

This training was built from a class taught for the DeIDOT TMC in 2004.

# MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES

## M.U.T.C.D.

for Transportation  
Management Technicians

*Edwards  
AND  
Kelcey*

 DeIDOT *DelTrac*





## Today's Goals

- Understand the pavement marking standards presented in the DE MUTCD.
- Understand the MUTCD terminology.
- Discuss what items automatically require the Traffic Section's involvement.
- Learn the "Golden Numbers". 



## Teamwork

- Pavement Rehab
- Traffic / TMC
- Quality
- Operations & Maintenance



# DE MUTCD Overview

## *CONTENTS*

- **Part 1: General**
- **Part 2: Signs**
- **Part 3: Pavement Markings**
- **Part 4: Highway Traffic Signals**
- **Part 5: Low-Volume Roads**
- **Part 6: Temporary Traffic Control**
- **Part 7: School Areas**
- **Part 8: Highway-Rail Grade Crossings**
- **Part 9: Bicycle Facilities**
- **Part 10: Highway-Light Rail Transit Grade Crossings**



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*Today's focus*

*7, 8, 9 also include pavement marking standards*



# DE MUTCD Overview

## *TERMINOLOGY*

- **STANDARD** - Required, mandatory, or prohibitive practice. The verb **SHALL** is typically used.
- **GUIDANCE** - Recommended, but not mandatory, practice in which engineering judgment may indicate the use to be appropriate. The verb **SHOULD** is typically used.
- **OPTION** - A permissive condition that carries no requirement or recommendation. Options may contain allowable modifications to a Standard or Guidance. The verb **MAY** is typically used.
- **SUPPORT** - An informational statement that does not require or recommend a specific practice. The verbs shall, should, and may are **NOT** used in Support statements.

Engineering  
judgment



## Traffic Section Involvement

### *AUTOMATIC TRIGGERS*

- Traffic signal.
- Mid-block uncontrolled crossing.
- Bicycle treatment.
- Turning a shoulder into a right-turn lane.
- Railroad crossing.
- Right-turn acceleration lane.
- Crossover.



## Line Type & Function

- **Double line** – indicates maximum or special restrictions.
- **Normal line**
  - Interstates, freeways, expressways: **6 in**
  - All other roads: **4 in** 
- **Wide line** – at least 2x normal line
- **Broken line** - indicates a permissive condition.
  - Typically 10 foot line segments with 30 foot gaps. 
- **Dotted line** . . .



*Markings on NB US 202*



## Dotted Line

- Dotted line . . . *PROVIDES GUIDANCE*
  - Shall consist of 3 ft line segments and 9 ft gaps for line extensions on interstates, freeways and expressways.
  - Shall consist of 2 ft line segments and 6 ft gaps for line extensions on all other roads, except roundabouts. 
  - Shall consist of 2 ft line segments and 2 ft gaps at roundabouts.

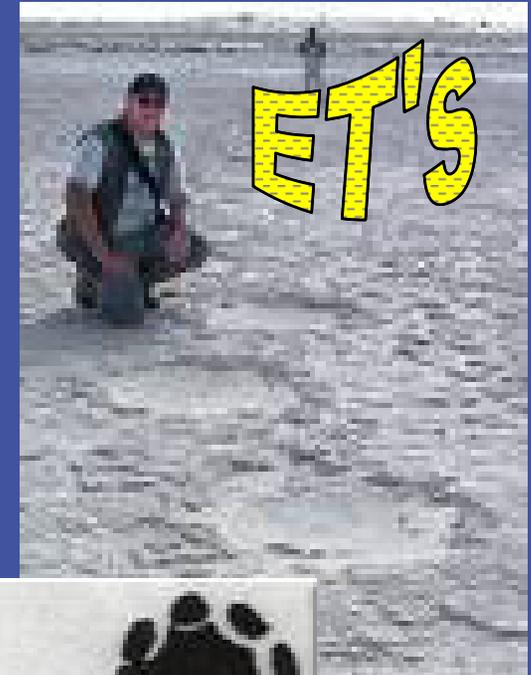


SR 273 EB towards  
Old Baltimore Pike



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**Skip lines**



## Colors

- **White markings:**
  - Separate traffic flows in the **same direction**.
  - Identify the **right edge** of the roadway.
- **Yellow markings:**
  - Separate traffic traveling in **opposite directions**.
  - Identify the **left edge** of the roadways on divided roadways and ramps.



*Various pavement marking colors*



## Markings Exercise

- Identify any problems with the traffic control markings shown in the picture.



Solid yellow line is used to separate the SB left turn and through lanes.



# Markings Exercise

Before



After



Southbound US 202 (Concord Pike) & Murphy Rd. / S.R. 141



## Warrants

- **Centerline markings shall be placed on roadways with:**

- A width of 19 feet or more and an ADT of 1,000 vehicles per day or greater.



- **Edge Lines shall be placed on:**

- Freeways and expressways.
- Roadways with a width of 20 feet or more and an ADT of 3,000 vehicles per day or greater.



*Yellow centerline markings*



## Warrants

- Sometimes edge lines and centerlines are installed for safety reasons even though they do not meet the warrants.



