



# Minnesota Field Manual UPDATE

2014 Edition of MN MUTCD Part 6K

Presented to the Statewide Work Zone Safety  
Committee – October 17, 2013

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*Your Destination...Our Priority*



# Update Highlights

- Cleaned up typos, corrected mistakes, and expanded definitions
- Included new reference material links
- Modified some layouts to reflect current practices
- Added new layouts:
  - Short duration layout for use up to 1 hour
  - Flagging cross-roads and blind curves
  - Flagger options–enhancements to flagger station
  - Roundabout lane closure



# 2014 Field Manual

- Some layouts have moved
- Some options have changed
- Confusing language was improved



# 2014 Field Manual

- Added the Full definition of Engineering Judgment
- Lane width is defined to be a minimum of 10'
- Roundabout and TPAR are defined
- Added definitions of Shall, Should, and May



# 2014 Field Manual

- Flashing warning lights will no longer be required on Road, Ramp, and Sidewalk closed signs
- Changed language from longitudinally perpendicular sign installation to perpendicular to the roadway and vertically plumb
- Added a link to our “CMS Manual of Practice”
- Added the table specifying panel type to the Flashing Arrow Board page



# 2014 Field Manual

|  |        |  |        |  |        |
|--|--------|--|--------|--|--------|
|  | R1-1   |  | R11-3a |  | W8-1   |
|  | R1-2   |  | R11-4  |  | W8-1a  |
|  | R1-X3  |  | W1-4R  |  | W8-8   |
|  | R3-1   |  | W1-4L  |  | W8-9   |
|  | R3-2   |  | W1-6   |  | W8-11  |
|  | R4-7c  |  | W3-1   |  | W8-15P |
|  | R10-6R |  | W3-2   |  | W8-23  |
|  | R10-6L |  | W3-3   |  | W9-3a  |
|  | R9-9   |  | W3-4   |  | W13-1P |
|  | R9-10  |  | W4-2R  |  | W20-1  |
|  | R9-11R |  | W4-2L  |  | W20-1a |
|  | R9-11L |  | W7-3aP |  | W20-4  |
|  | R11-2  |  |        |  | W20-7  |

## SIGN CODES QUICK REFERENCE

For additional signs and information on typical sizes and usage, see the Minnesota Manual on Uniform Traffic Control Devices <http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html>

Figure 6K-8  
6K-xxvi

|  |           |  |                       |  |         |
|--|-----------|--|-----------------------|--|---------|
|  | W20-100P  |  | W21-X5                |  | W22-2   |
|  | W20-X3R   |  | W21-X5a               |  | W22-3   |
|  | W20-X3L   |  | W21-X5L               |  | G20-4   |
|  | W20-X12   |  | W21-X6                |  | G20-X1  |
|  | W20-X13R  |  | Flagger Paddle W21-X7 |  | G20-X7  |
|  | W20-X13L  |  |                       |  | G20-X9  |
|  | W20-X16   |  | W21-X9                |  | G20-X10 |
|  | W20-X18   |  | W21-X10               |  | G20-X11 |
|  | W21-1     |  | W21-X11               |  | G20-X12 |
|  | W21-X4aR  |  | W21-X12               |  | G20-X14 |
|  | W21-X4aL  |  |                       |  |         |
|  | W21-X4aRA |  |                       |  |         |
|  | W21-X4aRS |  | W22-1                 |  |         |

## SIGN CODES QUICK REFERENCE

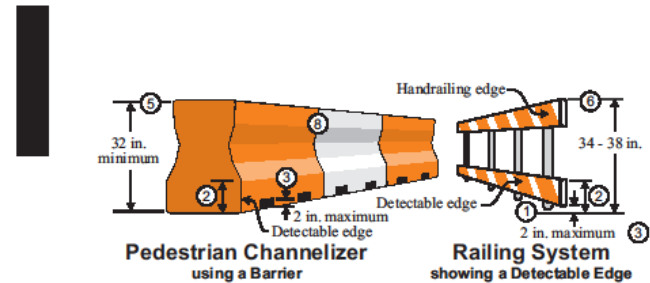
For additional signs and information on typical sizes and usage, see the Minnesota Manual on Uniform Traffic Control Devices <http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html>

