MINUTES

April 2018 Section Meeting
Tuesday, April 24th, 2018: 11:30am-1:30pm
Location: MnDOT Waters Edge
Advertiser: HDR

1. **Call Meeting to Order**
   Scott Poska, NCITE President, called the meeting to order at 12:27pm. A box lunch preceded the meeting.

2. **Introductions**
   All attendees introduced themselves, stated their employer and NCITE involvement, and answered the question “Which construction project is currently impacting your commute the most?”. Forty-one people were in attendance. Responses to the question were as follows:
   - None (36)
   - I-494 @ Bush Lake Road (2)
   - Glenwood Avenue (1)
   - TH 7 (1)
   - TH 65 (1)

3. **Announcements**
   Scott made the following announcements:
   - Saturday, April 28th, 2018 is Civil Engineering Day at the Science Museum of Minnesota. NCITE will have a booth with activities for kids.
   - The May Section Meeting will be held on May 22nd, 2018 at Gasthof’s. This meeting will feature the membership drive and the 2018 ITE Annual Meeting promotion – “Lake Name or Fake Name”.
   - Registration is open for the 2018 ITE Annual Meeting and the 2018 ITE Student Leadership Summit.

4. **Presentation**
   Scott introduced Mike Fairbanks, NCITE Director. Mike introduced Ken Johnson of MnDOT to present on the 2018 Temporary Traffic Control Field Manual Update. The presentation is attached to these minutes. Highlights of the presentation included:
   - The Field Manual is Part 6 of the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD). This is the only engineering-related manual required by statute and provides traffic control requirements for all roads open to the public.
   - The Field Manual includes temporary traffic control requirements for work of three days or less or daily lane closures. Work beyond this requires a temporary traffic control plan.
   - The Field Manual re-write started in April 2016 and included participants from MnDOT Central Office and Districts, State Aid, cities, counties, and the Northland Chapter of the American Traffic Safety Services Association (ATSSA).
   - Updates to the General Provisions (formally Standards and Specs) included:
     - Using letters for page numbers instead of Roman numerals
     - Clarification of individual and general responsibilities (page 6K-k)
Clarification of compliance levels (shall, should, and may) (page 6K-a)
New and modified definitions (pages 6K-b to 6K-j)
Temporary traffic control enhancements (additional personnel, buffer or additional lane closures, sequential lighting, etc.) (page 6K-m)
New guidance:
  - Inspecting and removing the temporary traffic control zone (page 6K-n)
  - Crossing live lanes of traffic (page 6K-n)
  - Roadside safety (page 6K-n to 6K-o)
Reorganized temporary traffic control devices (page 6K-r)
Clarification of high-visibility clothing (page 6K-r)
Clarification of channelizers (Page 6K-t)
Detectable edges for work zone signing (page 6K-u)
Portable changeable message sign requirements (pages 6K-ab to 6K-ah)
Mobile temporary traffic control distance charts (page 6K-ap)
  - Key changes to the layouts included:
    - Specific versus general notes
    - New layouts:
      - Road closure for special events
      - Work vehicle parked on shoulder
      - Mobile/short duration multi-lane closure
      - Mobile/short duration road closure
      - Closure at top of entrance ramp
      - Closing one turn lane on dual turn lanes
      - Controlled burn
      - Bike lane closure
    - New sections for low volume roadways and two-way, continuous left turn lane roadways
    - Updated flagging layouts
  - Additional information and training regarding the Field Manual can be found at the following locations:
    - MN LTAP Circuit Training and Assistance Program (CTAP) Workshops
    - MN State Aid for Local Transportation (SALT) Field Manual Resource
    - Field Manual

5. **Adjourn**
Mike thanked the speaker and adjourned the meeting at 1:30pm.

Respectfully submitted,

[Signature]

Jacob Folkeringa
2018 Secretary

May 10, 2018
Field Manual Update

Spring 2018

Ken E. Johnson
State Work Zone, Pavement Marking & Traffic Devices Engineer
What we’ll answer today

- What is the Field Manual?
- Who was involved with the update?
- Key changes
Additional Training

• MN LTAP Circuit Training and Assistance Program
  • WZ Safety, Temporary Traffic Control, and Flagging Course

• MN State Aid for Local Transportation webpage
  • Link to Field Manual Resource webpage
  • Videos of the above training

• Field Manual Webpage
  • Field Manual Update presentation
What is the Field Manual?
• Only engineering related manual required by statute