*Centerline marking on Black Diamond Rd.*



*Edge lines on Eagle Nest Landing Rd.*

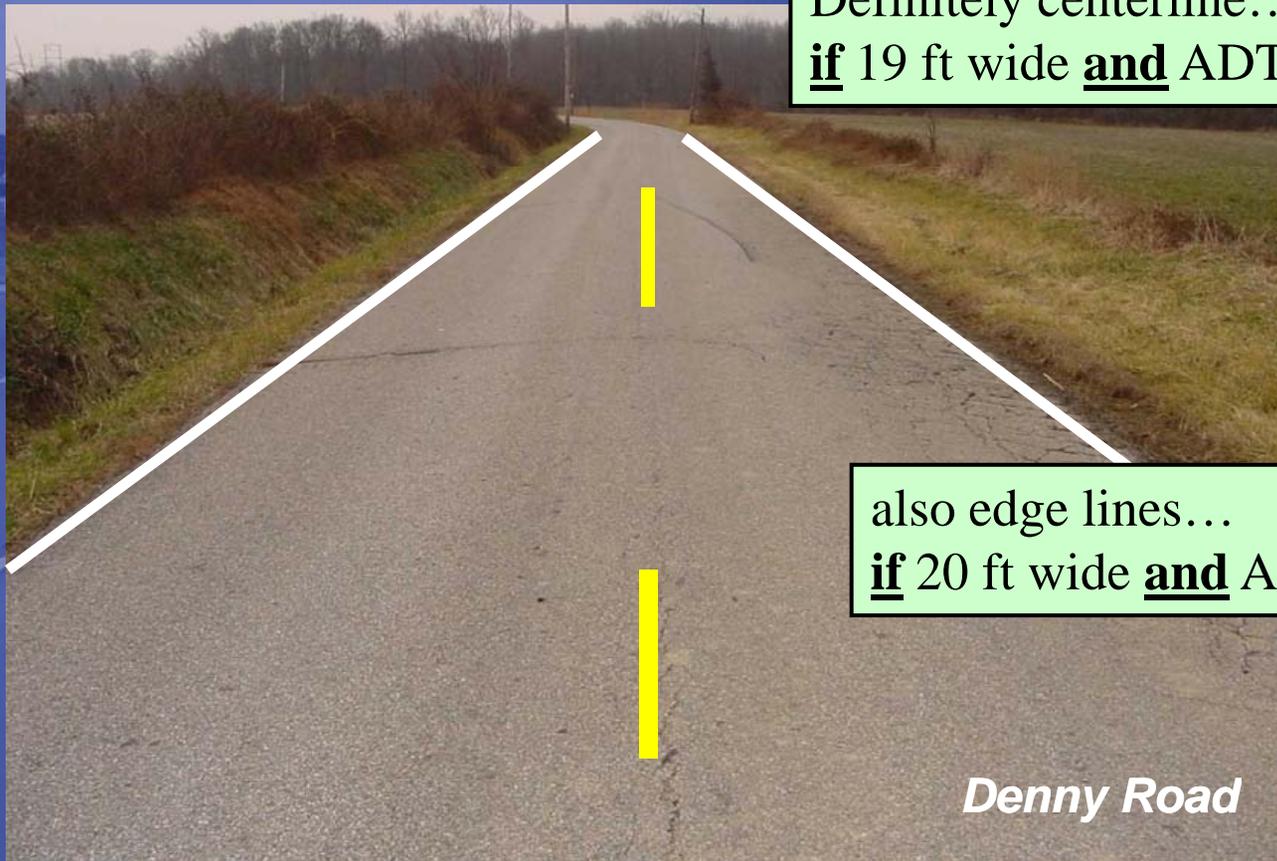


## Warrants Exercise

- Should this road be striped?

Definitely centerline...  
**if** 19 ft wide **and** ADT of 1,000

also edge lines...  
**if** 20 ft wide **and** ADT of 3,000



*Denny Road*



## When do we break the edge line?

- Except for dotted edge line extensions, edge line markings shall not be continued through intersections or major driveways.
- Edge lines should not be broken for minor driveways.



