



## *Florida Department of Transportation*

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SECRETARY

**Mail Station 32**

### **ROADWAY DESIGN BULLETIN 06-09**

**DATE:** August 25, 2006

**TO:** District Design Engineers, Plans Preparation Manual Holders

**FROM:** David C. O'Hagan, PE, State Roadway Design Engineer

**COPIES:** Robert Greer, Brian Blanchard, Tim Lattner, William Nickas,  
Duane Brautigam, Marianne Trussell, Chris Richter, FHWA

**SUBJECT:** Crossovers on Limited Access Facilities

A handwritten signature in black ink, likely belonging to David C. O'Hagan, PE, the State Roadway Design Engineer mentioned in the 'FROM' field.

### **REQUIREMENTS**

The following section addressing the installation of permanent crossovers on Limited Access facilities is added to the Plans Preparation Manual, Volume I, Chapter 2.

#### **2.14.4 Crossovers on Limited Access Facilities**

Permanent crossovers on rural freeways are sometimes necessary to avoid excessive travel distances for emergency vehicles, law-enforcement vehicles, and maintenance vehicles. Median crossings shall be allowed only when there is a clear documented request and need for such a feature; however they shall be limited in number and very carefully located. The location of crossovers used for maintenance purposes should consider the needs of emergency and law enforcement vehicles and vice versa. Permanent crossovers should conform to the recommendations of AASHTO's "Geometric Design of Highways and Streets" (see Rural Freeway Medians). The location of all crossovers requires approval of the District Design Engineer. Note, this criteria does not apply to contra flow crossovers placed for facilitating hurricane evacuation, nor does it apply to temporary construction crossovers. For temporary construction crossovers, please see Design Standards Index Numbers 630 and 631.

The following AASHTO crossover recommendations are requirements on FDOT's Limited Access Facilities:

1. Not spaced closer than 3.0 miles apart.
2. Located only in areas with above-minimum stopping sight distance and without superelevated curves.
3. Not located within 1,500 feet to the end of a speed-change taper (of a ramp or facility widening/narrowing) or any structure (bridge, overpassing facility or overhead sign).
4. Not located where the median width is less than 25 feet.

Crossover locations that do not meet the above criteria require approval by the State Roadway Design Engineer and FHWA (FHWA on Interstate facilities only).

The following additional criteria are also placed on crossovers designed for FDOT's Limited Access Facilities:

1. Not located within 1.5 miles of any interchange.
2. Not located where the median width is less than 40'.
3. Not located in urban areas
4. Where continuous median barrier is present, openings for crossovers should not be greater than 5.0 miles apart between Interchanges.

Crossovers that do not meet these additional criteria require approval by the District Design Engineer.

Typical layouts for the design of emergency use crossovers are provided in Figures 2.14.1, 2.14.2 and 2.14.3. These typical layouts will not cover all situations, but are provided as a guide for developing site-specific designs. Designs should accommodate the types of emergency vehicles expected to use the crossover. Law enforcement vehicles and typical ambulance sized vehicles can usually be easily accommodated. The typical layouts in Figures 2.14.1, 2.14.2 and 2.14.3 will accommodate an SU design vehicle. To the extent practical, designs should accommodate larger emergency response vehicles such as fire trucks. This will require acquiring information from local emergency responders on the size and configuration of vehicles used. Except where median widths are wider than normal, fire trucks and other larger vehicles will likely not be able to make u-turns without encroaching or crossing travel lanes. As a minimum, designs should provide for the necessary minimum radii and width to allow the largest design vehicle to enter the crossover and stop as close to perpendicular to traffic as practical. All designs should be tested by superimposing the turning path of the design vehicle to insure the crossover will operate as expected.

On Interstate facilities, the Federal Highway Administration directs that median shoulders approaching the crossover utilize the standard shoulder width, or existing shoulder width. The FHWA believes the safety benefits derived by making the crossovers appear less conspicuous outweigh the benefits obtained by providing paved

shoulders to accommodate acceleration and deceleration lanes for emergency vehicles, law enforcement, or other authorized vehicles.