Figure 6K-9  
6K-xxvii



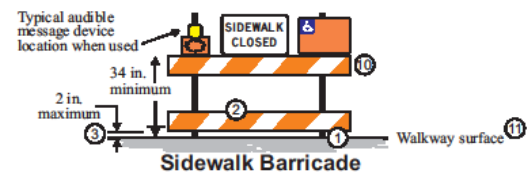
# 2014 Field Manual

- Removed Type IV barricade
- Added a Sidewalk Barricade with a detectable edge
- Added Walkway surface description (Note 11)



## NOTES:

1. To prevent any tripping hazard to pedestrians, ballast shall be located behind or internal to the device. Any support on the front of the device shall not extend into the 48 in. minimum walkway clear space and shall have 0.5 in. maximum height above the walkway surface with approved beveling (see note #9 on page 6K-xxx for beveling details).
2. Detectable edges for long canes shall be continuous and 6 in. min high above the walkway surface and have color or markings contrasting with the walkway surface.
3. Devices shall not block water drainage from the walkway. A gap height or opening from the walkway surface up to 2 in. maximum height is allowed for drainage purposes.
4. Railings or other objects may protrude a maximum of 4 in. into the walkway clear space when located 27 in. minimum above the walkway surface.
5. Longitudinal channelizing devices for pedestrians shall be 32 in. high or greater.
6. When hand guidance is required, the top rail or top surface shall:
  - be in a vertical plane perpendicular to the walkway above the detectable edge,
  - be continuous at a height of 34 to 38 in. above the walkway surface, and
  - be supported with minimal interference to the pedestrian's hands or fingers.
7. All devices shall be free of sharp or rough edges, and fasteners (bolts) shall be rounded to prevent harm to hands, arms or clothing of pedestrians.
8. All devices used to channelize pedestrian flow should interlock such that gaps do not allow pedestrians to stray from the channelized path.
9. Any pedestrian devices used to provide positive protection (traffic or hazard) for pedestrians or workers shall meet crashworthy requirements appropriate for the barriers' application.
10. Barricades shall be used to close the entire width of the walkway surface.
11. A walkway surface shall be firm, stable, and slip resistant.



## Typical TPAR Devices

Refer to the MnDOT TPAR website for additional standards, guidance, and options for designing temporary pedestrian access routes.  
<http://www.dot.state.mn.us/trafficeng/workzone/tpar.html>

Figure 6K-12

6K-xxx



# 2014 Field Manual

- Buffer “B” distance table increased to reflect current FHWA guidance
- Added vertical panel to Type B channelizers

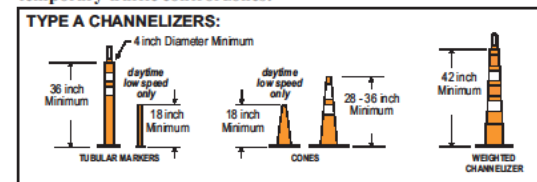
Temporary Traffic Control Distance Charts

| Posted Speed Limit Prior to Work Starting (mph) | Advance Warning Sign Spacing (A) feet | Decision Sight Distance (D) feet | Taper Length (12 ft lane) (L) feet | Shifting Taper (L/2) feet | Typical Shoulder Taper (L/3) feet |
|---|---------------------------------------|----------------------------------|------------------------------------|---------------------------|-----------------------------------|
| 0 - 30  | G = 25 ft                             | 250                              | 200                                | 100                       | 75                                |
| 35 - 40   |                                       | 325                              | 325                                | 175                       | 125                               |
| 45 - 50   | G = 50 ft                             | 600                              | 900                                | 300                       | 200                               |
| 55  |                                       | 750                              | 1200                               | 350                       | 250                               |
| 60 - 65   |                                       | 1000                             | 1400                               | 400                       | 275                               |
| 70 - 75   |                                       | 1200                             | 1600                               | 450                       | 300                               |