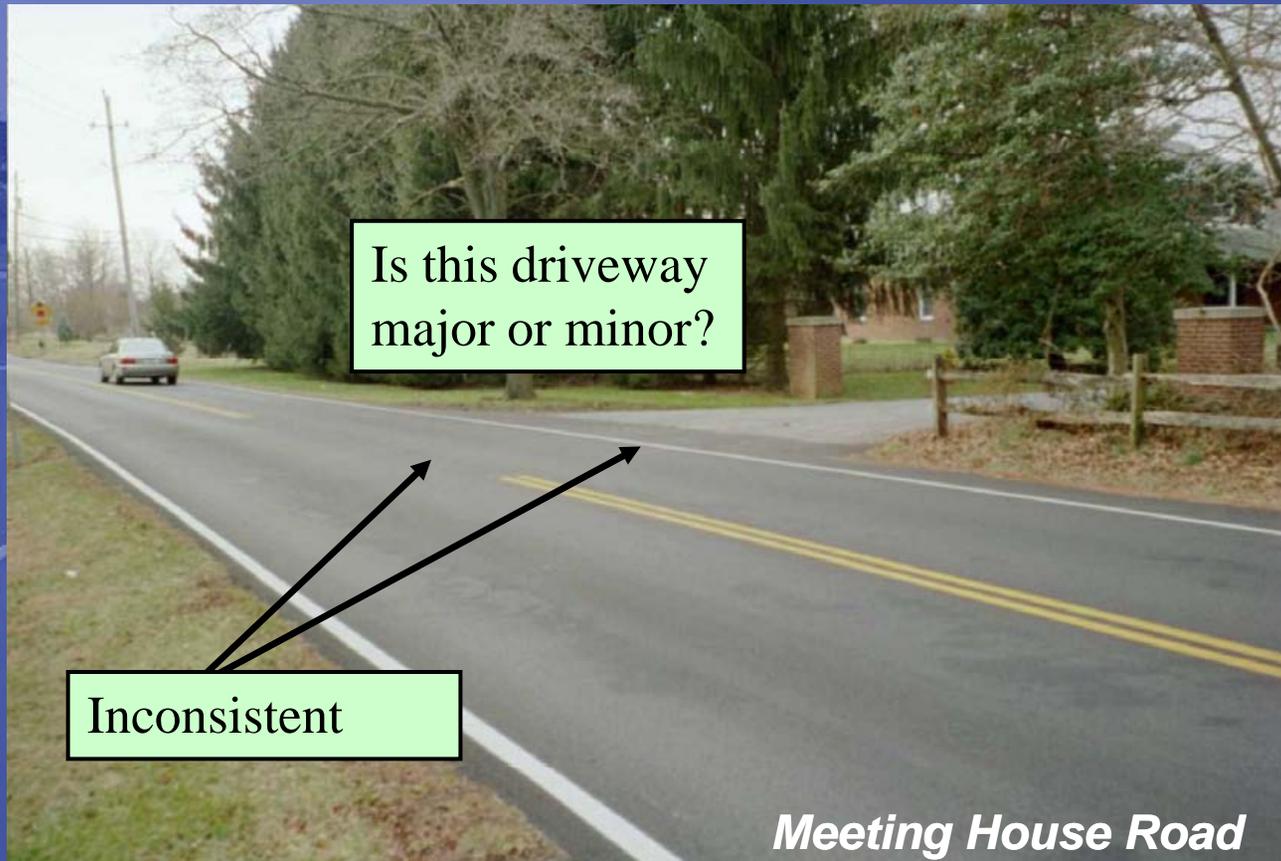
Shoulder edge line should be wrapped.

SECTION 3B.06



## Edge Line Discussion

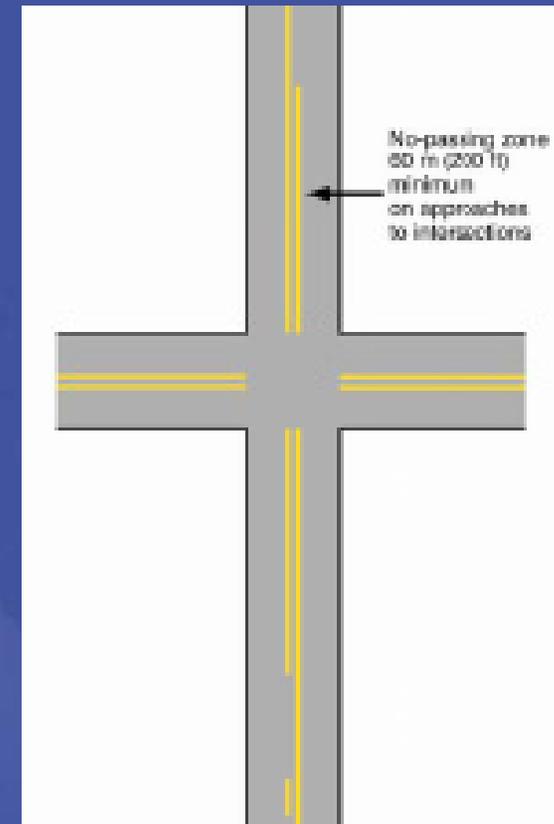
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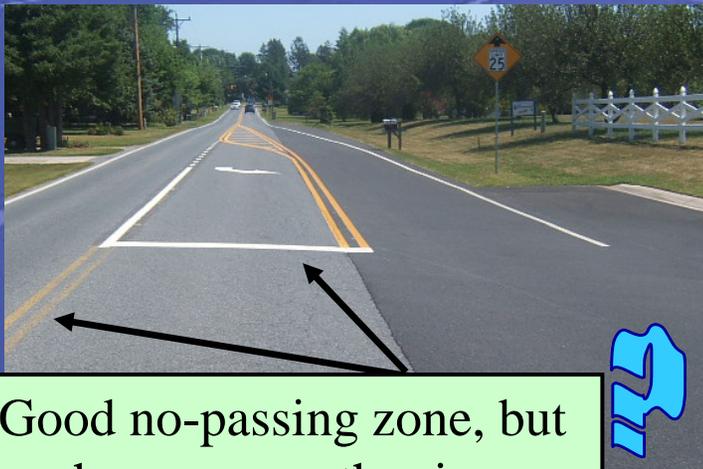
## No-Passing Zone

- Shall be used on all approaches to an intersection within 200 ft. 
- Shall be used on approaches to highway-grade crossings.