• Traffic control requirements for all roads open to the public

• Governed by the Minnesota Committee on Uniform Traffic Control Devices

• mndot.gov/mnmutcd

• Part 6 is Temporary Traffic Control
• Part 6K of the MN MUTCD

• Temporary Traffic Control requirements for 3 days or less
  • Or daily lane closures

• Beyond that – Temporary Traffic Control Plan needed
Field Manual Rewrite

• Started April 2016

• Participants
  MnDOT CO and Districts (Traffic, Construction, Maintenance)
  Washington County
  Hennepin County
  City of Eagan
  City of Bloomington
  City of Minneapolis
  City of Rochester
  State Aid
  Northland Chapter of the American Traffic Safety Services Association
  MN LTAP CTAP
New Sections!!

- Low Volume
- Two-Way Left Turn Lane
- Standards and Specs renamed General Provisions
No job is so important in maintenance or construction, and no service so urgent, that we cannot take time to perform our work safely.
Engineering Judgment - the evaluation of available pertinent information, and the application of appropriate principles, standards, guidance, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. Engineering judgment shall be exercised by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required.

Expressway - any multi-lane, divided highway for through traffic with partial control of access and generally with at-grade intersections.

Following Distance - the distance in a mobile operation between the shadow of the tail of the lead vehicle and the tail of the following vehicle.

Typical Example:
- Tail of following vehicle is 100 feet behind lead vehicle.
- Tail of lead vehicle is 200 feet behind leading vehicle.

Freeway
- no at-grade

High S
- hour or higher

Lane Closure - a closure of one or more lanes of the roadway to traffic. Work operations that restrict adjacent lane width should consider various lane closure alternatives depending upon volume and speeds on the roadway.

Lane Width - for traffic control purposes, a minimum lane width of 10 feet shall be provided.

Lateral Buffer Space - the space that separates the traffic space from the work space. It is typically the extra space provided between traffic and workers, excavations, pavement edge drop-offs, or an opposing lane of traffic. Traffic lanes may be closed to provide for lateral buffer space. See the Longitudinal Drop-off Guidelines (pages 6K-xxi thru 6K-xxiii) of this manual for more information.

Longitudinal Buffer Space - the distance between the transition area and the work space. If a driver does not see the advance warning or fails to negotiate the transition area, a buffer space provides room to stop before the work space. Typical Longitudinal Buffer Spaces (B) are included in the TTC Distance Charts.

Decision Sight Distance (D)
- The total distance traveled during the length of time required for a driver to:
  - Detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered;
  - Recognize the hazard or its potential threat;
  - Select an appropriate speed and path; and
  - Initiate and complete the required maneuver safely and efficiently.

In the Field Manual, the Decision Sight Distance (D) is used to determine the minimum size (as the straight line distances) of the work area layouts with lane closures, exclusive of mobile equipment layouts.

Divided R
- A high median
- wide e
- multi-li

Drivable
- Capable

Downstream Taper
- The taper at the end of the activity area which guides traffic back into its original lane. When used, this taper is a minimum length of approximately 100 feet with a 20-foot spacing between channelizing devices.

Duration
- The length of time any work operation occupies a specific location or causes a traffic obstruction without changing the location. This time is measured from the first disruption to traffic until the total clearing of the area. The following durations are defined in overlapping intervals. Temporary Traffic Control layouts for longer durations may always be used for shorter durations, especially when roadway attributes such as traffic volume and speed, and the work area location may warrant higher levels of traffic control.
  - Mobile - when an operation is continuously moving or stopped in one location for periods of 15 minutes or less. The Temporary Traffic Control (TTC) devices are typically vehicle-mounted. The work area should change by at least the Decision Sight Distance (D) for it to be considered a change in location.
  - Short Duration - when an operation stays in one location during daylight conditions from 15 minutes to 1 hour.
Individual & General Responsibilities

(Individual)
• Be trained for the work you are doing

(General)
• Protect work space
• Safely direct traffic
• Keep devices clean and in position
• Remove devices when no longer needed
• Keep road authority notified
• Keep proper records
• Day and night inspections
Compliance Levels

• Shall
  • Standard
  • You are required to do (mandatory condition)

• Should
  • Guidance
  • You are advised or recommended to do, engineering judgment required to deviate

• May
  • Optional
  • You are allowed to do, sometimes used to list conditions from which a Standard or Guidance statement can be modified
New Definitions