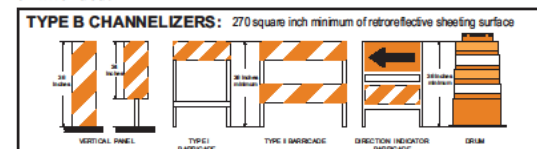
  

| Posted Speed Limit Prior to Work Starting (mph) | Buffer Space (B) feet | Shadow Vehicle Following Distance (F) feet | Protection Vehicle Roll-Ahead Buffer Distance (with or without TMA) |              |
|---|-----------------------|--|---|--------------|
| 0 - 30  | G = 25 ft             | 200  | Moving (15 mph max) feet  | Stopped feet |
| 35 - 40   |                       | 305  | 100   | 100          |
| 45 - 50   | G = 50 ft             | 425  | 100   | 100          |
| 55  |                       | 500  | 175   | 125          |
| 60 - 65   |                       | 650  | 175   | 125          |
| 70 - 75   |                       | 820  | 225   | 175          |

Type A channelizing devices are typically used in attended temporary traffic control zones.\*



Type B channelizing devices shall be used if the temporary traffic control zone will be installed for more than 12 hours or if it is left unattended.\*



\* See the MN MUTCD, Part 6F for more details on application restrictions.

Figure 6K-15

6K-XXXIII





# 2014 Field Manual

- Most Flagging layouts were changed from 12 hours or less to 3 days
- Restrictions on the AFAD layout were reduced to match the FHWA guidance
- Emphasised a note on the moving work spaces with Flagger control to indicate a Flagger station layout shall also be used

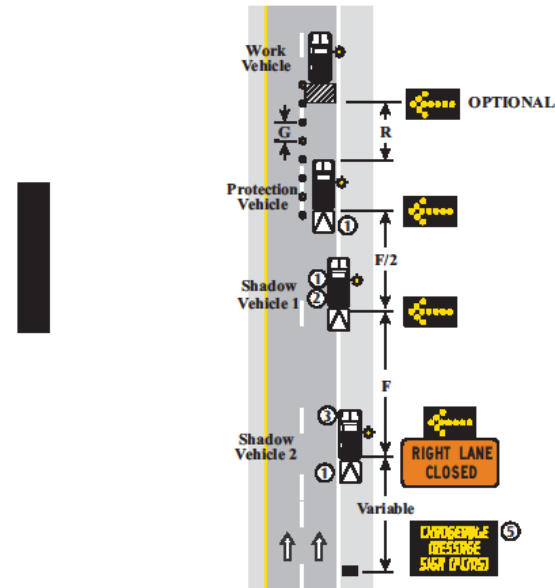


# 2014 Field Manual

- For use in WZ's up to 1 hour
- A CMS, FAB's and TMA's are required
- Channelizing devices at "G" spacing

## NOTES:

1. All Shadow and Protection Vehicles shall be equipped with a truck-mounted attenuator.
2. The lateral placement of Shadow Vehicle 1 may be adjusted to create a taper.
3. Shadow Vehicle 2 may encroach into the traffic lane when the shoulder is too narrow to drive on.
4. If the operation does not move at least the Decision Sight Distance once each hour, the appropriate stationary layout should be used.
5. A typical message should be ROAD WORK AHEAD and RIGHT LANE CLOSED.