# No-Passing Zone Exercise



Good no-passing zone, but we have some other issues.





# Island Hatching

- 12 in wide diagonal markings, 25 ft spacing. 

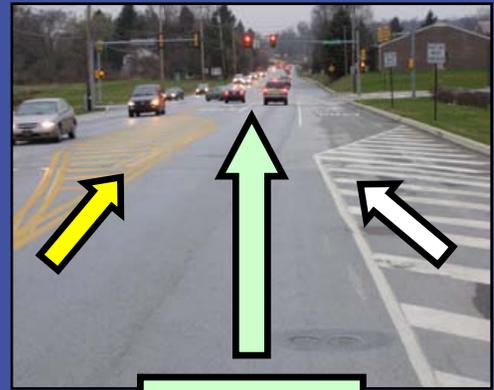
- Markings “guide” or “point” towards the direction of travel.



*Left edge of travel lane channelization marking*



*Right edge of travel lane channelization marking*



**DIRECTION OF TRAVEL**



# Islands Exercise





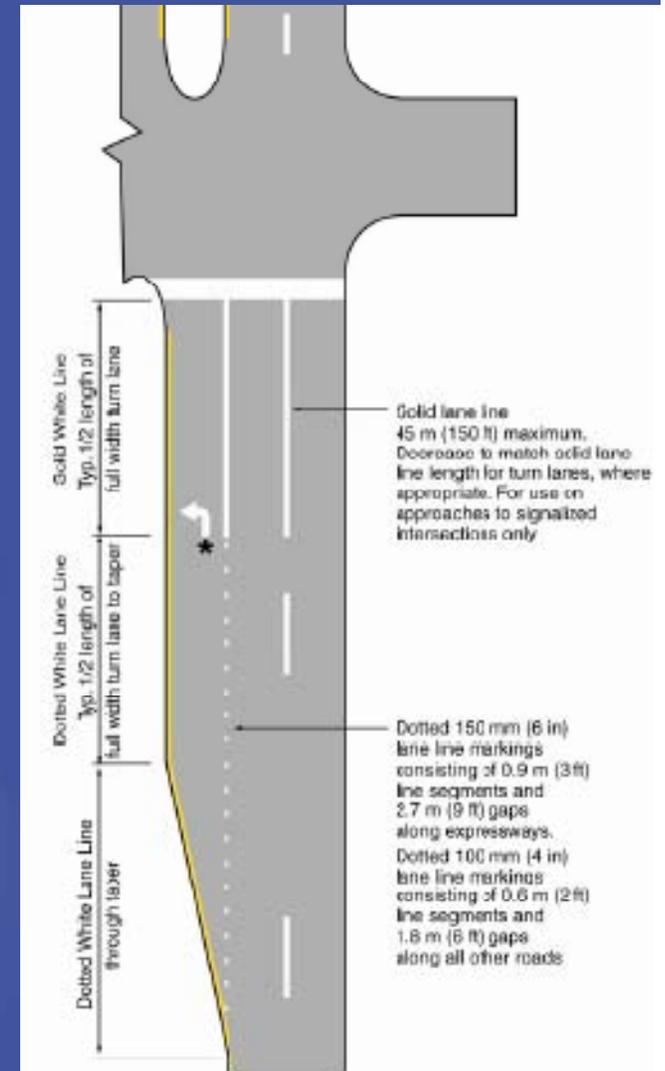
# Island Discussion





## Stack Lines

- Lane lines separating through-traffic lanes should not be converted to solid lines approaching intersections except at signalized intersections.
  - 150 ft. maximum 
  - Same principle separating dual left-turn lanes
- Should be used to separate a turn lane from the through-traffic lanes at all intersections.
  - Length based on operational analysis





## Stack Lines Exercise

- Lane lines separating through-traffic ... should ... be ... solid ... approaching ... signalized intersections.