The profile of the crossover shall conform as close as practical with travel way shoulder slopes and median side slopes so that the crossover is inconspicuous as possible to traffic. The paved width of the crossover should not be any wider than that necessary to provide for the largest design vehicle. Shoulder width for the crossover should be 8' minimum. Side slopes of the crossover (parallel with the mainline travel way) shall be 1V:10H or flatter. However, side slopes may be transitioned to match the slope of a pipe culvert safety end treatment where a culvert crossing underneath the crossover is necessary to provide for proper median drainage.

In locations where a median barrier is present, the length of the barrier opening should be minimized to the extent practical. As shown in Figure 2.14.3, the barrier ends on each side of the opening should be offset to the extent practical. Crashworthy end treatments or crash cushions to shield the barrier ends shall be provided when the ends are within the clear zone and fall within the departure angle used to set length of need. Crashworthy end treatments or crash cushions shall also be provided whenever the angle between barrier ends is less than 30 degrees measured from the direction of mainline travel (see Figure 2.14.3).

Drainage requirements must be determined for each location and appropriate provisions made. The drainage culvert shown in the figures are for example only. Either a mitered end section (1:4) or preferably a u-endwall with grate (1:6) should be used for culverts parallel with the mainline. Note that in some cases existing median ditches are shallow and there will be minimal clearances available for even small size culverts. This requires that site-specific vertical and horizontal geometry be developed for each location rather than use a typical drawing.

A pavement design equivalent to a Limited Access shoulder pavement should be provided (1-1/2" Structural Course, Base Group 1 with a 12" Stabilized Subgrade).

Signing for permanent crossovers shall consist of a "No U-turn" sign (R3-4) with an "Official Use Only" plaque (FTP-66-04). In accordance with MUTCD Section 3D.03, a double yellow delineator should be placed on the left side of the through roadway on the far side of the crossover for each roadway (see figures). To improve nighttime visibility for approaching emergency responders, install yellow RPM's placed outside the yellow edge line in advance of the crossover using the following pattern and spacing: 3 spaced 4" apart @ 1500', 2 spaced 4" apart @ 1000', and 1 @ 500' in advance of the crossover.

On reconstruction and RRR projects, the location of existing crossovers shall be evaluated for conformance to the above criteria. Those that do not meet this criterion must be removed as a part of the project unless approved by the State Roadway Design Engineer and FHWA (FHWA approval on Interstate only).

