**BUFFER DATA**

**LONGITUDINAL BUFFER SPACE = B**

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (feet)</td>
<td>155</td>
<td>200</td>
<td>250</td>
<td>305</td>
<td>360</td>
<td>425</td>
<td>495</td>
<td>570</td>
<td>645</td>
<td>730</td>
</tr>
</tbody>
</table>

**PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE**

**TYPICAL PROTECTIVE VEHICLE TYPE WITH TMA**

| MINIMUM WEIGHT 15,000 LBS. (MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION) |
| 30 MIN. |

**ROLL AHEAD STOPPING DISTANCE ASSUMES DRY PAVEMENT**

\* A PROTECTIVE VEHICLE IS RECOMMENDED REGARDLESS IF A TMA IS AVAILABLE. IF NO TMA IS USED, THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO PROTECT WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.

\** LATERAL BUFFER SPACE IS 2 FEET FOR HIGH SPEED WORK ZONES.**

**CHANNELIZING DEVICE SPACING (FEET)**

<table>
<thead>
<tr>
<th>MPH</th>
<th>TAPER</th>
<th>TANGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/70</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>35/45</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>25/30</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

**MINIMUM TAPER LENGTH (L) IN FEET**

<table>
<thead>
<tr>
<th>Width (feet)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>105</td>
<td>150</td>
<td>205</td>
<td>265</td>
<td>350</td>
<td>400</td>
<td>500</td>
<td>560</td>
<td>620</td>
<td>780</td>
</tr>
<tr>
<td>11</td>
<td>115</td>
<td>165</td>
<td>225</td>
<td>285</td>
<td>495</td>
<td>550</td>
<td>605</td>
<td>660</td>
<td>720</td>
<td>840</td>
</tr>
<tr>
<td>12</td>
<td>125</td>
<td>180</td>
<td>245</td>
<td>320</td>
<td>540</td>
<td>600</td>
<td>660</td>
<td>720</td>
<td>780</td>
<td>840</td>
</tr>
</tbody>
</table>

**LEGEND**

- Arrow Panel
- Channelizing Devices
- Protective Vehicle with or without TMA - Recommended
- Protective Vehicle with TMA - Recommended

**TAPER AND BUFFER SPACE DETAILS**

(DECEMBER 2006) Work Zone Traffic Control Guidelines
## TAPER / CHANNELIZING DEVICE TABLE

MERGING, SHIFTING & SHOULDERS

LENGTHS

AND NUMBER OF CHANNELIZATION DEVICES USED

(All minimums)

<table>
<thead>
<tr>
<th>Lane Width</th>
<th>10 Feet</th>
<th>11 Feet</th>
<th>12 Feet</th>
<th>Shoulder Tapers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>1/2 L</td>
<td>L</td>
<td>1/2 L</td>
</tr>
<tr>
<td>MPH</td>
<td>Merging Devices</td>
<td>Shifting Devices</td>
<td>Merging Devices</td>
<td>Shifting Devices</td>
</tr>
<tr>
<td>20</td>
<td>70</td>
<td>6</td>
<td>35</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>105</td>
<td>6</td>
<td>55</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>150</td>
<td>8</td>
<td>75</td>
<td>5</td>
</tr>
<tr>
<td>35</td>
<td>205</td>
<td>8</td>
<td>105</td>
<td>5</td>
</tr>
<tr>
<td>40</td>
<td>270</td>
<td>10</td>
<td>135</td>
<td>6</td>
</tr>
<tr>
<td>45</td>
<td>450</td>
<td>16</td>
<td>225</td>
<td>9</td>
</tr>
<tr>
<td>50</td>
<td>500</td>
<td>14</td>
<td>250</td>
<td>8</td>
</tr>
<tr>
<td>55</td>
<td>550</td>
<td>15</td>
<td>275</td>
<td>8</td>
</tr>
<tr>
<td>60</td>
<td>600</td>
<td>16</td>
<td>300</td>
<td>9</td>
</tr>
<tr>
<td>65</td>
<td>650</td>
<td>17</td>
<td>325</td>
<td>9</td>
</tr>
<tr>
<td>70</td>
<td>700</td>
<td>19</td>
<td>350</td>
<td>10</td>
</tr>
</tbody>
</table>

*L for shoulder taper equals Shoulder Width x Speed. Figures shown are for a 10’ shoulder.

