ***Figure 4.2-4***.
- Leave an 80-foot gap between markings except for cardinal directions, which may be 40 feet from a route shield marking.

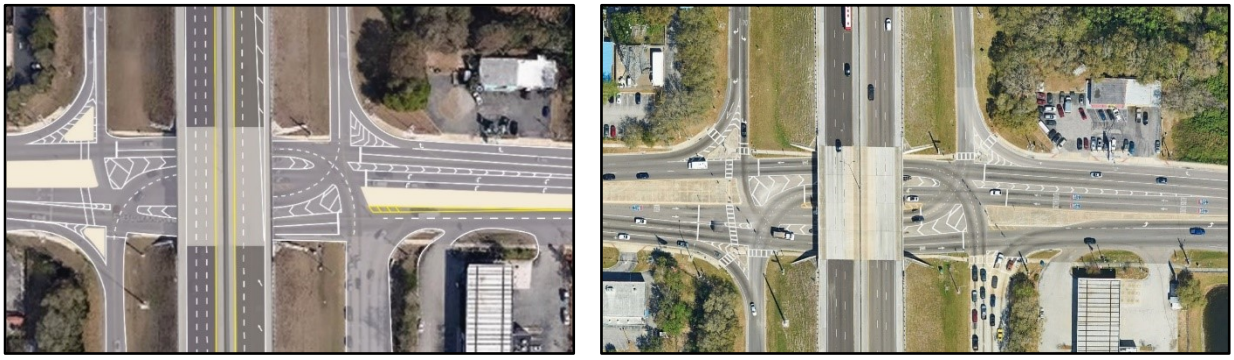
Figure 4.2-4. Cardinal Direction Markings

4.2.4 ROUTE SHIELDS FOR INTERCHANGE ACCESS

Route shield pavement markings can help prevent wrong-way driving as drivers navigate arterials connected to limited access facilities. A common example of their application is diamond interchanges or where turn lane(s) are developed at signals where the actual turning movement is to be made at a downstream signal. Engineers should apply these treatments in conjunction with appropriate geometric design (e.g., supplemental channelization, signing, lighting) to prevent potential wrong-way driving.

Figure 4.2-5 shows before and after plan views at the E Bearss Avenue and I-275 interchange. The image to the left shows the before conditions with dual westbound left-turn arrow markings east of the northbound off-ramp. The image to the right shows the after conditions with interstate shield, cardinal direction, and straight arrow pavement markings on the eastbound and westbound left-turn lanes. These pavement marking improvements inform drivers that the limited access on-ramp entrance is available at the downstream signal.

Figure 4.2-5. Before and After Plan View of E Bearss Avenue and I-275 Interchange



Include the interstate shield, cardinal direction, and straight arrow pavement markings that fall before a break in the arterial left-turn lane(s) serving a ramp at an interchange. An example is shown in ***Figure 4.2-6***.

Figure 4.2-6. Pavement Markings for Interchange Access

At new interchanges, install one set of markings, including the interstate shield, cardinal direction, and straight arrow per lane preceding the break in the turn lane that serves the on-ramp.

Section 4.3

Use of Blue Raised Pavement Markers to Identify Fire Hydrants

Section rescinded. Requirements can now be found in ***Standard Plans, Index 706-001***.

Section 4.4

Roundabout Markings

The Department's standards for this section are shown in ***MUTCD Chapter 3C*** and ***FDM 213***.

Section 4.5

Express Lanes Markings

4.5.1 PURPOSE

This section provides guidance on pavement markings for express or managed lanes. It supplements the standards defined in the ***FDM 211***, ***FDOT Managed Lanes Handbook***, and ***MUTCD***.

4.5.2 DEFINITIONS

Buffer Area or Buffer Space: The space between the managed lane(s) and the general purpose lanes. This space is delineated by a pattern of standard longitudinal pavement markings that are wider than usual or wide lane line markings.

Buffer Width: The lateral gap between the managed lane(s) and the general purpose lanes as measured from the centerline of an 8-inch longitudinal pavement marking.

Slip Ramp: An exclusive lane that connects managed lane(s) and general purpose lanes by using breaks in the separation type.

Toll Gantry: Truss structure supporting toll equipment over the roadway.

Tolling Area: Section of roadway underneath the toll gantry.

Weave Lane: A lane accommodating weaving movements and speed changes as vehicles merge between managed lane(s) and general purpose lanes.

Weave Zone: Provides simultaneous ingress and egress access between managed lane(s) and general purpose lanes using a break in the separation type.

4.5.3 *'EXPRESS'* AND *'ONLY'* WORD PAVEMENT MARKINGS IN EXPRESS LANES

Install the *EXPRESS* and *ONLY* roadway pavement words before express lane access points and co-locate them with overhead advance guide signs under the following conditions:

- When a general purpose lane transitions directly into an express lane(s).
- When a general purpose lane directly connects from a surface street (see ***MUTCD Figure 2G-26***).

Install the *EXPRESS* roadway pavement word at the immediate point of entry under the following conditions:

- When the slip ramp transitions directly into an express lane(s).
- When the slip ramp from a general purpose lane merges directly into an express lane(s).

Do NOT install the *ONLY* roadway pavement word under the following conditions:

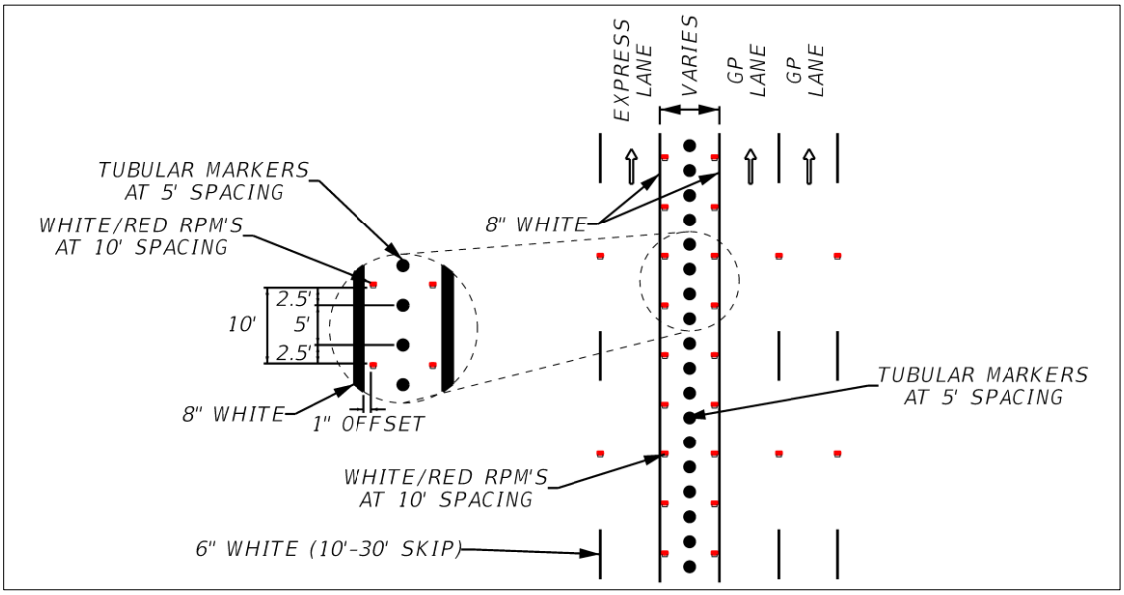
- When the express lane is accessed by a weave zone.
- When the express lane is accessed by a weave lane.
- At any point beyond the entry gore where there is no legal option to exit or enter an express lane(s).

4.5.4 CHEVRONS AND MARKERS IN THE BUFFER AREA

Follow the buffer width requirements in ***FDM 211*** for chevrons and pavement markers in the buffer area. Install chevron crosshatch markings in buffer areas with tubular markers (***Figure 4.5-1***) as follows:

- Do not use chevrons in buffers narrower than 2 feet.
- Place chevrons as follows in buffers 2 to 12 feet wide:
  - **Slip Ramps:** Add 18-inch white chevrons spaced 100 feet apart within the slip ramp transition.
  - **Weave Lanes:** Add 18-inch white chevrons spaced 100 feet apart within the weave lane transition.
  - **Weave Zones:** Add 18-inch white chevrons spaced 100 feet apart for 1,000 feet on both sides of the weave area.
- For buffer widths greater than 12 feet, add 18-inch white chevrons spaced 100 feet apart.

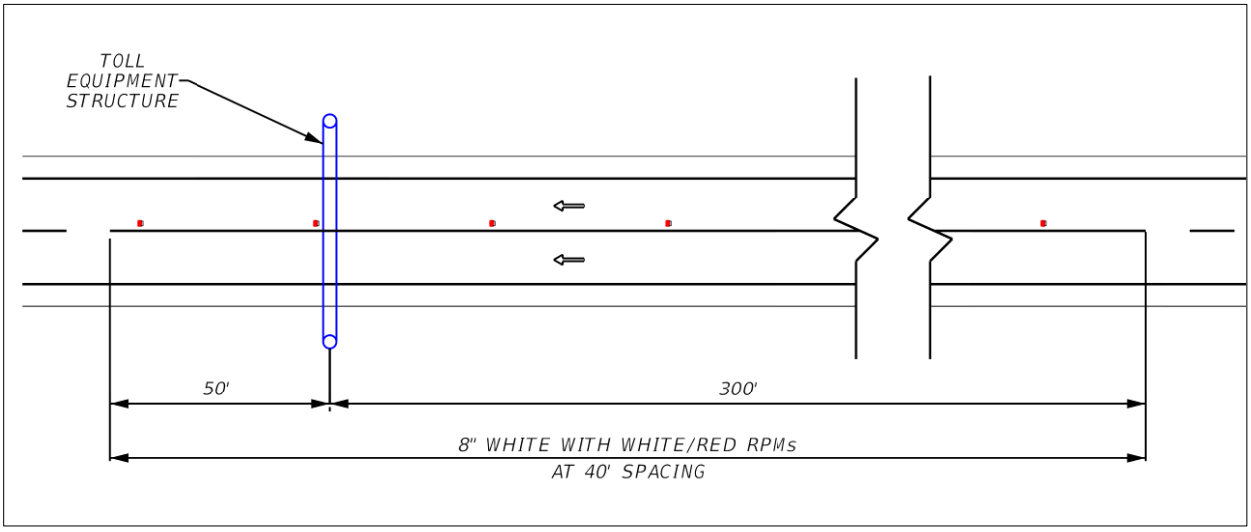
Figure 4.5-1. Buffer Area Detail



4.5.5 SPECIAL PAVEMENT MARKINGS WITHIN THE TOLLING AREA

Where there is more than one express lane, separate the lanes with a solid 8-inch white stripe 300 feet ahead of the toll gantry and 50 feet past it, as shown in ***Figure 4.5-2***.

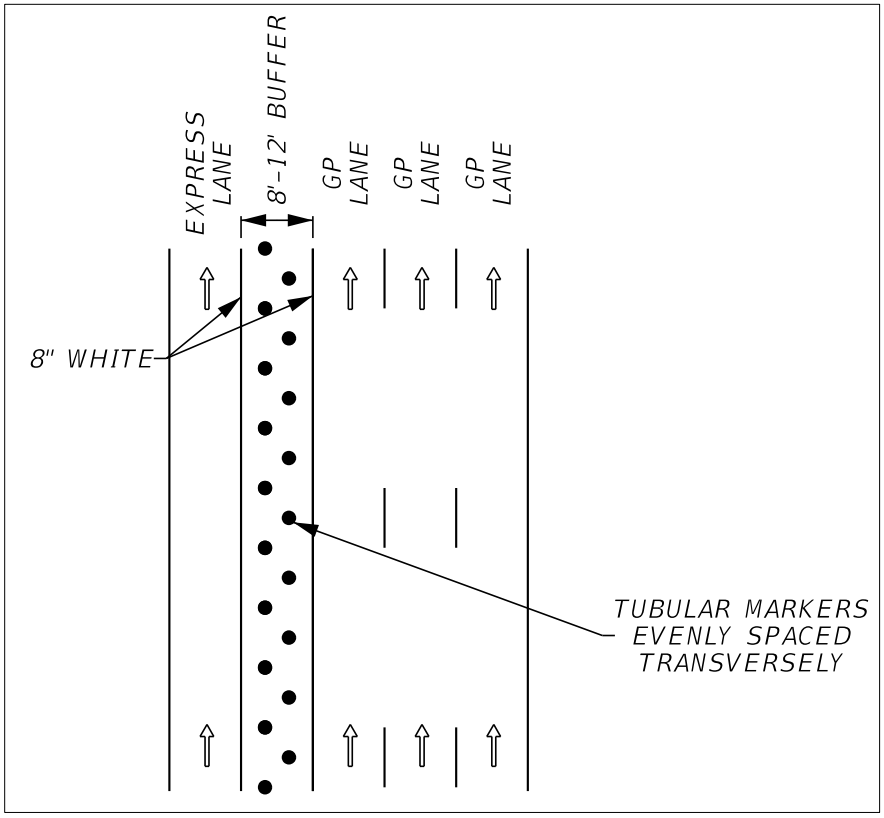
Figure 4.5-2. Striping Under the Toll Gantry



Place tubular markers within the tolling area according to the ***FDM 211*** buffer width requirements:

- **Less than 8 feet:** Place one tubular marker, as shown in ***Figure 4.5-1***.
- **Between 8 and 12 feet:** Evenly space two tubular markers transversely, as shown in ***Figure 4.5-3***.
- **12 feet and greater:** Evenly space three tubular markers transversely.
- Do not install tubular markers or raised pavement markers on top of the loop or lead-in saw cut or sealant.

Figure 4.5-3. Tubular Marker Placement within the Tolling Area for Buffer Widths between 8 and 12 feet



Section 4.6

Use of Internally Illuminated Raised Pavement Markers

4.6.1 PURPOSE

This section provides guidance for the uniform application of internally-illuminated raised pavement markers (IIRPMs) on the State Highway System.

4.6.2 DEFINITIONS

Raised Pavement Marker (RPM): A roadway safety treatment used to enhance nighttime and wet weather visibility of roadway striping. RPMs are typically made of plastic, ceramic, or thermoplastic paint.

Retroreflective Raised Pavement Marker (RRPM): An RPM that retroreflects automotive headlights.

Internally-Illuminated Raised Pavement Marker (IIRPM): A steady-burn internally-illuminated RPM. IIRPMs are permitted for use by ***MUTCD Chapter 3B*** as an equivalent alternative to RRPMs. The IIRPMs mentioned in this section are also known as Class F RPMs in ***Standard Specifications, Section 706***.

4.6.3 APPLICATION

RRPMs are the Department's standard type of raised pavement marker. The use of IIRPMs should be limited to mitigation strategies for curves with any of the following:

- Substandard horizontal alignment or superelevation.
- Substandard lane widths.
- Substandard shoulder widths.

4.6.4 PROCEDURE

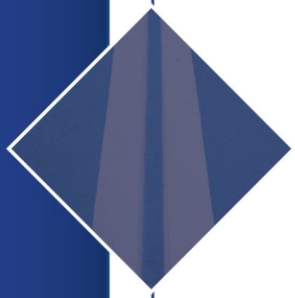
Space IIRPMs that supplement or substitute for longitudinal line markings as described in ***MUTCD Sections 3B.12 through 3B.14***. IIRPM installation on roadways within the State Highway System requires a signed and sealed traffic engineering and safety study. Submit the study to the District Traffic Operations Office for approval. ***DTOEs*** will coordinate with the District Maintenance Engineer regarding the location of these installations.

PROCEDURE

SIGNS

SIGNALS

MARKINGS



SPECIAL OPERATIONAL TOPICS

SECTION 5.1

GOLF CART CROSSING AND OPERATION ON THE STATE HIGHWAY SYSTEM

5.1.1 PURPOSE

The purpose of this section is to establish criteria and guidelines for safe operation of golf carts on authorized portions of the State Highway System.

5.1.2 GENERAL

The Department has developed this section in response to a growing public interest in using golf carts. Golf carts are increasingly used to make short trips for shopping, social and recreational purposes from nearby residential neighborhoods. These passenger-carrying vehicles offer a variety of advantages, including comparatively low-cost and energy-efficient mobility at lower speeds.

