

# Traffic Engineering Manual

(Metric Version) JAN 1978



*Florida Department of Transportation • Traffic Engineering Office  
605 Suwannee Street, M. S. 36 • Tallahassee, Florida 32399-0450*

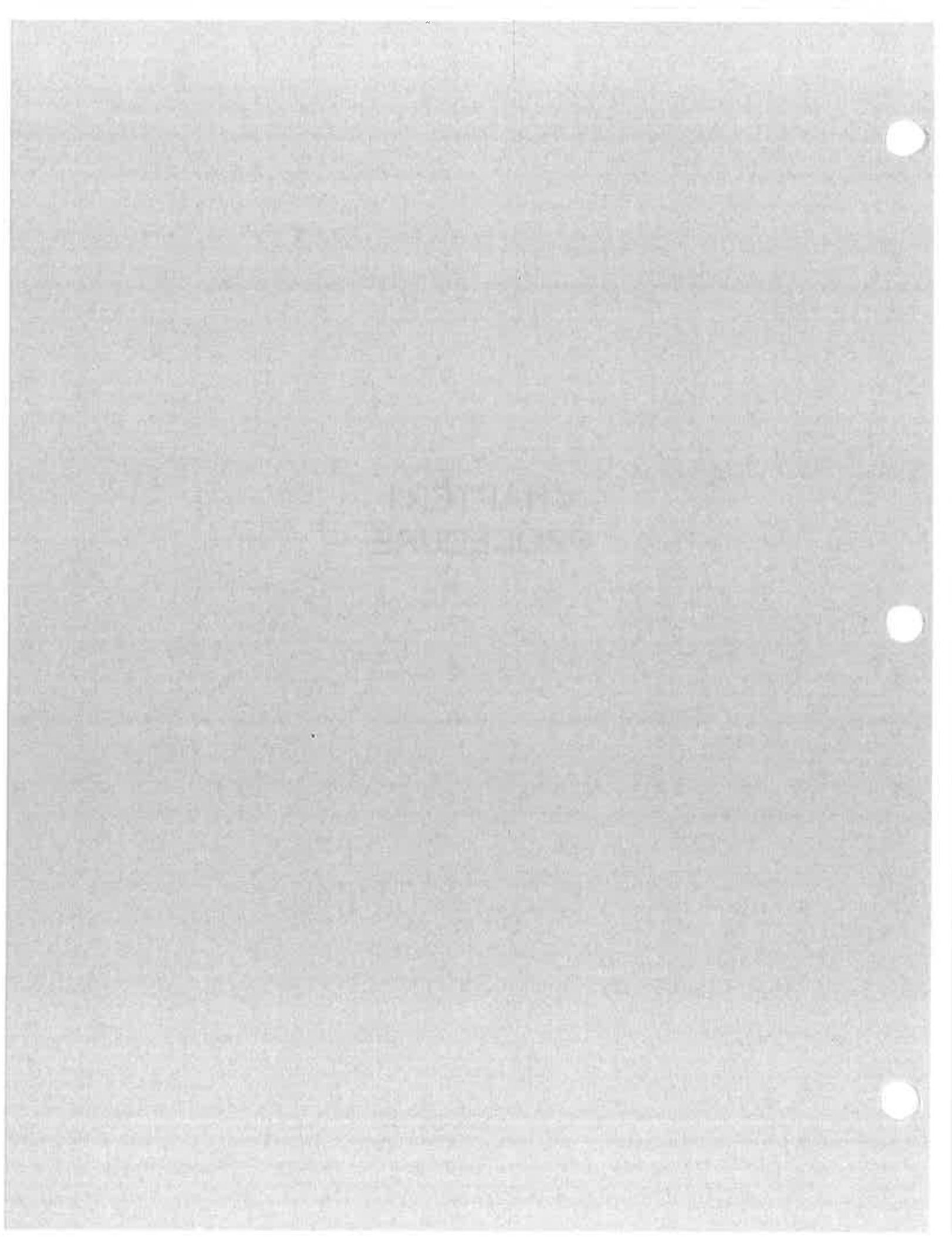


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**CHAPTER I  
PROCEDURE**



Approved:



Ben G. Watts, P.E.  
Secretary

Effective: April 30, 1996  
Office: Traffic Engineering  
Topic No.: 750-000-005-d

## TRAFFIC ENGINEERING MANUAL - METRIC VERSION

### PURPOSE:

To provide traffic engineering standards and guidelines to be used on the State Highway System by the Department's District Traffic Operations Offices. This manual will replace the current english version of the Traffic Engineering Manual.

### AUTHORITY:

Chapters 316 and 334, Florida Statutes. Section II.16 is incorporated by reference into Rule 14-51.004, F.A.C.

### SCOPE:

This manual affects Central Traffic Engineering Office, District Traffic Operations Offices and anyone else affected by traffic engineering standards and guidelines.

### DISTRIBUTION:

The official recipients of the manual will be the District Traffic Operations Engineers and their employees, and the Central Office Traffic Engineering managers and staff. The manual is available free of charge to Department personnel for informational purposes.

#### 1. Registration

Manuals will be issued with a registration form for the recipient to complete and return to the Central Traffic Engineering Office in order to verify receipt and mailing address. The Central Traffic Engineering Office will maintain the registration list of official manual holders to ensure that revisions or additions to the manual will be accurately distributed.

#### 2. Additional Copies

Copies of this document may be purchased from Florida Department of Transportation, Maps and Publications, 605 Suwannee Street, Mail Station 12, Tallahassee,

Florida 32399-0450.

**REVISIONS AND ADDITIONS:**

1. The District Traffic Operations Engineers and the State Traffic Operations Engineer will constitute the Manual Review Committee.
2. A form will be made available for this manual, soliciting input from the Manual Review Committee. Forms will be collected throughout the year, and each recommendation will be reviewed by the State Traffic Operations Engineer. Items warranting immediate change will be made with the approval of the State Traffic Operations Engineer (after a majority vote of the Manual Review Committee and consultation with any other affected parties). Statewide meetings of District Traffic Operations Engineers will be held every six months, and a major agenda item will be the review of the manual.
3. All revisions will be coordinated through the Organization and Procedures Office prior to implementation.
4. Revisions to Section II.16 will be coordinated with the Office of General Counsel for updating in Rule 14-51.004, Florida Administrative Code.
5. Substantive revisions, as determined by the Manual Review Committee, will be approved by the Secretary following the process established in the Standard Operating System.
6. The manual will include a section labeled "Transmittals" for retaining copies of transmittals of revisions and updates. Such transmittals will summarize changes to the manual.

**TRAINING:**

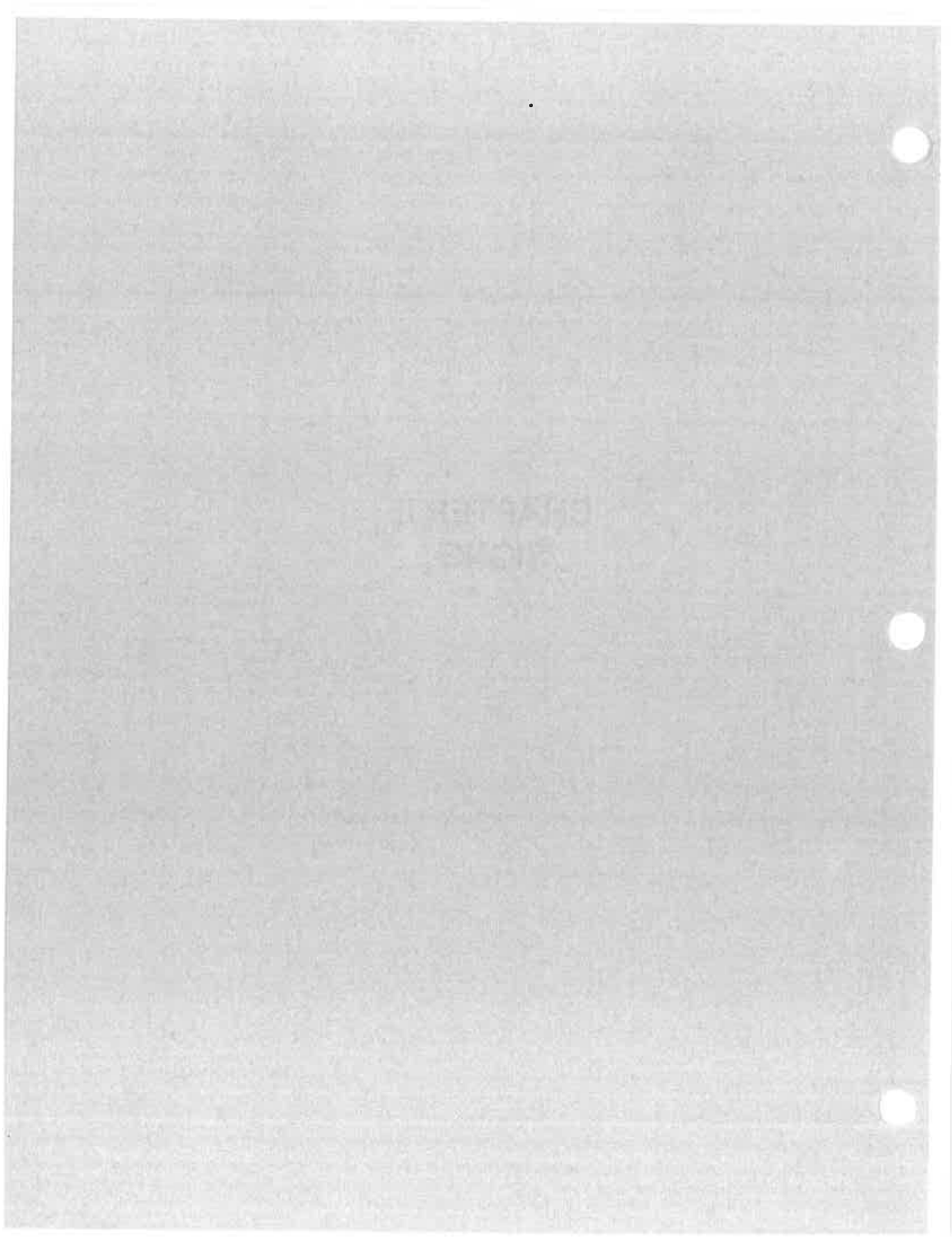
None required.

**FORMS ACCESS:**

None required.



**CHAPTER II**  
**SIGNS**



## Section II.1 USE OF SLIPPERY WHEN WET SIGNS

### Conditions for Use

The District Traffic Operations Engineer shall request the District Maintenance Engineer to erect SLIPPERY WHEN WET signs at locations where it has been determined there is a slippery pavement condition. A slippery pavement is defined as one when a standard friction test at 60 km/h (40 mi/h) has determined the skid numbers are less than 25. When the posted highway speed is above 70 km/h (45 mi/h), SLIPPERY WHEN WET signs should be installed when skid numbers are less than 30, and one of the following conditions is also met:

- Location is on the High Crash Section or High Crash Spot computer listings.
- Any downgrade greater than 3 percent.
- At intersections with traffic signals.

### Location and Placement

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

*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.

*Hydroplaning.* Generally, hydroplaning only occurs at speeds above 76 km/h (47 mi/h); 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.

*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 60 km/h (40 mi/h) can be requested. SLIPPERY WHEN WET signs should be used with an advisory exit speed sign, RAMP XX MPH (W13-2). Steel bridge decks can also be a problem and should be signed prior to the decking.

### **Notification**

The District Maintenance Engineers will promptly notify in writing the District Traffic Operations Engineer when SLIPPERY WHEN WET signs have been erected.

The District Traffic Operations Engineer shall request the District Maintenance Engineer to remove SLIPPERY WHEN WET signs that are no longer warranted under the above provisions.

## Section II.2

### STREET NAME AND ADVANCE STREET NAME GUIDE SIGNS AT MAJOR 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 critical or significant cross streets on the State Highway System, the larger street name and advance street name guide signs should be used. These signs may be furnished, installed and maintained by the Department.

#### Definitions

*Critical or Significant Cross Street.* A cross street classified as a minor arterial or higher or a signalized intersection, or one which may be a unique traffic generator or possess other comparable physical or traffic characteristics deemed to be critical or significant.

#### General Recommendations

- Street name and advance street name guide signs should only be used to identify cross streets. They are not intended to identify destinations such as cities or facilities.
- 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 Peachtree Street and Peachtree Avenue, this deletion should not be made.
- When a cross street is known by both route number and a local name, use of the local name is preferred on both the advance street name and the street name guide signs since the route number is identified on route markers along the route.
- 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 advance street name and the street name guide signs.
- 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. For the street name guide 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 wire may dictate the need for the use of a single side with both names and arrows being used.

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

#### Location

- Advance street name guide signs should be installed in advance of the intersection in accordance with Section 2C-3 of the MUTCD.
- The location of the street name guide sign on a signal span wire may vary. However, it shall not interfere in any way with the motorist view of the signal heads. The preferred location is to the right side of the signal heads. 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.
- In the event that a critical or significant intersection is not signalized, street name signs should be post mounted. Lateral distances and heights shall conform to the Department's Roadway and Traffic Design Standards, Index No. 17302.

#### Legend and Border

- Advance street name and street name guide signs should consist of upper case letters in accordance with Sections 2A-15 and 2D-5 of the MUTCD. Letter height (legend) should be 265 mm upper case and 200 mm lower case for E-Modified and 250 mm upper case and 200 mm lower case for Series C.
- Series E Modified letters are most desirable. However, Series C letters are acceptable.

#### Panel Size and Color

- A 450 mm high sign blank is recommended for use on advance street name and street name guide signs.
- Advance street name and street name guide signs shall have a white message and border on a green background. High intensity sheeting should be used on all overhead advance street name and street name guide signs for added visibility at night.

## Section II.3

### SIGNS AND MARKINGS AT NON-SIGNALIZED INTERSECTIONS OF DIVIDED HIGHWAYS AND CROSSROADS

#### Definitions

*Median width.* The distance from the edgeline of the inside through travel lane in one direction to the edgeline of the inside through travel lane in the opposite direction. In the event that the median width varies from one side of the intersection to the other, the greater median width should be used to determine the appropriate signing and marking scheme.

*Crossroad.* Any intersecting roadway, paved or unpaved, which is maintained by a public agency. It does not include crossovers or "T" intersections. Driveways and entrances to businesses are not considered crossroads. However, if large malls or office complex developments exist it may be necessary to install the signs and markings noted herein. This decision should be based upon good engineering judgement and is left to the discretion of the District Traffic Operations Engineer.

#### Median Widths Under 9.0 m

For divided highways with medians under 9.0 m wide, the signing and markings shown in Standard Index No. 17346 should be used. Pavement markings or traffic control devices in the median area are not required or recommended. ONE WAY (R6-1) and DIVIDED HIGHWAY (R6-3 and R6-3a) signs are optional and should only be installed when evidence and/or experience indicates a problem with wrong way movements. WRONG WAY (R5-1a) and DO NOT ENTER (R5-1) signs should only be used as a last resort and after an engineering investigation indicates that no other countermeasures are appropriate.

Where the difference in elevation is such that both sides of the roadway are not visible, the signing and markings required for median widths 9.0 m and greater shall be used.

#### Median Widths 9.0 m and Greater

For divided highways with median widths 9.0 m and greater, the signing and markings shown in Standard Index No. 17346 should be used. The TURN PROHIBITION (R3-1) sign should only be used when problems are experienced with wrong way maneuvers. WRONG WAY (R5-1a) and DO NOT ENTER (R5-1) signs should only be used as a last resort and after an engineering investigation indicates that no other countermeasures are appropriate.

Generally, the Department's typical median opening design encourages "inside" opposing lefts on the mainline rather than "outside" lefts. Pavement markings in the median area are not appropriate for this type of design. Pavement markings such as stop bars and centerlines should only be used in the median area under one or more of the following conditions:

- The median intersection geometrics do not encourage inside left turns.
- Pavement markings would enhance the intersection operations by eliminating undefined operations.
- Placement of markings within the median area will not cause problems with vehicle queues on the mainline left turn lanes.

#### **General**

- The recommended size for the YIELD (R1-2) sign is 750 mm. STOP (R1-1) signs should be 750 mm or greater.
- Where DO NOT ENTER (R5-1) signs are warranted, they shall be installed in accordance with Section 2B-26 of the MUTCD. When WRONG WAY (R5-1a) signs are warranted, they should be installed 45 to 75 m from the crossroad, depending on the existence of other signs and on the highway speed.



## Section II.4

### SYMBOL SIGNS ON THE STATE HIGHWAY SYSTEM

#### 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.

#### Conditions for Use

- 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 arise extenuating circumstances where a word message sign is more appropriate. In these cases, the District Traffic Operations Engineer should maintain documentation of the exception in district files.
- Any proposed new symbol will require approval as provided in Sections 1A-2 and 1A-6 of the MUTCD. All requests for a new symbol shall be sent to the State Traffic Operations Engineer for review and processing with the Federal Highway Administration.
- 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-13 of the MUTCD.



**Section II.5**  
**DESTINATION DISTANCE SIGNS AT RURAL INTERSTATE**  
**AND FREEWAY EXIT RAMP TERMINALS**

- Combined DESTINATION-DISTANCE (D1-2a) signs should be used at exit ramp terminals on rural interstates and freeways in lieu of DESTINATION (D1-2) signs.
- The combined DESTINATION-DISTANCE sign shall only be used facing exiting traffic from rural interstate and freeway ramps.
- Existing DESTINATION signs at exit ramp terminals should be replaced with the combination DESTINATION-DISTANCE signs during the course of routine sign replacement activities.
- 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 Statistics Office.
- 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.
- Distance figures shall be shown just after the destination name.
- Signs shall have a white legend on green background. The signs shall be individually detailed in plans utilizing 200 mm numerals and upper case letters and 150 mm lower case letters.



## Section II.6 BRIDGE SIGNS AND MARKINGS

### Bridge and Sign Structure Low Clearance Signs

- A LOW CLEARANCE (W12-2) sign shall be placed in advance of every bridge or structure having a minimum vertical clearance of 4.5 m or less except as noted below.
- 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.
- 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 4.2 m or less.
- LOW CLEARANCE signing and marking shall conform with additional criteria outlined in Section 2C-34 of the MUTCD.

### Bridge Pier Marking

- Bridge piers shall be marked only when they are not protected by a guardrail or a barrier and are less than 9.0 m from the near edge of pavement.
- The marking used shall be a Type 3 object marker 300 by 900 mm 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.
- For additional emphasis, a large surface bridge pier may be treated with sheeting having diagonal stripes at least 300 mm wide and similar in design and application to the Type 3 object marker.

### 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.

### Narrow Bridge Treatment

Signs and markings on narrow bridge approaches shall be as shown in Standard Index No. 17359.



## Section II.7 PLACE NAME SIGNS ON THE STATE HIGHWAY SYSTEM

### Definitions

*Place Name Sign.* Sign identifying the geographic boundary of a city or county government or the outer extremity of an unincorporated community lying on or along a road on the State Highway System.

*Unincorporated Community.* A significant, identifiable group of people living in a distinct, common, unincorporated geographical area which lies on or along a road on the State Highway System such as a village, development, isolated subdivision or similarly developed place located primarily in a rural area.

Place name signs identifying geographic boundaries of local governments (counties, cities, municipalities) normally shall be erected and maintained on roads on the State Highway System by the Department.

Nonconforming signs in place as of April 19, 1990, may remain in place for their useful life but not to exceed seven years.

### Exclusions

- Place name signs other than for geographic boundaries of local incorporated governments shall not be erected on limited access highways or freeways.
- Place name signs for other governmental boundaries such as water management, school and fire districts shall not be erected on the State Highway System.
- Place name signs should not normally be installed for urban subdivisions unless they appear on the full size Official Transportation Map (not on the urban area blowups).
- "Exiting" or "Leaving" place name signs shall not be permitted.
- Overhead signs/structures shall not be permitted.
- Place name sign requests originated by organizations or persons other than the local government shall not be considered.

### Criteria for Unincorporated Communities

- If an unincorporated community appears on the Official Transportation Map of Florida, signing should be provided by the Department upon request by local jurisdiction.
- Place name signs for an unincorporated community not appearing on the current Official Transportation Map of Florida may be considered upon written request of the county having jurisdiction to the District Traffic Operations Engineer. Such requests should be accompanied by evidence supporting reasonable need.
- There should be clearly identifiable localized development in the area that is significantly more intense than encountered on the State Highway approaches to the community.
- The community must lie on or along the State Highway System.
- The horizontal/vertical curves of the roadway may restrict advance notice to motorists approaching the community.
- The community is a county seat or has historical, cultural, educational interests or major tourist attractions which are not separately signed.
- A post office, railroad station, water tower or similar structure bearing the place name exists in the community.
- The county has installed or agreed to install place name signs on their roads traversing the area.
- Upon the approval and erection of place name signs for an unincorporated area not appearing on the Official Transportation Map, the District Traffic Operations Engineer shall issue an opinion on whether the location is a specifically identifiable community.

If so, the District Traffic Operations Engineer shall forward to the Department's Surveying and Mapping Office supporting documentation including the location and name of the unincorporated place to be added to the Official Transportation Map. The decision to include the qualifying place name on the Official Transportation Map rests with the Surveying and Mapping Office.

### Sign Characteristics

- Place name signs shall have a white legend on a green rectangular background.



- Place name signs shall be reflectorized and shall conform to the MUTCD standards and specifications for guide signs and general information signs.
- Sign information should normally be limited to the name of the place.
- Only one sign should be permitted in each approach direction. The signs should be located at or in close proximity to the geographical boundary of the county, city or municipality.

### **Customized Place Name Signs**

- Customized treatment shall be considered only for city limits, incorporated municipalities, and counties on State Highways other than limited access highways or freeways.
- The preferred location of customized place name signs is off the State Highway right-of-way, where increased lateral clearance can be used. When additional right-of-way is not available, the Department should authorize placement of the sign within State Highway right-of-way. Sufficient lateral clearance is particularly important for custom place name signs due to nonstandard designs and sizes.
- The sign and structure or other treatment shall be located at or in close proximity to the geographical boundary of the city or county in the approach direction only.
- The proposed installation will not interfere in any manner with other traffic control devices in the area.
- Existing city limit or county boundary signs and/or nonofficial signs or structures at or near the location shall be removed.
- All signs and supporting structures shall be designed, constructed and installed to meet the Department's clear zone and safety criteria including breakaway features. The design shall be signed and sealed by a Professional Engineer registered in the State of Florida.
- Sign size and lettering shall be appropriate for driver readability without slowing down.
- Sign information shall be limited to the name of the city or county logo, the words "Welcome To", and where appropriate, a regional designation or phrase.
- The sign and structure shall be completely devoid of any commercial advertising or the name of any political incumbent and of such design and color as to be considered in good taste and aesthetically pleasing.

- The primary location for custom place name signs shall be along the roadside behind curb and gutter sections. Medians should only be considered if other roadside locations, either on or off State Highway rights-of-way, are not practical.
- Installations in any median shall meet the Department's appropriate clear zone and safety criteria. Signs shall not be installed in both the median and roadside at a given location.
- Displays shall be fixed. No flashing or colored lights nor changeable messages shall be used. However, customized treatment may include interior or exterior illumination. In the absence of lighting, signs shall be reflectorized.
- Upon approval of a customized-place name sign request, the Department and the local government shall execute an agreement providing for the local government to install and maintain the customized sign/sign supports and all landscaping and shrubbery associated with the installation as well as to defray the cost of any electrical energy necessary for operation of the sign display. The agreement shall clearly indicate that the Department reserves the right to have the installation modified or removed from within the State Highway rights-of-way if deemed necessary for any reason.

## Section II.8 MOVE ACCIDENT VEHICLES FROM TRAVEL LANES SIGNS

### Location and Placement

- The District Traffic Operations Engineer shall determine placement of signs in conjunction with MUTCD requirements.
- MOVE ACCIDENT VEHICLES FROM TRAVEL LANES (FTP-46) signs shall conform to the Department's Roadway and Traffic Design Standards Index No. 17355.
- MOVE ACCIDENT VEHICLES FROM TRAVEL LANES (FTP-46) signs 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 accidents.
- MOVE ACCIDENT VEHICLES FROM TRAVEL LANES (FTP-46) signs of a smaller size may be used in urban non-freeway settings when their use will reduce queue lengths and delays, remove interference with traffic signal vehicle detectors or enhance intersectional capacity.

### Physical Characteristics

- Signs shall be rectangular in shape with black letters on a white reflective background.
- Sign sizes are shown in Index No. 17355 and should fit most locations; however, the use of other sizes is not precluded.



## Section II.9 NO PASSING ZONE SIGNS

- The NO PASSING ZONE (W14-3) pennant sign shall **not** be used routinely at the beginning of all no passing zones.
- 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:
  - 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.
  - Other locations where such signs are determined desirable for safety as a result of an engineering study.
- Proposed use of NO PASSING ZONE pennant signs at locations meeting the above criteria shall be reviewed and approved by the District Traffic Operations Engineer prior to installation.



## **Section II.10 VENDING MACHINE SIGNS**

### **Physical Characteristics**

VENDING MACHINES signs will be 1650 mm wide and 750 mm high with two lines of legend in 200 mm, Series D letters. The legend and border will be white on blue.

### **Location and Placement**

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.

At some rest areas there is a fold-up SAFETY BREAK FREE COFFEE sign in this location. At these rest areas the new sign is to be a fold-up sign also. The 1650 to 750 mm size will match the old sign in size.