SHORT DURATION LANE CLOSURE  
MULTI-LANE ROAD

1 HOUR or LESS

6K-50

LAYOUT 10

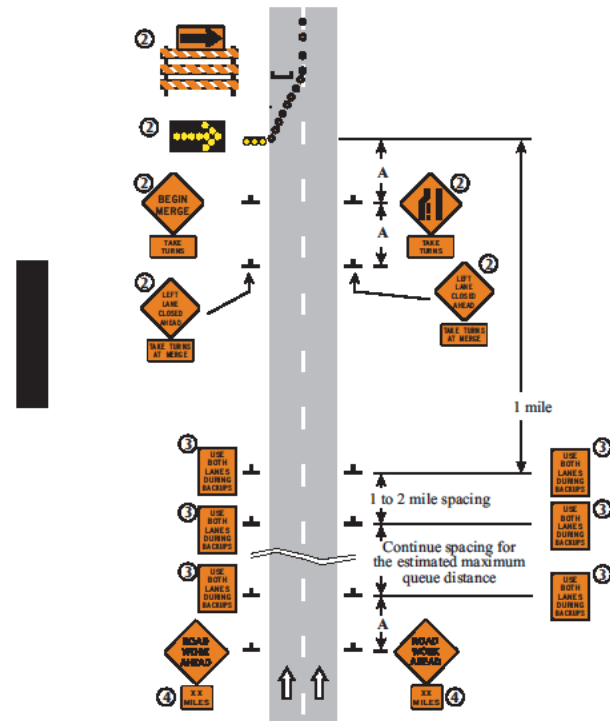


# 2014 Field Manual

- New sign “Begin Merge” and “Take Turns” placque
- Better indicates merging location

## NOTES:

1. This layout should be used on high speed roadways where traffic queues may extend at least 0.5 mile upstream of the taper. If little or no queuing is anticipated, use the typical lane closure Layout 52.
2. Use the appropriate traffic control devices for a left lane closure.
3. A PCMS may be used in place of a pair of USE BOTH LANES DURING BACKUPS signs.
4. Distance plaques are recommended when the distance is 2 miles or more.



LANE CLOSURE WITH LATE MERGE  
MULTI-LANE DIVIDED ROAD

3 DAYS or LESS

6K-54

LAYOUT 54

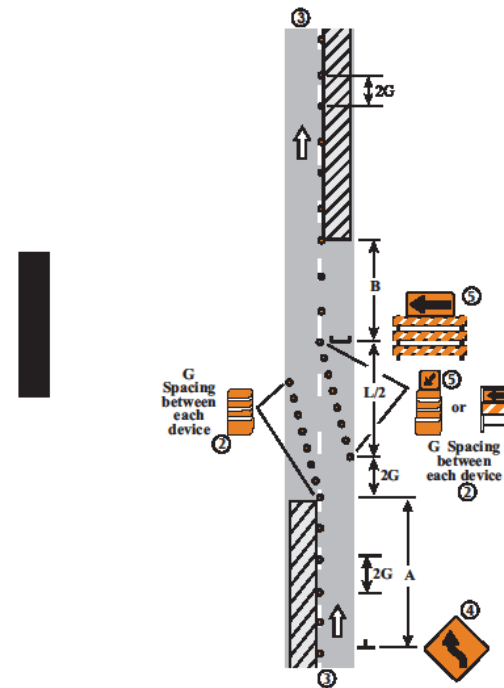


# 2014 Field Manual

- Specifies that a directional arrow shall be used
- Arrows may be used on either the Type B channelizer or the Type III barricade

## NOTES:

1. For one lane of traffic only.
2. Continue the pattern and the spacing of devices for additional lateral shift.
3. For advance signing, placement of traffic control devices, lane taper, see the appropriate stationary layout.
4. The Lane Shift sign may be omitted when the posted speed limit is 40 mph or less.
5. Directional arrows shall be used on either the drums or the Type III barricade