Golf cart use and operation on public roads is authorized only under certain circumstances as provided in ***Section 316.212, F.S.*** and in the ***Guide to Safe and Legal Golf Cart Operation in Florida.*** The intent of this section is to provide criteria and guidelines for authorizing golf cart crossings at designated locations along State Highway System and promote uniformity within the State. This section also provides safety recommendations to counties and municipalities wishing to enact ordinances authorizing the use of golf carts on sidewalks adjacent to or on the State Highway System within their corresponding jurisdictions.

5.1.3 DEFINITIONS

Golf Cart: A motor vehicle that is designed and manufactured for operation on a golf course for sporting or recreational purposes and that is not capable of exceeding speeds of 20 miles per hour.

Grade-Separated Crossing: A crossing of two roadways, or a roadway with a railroad or pedestrian pathway, at different levels.

Local Government: The governing body of a unit of local general-purpose government which may include a county agency, municipality, tourist development council, county tourism promotion agency, or special district as defined in ***Section 189.012. F.S.*** and in ***Section 11.45 (e). F.S.***

State Roadway: These are the roads on the State Highway System (i.e., roads owned and maintained by the State of Florida. Includes roads signed as interstate highways, U.S. routes, and state roads).

5.1.4 PROCEDURE

Acquire ***District Traffic Operations Engineer (DTOE)*** approval prior to installation of any golf cart crossing proposed for a location on the State Highway System. The Department prefers grade-separated facilities for golf cart crossings on state roads.

Local governments are to submit requests to the corresponding ***DTOE***. Non-governmental entities seeking authorization for a golf cart crossing may do so through the local government with jurisdictional authority.

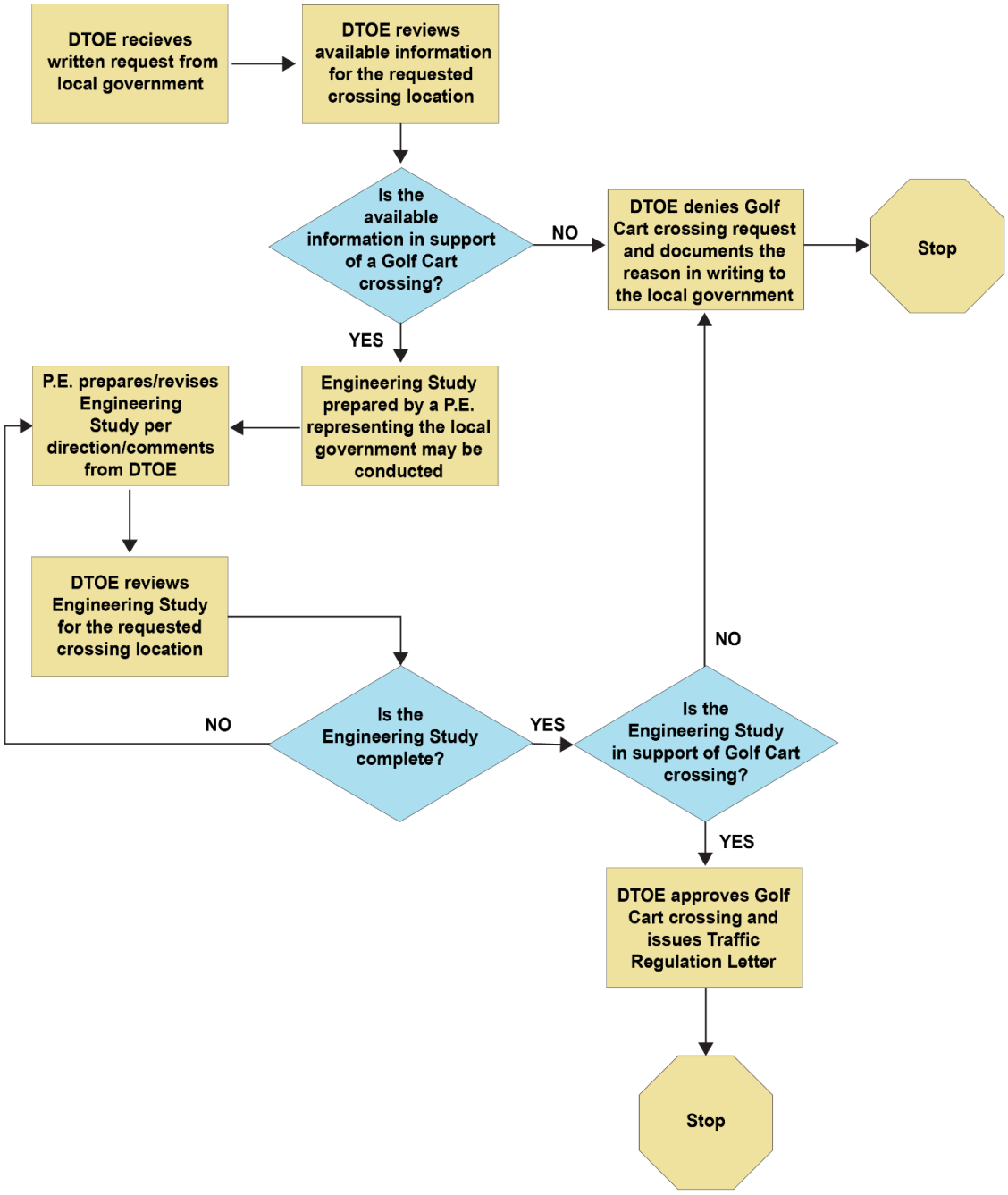
If the ***DTOE's*** review supports the installation of a golf cart crossing based upon the criteria outlined in ***TEM 5.1.5***, a professional engineer licensed in the State of Florida must conduct a full engineering study representing the requester. Meet the criteria referenced in ***TEM 5.1.5***, as documented in an engineering study, as a condition for approval of a golf cart crossing. Include the following information in the engineering study:

- Document the need for a golf cart crossing based on conditions set forth in ***Section 316.212, F.S.***, and verify the following:
    - The intersecting county or municipal road has been designated for use by golf carts.
    - A golf course or single mobile home park is constructed on both sides of a state road.
- Document all safety considerations with respect to intersecting sight distances, proximity to intersection and driveway conflict areas, number and configuration of approach lanes to signalized intersections, and roadway speed and volume thresholds as described in ***TEM 5.1.5*** that can be satisfied at the proposed location.
- Document the proposed golf cart crossing, roadway segment location (Roadway ID and Mile Post), and corresponding signing, marking, and signal treatments as applicable. Provide a schematic layout over aerial photography or survey to show locations of signs, markings, and other treatments in proximity to existing traffic control devices.
- Document all crash history within the vicinity of the proposed golf cart crossing based upon a minimum three years of data.

If the evaluation results in a decision not to authorize the installation of a golf cart crossing, the ***DTOE*** shall document the reasons and advise the local government of the findings. Meeting the minimum criteria outlined in this section does not guarantee approval of a request for a golf cart crossing.

Prior to the approval of a golf cart crossing, coordination is necessary between the appropriate ***District Traffic Operations Office***, District Maintenance Office and local governments to determine any permitting requirements or responsibilities for maintenance.

Figure 5.1-1. Procedure Flowchart

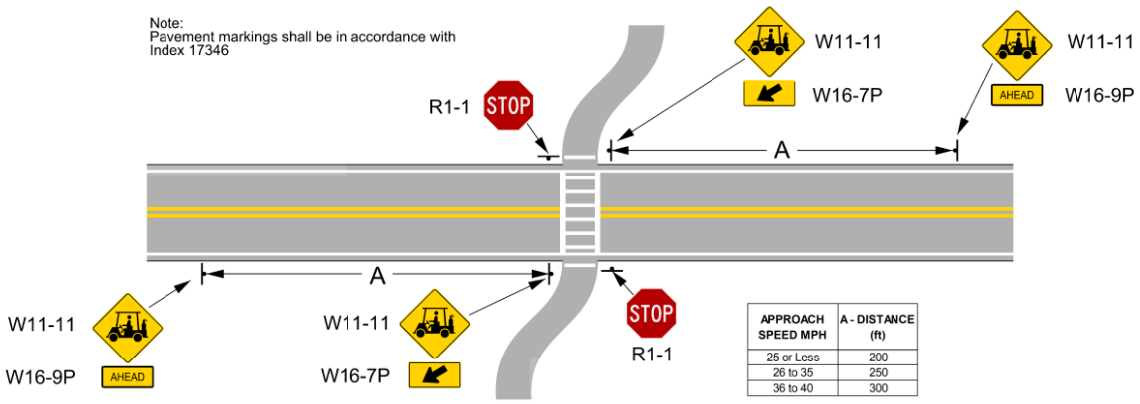


5.1.5 CRITERIA FOR APPROVAL OF CROSSING

Mid-Block Crossing: Golf carts may cross a state road at a mid-block location where there is a golf course or a single mobile home park on both sides of the road if the following criteria are met:

- Maximum vehicular volume of 15,000 Average Daily Traffic (ADT) or less along the roadway segment.
- Maximum Posted Speed Limit of 40 miles per hour or less.
- Maximum number of lanes is three (3) with or without bike lanes.
- Maximum allowable median width is 15 feet.
- Minimum distance to the nearest driveway, access point or pedestrian crosswalk is 350 feet in each direction.
- The crossing must be on a straight road segment, with the nearest point of curvature at least 350 feet away in each direction.
- A clear and unobstructed view of the roadside on the approach to the crossing.
- Signing and pavement markings are installed as shown in ***Figure 5.1-2***.
- Golf carts are the only vehicle permitted to use the designated crossing or to traverse State right-of-way. Other vehicles such as Low Speed Vehicles are strictly prohibited. See ***320.01(42) F.S.***

Figure 5.1-2. Mid-Block Crossing



Side Street Stop Controlled Intersections: To be considered for a golf cart crossing at a roadway intersection with side street stop control, the location along any state road shall meet the following criteria:

- Side street maximum vehicular volume 1,200 ADT and AM/PM Peak Hour not to exceed 110 vehicles per hour single direction.
- Main street posted speed limit is 35 miles per hour or less.

- Maximum crossing distance for undivided roadways is three (3) lanes (excluding any right turn lanes, bike lanes, or crosswalks). For divided roadways of four (4) lanes or less, a minimum of twenty-two (22) feet median width is required (***Figure 5.1-4***).
- Side street approaches should have an exclusive left turn lane and a shared through-right turn lane. Other lane approach configurations will be considered on case-by-case basis.
- Side street intersection alignment shall be a 90 degrees (not more than 105 degrees) angle to the mainline tangent. Skewed or offset intersections are not considered for golf cart crossings.
- Follow ***MUTCD*** and ***Standard Plans, Index 711-001*** for approach stop signs and pavement markings.
- Place Golf Cart signs (W11-11) on the mainline approach as shown in ***Figure 5.1-3*** and ***Figure 5.1-4***.

Figure 5.1-3. Stop-Controlled Crossing

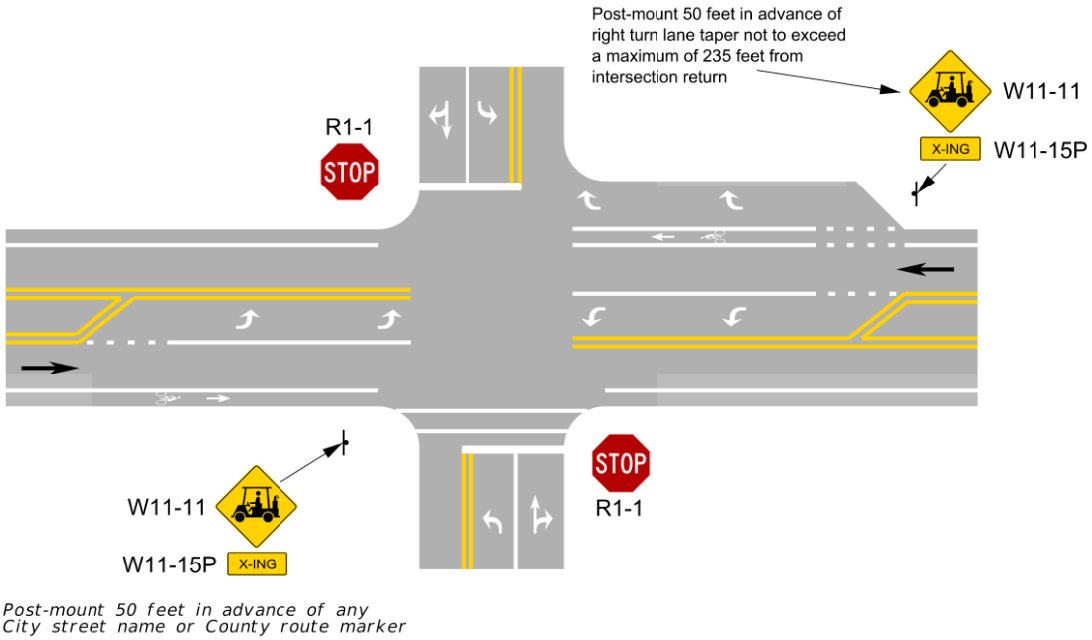
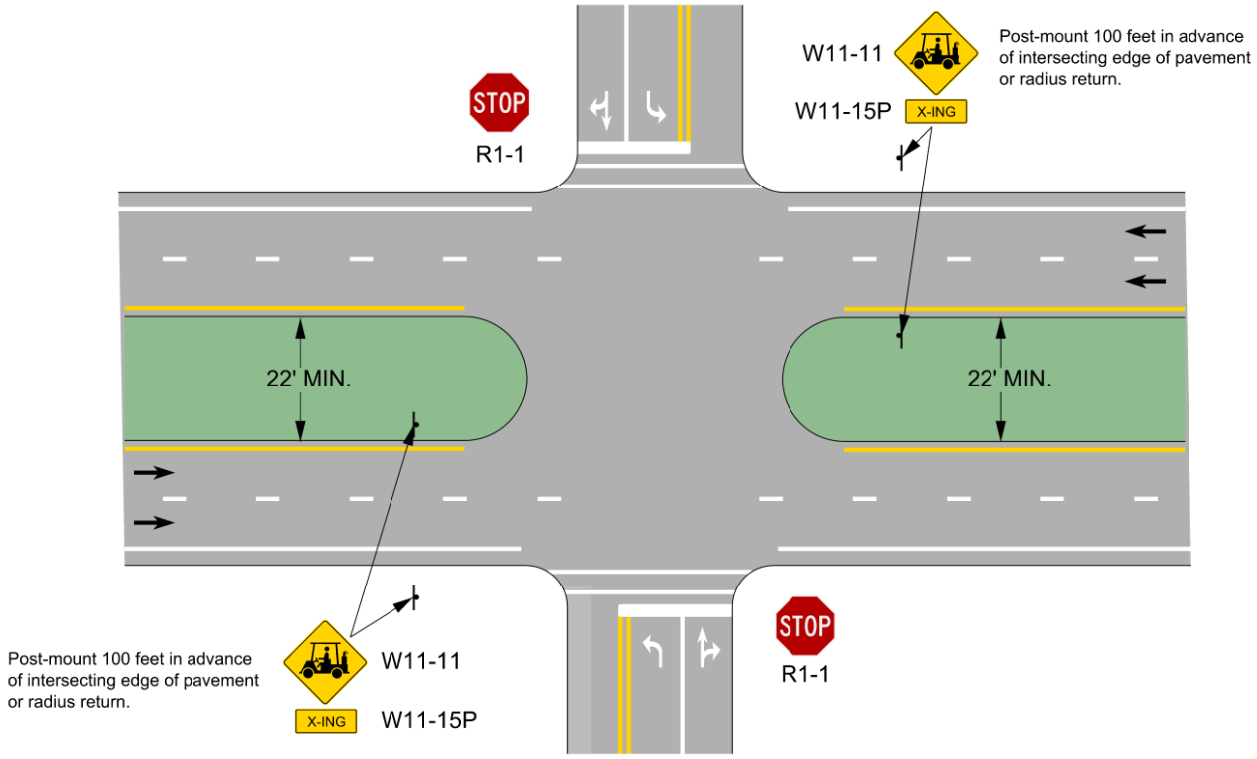