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





## Section II.11 GUIDELINES FOR BICYCLE WARNING SIGNS

### Definitions

*Bicycle Facilities.* A general term denoting improvements and provisions by public agencies to accommodate or encourage bicycling.

*Bicycle Sharing Roadway Signs.* Signs used to warn motorists that bicycles and vehicles can legally use/share travel lanes.

*Designated Bicycle Facilities.* Bicycle lanes that are always designated or marked with a solid white line, bike lane signs, and bicycle symbols on the pavement.

*Designated Bicycle Trails.* Any mapped recreational bicycle routes.

### General Instructions

To have maximum effect, these signs are to be used with discretion only at locations that have a problem, and only where one or more of the following criteria are met:

- Safety problems when the roadway cannot be improved for bicycle features.
- When a high level of bicycling can be anticipated.
- When a known roadway courtesy problem exists.

Designated bicycling facilities are not eligible for this sign. As a general rule, corridors where paved shoulders or designated bicycle lanes are present will not be considered unless a special safety or road courtesy problem exists. Then the signs may be placed for added information.

Prior to action by the District Traffic Operations Engineer, the District Bicycle Coordinator shall review and recommend approval of all signing requests.

### When Sign Requests May Be Approved

- Roadway sections that have a higher than average number of bicycling accidents will be considered for signing.
- Roadway sections where motorists are likely to pass one or more bicyclists at least every 1.5 to 5.0 km during daylight hours should be considered for signing.

- Roadway sections that have special problems should be considered even if a lower volume of bicycling is anticipated. For instance, a roadway section that has the potential to attract bicyclists that has been narrowed for the standard 3.6 m (12 foot) width may be considered.
- Where designated bicycle trails are placed on short stretches of a major roadway that has not been improved for bicycling.
- On approaches to bridges or any other section where motorists and bicyclists have reduced sight distance or operating widths or have been compromised due to right-of-way or actual roadway geometry restrictions.

### **Sign Placement**

- The BICYCLE SHARING ROADWAY sign should be erected 45 to 90 m in advance of any turn and elsewhere for straight-ahead confirmation, if needed.
- In urban areas, it shall be mounted at the right of the roadway, not less than 2.0 m above the curb, and at least 300 mm back from the face of the curb. In rural areas, it shall be not less than 1.5 m above the rear edge of pavement and 1.8 to 3.0 m to the right of the roadway edge.
- The sign shall be erected only at locations reviewed and approved by the District Traffic Operations Engineer to ensure that such signs do not interfere with existing traffic control devices.

### **Sign Evaluation**

Districts should perform studies to determine the effectiveness of bicycle warning signs and send study results and recommendations to the Central Traffic Engineering Office.

## Section II.12 RECYCLING COLLECTION CENTER SIGNS

### Definition

A *Recycling Collection Center* is a facility open full time to the general public for the purpose of collecting items to be recycled, for example, 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.

### Requests for Signing

- Requests for permitting the erection of RECYCLING COLLECTION CENTER signs within the State Highway System right-of-way should be reviewed by the District Traffic Operations Engineer.
- Only requests submitted by local governments should be considered.

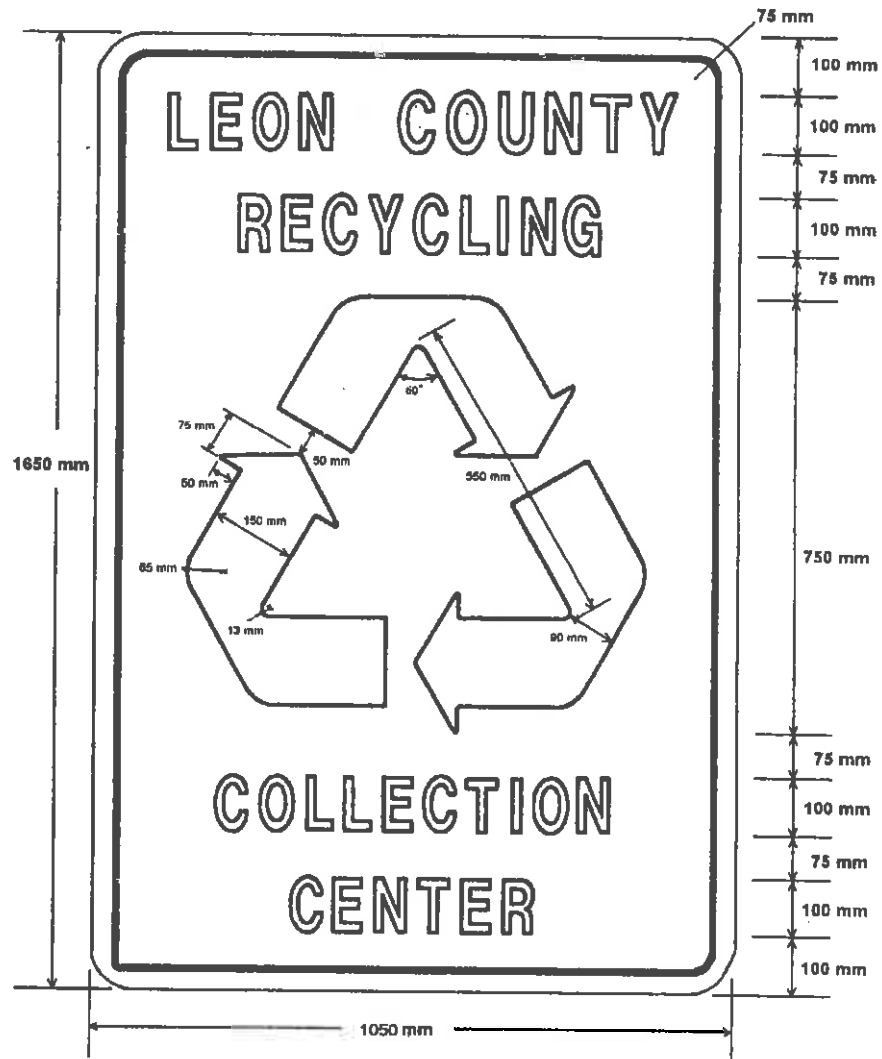
### Sign Design

- Refer to Figure II-1 for a detail of the RECYCLING COLLECTION CENTER sign.
- The RECYCLING COLLECTION CENTER sign shall be no larger than 1650 mm high and 1050 mm wide. Lettering shall be 100 mm, Series C.
- Only the top line of legend may be used to indicate the municipality responsible for operation of the center. The top line of legend is optional and may use smaller lettering or abbreviations as needed. The legend and border shall be white on green.
- A Directional Arrow (M-Series) may be attached below the sign panel if desired.

### Sign Placement

- RECYCLING COLLECTION CENTER signs placed on the State Highway System should adhere to the mounting heights and lateral clearances specified in the MUTCD and the Department's Roadway and Traffic Design Standards. Support systems shall meet or exceed the Department's Standards of Frangibility.
- 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.

Figure II-1. Recycling Collection Center Sign



## Section II.13

### SIGNING FOR SAFETY BELT USE AND CHILD RESTRAINT LAWS

#### Purpose

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 safety belt use and child restraint laws signing.

#### Background

Elements of the media and organizations involved with traffic safety education and enforcement of laws have urged the Department to inform motorists of laws requiring the wearing of safety belts and the use of child restraint devices.

In the Florida Safety Belt Law (316.614, F.S.), the Legislature mandated that 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.

The Department was unable to respond to signing requests as the Federal Highway Administration (FHWA) had consistently ruled against signing that advocated compliance with state laws. However, FHWA's Administrator Bamhart, in his letter of August 20, 1987 to Senator Lawton Chiles, stated that such signing is permissible when needed for driver guidance or to aid enforcement.

With this change in FHWA position, the Secretary requested that appropriate signing be erected and a directive dated November 5, 1987 issued by the Deputy Assistant Secretary for Technical Policy and Engineering Services initiated actions that have resulted in appropriate signing. This policy is consistent with but replaces such directive and promulgates continuation of the subject signing on a permanent basis. This document supersedes Procedure No. 750-010-014.

#### State Highway System Points of Entry

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. These signs shall be placed in an appropriate location downstream of existing "Welcome to Florida" and speed limit signs. Such signs shall bear the legend:

SAFETY BELT  
CHILD RESTRAINT  
USE REQUIRED  
BY LAW

## Rest Areas and Interstate Welcome Centers

A sign 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. It shall bear the following legend:

SAFETY BELT USE	FLORIDA LAW	CHILD RESTRAINT USE
• Front seat passengers of cars, vans, and pickup trucks		• A child three years or younger must be in a federally approved child restraint device
• Individuals may be exempt when certified by a physician		• A child four or five years old must be in a federally approved child restraint device or a safety belt
• Violators may be fined up to \$20		• Law applies to children age five or less in a passenger car, van, or pickup truck
		• Parent or legal guardian may be fined up to \$20 for violation

On the exit from these rest areas and Welcome Centers, the existing "Buckle Up" sign shall be replaced with a sign informing motorists of safety belt and child restraint laws with the following legend:

SAFETY BELT  
CHILD RESTRAINT  
USE REQUIRED  
BY LAW

## Other Locations

The sign described above may be used at other locations on the State Highway System at the discretion of the District Traffic Operations Engineer or higher level authority but should be limited to locations where:

- There is documented evidence of a high ~~accident~~<sup>crash</sup> location;

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- a high percentage of the traffic is composed of tourists or visitors; and
- the sign will not interfere or detract from existing regulatory, guide or warning signs or other traffic control devices.

### **Standard Seatbelt Sign (Figure II-2)**

- To be used for general education purposes.
- Specific locations to be determined by District Traffic Operations Offices.
- Size is 900 by 1200 mm for all applications.

### **Sign Availability**

- Maintenance may obtain new or replacement signs by requisition from the Department's sign shop in Lake City.
- Specific sign design details are on file with the Lake City Sign Shop.

Figure II-2. Standard Seatbelt Sign







## Section II.14

### SIGNING HURRICANE EVACUATION ROUTES

#### Purpose

To establish a uniform basis for erecting and maintaining hurricane evacuation route signs on the State Highway System.

#### Background

- Emergency management officials requested the Department to erect and maintain hurricane 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.
- The Secretary of Transportation determined that hurricane evacuation route signs would be erected and in place on the State Highway System prior to the 1986 hurricane season (June through November). The Department of Community Affairs, Division of Emergency Management, agreed to encourage local governments to erect identical signs on those city streets and county roads designated as approved hurricane evacuation routes.
- In the absence of specific sign standards in the MUTCD, the Department with the guidance and concurrence of the Federal Highway Administration, determined that use of Modified CD-1 Evacuation Signs, removing the CD symbol and arrow and adding the weather symbol for a hurricane, was appropriate.
- This document supersedes Procedure No. 750-020-006.

#### Procedure

- The State Traffic Operations Engineer will obtain hurricane evacuation plans showing approved routes and a listing of County Emergency Management Directors from the Department of Community Affairs, Division of Emergency Management, and shall forward them to the appropriate District Traffic Operations Engineers.
- The District Traffic Operations Engineer shall initiate the actions necessary at the district level to implement these guidelines and that hurricane evacuation routes are properly and promptly signed. District Maintenance will ensure that the signs are erected and maintained in the field.

- The District Traffic Operations Engineer shall contact the County Emergency Management Director and coordinate state signing efforts through the Emergency Management Director with the appropriate local governments.
- Subsequent signing changes necessitated by approved changes in evacuation routes shall be handled by the District Traffic Operations Engineer upon request of the Division of Emergency Management, Department of Community Affairs.
- Technical questions regarding hurricane evacuation routes may be directed to the Bureau of Planning, Division of Emergency Management, Department of Community Affairs (904) 487-4915.

### **Sign Design**

- The HURRICANE EVACUATION ROUTE (FTP-53) sign shall conform to the Department's Roadway and Traffic Design Standards, Index No. 17355.
- Either a 450 mm or 600 mm diameter FTP-53 sign may be used by local governments to indicate roads or streets under local jurisdiction as official hurricane evacuation routes.
- The 600 mm diameter FTP-53 sign shall be used by the Department to indicate roads on the State Highway System as official hurricane evacuation routes. A 900 mm diameter sign may be used on limited access highways.
- Where CD-1 evacuation signs have already been erected by local governments on city streets or county roads, they should be replaced with the FTP-53 signs whenever the CD-1 signs require routine replacement; i.e., due to wear, accidents, vandalism, etc. However, on state highways, they shall be replaced by the Department with the 600 mm diameter FTP-53 signs as part of the initial installation process.
- Local governments may obtain design details for the manufacturing of hurricane evacuation route signs from the District Traffic Operations Engineer or from the Department's Roadway Design Office, 605 Suwannee Street, M.S. 32, Tallahassee, Florida 32399, telephone (904) 487-1949.

### **Sign Use**

- The FTP-53 sign shall be used exclusively to sign hurricane evacuation routes that have been so designated on evacuation route plans approved by the Department of Community Affairs.

- The FTP-53 sign shall be used to guide motorists to destinations *away* from potential high-risk areas; i.e., signs shall be posted to guide traffic in the direction shown on approved evacuation route plans.
- The sign shall comply with applicable provisions of the MUTCD.

### Sign Placement

Signs shall be placed in accordance with existing Department standards and be consistent with the MUTCD and safety criteria.

- The HURRICANE EVACUATION (FTP-53) sign with stock M6 arrow plate, where appropriate, shall be erected 45 to 90 m in advance of, and at any turn in an approved evacuation route and elsewhere for straight-ahead confirmation, if needed. In urban areas, it shall be mounted at the right of the roadway in the outbound direction only, not less than 2.1 m above the curb, and at least 300 mm back from the face of the curb. In rural areas, it shall be ~~not less than 1.5 m~~ above the near edge of pavement and ~~1.8 to 3.0 m~~ to the right of the roadway edge.

### Sign Installation

- Signs shall be furnished, erected and maintained by the Department on official evacuation routes that are on the State Highway System.
- Signs shall be erected only at locations reviewed and approved by the District Traffic Operations Engineer to insure that such signs do not interfere with existing traffic control devices.

### Shelter and Traveler Information Signing

The statewide emergency evacuation plan must compliment both local and regional evacuation plans. In order to assist in this effort, shelter signing and emergency evacuation traveler information is included in this section.

The State Traffic Operations Engineer will coordinate, address and implement operational concerns on evacuation route signing and related operational needs with the Safety office, and other offices within the Department and with the Department of Community Affairs, Division of Emergency Management.

The District Traffic Operations Engineers will coordinate hurricane 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

(Comprehensive Emergency Management Plan) area/regional evacuation plan. The plan should assign responsibility for turning the "flip up" signs up during emergency conditions, and back down when conditions return to normal.

Shelter signing will ~~not~~ be allowed on limited access facilities due to:

*Considerations*

- The variability of local and out of area traffic demands;
  - the availability/location of shelters for local needs, compared to location/availability for out of area users; and
  - the variable occupancy rate of shelters.
- or delete*
- For these reasons, the best strategy is to provide travelers with the most current and accurate information on shelter availability, location, etc. as the motorist is traveling into an area on the interstate, Turnpike, or other limited access state highway.

### Shelter Sign Design and Use

The color for shelter signs will be blue background with white legend and directional arrow.

On the State Highway System, signing for shelters will be allowed on only non-limited access facilities. The type of shelter signing support used on the State Highway System, portable (temporary), or permanent, will be determined by the District Traffic Operations Engineer.

The sign designs for shelters are shown in Figure II-3 for permanent signing and II-4 for temporary. The permanent design will use a "flip up" design as shown in Figure II-6. This means the bottom panel will be flipped up to reveal the shelter message. The Safety Belt Symbol Sign or DIAL \*FHP message may be used as the default message for shelter signs.

### Traveler Information Signing Design and Use

The Traveler Information sign shall have a blue background with a white legend. The legend will be four lines:

TRAFFIC  
INFO  
TUNE  
0000 AM

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 up signs as shown in Figure II-5. A default message for the flip up sign may be the DIAL \*FHP or Safety Belt Symbol sign.

Figure II-3. Permanent Shelter Signing



Sign Width (mm)	Sign Height (mm)	Letter Size (mm) Series	Arrow Size (mm)
1200	1200	200 C	600 by 300
900	1200	150 C	450 by 225
600	750	100 C	300 by 150

Figure II-4. Portable Shelter Sign

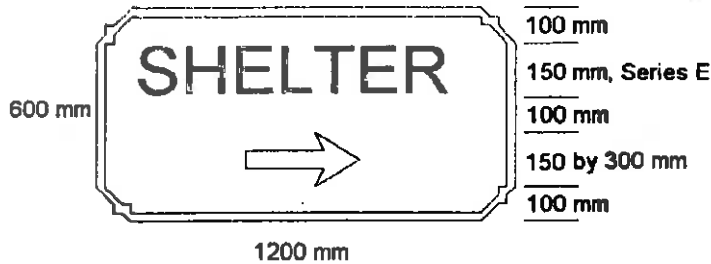
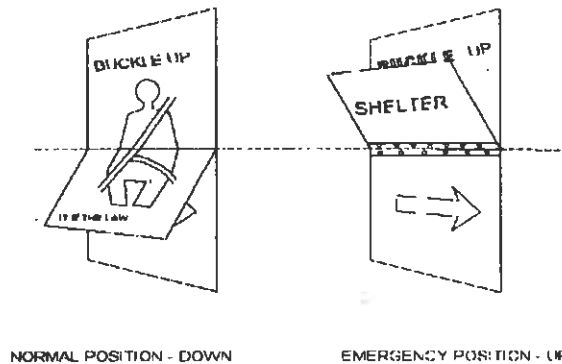


Figure II-5. Traveler Information Sign



Sign Width (mm)	Sign Height (mm)	Letter Size (mm) Series
1200	1200	150 E
900	1200	125 C

Figure II-6. Flip Up Sign



**Continuous Hinge Requirements**

The continuous hinge shall be of stainless steel, with minimum 1.5 mm leaf thickness, 50 mm open width and 3.0 mm pin diameter. The hinge shall be attached to the aluminum sign panels with 3.0 mm stainless steel pop rivets installed on 100 mm centers for the width of the sign. The pin must be permanently located in place by shortening the pin at each end of the hinge and staking the ends of the two outboard knuckles.

Two sources for these hinges are:

- H.A. Guden Co. (800) 344-6437 FAX (516) 737-2933
- Stanley Co. (800) 622-4393 FAX (800) 445-5723

## Section II.15 SMOKE ON HIGHWAY SIGNS

### General

The occurrence of fires in close proximity to highways in Florida often creates safety hazards to motorists. These fires can be accidental forest and brush fires or intentional, controlled burn fires. In virtually every case, Florida Department of Agriculture, Division of Forestry Officials are most knowledgeable of the location and seriousness of the situation.

Several years ago portable temporary smoke warning signs were purchased by the Department of Transportation for use by Division of Forestry officials. These signs were to be used in emergency situations where smoke created a hazard to motorists. This section of the Traffic Engineering Manual continues this practice and documents the authority of the Division of Forestry to erect temporary signs on the State Highway System.

### Procedure

Each Forest Area Supervisor employed by the State of Florida Department of Agriculture, Division of Forestry is authorized to approve the placement of portable sign assemblies warning motorists of smoke on the State Highway System. These signs may be erected upon the decision by the Forest Area Supervisor that sufficient smoke is present and creating a safety concern to motorists.

The sign locations shall be located in advance of the hazard area in both directions to allow motorists time to react to the sign message. Signs shall be double-mounted on divided highways.

The appropriate Department of Transportation Maintenance Office shall be notified within the shortest possible time (not to exceed four (4) hours) when SMOKE ON HIGHWAY signs are used so that coordinated efforts can be developed.

Conditions must be monitored and the signs removed when conditions improve to the extent where these signs are not needed. The removal of these signs should be done by Division of Forestry personnel or Department of Transportation Maintenance forces, whoever erected the sign.

The signs and support hardware must comply with Department standards and shall consist of a portable wind resistant stand and roll-up 1200 by 1200 mm retroreflective warning sign, yellow with black lettering, with legend as indicated in Figure II-7.

Figure II-7. Smoke on the Highway Sign





## Section II.16

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

#### Purpose

This section of the manual will provide for a system of supplemental guide signing that will perform the following functions:

- Inform and guide motorists to the needed signed facilities and services.
- Improve traffic flow at interchanges or intersections near destinations that generate a large volume of traffic.
- Establish criteria for the erection of supplemental guide signs and motorist service signs.

#### Scope

To establish criteria for the installation of supplemental guide and motorist services signs (excluding Rule Chapter 14-85, FAC, Logo Sign Program), on ALL HIGHWAYS (including toll facilities) maintained and operated by the State of Florida Department of Transportation.

#### Definitions

*Limited Access Highway:* A street or highway especially designed for through traffic and over, from, or to which owners or occupants of abutting land or other persons have no right or easement of access, light, air, or view.

*Non-Limited Access Highway:* A street or highway designed with access to abutting land, characterized by at-grade intersections, cross streets and assigned right of way. These roadways can function as an arterial, collector or local functional classification, as reflected by trip characteristics and the level of property access.

*Rural Interchange:* An interchange outside the limits of any urban or urbanized area as defined in Section 334.03, Florida Statutes. Where either the right of way of a limited access roadway or the right of way of an intersecting roadway constitutes the boundary of an urban or urbanized area, the interchange or intersection shall be considered urban.

*Supplemental Guide Sign:* A sign that provides information regarding destinations accessible from an interchange, other than places shown on the standard interchange signing.

**Tourist Attraction:** Florida tourist attractions are facilities that principally provide recreation, amusement or leisure activities to the general public, the majority of which do not reside in the immediate area of the attraction, and travel over 160 km to enjoy what the facility offers. Tourist attractions may be publicly or privately owned, but derive the major portion of their income from these non-resident visitors.

**Trailblazers:** Signs erected at strategic locations, usually along major urban arterials in conjunction with the signing of a major destination, tourist attraction, or motorist service facility on a limited access highway. These signs should provide the distance or direction to the nearest or most convenient point of access. These signs should match the color scheme, or symbol as found on the limited access highway.

## **SUPPLEMENTAL GUIDE SIGNING**

### **Limited and Non-Limited Access Highways - General Criteria**

- Supplemental guide signs for other than recreational, historical, or cultural facilities shall be white on green in color. Signs for recreational, historical, or cultural facilities shall be white on brown in color. If there is an existing white on green supplemental guide sign in place, a combination sign consisting of white on green and white on brown may be used with the colors separated by a common white border.
- Signing for a destination with a limited period of operation should be displayed only during those periods of operation, and only if the generator meets the suggested annual attendance criteria referenced in Table II-4 for Limited Access and Table II-5 for Non-Limited Access. If occasional off-season usage exceeds 25 percent of the annual attendance rate for most of the year, the signs may be displayed permanently. Pari-mutuels exhibit distinct seasons and may be signed for at the discretion of the District Traffic Operations Engineer.
- Signing for major short term events, e.g. golf and tennis tournaments, that will attract a significant number of non-residents, may be erected, by permit, with approval of the District Traffic Operations Engineer. Static signs may be erected no more than one week before nor should remain one week after. Sign costs which include, but are not limited to, design, installation, maintenance and removal of the signing should be paid by the requestor. At the discretion of the District Traffic Operations Engineer, either Changeable Message Signs (CMS) or static signs may be used. Both the static or CMS signing will be installed through the Department's permit process. CMS devices must only be used for traffic control, devoid of advertisements. CMS devices must be certified by the Department for use on the State Highway System, and only used during the time of the event with a generic message. All applicable Department clear recovery zone requirements must be met, and short-term event signing cannot interfere with visibility/effectiveness of existing traffic control devices.

- In no case shall information relating to destinations, motorist services, and multi-modal facilities be displayed on a supplemental guide sign until trailblazer signing has been installed to direct motorists from the exit or intersection to the destination, service, or facility.
- When there are more qualified destinations than can be signed for, local government may specify the facilities to be signed, with the approval of the District Traffic Operations Engineer. If local government has no preference, the ones that create the greatest traffic demand shall be shown, subject to standards specified in the following sections.
- No supplemental guide signs for destinations may be erected prior to approval by the District Traffic Operations Engineer.
- Supplemental signs shall not be installed where such signing interferes with the function of traffic control devices or other more important guide signing, including impairment of visibility and violation of minimum spacing distances listed in Table II-2 for both Limited and Non-Limited Access Highways.

Speed (km/h)	Minimum Spacing Distance (m)
50 to 60	60
60 to 70	75
80 to 90	90
90 to 110 (Interstate)	245

- Florida Farm Wineries qualify for signing as defined by Section 599.004, Florida Statutes.
- The District Traffic Operations Engineer may approve signing for regional malls or shopping centers (93,000 square meters or more ) when the route to the facility is not obvious to the motorist or safety or operational problems can be attributed to unclear directions. Safety and operational problems must be documented and effect both site destined and other traffic. Local government concurrence of the request is required before it will be considered.
- A periodic review should be established by District Traffic Operations Engineers to determine if supplemental destinations are still in business.
- Signs may be provided for any state-funded community college, vocational/ technical center, or university main campus. Signing may be provided for

satellite campuses if the curriculum allows students to obtain an Associate of Arts (AA) degree or higher without attending the main campus. Additional suggested criteria for private colleges and universities are referenced in Tables II-4 and II-5.