* The number of channelizing devices listed is the minimum required. Use of more devices should be considered if additional delineation is desired.

** Termination taper, when used should have a minimum length of 100’ per lane with devices placed approximately 20’ O.C.
Stationary work zones are used for work activities that exceed one hour but could last for several days. Signs and channelizing devices are required for stationary work zones. Devices, such as sequential arrow panels, barricades and protective vehicles, may also be used depending on the situation. For longer term projects, temporary concrete barrier, temporary pavement markings and post mounted signs might be typical devices. Examples of stationary work zone operations include: light standard repair, paving, sign installation and bridge repair. Stationary work zone traffic control is usually associated with a substantial work operation that may have many workers, equipment, truck hauling and flagging. Traffic operation, all work activities, workers and flaggers must be incorporated into the work zone and provided for during planning and selecting the Traffic Control Plans (TCP’s).

The following TCP’s show typical stationary traffic control setups.
G20-2A
48"x24"
B/O

END ROAD WORK

COUNTY ROAD INTERSECTION

G20-2A
48"x24"
B/O

END ROAD WORK

SIGN SPACING = X (feet) (1)

<table>
<thead>
<tr>
<th>Type of Roadway</th>
<th>Spacing (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Highways</td>
<td>60/65 MPH</td>
</tr>
<tr>
<td>Rural Roads</td>
<td>45/55 MPH</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterial</td>
<td>35/40 MPH</td>
</tr>
<tr>
<td>Urban Streets</td>
<td>25 MPH or LESS</td>
</tr>
</tbody>
</table>

(1) All spacing may be adjusted to accommodate interchange ramps, off-grade intersections, and driveways.

GENERAL NOTES

1. NIGHTWORK REQUIRES ADDITIONAL ROADWAY LIGHTING AT FLAGGING STATIONS. REFER TO W901T STD. SPECIFICATIONS FOR ADDITIONAL DETAILS.
2. RECOMMEND EXTENDING CHANNELIZING DEVICE TAPER ACROSS SHOULDER.
3. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
4. SIGN SEQUENCE IS THE SAME FOR BOTH DIRECTIONS OF TRAVEL ON THE ROADWAY.
5. FOR LOW-VOLUME SITUATIONS WITH SHORT WORK ZONES ON STRAIGHT ROADWAYS WHERE THE FLAGGER IS VISIBLE TO ROAD USERS APPROACHING FROM BOTH DIRECTIONS, A SINGLE FLAGGER, POSITIONED TO BE VISIBLE TO ROAD USERS APPROACHING FROM BOTH DIRECTIONS, MAY BE USED.
6. WHEN USED, THE DOWNSTREAM TAPER DEVICE SPACING SHOULD BE 20' O.C.
GENERAL NOTES

1. REFER TO SHEET TCP1 FOR ADDITIONAL SIGNING AND FLAGGING DETAILS NOT SHOWN.

9. CHANNELIZING DEVICES ARE RECOMMENDED ALONG CENTERLINE TO SEPARATE TRAFFIC FROM WORK OPERATION. DEVICES ARE REQUIRED AT TAPERS TO SHIFT TRAFFIC MOVEMENT BETWEEN Lanes AND TO PROTECT ALL FLAGGING STATIONS.

PILOT CAR OPERATION
 TCP 2
BUFFER DATA

** LONGITUDINAL BUFFER SPACE = 8**

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (feet)</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
</tr>
</tbody>
</table>

PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE

<table>
<thead>
<tr>
<th>VEHICLE TYPE</th>
<th>8 YARD DUMP TRUCK, SERVICE TRUCK, FLAT BED, ETC.</th>
<th>TYPICAL PROTECTIVE VEHICLE WITH TMA (2,000 LB) WEIGHT</th>
<th>STATIONARY OPERATION (feet)</th>
<th>MINIMUM WEIGHT 5,000 LB.</th>
<th>MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROLL AHEAD STOPPING DISTANCE ASSUMES DRY PAVEMENT</td>
<td></td>
<td></td>
<td>30 MIN.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A PROTECTIVE VEHICLE IS RECOMMENDED REGARDLESS IF A TMA IS AVAILABLE. IF NO TMA IS USED, THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO SHIELD WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.