Figure 5.1-4. Four-Lane Stop-Controlled Crossing

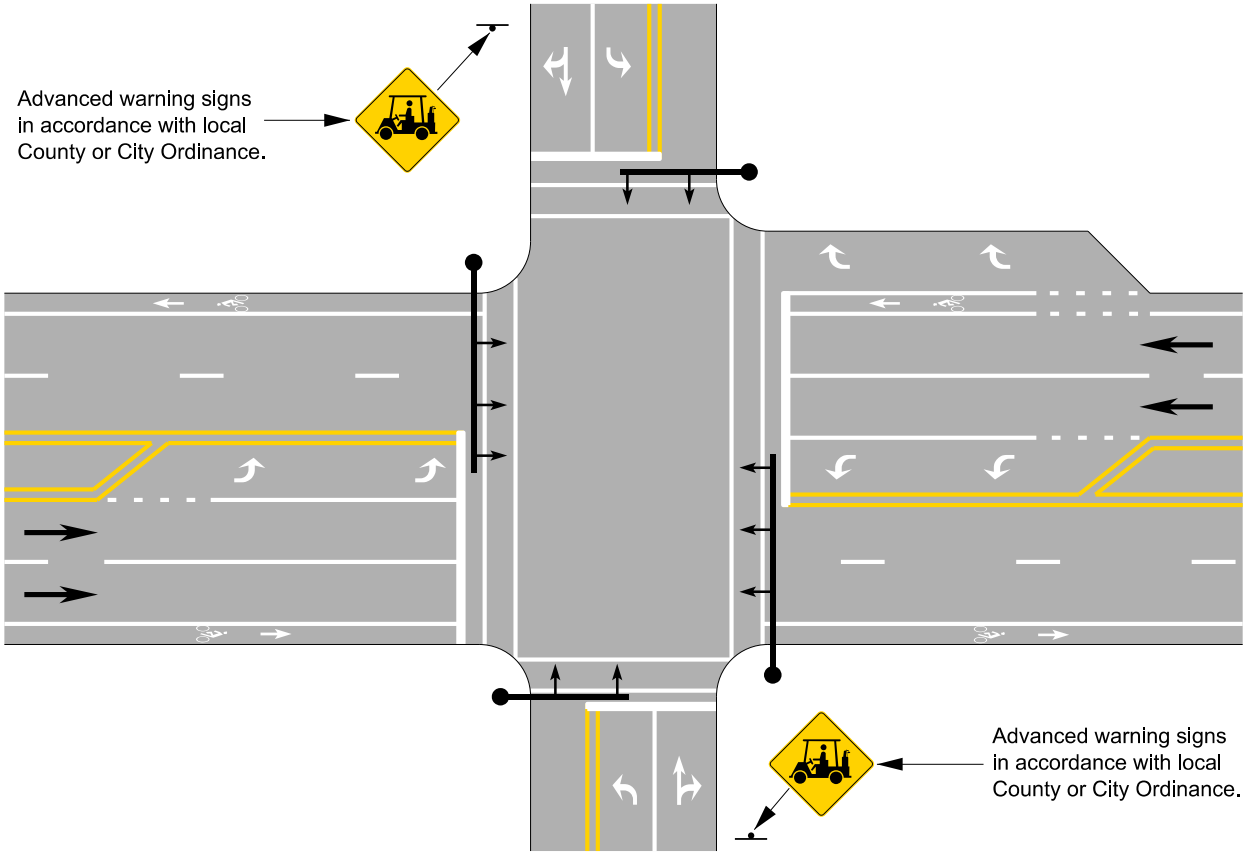


Full Signalized Intersections: To be considered for a golf cart crossing at a roadway intersection with full signal control, the location along any state road shall meet the following criteria:

- Side street maximum vehicular volume 1,500 ADT and AM/PM peak hour not to exceed 200 vehicles per hour in single direction.
- Maximum side street posted speed limit is 35 mph.
- Maximum crossing distance is five (5) lanes (excluding any right-turn lanes, bike lanes, or crosswalks).
- Side street approaches should have at least one (1) exclusive left-turn lane and at least one (1) exclusive through or shared through-right-turn lane. Other lane approach configurations will be considered on a case-by-case basis.
- Side street intersection alignment shall be a 90 degrees (not more than 105 degrees) angle to the mainline tangent. Skewed or offset intersections are not considered for golf cart crossings.
- Golf carts are not allowed to use pedestrian crosswalks or sidewalk ramps to cross the mainline state road.
- Golf cart crossings are not permitted at “T” intersections.

- For existing signalized “T” intersections, a proposed fourth leg approach and receiving lane for the exclusive use of golf cart crossing shall not be permitted.
- Follow ***MUTCD*** and ***Standard Plans, Index 711-001*** for approach stop signs and pavement markings.
- Place the Golf Cart signs **(W11-11)** on the side street approach as shown in the ***Figure 5.1-5***.

Figure 5.1-5. Traffic Signal Controlled Crossing



5.1.6 OPERATION OF GOLF CARTS ON SIDEWALKS

Title 23 of United States Code, Section 217, prohibits the use of motorized vehicles, such as golf carts, on existing and proposed non-motorized trails and pedestrian walkways that use Federal transportation funds. However, exceptions can be authorized through a framework developed by the Federal Highway Administration (FHWA).

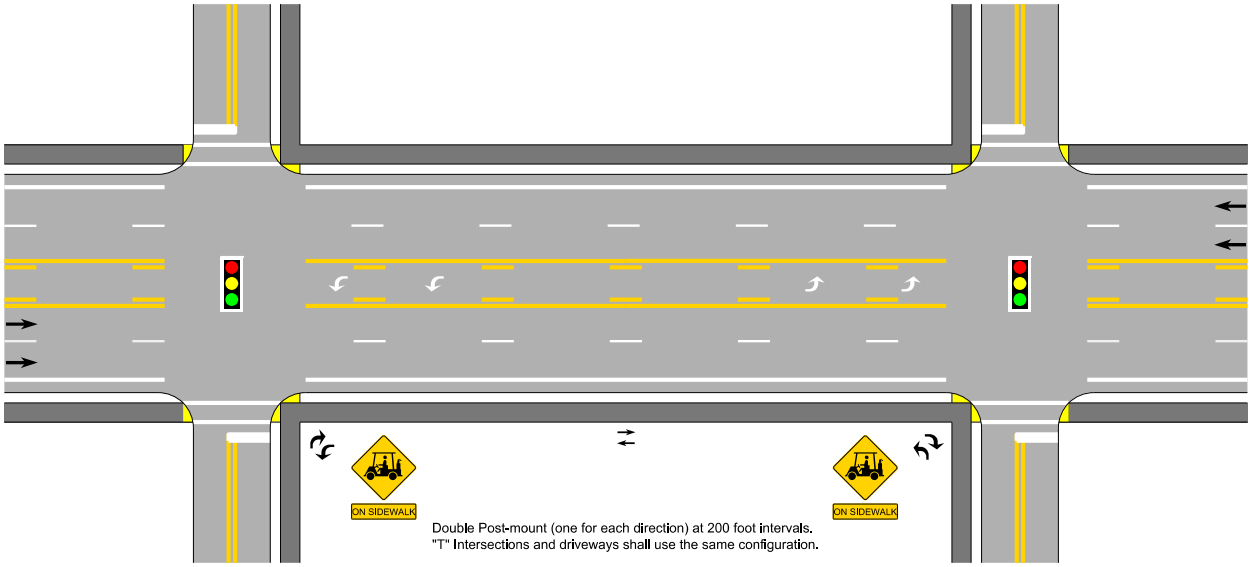
Safety and Operational Recommendations: Consider the following recommendations for the operation of golf carts on sidewalks adjacent to a state road when authorizing such use by local government ordinance:

- Access to state-maintained sidewalks should be from county- or city-maintained

sidewalks adjacent to side streets intersecting with a state road. In-street golf cart operation onto state-operated sidewalks via ADA curb ramps is not permitted.

- Crossing a state road from county- or city-maintained streets or sidewalks to access state-operated adjacent sidewalks is not recommended. If a local government submits a request for a golf cart crossing and seeks consultation for golf cart operation on a state-operated sidewalk at the same location, the golf cart crossing will not be allowed.
- A minimum unobstructed sidewalk width of 8 feet is required, and separation from the back of the curb or edge of the shoulder by at least 5 feet is recommended.
- A minimum width of 4 feet of grassed or stabilized, relatively flat area should be provided beyond the outside edge of sidewalks for recovery or stalled golf carts. Do not consider drainage feature or fencing adjacent to a sidewalk.
- Terminate golf cart operation on state-operated sidewalks at a connecting county or city-maintained sidewalk.
- Install state-approved, “Golf Cart On Sidewalk” signs along state-operated sidewalks as shown in ***Figure 5.1-6***.

Figure 5.1-6. Golf Cart Operation on Sidewalks



Section 5.2

TREATMENTS FOR PEDESTRIAN CROSSWALKS AT MIDBLOCK AND UNSIGNALIZED INTERSECTIONS

5.2.1 PURPOSE

This section establishes criteria and guidelines for the consistent installation and operation of pedestrian treatments at midblock and unsignalized intersections on the State Highway System. These treatments include marked pedestrian crosswalks, signs, traffic control devices, and other measures. Information on pedestrian crosswalks at roundabouts can be found in ***FDOT Design Manual (FDM) 213***.

5.2.2 GENERAL

A crosswalk is a safe and predictable location that facilitates pedestrian access and concentrates crossing activity. Pedestrian treatments at midblock and unsignalized intersections aim to enhance pedestrian connectivity and reduce instances of unpredictable crossings. This can be achieved by reducing confusion and removing measurable risks to pedestrians and other road users.

To determine whether to apply pedestrian crosswalks at midblock and unsignalized intersections, consider documented pedestrian demand. When the distance to the nearest controlled intersection crossing would result in significant out-of-direction travel for pedestrians, it increases the risk for unexpected crossings and crashes. Pedestrian crosswalks applied at these locations may be a suitable treatment.

Supplemental signage can improve safety and compliance in locations with or without traffic control devices where a marked pedestrian crosswalk has been installed. Other crosswalk design treatments, including refuge islands, curb extensions, lighting, and raised crosswalks, could also be considered to support pedestrian visibility and safety. ***Figure 5.2-13*** illustrates the combined use of many of these treatments.

Well-located and thoughtfully designed marked crosswalks and pedestrian treatments can improve pedestrian connections, community walkability, and pedestrian safety. However, they are not suitable for all locations. Careful evaluation is necessary to determine suitability based on expected levels of pedestrian crossing demand, safety characteristics of the crossing location, and design considerations for the crossing control type.

5.2.3 DEFINITIONS

Alternative Pedestrian Crossing Location. Any controlled location with a STOP sign, traffic signal, or a grade-separated pedestrian bridge or tunnel that accommodates pedestrian movement across the subject roadway.

Average Day. A day representing traffic volumes normally and repeatedly found at a specific location. Weekdays having volumes influenced by employment or weekend days having volumes influenced by entertainment or recreation represent two types of an Average Day.

Context Classification. Description of the land use and transportation context where a roadway is found. Roadways are designed to match the characteristics and demands defined by the appropriate Context Classification. See ***FDM 200*** for additional information.

Controlled Approach. All lanes of traffic moving toward an intersection or a midblock location from one direction (including any adjacent parking lane) that are controlled by a sign, signal, marking, or other devices.

In-Roadway Lights. Special types of highway traffic control devices installed in the roadway surface to warn road users that they are approaching a condition on or adjacent to the roadway that might not be readily apparent and might require the road users to slow down and/or come to a stop.

Marked Crosswalk. Any portion of a roadway segment, including an intersection or midblock distinctly indicated as a pedestrian crossing by pavement marking lines on the surface which might be supplemented by contrasting pavement structure, style, or color. Marked crosswalks serve to provide guidance, define and delineate crossing paths, define intersections, and designate a stopping location when motorists are required to stop in the absence of a stop line.

Midblock Crossing. Any location where a marked crosswalk (signalized or unsignalized) is proposed or already exists between intersections.

Midblock Pedestrian Signal (MPS). An MPS is a hybrid between a Midblock Traffic Control Signal and a Pedestrian Hybrid Beacon and it is currently an ***MUTCD Request to Experiment (RTE)***. It is a highway traffic signal in which traffic is alternately directed to stop, then a flashing RED indication during the pedestrian clearing interval is activated to assist pedestrians crossing a street or highway at a marked crosswalk.

Midblock Traffic Control Signal. Any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed at a midblock crosswalk.

Passive Pedestrian Detection. Automated pedestrian detection systems that can detect the presence and direction of pedestrians and activate the traffic control device without any required action by the pedestrian.

Pedestrian Attractor. A residential, commercial, office, recreational, or other land use that is expected to be an end destination for pedestrian trips.

Pedestrian Generator. A residential, commercial, office, transit, recreational or other land use that serves as the starting point for a pedestrian trip.

Pedestrian Hybrid Beacon (PHB). A special type of hybrid beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or

highway at a marked crosswalk. It is also known as high-intensity activated crosswalk (HAWK).

Rectangular Rapid Flashing Beacon (RRFB). A traffic control device consisting of two rapidly and alternately flashing rectangular yellow indications having LED array-based pulsing light sources that function as a warning beacon.

Shared Use Path. A multi-user path outside the traveled way and physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Shared use paths are used by pedestrians (including skaters, users of manual and motorized wheelchairs, and joggers), bicyclists and other authorized motorized and non-motorized users.

Two-Stage Pedestrian Crossing. A marked crosswalk controlled by RRFB, PHB or midblock traffic signal that is designed to allow pedestrians to cross each half of the roadway independently, using a median refuge island for pedestrians to wait before completing the crossing. A two-stage pedestrian crossing may have a lesser impact on vehicle delay (compared to a single crossing) since the signal serves each direction independently while the median serves as a refuge area for pedestrians to wait prior to completing their crossing.

Uncontrolled Approach. All lanes of traffic moving toward an unsignalized intersection or a midblock location from one direction (including any adjacent parking lane) that are not controlled by any sign, signal, marking, or other control devices.

Unsignalized intersection. Any at-grade junction of two or more public roads at which a highway traffic signal does not control the right-of-way for motorists, bicyclists, and pedestrians.

Unmarked Crosswalk. The legal crossing area at an intersection connecting opposite sides of the roadway that does not have painted lines, words, or images.

5.2.4 PROCEDURE

These procedures apply to all marked crosswalks at midblock and unsignalized intersections:

- Contact the appropriate ***District Traffic Operations Office*** to request an evaluation of a marked crosswalk or other treatments.
- Install special markings and signs for all midblock crosswalks and uncontrolled approaches with crosswalks. Meet the criteria in ***TEM 5.2.5*** for additional treatments.
- For existing marked crosswalks at midblock or unsignalized intersections, a study or warrant analysis is required before installing midblock traffic control signals or PHBs. Refer to ***TEM 5.2.5*** for guidance.
- See ***TEM 5.2.6*** for new marked crosswalks.

- When evaluating new marked crosswalks, consider the following safety factors:
  - Stopping sight distance
  - Adequate lighting for the crosswalk
  - A refuge island or raised median for roads with five or more lanes, to facilitate two-stage crossing.
  - A suitable bus stop location to minimize conflicts with transit vehicles.
- For further safety improvements, see ***TEM 5.2.7***.
- Before approving a new marked crosswalk or treatment for an existing one, the ***District Traffic Operations Office*** must coordinate with the local agency responsible for maintenance and compensation.
- Have the ***DTOE*** review and approve any proposed marked crosswalk or treatment at a midblock or unsignalized intersection on the State Highway System before installation.