- Signing for multi-modal transportation facilities is considered supplemental guide signing, except for those which qualify as a motorist service.
- Multi-modal facilities are airports (air carrier, and general aviation), seaports (passenger and cargo), rail terminals, intercity bus, parking lots, garages, and Park and Ride.
- A signing plan for multi-modal facilities should be submitted to the District Traffic Operations Engineer for review and approval.
- The suggested criteria referenced for destinations listed in Tables II-4 and II-5 are used to determine which destination will be signed for on both Limited and Non-Limited Access Highways. A more detailed explanation is shown in the Sign Evaluation Process section.

#### **Limited Access Highways - Standards**

- Not more than one supplemental guide sign may be erected at each interchange approach.
- Not more than two supplemental destinations may be signed at any one interchange approach. Each supplemental guide sign shall contain no more than two destinations with no more than three lines of legend, excluding exit numbers or exit directions.
- Each destination may be signed only once in each direction.
- Signs for destinations shall be located in advance of the interchange that is the most practical route to the facility. Local government may be consulted on the most practical route.
- "DOWNTOWN" signs shall meet the following criteria in order to be considered for supplemental signing:
  - "DOWNTOWN" signs will only be considered for the largest core city of a recognized urban area of 50,000 population or more.
  - The limited access highway must traverse the incorporated limits of the city under consideration and have multiple exits for each direction of

travel.

- Urban guide signing concept as specified in the MUTCD must be in effect.
- A distinct central business district must exist with an established grid street system. Strip development business centers shall not qualify.
- The central business district must be located within three km of the interchange for which such signing is being considered.
- Only one such sign will be permitted for each direction of travel. The sign shall be erected in advance of the most direct route to the downtown core.
- Trailblazers shall not be erected on the mainline portion of limited access highways.
- Except as otherwise specified in Rule Chapter 14-85, FAC, Logo Sign Program, and other areas of this section, the name of the operating agency, community group, or enterprise may not appear in the legend of any supplemental sign.
- Major metropolitan area airports and major seaport passenger facilities are considered prime destinations and may be included in advance guide signs.
- Signing for general aviation will not be allowed.

#### **Limited Access Highways - Guidelines**

- Supplemental guide signs should not normally be installed in advance of freeway-to-freeway interchanges. Interchanges between freeways are major decision points; therefore, the sign messages should contain only the route shield, cardinal direction, and the name of the next control city on that route.
- Supplemental guide signs may be installed in advance of freeway-to-spur interchanges if the spur serves a local community.
- Recreational, historical, or cultural attractions should meet the following specific criteria in order to be considered for signing:
  - The recreational, historical, or cultural attraction should be identified by name on the current Florida Department of Transportation Map or other state published/sponsored guides or books, and/or other State Historic Signing Programs, i.e. Wildlife Signing Program. Identification on local city maps does not qualify an attraction for interstate signing.

- The cultural or historical attractions must be located within proximity to the limited access highway and provide easy access for motorists and ample all-weather (surface treated) parking. The attraction may be publicly or privately owned, but must be operated on a non-profit basis and be open to the general public year-round for sign consideration. Examples include forts, battlegrounds, plantations, archeological or geological sites, art galleries, and museums.
- Historic attractions must be listed in the National Register for Historic Places.
- Recreational attractions are major facilities located adjacent to or in close proximity to the limited access highway corridor which provide easy access for motorists, ample all-weather parking areas, and several recreational activities such as picnicking, camping, hiking, swimming, fishing, or boating. Examples include public recreational facilities and wildlife refuges. Recreational attractions in this category must be operated on a non-profit basis.
- The suggested criteria referenced in Table II-4 may be used as a guide to determine which destination to sign for on new interchanges, or to determine which destination to add to an existing supplemental sign, with an existing destination.
- Unincorporated communities must meet the criteria as shown in the *Place Name Signs on the State Highway System* section of this manual in order to qualify for signing.
- **Airports**
  - Air Carrier airports are those which are served regularly by scheduled airlines. (List and revisions compiled and available from the Aviation Office). The airport symbol should also be used with the airport name.
- **Seaports**
  - Deep water public cargo, or passenger ports (for Port Authority Locations).
- **Rail Terminals**
  - Intercity Rail (Amtrak, Commuters, etc.) Should be ICC, PSC Certified, or FDOT approved, and provide regularly scheduled passenger service and have parking spaces for patrons use.

- **Park and Ride**

- Governmentally owned and operated as part of a car pool, van pool, or other public transportation program. The facility must have parking spaces for patrons use.

**Limited Access Highways - Destinations For Which Signing Shall Not Be Provided**

Except as provided in Rule Chapter 14-85, Logo Sign Program or Motorist Services, signing shall not be provided for the following destinations shown in Table II-3.

Businesses	Chamber of Commerce, Television/Radio Station, Theaters, Motels/Hotels/Inns, Travel Trailer Parks, Industrial Parks and Plants, Shopping Centers (less than 93,000 square meters).
Cemeteries	Local, State, Public, Private.
Community Facilities	Libraries, Churches, Subdivision, Mixed Use Facilities.
Governmental	Research/Experimental, Courthouses, Drivers' License Centers, Jails, Civil Defense Facilities, Maintenance Facilities, Power Plants.
Schools	K through 12, Seminaries.
Historical	Homes/Buildings, Privately Owned Facilities.
Medical	Mental Facilities, Research Facilities, Sanitariums, Infirmarys/Treatment Centers, Non-Hospital Veteran's Facilities, County/Fraternal/Nursing Homes, Retirement Facilities, Humane Facilities.
Military	Sites/Detachments, Armories, Arsenals.
Recreation/Conservation	Country Clubs/Golf Courses, Fish Hatcheries, Game Farms, Tree Nurseries/Arboretums, Points of Interest, Camps (Scout, Church 4-H, Youth, YMCA/YWCA).

**Non-Limited Access Highways - Standards**

- Not more than six qualifying destinations including cities shall be signed at any intersection approach. These qualifying destinations shall be indicated on not more than two separate signs with no more than three lines of legend on each sign.
- If there are three destinations to be signed at a given intersection, all three destinations shall be included on one sign where practical.

- Signs for destinations shall be located in advance of the intersecting roadway that is the most direct and/or desirable route to the facility. Local government shall be consulted on the most desirable route.

### **Non-Limited Access Highways - Guidelines**

- Signs may be provided for any state or national park, or state forest open to the public. Advance mileage signs for these parks may be installed on approval of the District Traffic Operations Engineer. Sign panels should be provided by the park. Advance signs should be located no more than 16 km from park entrance.
- "DOWNTOWN" signs shall meet the following criteria in order to be considered for supplemental guide signing.
  - "DOWNTOWN" signs will be considered for cities with a population of 5,000 or more.
  - The non-limited access highway route must traverse the city limits.
  - A distinct central business district must exist with an established grid street system. Strip development business centers shall not qualify.
  - The central business district must be located within 800 m of the non-limited access highway.
  - Only one such sign will be permitted for each direction of travel.
- The suggested criteria referenced in Table II-5 may be used as a guide to determine which destination to add to an existing supplemental sign, with an existing destination.
- Signs may be erected for recreational, historical or cultural attractions funded by federal, state, or local governments. Such attractions must meet the following specific criteria in order to be considered for signing:
  - Historical attractions must be listed in the National Register of Historic Places and be open to the general public year round. City historic areas or districts must be officially declared by either city or county resolution in order to qualify for signing.
  - Cultural attractions must be open to the general public year round.
  - Signs for such facilities should be limited to the nearest State Highway System juncture.



- Recreational attractions are operated on a non-profit basis and include multiple activities such as picnicking, camping, hiking, swimming, fishing, or boating.
- The recreational, historical, or cultural attraction is identified by name on state published/sponsored guides or books, and/or other State Historic Signing Programs, i.e. Wildlife Signing Program, Canoe Trail Signing Program.
- Signs may only be erected to identify parking areas for state or local recreational trails.
- Requests for destination signing by local government agencies must be approved by the District Traffic Operations Engineer through the Department's permit process. The District Traffic Operations Engineer may allow local government to fabricate and install these supplemental guide signs. Signs for the following facilities may be erected at the intersection nearest the facility.
  - Post Offices
  - Libraries
  - Recycling Drop-Off Centers
  - Courthouses
  - Publicly-owned Vocational/Technical Schools. (Should meet criteria established in Table II-5)
  - Parks
  - High Schools
  - Tax Collectors
  - Chamber of Commerce
  - Animal Shelters
  - City/Town Halls
  - Landfills
  - Bus and Rail Stations
- Parking Lots and Garages
  - Governmentally owned and operated (open to public), with non-reserved parking spaces (open to public), and not more than 1.5 km from the intersection. These signs shall be white on green in color.
- Rail Terminals
  - Intercity rail, same as for limited access highways.
  - Intra-urban rail should be approved by DOT, provide regularly scheduled service, have parking spaces for patrons use.

- Intercity bus service, same as for limited access highways.
- Seaports, same as for limited access highways.
- Airports
  - Air carrier, same as for limited access highways.
  - General Aviation (open to public use) signs may be provided in each direction along the State Highway System in advance of an intersecting roadway which provides direct access to the airport property. Signing should be limited to an intersection within five km of the airport.

**Non-Limited Access Highways - Destinations Which Signing Shall Not Be Provided**

Except as provided in Rule Chapter 14-85, Logo Sign Program or Motorist Services, signing shall not be provided for the following.

- Commercial Enterprises and Businesses such as Television/Radio Station, Theaters, Motels/Hotels/Inns, Travel Trailer Parks, Industrial Parks and Plants, Shopping Centers (less than 93,000 square meters).
- Civic Groups, such as Kiwanis, Lions, Rotary, etc.
- Community Facilities, such as cemeteries, churches, etc.
- Water and Soil Conservation District Boundaries.
- Infirmaries or Treatment Centers.
- County, Fraternal or Nursing Homes.
- Retirement Facilities.
- Recreation Centers, such as community centers, swimming pools, baseball/softball fields, tennis courts, etc.
- Country Clubs and Golf Courses.
- Tree Nurseries and Arboretums.
- Grade Schools (K-9).

## TRAILBLAZING SIGNS

The use of a distance "countdown" system on trailblazer signs for destinations which are eight km or more from the interchange or intersection is **highly** recommended. The use of the distance "count down" system for destinations eight km or less from the exit, should be considered when a motorist could drive through highly developed areas, or through a "Y" intersection, or multiple strip developments to reach their destination. The use of the countdown distance system should be based upon specific site/area conditions.

## MOTORIST SERVICES SIGNS

Motorist services signing may be used when such services are infrequent, and not within sight of the interchange.

### Limited and Non-Limited Access Highways - General Criteria

- Requests for motorist services signing (except Logo signing) shall be directed to the District Traffic Operations Engineer.
- Signing for motorist services is considered supplemental to overall signing.
- Motorist services signs, including signing for state agency buildings, have a white legend on blue background, except for multi-modal facilities.
- The name of the operating agency, community, group, individual's name or enterprise shall not appear on the service sign, except for state agency buildings, and other facilities meeting the criteria established in this section.
- Symbol signs for **Hospital, Airport, Amtrak, Greyhound, Cruise-based Seaports and Commuter Rail** may be used in urban or rural areas, at the discretion of the District Traffic Operations Engineer.
- **Tourist Information Centers** will use word legend signs.
- In no case shall signing be erected that would function primarily as advertisements for businesses.
- Signs for a **Hospital** may be erected on the State Highway System in advance of the interchange or intersection which provides the most practical route to that facility when:
  - The hospital facility has an emergency room open 24 hours each day, seven days a week. Where more than one hospital meeting the criteria is available from any one interchange or intersection, only the hospital

located closest to the exit point shall be signed or trailblazed for.

- Meets suggested criteria referenced in Table II-4 for Limited Access and Table II-5 for Non-Limited Access Highways.
- **Tourist Information Center** signs may be erected on the State Highway System for such centers which:
  - Give continuous service for a minimum of eight hours a day, seven days a week;
  - Are operated exclusively by a non-profit making organization.
  - If the **Tourist Information Center** is operated on a seasonal basis, the signs shall be removed during the off season.
- In no case shall information relating to motorist services be displayed until trailblazer signing has been installed to direct motorists from the exit or intersection to the service.

#### **Limited Access Highways - Standards**

- Except as otherwise specified in Rule Chapter 14-85, FAC, Logo Sign Program, where logo signs are utilized, general motorist signs shall not be used. Signing for motorist services off the Department's right of way will not be provided when those services are conveniently located off an interchange.
- Except as otherwise specified in Rule Chapter 14-85, FAC, Logo Sign Program, only symbol signs will be used to advise the availability of **Gas, Food, Lodging, Camping, Hospital, and Phone** on rural limited access highways. Symbol signs for **Hospital** may be used in urban areas at the discretion of the District Traffic Operations Engineer.
- When three or less of these services are available at a given interchange and where it is unlikely that more than three services will be provided in the near future, the symbol signs denoting these services may be appended to the advance guide sign. At locations where the "NEXT EXIT 00 MILES" panel is attached to the advance guide sign, the symbol service signs may be appended to the exit direction sign. If four or more services are available at an interchange or anticipated in the near future, it will be necessary to install a supplemental roadside sign denoting the available services by symbols with the bottom line of copy reading "NEXT RIGHT" or the interchange exit number.

## Limited Access Highways - Guidelines

- **Gas**

- Service station facility is located within 1.5 km of the exit ramp terminal;
- is open for continuous service a minimum of 16 hours each day, seven days a week;
- provides vehicle services including fuel, and oil;
- provides public rest rooms; and
- has a telephone available for public use.

- **Food**

- A restaurant facility is located within 1.5 km of the exit ramp terminal;
- serves a complete meal and is open for continuous service a minimum of 14 hours each day, seven days a week;
- provides public rest rooms;
- has a telephone available for public use; and
- is licensed as meeting the requirements of the Florida Department of Business Regulation, Division of Hotels and Restaurants and the local County Health Department.

- **Lodging**

- The lodging facility is located within 1.5 km of the exit ramp terminal;
- is equipped with 20 or more units for rent;
- has a telephone available for public use; and
- is licensed as meeting the requirements of Florida Department of Business Regulations, Division of Hotels and Restaurants and the local County Health Department.

- **Camping**

- The camping facility is located within eight km of the exit ramp terminal;
- is equipped with a minimum of 25 rental camp sites;
- is equipped with indoor sanitary toilet and bathing facilities;
- has a telephone available for public use; and
- is licensed as meeting the requirements of the local County Health Department.

- Signs for a **Hospital** may be erected in rural and urban areas in advance of an interchange when:

- The hospital facility is located not more than 16 km from the exit ramp terminal; and
- in the event a hospital meets the criteria, but another hospital is closer by continuing along the limited access facility to another exit, the first hospital will not be signed for.
  
- **Signs for a Tourist Information Center** may be erected when the center is located on a direct route from the limited access highway and not more than 1.5 km from the exit ramp;
  
- **Telephone** symbol signs may be erected when:
  - The telephone is a public telephone available for use 24 hours a day, seven days a week; and
  - is located within the immediate interchange area, not more than 800 m from the interstate or freeway exit ramp; and the immediate interchange is located in an isolated rural area.
  - Signs denoting **Telephone** may not be installed in advance of interchanges where **Gas, Food, Lodging, or Camping** is identified since a criterion for signing for these services includes the availability of a telephone for public use.

#### **Non-Limited Access Highways - Standards**

- Not more than one sign with a directional arrow for a particular service may be displayed, in each direction, in advance of the intersection to the facility. Signs for these services shall only be located in advance of the intersecting road which is the most direct and best route to the facility.
  
- Signs may be placed on the State Highway System for driver license, police, sheriff, and highway patrol stations.
- Signs for **Hospital** may be installed when the hospital is located not more than five km from an intersection (other than trailblazing from a limited access highway).
  
- Signs may be installed for a **Tourist Information Center** when the center is located not more than 1.5 km from the state highway.

#### **Non-Limited Access Highways - Guidelines**

- **Boat Ramp** and **Camping** signs may be erected on the State Highway System in rural areas in advance of intersecting roads with direct access to the boat ramp, canoe or camping facility provided that facility is located not more than 1.5 km from the state highway.

Signing will be provided to state agency buildings which large numbers of the general public access. The sign panels will be supplied by the requestor and installed where space allows on the State Highway System by FDOT Maintenance forces. The requestor will also supply replacement panels when necessary. The sign will be installed adjacent to the building on the State Highway System. If the building is located more than 1.5 km from the state highway, then the sign will be placed at the nearest intersection and trailblazing signs to the building will be supplied by the requestor. Signing will be provided to those state agency buildings where the need for directional information based on emergency situations, such as emergency evacuation shelters, permits and/or a state gas facility, is necessary. All other state agency buildings must meet the following criteria:

- The number of non-employee trips generated by the building should meet the criteria established in Table II-5.
- Meeting space for a minimum of 30 people.

## SIGN EVALUATION PROCESS

Sign requests should generally be evaluated according to a series of criteria. Requests may originate from city or county resolution, official representatives of schools or universities, and representatives of tourist attractions or businesses.

Upon receiving a request districts should:

- Determine if the request concerns an eligible destination or service.
- Ascertain whether the trip generation meets or exceeds the criteria. Are there seasonal considerations or is there significant rapid growth projected?
- Does existing guide and supplemental guide signing contain adequate space for additional sign legend? Can a supplemental sign be added?
- Does the proposed design, location, materials, and support structure fully comply with Department Design Standards?
- Finally, will the addition of the subject destination or service provide a benefit to the motoring public?

If the request complies with these criteria and has the support of the District Traffic Operations Engineer, the request may be approved.

Occasionally, there may be situations where available space precludes signing for all desired destinations or a new destination generates more trips than a destination

already shown on a sign. Recalling that the intent of guide signing is to provide guidance for drivers who are not familiar with the route or area, the following suggestions should be considered:

- Preference should be given to destinations that would attract a larger number of trips from longer distances.
- Consideration should be given to the likelihood that the destination will continue to generate a high number of trips or if there are seasonal characteristics.
- Local government participation may be helpful in reaching a decision.

Supplemental guide sign destinations should be subject to a four year review cycle to verify that the trip generation characteristics are consistent with Department signing goals. This review will insure that at least mid-way through the life of the sign panel (approximately 7 to 8 years) an opportunity will exist to make sign changes.

Tables II-4 and II-5 are to be used as guidelines and not as mandatory criteria. The suggested criteria will assist the District Traffic Operations Engineer when determining which destination will be signed for on both Limited and Non-Limited Access Highways.



TABLE II-4. GUIDELINES FOR SIGNING DESTINATIONS ON LIMITED ACCESS HIGHWAYS

TYPE OF DESTINATION	CRITERIA	GUIDELINES		
		Major Metro Areas <sup>1</sup>	Urban Areas <sup>2</sup>	Rural Areas <sup>3</sup>
State and National Parks	km from Interchange	24	24	24
Private Colleges and Universities	Number of Trips Generated Annually	900,000 <sup>a</sup> 1,200,000 <sup>b</sup>	550,000 <sup>a</sup> 750,000 <sup>b</sup>	300,000 <sup>a</sup> 450,000 <sup>b</sup>
	km from Interchange	24	24	24
Private Vocational/ Technical Schools	Number of Trips Generated Annually	675,000 <sup>a</sup>	550,000 <sup>a</sup>	300,000 <sup>a</sup>
	km from Interchange	24	24	24
Military Bases	Number of Trips Generated Annually <sup>c</sup>	5,000,000	4,000,000	3,000,000
	km from Intersection	16	16	16
Arenas, Auditoriums, Civic Centers, Convention Halls, Stadiums, Major Tourist Attractions (Fairgrounds, Amusement Parks, Zoos, etc.)	Number of Trips Generated Annually <sup>d</sup>	200,000	165,000	135,000
	Seating Capacity (If Applicable)	6,000	5,000	4,000
	km from Interchange <sup>4</sup>	8	8	8
Historical, Cultural, or Recreational Attractions	Number of Trips Generated Annually <sup>d</sup>	50,000	50,000	50,000
	km from Interchange <sup>4</sup>	24	24	24

- 1 Over 50,000 population.
- 2 5,000 to 49,000 population.
- 3 Under 5,000 population.
- 4 The distance may be increased 800 m for each 10% over either the trips generated or minimum seating requirement listed to a revised maximum of two times the maximum distance listed.
- a College or university without dormitories, each student equals 1.5 trips. Figures based on AASHTO's 1993 Selection of Supplemental Guide Signs for Traffic Generators.
- b College or university with dormitories, each student equals 2.0 trips. Figures based on AASHTO's 1993 Selection of Supplemental Guide Signs for Traffic Generators.
- c One employee or military personnel equals 0.9 trips. Figures based on AASHTO's 1993 Selection of Supplemental Guide Signs for Traffic Generators.
- d Trip - a single or one-direction vehicle movement, either to or away from the traffic generator.

TABLE II-5. GUIDELINES FOR SIGNING DESTINATIONS ON NON-LIMITED ACCESS HIGHWAYS				
TYPE OF DESTINATION	CRITERIA	GUIDELINES		
		Major Metro Areas <sup>1</sup>	Urban Areas <sup>2</sup>	Rural Areas <sup>3</sup>
State Colleges and Universities	Nearest State Highway System Juncture			
Private Colleges and Universities	Number of Trips Generated Annually	900,000 <sup>a</sup> 1,200,000 <sup>b</sup>	550,000 <sup>a</sup> 750,000 <sup>b</sup>	300,000 <sup>a</sup> 450,000 <sup>b</sup>
Private Vocational/ Technical Schools	Number of Trips <sup>4</sup> Generated Annually	675,000	550,000	300,000
Military Bases	Number of Trips <sup>4</sup> Generated Annually	5,000,000 <sup>c</sup>	4,000,000 <sup>c</sup>	3,000,000 <sup>c</sup>
Arenas, Auditoriums, Civic Centers, Convention Halls, Stadiums, Tourist Attractions, Racetracks, Jai-alai, Recreational Areas, Fairgrounds, Museums, Zoos and Planetariums	Number of Trips <sup>4</sup> Generated Annually		37,500 Trips plus 3,750 Per km of Distance from Intersection	
State and National Parks	Nearest State Highway System Juncture			
Youth Camps (YMCA, Scouts, etc.)	Signing only in rural areas, with facilities for 50 persons minimum on an overnight basis and in operation for at least six months of the year			
Institutions and Medical Facilities	Minimum of 500 beds Nearest State Highway Juncture			
Downtown	There must be a clear central core commonly considered the downtown area that is located on an intersecting road a maximum of five km off the state road			
Drivers License	Nearest Intersection Only			
State Agency Buildings	Number of Trips <sup>4</sup> Generated Annually	260,000	100,000	1,500
Florida Highway Patrol, Police, Sheriff Stations	In advance of the building on the State Highway System			

- 1 Over 50,000 population (Section 334.03, Florida Statutes)
- 2 5,000 to 50,000 population (Section 334.03 Florida Statutes)
- 3 Under 5,000 population
- 4 Trip - a single or one-direction vehicle movement, either to or away from the traffic generator.
- a College or university without dormitories, each student equals 1.5 trips. Figures based on AASHTO's 1993 Selection of Supplemental Guide Signs for Traffic Generators.
- b College or university with dormitories, each student equals 2.0 trips. Figures based on AASHTO's 1993 Selection of Supplemental Guide Signs for Traffic Generators.
- c One employee or military personnel equals 0.9 trips. Figures based on AASHTO's 1993 Selection of Supplemental Guide Signs for Traffic Generators.

New 4/96

## Section II.17 EMERGENCY HIGHWAY TRAFFIC PLAN

### General

Emergency Highway Traffic Regulation (EHTR) is a joint function of government at all levels, working with civil associations and organizations, and with the Second U.S. Army having specific responsibilities in highway transportation in the event of a national emergency. Organizations represented include:

- Department of the Army, acting for the U.S. Department of Defense.
- Federal Highway Administration (FHWA).
- Florida Department of Community Affairs, Division of Emergency Management (DEM), coordinating efforts in the event of an emergency.
- Florida Department of Transportation (FDOT), having primary responsibility for emergency highway traffic regulation.
- Florida Highway Patrol (FHP), acting for police services at all levels.
- Florida Highway Users Federation, acting for organized highway users.
- Florida Public Service Commission (PSC), for the Interstate Commerce Commission.

This plan establishes the regulation of traffic around or through dangerous areas, the observance of priorities for essential traffic, and the clearance of traffic over routes of limited capacity. The plan will be placed in effect when so directed by or on behalf of the Governor.

### Definitions

*Class A Routes.* Highway sections lying within areas that are hazardous to the life and health of highway users.

*Class B Routes.* Highway sections that are temporarily reserved exclusively for a special purpose, such as military or civil defense movements. Emergency road use permits will not be required for these movements.

*Class C Routes.* Highway sections that have or that are expected to develop critical traffic capacity restrictions or volume demands. At specific times, travel will be generally limited to holders of emergency road use permits.

*Emergency Highway Traffic Regulation (EHTR).* A system of traffic management and control devised to regulate the use of highways and to expedite and facilitate essential movements during a national defense emergency or a natural disaster.

***EHTR District Center.*** The centers designated as subordinate to the State EHTR Center and responsible for a Department of Transportation District, supervised by the State EHTR Center, and located at DOT District Headquarters.

***EHTR Post.*** Control points at each end of or along regulated routes, for the purpose of controlling the flow of traffic onto or on the routes, checking emergency road use permits, and advising occupants of vehicles of any possible dangers.