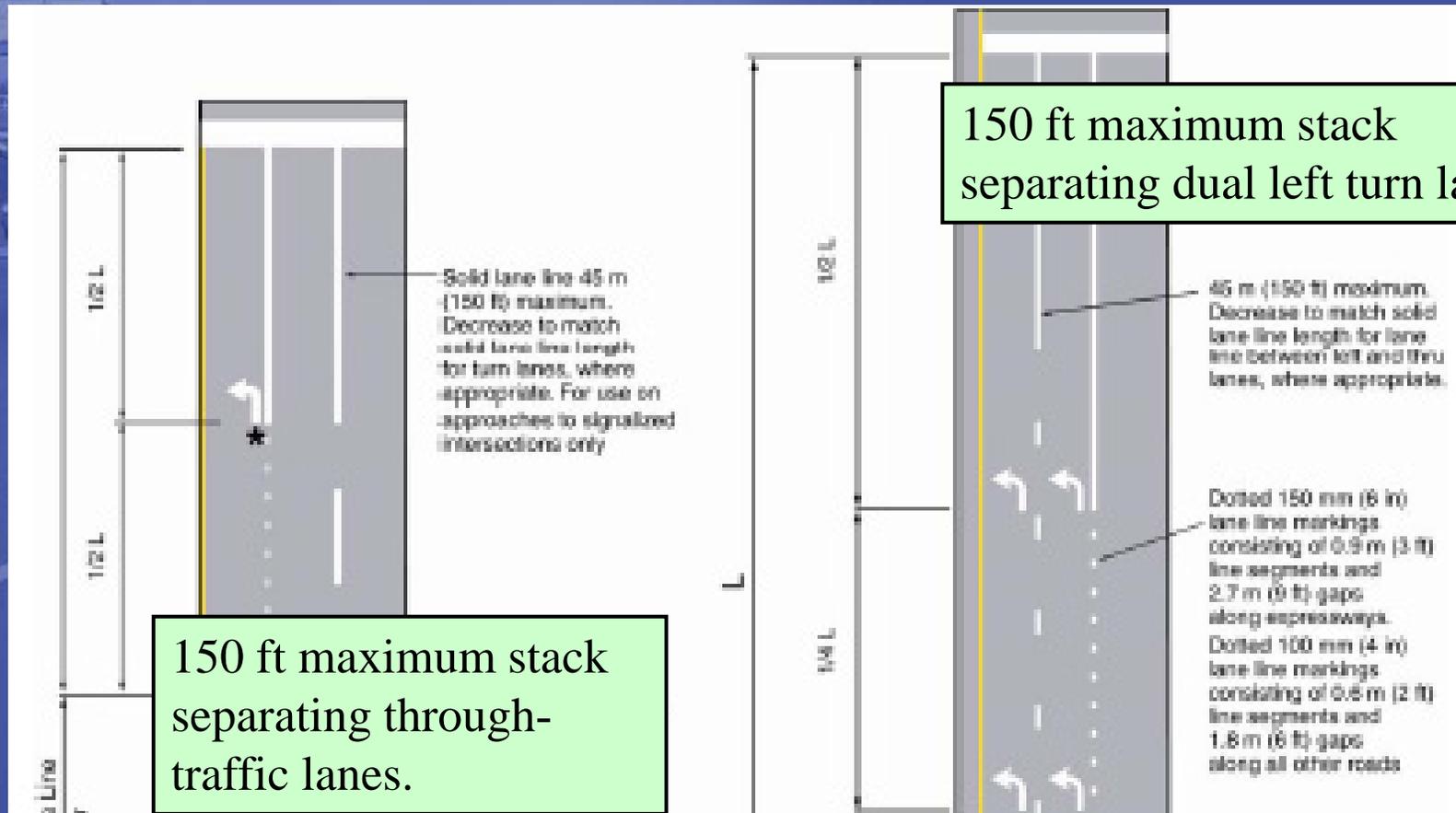


150 ft maximum stack separating through-traffic lanes.



# Turn Lane Lengths

- **L based on operational analysis.**
  - Lengths and tapers in Subdivision Manual (pages 101, 105, 106).