5.2.5 SELECTION CRITERIA

5.2.5.1 Criteria for Marked Crosswalk

Follow the strategic plan and validate the need for placement of marked crosswalks at midblock and uncontrolled approaches with an engineering study. Listed below are the criteria for placement of marked crosswalks:

- Proximity to significant generators and attractors
  - Any midblock or unsignalized intersection under consideration for a marked crosswalk should have either of the following characteristics:
    - A well-defined spatial pattern of pedestrian generators, attractors, and flow (across a roadway) between them; or
    - A well-defined pattern of existing pedestrian crossings.
  - Identification of pedestrian generators and attractors shall be documented in an engineering study to illustrate potential pedestrian routes in relation to any proposed marked crosswalk locations, as described in ***TEM 5.2.6***.
- Recommended Levels of Pedestrian Demand
  - The pedestrian volume threshold for a new marked crosswalk is 20 or more pedestrians during a single hour (any four consecutive 15-minute periods) of an average day. Average day pedestrian volume data should be collected with the methods outlined in ***TEM 5.2.6.***

- Pedestrian volume demand data is not needed for the following conditions:
  - Pedestrian crosswalks within a school zone
  - Pedestrian crosswalks under the following Context Classifications:
    - C2T Rural Town
    - C3C Suburban Commercial
    - C4 Urban General
    - C5 Urban Center
    - C6 Urban Core

- Crosswalks threshold at midblock or unsignalized intersection connecting a **SHARED USE PATH**
  - To promote the use of shared use paths and reduce the occurrence of multiple roadway crossings, crossing locations connecting to a shared use path may use a 50 percent reduction to the recommended pedestrian threshold in ***TEM 5.2.5.1-(2)b***.
  - Check with Consult local strategic plan when determining the location for installing these types of marked crosswalks.

- Nature-based trail crossings
  - Before a new nature-based trail crossing is approved by the ***DTOE***, the ***DTOE*** should evaluate whether it's appropriate to install the trail crossing on the State Highway System (SHS).
  - See ***TEM 2.33*** for additional information on nature-based trail crossings.

- Minimum Location Characteristics
  - A minimum vehicular volume of 2,000 Average Daily Traffic (ADT) along the roadway segment.
  - Minimum distance to nearest alternative intersection or crossing location
    - The minimum distance to nearest alternative intersection or crossing location is 300 feet per the ***FDM 222***.
    - A proposed crossing location that falls between 100 and 300 feet from an alternative existing crossing may be considered if it is more practical for pedestrian use; this justification must be documented in the engineering study.
  - Adjacent signalized intersection
    - The proposed location must be outside the influence area of adjacent signalized intersections, including the limits of the auxiliary turn lanes.

5.2.5.2 Criteria for Beacons and Signals

Yellow Flashing Beacon

Use Yellow Flashing Beacons to enhance conspicuity for standard signs in accordance with ***Section 2A.15 of the MUTCD***.

Rectangular Rapid Flashing Beacon (RRFB)

Limit the use to the roadways with the following conditions:

- Posted speed limit of 35 mph or slower
- A marked special emphasis crosswalk
- Maximum of four (4) through lanes (both directions) irrespective of median presence, or five (5) lanes with a median refuge island (Note: For locations with five (5) lanes with a Two-Way Left-Turn Lane, a refuge island or raised median needs to be present for RRFB application).

For locations that do not meet the criteria above, submit a variation to the ***State Traffic Engineering and Operations Office*** for review and approval. Include the following information in the variation submittal:

- AADT
- Sight distance
- Speed data
- Crash data
- Supplemental information including location description and observations.

Pedestrian Hybrid Beacon (PHB)

When installing a pedestrian hybrid beacon (PHB), make sure to place it at least 100 feet away from side streets or driveways controlled by stop or yield signs, and avoid installing it at an intersection or driveway. If the location is less than 100 feet from the side streets or driveways controlled by a stop sign, additional treatments should be implemented to reduce the risk of conflicts between pedestrians and vehicles. These treatments may include blank-out signs, static signs, in-roadway lights, R1-6a sign, R10-6 (STOP HERE ON RED) sign, or other treatments to inform drivers of the PHB.

Consider the following conditions for the installation of a PHB:

- Where a midblock traffic control signal is not justified under ***Chapter 4C of the MUTCD*** signal warrants and when gaps in traffic are not adequate to permit pedestrians to cross.
- Where the speed of vehicles approaching the location on the major street is too high to permit pedestrians to cross.

- Where pedestrian delay is excessive, follow the engineering study requirement mentioned in ***Section 4F.01 of the MUTCD***.

See ***Chapter 4F of the MUTCD*** for PHB volume guidance. This guidance is summarized in ***Figure 5.2-1*** and ***Figure 5.2-2***. In an urban corridor under context classification C4, C5, and C6 with a site location that warrants a PHB in accordance with the above criteria, the PHB may be substituted with a midblock traffic control signal using ***Warrant 8 of the MUTCD, Roadway Network***.

Follow ***Section 4F.02 of the MUTCD*** for a sequence for a PHB and adjust according to this manual. The guidance is shown in ***Figure 4F-3***.

- Keep the signal dark outside of the activation window.
- Follow ***TEM 3.6.2.1*** for the duration of the flashing yellow.
- The steady yellow change interval is determined using engineering practices with a minimum duration of 3 seconds and a maximum duration of 6 seconds (see ***Section 4D.26 of the MUTCD***). The longer intervals are reserved for use on approaches with higher speeds or multiple travel lanes.
- Make the duration of steady red equal to the pedestrian walk interval. The guidance is shown in ***Section 4F.03 of the MUTCD***.
- Make the duration of the alternating flashing red equal to the pedestrian clearance interval. The guidance is shown in ***Section 4F.03 of the MUTCD***.
- When implementing a PHB, follow ***Section 4F.02 of the MUTCD*** for a sequence and adjust according to the manual. Keep the signal dark outside of the activation window and follow TEM 3.6.2.1 for the duration of the flashing yellow. Determine the steady yellow change interval using engineering practices, with a minimum duration of 3 seconds and a maximum duration of 6 seconds (see ***Section 4D.26 of the MUTCD***). Longer intervals are reserved for approaches with higher speeds or multiple travel lanes. Make the duration of steady red equal to the pedestrian walk interval and the duration of the alternating flashing red equal to the pedestrian clearance interval. Guidance for these intervals is provided in ***Section 4F.03 of the MUTCD***.

Midblock Traffic Control Signal

To ensure safe pedestrian crossing, traffic control signals at midblock crosswalks must be positioned at a minimum distance of 300 feet from side streets or driveways with stop or yield signs. For midblock crosswalks located over 300 feet away from the nearest signalized intersection, the signal's distance to adjacent signals and the availability of adequate gaps for pedestrian crossing must also be considered to determine whether a signal is required.

Traffic Control Signals at midblock crosswalks shall meet ***Warrant 4 of the MUTCD, Pedestrian Volume***. ***Figure 5.2-1*** and ***Figure 5.2-2*** summarize this warrant. The minimum pedestrian volume threshold under Warrant 4 may be reduced for the following conditions:

- When the 15th percentile crossing speed is less than 3.5 feet per second, the pedestrian volume that crosses the major street can be reduced as much as 50 percent.
- When the 85th percentile speed on the major street exceeds 35 mph or when the area of the midblock crossing is within the built-up area of an isolated community having a population of less than 10,000, the pedestrian volume that crosses the major street can be reduced by 30 percent.

Combining both pedestrian volume reductions of 30 and 50 percent is allowed when it meets the criteria listed above.

Information on requirements for traffic control signal at intersections can be found in ***TEM 3.3***.

To meet the criteria for safe pedestrian crossing, traffic control signals at midblock crosswalks must comply with ***Warrant 4 of the MUTCD, Pedestrian Volume***. which assesses pedestrian volume. ***Figure 5.2-1 and Figure 5.2-2*** summarize this warrant. The minimum pedestrian volume threshold under Warrant 4 may be lowered for certain conditions. For instance, when the 15th percentile crossing speed is below 3.5 feet per second, the pedestrian volume crossing the major street can be reduced by up to 50 percent. When the 85th percentile speed on the major street is over 35 mph or when the midblock crossing is in the built-up area of an isolated community with fewer than 10,000 inhabitants, the pedestrian volume crossing the major street can be reduced by up to 30 percent. Both reductions in pedestrian volume can be combined if they meet the above criteria.

For details on requirements for traffic control signals at intersections, refer to ***TEM 3.3***.

Figure 5.2-1. Guidelines for the Installation of Pedestrian Treatments on Low-Speed Roadways

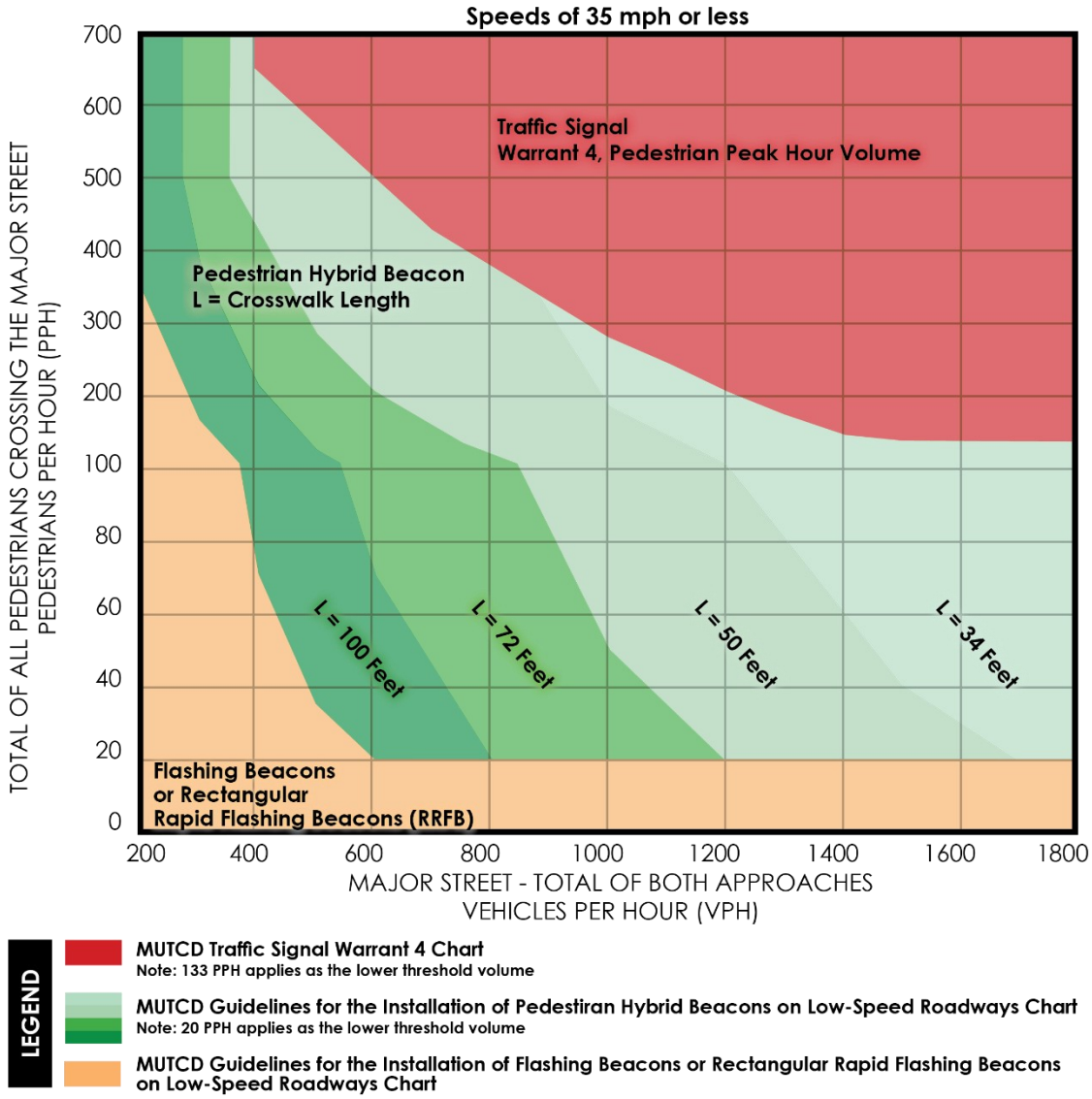
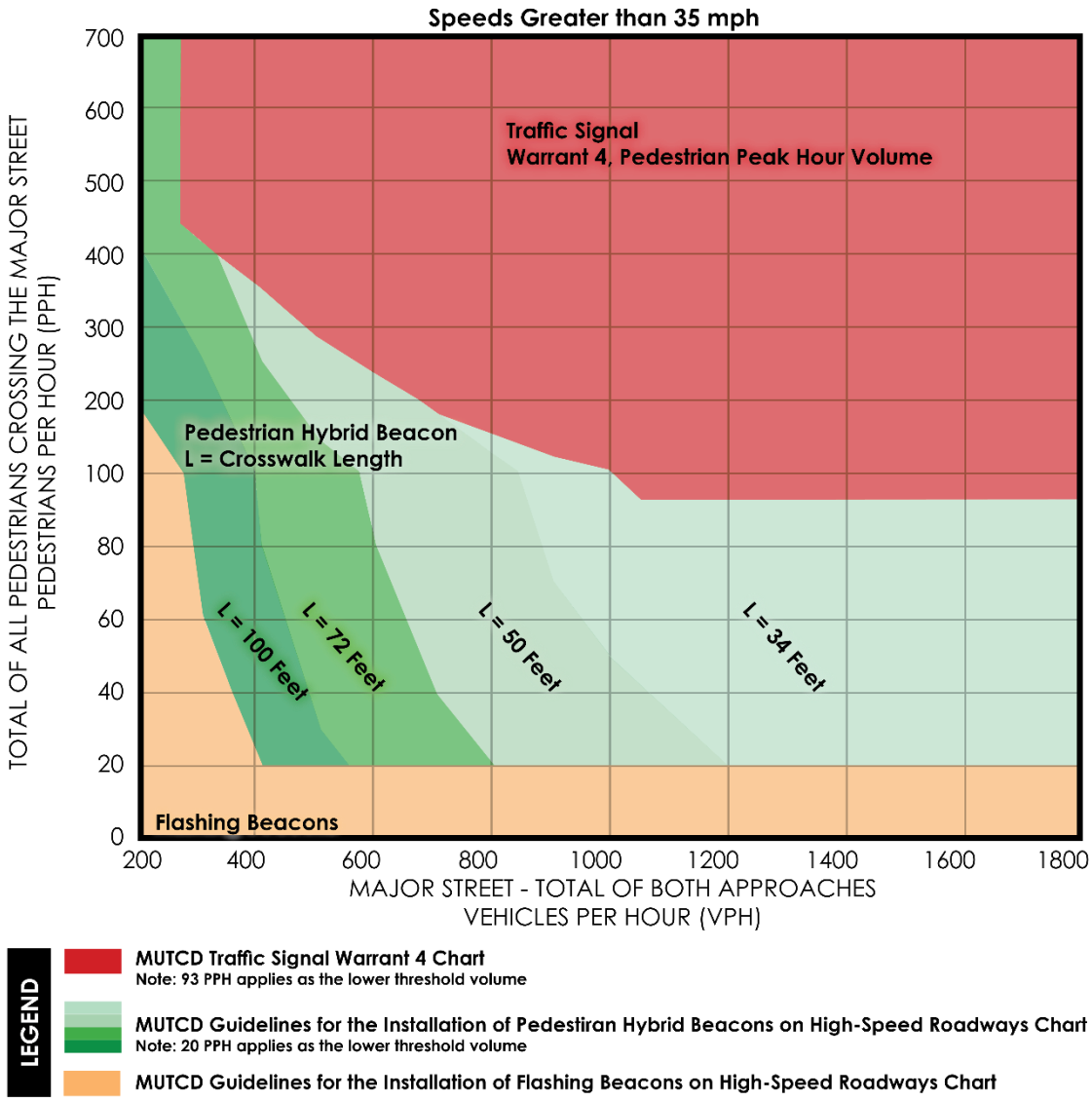


Figure 5.2-2. Guidelines for the Installation of Pedestrian Treatments on High-Speed Roadways



5.2.6 ENGINEERING STUDY

Conduct an engineering study before the installation of a marked pedestrian crosswalk or treatments at a midblock crosswalk location or unsignalized intersection.

The study should select treatments based on factors such as pedestrian and vehicular volumes, roadway characteristics, and environmental factors documented in the study.

The engineering study should include the following information:

- Field data to demonstrate the need for a marked crosswalk based upon minimum

pedestrian volumes (except as described in ***TEM 5.2.5.1*** and availability of any alternative crossing locations that satisfy the criteria described in ***TEM 5.2.5***).