***EHTR Sector Center.*** The centers designed by the State as subordinate to, and supervised by the appropriate EHTR District Center, and responsible for the control of traffic in and through their respective EHTR Sector.

***EHTR State Center.*** The center designated as the headquarters for overall supervision of the Emergency Highway Traffic Regulation within the State of Florida. Depending on the nature of the disaster, the center will be activated at either the Department of Transportation Central Office or Division of Emergency Management in Tallahassee, Florida.

***Regulated Routes.*** Selected highways which must be subjected to control by the EHTR organization because of hazardous conditions, special uses, or limited capacity.

***Emergency Road Use Permit.*** A legal permit form issued to authorize specific travel over a designated regulated route during a specified time.

### **Responsibilities of Organizations**

***Department of the Army.*** Receives requests from military users and obtains the necessary clearances in coordination with the other users staffing the EHTR centers. Coordinates and disseminates information to all military installations and activities as needed.

***FHWA.*** The FHWA representative will furnish advice and guidance to FDOT and act only in a liaison capacity.

***Division of Emergency Management.*** Assists FDOT, FHP, and PSC in maintaining liaison with other services. Provides space when available for EHTR center operating space. Recommends assignment of state- and privately-owned radio frequencies for the EHTR network. Acts as claimant for road space. Provides communications when available.

***Florida Department of Transportation.*** Directs EHTR programs. Furnishes personnel to EHTR centers. Furnishes operations space for State and District EHTR Centers. Designates routes as clear, or regulated, Class A, B, or C. Furnishes personnel to aid in marking of restricted areas. Furnishes suitable state, area, and county maps and

charts. Provides available communications to EHTR network. Furnishes appropriate signs and barriers for marking restricted areas.

*Florida Highway Patrol.* Supervises the enforcement of EHTR. Furnishes personnel to EHTR centers and posts. Coordinates with county and local law enforcement agencies in control of traffic. Furnishes radio communications for EHTR activities. Furnishes space for sector centers. Supervises EHTR posts.

*Organized Highway Users.* Coordinate between organized highway users in Florida through the PSC at EHTR State Center and organized highway users in adjacent states in claiming space, determining roadway allotments, and issuing permits for movements of essential intra- and interstate traffic.

*Public Service Commission.* Provides equipment and personnel to centers. Aids in the allocation of road space as determined by the traffic engineer or his delegate at the EHTR center and issuing of permits for movements of traffic. Provides necessary forms, equipment, and clerical staff to process road space claims. Coordinates with local, area, and state users groups as necessary. Disseminates information for and about EHTR organizations. Provides communications when available.

### State EHTR Center

The State EHTR Center will be the central authority and responsibility for activating and coordinating all agencies and subordinate EHTR centers involved. The center will be staffed by officials from FDOT, FHWA, PSC, DEM, and the 2nd Army. The State EHTR Center upon activation would:

- Identify and evaluate the availability and the traffic-carrying capacity of usable highways, roads and streets within the State, including all those within areas of unrestricted travel and those that can be opened to controlled use through hazardous areas.
- Develop and maintain a State situation map showing damaged or destroyed highways and highway facilities.
- Inform the public of closed highways.
- Estimate traffic demand for essential movement for the entire usable highway network.
- Determine the percentage of highway traffic capacity to be reserved at the State EHTR Center for Interstate traffic.
- With assistance from District and Sector Centers, make periodic checks on traffic volumes on main routes to determine whether the traffic volume is

approaching the capacity of the route. As volume reaches capacity, take action to institute partial or complete traffic regulation of the route to insure the movement of essential traffic.

- Prescribe maximum and minimum speeds in keeping with local conditions.
- Inform all District Centers of the regulated routes within their boundaries and the number of road-spaces allocated to such centers for issuance of emergency road use permits.
- Issue emergency road use permits.

### **District EHTR Center**

District EHTR Centers will be staffed by personnel from FDOT, the Public Service Commission, Florida Highway Patrol, and/or related organizations having districtwide capabilities in EHTR. District EHTR Centers upon activation would:

- Receive from the State EHTR Center all necessary information and guidance for its operation.
- Develop and maintain, with respect to the district, a situation map showing damaged or destroyed highways and highway facilities in the district, and available detours and report these to the State EHTR Center.
- Reserve prescribed percentage of the highway traffic capacity of each regulated route for through traffic.
- With assistance from sector centers, make periodic checks on traffic volumes on main routes to determine whether the traffic volume is approaching the capacity of the route. As the volume reaches capacity, institute partial or complete traffic regulation and notify State and Sector EHTR Centers.
- Activate Sector Centers (county, city or metropolitan area) that are initially located at FDOT Maintenance Offices in each district, as prescribed by the State EHTR Center, and recommend to the State EHTR Center the establishment of other sectors as necessary to facilitate the movement of essential traffic. Since these facilities are normally operational, supplies and equipment are already on hand.
- Inform Sector Centers of regulated routes within the sector boundaries and the amount of space available to the sector against which it may issue emergency road use permits.
- Coordinate operations with the appropriate area emergency operating center.

- Within the limits assigned by the State EHTR Center, issue emergency road use permits for trips originating in the district.
- Erect signs on routes through restricted and unrestricted areas.

### **Sector EHTR Centers**

Sector Centers will operate under the supervision of a FDOT engineer or his delegate. Sector Center staff will consist of selected personnel from FDOT, PSC, FHP and/or related organizations and will include the following:

- One traffic engineer familiar with the sectors system of roads, road condition reports, and traffic engineering and control procedures.
- One representative of police services, familiar with the sector's network of law enforcement agencies, communications and traffic control procedures.
- One representative of PSC having knowledge of highway transportation operations within the sector.

The Sector EHTR Centers upon activation would:

- Maintain a situation map showing damaged or destroyed highways and highway facilities in the sector and available detours.
- Make periodic checks on traffic volume and recommend to the District Center the institution of emergency highway traffic regulation as volume reaches traffic carrying capacity.
- Within limits assigned by the District Center, issue emergency road use permits for trips originating in the sector.
- Coordinate requests for inter-sector movements with the District Headquarters.
- Erect signs on routes through restricted or unrestricted areas.

### **EHTR Posts**

Posts will be manned by law enforcement personnel.

- Restrict the use of regulated routes to those vehicles displaying emergency road use permits.

- Place and maintain as necessary appropriate traffic regulation signs and barricades.
- Maintain where feasible adequate lighting and personnel for 24-hour operation.
- Maintain communication with EHTR Center responsible for supervising the post.
- Through the exercise of sound judgment, meter emergency vehicles into the traffic stream.
- Maintain a suitable off-the-road holding area for vehicles which do not have emergency road use permits.
- Implement procedures for handling non-emergency vehicles without emergency road use permits.

### **Road Space Allotment**

- Travel on Class C routes is defined as:
  - Local (within a sector or to an adjacent sector)
  - Intermediate (between more than two sectors or to an adjacent district)
  - Long distance (between more than two districts or between states)
- The State EHTR Center must consider both immediate and long-range needs. It will determine periodically the amounts and rates of available road space on Class C routes, and determine the percentages of these which should be allotted to local, intermediate, and long distance travel. It will establish and announce general rules to be followed by all subordinate EHTR Centers. It will inform adjacent states of general operating conditions and will coordinate interstate travel.

### **Priorities**

- The State EHTR Center will advise subordinate centers of transportation priorities and allocations which are established by national and state transportation authorities for general emergency services.
- Specific application of these priorities will be made by a joint decision of the representatives at the State EHTR Center, with the final responsibility resting with the District EHTR Supervisor.
- Specific priorities will be established as the need arises.



- Subordinate EHTR centers will allot road space to units of transportation under their jurisdiction.

### **Emergency Road Use Permits**

- Master copies of Emergency Road Use Permits, Figure II-7, should be kept at the State, District and Sector EHTR Centers.
- Users requesting road space should make application to the EHTR Center nearest their point of origin.
- Emergency Road Use Permits will usually be issued by the lowest echelon of the EHTR that is able to grant the request. This will be the EHTR Sector Center, except in cases of extreme emergency (as determined by the State EHTR Center) when the EHTR posts will assist the sector in this responsibility where applicable.

### **Traffic Regulation and Enforcement**

- The physical control of traffic will remain a function of the proper law enforcement agency.
- The Florida Highway Patrol or other law enforcement member of each center's staff will serve as liaison with appropriate law enforcement agencies in the jurisdiction of the center.
- Standard traffic regulation measures used under normal conditions will continue to be used, whenever possible, during time of emergency.
- The use of signs and marking devices will be as outlined in the MUTCD. However, the guidelines established by the Manual are not intended to preclude the use of any device deemed necessary to cope with the situation at hand.
- Information regarding traffic regulation on specific routes will be furnished to users when Emergency Road Use Permits are issued.

Figure II-8. Emergency Road Use Permit

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		FORM 750-910-01 TRAFFIC ENGINEERING 03/93
<b>EMERGENCY ROAD USE PERMIT</b>		
No. _____		
Trip Origin _____		
Trip Destination _____		
Number and type of vehicle _____		
_____		
Owner _____		
Commodity _____		
Shipment priority _____		
Regulated route number _____		
Authorized time of entry _____		
(and/or such other items of information as may be appropriate)		
Loading EHTR Center _____		
By _____		
12	Highway Road-Use Permit for Regulated Route Number	12 - 1
11		1 - 2
10		2 - 3
9		3 - 4
8		4 - 5
7		5 - 6
6		6 - 7
5		7 - 8
4		8 - 9
3		9 - 10
2		10 - 11
1		11 - 12
Loading EHTR Center _____		
By _____		
Valid only on _____, 19 _____		

**STATEMENTS OF PENALTY FOR MISUSE TO BE PRINTED ON BACK OF FORM:**

During a National Emergency this permit is the property of the United States Government. Its counterfeiting, alteration or misuse is a violation of 18 U.S.C., Section 499 (1948). Violators shall be fined not more than \$2,000 or imprisoned not more than five years, or both.

During a Statewide Emergency this permit is the property of the State of Florida. Its counterfeiting, alteration or misuse is a violation of Sections 831.01 and 831.02 of the Florida Statutes (1991). Violators shall be fined not more than \$5,000 or imprisoned not more than five years, or both.

## Section II.18

### \*FHP HIGHWAY ASSISTANCE PROGRAM

The \*FHP Highway Assistance Program is a statewide program where motorists wishing to report highway related information to the Florida Highway Patrol can do so by using their cellular phone. Signs will be erected to inform motorists of the cellular phone number.

The signing program will extend to all Interstate, Toll, U.S. Routes, and other major State Highway System roadways throughout the state.

The \*FHP sign (Figure II-9) will have a white legend on blue background and may be ordered from the Lake City Sign Shop.

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

- Interstate and other limited access routes:
  - At state and county lines
  - At approximately 50 km intervals
  - Following major freeway to freeway interchanges
- Major arterial routes:
  - At state and county lines
  - At approximately 50 km intervals
  - Downstream from intersections formed by junctions of U.S./major State Highway System roadways

The locations 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.

Figure II-9. \*FHP Sign





**Section II.19**  
**SIGNING FOR OFF-SITE RENTAL CAR RETURN FACILITIES**

This section is reserved for future publishing of our policy dealing with signing for off-site rental car return facilities. We are currently submitting this as a request to experiment to Federal Highway Administration.

When the experiment is complete the policy will appear in this section of the Traffic Engineering Manual.



## Section II.20 CALL BOX/MILE MARKER SIGNS

### Purpose

To establish a uniform basis for the installation of the combined motorist aid call box sign and mile marker sign on existing call box poles along the State Highway System.

### Installation

The sign can be installed on the call box poles anytime the call box and the existing mile marker overlap or when the call box is within 60 m of the existing mile marker. The sign will serve as both the call box number and the mile marker. The mile marker number shall be to the whole mile.

For call boxes located farther than 60 m from a mile marker, the call box sign shall have only the call box number. The mile marker will remain on its own pole at its existing location. Once the new signs are installed the corresponding mile marker should then be removed.

The combination call box and mile marker sign should be installed on all new call box projects. For existing call boxes, signs should be replaced in total or as knockdowns occur and a replacement sign is required.

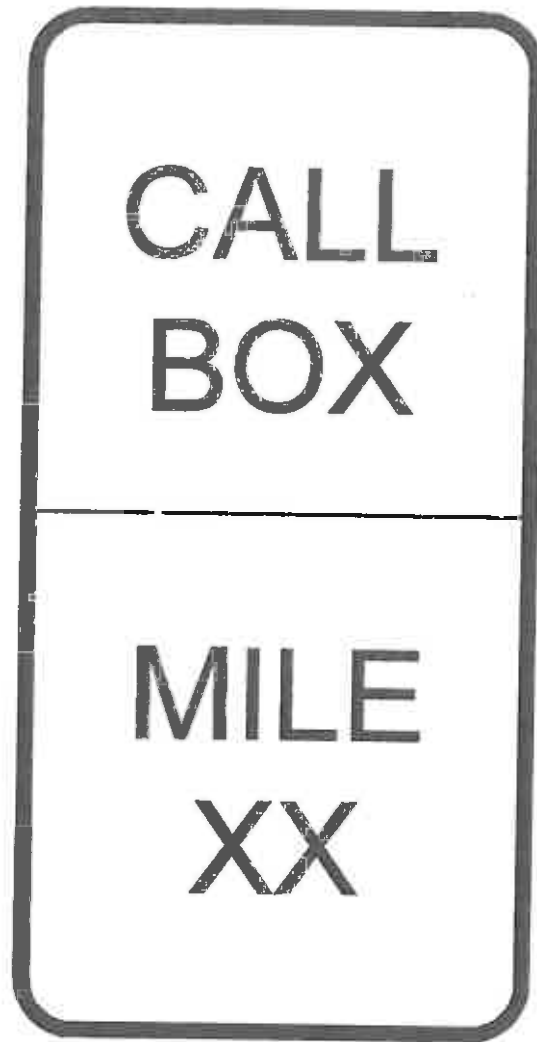
When existing call box signs need to be replaced, it will be Maintenance's responsibility to install the signs. However, for new construction it will be the Contractor's responsibility to supply and install the signs.

### Sign Design (Figure II-12)

The top half of the sign shall be blue reflective background with white lettering and the bottom half of the sign shall be green reflective background with white lettering.

The sign shall be 600 x 1000 mm with both 4E (Call Box and Mile) and 6E (Number) lettering. Specific sign details are available at the Lake City Sign Shop.

Figure II-12. Call Box/Mile Marker Sign





## Section II.21 FLORIDA LITTER LAW SIGNS

### Purpose

In 1988, the Legislature enacted the Solid Waste Act 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.

### Sign Installation

- The FLORIDA LITTER LAW sign (Figure II-13) is to be installed in compliance with Section 403.4131(4), F.S.
- The location of the signs will be on interstate off ramps as required by statute. They should be installed a minimum of 30 m in advance of the first motorist services sign, or a minimum of 30 m in advance of directional signs on the off ramps without motorist service signs.
- The off ramp sign will be 750 x 900 mm with a white background/black legend. Specific sign details are available at the Lake City Sign Shop.
- 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 erect them.

Figure II-13. Florida Litter Law Sign



New 7/97



## Section II.22

### TRAFFIC CONTROL FOR TOLL COLLECTION FACILITIES

#### Purpose

To establish a procedure for the standard application and design of traffic control devices for use on Florida's Turnpike System and other toll collection facilities under the Department's jurisdiction. To guarantee that traffic control devices and their applications at toll collection facilities comply with the State's adopted uniform system of traffic control devices and the Department's standards and specifications. To ensure compliance with Department requirements for certification of traffic control devices.

#### Definitions

*Traffic Control Devices.* All signs, signals, pavement markings, and devices for the purpose of regulating, warning, or guiding traffic, placed on, over, or adjacent to:

- A street or highway by authority of a public body or official having jurisdiction to regulate, warn, or guide traffic on such street or highway; and;
- any place where the public is invited by a nongovernmental entity owning, leasing, or exercising control over such place.

*Traffic Control Signal Device.* Includes, but is not limited to controller assemblies (controller cabinets and their contents); signal heads including the disconnect hanger; detector systems (loops, sealant, amplifier, lead-in wire, or cable); and pedestrian systems (push-button, push-button housing, lead-in wires, and sign).

*Approved Traffic Control Device.* A traffic control device that has been determined by the Department to be in conformance with the adopted uniform system and minimum specifications and also meets or exceeds the Department's Standards and Specifications.

#### General

Sign design and application shall comply with the MUTCD. For the purposes of lane signs, "Exact Change" lanes shall be signed as motorist services signing with white legend on a blue background.

This section does not incorporate the use of SunPass. We will be developing a section to incorporate SunPass standards in the near future. In the meantime, for specific SunPass standards and criteria please contact the Turnpike District.

Advance signing shall be provided to adequately warn the motorist of the approaching toll plaza using signs with the letter height consistent with the MUTCD for approach speeds. Distances shown are measured from the toll plaza centerline and are considered minimum distances. The advance warning signs shall occur in the following sequence:

### **Mainline Plaza Signing (Figure II-14)**

*Toll Plaza 2 Miles.* Overhead, lighted sign, green background/white legend, located 3 km in advance of toll plaza. This sign should be used when the majority of motorists have traveled a distance exceeding 40 km without encountering a mainline toll collection facility.

*Toll Plaza 1 Mile.* Overhead, lighted sign, green background/white legend, located 1.5 km in advance of toll plaza.

*Toll Plaza 1/2 Mile Reduce Speed.* Overhead, lighted sign, yellow background/black legend, located 800 m in advance of toll plaza.

*CARS 0.00.* Advance toll amount for automobiles, located 600 m in advance of toll plaza centerline on both sides of roadway.

The following signs are the *Advance Lane Assignment Group* signs which identify the approach lanes. These signs shall be overhead lighted, located at least 300 m in advance of the toll plaza centerline, or 90 m in advance of the flared pavement area.

- *Exact Change/Cars Only XX* (blue background/white legend)
- *Change - Receipts, Cars - Trucks* (green background/white legend)
- *Wide Lane Keep Right* (yellow background/black legend)
- "Directions"

*Toll Schedule.* Although the fee structure varies, this sign details fees for additional axle combinations. This sign is ground mounted with green background/white legend, and is located 275 m or at the point where the pavement begins to flare to additional lanes.

### **Off-Ramp Plaza Approach Signing (Figure II-15)**

Although ramp lengths vary, the following sequence of signs should be used if sufficient length is available:

*Roadway Exit Sign.* This sign is the MUTCD standard exit sign for the mainline roadway.

*Toll Plaza Ahead 0.00 - Sign No. 804-231.* Used when approaching a single rate toll facility. Warning sign located no greater than 300 m in advance of the toll plaza centerline.

*Toll Plaza Ahead Cars 0.00.* Used when approaching a multiple rate toll facility. Warning sign located no greater than 300 m in advance of the toll plaza centerline.

*Speed Limit Sign.* Regulatory speed zone signs, if needed to slow traffic in 10 mi/h increments to safe ramp speed.

The following signs are the *Advance Lane Assignment Group* signs which identify the approach lanes. These signs shall be overhead lighted, located at the beginning of the flared pavement area, but no closer than 150 m from the toll plaza centerline.

- Exact Change
- Change - Receipts, Cars - Trucks
- Wide Lane Keep Right
- Free Exit Lanes
- Toll Amounts

*Stop Ahead Pay Toll - Sign No. 804-233.* Warning sign located 90 m in advance of the toll plaza centerline.

### **On-Ramp Plaza Approach Signing (Figure II-16)**

Toll facility entrance areas are characterized by low vehicle speeds and short approach distances.

Although often desirable, there is seldom adequate space to provide advance signing for lane assignments. The following signing sequence should be used:

*Advance Destination Lane Assignments.* Used when adequate length exists to provide the motorist advance notice for lane selection, amount of toll, and free lanes. These signs may be ground mounted or overhead as space permits, located at least 120 m in advance of the toll plaza centerline.

*Wide Lane Keep Right.* Located 90 m in advance of the toll plaza centerline on both sides of the roadway.

### **Toll Plaza Signing (Figure II-17)**

Signing for mainline barrier and ramp toll plazas follows the same plan.

*Stop Ahead Pay Toll (or Get Ticket).* Warning sign located on the abutment in front of each toll booth.

*Overhead Messages.* The following signs shall be mounted above the lanes on the toll canopy. One sign may service two adjacent lanes if arrows are used on the sign.

- *Exact Change Cars Only .XX.* Blue background, white legend.
- *Change - Receipts, Cars-Trucks.* Green background, white legend.
- *Variable Message Sign.* May be used in place of the above two signs or to denote a closed lane.

*Stay in Vehicle.* Located on side of booth.

*No Change No Pennies.* Located at unattended automatic lanes.

*Wait for Green.* Attached to red and green signal post in automatic lanes.

### **Exit Area Signing**

*Speed Limit Sign.* Regulatory speed for mainline. Speed advisories on ramp.

### **Typical Sign Layout**

Although actual sign layouts are site specific, typical sign placement for the Mainline and Ramp Plazas are shown in Figures II-14, II-15, II-16, and II-17.

### **Traffic Signals**

The use of traffic signal heads is limited to three applications for toll plazas: lane use control, lane use warning, and traffic regulation within the toll lane.

*Lane Use Control.* Lane use control signals shall be installed over toll plaza lanes and attached to the canopy on the approach sides in accordance with the following conditions:

- Signal design and manufacture shall comply with the MUTCD.
- Assembly shall consist of horizontally mounted 300 mm black signal heads containing a green and red solid ball.
- Signals shall conform to current Department specifications for vehicle traffic control signal heads.
- Traffic signals shall be an approved traffic control device, certified for use on the State Highway System.

*Lane Use Warning.* A red, steady burn, 300 mm ball attached to the canopy on the departure side. This signal head is to help warn motorists approaching from the wrong direction not to

enter the toll lane.

**Traffic Control.** Traffic control signals are required to regulate traffic within automatic toll lanes. The signal display shall rest in the red indication. Upon paying the toll, the motorist will receive a green indication. Traffic control signals shall comply with the specifications for lane use control, certification criteria and also meets the following conditions:

- Signals shall be mounted vertically 1.22 m from the pavement surface to the bottom of the signal head within or at the exit area of the toll plaza.
- Signals shall *not* be located within impact attenuators.
- Assemblies may utilize 200 mm signal heads.

### **Pavement Markings**

Pavement markings are used to delineate intended vehicle travel paths and maintain a separation between those paths; however, in the weaving area in advance of some toll plazas and in areas of reversible toll plaza lanes, they should be omitted.

**Longitudinal Lines.** Definitions for longitudinal lines are consistent with the MUTCD. Applications are as follows:

- **Solid Yellow Line.** Normal application for left edge of pavement delineating separation of directions, stopped within 60 m of approaching and beyond the toll plaza centerline for reversible lane application.
- **Solid White Line.** Normal application for right edge of pavement and as a lane line approaching the toll booth abutment as part of the obstruction markings. When used in this capacity, the solid line should begin 30 m in advance of the obstruction marking taper.
- **Broken White Line.** Used to continue the normal lane lines on the mainline roadway. As pavement width increases in the lane increase transition area, additional lanes should be delineated 3.6 m as width becomes available. Similarly in the lane reduction area beyond the toll plaza, lane lines should be discontinued in accordance with Section 3B-8 of the MUTCD.

**Traverse Markings.** Traverse markings for toll plaza applications consist of diagonal transition markings to define tapers and chevrons delineating the toll booth abutments.

- **Diagonal Transition Markings.** Shall be provided to delineate tapered areas in accordance with FDOT Standard Index No. 17346.

- **Toll Booth Abutments.** Toll booths are treated as fixed obstructions in accordance with MUTCD Section 3B-13 and Figure 3-13c. The toll booth area is unique, however, in that it causes urban type traffic maneuvers even when located in rural areas. Pavement markings shall be provided in accordance with the following criteria:
  - Pavement markings shall follow the urban criteria with a minimum taper length of 30 m.
  - Pavement markings should continue along the abutment forming edge lines for the travel lane.
  - Pavement markings and curbs facing traffic shall be painted white.

### **Raised Pavement Markers**

Raised pavement markers shall be used to enhance pavement markings within the toll plaza area. Color and spacing of RPM's should be in accordance with FDOT Standards and Specifications.

### **Traffic Channelizing Devices**

To minimize the effects of last minute weaving in advance of the toll plaza, to indicate closed lanes, and to assist in guiding the motorist through reversible lane areas, traffic cones may be used.

Traffic cones used for toll facilities traffic control shall be approved traffic control devices with a minimum height of 700 mm and shall be orange in color with reflective collars. Cones shall contain a 150 mm retroreflective band 75 mm from the top and a 100 mm white band 50 mm below the 150 mm band.

Traffic cones used for toll facilities for separating lanes shall be typically placed no less than 3 m apart nor greater than 9 m apart.

### **Toll Plaza Lighting**

Toll plaza lighting should use high pressure sodium lighting fixtures with illumination levels as specified below:

**Conventional Pole System.** Should be designed at 1.5 average initial horizontal footcandles with a uniformity ratio of 4:1 or less and a maximum to minimum ratio of less than 10:1.