- New or Modified Definitions:
  - Advance Warning Following Distance (F)
  - Alternate Pedestrian Routes (APR) & Temporary Pedestrian Access Route (TPAR)
  - Clear Zone
  - Deadheading
  - Drivable
  - Fixed Object
  - Flashing Arrow Board
  - Lane Width
  - Pilot Car
  - Road Authority
  - Spotter
  - TMA (Truck/Trailer Mounted Attenuator)
TTC Enhancements

- Additional Personnel
- Additional or Enhanced Devices
- Upgrading Devices
- Buffer or Additional Lane Closure
- Closing Shoulders and/or Protection Vehicles
- Increase Distances
- Lighting
  - Sequential Lighting
- Work Zone Speed Limit
New Guidance in General Provisions

• Inspecting the TTC Zone
  • Routine day and night inspections

• Removing the TTC Zone
  • Previous – only remove in opposite order of installations
  • Now
    • Advance Warning Area may be removed in order of installation
  • Mobile Lane Closure
New Guidance in General Provisions

• Crossing Live Lanes of Traffic
  • Personnel may cross live traffic lanes only if it is safe to do so utilizing a walking pace taking into consideration roadway geometry, traffic volume, and other appropriate factors.
New Guidance in General Provisions

• Roadside Safety

  • Provide clear zones where practical
    • See Table 6K-1, Recommended Clear Zones
  • Work equipment, worker vehicles, materials, and debris stored to reduce probability of run-off-road vehicles
  • Lateral offset to obstruction of 1.5 feet behind curb face used in urban areas
  • When work not active, hazards or fixed objects should not be in clear zone or lateral offset to obstruction
    • If not practical, shield; if that not practical, delineate
New Guidance in General Provisions

• Marking Hazards
  • Repair damaged infrastructure as soon as possible
  • Until repair possible, mark with Type I/Type II barricade with flashing warning light or drum
  • Cones allowed for short term emergency
  • Structures above grade – make apparent
Temporary Traffic Control Devices

• Reorganized
  • Crashworthy requirement moved to beginning
  • Trailer Mounted Devices
    • Added layout reference (Layout 7)
  • High-Vis Clothing
    • See next slide
  • Flashing Warning Lights (no changes)
  • Vehicle Warning Lights
    • Added “… shall be visible for 360 degrees around the vehicle at a min height of 3.5 feet and a radius of 60 feet or greater”
High-Vis Clothing

• ANSI/ISEA 107-2004, 107-2010, or 107-2015 Type R
  • Class 2 or 3

• Flaggers need high-vis vest, pants, and hat at all times

• All workers – high-vis hat should be worn if hard hat not required
TYPE B CHANNELIZERS

- Channelizers used on high speed roadways shall have a minimum of 270 square inches of retroreflective area facing road users.
- Orange diagonals shall slope down toward the traffic side.
- 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. Weighted channelizers may be used in lieu of a Type B channelizer with the permission of the road authority.
- Type A Flashing Warning Lights may be used - place on the side with traffic.
• Biggest change - Any portable sign stand or barricade placed in a pedestrian walkway that could be a hazard to a visually impaired pedestrian should have a detectable edge to guide the pedestrian around the hazard.
### Sign Codes Quick Reference

#### Field Manual

<table>
<thead>
<tr>
<th>Sign</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP</td>
<td>R1-1</td>
<td></td>
</tr>
<tr>
<td>YIELD</td>
<td>R1-2</td>
<td></td>
</tr>
<tr>
<td>TAKE TURNS</td>
<td>R1-X3P</td>
<td></td>
</tr>
<tr>
<td>SPEED LIMIT</td>
<td>R2-1</td>
<td></td>
</tr>
<tr>
<td>$300 FINE</td>
<td>R2-6bP</td>
<td></td>
</tr>
<tr>
<td>SIDEWALK CLOSED</td>
<td>R9-9</td>
<td></td>
</tr>
<tr>
<td>SIDEWALK CLOSED USE OTHER SIDE</td>
<td>R9-10</td>
<td></td>
</tr>
<tr>
<td>SIDEWALK CLOSED AHEAD CROSS HERE</td>
<td>R9-11 (R or L)</td>
<td></td>
</tr>
<tr>
<td>STOP HERE ON RED</td>
<td>R10-6 (R or L)</td>
<td></td>
</tr>
<tr>
<td>ROAD CLOSED STREET RAMP BIKE LANE</td>
<td>R11-2</td>
<td></td>
</tr>
<tr>
<td>W4-2 (R or L) Lane Ends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROAD NARROWS RAMP</td>
<td>W5-1</td>
<td></td>
</tr>
<tr>
<td>W6-4 Opposing Traffic Lane Divider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEXT X MILES</td>
<td>W7-3aP</td>
<td></td>
</tr>
<tr>
<td>BUMP</td>
<td>W8-1</td>
<td></td>
</tr>
</tbody>
</table>