- Data collection should be based upon pedestrian volumes observed crossing the roadway outside a crosswalk at or in the vicinity of the proposed location or at an adjacent (nearby) intersection. If applicable, a cyclist can be counted as a pedestrian.
- The ***Department's Manual on Uniform Traffic Studies (MUTS)*** provides additional information on obtaining pedestrian group size and vehicle gap size field data for use in making assessments of opportunities for safe crossings at midblock and unsignalized intersections.

- Field data to estimate individual pedestrian walking speeds, pedestrian speed cumulative curve, and the 15th percentile pedestrian crossing speed. The ***Chapter 9 of the Department's Manual on Uniform Traffic Studies (MUTS)*** provides additional information on the procedure and method for calculating the parameters of pedestrian walking speed.
- Potential links between pedestrian generators and attractors. Generators and attractors should be identified from an aerial photograph to illustrate potential pedestrian routes in relation to any proposed marked crosswalk location. This information is required for establishing the proposed crossing location or to confirm existing pedestrian crossing patterns.
- All safety considerations as described in ***TEM 5.2.4*** with respect to stopping sight distances, illumination levels, and proximity to intersection conflict areas.
- Proposed crossing location and corresponding signing, marking, and signal treatments as follows:
  - A schematic layout should be provided over aerial photography or survey to show locations of signs, markings, and other treatments in proximity to existing traffic control devices.
  - Treatments are dependent upon the site context, vehicle operating speeds, roadway cross-section, pedestrian volumes, and other variables. Treatments may include consideration of traffic signals or other warning devices to enhance driver yielding behavior. Other treatments such as median refuge areas, curb extensions, raised crosswalks, and supplemental signing and markings may also be applicable at some locations to support reduced crossing distance and enhanced pedestrian visibility. See ***TEM 5.2.7*** for discussion of treatment options and guidance on treatment selection.
- Documentation of the latest three years of pedestrian-vehicle crash history within the vicinity of the proposed crosswalk, including the number and nature of conflicts based on field observations.
- Transit route data and the location of transit stops within the vicinity of the proposed crosswalk.

Consider an alternative control strategy, found in the ***Department's Manual on Intersection Control Evaluation***, to resolve a need for an intersection or midblock crosswalk. Alternative analysis can be conducted at adjacent intersections and midblock locations through the procedure described in the ***Department's Manual on Intersection Control Evaluation***.

5.2.7 TREATMENT OPTIONS

5.2.7.1 Pavement Markings

Requirements for Marked Pedestrian Crosswalk

Special Emphasis Crosswalk - Marked crosswalks at unsignalized intersections (uncontrolled approach) and midblock crossings require a special emphasis crosswalk. Follow the procedures identified in ***TEM 5.2.4*** prior to installation.

Standard Crosswalk - At an unsignalized intersection-controlled approach, the crosswalk marking must comply with ***FDM 230*** design criteria. An engineering study is not required for the installation of standard crosswalks.

PEDESTRIAN CROSSING WARNING Sign *(W11-2)* Pavement Markings

The ***W11-2*** pavement markings may be used to supplement existing signage at marked pedestrian crossings when high vehicular volumes and speeds are documented in an engineering study. Receive ***DTOE*** approval of ***W11-2*** pavement markings the prior to installation. The use of ***W11-2*** pavement markings as a safety countermeasure is recommended and should be installed if any of the following conditions apply:

When there is a high volume of fast-moving vehicles at a marked pedestrian crossing, the **W11-2** pavement markings can be used alongside existing signs. To install these markings, approval must first be obtained from the ***District Transportation Operations Engineer.*** Using ***W11-2*** pavement markings is recommended as a safety measure in the following circumstances:

- Multi-lane roadway (45 mph or greater)
- Rural two-lane roadway (50 mph or greater)
- Crosswalks have restricted sight distance due to obstructions such as trees or parked vehicles.
- There is a documented history of non-compliant driver yielding to pedestrian behavior.

When installing at midblock or unsignalized intersections, apply the ***W11-2*** pavement markings as follows (see ***Figure 5.2-3*** and **Figure 5.2-4** for additional information):

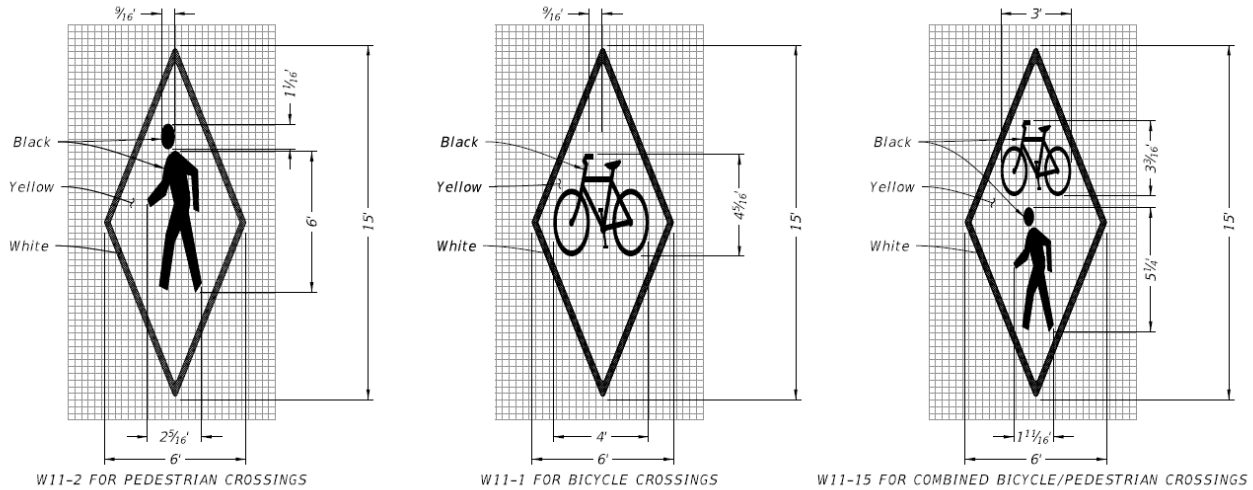
- Centered in the travel lane(s) on the approach to the crosswalk and in alignment with adjacent lanes when used on multi-lane approaches.

- The ***W11-2*** pavement marking shall not be intermixed with other pavement markings.
- Place the markings in the travel lane(s) approaching the crosswalk, centered and aligned with adjacent lanes for multi-lane approaches (refer to ***Figure 5.2-3 and Figure 5.2-4*** for further guidance)
- Do not mix ***W11-2*** markings with other pavement markings.

For guidance on the placement of ***W11-2*** pavement markings similar to the warning signs and their alignment with the posted speed limit, follow ***Chapter 2C of the MUTCD***. Additionally, coordinate this installation with the District Maintenance Office.

Figure 5.2-3. PEDESTRIAN CROSSING WARNING Sign (W11-2) Pavement Marking

Figure 5.2-4. PEDESTRIAN and BICYCLE CROSSING WARNING Signs Pavement Marking Details



Pavement Word Markings

See ***TEM 4.2*** for information on the use of Pavement Word Markings.

5.2.7.2 Signs

General

The signs covered in this subsection may be installed at midblock crosswalks and unsignalized intersections to improve non-compliant driver yielding and stopping behavior to pedestrians. See ***FDM 230*** for sign placement details.

To enhance sign conspicuity, highlighted signs and flashing beacons may be installed in accordance with ***Section 2A.15 of the MUTCD***.

STOP HERE FOR PEDESTRIANS Sign (*R1-5b* and *R1-5c*)

For additional emphasis, a stop line may be installed with the STOP HERE FOR PEDESTRIANS (***R1-5b*** and ***R1-5c***) sign in accordance with ***Section 2B.11 of the MUTCD***. If used, place the stop lines 40 feet in advance of the marked crosswalk.

To make sure drivers stop for pedestrians, a stop line can be added with the STOP HERE FOR PEDESTRIANS sign in accordance with ***Section 2B.11 of the MUTCD***. If this is done, the stop line should be 40 feet before the marked crosswalk.

When the STOP HERE FOR PEDESTRIANS sign is installed, parking is prohibited in the area between the stop line and the marked crosswalk. Use a solid lane line between the stop line and crosswalk.

Use the ***R1-5b*** and ***R1-5c*** signs with the advanced warning ***W11-2*** and ***W16-7P*** signs.

Do NOT use the ***R1-5b*** and ***R1-5c*** signs in combination with the traffic signal or PHB.

The ***R1-5b*** and ***R1-5c*** sign may be used at locations where there is non-compliant stopping for pedestrians at an existing mid-block crosswalk, as follows:

- One sign in each direction
- Within 100 feet in advance of the crosswalk
- Does not interfere with required signs

Figure 5.2-5. Pedestrian Crossing Signs (*R1-5b* and *W11-2* with an RRFB)

TURNING VEHICLES STOP FOR PEDESTRIANS Sign (*R10-15a*)

See ***TEM 2.44*** for guidance on the use of the TURNING VEHICLES STOP FOR PEDESTRIANS sign (***R10-15a***) at locations other than midblock crosswalks.

PEDESTRIAN CROSSING Signs

Use a PEDESTRIAN CROSSING ***(W11-2)*** warning sign with supplemental AHEAD plaque ***(W16-9P)*** in combination with the ***R1-5b*** or ***R1-5c*** sign.

A school sign (***S1-1***) with supplemental diagonal downward pointing arrow (***W16-7P***) may be used to advise road users that they are approaching a crosswalk in close proximity to a school.

The combined bicycle/pedestrian sign (***W11-15***) may be used where both bicyclists and pedestrians might be crossing the roadway. A TRAIL X-ING (***W11-15P***) supplemental plaque may be mounted below the ***W11-15*** sign.

In-Street Sign (R1-6a)

In-street signs ***(R1-6a)*** are useful on low-speed roadways to remind road users of laws regarding right-of-way at a midblock or unsignalized pedestrian crosswalk. Implement in-street signs ***(R1-6a)*** in roadways with four (4) or fewer through lanes (both directions) and with a posted speed limit of 35 mph or less.

Coordinate with the District Maintenance Office prior to ***DTOE*** approval for the use of the in-street sign (***R1-6a***).

If used, place the in-street signs ***(R1-6a)*** at one of the following locations:

- In the roadway at the marked crosswalk location on the center line,
- In the case of a one-way roadway application, on a lane line, or
- On a median island as allowed by ***Section 2B.12 of the MUTCD***.

See ***Standard Plans, Index 700-102-1*** for design details on the fabrication of in-street signs ***(R1-6a)***. Do NOT post mount the in-street sign ***(R1-6a)*** on either side of the roadway.

The use of in-street signs **(*R1-6a*)** on lane lines may be substituted with tubular markers to reduce the maintenance and replacement cost due to periodic impacts from vehicular traffic. When the tubular markers are used to supplement an ***R1-6*** series sign that is either on the center line, lane line, or median island, they should not be used on the same pavement marking line where the ***R1-6*** Series sign is installed. If used, match the tubular marker color to the pavement marking that they supplement, in accordance with ***Section 3H.01 of the MUTCD***.

For further guidance on tubular marker substitution, see ***TEM 5.2.7.2.***

To reduce maintenance and replacement costs from vehicular traffic, use tubular markers instead of in-street signs on lane lines. If used, match the color of the tubular markers to the pavement marking they supplement, following ***Section 3H.01 of the MUTCD***. Do not install tubular markers on the same pavement marking line as the R1-6 series sign. For more guidance on using tubular markers, see ***TEM 5.2.7.2.***

Figure 5.2-6. Pedestrian Crossing Signs (*R1-6a* and *W11-2*)

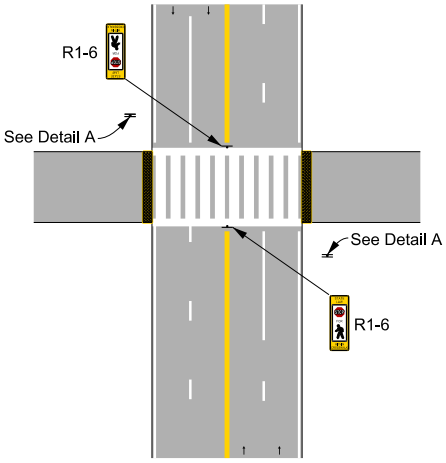
Tubular Marker Gateway Treatment

To provide additional emphasis for the pedestrian crossing and to provide a channelizing and potentially calming effect on vehicle traffic, the in-street signs (***R1-6a***) may be used with one or more supplemental tubular markers on the lane lines or edge lines at a mid-block pedestrian crossing.

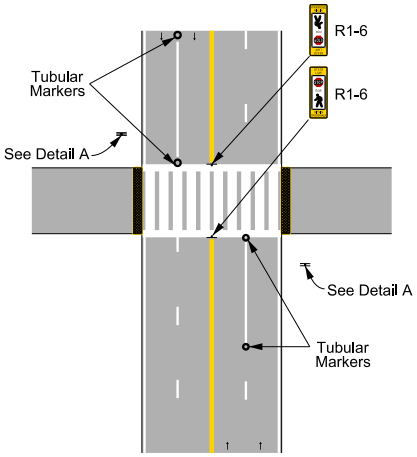
The use of supplemental tubular marker for gateway treatment is compliant with the ***MUTCD***. See FHWA Official Ruling ***3(09)-61 (I) – Channelizing Devices at Mid-Block Pedestrian Crossings in Conjunction with In-Street Pedestrian Crossing (R1-6 Series) Signs*** issued on August 3, 2020, with guidance and illustrations.

To make sure drivers pay attention to pedestrians crossing the road and to help control traffic, use in-street signs (***R1-6a***) with one or more tubular markers on lane or edge lines at a mid-block pedestrian crossing. This use of tubular markers is allowed by the MUTCD and complies with FHWA Official Ruling ***3(09)-61 (I) – Channelizing Devices at Mid-Block Pedestrian Crossings in Conjunction with In-Street Pedestrian Crossing (R1-6 Series) Signs.*** The ruling includes helpful guidance and illustrations and was issued on August 3, 2020.

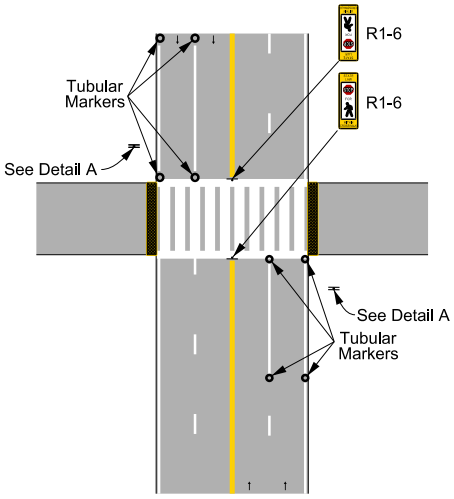
Figure 5.2-7. Gateway Treatment with R1-6a and Tubular Marker



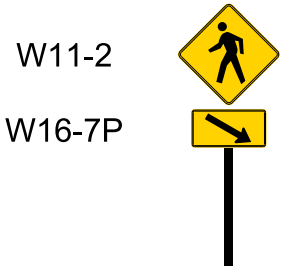
I. Single Sign Treatment



II. Partial Gateway Treatment



III. Full Gateway Treatment



IV. Detail A in Gateway Treatment

Portable Changeable Message Sign (PCMS)

To inform the traveling public of a new traffic control pattern, a PCMS is required for all new RRFB, PHB, flashing yellow beacon, and midblock traffic control signals in accordance with the following criteria.

- Display the following safety message the PCMS:
  - NEW SIGNAL XX/XX
  - PREPARE TO STOP
- Coordinate with Local Law Enforcement, Local Agency, District Public Information Office, District's Law Enforcement Liaison, and District CTST Coordinator two weeks before the new traffic control device is installed.
- Install the PCMS two weeks prior and remain in place for a minimum of one week after the installation of traffic control devices mentioned above.

5.2.7.3 Beacons (Signal Warrant Analysis Not Required)

General

If a location doesn't meet the requirements for traffic control signals or PHBs, you can use other devices that pedestrians activate to warn drivers and draw attention to the marked crosswalk and pedestrians. ***TEM 5.2.4*** provides guidance on these devices that are exempt from requirements. Depending on the site's specific features, other treatments not listed here may also be appropriate. Engineering judgment should guide decisions about which additional treatment options to include, if any.