**Highmast Lighting System.** Should be designed at 0.9 average initial horizontal footcandles with a uniformity ratio of 3:1 or less and a maximum to minimum ratio of less than 10:1. Mainline



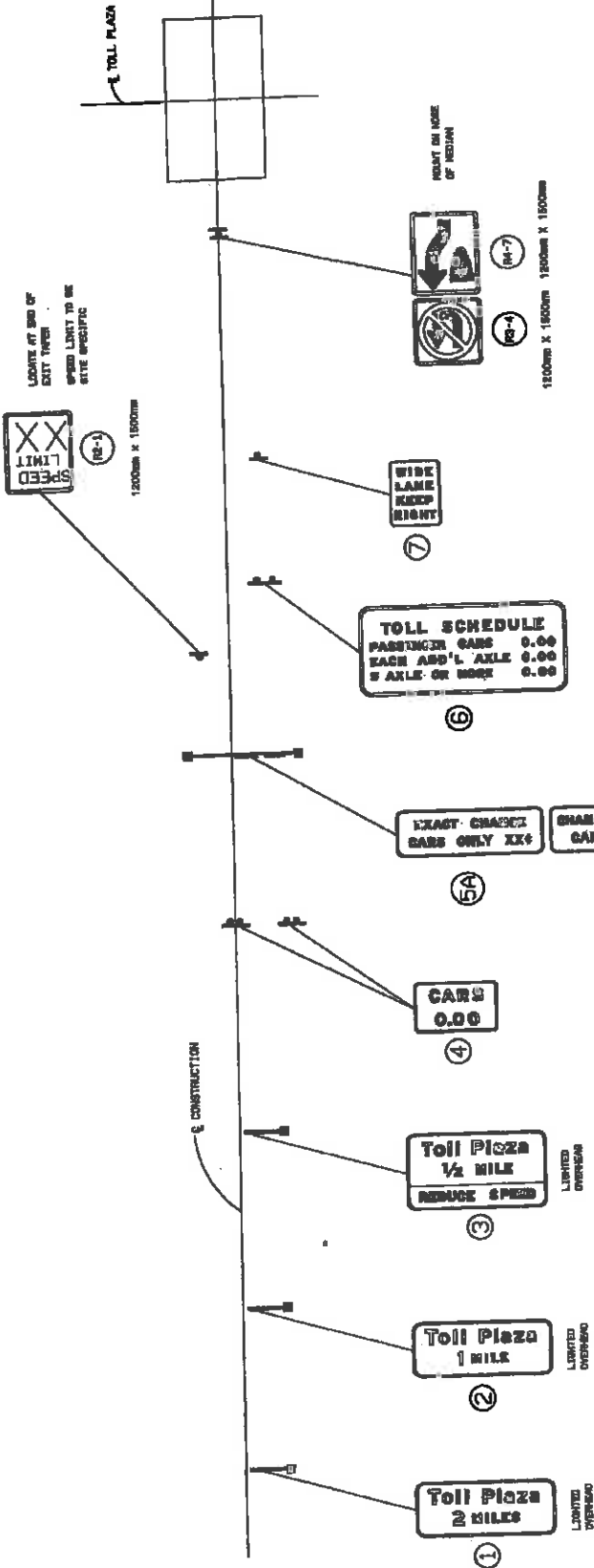
toll plazas should be provided with sufficient lighting to allow the motorist to clearly identify signs and pavement markings in the vicinity of the toll plaza. Lighting should begin 60 m in advance of flared pavement area.

### **Impact Attenuators**

To mitigate the effects of vehicle collisions, impact attenuators shall be used to protect all toll booth abutments on mainline plazas. Impact attenuators should also be used on ramp plazas when approach conditions present particular safety problems. These devices must comply with DOT special details for G-R-E-A-T attenuator model groups 100.100, 200.200 and 300.300. These details are available from the State Roadway Design Engineer in Tallahassee or the District Roadway Design Offices.



# FIGURE II-14 MAINLINE PLAZA SIGNING



STATION	DISTANCE FROM PLAZA (M)	QUANTITY
1	0	2
2	1.8	2
3	5.00m	2
4	600m	4
5	200m	2
6	275m	2
7	275m	2

\* SIGN 1 IS TO BE USED WHEN THE MAJORITY OF MOTORISTS HAVE TRAVELLED A DISTANCE OF MORE THAN 48 Km WITHOUT ENCOUNTERING A MAINLINE TOLL PLAZA.

\*\* SIGN 2 AND 3 ARE TO BE USED TO BE USED IN A COMBINATION OF 2 MILES AND 1 MILE OR 1 MILE AND 1/2 MILE. THESE SIGNS ARE TO BE OMITTED WHEN ALL LANES ARE MANUAL OPERATION.

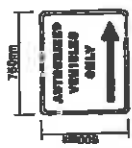
NOT TO SCALE  
FIGURE II-14  
MAINLINE PLAZA SIGNING





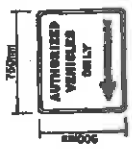
# FIGURE II-17 TOLL PLAZA SIGNING

SP-3



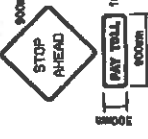
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BLACK NON-REFLECTIVE LETTERS & BORDER

SP-4



WHITE REFLECTIVE BACKGROUND  
BLACK NON-REFLECTIVE LETTERS & BORDER

SP-1



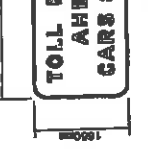
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BLACK NON-REFLECTIVE LETTERS & BORDER

SP-2



YELLOW REFLECTIVE BACKGROUND  
BLACK NON-REFLECTIVE LETTERS & BORDER

SP-5



BLUE REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.

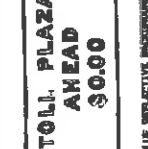
SP-6



BLUE REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.

SP-7



BLUE REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.

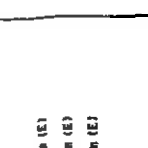
SP-8



YELLOW REFLECTIVE BACKGROUND  
BLACK NON-REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.

SP-9

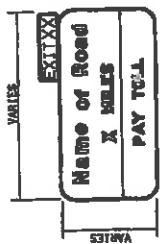


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BLACK NON-REFLECTIVE LETTERS & BORDER

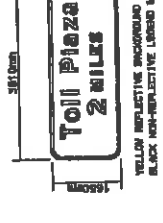
NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.



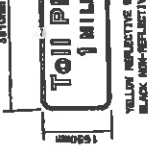
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YELLOW REFLECTIVE BACKGROUND  
BLACK NON-REFLECTIVE LETTERS & BORDER



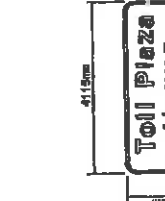
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YELLOW REFLECTIVE BACKGROUND  
BLACK NON-REFLECTIVE LETTERS & BORDER

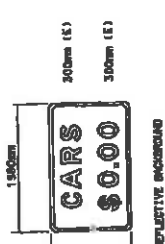


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BLACK NON-REFLECTIVE LETTERS & BORDER



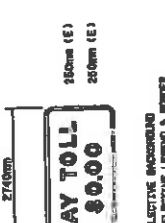
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WHITE REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.



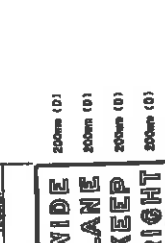
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WHITE REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.

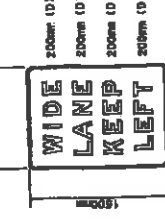


BLUE REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER

NOTE:  
FOR TOLL RATES LESS THAN ONE DOLLAR  
A CENT'S SYMBOL "¢" SHALL BE USED.



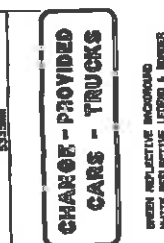
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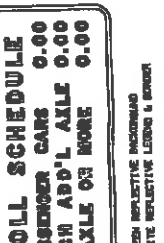
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BLUE REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER



GREEN REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER



GREEN REFLECTIVE BACKGROUND  
WHITE REFLECTIVE LETTERS & BORDER

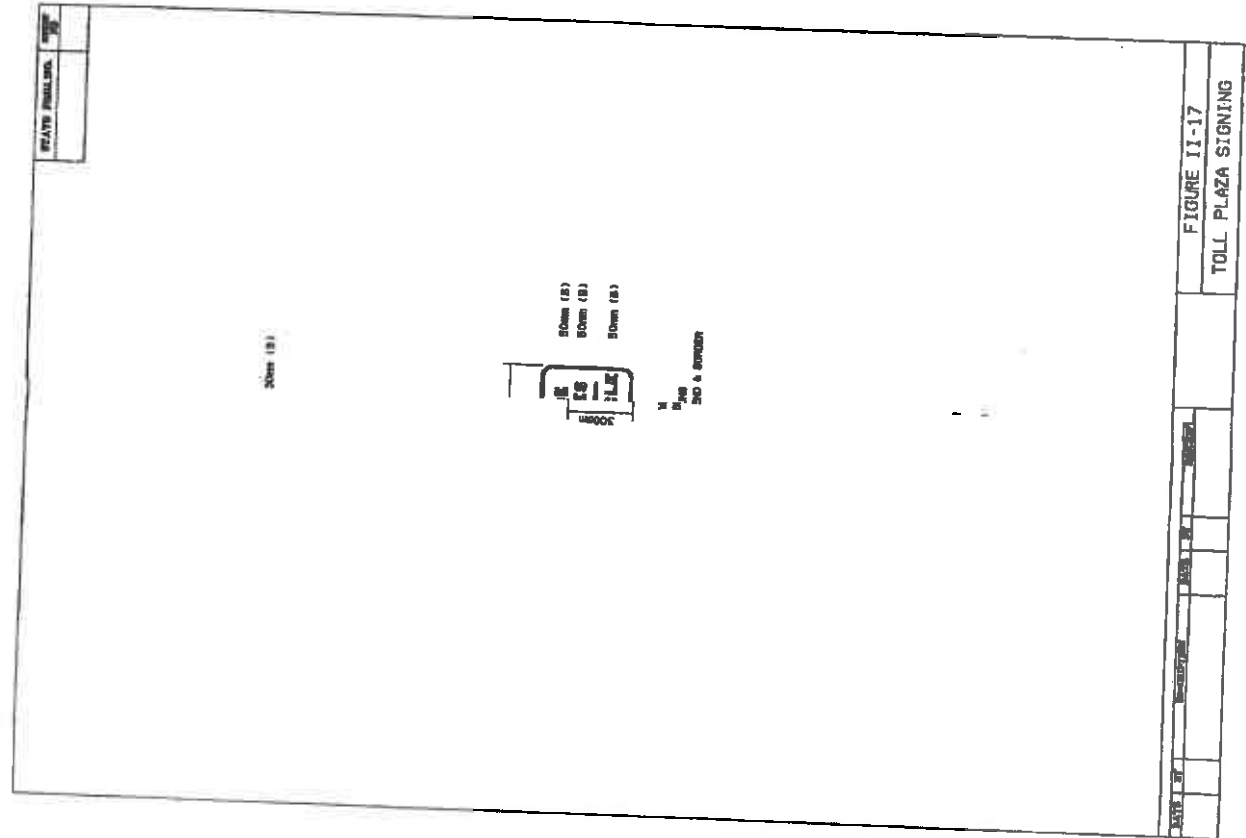
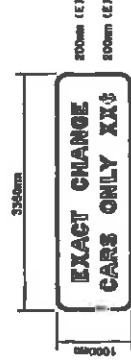
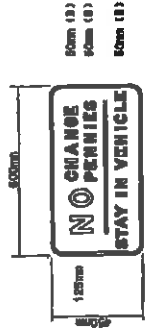
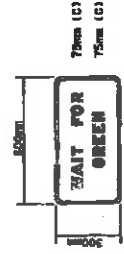
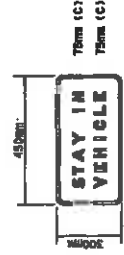
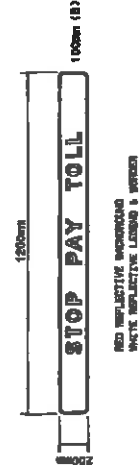


FIGURE II-17 (CONTINUED)  
TOLL PLAZA SIGNING







## Section II.23 FLORIDA'S TURNPIKE AND TOLL ROAD NUMBERING AND SIGNING PROGRAM

### Purpose

To establish standards for systematic numbering and signing of Florida's emerging toll road system.

### Background

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.

Section 338.001 of the Florida Statutes 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 of Transportation 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.

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.

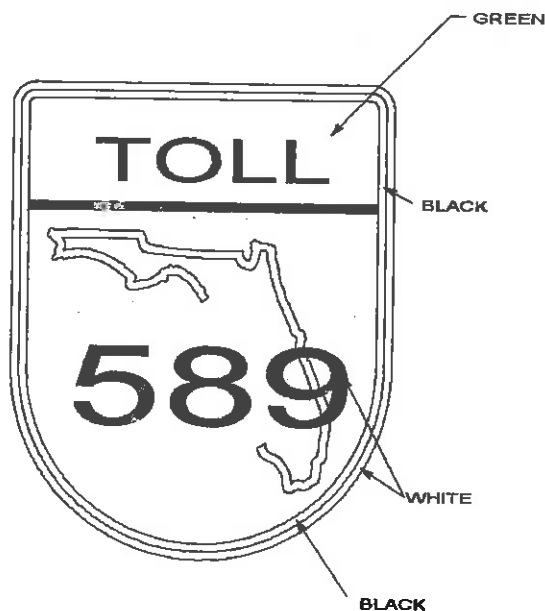
### Road Numbering Program

- 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.
- With the Florida Turnpike as the primary exception, local names will be retained for identification and a local sense of ownership only. Local names 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.

- 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 Statistics 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.
- To express membership in the statewide toll system, and provide a consistent method of identification throughout the State, a sign has been developed (Figure II-18) 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 II-18. Toll Route Marker



### Signing Program

- The toll route marker is available in three sizes, depending on application. To identify the facility along the mainline a 1200 by 1500 mm toll route marker shall be used. This sign shall be used to confirm the route upon leaving the toll plaza and erected periodically along the mainline.
- To maintain the local identity of the toll road, and provide for local area motorists, the toll road name may be erected on a confirmation guide sign downstream from the mainline

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

- To identify a toll facility at a freeway to freeway interchange, both the advance guide sign and exit direction guide sign shall the 900 by 1200 mm 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 shall not be used in a guide sign or direction sign application.
- To identify a toll facility from a conventional road, (state, county or local systems), or to provide trailblazing to a toll facility a 600 by 750 mm toll route marker shield shall be used in conjunction with the appropriate cardinal direction information, arrows, junctions, etc. Only in extraordinary cases may an educational plaque containing the name of the toll facility be used. Such cases include new bridges, where an educational function is to be provided. Educational plaques are authorized for a maximum one year period and must be designed using standard highway sign lettering, devoid of logos. Confirmation assemblies should be used in trailblazing beyond intersections of numbered routes.
- 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:

#### **Recommended Maximum Trailblaze Distance**

Rural density	8 km
Urban density	3 km

- 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.

#### **Limited Access Sign Designs**

- 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 heights, sign placement, etc. (See Section 2F-2, 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.

- 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 Section II.16, *Signing for Supplemental Guide Signs and Motorist Services on Limited and Non-Limited Access Highways*.

## Section II.24 PLACEMENT OF CRIME WATCH SIGNS ON THE STATE HIGHWAY SYSTEM

### Purpose

To aid in evaluating and responding to requests for erecting Crime Watch Signs within the State Highway System rights-of-way.

### Definition

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

### Background

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.

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.

### Requests for Signing

- Requests for permitting the erection of Crime Watch Signs within State Highway System rights-of-way shall be reviewed by the District Traffic Operations Engineer.
- Only requests submitted by local government traffic engineering or law enforcement agencies should be considered. Others should be referred to their local governmental agencies.

### Sign Locations

- 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.
- 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 visible to someone entering the side street from the State Highway.

- 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 with moderate spacing may be needed.
- 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 motorists' attention (e.g., next to a STOP Sign).

### **Sign Design and Placement**

- Since Crime Watch Signs are not official traffic control devices, requests for the Department to design or establish standards for these signs should be denied. However, the District Traffic Operations Engineer 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.
- 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.
- Mounting heights and lateral clearances should adhere to those specified in the Department's Roadway and Traffic Design Standards and support systems shall meet or exceed Department standards of frangibility.
- Crime Watch Signs shall not be affixed to any sign support maintained by the Department.

### **Installation and Maintenance**

- 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 erection on the State Highway System.
- 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.

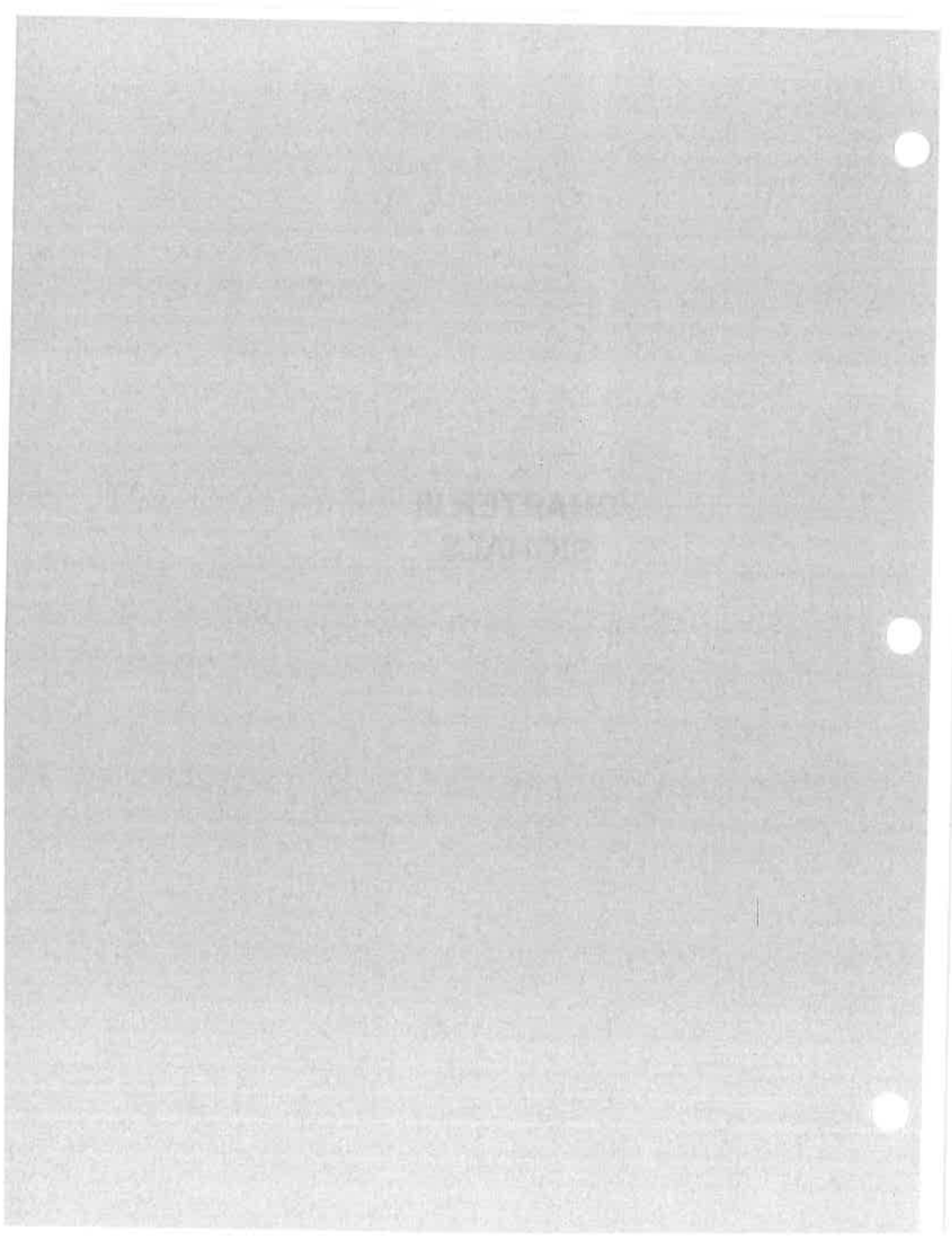
### **Special Considerations**

- Requests or designs, or problems associated with Crime Watch Signs on the State Highway System should be discussed with the State Traffic Operations Engineer prior to permitting.





**CHAPTER III**  
**SIGNALS**



## Section III.1 SIGNALIZED INTERSECTION FLASHING MODE OPERATION AND FLASHING BEACONS

### Definitions

*Programmed Flashing Mode Operation.* The automatic transfer from a signalized intersection's normal mode operation (stop and go, steady red-yellow-green displays) to flashing mode operation (stop or caution, flashing red-yellow or red indications) during specific times during the day.

*Non-Programmed Flashing Mode Operation.* The automatic transfer from a signalized intersection's normal mode operation (stop and go, steady red-yellow-green displays) to flashing mode operation (stop or caution, flashing red-yellow or red indications) caused by a malfunction of the signal controller, a conflict in signal displays or manual selection of the flashing mode operation by maintenance or police personnel.

### Recommendations for Signalized Intersections

*Programmed Flashing Mode Operation.* The potential conservation of energy associated with flashing signals has been calculated at approximately 17 000 liters of crude oil per intersection per year. This figure assumes six hours of flashing per day and considers both electrical and gasoline savings. Flashing operation is both energy and operationally efficient and is encouraged when consistent with the following recommendations:

- Flashing yellow/red operation should be considered when two-way traffic volumes on the main street are below 200 vehicles per hour.
- Flashing yellow/red operation may be used during any hours of the day or night when MUTCD Signal Warrants #1 and #2 are not met and where the 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.
- Signal operation should be changed to regular operation if accident pattern or severity increases or there is an increase in conflicts.
- A "speedway" effect can be avoided and uniform speeds obtained by maintaining sufficient signals cycling through steady red, green and yellow at proper spacing so as to provide signal progression at an appropriate speed.
- Traffic signals should be put on flashing operation primarily at simple traffic signal controlled intersections where the side street drivers have an unrestricted view of approaching main street traffic. Intersections with more than four legs, or skewed intersections (greater than 15 degrees) or railroad preempted signals should not be

considered for flash.

- Flashing should be restricted to no more than three separate periods in a 24 hour period.

*Non-Programmed Flashing Mode Operation.* All signalized intersections shall automatically transfer to flashing mode immediately (no clearance interval) whenever a malfunction occurs during the normal mode operation of the signalized intersection.

### **Application Requirements for Signalized Intersection**

The signal flashing mode and start-up sequence shall be as follows:

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

*Protected Left Turns.* Flashing red during flashing mode, then steady red on start-up sequence. Protected left turn signals should carry all arrow indications.

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

### **Heads To Be Flashed**

Section 4B-19 of the MUTCD requires all signal faces on an approach to be flashed when the signal is in flashing mode operation. Therefore, a left or right turn signal not illuminated during flashing mode operation is unacceptable. Section 4B-5(4)(c) of the MUTCD requires the flashing of red or yellow arrow indications.

Pedestrian signal indications (WALK and DON'T WALK) shall not be illuminated during flashing mode operation at signalized intersections.

### **Flashing Indication Colors**

The color to be flashed, red or yellow ball or arrow indications shall be determined as follows:

- Each approach or separately-controlled turn movement that is controlled during normal stop-and-go operation shall be provided with a flashing display.
- All signal faces on an approach shall flash the same color, either yellow or red circular or arrow. However, separate signal faces for separately-controlled turn movements may be flashed as illustrated in Figure III-1. Flashing yellow indications for through traffic do not have to be shielded or positioned to prevent visual conflict for drivers in separately-controlled turn lanes; however, shielding for separate protected turn movements shall be in accordance with Section 4B-11 of the

**MUTCD.**

- When a signal face consisting entirely of arrow indications is to be put on flashing operation, or when a signal face contains no circular indication of the color that is to be flashed, the appropriate red or yellow arrow indication shall be flashed.
- When a signal face includes both circular and arrow indications of the color that is to be flashed, only the circular indication of that color shall be flashed. A 5-section head cluster shall be flashed the same color as the approach through lanes. Only circular red or circular yellow indications shall be flashed in a flashing mode operation.
- No steady green indication or flashing yellow indication shall be terminated and immediately followed by a steady red or flashing red indication without the display of the steady yellow change indication; however, transition may be made directly from a steady green indication to a flashing yellow indication. This applies to both the circular and arrow indications. The transition from stop-and-go to flashing operation, when the transition is 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.

Green arrow indications which are continuously illuminated during normal operations should be continually illuminated during flashing mode operation.

### **Application Requirements for Flashing Beacons**

All existing flashing beacons are considered to meet the MUTCD requirements whether they are single or dual indicated.