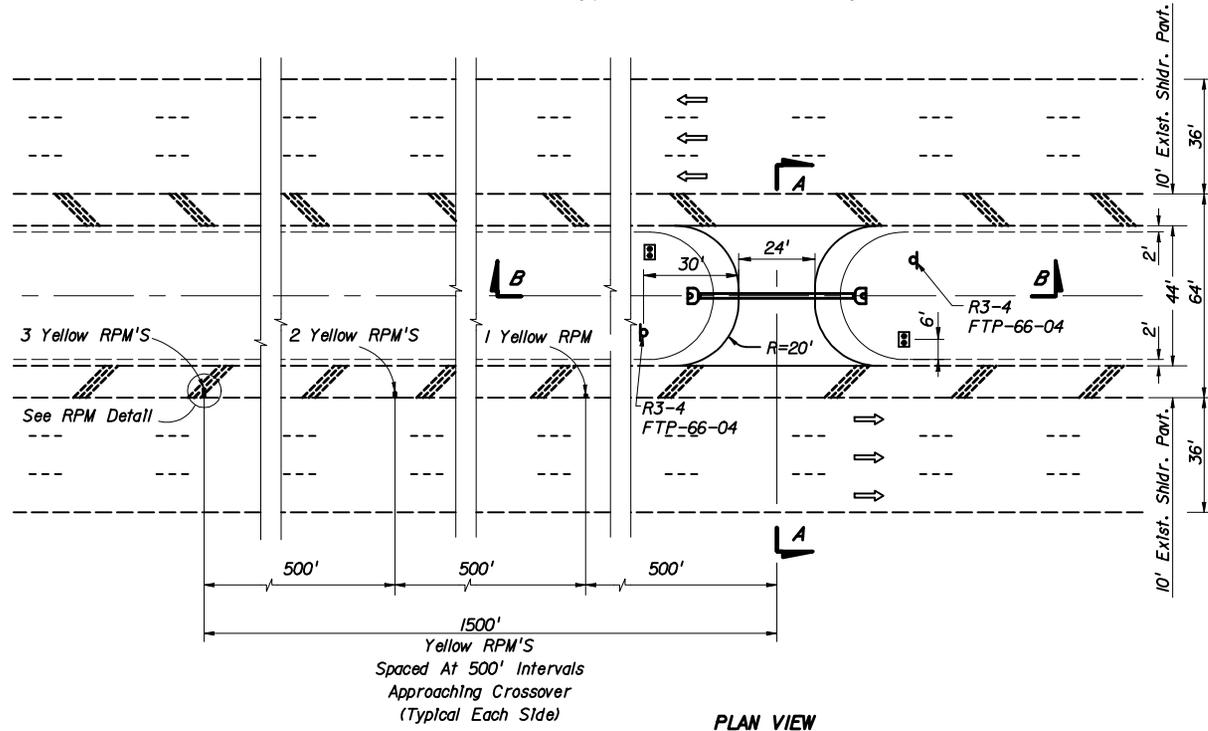
## **IMPLEMENTATION**

The above requirements are effective immediately on all crossovers that have not been approved as of this date by the FHWA on Interstate Facilities, or the District Design Engineer on non-Interstate Limited Access facilities.

## **CONTACT**

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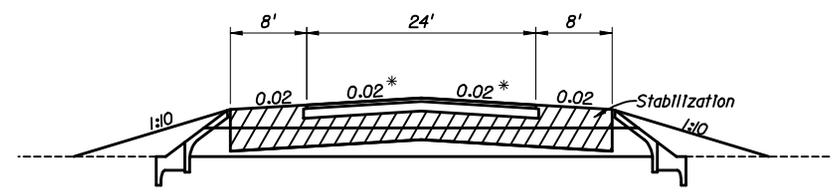
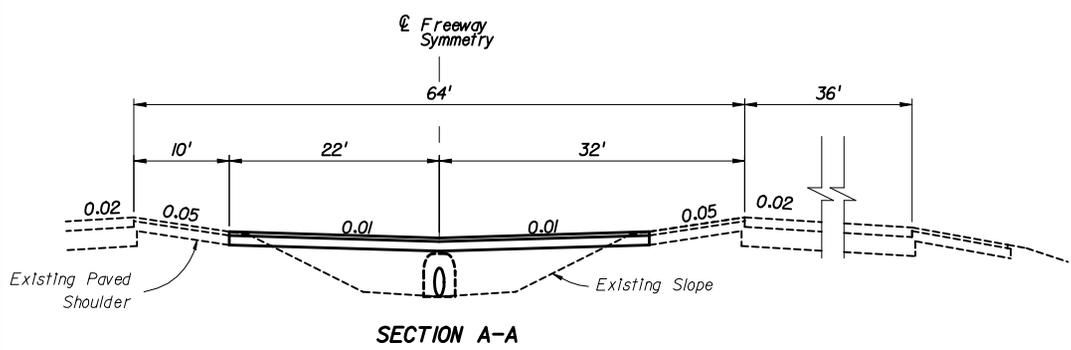
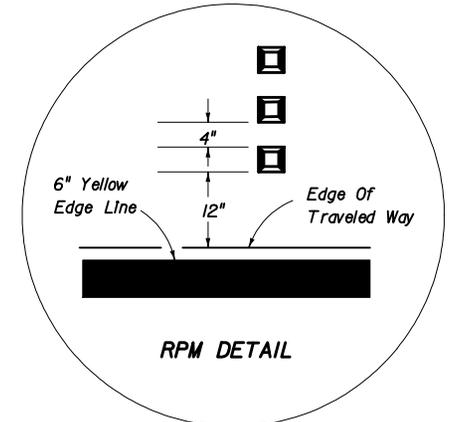
Figure 2.14.1  
 Crossovers On Limited Access Facilities - 6 or More Lanes  
 Typical Plan View Layout and Sections