- Included all signs in Field Manual
- Any non-word sign is named per MN MUTCD

Page 6K – w to y
Portable Changeable Message Signs

• Modified requirements for Type B PCMS
  • High speed - font size 18”
  • May allow 5 characters per line

• Tables with allowed abbreviations and not allowed abbreviations

Page 6K – ab to ah
Mobile TTC Zone Components

- **Modified distance**
  - Between Shadow Vehicle and Protection Vehicle – used to be F/2
## TTC Distance Charts

### Temporary Traffic Control Distance Charts

<table>
<thead>
<tr>
<th>Posted Speed Limit Prior to Work Starting (mph)</th>
<th>Advance Warning Sign Spacing (A) feet</th>
<th>Decision Sight Distance (D) feet</th>
<th>Taper Length (12 ft lane) (L) feet</th>
<th>Shifting Taper (12 ft lane) (L/2) feet</th>
<th>Typical Shoulder Taper (L/3) feet</th>
<th>Buffer Space (B) feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30</td>
<td>G = 25 ft.</td>
<td>100</td>
<td>550</td>
<td>200</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>35-40</td>
<td>G = 25 ft.</td>
<td>325</td>
<td>700</td>
<td>325</td>
<td>175</td>
<td>125</td>
</tr>
<tr>
<td>45-50</td>
<td>G = 50 ft.</td>
<td>600</td>
<td>900</td>
<td>600</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>55</td>
<td>G = 50 ft.</td>
<td>750</td>
<td>1200</td>
<td>700</td>
<td>350</td>
<td>250</td>
</tr>
<tr>
<td>60-65</td>
<td>G = 50 ft.</td>
<td>1000</td>
<td>1400</td>
<td>800</td>
<td>400</td>
<td>275</td>
</tr>
<tr>
<td>70-75</td>
<td>G = 50 ft.</td>
<td>1200</td>
<td>1600</td>
<td>900</td>
<td>450</td>
<td>300</td>
</tr>
</tbody>
</table>
# TTC Distance Charts

<table>
<thead>
<tr>
<th>Posted Speed Limit Prior to Work Starting (mph)</th>
<th>Advance Warning Following Distance (F) feet</th>
<th>Roll Ahead Distance Charts</th>
<th>Recommended Spacing for Vehicles Weighing 9,900 to 22,000 lbs GVW (R) feet</th>
<th>Recommended Spacing for Vehicles Weighing Greater than 22,000 lbs GVW (R) feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30 G = 25 ft.</td>
<td>100 - 550</td>
<td>Stationary Operation 100</td>
<td>Stationary Operation 75</td>
<td>Moving Operation 15 MPH max 100</td>
</tr>
<tr>
<td>35-40</td>
<td>325 - 700</td>
<td>100</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>45-50</td>
<td>600 - 900</td>
<td>125</td>
<td>175</td>
<td>100</td>
</tr>
<tr>
<td>55 G = 50 ft.</td>
<td>750 - 1200</td>
<td>125</td>
<td>175</td>
<td>100</td>
</tr>
<tr>
<td>60-65</td>
<td>1000 - 1400</td>
<td>175</td>
<td>225</td>
<td>150</td>
</tr>
<tr>
<td>70-75</td>
<td>1200 - 1600</td>
<td>175</td>
<td>225</td>
<td>150</td>
</tr>
</tbody>
</table>

Shadow and Protection Vehicle wheels should be pointed straight ahead.
Low Volume Roads: Rural and Urban

A Rural Highway with less than 400 ADT, and an Urban Residential Street with less than 400 ADT and speeds of 30 mph or less.

*Drawings Not To Scale

Layouts Key Changes
NOTES:

1. Any Shadow Vehicle or Protection Vehicle operating totally or partially in a traffic lane should be equipped with a TMA.
2. The Shadow Vehicle or Protection Vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
3. Any vehicle not displaying a Flashing Arrow Board shall display high-intensity rotating, flashing, oscillating, or strobe lights.
4. The PCMS shall be used for nighttime operations.
5. When the PCMS is used, the SHOULDER CLOSED or NO SHOULDER sign becomes optional.
6. The distance between the work area and the Shadow Vehicle should be adjusted between R and F based on traffic volume and sight distance.