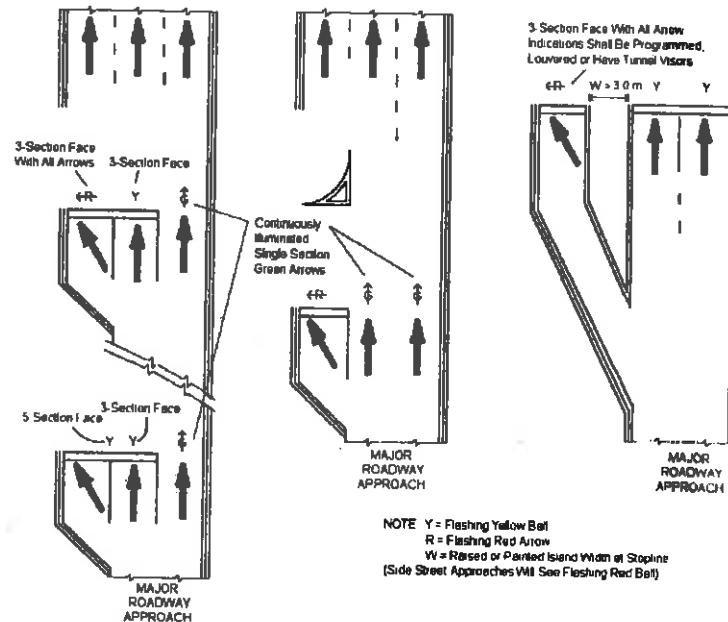
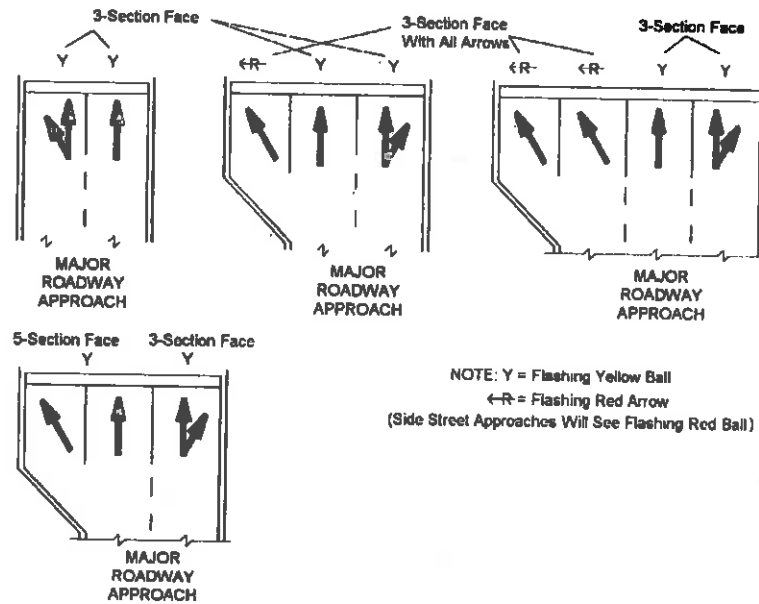
However, all new or replacement flashing beacon installations shall be designed and installed with dual indications. Wherever practical, the dual indications shall both be positioned laterally within each approach width to the intersection. For example, a four-way beacon assembly over each side of a divided four-lane highway does not meet this requirement. In no instance shall flashing beacon indicators on an approach be closer than 2.5 m apart measured horizontally.

### **Operation of Flashing Beacons**

The dual indications for flashing beacons shall be simultaneously flashed for each approach. Alternate flashing of dual indications is reserved for highway approaches to a

railroad. Dual "bouncing ball" flashing beacons (two 2-section heads) may be used in rare cases where special impact is required at a high crash intersection.

Figure III-1. Typical flashing operation of traffic signal faces



## Section III.2 GUIDELINES FOR LEFT TURN TREATMENT

This guideline can be used to determine the selection of the following types of left turn treatment:

- Protected/Permissive Left Turn
- Protected Left Turn
- Permissive/Protected Left Turn
- Split Phasing (Each direction alternatively has both left turn green arrow and circular green)

### Left Turn Signal Phasing

If the need for left turn phasing on an intersection approach has been firmly established, the following guidelines should be used to select the type of left turn phasing to provide.

Protected/permissive left turn phasing should be provided for all intersection approaches that require a left turn phase unless there is a compelling reason for using another type of left turn phasing. If the decision between providing protected/permissive or protected left turn phasing is not obvious, the traffic engineer should initially operate the left turn phase as protected/permissive on a trial basis. If satisfactory operations result, the protected/permissive left turn phase should be retained. If unsatisfactory operations result, the protected/permissive left turn phase should be converted to protected left turn phasing.

Protected left turn phasing shall be provided for an intersection approach if any of the following conditions exist:

- Double left turn only lanes are provided.
- Left turn lanes are separated greater than 3.0 m from the through lanes by raised or painted islands. If 3.6 m or less, engineering judgement shall determine whether a protected permissive left turn phase is required. If greater than 3.6 m, use protected left turn phasing.
- Sight distance due to geometric conditions to opposing traffic is less than 75 m when the opposing traffic is traveling at 60 km/h, or less than 120 m when the opposing traffic is traveling at 60 km/h or more. This represents approximately five seconds of travel time which is the smallest gap size universally accepted by all left turn drivers.





- The approach is the lead portion of a lead/lag intersection phasing sequence.

Protected left turn phasing may be considered if any of the following conditions exist:

- Speed limit of opposing traffic is higher than 70 km/h.
- Left turn traffic must cross three or more lanes of opposing through traffic.
- Protected/permmissive left turn phasing is currently in use and the number of left turn angle accidents caused by left turn drivers on this approach exceeds six per year.
- Unusual intersection geometrics exist that will make permmissive left turning particularly confusing or hazardous.

Permmissive/protected left turn phasing can be used effectively for some intersection approaches if the traffic engineer feels that the advantage to be gained in better progression, as demonstrated in a traffic signal analysis computer program, is worth the violation of driver expectancy. However, use of this type of left turn phasing should be limited and should be restricted to only the following situations which will not create a left-turn trap:

- T-intersections where opposing U-turns are prohibited.
- Four-way intersections where the opposing approach has prohibited left turns or protected left turn phasing.
- Four-way intersections where the left turn volumes from opposing approaches do not substantially differ throughout the various time periods of 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 to an extent that simultaneous left turns from opposing directions would be impossible or hazardous.
- Left turn volumes are extremely heavy on opposing approaches and both are nearly equal to the adjacent through movement critical lane volume.
- Left turn volume is extremely heavy on an approach that does not include a separate left turn lane.
- Drivers are permitted to turn left from more than one lane, but drivers are also permitted to use the right-most left turn lane as a through lane.



### Left Turn Signal Displays

The following are the left turn signal displays to be used with the various types of left turn phasing.

*Protected/permmissive left turn phasing.* A 5-section cluster (Type S in the MUTCD) centered over the lane line between the left turn lane and the left-most through lane should be used. The 5-section cluster could serve as one of the two required through traffic signal heads. No supplemental signing should be provided.

*Protected left turn phasing with a single left turn lane.* A 3-section vertical signal head (from top to bottom -- left turn red arrow, left turn yellow arrow, left turn green arrow) should be centered over the left turn lane. A circular red indication may replace the left turn red arrow if visibility controlled or if a left turn signal sign is also installed.

*Protected left turn phasing with double left turn lanes.* Two 3-section vertical signal heads as described in the paragraph above should be used with one centered over each left turn lane.

*Permissive/protected left turn phasing.* A 5-section cluster (Type S in the MUTCD) centered over the lane line should be used. The 5-section cluster could serve as one of the two required through traffic signal heads. No supplemental signing should be provided.

*Split phasing.* A 5-section cluster (Type S in the MUTCD) centered over the lane line between the left turn lane and the left-most through lane should be used. The 5-section cluster could serve as one of the two required through traffic signal heads. No supplemental signing should be provided.

### Signal Display for Exclusive Left Turn Lane

A 3-section (red, yellow and green) signal face shall *not* be placed over, and/or devoted to, an exclusive left turn lane, unless the signal phasing sequence provides a protected left turn movement during the cycle.

### Left Turn Phases for Separated Left and Thru Lanes

- Left turn lanes at signalized intersections that are separated greater than 3.0 m from thru lanes by raised or painted islands shall be operated as *exclusive* left turn lanes and a left turn signal phase must be provided. *Permissive* left turn signal displays shall *not* be provided in the exclusive left turn signal face. If the separation is 3.0 m or less, engineering judgment shall determine whether an exclusive phase is required.



### Permissive Dual Left Interval

- A permissive green interval for dual left turns shall *not* be used.



### Section III.3 SCHEDULING TRAFFIC SIGNAL STUDIES AND FUNDING ARRANGEMENTS

#### **Purpose**

To establish criteria for responding to requests for traffic signal installations, for funding and implementation arrangements for warranted signals and scheduling related studies to determine need.

#### **General**

Since the Department is charged with the responsibility to erect and maintain a uniform system of traffic signals and other traffic control devices for regulation, control, guidance, and protection of traffic on the State Highway System, there is need to provide uniformity in responding to requests for signals and in the scheduling and conducting of traffic studies to determine signal needs.

#### **Procedure**

##### **Response to Signal Requests and Scheduling Traffic Signal Studies**

- The District Traffic Operations Office shall objectively review all requests for traffic signal installations received by the Department against existing information and local knowledge of the intersection before agreeing to commit resources for a detailed traffic study. This initial screening may require a brief site visit to view the field conditions. During the initial screening, all data shall be recorded in writing and kept on file. An attempt shall be made to relate all data and analysis to standards set forth in the MUTCD. If the initial screening results in a decision to conduct a signal warrant study, the District Traffic Operations Office should contact the local government traffic engineering agency, advise them of the Department's decision, and obtain their views and input.
- If the initial screening results in a decision to not consider signalization or further study, the District Traffic Operations Office shall document the reasons and advise the requestor of the findings with a copy to the local government traffic engineering agency. Although local government concurrence is desirable, it is not a prerequisite for committing Department resources to a full signal warrant study.
- The District Traffic Operations Office shall normally conduct signal warrant studies for proposed signal installations on the State Highway System. However, a local government traffic engineering agency may conduct such studies and submit them to the District Traffic Operations Office for review. All studies shall be conducted in accordance with the procedure and standards prescribed in this document and shall

be signed and sealed by a professional engineer.

- Formal "legal" resolutions from local agencies may form the basis of their concurrence in the need for a traffic signal study. However, such documents should not be required by the Department as a prerequisite to scheduling the study. Additionally, the availability of implementation funds should not be a prerequisite to assessing traffic signalization needs (conducting a study).
- The District Traffic Operations Office shall keep a log of requests for traffic signal studies and their disposition. To the extent practical, a priority system utilizing the request date, traffic volumes, accident experience, and the level of local government interest should be used to schedule traffic signal studies.

### **Traffic Signal Studies and Engineering**

- Department of Transportation staff, local agency engineers or qualified consulting engineers may perform studies for traffic signals and provide any required engineering services for the preparation of implementation plans and specifications for proposed traffic signals on the State Highway System. However, the Department is responsible for requiring and overseeing such work.
- Traffic signal studies shall be made in accordance with Department Procedure No. 750-020-007, Uniform Traffic Engineering Studies, particularly, Chapter 12 of the Manual on Uniform Traffic Studies (MUTS), referred therein. Plans and specifications, if required, shall be prepared in accordance with established Department procedures.
- Traffic signal studies or engineering analyses conducted for new, or proposals for significantly revised, private access points to major traffic generators shall be conducted by qualified traffic engineers at no cost to the Department. Except under unusual circumstances, these studies and/or analyses shall be part of the Driveway Permit Application as per the requirements of Rule 14-96. These studies shall, in addition to evaluating the need for signal control at unsignalized intersections, also consider enhanced features at existing signalized intersections, as appropriate. Such study and report shall be signed and sealed by a professional engineer. Likewise, engineering costs associated with the preparation of implementation plans and specifications should also normally be borne by the developer. There may be instances where the Department determines that specific critical design requirements make it essential that the engineering work be performed by Department forces. In such instances, the District Secretary may direct that the engineering work be done by the Department at no cost to the developer.
- Studies and engineering at existing private access points which may be required as a result of normal traffic growth are usually made by qualified traffic engineers by the requestor. In extraordinary situations the Department may elect to do so.



## Funding Arrangements for Warranted New Signal Installations

- New traffic signal installations on the State Highway System may be funded from private, local, state, or federal funds, or any combination of such funds.
- The developers shall totally fund the installation of any new traffic signal and/or the enhancements of any existing traffic signals when these improvements are requirements specified in a new or revised Driveway Permit or local government Development Order. If proposals to provide signalization or modify existing signalization is above the minimum required by Permit or Development Order and provides a betterment to the State Highway System substantially beyond mitigation for development impacts, the Department's District Secretary may determine an appropriate financial participation formula and assign percentages of participation to the developer in consideration of the specific conditions at each site.
- Although signal installation on the State Highway System is the responsibility of the Department, local governments may contribute, on a voluntary basis, a portion, or all of the cost of signal installation depending upon specific cooperative arrangements worked out between the Department's District Offices and the local agency. Local funds are most often utilized in these cooperative efforts to advance the implementation schedule of a warranted traffic signal. When local funds are accepted by the Department, a formal joint project agreement executed by both parties is necessary.
- Most local governments in Florida's urban areas have qualified traffic engineering organizations with experienced traffic signal field crews and many new signals have been installed on the State Highway System using local agency installation crews with control hardware supplied by the Department. Where the local agency is agreeable to this procedure (most are because of their maintenance and operational involvement in these sites), this technique should be encouraged. No formal agreement is necessary since no money is changing hands; however, a letter from the local agency agreeing to install Department supplied hardware should be obtained.

## Other Considerations

- Prior to purchase, use, or installation, traffic signals must comply with provisions of Department Procedure No. 750-010-013, Certification and Approval of Traffic Control Devices.
- Prior to installation of traffic signals, provisions of Department Procedure No. 750-010-022, Traffic Signal Maintenance Agreements, should be complied with.



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distance

### Section III.4 EMERGENCY TRAFFIC CONTROL SIGNALS

#### Purpose

To provide guidance for warranting, designing, and operating emergency traffic control signals at locations where emergency vehicles, most commonly firetrucks, need special traffic signal assistance to egress onto the street system.

#### Background

The Department's district offices often receive local public agency requests for traffic signal control for the departure of emergency vehicles. This section was developed to give comprehensive guidance to determine if the signals are warranted.

#### Procedure

**An Emergency Traffic Control Signal shall be warranted if any of the following warrants are met**

- Minimum Traffic Volumes (Both directions of travel, based on signal warrant #2), as shown in Table III-1.

	Table III-1. Minimum Traffic Volumes	
	Peak Hour	or 24 Hours
2-Lane Roadway	750 VPH	7500 ADT
4-Lane Roadway	900* VPH	9000* ADT
6-Lane or more	1200* VPH	12000* ADT

\* Values shall be increased by 1/3 when arterial has traffic signal system coordination with signals located within 300 m in both directions from the emergency signal location.

- When the geometric design of the arterial and emergency vehicle facility is such that the vehicle when returning must "back in", and to do so must block traffic when performing this maneuver and the traffic volume and speeds are such that the use of emergency vehicle lights and flaggers have been ineffective in controlling traffic.
- When the location of the emergency vehicle driveway consistently conflicts with the normal traffic queue from an adjacent signalized intersection.

- 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.

### **Configuration and Operation of Emergency Traffic Control Signals**

Section 4E-21 of the MUTCD defines the operational requirements for a "mid-block" location of an emergency signal. The Manual allows either a steady green or flashing yellow operation of signal heads between emergency vehicle actuations. These choices of operation, combined with limited details for signal configuration requirements has resulted in a lack of uniformity of emergency signal design and operation within the State.

Based on requirements contained in the MUTCD, the following criteria for emergency traffic control signals shall be followed for new or reconstructed installations.

- Dual indications shall be provided for each roadway approach. A minimum of one signal face shall be installed for the emergency vehicle driveway but two indications are preferable.
- If the emergency service is located off the main roadway and emergency vehicles access the main roadway via a public access street, emergency signals may be erected at the intersection of these roadways. If this practice is followed, dual indication shall be used on the public access street, with the signals resting on the flashing red indication.
- Mid-block emergency signals shall be operated as flashing yellow between emergency vehicle actuations. Roadway signal head configuration shall consist of three sections and shall be operated as shown in Figure III-2. (The use of special technological signal devices may be selected, i.e. strobe signals, LED, or solar power. These devices may require temporary permitting prior to installation.)
- Signal operation at intersections which are pre-empted by emergency vehicles entering the roadway near or at the intersection should be designed on an individual basis.

It is not practical to outline all possible situations which may be encountered in the field. Such factors as emergency vehicle route, distance between the intersection and emergency vehicle driveway, intersection geometrics, number of lanes, normal queue length, traffic volumes, etc. should be considered.

### **Emergency Signal Sign (FTP-45)**

- As emergency signals are installed at locations along major arterials where emergency vehicles enter the roadway, the Emergency Signal (FTP-45) signs, as shown in Standard Index No. 17355, shall be placed on the span wire to identify the

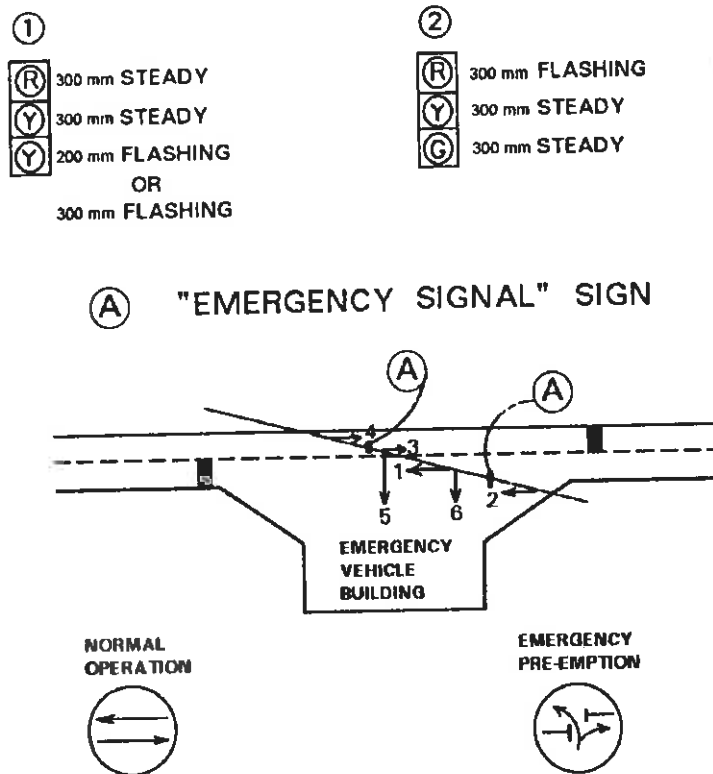
purpose of the signal to the driver.

- The Emergency Signal (FTP-45) signs shall be legible at all times, shall be mounted adjacent to each signal face, and shall be located between the dual signal indications on each roadway approach.
- No sign is required for the emergency vehicle driveway approach.

**Other Requirements**

- A controller timing chart shall be a part of the contract plans.
- A Maintenance Agreement shall be required for all Emergency Signals on the State Highway System.
- A signal timing study is required to determine proper clearance intervals.

Figure III-2. Mid-Block Emergency Signal Operation



SIGNAL	NORMAL OPERATION	CHANGE TO EMERG. PRE-EMPTION	EMERGENCY PRE-EMPTION	CHANGE FROM EMERG. PRE-EMPTION	RELEASE
1,2,3,4	G OR FY	Y	R	R	G OR FY
5,6	BLANK	BLANK	G	BLANK	BLANK



## Section 3.5

# IMPLEMENTATION GUIDELINES FOR TRAFFIC SIGNAL MAST ARM SUPPORTS

### 3.5.1 GENERAL

The following guidelines are intended to present the Department's process by which qualifying traffic signal installations can be selected or upgraded using a traffic signal mast arm support system. By Department policy (*Topic No. 000-625-020, Mast Arm Signal Support Policy*), new traffic signals installed on the State Highway System that are within 16 km of the coastline shall be supported by mast arms.

Traffic engineers need to be aware that the following offices, Traffic Engineering, Roadway Design - Traffic Plans and Standards, and Structures Design, all have reference documents that will assist in the implementation requirements for mast arm supports. Reference to the designated office responsible for certain implementation requirements is provided in this section.

### 3.5.2 IMPLEMENTATION

#### 3.5.2.1 16 km Coastline Boundary

The *Mast Arm Signal Support Policy* refers to a geographical definition of a 16 km boundary for requiring mast arm signal supports to be the design standard. This boundary follows an alignment of State Roads that are parallel to an approximate 16 km distance to the coastline. Official mapping of this boundary is maintained on a Map Info-Base by the State Traffic Engineering Office. Current district maps are available through District Traffic Operations Offices.

#### 3.5.2.2 Variations

Conditions may exist within the 16 km boundary, which would make the installation of a mast arm assembly impractical. These conditions may be intersection geometric, arm length, right-of-way, and continuity, etc. A span wire assembly may be used at these locations. These deviations to the mast arm policy are to be processed as DESIGN VARIATIONS in accordance with the latest guidance in *Chapter 23, Design, Exceptions, and Variations (Metric) of the Department's Plans Preparation Manual, Metric Version (Topic No. 625-000-005)*. The Department's Roadway Design - Traffic Plans and Standards Office is responsible for this manual.

Approval of variations will be at the district level.

### **3.5.3 PROCUREMENT PROCESS**

A formal internal task team provided an assessment and recommendations of cost effective measures and efficient methods for streamlining design approval, fabrication, and construction. The principle recommendation was to institute a pre-approval process for mast arm designs and to address other significant issues.

### **3.5.4 MAST ARM DESIGN**

The designer/engineer needs to be aware that the pre-approval process involves fabricator shop drawing submittals (signed and sealed) of various predetermined sizes of mast arms and pole structures. Review and approval of the submittals will be done by the Department's Structures Design Office. Specific design guidance on the various mast arm types and parameters are included in the following three basic documents which are available through the Structures Design Office:

- Semi-Standard Drawings
- Instructional Standard Drawings
- Design Documents for Fabricators

The following is a list of issues for standards which have been addressed or will be addressed by the Structures Design Office:

- Use of two wind load speeds (145 and 175 km/h)
- Three pole-to-arm attachment heights
- Minimum six bolt bolt-circle configuration
- Deflection criteria
- Luminaries
- Galvanized steel; galvanized steel with paint
- Pre-approval process for maximum arm length of 21.5 meters.

### **3.5.5 FOUNDATIONS**

The torsional resistance of foundations for mast arms shall be designed for a service load wind speed of 115 km/h with a safety factor of 1.0.

### **3.5.6 OTHER ISSUES**

#### **3.5.6.1 Qualified Products List (QPL)**

The Structural Engineer will design each mast arm assembly on the project. Based on this design, a pole and arm combination will be selected for each assembly from the



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Department's Qualified Products List (QPL). For those projects where a pole and arm combination are not available on the QPL, the engineer will provide a design in the plans. The Central Structures Design Office will review fabricator submittal for predetermined sizes to the QPL.

Mast arm fabricators that have followed the pre-approval submittal process and have been approved for standard arm and pole sizes shall be added to the Department's QPL.

### **3.5.6.2 Metric/English**

All final design documents for mast arms must be produced in metric. Fabricators may provide the shop drawings with English values in parenthesis following the corresponding metric value.



## Section 3.5

# IMPLEMENTATION GUIDELINES FOR TRAFFIC SIGNAL MAST ARM SUPPORTS

### 3.5.1 GENERAL

The following guidelines are intended to present the Department's process by which qualifying traffic signal installations can be selected or upgraded using a traffic signal mast arm support system. By Department policy (*Topic No. 000-625-020, Mast Arm Signal Support Policy*), new traffic signals installed on the State Highway System that are within ten miles of the coastline shall be supported by mast arms.

Traffic engineers need to be aware that the following offices, Traffic Engineering, Roadway Design - Traffic Plans and Standards, and Structures Design, all have reference documents that will assist in the implementation requirements for mast arm supports. Reference to the designated office responsible for certain implementation requirements is provided in this section.

### 3.5.2 IMPLEMENTATION

#### 3.5.2.1 Ten Mile Coastline Boundary

The *Mast Arm Signal Support Policy* refers to a geographical definition of a ten miles boundary for requiring mast arm signal supports to be the design standard. This boundary follows an alignment of State Roads that are parallel to an approximate ten mile distance to the coastline. Official mapping of this boundary is maintained on a Map Info-Base by the State Traffic Engineering Office. Current district maps are available through District Traffic Operations Offices.

#### 3.5.2.2 Variations

Conditions may exist within the ten mile boundary, which would make the installation of a mast arm assembly impractical. These conditions may be intersection geometric, arm length, right-of-way, and continuity, etc. A span wire assembly may be used at these locations. These deviations to the mast arm policy are to be processed as DESIGN VARIATIONS in accordance with the latest guidance in *Chapter 23, Design, Exceptions, and Variations (Metric) of the Department's Plans Preparation Manual, Metric Version (Topic No. 625-000-005)*. The Department's Roadway Design - Traffic Plans and Standards Office is responsible for this manual.

Approval of variations will be at the district level.

### **3.5.3 PROCUREMENT PROCESS**

A formal internal task team provided an assessment and recommendations of cost effective measures and efficient methods for streamlining design approval, fabrication, and construction. The principle recommendation was to institute a pre-approval process for mast arm designs and to address other significant issues.

### **3.5.4 MAST ARM DESIGN**

The designer/engineer needs to be aware that the pre-approval process involves fabricator shop drawing submittals (signed and sealed) of various predetermined sizes of mast arms and pole structures. Review and approval of the submittals will be done by the Department's Structures Design Office. Specific design guidance on the various mast arm types and parameters are included in the following three basic documents which are available through the Structures Design Office:

- Semi-Standard Drawings
- Instructional Standard Drawings
- Design Documents for Fabricators

The following is a list of issues for standards which have been addressed or will be addressed by the Structures Design Office:

- Use of two wind load speeds (90 and 110 mi/h)
- Three pole-to-arm attachment heights
- Minimum six bolt bolt-circle configuration
- Deflection criteria
- Luminaries
- Galvanized steel; galvanized steel with paint
- Pre-approval process for maximum arm length of 70 feet.