# Arrow Symbols Discussion

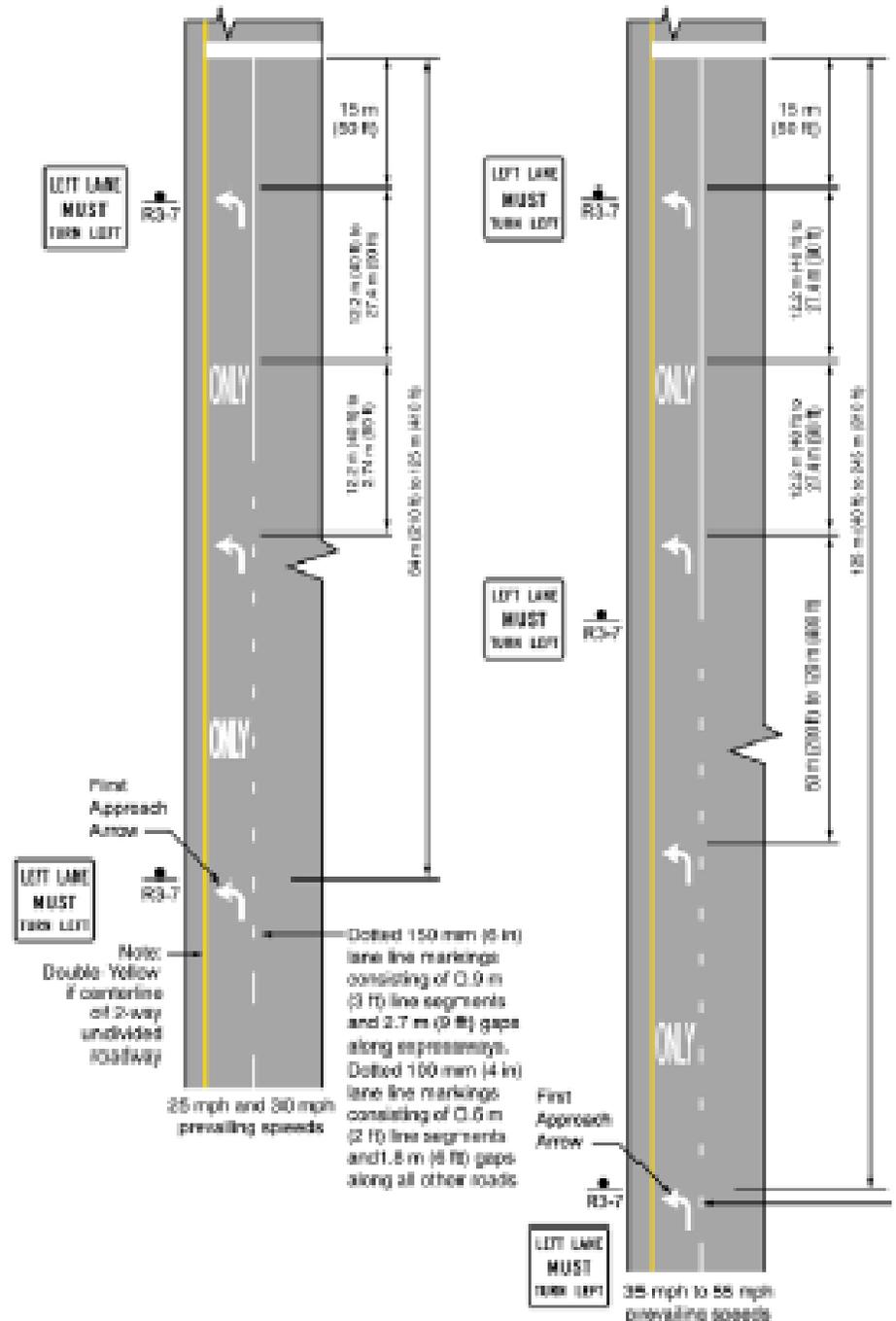




# Lane Drop

## PAVEMENT WORD AND SYMBOL MARKINGS

- Where through traffic lanes approaching an intersection become mandatory turn lanes, word and arrow markings shall be used and shall be accompanied by standard signs...





## Stop Lines

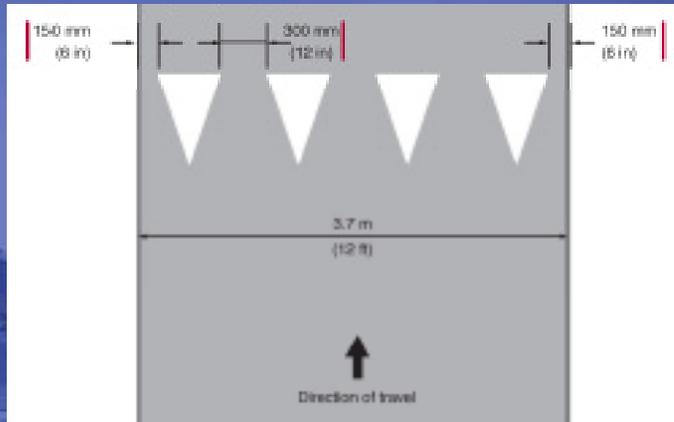
- **Stop Lines shall be:**
  - Placed on all approaches to signalized intersections.
  - Never at a mid-block crossing.
- **Stop Lines should be:**
  - 16 inches wide. 
  - 4-30 ft from the edge of the intersecting roadway. 
  - At least 4 ft in advance of the nearest crosswalk. 
  - At least 40 ft from signal head. 



*When patterned pavement or other similar treatments are used to depict crosswalks, 12 in solid while lines shall be used to define the crosswalk.*



## Yield Lines



- **Yield lines may be used for yield control.**
  - Do not mix a stop bar with a yield sign.
- **Yield lines should not be used for a right-turn lane that also has a YIELD sign and crosswalk markings.**