Rectangular Rapid Flashing Beacons (RRFB)

The FHWA issued ***Interim Approval 21, Rectangular Rapid Flashing Beacons at Crosswalks (IA-21)*** on March 20, 2018, which specifies the intended use and design requirements for RRFB devices.

FDOT has received FHWA approval to install RRFBs on the State Highway System. Local agencies must receive FHWA approval prior to installing RRFBs on their local roads.

The rectangular beacons are provided in pairs below the PEDESTRIAN CROSSING warning sign ***(W11-2)*** (and above the diagonal downward arrow ***(W16-7P)*** plaque for post-mounted RRFB) and operate in a flash pattern upon activation by the pedestrian. For school zone or trail crossings, school sign ***(S1-1)*** or combined bicycle/pedestrian sign ***(W11-15)*** may be placed alternatively above the rectangular beacons instead of the pedestrian crossing sign (***W11-2***). Detailed conditions of use, including sign/beacon assembly, dimensions, placement, and flashing rates are provided in ***IA-21***. Refer to the following FDOT policy for more guidance on RRFB implementation:

- ***Standard Plans, Index 654-001***
- ***FDM 941***
- ***Standard Specifications, Section 654***

Standard Plans, Index 654-001 requires that RRFBs to include an instruction sign (***FTP-68C-21***), mounted adjacent to or integral with the pedestrian push button device, with a 3-line legend that reads: PUSH BUTTON FOR WARNING LIGHTS / WAIT FOR TRAFFIC TO STOP / CROSS WITH CAUTION.

As of January 1, 2021, include, on all RRFB installations, an audible warning message that states “WAIT FOR TRAFFIC TO STOP THEN CROSS WITH CAUTION” when activated. An example of the RRFB treatment is shown in ***Figure 5.2-8***.

Figure 5.2-8. Rectangular Rapid Flashing Beacons

Flashing Yellow Beacons

For locations where traffic signals are not warranted, additional emphasis on the crossing location can be provided when using flashing yellow beacons to supplement the appropriately marked crossing warning or regulatory signs. These devices are still allowable in the ***MUTCD***, although newer devices such as RRFBs have increased in popularity. See ***Chapter 4L of the MUTCD***. for a complete list of requirements.

See ***Standard Plans, Index 700-120*** for design and installation details.

Configuration of beacons is either overhead or side-mounted; however, the preferred configuration is a side post-mounting to avoid drivers confusing the beacons for a flashing traffic signal.

- When post-mounted, the recommendation is to have a configuration of two vertically aligned beacons. Operate these beacons in an alternating flash pattern.
- When overhead mounted, flashing yellow beacons should feature an internally-illuminated Overhead Pedestrian Crossing sign ***(R1-9a)*** in conjunction with the beacons, which is continuously lit at night.

In-Roadway Warning Lights (IRWL)

Chapter 4N of the MUTCD provides detailed guidance on the installation of in-roadway lights. Coordinate with the District Maintenance Office prior to seeking ***DTOE*** approval on the use of the in-roadway lights.

In-roadway warning lights are installed in the roadway surface to warn road users that they are approaching a condition on or adjacent to the roadway that might not be readily apparent and might require the road users to slow down or come to a stop. This includes marked midblock crosswalks and marked crosswalks on uncontrolled approaches. In addition, when deploying IRWLs in conjunction with midblock pedestrian signals or pedestrian hybrid beacons, it is essential to obtain Request to Experiment (RTE) approval.

In-roadway warning lights may be installed at certain marked crosswalks, based on an engineering study or engineering judgment, to provide additional warning to road users. Operate in-roadway lights in a flashing pattern.

The installation of in-roadway warning lights in conjunction with overhead or LED roadside highlighted signs or flashing yellow beacons is allowed as long as the flashing rates are identical and flash in unison. Exercising engineering judgment is of great importance.

In locations where overhead lighting has been omitted by the EOR, consider in-roadway lights. Use following criteria for in-roadway lights:

- Install only at marked crosswalks with applicable warning signs.
- Install along both sides of the crosswalk and span its entire length.
- Do NOT use IRWLs at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.

If a pedestrian push button actuates the in-roadway lights, mount a PUSH BUTTON TO TURN ON WARNING LIGHTS (with push-button symbol) (***R10-25*** or ***FTP-68C-21***) sign adjacent to or integral with each pedestrian push button.

5.2.7.4 Beacons and Signals (Warrant Analysis Required)

Pedestrian Hybrid Beacon (PHB)

A possible alternative to the traffic signal is a PHB. Use PHBs in conjunction with signs and pavement markings to warn and control traffic at locations where pedestrians enter or cross a street or highway. See ***Figure 5.2-9*** for an example of the PHB treatment.

Only install PHBs at midblock crosswalks. See ***Chapter 4F of the MUTCD*** for guidance and criteria on PHB installations.

For six-lane roadways or crossing distances exceeding 80 feet, consider a two-stage pedestrian crossing with a median refuge island where a warranted PHB will control the proposed marked crossing.

Include the CROSSWALK, STOP ON RED, PROCEED ON FLASHING RED WHEN CLEAR ***(R10-23a)*** sign in PHB treatments. The ***R10-23a*** replaces the existing ***MUTCD R10-23*** sign per the ***FHWA Interpretation Letter 4(09)-61(I)***.

Figure 5.2-9. Pedestrian Hybrid Beacons

Midblock Traffic Control Signal

Where pedestrian volumes meet the ***Signal Warrant 4 of the MUTCD***, a midblock traffic control signal may be installed to serve this demand in accordance with ***Section 4C.05 of the MUTCD***. Ensure that the new pedestrian signal is compatible with the signal system along the arterial corridor.

Where signalized control is selected for the pedestrian crossing, additional coordination is recommended with the District Access Management Review Committee and the ***DTOE***.

For six-lane divided roadways or crossing distances exceeding 80 feet, also consider a two-stage pedestrian crossing with a median refuge island where a warranted traffic control signal will control the proposed marked midblock crossing.

At locations where pedestrian compliance is of concern, feedback devices may be installed with the traffic control signal button to provide pedestrians with confirmation of the call.

For locations where signal warrants are met, consideration may be given to providing a pedestrian bridge or tunnel to address safety and compliance issues that cannot be addressed by a traffic signal.

In some cases, a traffic control signal may not be needed at the study midblock location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the roadway.

See the ***Department's Manual on Uniform Traffic Studies (MUTS)*** for guidance on conducting Pedestrian Group Size and Vehicle Gap Size studies.

See ***TEM 3.7*** for information on the use of accessible pedestrian signals**.**

See ***Standard Plans, Index 653-001*** for details on installing midblock traffic control signals. An example of the midblock traffic control signal treatment is shown in ***Figure 5.2-10*****.**

Figure 5.2-10. Midblock Traffic Control Signal

5.2.7.5 Other Treatments

Consider incorporating pedestrian refuge islands, raised median, curb extensions, raised crosswalks (See ***Figure 5.2-11***) or the following treatments to improve visibility, support pedestrian travel, and increase awareness for pedestrians at crossings. For other **speed reduction treatments** see ***FDM 202***.

See ***FDM 222*** for design criteria of pedestrian treatments.

Figure 5.2-11. Raised Pedestrian Crosswalk

Crosswalk Illumination

There are locations such as environmentally sensitive areas or crosswalks serving facilities that are open only during daylight hours, where lighting may be omitted. ***DTOE's*** approval is required for this omission. Consider in-roadway lighting at locations that omit illuminating the crosswalk.

Provide crosswalk illumination in accordance with ***FDM 222 and 231*****.**

Passive Pedestrian Detection

In addition to traditional active pedestrian detection (push button), passive pedestrian detection may be used to supplement and improve pedestrian detection for signals, RRFBs, PHBs, and warning beacons.

Consider passive pedestrian detection in locations with documented observations of low usage of the active pedestrian detection (push button). This could be acquired by field review, demographics, or per request. Children/teenagers, school zone, aging roadway users, and other demographics should be considered when implementing passive pedestrian detection.

When passive pedestrian detection is installed, adequate passing space around the waiting detection area on the sidewalk should be present. Provide overhead lighting to increase

pedestrian visibility and detector accuracy. Adjust detection zones after installation to cover the exact specified pedestrian waiting area.

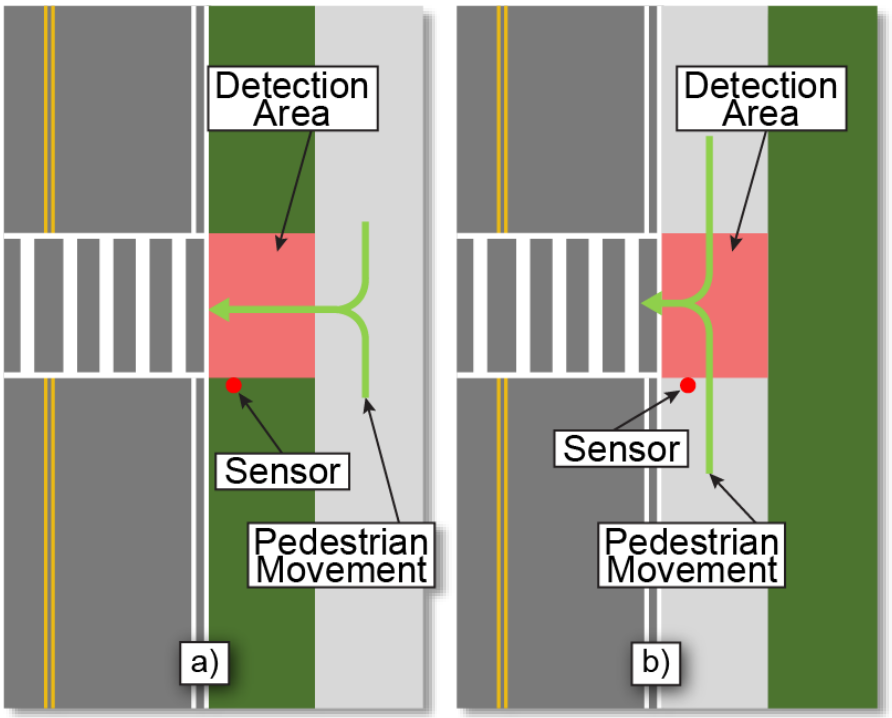
When using passive pedestrian detection, ensure adequate installation height, detection distance, and position and angle of the detector to recognize pedestrian features and detect the presence of pedestrians. If there are no existing poles or infrastructure at the implementation site, consider a supplemental pole or an extended arm from an existing pole.

When deploying a passive pedestrian detection system, two options will be encountered for the sidewalk locations as illustrated in ***Figure 5.2-12***.

For the option in ***Figure 5.2-12 a)***, a grassy shoulder/buffer is constructed between the sidewalk and the road. The area leading towards the crosswalk can be used as the detection zone for the system, providing a well-established and clear area for detection. This option is preferable for deploying passive pedestrian detection.

For the option in ***Figure 5.2-12 b)***, a sidewalk is constructed next to a curb without any buffer between them, which is common in urban environments with limited right-of-way. The area that can be used for detection is smaller, and a pedestrian walking on the sidewalk turning into the crosswalk may not be detected in some cases. There may also be false detections with this design. The pedestrian “WALK” signal can be activated by pedestrians walking along the sidewalk but not turning to the crosswalk. Consider this limitation when implementing passive pedestrian detection.

Figure 5.2-12. Sidewalk Location Options for Passive Pedestrian Detection



For a shared-use path that crosses a state roadway, passive bicyclist detection may be added in addition to an active bicyclist detection (push button) to improve driver yielding behavior and cyclist safety. Consider the following guidance when installing passive bicyclist detection at midblock or unsignalized intersections:

- At unsignalized intersections and midblock that require bicyclist detection, consider passive bicyclist detection.
- Place the passive bicyclist detection devices in the expected path of the bicyclists.
- Locate bicycle detection devices in the most conspicuous location and supplemented by appropriate signing and pavement markings to inform bicyclists of where to wait.
- Install advanced bicycle detection on the approach to the intersection to extend the phase or to prompt the phase and allow for continuous bicycle through movements.
- Consider the amount of metal in typical bicycles in the design of loop detectors. Certain loop configurations are better at detecting bicyclists than others. Adjust settings for loop detectors to detect bicycles properly.

Transverse Rumble Strips

Transverse rumble strips in advance of rural stop-controlled intersections have been shown to improve driver awareness and overall safety performance. Therefore, this type of rumble strips may be used in advance of midblock and unsignalized intersections where driver yielding behavior has not been successful with other advance warning treatments identified in this section. Install transverse rumble strips in accordance with ***Standard Plans, Index 546-001***, ***Standard Specifications, Section 546***, and ***FDM 210***. Consider the following factors when installing transverse rumble strips near midblock or unsignalized intersections:

- Evaluate the noise impact of installing transverse rumble strips near residential areas before installation.
- Coordinate with the District Maintenance Office prior to ***DTOE*** approval for the use of the transverse rumble strips.
- There are two basic layouts for transverse rumble strips, extending across the entire traffic lane or placement only in the wheel tracks. The wheel track layout is preferred because it allows drivers that do not need any additional warning to avoid the rumbles without driving into the opposing lane.
- Use the transverse rumble strips in combination with Pedestrian Crossing (***W11-2***) signs.

5.2.8 TREATMENT OPTIONS SELECTION MATRIX

Select pedestrian treatments at midblock crosswalks and unsignalized intersections based on pedestrian volume, roadway context classification, number of lanes, posted speed limit, and other related factors as identified in ***TEM 5.2.4***, ***TEM 5.2.5***, and ***TEM 5.2.7***. As a reference ***Figure 5.2-13*** has been designed to aid in the treatment option selections process. This matrix summarizes the procedures, selection criteria and treatment requirements identified in ***TEM 5.2***.

Figure 5.2-13. Midblock Crosswalk and Unsignalized Intersection Selection Guidance Matrix

TEM 5.2 Midblock Crosswalks and Unsignalized Intersection Selection Guidance Matrix			Midblock and Unsignalized Intersections					Midblock		TEM SECTION
			Pavement Marking			RRFB		PHB	Traffic Signal	
			Special Emphasis Crosswalk							
			20 PPH for 1 Hr			2-4 lanes	3-5 lanes With TWTL	Florida warrants must be met		
			or SHARE USE PATH 50% PPH reduction							
			or school zones							
			or C2T, C3C, C4, C5, and C6	40-45 mph	>45 mph	≤35 mph		All Speeds		
Pavement Markings	Special emphasis crosswalk	Midblock	M	M	M	M	M	M	M	5.2.7.1
		Intersection	M	M	M	M	M	N	N	
Signs	Stop Here for Peds Sign (R1-5b) / Stop Here for Pedestrians Sign (R1-5c)	Enhance option: highlighted or beacon	O	O	O	M	M	N	N	5.2.7.2
	Pedestrian Sign (W11-2) / Ahead Plaque (W16-9P)		M	M	M	M	M	M	M	
	PushButton For Warning Lights, Wait For Traffic To Stop, Cross With Caution Sign (FTP-68C-21)		O	O	O	M	M	O	O	
	Overhead Ped Crossing Sign (R1-9a)		O	O	O	O	O	O	O	
	Crosswalk, Stop on Red Sign (R10-23a)		N/A	N/A	N/A	N	N	M	N	
	In-street Ped Crossing Sign (R1-6a)		R (≤35 mph)	N	N	R	N	N	N	
Emphasis / Enhancements	Audible message		N/A	N/A	N/A	M	M	N	N	5.2.7.3
	In-roadway warning light		N/A	N/A	N/A	O	O	O	N	
	Passive pedestrian and bike detection	SHARED USE PATH	N/A	N/A	N/A	R	R	R	R	5.2.7.5
		All others locations	N/A	N/A	N/A	O	O	O	O	
TEM SECTION			5.2.5.1			5.2.5.2				

Legend

M	**M**andatory if applied
R	**R**ecommended Option
O	**O**ptional
N	**N**ot to be Applied
N/A	**N**ot **A**vailable Option(1)

Note
(1) Identifies where the treatment cannot be applied because the infrastructure is not there. Ex: Audible Message on a Marked Crosswalk

Section 5.3

TREATMENTS FOR PEDESTRIANS AND BICYCLISTS ON MOVABLE BRIDGES

5.3.1 PURPOSE

The intent of this section is to establish criteria and guidelines for the consistent installation and operation of pedestrian treatments on movable bridges. These treatments include swing-style pedestrian gate, signs, and advanced detection systems such as LiDAR and Thermal Imaging cameras. See ***Structures Design Guidelines (SDG) 8.1.9*** for more design information.