** SIGN SPACING = X (feet) **

<table>
<thead>
<tr>
<th>ROADWAY TYPE</th>
<th>55/70 MPH</th>
<th>800'-1200'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeways &amp; Expressways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural Highways</td>
<td>60/65 MPH</td>
<td>800'-1200'</td>
</tr>
<tr>
<td>Rural Roads</td>
<td>45/55 MPH</td>
<td>800'-1200'</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>35/40 MPH</td>
<td>800'-1200'</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>25/30 MPH</td>
<td>800'-1200'</td>
</tr>
<tr>
<td>Urban Streets</td>
<td>25 MPH</td>
<td>800'-1200'</td>
</tr>
</tbody>
</table>

** CHANNELIZING DEVICE SPACING (feet) **

<table>
<thead>
<tr>
<th>MPH</th>
<th>TAPER</th>
<th>TANGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/70</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>35/45</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>25/30</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

** GENERAL NOTES **

1. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
2. CONTACT REGION TRAFFIC OFFICE FOR WORK HOUR RESTRICTIONS.
3. RECOMMEND EXTENDING DEVICE TAPER ACROSS SHOULDER. (1/3 TAPER)
4. DEVICES SHOULD NOT ENCRAMMENT INTO ADJACENT LANES.
5. PCMS RECOMMENDED.
6. USE TRANSVERSE DEVICES IN CLOSED LANE EVERY 1000'-1200' (RECOMMENDED).
7. TRAFFIC SAFETY DRUMS RECOMMENDED FOR ALL TAPERS ON HIGH SPEED ROADWAYS. (SEE DEVICE MATRIX)
8. WHEN USED, DEVICE SPACING FOR THE DOWNSTREAM TAPER SHOULD BE 20' O.C.

** SINGLE-LANE CLOSURE FOR MULTI-LANE ROADWAYS ** TCP 3
**W4-2L**

**COMPLIANCE DATE**
12/23/13

**END ROAD WORK**
G20-2A
48" x 24" B/O or down stream taper to show end of work area

**RECOMMEND CLOSING ADJACENT LANE TO MAINTAIN BUFFER SPACE.**

**LEGEND**

- **X** SIGN LOCATION
- ARROW PANEL
- CHANNELIZING DEVICES
- PROTECTIVE VEHICLE - RECOMMENDED
- PORTABLE CHANGEABLE MESSAGE SIGN

**CHANNELIZING DEVICE SPACING (FEET)**

<table>
<thead>
<tr>
<th>MPH</th>
<th>TAPER</th>
<th>TANGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/70</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>40/45</td>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>

**(SAMPLE MESSAGE)**

PCMS

2 LANES CLOSED
1 MILE AHEAD
1.5 SEC 1.5 SEC

Field locate 1 mile -- in advance of lane closure.

**BUFFER DATA**

LONGITUDINAL BUFFER SPACE = B

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (ft)</td>
<td>55</td>
<td>270</td>
<td>250</td>
<td>320</td>
<td>340</td>
<td>425</td>
<td>475</td>
<td>570</td>
<td>645</td>
<td>730</td>
</tr>
</tbody>
</table>

**PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE**

<table>
<thead>
<tr>
<th>TYPICAL PROTECTIVE VEHICLE TYPE WITH TMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINIMUM WEIGHT 5,000 LBS. MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROLL AHEAD STopping Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 MIN.</td>
</tr>
</tbody>
</table>

**A PROTECTIVE VEHICLE IS RECOMMENDED WITHOUT A TMA IF A TMA IS AVAILABLE IF NO TMA IS USED THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO SHIELD WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.**

**MINIMUM TAPER LENGTH (L) IN FEET**

<table>
<thead>
<tr>
<th>Lane Width (feet)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
</tr>
<tr>
<td>11</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
</tr>
<tr>
<td>12</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
</tr>
</tbody>
</table>

**SIGN SPACING = X (feet) (1)**

<table>
<thead>
<tr>
<th>Freeways &amp; Expressways</th>
<th>55/70 MPH</th>
<th>5000' OR AS PER MUTCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Highways</td>
<td>60/60 MPH</td>
<td>800' - 1</td>
</tr>
<tr>
<td>Rural Roads</td>
<td>45/55 MPH</td>
<td>500' - 1</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>35/40 MPH</td>
<td>350' - 1</td>
</tr>
<tr>
<td>Residential &amp; Business Districts</td>
<td>25/30 MPH</td>
<td>200' - 2</td>
</tr>
<tr>
<td>Urban Streets</td>
<td>25 MPH OR LESS 100' - 2</td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

1. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
2. CONTACT REGION TRAFFIC OFFICE FOR WORK HOUR RESTRICTIONS.
3. RECOMMEND EXTENDING DEVICE TAPER ACROSS SHOULDER (1/4 TAPER)
4. DEVICES SHALL NOT ENDERACH INTO ADJACENT LANES.
5. PCMS RECOMMENDED.
6. USE TRANSVERSE DEVICES IN CLOSED LANE EVERY 1000' (RECOMMENDED).
7. TRAFFIC SAFETY DRUMS RECOMMENDED FOR ALL TAPERS ON HIGH SPEED ROADS (SEE DEVICE MATRIX)
8. WHEN USED, DEVICE SPACING FOR THE DOWNSTREAM TAPER SHOULD BE 20' G.C.
### BUFFER DATA

| LONGITUDINAL BUFFER SPACE = B |  
|-------------------------------|---|
| SPEED (mph) | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| LENGTH (feet) | 55 | 200 | 250 | 305 | - | - | - | - | - | - |

### SIGN SPACING = X (FEET) (1)

| PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE |  
|-----------------------------------------------|---|
| TYPICAL PROTECTIVE VEHICLE WITH TMA |  
| TYPICAL PROTECTIVE VEHICLE WITH TMA |  
| STATIONARY OPERATION (feet) | 30 MIN. |

4 YARD DUMP TRUCK, SERVICE TRUCK, FLAT BED, ETC.
MINIMUM WEIGHT 15,000 LBS.
MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

ROLL AHEAD STOPPING DISTANCE ASSUMES DRY PAVEMENT

A PROTECTIVE VEHICLE IS RECOMMENDED REGARDLESS IF A TMA IS AVAILABLE. IF NO TMA IS USED, THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO SHIELD WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.

### MINIMUM TAPER LENGTH IN FEET (L)

| MINIMUM TAPER LENGTH IN FEET (L) |  
|-----------------------------------|---|
| Shoulder Width (feet) | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| Post Speed (mph) | 63 | 90 | 123 | 165 | - | - | - | - | - | - |
| 25 MPH or LESS (2) | 84 | 120 | 162 | 210 | - | - | - | - | - | - |
| Residential & Business (2) | 105 | 150 | 204 | 270 | - | - | - | - | - | - |

500' MAX.

### CHANNELIZING DEVICE SPACING (FEET)

| CHANNELIZING DEVICE SPACING (FEET) |  
|-------------------------------------|---|
| MPH | TAPER | TANGENT |
| 35/40 | 30 | 60 |
| 25/30 | 20 | 40 |

### GENERAL NOTES

1. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
2. WHEN USED, THE DEVICE SPACING FOR THE DOWNSTREAM TAPER SHOULD BE 20' O.C.

### LEGEND

- **SIGN LOCATION**
- **CHANNELIZING DEVICES**
- **PROTECTIVE VEHICLE - RECOMMENDED**

### SHOULDER CLOSURE - LOW SPEED

TCP 5
### BUFFER DATA

**LONGITUDINAL BUFFER SPACE = B**

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (feet)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>360</td>
<td>425</td>
<td>495</td>
<td>570</td>
<td>645</td>
<td>730</td>
</tr>
</tbody>
</table>

**PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE**

1. **TYPICAL PROTECTIVE VEHICLE WITH TMA**
2. **TYPICAL PROTECTIVE VEHICLE (WITH TMA) LOADED WEIGHT (LBS)**
3. **STATIONARY OPERATION (feet)**

- 4 YARD DUMP TRUCK, SERVICE TRUCK, FLAT BED, ETC.
- MINIMUM WEIGHT 15,000 LBS. (MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION)
- 30 MIN.

*A PROTECTIVE VEHICLE IS RECOMMENDED REGARDLESS IF A TMA IS AVAILABLE. IF NO TMA IS USED, THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO SHIELD WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.