LEGEND:

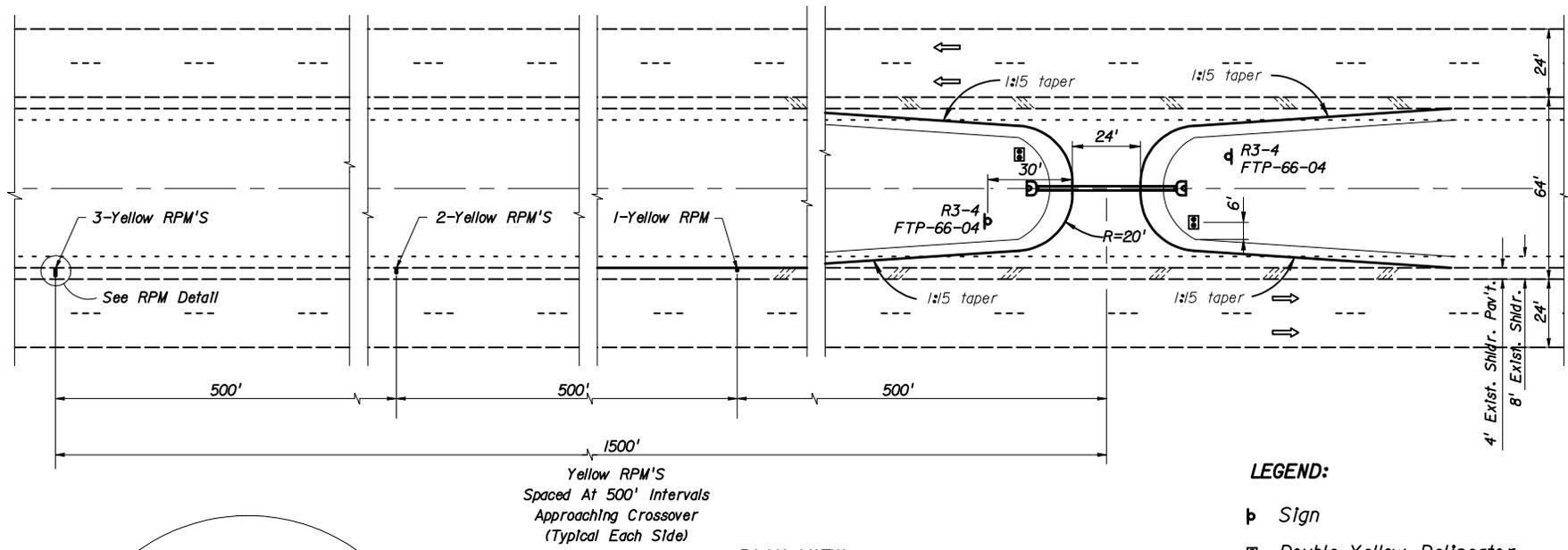
- Sign
  - ▣ Double Yellow Delineator
- R3-4  
 (36"x36")
- OFFICIAL  
 USE ONLY

FTP-66-04  
 (36"x18")



\* For freeway grades 2% or greater, match freeway grade

Figure 2.14.2  
Crossovers On Limited Access Facilities - 4 Lanes  
Typical Layout