### **3.5.5 FOUNDATIONS**

The torsional resistance of foundations for mast arms shall be designed for a service load wind speed of 70 mi/h with a safety factor of 1.0.

### **3.5.6 OTHER ISSUES**

#### **3.5.6.1 Qualified Products List (QPL)**

The Structural Engineer will design each mast arm assembly on the project. Based on this design, a pole and arm combination will be selected for each assembly from the

**CHAPTER IV**  
**MARKINGS**

WATERBURY  
CONNECTICUT

## Section IV.1 CROSSWALKS IN HEAVY PEDESTRIAN CONCENTRATION AREAS

Heavy pedestrian generators such as beaches or hotels may create a need for channeling pedestrians across a State Highway at locations other than intersections.

To help ensure the use of marked crosswalks in heavy pedestrian concentration areas, special consideration should be given to their location relative to construction or proximity of sidewalks, paths, guardrails, retaining walls or shrubbery as a means for controlling existing pedestrian crossing movements within a defined path.

### Markings

- As a minimum, a marked crosswalk shall consist of two parallel white lines 300 mm wide. Lines should be placed not less than 1.8 m apart and located to provide the least amount of walk time, whenever practical (see Standard Index Nos. 304 and 17346).
- For added visibility, special emphasis markings may be used (see Standard Index No. 17346).

### Signing

- A PEDESTRIAN CROSSWALK (W11A-2) sign shall be installed immediately adjacent to each marked pedestrian crossing location.
- An ADVANCE CROSSING (W11-2) sign shall be installed in advance of a series of marked crosswalks and may be installed in advance of each crosswalk location within a heavy pedestrian concentration area. The need for advance crossing signs shall be based on engineering judgement considering relative spacing of crosswalks, roadside development and other factors. Standard Index No. 17346 suggests mounting locations as related to approach speeds.
- An END PEDESTRIAN CROSSING sign may be installed to notify motorists that the pedestrian zone has ended. The sign should be 1000 by 2400 mm with 200 mm letters if mounted overhead. The size of a ground-mounted sign shall be 600 by 750 mm. Sign format shall be similar to that used for the END SCHOOL ZONE (FTP-34 or 36) signs as shown in Standard Index No. 17344. The sign should be installed approximately 60 to 90 m beyond the last marked crosswalk.





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**Section IV .2**  
**APPLICATION OF LANE USE ARROW PAVEMENT MARKINGS AND THE WORD**  
**"ONLY" ON APPROACHES TO INTERSECTIONS**

- Where a movement that would otherwise be legal is to be prohibited, the lane use arrow symbol should be accompanied by the word "ONLY."
- The word "ONLY" is not required if the arrow symbol for an exclusive turn lane is used under the following conditions:
  - Lane is developed at a mid-block location.
  - lane is clearly delineated by appropriate channelization.
  - Lane requires lateral vehicle movement from an established lane for proper positioning to execute the turn.

However, the word "ONLY" should be used with the arrow symbol where unusual geometrics or alignment of an exclusive turn lane may result in driver confusion or misunderstanding.

- Where an established through lane becomes an exclusive turn lane, the word "ONLY" shall be used with the arrow symbol indicating the allowed turning movement.
- Pavement arrow symbols should not be routinely applied in through lanes at intersections except with overhead lane-use control signs. However, where unusual geometrics or alignment of through lanes may result in driver confusion, a straight arrow symbol may be used to provide additional guidance for drivers in the through lanes.
- Whenever the word "ONLY" is used with an arrow symbol, these markings shall be accompanied by the appropriate signs as specified in Sections 2B-17, 2B-18 and 3B-20 of the MUTCD.



### Section IV.3

## USE OF BLUE RAISED PAVEMENT MARKERS TO IDENTIFY FIRE HYDRANTS

### Purpose

To provide instruction for uniform application of blue raised pavement markers (RPMs) as aids in locating fire hydrants on the State Highway System.

### Background

Rapid location of fire hydrants can be hindered by shrubbery or parked vehicles blocking the view from fire apparatus on the travelled way. Accordingly, local fire agencies have been installing blue RPMs on the pavement surface to more readily locate hydrants. These markers are not traffic control devices but are a significant aid to public safety. Uniformity in application is essential for locating purposes and to ensure they do not distract from official traffic control devices.

### Procedure

Blue RPMs may be used on the State Highway System but solely for aiding in locating fire hydrants.

Local governmental agencies desiring to install blue RPMs on the State Highway System should obtain approval from the District Traffic Operations Engineer prior to installation. Such approval shall not be unreasonably withheld.

Installation and maintenance of blue RPMs, including replacement on resurfacing projects, shall be the sole responsibility of the local governmental agency seeking approval for installation.

Generally, blue RPMs shall be installed by the local governmental agency on the pavement directly across from the fire hydrant in accordance with the guidelines listed herein.

The District Traffic Operations Engineer may authorize exceptions, in writing, where unusual circumstances or conditions may exist.

### Guidelines

*Two-Way Streets or Roads.* Markers should be placed 150 mm from edge of painted centerline on the side nearest the fire hydrant. If the street has no centerline, the marker should be placed 150 mm from the approximate center of the roadway on the side nearest the hydrant. See Figures IV.1, IV.2, and IV.3.

*Streets with Left Turn Lane at Intersection.* Markers should be placed 150 mm from edge of painted white channelizing line on the side nearest the hydrant. See Figure IV.4.

*Streets with Continuous Two-Way Turn Lane.* Markers should be placed 150 mm from the edge of the painted yellow barrier line on the side nearest the fire hydrant. See Figure IV.5.

*Freeways and Expressways.* Because of higher maintenance at these locations if placed on the roadway, markers should be placed on shoulder 300 mm to the right of the painted edgeline opposite the off right-of-way fire hydrant location. It is recommended that due to high speed environment, the markers are placed in a cluster of four. We also recommend the use of hydrant location signs to be placed on fence or more importantly, on sound walls. See Figure IV.6.

Figure IV.1  
TWO-LANE STREET

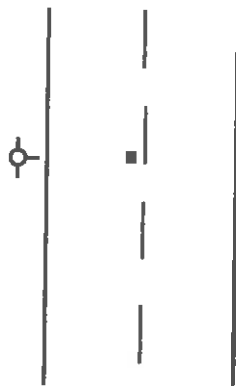


Figure IV.2  
MULTI-LANE STREET

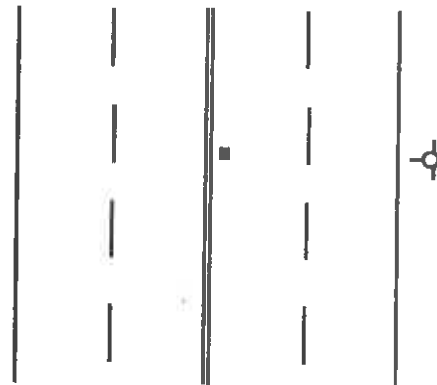


Figure IV.3  
TWO-LANE STREET  
AT INTERSECTION

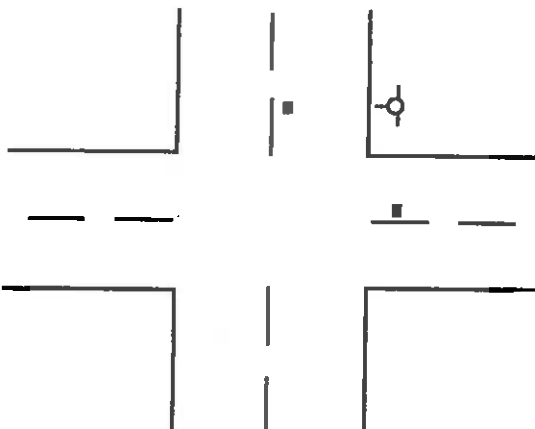


Figure IV.4  
FOUR-LANE STREET  
WITH TURN LANE  
AT INTERSECTION

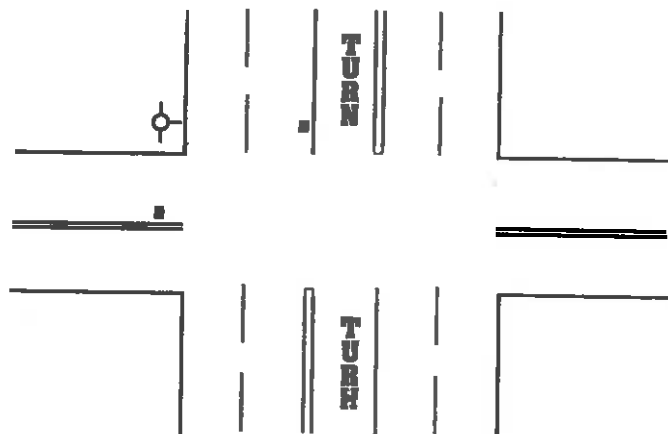


Figure IV.5  
MULTI-LANE STREET  
WITH TURN LANE

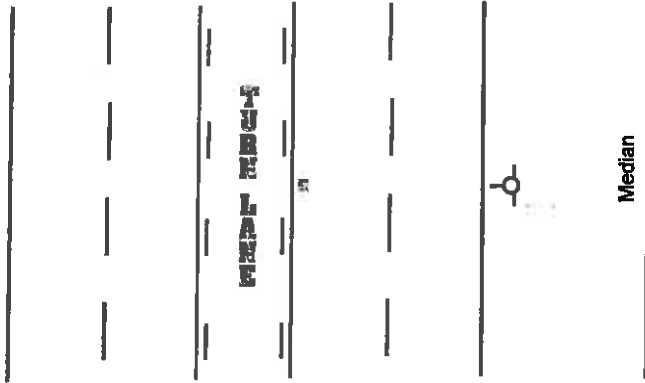
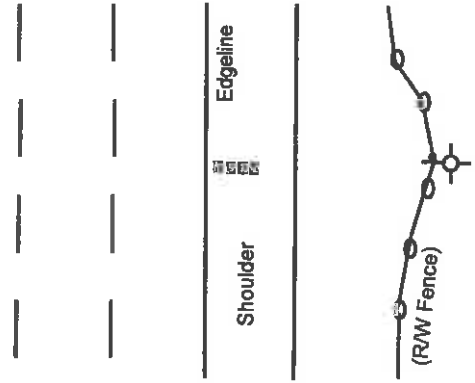
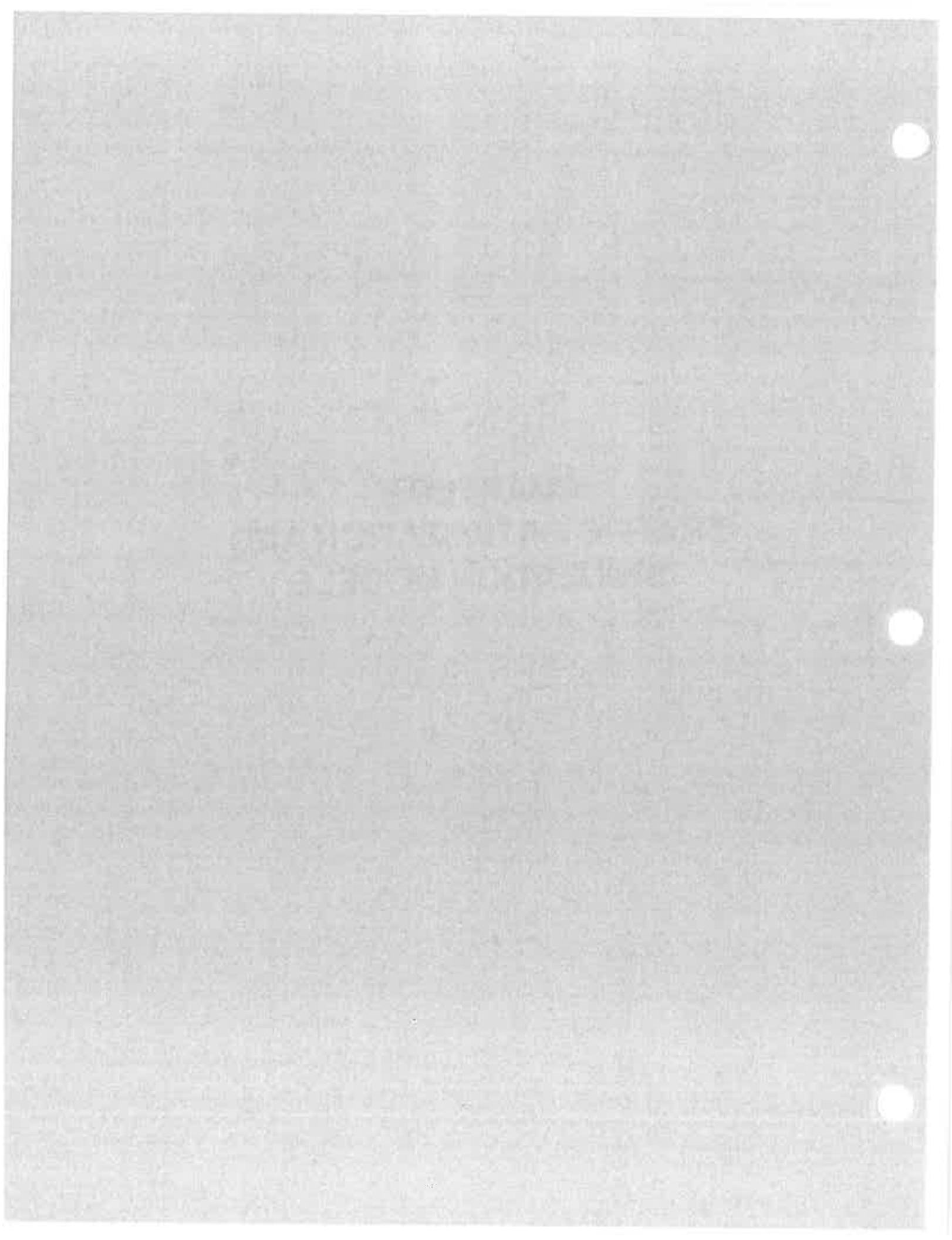


Figure IV.6  
FREEWAYS AND EXPRESSWAYS





**CHAPTER V**  
**TRAFFIC OPTIMIZATION AND**  
**SIMULATION MODELS**





## Section V.1 COMPUTER MODELS FOR TRAFFIC ENGINEERING AND INTELLIGENT TRANSPORTATION SYSTEMS (ITS) ANALYSIS AND DESIGN

### Use of Programs

The State Traffic Engineering Office can provide assistance to the Department, cities and counties in model applications with the current traffic engineering and ITS computer programs. The Department makes no endorsement, warranty or representation, either expressed or implied, with respect to these programs, their documentation, quality, performance, or suitability for a particular purpose. The Engineer of Record assumes the complete responsibility as to the quality and performance of these programs for his specific application. The Department would appreciate the user to report problems, errors or improvements in any of these programs so that the program developers can update their models to benefit all users.

### Requesting Documentation and Microcomputer Programs

The State Traffic Engineering Office will coordinate the Department agency licenses of major software and documentation. The following two transportation centers distribute the majority of the software and documentation:

Center of Microcomputers in Transportation (McTrans)  
University of Florida  
512 Weil Hall  
Gainesville, Florida 32611-2083  
(904) 392-0378  
McFax (904) 392-3224  
McLink (904) 392-3225

Transportation Center (PC-TRANS)  
University of Kansas  
2011 Learned Hall  
Lawrence, Kansas 66045  
(913) 864-5655  
Fax (800) 245-8760

### Model Applications Training

The ITS Traffic Engineering Modeling and Integration Section can provide the Department in-house workshops upon request and can help the Department engineers in model

application, preparation, test, review, verification and validation.

### **Dial Up Service**

The Department currently provides dial up service for microcomputer users to dial into the Florida Department of Transportation's Network (DOTNET). When the user logs on to DOT he will have access to the Approved Product List mainframe computer programs and E-Mail services.

The Florida Department of Transportation Office of Information Systems (OIS)'s "*Hints and Tips for Dial-In Users*" covers the hardware and software requirements for dial up service and technical support information.

Users may contact the Department Central or District OIS Office about the dial up technical support. The OIS Help Desk telephone number for the Central Office is (904) 488-8008. The telecommunication numbers for a microcomputer user connecting his computer to DOTNET through the modem are listed below:

Central, Tallahassee	(904) 487-4760
District One, Bartow	(813) 871-7290
District Two, Lake City	(904) 758-0596
District Two, Jacksonville	(904) 695-4149
District Three, Chipley	(904) 638-6355
District Four, Ft. Lauderdale	(305) 467-4442
District Five, Deland	(904) 736-5375
District Six, Miami	(305) 470-5607
District Seven, Tampa	(813) 871-7290

Users outside these areas may dial long distance telephone service to any one of these numbers and the respective telephone company for the telecommunication service will bill the users accordingly.

### **Microcomputer Programs and Models (IBM PC / MS DOS)**

The State Traffic Engineering Office currently applies the following categories and lists of computer programs for traffic engineering and Intelligent Transportation Systems (ITS) modeling, calibration and verification:

#### **Data Processing:**

- COUNTS PC:** FHWA developed this program to process traffic count data from a machine reader or manual input to provide MUTCD signal warrants analysis 9, 10, and 11.
- LOOPPROG:** TRANSYT Corporation developed this Release 5 in March 1989 for TRANSYT Closed Loop System.

- P.E.T.R.A.:** Professional Engineers Traffic Reporting and Analysis Computer Program Version 1.07m receives data from counters or manual input, supports turning movements, classification counts, gap studies, intersection stop delay, stop sign delay saturation flow rate and spot speed studies. Jamar Technologies, Inc. developed this program.
- TURNFLOW:** Intersection Turning Movement Program Version 1.00. This program was developed by Mark C. Shaefer in 1988.
- TURN:** Turning Movement Iteration Program using NCHRP Report 255 "Highway Traffic Data for Urbanized Area Project Planning and Design", Chapter 8, Page 105. Rick Ernstmeyer with the Nebraska Department of Roads, developed this program in January 1990.

**Highway Capacity Analysis:**

**CAPSSI:** Comprehensive Analysis Program for a Single Signalized Intersection, Release 10, 4/18/91. Analyzes a signalized intersection and determines the Level of Service based on the 1985 Highway Capacity Manual.

**HCS:** FHWA Highway Capacity Software Rel. 2.0 analyzes signalized intersection and non-signalized highway capacity of the following categories based on the 1985 Highway Capacity Manual.

- Basic Freeway Segments
- Weaving Areas
- Ramps and Ramp Junctions
- Multi-lane Highways
- Two Lane Highways
- Vertical Profile for Composite Grade
- Signalized Intersections
- Unsignalized Intersections
- Urban and Suburban Arterial
- Transit Capacity
- Pedestrians

**Traffic Studies:**

**AUTOMUTS:** Automates the Florida Department of Transportation's Manual on Uniform Traffic Studies in the following areas:

- Traffic Signal Warrant Summary
- Pedestrian Group Size Study

- Collision Diagram
- Vehicle Spot Speed Study
- Travel Time and Delay Study
- Intersection Delay Study
- Highway Lighting Justification

DOT Warrant Traffic  
Evaluation Module:

Signal Warrant Evaluation is based on the methodology from Part 4C of the MUTCD as amended by the FHWA on August 6, 1992.

### Signal Timing and Warrants:

#### Isolated Signal Analysis

- SOAP 84:** **Signal Operations Analysis Package:** Develops effective traffic signal control timing plans for isolated intersections. SOAP determines optimal cycle, splits and dial assignment of isolated intersection. Input phase sequence. Handles up to 48 time periods. Only evaluates the phase sequence(s) coded. Multiple runs are needed to consider alternatives. Cannot explicitly consider alternative phase with and without overlapping. Calculate average rather than optimal cycle length. Minor phase may be less than typical minimum to represent skips.
- SIGNAL85:** Version 2, L6.0, 07NOV93, performs isolated intersection capacity analysis, signal timing optimization and design of intersection geometry and control. This program is a component of TEAPAC.
- SIDRA:** **Signalized Intersection Design and Research Aid Version 4.07,** released in April 1993. Designs and evaluates isolated signalized intersections, roundabout and other unsignalized intersections. The analytical model provides detailed lane-by-lane treatment. Menu driven, graphic-based input editing and graphical output designs and displays intersection. Rahmi Akçelik or Mark Besley of Australian Road Research Board (ARRB) developed and supports this program. They may be contacted at P.O. Box 156, Nunawading Victoria 3131 Australia, Fax Number 61 3 887 8104, Telephone Number 61 3 881 1555. McTrans distributes this software.
- SPUI:** **SPUI Geometry Version 1.0 ,** released November 1991. Uses a spreadsheet template for analyzing the geometric design of the single-point urban interchange. The template can help designers with determining the impact of various design elements (e.g., number of lanes, lane width, skew angle, median width, ramp-major road separation distance) on bridge length. Reads bridge size and

clearance time of the single-point urban interchange. James A. Bonneson, Brian Moen, and Jim Kollbaum of the University of Nebraska developed this program.

### Coordinated Signal Analysis

- PASSERII 90:** **Progressive Analysis and Signal System Evaluation Routine, Version 2**, develops optimal progression to maximize band width on a linear arterial highway system of interconnected traffic signals with common cycle length. Developed by the Texas Department of Highways and Public Transportation
- TRANSYT-7F:** **TRAffic Network StudY Tool, Release 7.2.** Optimizes traffic signal timings including cycles, splits and offsets to minimize stop, delay and fuel consumption in a coordinated network or linear systems of up to 50 intersections. This program may model signalized intersection and side street stop signs. User inputs phase sequences under evaluation then executes multiple runs to compare alternatives. The user may not explicitly consider alternative phase with or without overlapping and he may estimate (then hold fixed) actuated phase splits to achieve a desired degree of saturation then hold to fixed phase. Transport and Road Research Laboratory, United Kingdom developed this program, Transportation Research Center, the University of Florida provided Data Input Manager (T7FDIM) and Platoon Progression Diagram (PPD).
- PASSER III:** **Progressive Analysis Signal System Evaluation Routine.** Determines the optimal traffic signal timings of a diamond interchange and progression of traffic on parallel frontage roads.

### ITS and Traffic Engineering Simulation:

- CORFLO V3.10** This is an urban corridor or network macroscopic simulation model and a component of the TRAF Model. FHWA's Intelligent Vehicle Highway System Research Division, developed this program on 5/10/91. CORFLO includes the following three submodels:
- **FREFLO:** Simulates macroscopic freeway traffic, geometric improvements, HOV lanes, bus operations, lane closures and incidents.
  - **NETFLO1:** Simulates urban streets by identifying each vehicle.
  - **NETFLO 2:** Simulates urban streets by adapting TRANSYT model.

The CORFLO uses GCOR to display graphics output. GCOR includes ACOER for animated graphics and SCORG for static graphics.

- D-QUEUE :**  
**(TOLLSIM)**      **A Dynamic Toll Plaza QUEUing Analysis Program V1.30.** The Florida Department of Transportation State Traffic Engineering Office developed this program to evaluate traffic delays at toll facilities. This program simulates traffic volumes, service rates, weaving maneuvers, facility layout and types of operation. dQueue calculates delay, queue size, queue length and Level of Service.
- FREEQ 10:**      **Freeway Corridor System, Version 10, Release 3.0.** The University of California at Berkeley, in cooperation with CALTRANS, developed this macroscopic model to design a freeway corridor, create a dataset for the freeway and arterial. Use submodel FREQ PL to perform a priority (i.e., HOV) lane simulation or submodel FREQ PE to perform a priority entry simulation for the corridor.
- FREESIM:**      **FREEway Simulation Microscopic Model, Version 3.15.** Evaluates freeway improvement alternatives and refining freeway designs. JHK and Associates developed this model under a Federal Highway Administration contract.
- FREEVU:**      **FREEway Evaluation with Visual Understanding, April 1991.** First, the user can specify a freeway section including lanes, grades, exits, entrances, posted speed limits, detector location, etc. Then the user can view the screen to confirm the proposed design.
- FSUTMS:**      **Florida Standard Urban Transportation Modeling Structure Version 4.1.** FDOT Highway Systems Planning Office developed this program.
- QUEWZ3:**      **Analyze and evaluate freeway Work Zone Version 2.** Texas Transportation Institute of Texas A&M University developed this model in June 1991 to calculate queue delay, cost of speed change cycles, change in vehicle running costs and total user cost. The Florida Department of Transportation and the Texas Department of Highways and Public Transportation sponsored this program.
- TRAF-NETSIM**      **Version 4.2, Network Simulation Model** which performs a microscopic simulation of traffic flow on an urban street network to evaluate alternative network control and traffic management strategies. FHWA developed this model.