5.3.2 GENERAL

Pedestrian and bicyclist safety can significantly improve by thoughtfully placed signs and swing-style pedestrian gates on movable bridges. Advanced Detection Systems help the bridge tenders detect pedestrians or bicyclists and prevent the bridge from opening when there are any pedestrians or bicyclists in the vulnerable zones of the movable span.

5.3.3 DEFINITIONS

Advanced Detection System. A passive detection system that can identify, target, track, and alert if a moving or still human characteristic is spatially referenced in a predetermined geographical space during all weather conditions.

Bascule Bridge. A movable bridge (also referred to as a drawbridge or a lifting bridge) with a counterweight that continuously balances a span, or leaf, throughout its upward swing to provide clearance for maritime traffic. It may be single- or double-leafed.

Bridge Tender. Operator of the movable bridge according to the regulations of the United States Coast Guard (Chapter 33 of the Code of Federal Regulations Section 117.1101, which is included in Volume I: Appendix G) and with the State of Florida Statutes.

Lift Bridge. A vertical-lift bridge or just lift bridge is a type of movable bridge in which a span rises vertically while remaining parallel with the deck.

Movable Bridge. A bridge that moves to accommodate the passage of maritime vessels. There are several types of movable bridges mentioned in this section.

Swing Bridge. A swing bridge (or swing span bridge) is a movable bridge that has, as its primary structural support, a vertical locating pin and support ring which is usually at or near its center of gravity about which the swing span (turning span) can then pivot horizontally.

Swing-Style Pedestrian Gate. A gate that opens and closes automatically with the assistance of electronic, hydraulic, or mechanical means. Swing-style pedestrian gates open on their vertical axes so that they swing towards or away from pedestrians.

Vulnerable Zones. Areas of high risk for pedestrians, bicycles, and vehicles that may cause harm during bridge openings.

5.3.4 TREATMENT OPTIONS

Swing-Style Pedestrian Gate

Install swing-style pedestrian gate on movable bridges in accordance with ***SDG 8.1.9***.

Signage

Install a **NO PEDESTRIANS OR BICYCLES BEYOND GATE** sign on movable bridge swing-style pedestrian gate as shown in ***TEM 2.6.6***.

Advanced Detection Systems

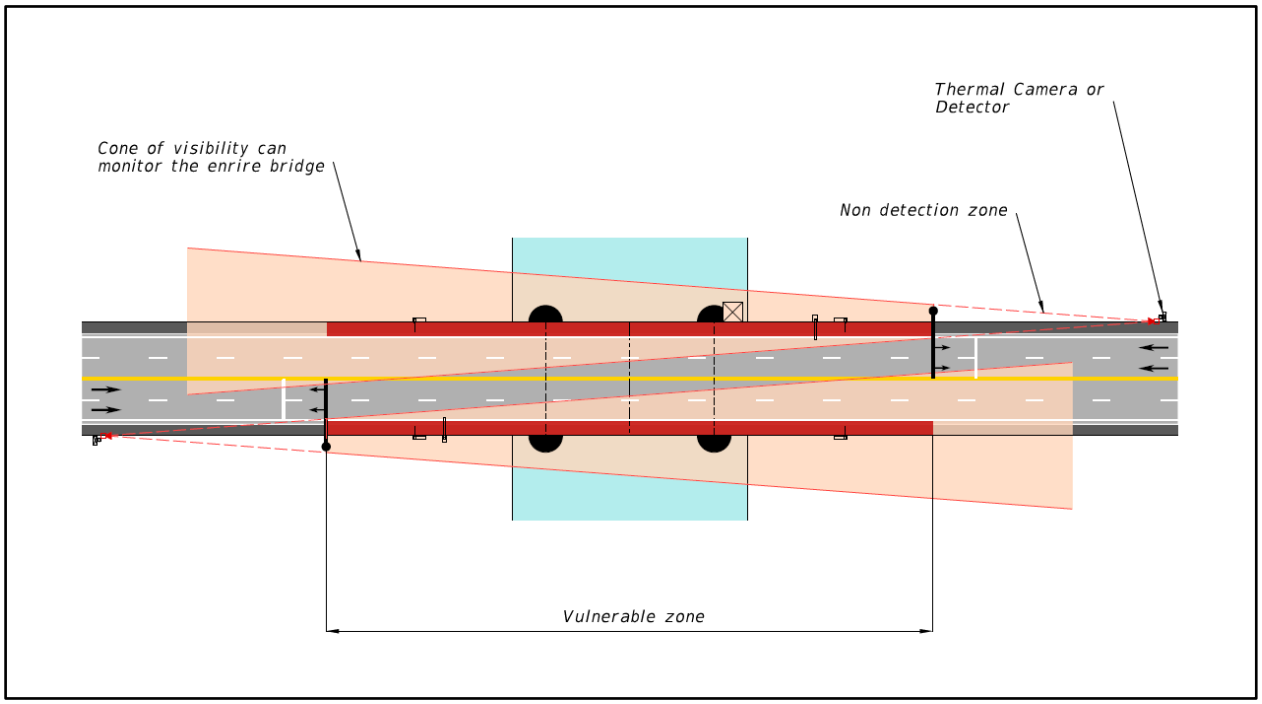
These passive thermal or laser-based systems identify, target, track, and alert the bridge tender station if any pedestrians or bicyclists are detected in vulnerable zones of the movable bridge.

- The thermal camera system is an advanced detection system that uses infrared radiation to detect and locate heat signature objects.
- LiDAR camera system is an advanced detection system that uses **Li**ght **D**etection **a**nd **R**anging technology. Pulsed laser beams are emitted in a predetermined geographic space that measures the time taken for each pulse of laser light to be reflected back from the environment and objects of interest creating a 3D image of the target. Typically, these lasers can be visible light, infrared or ultraviolet lasers.

Bridge tender house receives the sensor data from the advanced detection system into a computer, with an uninterruptible power supply, that displays the feed through a monitor. These systems, including all integrated components, are currently on the ***Department's Approved Products List (APL)***. Systems may include but are not limited to:

- Thermal camera, or LiDAR camera
- Controller or server cabinet
- Communication system (wired or wireless or cellular service)
- Network switch
- Conduit and pull box
- Power supply (hook up to existing power or solar power systems)
- Wire, cable, and related fittings

Figure 5.3-1. Typical Detection Zones



The advanced detection system technology selection is at the discretion of the ***DTOE***. ***State Traffic Operations Engineer (STOE)*** approval is required to select technology not covered in this section.

APPENDICES

HISTORY

Entire Manual	**FDOT Traffic Engineering Manual (TEM)**
11/23	Updated links for the outdated references and cross-referencing for tables and figures.
01/23	Modified language for all the “PURPOSE” sections to have a consistent format
11/17	Changed name of Department’s Design Standards to Department’s Standard Plans and updated associated references.
11/17	Updated reference to Transportation Statistics Office to reflect name change to Transportation Data and Analytics Office.
11/16	Updated hyperlinks to reflect change in office section name from Operations to Traffic Services.
01/12	Mandatory changes to incorporate adoption of MUTCD 2009.
12/06	Pen and Ink changes (updated references and/or links).
Chapter 1	**Procedure**
01/23	Restructured language and updated section numbering. Added sections 1.10 (Forms) and Section 1.11 (Resources)
10/11	Added Section 5 (Traffic Engineering Variations) and Section 6 (Traffic Engineering Variation Process)
03/09	Pen and ink changes.
04/05	Changed office name. Removed rule reference for Section 2.16.
08/03	Changed website address.
03/03	Changed rule incorporation reference to 14-15.015. Updated website address.
03/02	Changed website address. Also created links to references and changed office name to Traffic Operations.
10/01	Approved to have TEM available electronically on the internet/infonet only.

Chapter 2 Signs

11/16 Simplified language.

Section 2.1 Use of Slippery When Wet Signs

03/02 Updated references to Millennium MUTCD and included links to all references.

10/99 Section 2.1.2(3), 2nd paragraph. Added, "These signs should be placed in accordance with MUTCD Table II-1 using a 10-mph deceleration factor."

06/91 Former FDOT Topic Number 750-010-018 incorporated into TEM.

Section 2.2 Overhead Street Name Signs

06/09 Clarified sign design requirements for internally illuminated overhead signs versus standard static panel signs.

04/07 Removed references to Advance Street Name Signs (new Section 2.37). Standardized sign sizes for overhead street name signs on State Highway System.

03/02 Updated references to Millennium MUTCD and included links to all references.

05/00 Section 2.2.4(1) and (2) changed to conform with letter height requirements shown in Table 6.3-1 in the Elder Roadway User Program Section of the TEM.

Section 2.3 Signs and Markings at Non-Signalized Intersections of Divided Highways and Crossroads

03/02 All references in this document are now in the 2002 edition of the Design Standards.

07/00 This section updated to include the mandatory implementation plan for Divided Highways and Crossroads issued by the State Highway Engineer.

06/91 Former FDOT Topic Number 750-010-035 incorporated into TEM.

Section 2.4 Symbol Signs on the State Highway System

03/02 Updated references to Millennium MUTCD and included links to all references.

06/91 Former FDOT Topic Number 750-010-026 incorporated into TEM.

Section 2.5 Destination Distance Signs at Rural Interstate and Freeway Exit Ramp Terminals

06/91 Former FDOT Topic Number 750-010-024 incorporated into TEM.

Section 2.6 Bridge Signs and Markings

01/23 Added new subsection 2.6.6 Swing-Style Pedestrian Gate Signs on Movable Bridges

11/18 Added clarification that placement of W12-2 sign should be at the Stopping Sight Distance

06/18 Added new subsection 2.6.5 Guide Signs on Overpasses

11/12 Mandatory changes to incorporate maximum vehicle height according to Section 316.515, F.S.

04/02 Updated references to Millennium MUTCD and included links to all references. We also standardized lettering size for the cross road signs on overpasses.

07/93 Cross Road Name Signs on Overpasses, added that signs can be installed if requested by law enforcement or emergency rescue organizations.

06/91 Former FDOT Topic Number 750-010-034 incorporated into TEM.

Section 2.7 Place Name Signs on the State Highway System

04/05 Rescinded. Now Part IV of Rule 14-51, F.A.C., Florida's Highway Guide Sign Program.

05/02 Minor editorial changes to make current.

05/00 Editorial comments. Section 2.7.6(2) revised to add that place name signs located off state right-of-way must conform to statute.

06/91 Former FDOT Topic Number 750-010-036 incorporated into TEM.

Section 2.8 Move Accident Vehicles from Travel Lanes Signs

06/04 Updated sign references to the 2004 Design Standards. Added optional graphic panel to limited access sign.

05/02 Updated references to Millennium MUTCD and included links to all references.

06/91 Incorporated into TEM.

Section 2.9 No Passing Zone Signs

07/12 Mandatory changes to incorporate MUTCD references.

05/02 Created a link to the W14-3 sign in the new federal Standard Highway Signs.

06/91 Incorporated into TEM.

Section 2.10 Vending Machine Signs

06/04 Added sign details.

06/91 Incorporated into TEM.

Section 2.11 Guidelines for Bicycle Warning Signs

10/20 Added guidance for the use of a bicycle passing clearance sign.

05/19 Eliminated references to the “Share the Road” sign and updated the section to include references to the “Bicycle May Use Full Lane” sign.

09/02 Updated references to the Millennium MUTCD and the 2002 Standard Highway Signs Manual.

07/00 Editorial comments. Added Section 2.11.4 to include sign design and instructions for Bicycle Sharing Road Sign. Change initiated due to Revision 5 of the MUTCD.

06/91 Incorporated into TEM.

Section 2.12 Recycling Collection Center Signs

09/04 Updated sign references to the 2004 Design Standards.

09/02 Updated sign references to the 2002 Design Standards.

06/91 Incorporated into TEM.

Section 2.13 Signing for Safety Belt Use and Child Restraint Laws

11/04 Updated sign references to the 2004 Design Standards and Sign Library.

01/03 Updated sign references to the 2002 Design Standards. Updated references to Millennium MUTCD.

07/00 Editorial Comments. Added sign details for all signs. Section 2.13.6 changed to add new design for Standard Safety Belt Sign.

03/93 Former FDOT Topic Number 750-010-014 incorporated into TEM.

Section 2.14 Signing for Evacuation Routes

01/23 Restructured language for the entire section. Incorporated the new flip-down sign in Figure 2.14-1 and updated Radio Coverage Map (Figure2.14-4).

10/20 Updated the FTP number in Section 2.14.4(4). Deleted the requirements for continuous hinge and added a link to the Department’s Standard Plans to avoid duplication.

06/18 Section renamed to Signing for Emergency Management.

06/18 Section updated to reflect most current practices.

11/16 Section rewritten to simplify language.

11/16 Corrected sign numbers.

11/16 Removed Department of Community Affairs, which has been dissolved into Florida Division of Emergency Management.

11/16 Added the word inch to clarify measurement.

11/16 Corrected phone number.

08/01 Changes were made to incorporate the process for signing for one-way operations and also radio frequency information signs during an evacuation. Also, the "hurricane" reference was removed from the title and throughout the document as this section is applicable to all types of evacuations.

09/99 Changes were made based on new direction of regional evacuation and sheltering plan. The Department's Emergency Coordination Office initiated changes.

08/93 Former Topic Number 750-020-006 incorporated into TEM.

Section 2.15 Smoke on Highway Signs

11/18 Section updated to reflect modified smoke management agreement

03/02 Changes necessary following the Highway Safety Smoke Management Interagency Agreement. Included sign details for Temporary and Prescribed Burn Signs and requirements for the installation and removal of these signs. Also included links to all references.

04/96 Incorporated into TEM.

Section 2.16 Signing for Supplemental Guide Signs and Motorist Services on Limited and Non-Limited Access Highways

04/05 Rescinded. Now Rule 14-51, F.A.C., Florida's Highway Guide Sign Program.

09/99 Formatting changes and converted back to English.

Section 2.17 Emergency Highway Traffic Plan

04/09 Rescinded. Now covered under Topic No. 500-000-104, Emergency Management Program.

06/93 Incorporated into TEM.

Section 2.18 *FHP Highway Assistance Program

11/04 Updated sign references to the 2004 Design Standards and Sign Library.

01/03 Changed sign detail references to their FTP number in the Design Standards.

04/96 Incorporated into TEM.

Section 2.20 Call Box/Mile Marker Signs

04/14 Rescinded. Call boxes removed from State Highway System.

09/04 Updated sign references to the 2004 Design Standards and Sign Library.

03/99 Section 2.20.2(1) and (2) increased measurement for installation. Also added sign design to include tenth of a mile measurement.

07/97 Incorporated into TEM.

Section 2.21 Florida Litter Law Signs

10/21 Updated FTP numbers of FLORIDA LITTER LAW signs to match the latest Department Standard Plans

10/20 Added a reference and linked to the related Florida statue in Section 2.21.2(2).

06/04 Updated sign references to 2004 Design Standards. Minor revisions recommended by Signing Team.

07/97 Incorporated into TEM.

Section 2.22 Traffic Control for Toll Collection Facilities

11/23 Removed Section due to outdated practices and links.

10/21 Updated reference to Turnpike Design Handbook (TDH).

04/09 Rescinded. Now included in Turnpike's Plans Preparation and Practices Handbook.

07/98 Former FDOT Topic Number 750-010-010 incorporated into TEM.

Section 2.23 Florida's Turnpike and Toll Road Numbering and Signing Program

11/01 Changes made were initiated by Management to include the use of the local road name or logo (to be provided by the local expressway authority) on the toll facility along with our Toll Route Marker. Updated references to Millennium MUTCD and the sign detail for the Toll Route Marker.