**LEGEND:**

▣ Sign

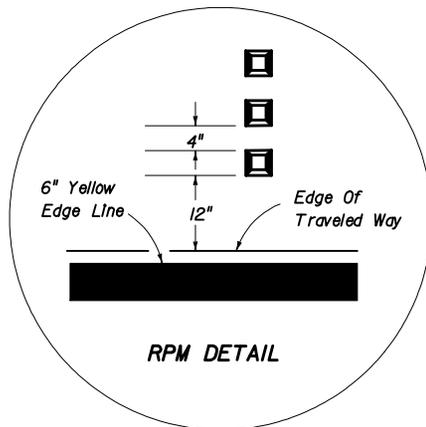
▣ Double Yellow Delineator



R3-4  
(36"x36")

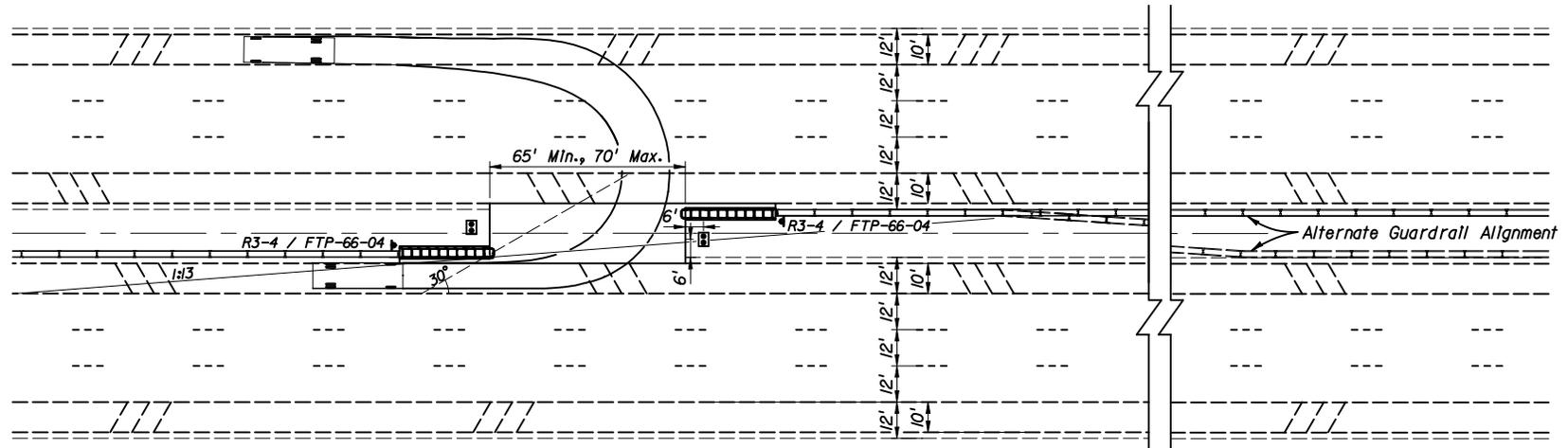


FTP-66-04  
(36"x18")



**PLAN VIEW**

Figure 2.14.3  
 Median Barrier Opening For  
 Crossovers on Limited Access Facilities  
 Typical Layout



**PLAN VIEW**

**LEGEND:**

-  Crash Cushion
-  Barrier
-  Sign
-  Double Yellow Delineator



R3-4  
 (36" x 36")

FTP-66-04  
 (36" x 18")

Turn simulations generated by AutoTURN. Minimum turning radius for SU vehicle shown.

Six lane facility with 40' median shown. For other lane and median configurations, adjustments in turn radii or added pavement may be required.

Provide Yellow RPM'S Placed Outside  
 Yellow Edge Line in Advance Of Crossover  
 Using The Following Pattern :  
 3 @ 1500', 2 @ 1000' And 1 @ 500'  
 See Example In Figure 2.14.1