LANE SHIFT  
MULTI-LANE DIVIDED OR ONE WAY ROAD

3 DAYS OR LESS

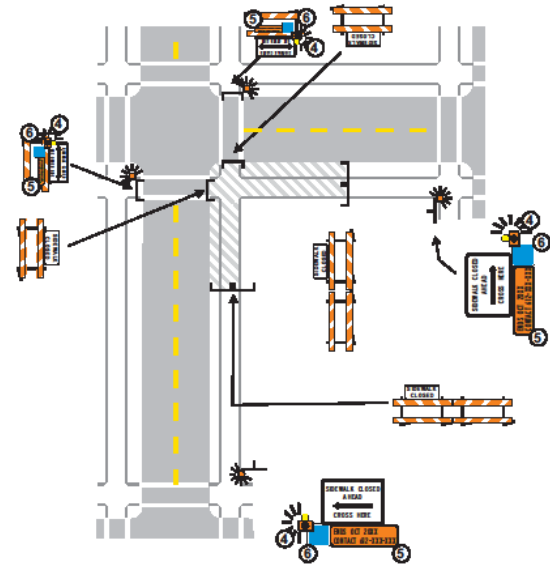
6K-60

LAYOUT 60



# 2014 Field Manual

- Sidewalk Closure using sidewalk barricades
- Shows current sidewalk closure signs