04/01 Section 2.23.4(3), last sentence. Allowed possibility of local road names to be used in a guide sign or directional sign. Change initiated by management.

07/98 Incorporated into the TEM.

Section 2.24 Placement of Crime Watch Signs on the State Highway System

05/04 Pen and Ink changes.

07/98 Former FDOT Instructional Memo Number 750-005 incorporated into TEM.

Section 2.25 Distance Signing for Non-Limited Access Highways

09/99 Incorporated into TEM. Implements Action Plan 006 from our Evaluation of International Signing Practices Study (1994).

Section 2.26 Advance Guide Signs on Limited Access Highways

09/99 Incorporated into TEM. Implements Action Plan 007 of our Evaluation of International Signing Practices Study (1994).

Section 2.27 Commuter Assistance Signs09/99 Incorporated into TEM.

Developed from discussions with Public Transportation Office.

Section 2.28 Reference Location Signs (Mile-Markers)

09/14 Criteria established for both limited and non-limited access roadways.

04/00 Incorporated into TEM. Recommended by DTOEs during statewide meeting.

Section 2.29 Use of Fluorescent Yellow-Green Sign Sheeting

11/18 Section rescinded and the language is now included in the FDOT Standard Specifications for Road and Bridge Construction Section 700.

07/00 Incorporated into TEM. Developed to establish guidelines for the use of this innovative sheeting that was approved by the FHWA.

Section 2.30 Signing for One-Stop Career Centers

08/04 Updated sign references to 2004 Design Standards.

07/00 Incorporated into TEM. Developed from sign request in District Four.

Section 2.31 Unique Transportation Symbol Signs

08/02 Incorporated into TEM.

Section 2.32 511 Telephone Service Sign

10/20 Updated the graphic on the Travel Info Call 511 sign.

06/04 Incorporated new FTP references.

06/02 Incorporated into TEM.

Section 2.33 Signing for Nature-based Tourism and Heritage Tourism Trails

09/02 Incorporated into TEM.

Section 2.34 Signing for Florida Scenic Highways Program and the National Scenic Byways Program

10/04 Incorporated into TEM.

Section 2.35 Signing for Memorial Roadway Designations

07/06 Web address for Sign Library changed.

10/04 Incorporated into TEM.

Section 2.36 Wayfinding Signs

04/07 Incorporated into TEM.

Section 2.37 Advance Street Name Signs

11/16 Added clarification that conditions are recommended and not mandatory.

11/16 Added language addressing lengthy street name legends and limited right-of-way.

11/16 Added language for font size.

06/09 In order to provide consistency with the MUTCD, incorporated standards for advance street name signs not only for signalized intersections but non-signalized and the use of advance street name sign plaques for advance warning and intersection control signs.

04/07 Incorporated into TEM.

Section 2.38 Use of Temporary Stop Signs at Non-Functioning Signalized Intersections

06/18 Section renamed to Use of Generators and Portable Stop Signs at Non-Functioning Signalized Intersections

06/18 Section updated to reflect most current practices.

01/16 Editorial change to apply to any emergency event.

05/07 Incorporated into TEM.

Section 2.39 Warning, Stop, and Yield Sign Sizes

10/20 Updated the STOP sign size in Table 2.39-3 to 30 inches for the 20 mph POSTED SPEED.

10/07 Pen and ink changes made to table for consistency with final research report.

08/07 Incorporated into TEM.

Section 2.40 Displaying Messages on Dynamic Message Signs Permanently Mounted on the State Highway System

11/17 Section modified.

08/15 New approved messages added

08/08 Incorporated into TEM.

Section 2.41 Guidelines for Use of Retroreflective Strips

10/15 Incorporated into TEM.

Section 2.42 Express Lanes Signing

10/21 Added guidance on Periods of Operation sign (R3-44).

05/19 Modified 2.42.4 paragraph (1) to allow more flexibility with the signing order.

06/18 Incorporated into TEM.

Section 2.43 Ramp Only Signal Panel

10/19 Incorporated into TEM.

Section 2.44 TURNING VEHICLES STOP FOR PEDESTRIANS Sign

01/23 Updated section to clarify the requirements for the use of the R10-15a sign.

10/21 Incorporated into TEM.

Chapter 3 Signals

11/23 Rewritten to follow the Federal Plain Language Guidelines along with an updated format. Updated terminology to be consistent with current practices. Updated references to match current FTP sign numbering

Section 3.1 Signalized Intersections Flashing Mode Operation and Flashing Beacons

11/23 Added guidance on when to choose red-red vs. yellow-red flashing mode. Updated language to include all turn arrow indications. Updated guidance to clarify the requirements for new beacons.

12/09 Changes made consistent with MUTCD 2003.

10/93 Page III-1 removed provision that accident patterns need to be monitored at flashing yellow/red locations. Page III-2 removed option for flashing signal operations in relation to closing times.

06/91 Former FDOT Topic Number 750-010-023 incorporated into TEM.

Section 3.2 Guidelines for Left Turn Treatment

11/23 Added Variable Left-Turn Mode definition and display guidance.

12/09 Changes made as recommended by DTOEs, figures added.

08/93 Under Left Turn Signal Phasing, changed left turn separation from 10 to 12 feet.

06/91 Incorporated into TEM.

Section 3.3 Scheduling Intersection Control and Funding Arrangements

11/23 Updated TSMCA procedure to match current practice.

10/19 Section name changed to “Scheduling Intersection Control Evaluations and Funding Arrangements.

10/19 Hyperlink added for Manual on Intersection Control Evaluation and FDOT Approved Product List Submittal Process.

10/93 Former FDOT Topic Number 750-010-001 incorporated into TEM.

Section 3.4 Emergency Traffic Control Signals

11/23 Updated Figure 3.4-1 to match written guidance.

11/18 Updated figure 3.4-1 and eliminated figure 3.4-2 by incorporation to improve legibility.

06/18 Section updated to reflect most current practices.

11/12 Mandatory changes to provide clarity and revise MUTCD reference.

02/10 Added appropriate MUTCD 2003 signs and references.

04/96 Former FDOT Topic Number 750-020-004 incorporated into TEM.

Section 3.5 Traffic Signal Mast Arm Support Boundaries

11/23 Updated boundary map description.

02/10 Section title change, references to PPM added, direct links to pdf versions of District Boundary Maps included.

10/98 Incorporated into TEM.

Section 3.6 Standardization of Yellow Change and Red Clearance Intervals for Signalized Intersections

10/20 Added guidance for calculating the yellow change interval and minor editorial updates.

10/13 Changes to yellow change and red clearance intervals: (a) Increased perception reaction time to 1.4 seconds; (b) Round up Yellow Change Intervals to the next 0.1 sec; (c) Increased the minimum Yellow Change Interval to 3.4 seconds; (d) Increased the minimum Red Clearance Interval to 2.0 seconds and the maximum Red Clearance Interval to 6.0 seconds.

09/12 New language added to clarify and give guidance for determining the all-red clearance interval.

07/11 Editorial changes made to clarity the method of determining yellow clearance time.

06/10 Changes necessary to have yellow and all-red intervals consist with ITE's Traffic Engineering Handbook.

07/05 These are guidelines so we changed title to reflect it. Changed from "Standardization of Yellow and All-Red Intervals for Signalized Intersections."

06/02 Incorporated into TEM.

Section 3.7 Accessible Pedestrian Signals

11/23 Clarified DTOE approval on APS being required for intersection and midblock signals on the SHS.

11/18 Entire section updated. "Audible" changed to "accessible".

02/03 Incorporated into TEM.

Section 3.8 Railroad Traffic Signal Preemption Time Calculation

10/21 Added language on preempt trap check and vehicle-date interaction check procedures as well as an example of adding a preemption phase to the traffic control system.

10/20 Incorporated into TEM.

Section 3.8 Marked Pedestrian Crosswalks at Midblock and Uncontrolled Approach Locations

10/20 Rescinded. Information contained in Section 5.2 (Treatments for Pedestrian Crosswalks at Midblock and Unsignalized Intersections).

10/19 Updated hyperlinks for Department's Standard Plans.

05/19 Section modified to include provisions for pedestrian crosswalk treatments that are based on context classifications.

11/18 Updated section to reflect MUTCD language consistency and to clarify the 'average day' language in Section 3.8.5(3)(b).

01/16 Modified to address pedestrian crosswalks at both midblock and uncontrolled approach locations. Added definitions to key terms, revised minimum pedestrian activity thresholds, updated photos, clarified guidance on Pedestrian Hybrid Beacons, and modified guidance on the use of Rectangular Rapid Flashing Beacons on multilane roadways.

10/14 Modified to reflect the language for crosswalk illumination to help implement safe crossing of pedestrians at midblock locations.

06/13 Changes necessary to refine the criteria for installing and operating mid-block pedestrian crosswalks.

01/10 Substantive changes necessary to expand crossing treatments available with appropriate criteria and selection guidance included.

06/03 Changes necessary to conform to the MUTCD 2000 standards.

02/03 Incorporated into TEM.

Section 3.9 Installing Signal Backplates on Existing Structures

11/23 Updated procedure for use of FRBs on existing mast arm and span wire structures.

10/21 Updated language clarifying the use of rigid and flexible retroreflective backplates.

10/20 Incorporated into TEM.

Section 3.9 Countdown Pedestrian Signal Applications

11/17 Section rescinded.

03/07 Changes necessary to incorporate Department's policy on this device.

07/06 Changes necessary to give direction to districts on implementation.

04/03 Incorporated into TEM.

Section 3.10 Flashing Yellow Arrow Signal Application

11/23 Included background information on FRA Signal Application. Clarified installation guidance on replacing a five-section signal head with a four-section FYA signal head.

01/23 Revised language and updated section numbering.

10/21 Updated language regarding education materials for flashing yellow arrow and portable changeable message signs.

10/20 Updated guidance on yellow left turn trap and referenced bulletin TEOB 20-02.

11/18 Incorporated into TEM.

Section 3.11 Signal Timing Applications for Pedestrian Movement

01/23 Modified language and updated the Leading Pedestrian Interval (LPI) timing equation.

10/21 Changed title to "Signal Timing Applications for Pedestrian Movement". Added signal timing definitions from NCHRP Report 812. Revised language pertaining to leading pedestrian interval (LPI) implementation and LPI considerations sections.

10/20 Revised criteria for LPI signal applications requiring engineers to consider LPI for all new traffic signal designs. Provided guidance on LPI applications for protected and permissive left-turn movements.

05/19 Incorporated into TEM.

Section 3.12 Traffic Signal Retiming

01/23 Incorporated into TEM.

Chapter 4 Markings

11/23 Rewritten to follow the Federal Plain Language Guidelines along with an updated format.

Section 4.1 Crosswalks in Heavy Pedestrian Concentration Areas

11/23 Updated crosswalk width to 10 feet for midblock locations per Std Plan Index 711 001 in Section 4.1.2. END OF PEDESTRIAN CROSSING sign updated from 8x3 to 8x4 per Std Plan Index 700-102 and SZM.

11/17 Changed reference to Design Standard to Speed Zone Manual.

08/04 Incorporated latest MUTCD 2003 changes.

06/91 Former FDOT Topic Number 750-020-008 incorporated into TEM.

Section 4.2 Pavement Word, Symbol, and Arrow Markings

11/23 Clarified steps to complete an RTE for non-standard word or symbol pavement markings. Clarified DTOE approves route shield applications. Updated section name to Route Shields for Interchange Access. Updated language description and images related to the E Bearss Avenue and I-275 interchange with current markings.

10/21 Revised the language for route shield pavement markings installation criteria.

10/19 Changed reference to design of elongated shields.

11/18 Updated figure 4.2-3 to improve legibility.

11/17 Changed reference to Design Standard to Speed Zone Manual.

02/15 Added new subsection for Route Shields for Wrong Way Treatment.

05/14 Pen and ink changes to update figures.

10/13 Changes necessary to bring the proper clarification for pavement markings and route shields into the TEM.

06/91 Former FDOT Topic Number 750-010-020 incorporated into TEM.

Section 4.3 Use of Blue Raised Pavement Markers to Identify Fire Hydrants

10/19 Rescinded.

07/98 Former FDOT Instructional Memorandum Number 750-004 incorporated into TEM.

Section 4.4 Roundabout Markings

07/07 Incorporated into TEM.

Section 4.5 Express Lanes Markings

11/23 Updated definitions for clarity.

10/21 Added FDM references to the section.

10/20 Section updated to replace “express lanes marker” with “Tubular marker” and some editorial changes.

11/18 Added new definitions.

06/18 Incorporated into TEM.

Section 4.6 Use of Internally Illuminated Raised Pavement Markers

11/23 Included additional name of IIRPMs to improve cross-referencing between manuals.

11/18 New section.

Chapter 5 Special Operational Topics

11/23 Rewritten to follow the Federal Plain Language Guidelines along with an updated format.

Section 5.1 Golf Cart Crossings and Operation on the State Highway System

11/23 Revised the definition of State Roadway.

10/21 Revised the side street maximum vehicular volume and AM/PM peak hour volume criteria for golf cart crossings at full signalized intersections. Updated language on the operation of golf carts on sidewalks. Added language pertaining to the education of golf cart operations.

10/11 Incorporated into TEM in new “Specialized Operational Topics” chapter.

Section 5.1 Computer Models for Traffic Engineering and ITS Analysis and Design

11/10 Rescinded.

06/91 Former FDOT Topic Number 750-030-005 incorporated into TEM.

Section 5.2 Treatments for Pedestrian Crosswalks at Midblock and Unsignalized Intersections

11/23 Additional guidance on the placement of W11-2 pavement markings. Updated coordination language for new TCD installations. Revised Midblock Crosswalk and Unsignalized Intersection Selection Guidance Matrix (Figure 5.2-13) to align with treatments in the TEM.

01/23 Revised selection criteria for Yellow Flashing Beacon and Rectangular Rapid Flashing Beacon (RRFB). Updated the language to include the guidance for a Pedestrian Hybrid Beacon (PHB) sequence and modified figure 5.2-4 (Pedestrian and Bicycle Crossing Warning Sign Pavement Marking Details). Created interactive excel tool and updated figure 5.2-13 (Midblock Crosswalk and Unsignalized Intersection Guidance Matrix).

10/21 Updated safety considerations criteria for new marked crosswalks. Revised recommended levels of pedestrian demand threshold criteria and added C3C context classification for pedestrian volume demand exemptions. Added language on nature-based trail crossings and revised language for engineering study.

10/20 Incorporated into TEM by restructuring the rescinded TEM Section 3.8 (Marked Pedestrian Crosswalks at Midblock and Uncontrolled Approach Locations). New guidance has been provided to pavement markings, signs, beacons, signals to improve safety.

Section 5.3 Treatments for Pedestrians and Bicyclists on Movable Bridges

01/23 Incorporated into TEM.

Chapter 6 Safe Mobility for Life Program

11/16 Removed.

Section 6.1 Elder Road User Program

04/07 Rescinded. Information contained in section provided on Safe Mobility for Life Program (Topic No. 000-750-001) website.

06/98 Incorporated into TEM. Initiated by Elder Road User Program FDOT Topic Number 000-750-001.

Section 6.2 Warning, Stop, and Yield Sign Sizes to Accommodate the Elder Roadway User in Florida

08/07 Rescinded. Information contained in Section 2.39 (Warning, Stop, and Yield Sign Sizes).

06/98 Incorporated into TEM. Based on research developed from Elder Road User Program.

Section 6.3 Intersection Guide Signs

04/07 Rescinded. Information contained in Section 2.37 (Advance Street Name Signs).

06/98 Incorporated into TEM. Based on research developed from Elder Road User Program.

Chapter 7 Approved Product List Certification and Approval Process

11/16 Removed.

Section 7.1 Approved Product List Certification and Approval Process

07/12 Rescinded. Changed into a local procedure and link shown in section.

03/11 Title changed and APL Vendor Qualification Program was added. Changes made to the Product Approval Process, Temporary Permit Process and APL Review Process. Moved remaining APL procedures from MSTCSD specifications to this section.

03/99 Former FDOT Topic Number 750-010-013 incorporated into TEM.

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