Specific vs. General Notes

- Specific note - see drawing
- General note – applies overall
## Low Volume Indexes

- Matrices based on Maintenance Activities
  - Developed in LRRB Sponsored Project
  - Urban and Rural

### Layout Selection Matrix by Maintenance Activity

The following are examples of situations where layouts may be used. Layouts may be used for other operations.

<table>
<thead>
<tr>
<th>URBAN</th>
<th>WORK DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MOBILE 15 Minutes or Less</td>
</tr>
<tr>
<td>MAINTENANCE ACTIVITY</td>
<td></td>
</tr>
<tr>
<td>Asphalt Pavement Patching</td>
<td>11</td>
</tr>
<tr>
<td>Concrete Pavement Patching</td>
<td>11</td>
</tr>
<tr>
<td>Pothole Patching</td>
<td>11</td>
</tr>
<tr>
<td>Crack Filling</td>
<td>4*</td>
</tr>
<tr>
<td>Crack Sealing - Route and Seal</td>
<td></td>
</tr>
<tr>
<td>Surface Treatment</td>
<td></td>
</tr>
<tr>
<td>Sweeping - Residential</td>
<td>11</td>
</tr>
<tr>
<td>Utility Repair - Centerline</td>
<td>1</td>
</tr>
<tr>
<td>Utility Repair - Center of Intersection</td>
<td>3</td>
</tr>
<tr>
<td>Road Closure (e.g. water main break)</td>
<td>31</td>
</tr>
<tr>
<td>Road Closure (for Special Event)</td>
<td>5</td>
</tr>
<tr>
<td>Utility Maintenance (partial road closure)</td>
<td></td>
</tr>
<tr>
<td>Moving</td>
<td>10</td>
</tr>
<tr>
<td>Tree/Brush Removal</td>
<td>10, 11</td>
</tr>
<tr>
<td>Debris Removal - Routine (e.g. litter pickup)</td>
<td>8, 9</td>
</tr>
<tr>
<td>Debris Removal - Large Item (e.g. couch, roadkill)</td>
<td>11</td>
</tr>
<tr>
<td>Utility Repair - Shoulder</td>
<td>8, 9</td>
</tr>
<tr>
<td>Sign Repair</td>
<td>8, 9, 11</td>
</tr>
<tr>
<td>Snow Cleanup</td>
<td>8, 9, 11</td>
</tr>
</tbody>
</table>

* This layout may be used for nighttime operations only if the flagging stations are occupied and illuminated with auxiliary lighting such as floodlights or balloon lighting except in emergency situations.
Low Volume Layouts

- Reduced number of devices allowed by MN MUTCD Parts 5 & 6
- Reviewed and approved by MCUTCD
- Particularly on roads with speeds ≤ 30 MPH
Road Closure
Special Events

• Brand new layout

• Special events
  • Parade
  • Block Party

• Modified language in Part 6F allowing Type I & II Barricades to close roads
NOTES:
1. The Work Vehicle should be pulled over as far off the roadway as possible, and shall display and operate a 360-degree flashing beacon.

• Brand new layout
• Layout 8 simplified
Flagging Layouts

• Typical Flagging – Layout 16

• Moved all flagging related layouts to Two-Lane, Two-Way
  • Flagging Crossroads and Blind Curves (19)
  • Flagging Station Options (23)

• Modified distance between downstream flagging taper and flagger
Flagging near Railroad

- Shall coordinate with railroad.
- Channelizing devices shall not be placed within 8 feet on either side of the railroad track.
Portable Signals

- Use shifting tapers, not flagging tapers
• Gravel Road Maintenance (30)
• Temporary Road Closure (31)
• Road Closure (32)
• Crossroad and Confirmation Signing (35)

• Turn Lane Closures (33, 34)
  • Not moved
Two-Way, Continuous Left Turn Lane

A roadway with a center lane between opposing lanes of traffic that allows traffic from either direction to make left turns off the roadway.