**Preprocessors:**

- AAP:** The Arterial Analysis Package and the design of arterial signal systems Release 4.2 includes PASSER II and TRANSYT-7F in a single package for arterial analysis. AAP does not actually analyze signals or systems, but allows the easy entry of data in the SOAP format and builds data decks for SOAP, PASSER II and TRANSYT-7F. It also checks the data decks for coding errors and submits the data to SOAP, PASSER or TRANSYT. In addition to returning the outputs from the component programs, the AAP will generate design and evaluation tables in a format similar to all three component programs. AAP uses Data AAPFORMS for forms display and AAPDIM for data input manager.
- TEAPAC:** Traffic Engineering Applications **PAC**kage, Version 2 L2.2, developed on May 1, 1992. Strong Concepts developed this package.
- TUTOR V2 L2.3 07NOV93 provides samples, commands and advanced techniques for using TEAPAC programs.
  - PREPASSR V1 L3.0 01MAY92 preprocesses PASSER II data by accepting English-language commands to build PASSER input coding and eliminate user error. PREPASSR can read and share SIGNAL85, PRETRANSYT data files directly for complete signal timing optimization.
  - PRETRANSYT V2 L4.0 01MAY92 preprocesses TRANSYT data by accepting English-language commands to build TRANSYT 7F input coding. PRETRANSYT can read and share SIGNAL85, PREPASSR data files directly for complete signal timing optimization.
- WHICH:** The Wizard of Helpful Intersection Control Hints, released February 1994. Integrates and provides access to several intersection analysis techniques for design and evaluation of the traffic control operation at signalized and unsignalized intersections. The University of Florida developed this package for the FDOT. WHICH provides the complete framework for entering the data and executing any of the following component design and analysis programs from a common data set, viewing results, and transferring information from one program to another.
- The EXSYS expert system shell prepares reports and makes recommendations.
  - Independent Component Programs

SIDRA, HCS, TRAF-NETSIM, SIGNAL85

- Dependent Component Programs  
SOAP, LOSGRAPH, ARTQUE, UNSIG2, 4WAYSTOP, SGGOLD
- Expert System Applications  
STOP CONTROL, SIGNAL CONTROL

**Traffic Management:**

**APL:** The Florida Department of Transportation Traffic Control Devices Approved Product List. Users currently may access this program from the FDOT IBM Mainframe Computer. This program provides users with qualified product listings and all relative information.



## Section VI.1 Florida's Elder Road User Program

### Purpose

In 1991 the Central Traffic Engineering Office was directed by the Secretary of Transportation to develop a plan for an elder roadway user program in Florida. This directive, in recognition of the special needs of the fastest growing segment of the population, began a program to redefine the design driver in the State of Florida. The following plan describes the development and continuation of this program.

### Background

The increasing needs of elder road users have become more apparent as a greater proportion of our nation's motorists fall into the 65 or older age group. Research has proven that the natural aging process results in a steady decrease in the abilities needed to perform the driving task. The effect of aging upon vision, hearing, coordination, range of movement, strength, attentiveness and response time have been well documented through research activities over the past decade.

Concern over how these limitations affect motorists ultimately resulted in the preparation of the Transportation Research Board's (TRB) Special Report 218, *"Transportation in an Aging Society,"* in 1988. This report was the first to summarize mobility concerns, the problems older drivers have with vehicle operation, and current highway design deficiencies related to older driver abilities. The report presents recommendations for corrective improvements in several areas including those we categorize as engineering improvements:

- Roadway design and operation,
- Traffic control devices (signs, signals and markings)

### FHWA Follow-up

The Federal Highway Administration supported the TRB's recommendations and developed an action plan to implement the highway-related recommendations of the report. Their *"Action Plan for Older Persons,"* dated February 1989, was developed into a high priority program called, *"Improved Highway Travel for an Aging Population."* Part of this program is the familiar Older Driver Pilot Program in which Florida participated along with several other states.

### Florida DOT

The Department's Elder Roadway User Program built upon the research and findings of those who have gone before. By establishing revised standards and specifications for traffic

control devices and applications based on the abilities of the average older person, we are modifying our highway transportation system to be safer for this special population.

### **The Elder Roadway User - Training**

To identify the special needs of the elder roadway user, the Central Traffic Engineering Office began a literature search to identify and obtain the latest, most comprehensive information on older drivers. To provide Department personnel with the latest educational background, we sponsored the first session the National Highway Institute (NHI) Course No. 13353, *"Improved Highway Travel Considerations for an Aging Population."* Harold Lunenfeld, the author and instructor, is a national expert in this field and provided early suggestions in the development of Florida's plan.

This course is recommended for all personnel involved in roadway design and the design and application of traffic control devices. It focuses on the needs of drivers within the context of the aging process, discussing the problems associated with diminishing capabilities and relating them to the driving task. The mobility needs of the older road-user as well as special safety considerations and compensatory behavior are discussed. Current design standards are evaluated in light of the abilities of the older person, and strategies for mitigating these problems are reviewed.

### **Human Factors Research**

The FHWA Office of Safety and Traffic Operations has been working on several projects to identify older driver/pedestrian needs and recommend improvements to accommodate those needs. The Central Traffic Engineering Office will stay abreast of all current research and adopt appropriate standards to implement these findings.

### **Plan Implementation**

To implement the Elder Roadway User Program in the shortest amount of time, the improvements were separated into two categories:

- *Short-term Improvements.* Those that could be implemented by maintenance forces or specialty contracts in the shortest time, and ultimately included in all construction contracts.
- *Long-term Improvements.* Those that would require a lead time for design and funding, and would be accomplished through construction contracts following a change to design standards.

### **Short Term Improvements**

The short-term improvements were immediately started. Instructions were transmitted to District Traffic Operations Offices to locate specific improvements at intersections and roadway

links on the Highway System. Other improvements were made statewide through maintenance activities.

A discussion on short term improvement follows below.

### *Reflective Paint Markers*

The increase of reflective pavement markers (RPMs) was the most effective short term improvement. RPMs provide increased delineation of the intended travel path during darkness or conditions, when visibility is most difficult for the elderly.

The DOT specification was modified to require 12 m spacing on all segments of the State Highway System. RPM spacing of 6 m is used for sharp curves and 60 m in advance of the stop bar on mainline, signalized intersections.

### *Overhead Street Name Signs*

The use of large lettering on overhead street name signs at signalized intersections increases intersection safety by allowing the older driver to identify the cross street earlier and to devote more time to concentrating on vehicle maneuvers. The effect of this improvement is apparent during both daylight and night operations.

Overhead street name signs used throughout the state should have 265 mm Series E modified upper case and 200 mm lower case letters. Where long street names preclude this size, 200 mm Series C letter height may be used. The practical limit on overall sign size is 450 by 1800 mm.

### *Wider Pavement Markings*

The pavement marking specification was modified to require 150 mm wide lines, statewide for all applications. Compliance with the new standard began immediately through maintenance striping activities and contract maintenance. Wide pavement markings more clearly delineate the travel path for the older driver travelling during the night.

### *Advance Street Name Signs*

Street name signs erected in advance of intersecting streets complete the older driver information system for cross streets. Advance signing allows the older driver time to select the appropriate lane before encountering short gaps close to the intersection. Initially advance intersection signs were installed at major intersections with significant traffic, now, they should be used wherever needed. See Section VI.3 of this manual for guidelines on the application of these signs.

### *Improved Pedestrian Crossings*

Pedestrian crossings at signalized intersections directly affect the safety and *ny* of the older population. Often, highway improvements constructed to increase capacity upgrade level of service have a detrimental effect upon the pedestrian. Adding increases the distances that must be traversed by the pedestrian.

Pedestrian crossings used frequently by older pedestrians should use high *ensis* crosswalks, slower walk speeds for signal timing (1.0 to 1.2 m/s) and increase use of refuge islands.

### *Improve Work Zone Safety*

The work zone is the most hazardous situation an older driver can encounter. *ough* Florida is among the leaders in the nation on workzone safety development, *specific* practices can be followed to better accommodate the older driver. *Delineation* of the intended travel path and correct driver actions are the most important *factors* to consider.

Work zone pavement markings should be supplemented with temporary *reflective* pavement markers to increase delineation. Advance warning signs must be located in accordance with approved procedures and field verified on a regular basis, for effectiveness. Signs and barricades must be better maintained to provide the best visibility and retroreflectivity. It is the responsibility of the project engineer to ensure improved standards are met.

### **Long Term Improvements**

The long term improvement category will require the greatest amount of time in this project. Specific long-term improvements will be continually evaluated, criteria established and design standards revised for their application. Implementation will occur as this process is complete for each recommendation as an ongoing program for the Department.

Current emphasis areas are sign visibility, improved advance notice and improved intersection techniques.

### **Sign Visibility**

*STOP, YIELD, and Warning Signs.* We selected 20/70 vision as the design acuity due to the fact that this is the minimum corrected visual acuity allowed in Florida for a drivers license (which will accommodate 97 percent of elders). Current MUTCD sign sizes accommodate 20/40 vision, which is used as the licensing standard in 41 states.

Our recommended new sign sizes for STOP, YIELD, and Warning signs appear in Section VI.2 of this manual.

*STOP and STOP AHEAD Signs.* The symbol STOP AHEAD sign should be used as a supplement to the STOP sign for speeds of 45 mi/h or greater on the State Highway System. A person with 20/70 vision cannot recognize a STOP sign until he is closer than the required stopping sight distance.

*RIGHT LANE ENDS.* Some warning signs, such as this one will not provide for 20/70 acuity even in the largest size. In these cases we recognize our limitations and specify the largest size, however, if a symbol sign can be used - use it.

*Guide Sign Considerations.* Larger lettering is needed for guide signs, but how large is a trade off. As letter size is increased to accommodate poor vision, the sign size increases dramatically. For example, a sign to accommodate 20/25 vision would be 1.25 times larger, than one for 20/20 vision; a sign for 20/40 vision would be 2.00 times larger. New standards for guide signs are currently under study.

### **Provide Advance Notice**

*Advance Lane Assignment signs.* These signs help reduce last minute decisions and lane changes just before an intersection or entrance ramp.

Advance lane assignment signs should be used on 6-lane approaches to intersections to delineate the turn/through lanes and on all approaches to freeway entrances where a left turn is required.

*Supplemental Pavement Markings.* Sign messages that provide advance notice can be supplemented with lane assignment pavement arrows and messages. Pavement arrows that indicate through and turn lanes should be installed as far back from the intersection or ramp as possible.

### **Improve Intersection Techniques**

At grade intersections are the most frequent cause of older driver crashes. By simplifying intersection operation and improving sight distance for traffic turning off the mainline roadway we can improve safety. However, these techniques should be considered with other factors on a case by case basis.

*Offset Left Turn Lane.* Involvement in left crashes increases steadily after we pass the age of 29, when our visual and cognitive abilities start to reduce. By the time we reach elder status, we have difficulty judging the speed of approaching vehicles and selecting acceptable gaps. Under such conditions, unobstructed sight distance is. By offsetting the turn lanes we can increase the visibility of opposing through lanes.

Offset (non-opposing) left turn lanes should be installed when intersections are improved and right-of-way can be obtained. This will occur at more rural intersections where cross street volumes are lower, minimizing the impact of a wider intersection.

*Offset Right Turn Lane.* A slightly different situation occurs where there is a heavy right turn movement (particularly trucks) and these vehicles block the vision of the side street traffic. By moving the turn lane farther to the right, sometimes providing a physical separation between the turn lane and the through lanes, sight distance is improved.

### **Measures of Effectiveness**

One of the difficult elements of this type of program is in determining how effective it is. During the Elder Road User Pilot Project, user surveys and crash records were used to evaluate the short term improvements.

These techniques will be used again along with a new concept called the *signing effectiveness study*. This study will involve pre-selecting a route from a map and attempting to drive it as an elderly non-familiar motorist. Control sections will also be selected over which we will conduct very close examinations of before/after crash records.

**Section VI.2**  
**WARNING, STOP, AND YIELD SIGN SIZES**  
**TO ACCOMMODATE THE ELDER ROADWAY USER IN FLORIDA**

**Introduction**

Warning, STOP, and YIELD signs are critical to the safe operation of motor vehicles by all drivers. However, elder drivers as a group have poorer eyesite and reaction time and reduced visual acuity is associated with repeat crash rates. In order to determine the appropriate sizes that should be used for these critical signs, the Central Traffic Engineering Office performed a study.

Statistics at the time of the study did not allow a good determination of a design visual acuity. However, the minimum required corrected visual acuity for a driver's license in Florida is 20/70. 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.

These required sign sizes should be installed in all counties of the state, during future projects, and as replacements are necessary due to sign damage or expiration of useful sign life.

**Recommended Warning Sign Sizes**

The recommended symbol warning sign sizes in Table VI-1 provide a minimum of 20/70 acuity.

<b>Table VI-1</b>		
<b>RECOMMENDED SYMBOL WARNING SIGN SIZES</b>		
SIGN CODE	SIGN SIZE (mm)	SIGN SYMBOL
W3-1a	900	Stop Ahead
W5-2a	900	Narrow Bridge
W11-10	900	Truck Crossing
W14-3	900 by 1200	No Passing Zone

The recommended word message warning sign sizes in Table VI-2 provide either a minimum of 20/70 acuity, or the most acuity available by using a 1200 mm diamond shape sign.

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

For any sign providing less than 20/70 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 II-1, and Section 2C-3 of the MUTCD, the same total distance from the point where the sign is just legible to the condition will be maintained. Add 7.5 m for 200 mm Series C and 200 mm Series D letters, 15.0 m for 125 mm Series D, 150 mm Series C, and 150 mm Series D letters and 22.5 m for 125 mm Series C letters.

### **Recommended Stop Sign Sizes**

The 1200 mm STOP sign provides a minimum required acuity of only 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.

Table VI-3 was produced to determine the required size for the STOP and STOP AHEAD sign, and the sign placement distance for the STOP AHEAD sign.

The stopping sight distance shown in the table above were calculated using the equation on Page 123 of AASHTO's *A Policy on Geometric Design for Highways and Streets* (Green Book, 1994 edition), and is for level, wet pavement. The brake reaction time was increased from 2.5 to 3.5 seconds to accommodate elder drivers.

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

The increase due to downgrades as steep as 6 percent does not change the results in Table VI-3 for speeds up to and including 35 mi/h. Table VI-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 VI-3.

The STOP AHEAD symbol sign should be placed according to Table VI-3, rather than Table II-1 in Section 2C-3 of the MUTCD for Condition B (Stop). The 900 mm size sign has 43.0 m legibility for 20/70 acuity, which is greater than the required 38.1 m.

If restricted right-of-way requires a STOP sign smaller than shown in this table, the largest possible size should be used and a 900 mm STOP AHEAD symbol sign should be placed according to Tables VI-3 and VI-4.



Table VI-2

## RECOMMENDED WORD MESSAGE WARNING SIGN SIZES

SIGN CODE	SIGN SIZE (mm)	LETTER SERIES	PRIMARY LETTER HEIGHT (mm)	MINIMUM REQUIRED ACUITY 20/x	SIGN MESSAGE
W5-1	1200	D	200	64	Road Narrows
W5-2	1200	D	200	64	Narrow Bridge
W5-3	1200	C	200	54	One Lane Bridge
W8-1	900	D	250	80	Bump
W8-2	900	E	250	88	Dip
W8-3	1200	C	200	54	Pavement Ends
W8-4	1200	C	200	54	Soft Shoulder
W8-6	1200	C	200	54	Truck Crossing
W8-7	1200	D	200	64	Loose Gravel
W8-8	1200	D	200	64	Rough Road
W8-9	1200	C	200	54	Low Shoulder
W9-1	1200	D	200	64	Right Lane Ends
W9-2	1200	D	200	64	Lane Ends Merge Left
W13-1	600	E	250	88	35 MPH
W13-2	900 by 1200	E	300	106	Exit 25 MPH
W13-3	900 by 1200	E	300	106	Ramp 30 MPH
W14-1	1200	D	225	72	Dead End

Table VI-3

STOP AND STOP AHEAD SIGN SIZES AND PLACEMENT

DESIGN SPEED (mi/h)	STOPPING SIGHT DISTANCE (m)	STOP SIGN SIZE <sup>1</sup> (mm)	STOP SIGN RECOGNITION DISTANCE (20/70) (m)	STOP AHEAD SYMBOL SIGN SIZE <sup>2</sup> (mm)	STOP AHEAD SIGN PLACEMENT DISTANCE (m)
20	38.0	600	53.5	—	—
25	55.5	750	66.9	—	—
30	76.7	900	80.2	900*	38.6*
35	101.3	900	80.2	900*	63.2*
45	130.3	900	80.2	900	92.2
50	161.8	1200	107.0	900	123.7
55	193.8	1200	107.0	900	155.7

\* If needed for restricted sight distance locations in urban areas.

<sup>1</sup>On state highways, the 1200 mm STOP sign should be considered for 45 mi/h or greater. STOP signs on roads intersecting the state highway are usually replaced in FDOT construction projects. The sizes in this document are recommended for the replacement signs. Motorists traveling on local roads, in urban areas, expect to encounter STOP signs. STOP signs larger than 900 mm should be used when greater emphasis or visibility is needed.

<sup>2</sup>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 mi/h. 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.

Post-it™ Fax Note	7671	Date	2.4.00	# of pages	1
To	Mark Gillette	From	Gail Holley		
Co./Dept.		Co.	FDOT		
Phone #	813.882.8364	Phone #	850.922.7244		
Fax #	813.884.5990	Fax #			

If restricted right-of-way demands a STOP AHEAD symbol sign smaller than 900 mm, the 750 mm sign will provide approximately 35.0 m legibility. This sign should be placed 3.0 m further from the STOP sign than the distance shown in Tables VI-3 and VI-4.

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

**Recommended YIELD Sign Sizes**

Only the 900 mm size sign is required because it meets the design visual acuity goal. YIELD sign sizes for expressway and freeway use should continue to comply with the Standard Highway Signs manual.

<b>Table VI-4</b>		
<b>ADDITIONAL STOPPING SIGHT DISTANCE AND STOP AHEAD SIGN PLACEMENT DISTANCE DUE TO DOWNGRADE</b>		
<b>DESIGN SPEED (mi/h)</b>	<b>ADDITIONAL DISTANCE (3% GRADE) (m)</b>	<b>ADDITIONAL DISTANCE (6% GRADE) (m)</b>
45	6.7	15.0
50	9.4	21.1
55	11.9	26.6



### Section VI.3 ADVANCE STREET NAME SIGNS

Advance street name signing allows the older driver more time to select the appropriate lane before encountering short gaps close to the intersection. For this reason, advance street name signs should be installed wherever needed. Table VI-5 should be followed to select the most cost effective sign size for advance street name signs.

The use of advance street name signs was identified as a short term improvement in the initial Elder Roadway User Program and many have been installed throughout Florida. The signs provide advance notice of an intersection cross street so that drivers have more time to select and move into the appropriate lane to make their intended maneuver.

In the initial plan, there was little guidance as to the size of lettering to use. Table VI-5 and Figure VI-1 were developed by District Five to provide this guidance. The table assigns letter sizes and sign spacing according to approach speed. This allows us to select a sign that can be adequately read by older drivers, without increasing the overall sign size beyond what is required. This results in a more cost effective design, which will fit better into the urban street layout, and will not be too large to be objectionable to local maintaining agencies.

**Table VI-5**

**DESIGN GUIDELINES FOR ADVANCE STREET NAME, DESTINATION, AND DISTANCE SIGNING**

POSTED SPEED LIMIT (mi/h)	LETTER SIZE (mm) SERIES E Upper Case	LETTER SIZE (mm) SERIES E Lower Case	DISTANCE 'X' (m)
30 - 35	150	100	60
40 - 45	200	150	75
50 - 55	265	200 <sup>1</sup>	105

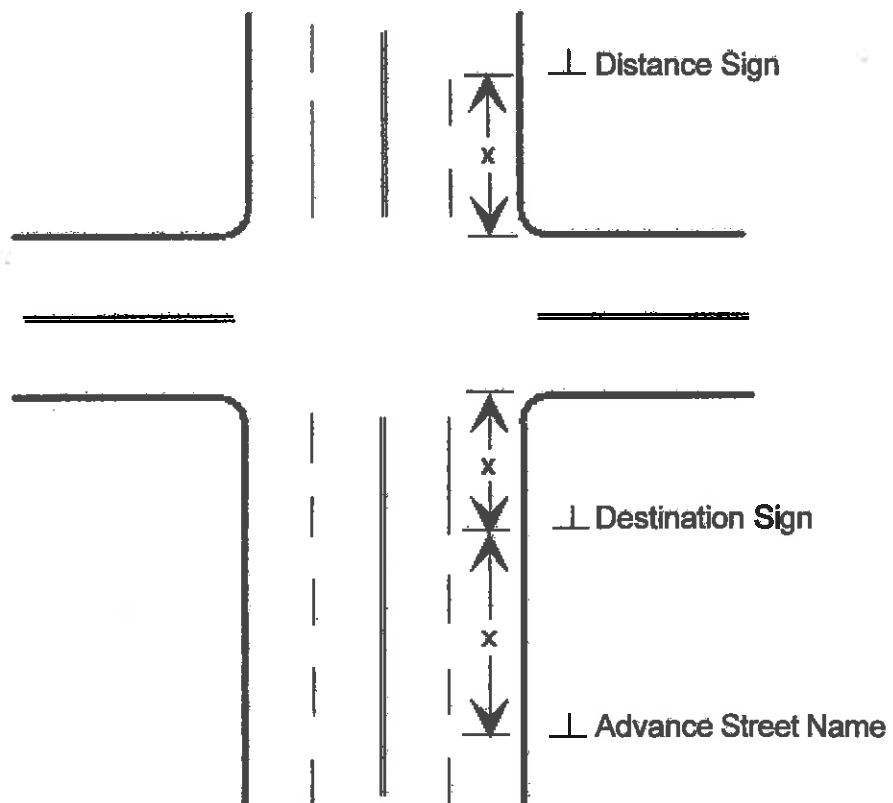
<sup>1</sup>The distance sign letter size may be reduced from 200 mm to 150 mm for roadways with speed limits posted from 50-55 mi/h.

*no lower case when used 6"*

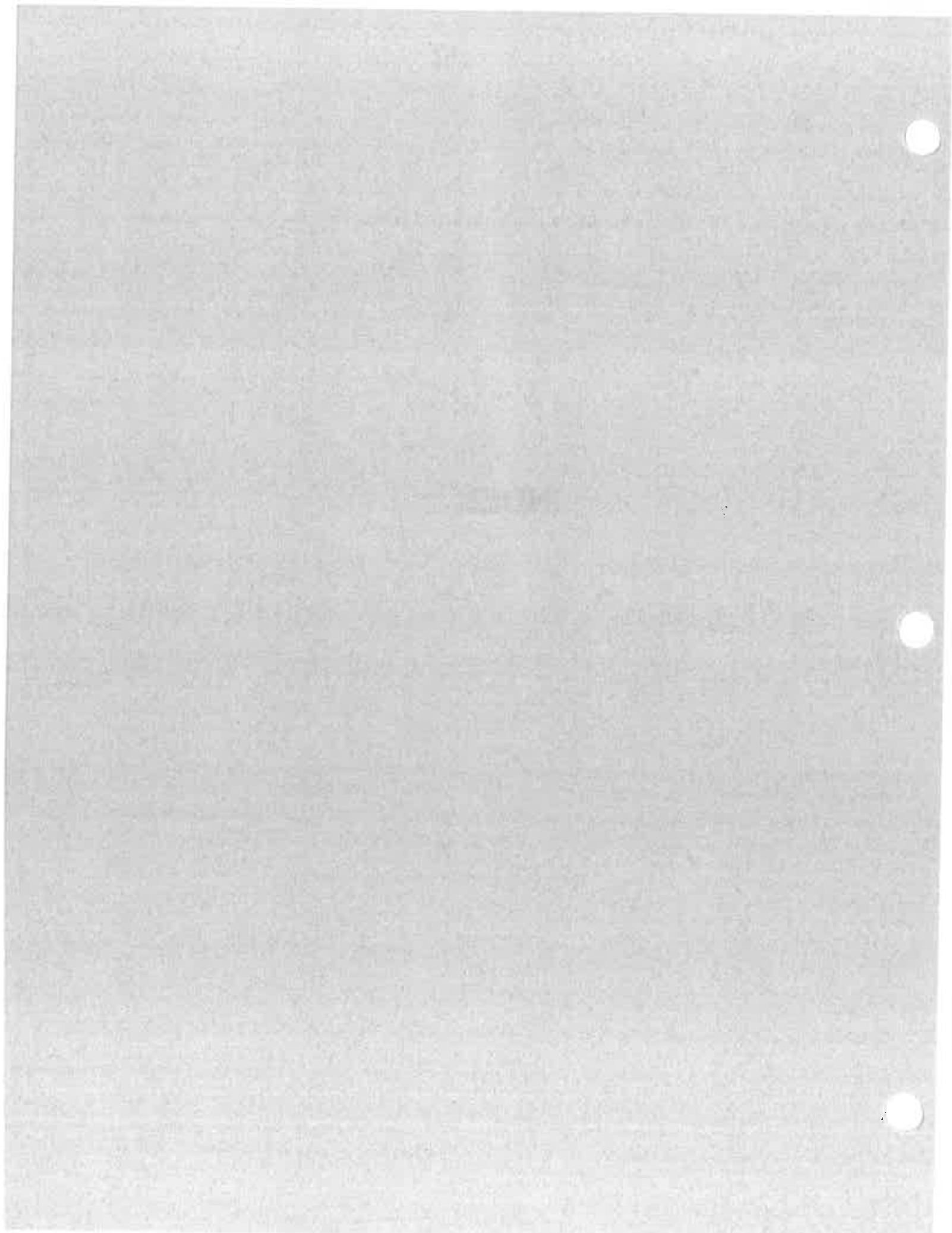
*Compliance w/ stan. signs.*

*Separate column as orig. cannot use to mod for 30-35*

Figure VI-1. Placement of Advance Street Name Signs



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New 4/96

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New 4/96