*Capitol Trail EB at  
Possum Park*



# Markings Exercise

Before

After

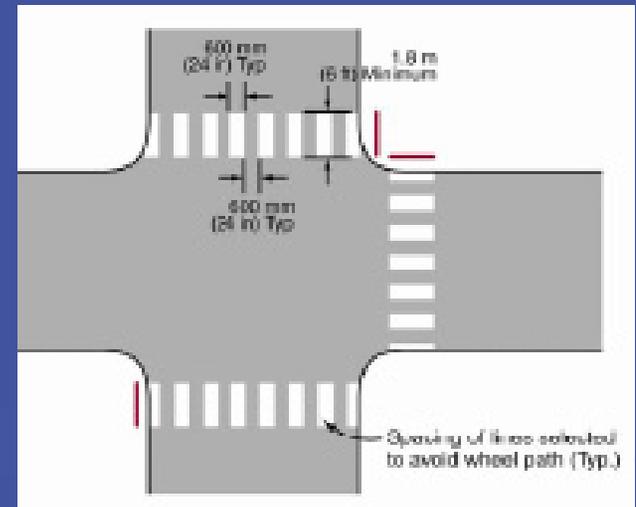


Capitol Trail EB at Possum Park



# Crosswalks

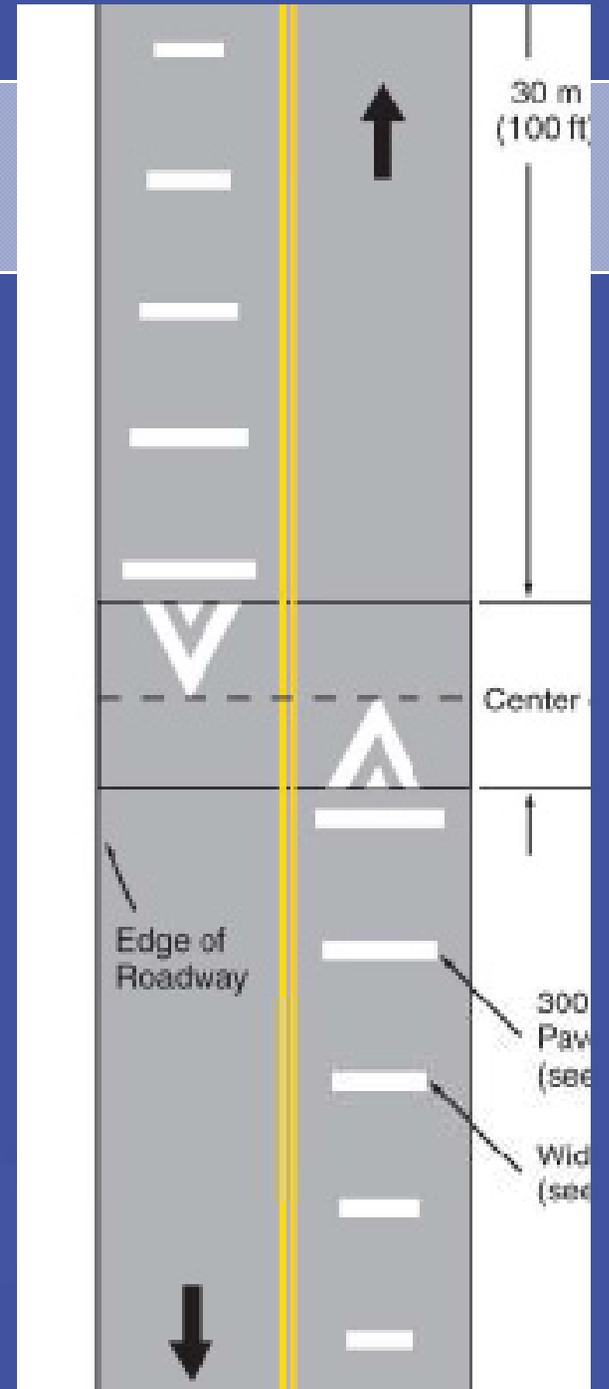
- **Crosswalk markings shall:**
  - consist of 24 in solid white longitudinal lines, spaced 24 in apart.
  - not be less than 6 feet “wide”.





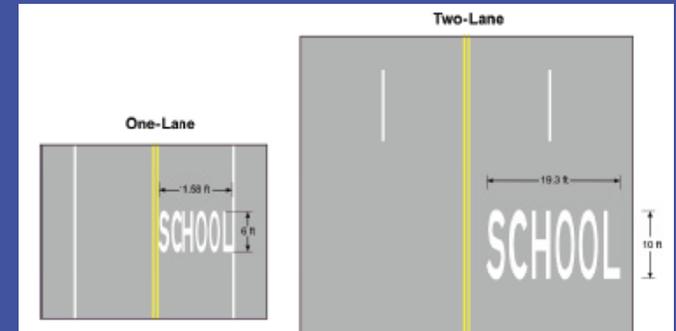
# Speed Humps

- Extend double yellow over speed hump.
- Advance warning markings optional.



## Part 7: School Areas

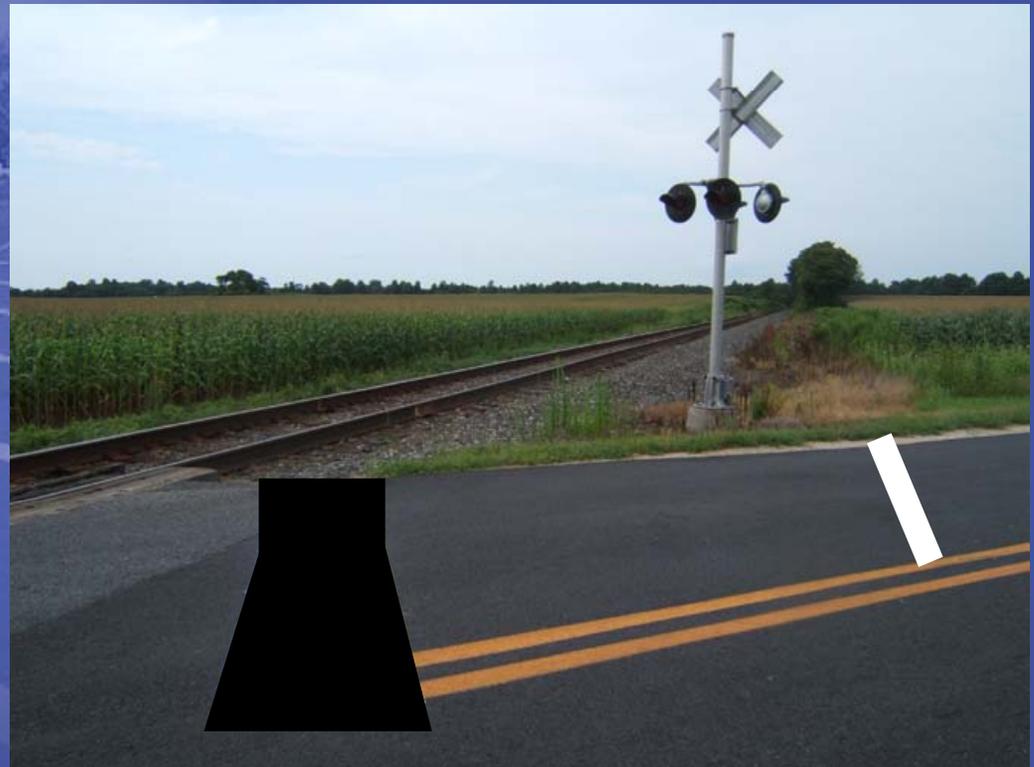
- Stop Lines are not to be installed at an unsignalized mid-block crossing.
- If used, yield lines should be placed adjacent to the Yield Here to Pedestrians sign, 20-50 ft in advance of the nearest crosswalk line.