*Drawings Not To Scale*

• Brand new section of Field Manual
  • Pulled from Undivided Multi-Lane
  • New layouts
  • More of these types of roads

• See Pic – TWLTL Mobile Lane Closure
Mobile/Short Duration

- New Layout
- Mobile/Short Duration Change throughout document
  - Beyond 15 minutes – additional devices
- 1 protection vehicle faces work vehicle
Multi-Lane Undivided Roads

A roadway having two or more lanes of traffic traveling in the same direction with no physical barriers separating the opposing traffic lane.

*Drawings Not To Scale*
Additional Positive Guidance

- Added to many layouts
- Additional channelizers (L/3)
- Keep Right sign
First Layout with Inset

- 2 signs in turn lane
Temporary Road Closure

- Up to 12 hours, **but see General Note 2**
- Applies to most temporary road closures
Multi-Lane Divided Road

Two separate roadways where opposing traffic is separated by a median.

*Drawings Not To Scale*
Mobile/Short Duration Multi-Lane Closure

- Brand new layout
- Created after discussions with Metro Maintenance Night Crews
- Yes, lots of vehicles
Mobile/Short Duration Road Closure

- Brand new layout
- Created due to requests for ‘Rolling Road Block’
  - Up to 1 hour, but see General Note 6
  - Longer term, see Layout 73 (up to 12 hours)
Lane Closure

- One Direction Large Arrow can no longer be used for merging tapers
Lane Closure Extension

- Cones may be used in lieu of Type III – see Specific Note 4
Lane Closure at Far Side of Signal

- Typical signal maintenance layout
- Added protection vehicle if signal not placed in ALL-RED flash mode.
  - See Specific Notes 3 and 5
Closure at Top of Entrance Ramp

• Brand new layout
Closing One Turn Lane on Dual Turn Lanes

- Brand new layout
- Close furthest turn lane
Miscellaneous Layouts

Layouts for Continuously Moving and Miscellaneous Operations.

*Drawings Not To Scale*
Typical Bump/Dip Signing

- Modified significantly
- New language in MN MUTCD Parts 2 and Part 6
- See Specific Note 6
Controlled Burn

- Brand new layout
Workers Present Speed Limit

NOTES:
1. Contact the road authority for requirements to implement a Workers Present Speed Limit.
2. All inplace speed limit signs shall be covered when Workers Present Speed Limit is implemented.
3. Workers Present Speed Limit assemblies shall be removed, covered, or modified to the existing posted speed limit when workers are not present directly adjacent to traveled lanes.
4. Workers Present Speed Limit assemblies may be placed in the buffer or work space as long as the assemblies are not blocked by vehicles or devices.
5. As workers proceed through the work area, the assembly shall be no greater than 1 mile in advance of the work crew. For Workers Present Speed Limits where the posted speed limit is 40 mph or less, the assembly should be no greater than 1/2 mile in advance of the work crew.
6. The Reduced Speed Ahead sign shall be used when the Workers Present Speed Limit is more than 10 mph below the posted speed limit.
7. The Flashing Arrow Board shall be used where the posted speed limit is 45 mph or greater and placed on the shoulder. If there is no shoulder, or the shoulder is too narrow, place at the end of the taper in lieu of the Type III barricade assembly.
8. The LANE CLOSED and/or the Lane Ends sign may be omitted when the posted speed limit is 40 mph or less.
9. A black on white END WORK ZONE SPEED LIMIT sign (R2-12) shall be placed within a mile of the last work crew (within 1/2 mile if speed limit is 40 mph or less) to indicate the end of the higher fines area.
10. When workers are present adjacent to the traveled lanes throughout the work area, confirmatory Workers Present Speed Limit assemblies may be placed according to the spacing table below.

<table>
<thead>
<tr>
<th>Workers Present Speed Limit (mph)</th>
<th>Assembly Spacing (mile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40</td>
<td>1/2</td>
</tr>
<tr>
<td>≥ 45</td>
<td>1</td>
</tr>
</tbody>
</table>

WORKERS PRESENT SPEED LIMIT

LAYOUT 83a

3 DAYS OR LESS

6K-83a
Bike Lane Closure

• Brand new layout

• MN statute only allows vehicles to cross bike lane lines to park or turn right

• Close Bike Lane when:
  • Working in bike lane or
  • See General Note 1
• Added General Note 2

When a sidewalk is closed but workers are present to halt operations and provide safe passage through the work site, the devices shown are not required. Pedestrians may be delayed for a short period of time for project personnel to move equipment and material to facilitate passage. Project personnel may also assist pedestrians in navigating the work zone.
Ken E. Johnson, PE

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