### CROSSWALK CLOSURES AND PEDESTRIAN DETOURS LAYOUT 84b

### 3 DAYS or LESS

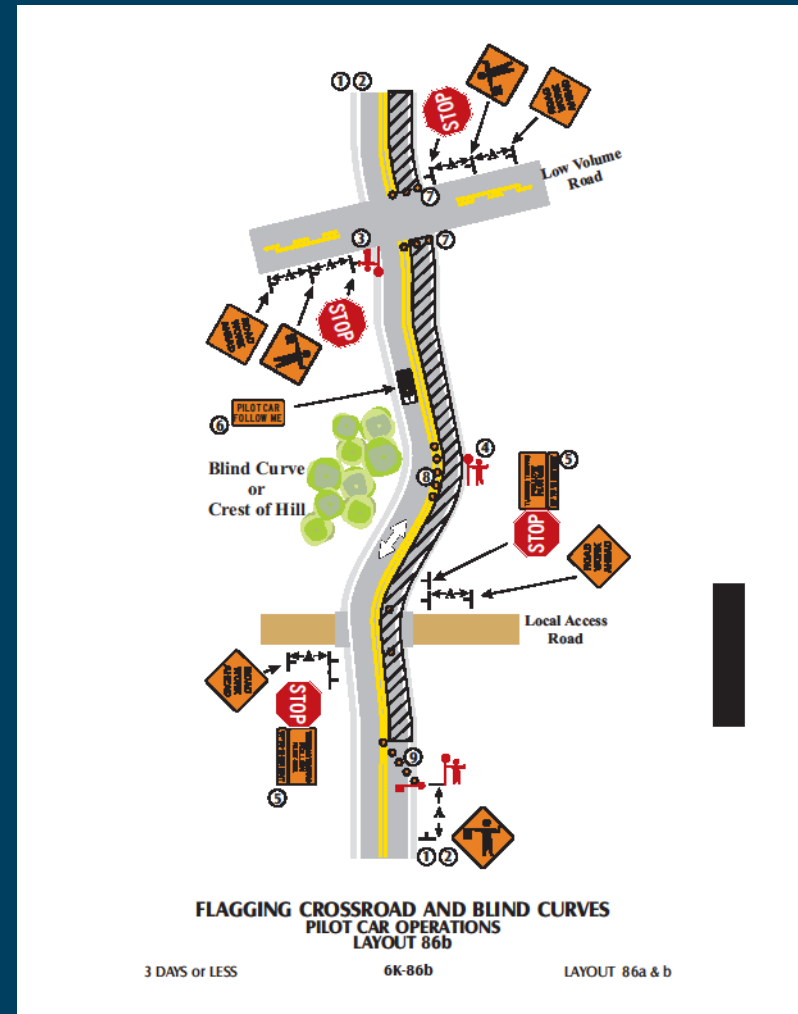
6K-84b

LAYOUT 84a & b



# 2014 Field Manual

- Strategies for a lengthy pilot car operation with crossroads and blind curves

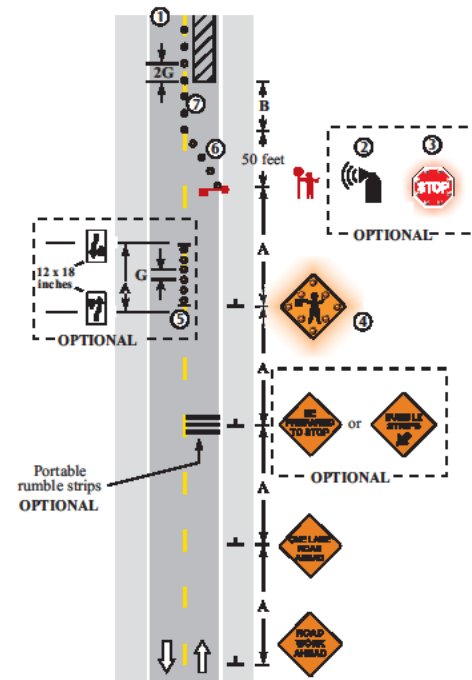


# 2014 Field Manual

- Enhancements to the Flagger station to gain the attention of distracted drivers

NOTE:

1. Approach signs are the same in both directions.
2. The flagger may be equipped with an airhorn.
3. The STOP/SLOW paddle may have flashing conspicuity lights on the signs.
4. The Flagger Ahead sign may have flashing conspicuity lights on it.
5. Type A channelizing devices such as weighted channelizers, cones, tubular markers, or centerline delineators.
6. The two-way taper should be 50 feet using 5 equally spaced channelizing devices.
7. The centerline channelizers are optional with pilot car operations.
8. The portable rumble strips shall be spaced according to the manufacturer's recommendations or typical 4 foot on center.