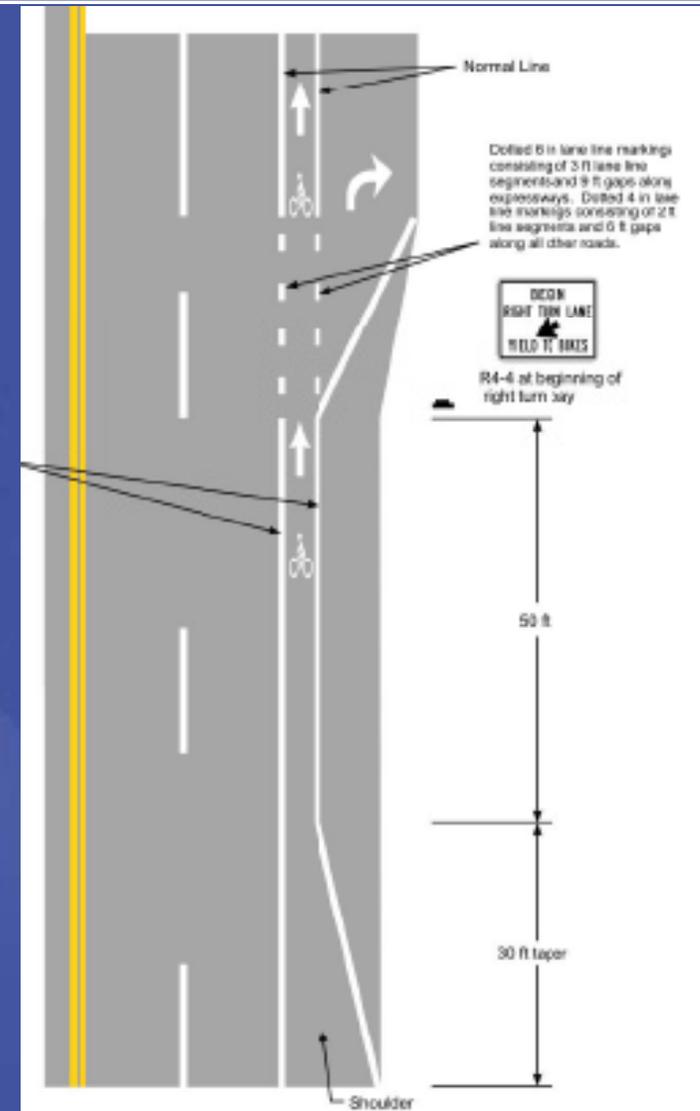
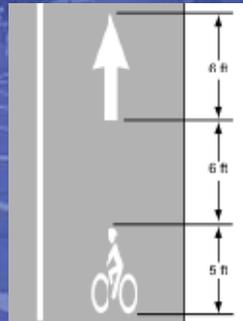
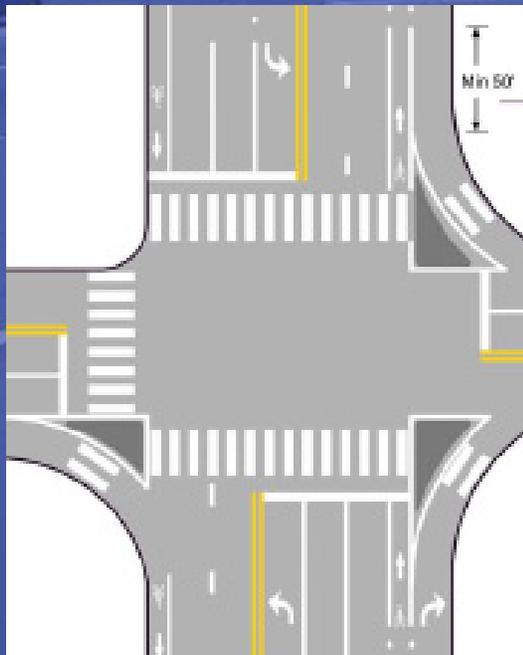
## Part 8: Highway-Rail Grade Crossings

- The stop line should be placed:
  - Approx. 8 ft from the gate or active warning device (if present).
  - no closer than 15 ft from the nearest rail.



# Part 9: Bicycle Facilities

- DeIDOT Policy – must perform engineering study to convert shoulder to right-turn lane.





## Traffic Section Involvement

### *AUTOMATIC TRIGGERS*

- Traffic signal.
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