FLAGGING STATION OPTIONS  
TWO-LANE TWO-WAY ROAD

3 DAYS or LESS

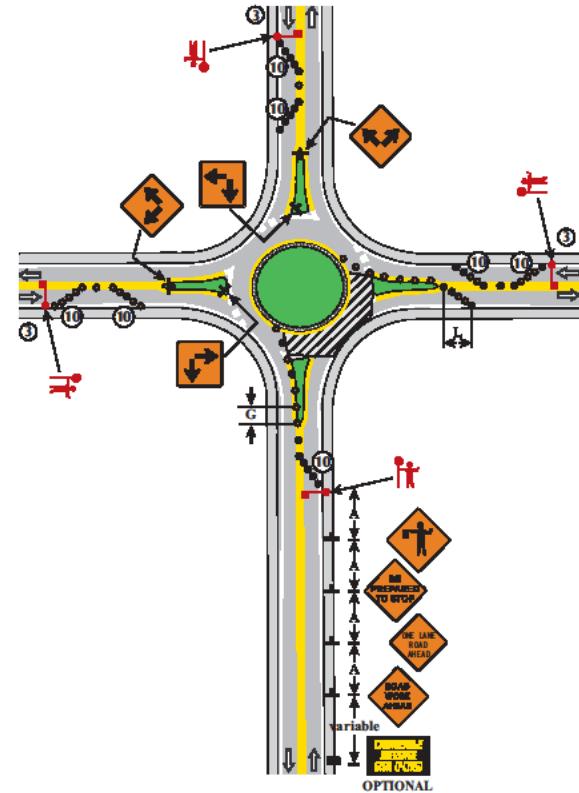
6K-87

LAYOUT 87



# 2014 Field Manual

- ▶ Single lane roundabout using flagger control



LANE CLOSURE IN ROUNDABOUT  
SINGLE LANE ROUNDABOUT  
LAYOUT 88b

3 DAYS or LESS

6K-88b

LAYOUT 88a & b



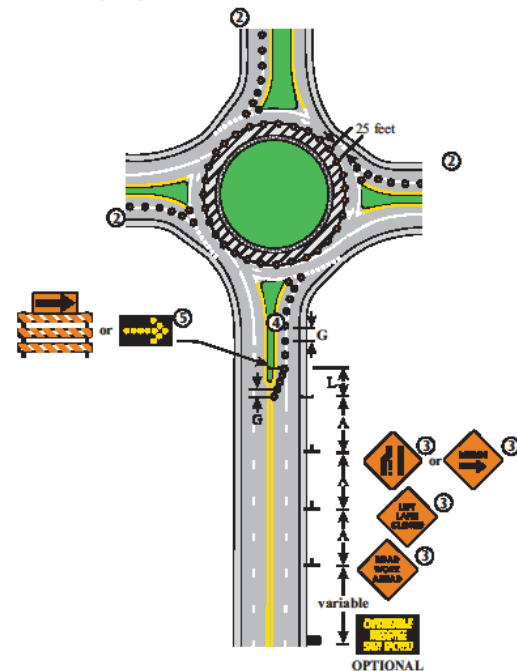


# 2014 Field Manual

- ▶ Two lane roundabout with work zone in the inside lane

## NOTES:

1. Each roundabout is unique and the traffic control shall be developed to meet the specific conditions of the location and the work operation. A detour could better serve traffic movement and shall be considered as an alternative to the flagger operation.
2. Approach signs are the same in all directions.
3. On divided highways having a median wider than 8 feet, right and left sign assemblies shall be required.
4. Type B channelizers may be used.
5. The flashing arrow board shall be used when the posted speed limit is 45 mph or greater.



LEFT LANE CLOSURE IN ROUNDABOUT  
TWO LANE ROUNDABOUT

3 DAYS or LESS

6K-89

LAYOUT 89

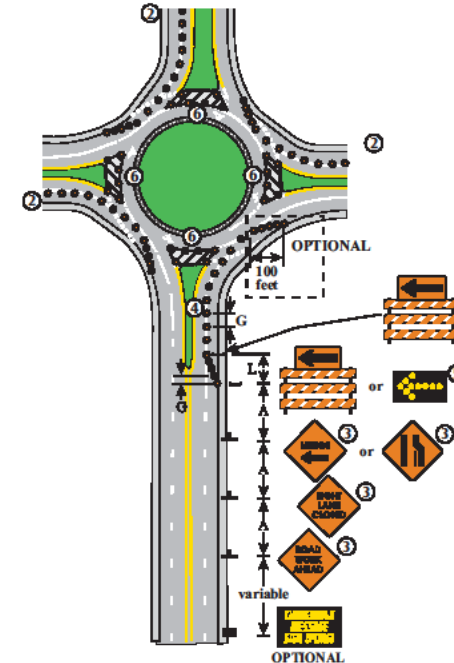


# 2014 Field Manual

## ► Two lane roundabout with work zone in the outside lane

### NOTES:

1. Each roundabout is unique and the traffic control shall be developed to meet the specific conditions of the location and the work operation. A detour could better serve traffic movement and shall be considered as an alternative to the flagger operation.
2. Approach signs and devices are the same in all directions.
3. On divided highways having a median wider than 8 feet, right and left sign assemblies shall be required.
4. Type B channelizers may be used.
5. The flashing arrow board shall be used when the posted speed limit is 45 mph or greater.
6. The distance between channelizing devices should be 10 feet or adjusted for local conditions.



RIGHT LANE CLOSURE IN ROUNDABOUT  
TWO LANE ROUNDABOUT

3 DAYS or LESS

6K-90

LAYOUT 90



# 2014 Field Manual

- ▶ No material changes, language was cleaned up and streamlined



# 2014 Field Manual

No major changes