### CHANNELIZING DEVICE SPACING (FEET)

<table>
<thead>
<tr>
<th>MPH</th>
<th>TAPER</th>
<th>TANGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/70</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>45</td>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>

### MINIMUM TAPER LENGTH IN FEET (L)

<table>
<thead>
<tr>
<th>Shoulder Width (feet)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posted Speed (mph)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
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<td>450</td>
<td>510</td>
<td>555</td>
<td>600</td>
<td>660</td>
</tr>
</tbody>
</table>

3 DEVICES MINIMUM SPACED 10’ O.C. IN TAPERS FOR SHOULDER WIDTHS LESS THAN 6 FEET

### SIGN SPACING = X (feet)

- Freeways & Expressways: 55/70 MPH
- Rural Highways: 60/65 MPH
- Rural Roads: 45/55 MPH

**1500’+--**

*(OR AS PER MUTCD!)*

All signs are 48” x 48” black on orange unless otherwise designated.

*All spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.*

### GENERAL NOTES

1. NO ENCROACHMENT ON TRAVELED LANE. IF ENCROACHMENT IS NECESSARY, LANE SHALL BE CLOSED.
2. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
3. WHEN USED, DEVICE SPACING FOR THE DOWNSTREAM TAPER SHOULD BE 20’ O.C.

**SHOULDER CLOSURE - HIGH SPEED**

TCP 6
**TEMPORARY OFF-RAMP**

**FOR MULTI-LANE ROADWAYS**

TCP 7

**LEGEND**

**SIGN LOCATION**

**ARROW PANEL**

**CHANNELIZING DEVICES**

**PROTECTIVE VEHICLE - RECOMMENDED**

**PORTABLE CHANGEABLE MESSAGE SIGN** (RECOMMENDED)

---

**BUFFER DATA**

LONGITUDINAL BUFFER SPACE = B

- **SPIED (mph)**: 25, 30, 35, 40, 45, 50, 55, 60, 65, 70
- **LENGTH (feet)**: 65, 200, 250, 300, 350, 400, 450, 500
- **PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE**
  - TYPICAL PROTECTIVE VEHICLE WITH TMA:
  - MINIMUM WEIGHT 5000 LBS.

- **COMPLIANCE DATE**
  - 12/23/13

---

**CHANNELIZING DEVICE SPACING (FEET)**

- **MPH**
  - 50 - 70: 40
  - 40 - 45: 30

---

**GENERAL NOTES**

1. THE DESIRABLE RAMP WIDTH IS 14' AND A 20'-1 RAMP TAPER.
2. G20-2A END ROAD WORK SIGN SHOULD BE INSTALLED 500' BEYOND THE WORK AREA OR USE A DOWNSTREAM TAPER, WHEN USED, DEVICE SPACING FOR THE DOWNSTREAM TAPER SHOULD BE 20'-1 TAPER.
3. CONTACT REGION TRAFFIC OFFICE FOR WORK HOURS RESTRICTIONS.
4. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
5. RECOMMEND EXTENDING CHANNELIZATION DEVICE TAPER ACROSS SHOULDER. 11/3 TAPER IS RECOMMENDED.
6. DEVICES SHOULD NOT ENGAGE INTO ADJACENT LANE.
7. TRAFFIC SAFETY DRUMS RECOMMENDED FOR ALL TAPERS ON HIGH SPEED ROADWAYS.
8. USE TRANSVERSE DEVICES IN CLOSED LANE EVERY 100'-1 RECOMMENDED.
9. CONSIDER SHORT TERM CLOSURE OF RAMP.
**BUFFER DATA**

Longitudinal Buffer Space = B

<table>
<thead>
<tr>
<th>Speed (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
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</table>

<table>
<thead>
<tr>
<th>Typical Protective Vehicle Type with TMA</th>
<th>Minimum Weight (5,000 LBS.)</th>
<th>Maximum Weight Shall Be In Accordance With Manufacturer's Recommendation</th>
<th>Stationary Operation (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Yard Dump Truck, Service Truck, Flat Bed, etc.</td>
<td>30 MIN.</td>
<td>A Protective Vehicle is Recommended Regardless if a TMA is Available. If No TMA is Used, the Protective Vehicle Shall Be Strategically Located in the Field to Shield Workers and No Roll Ahead Distance is Specified.</td>
<td></td>
</tr>
</tbody>
</table>

**SIGN SPACING = X (feet)**

- Rural Roads: 45/55 MPH 500+–
- Rural Roads & Urban Arterials: 35/40 MPH 350+–
- Rural Roads, Urban Streets, Residential & Business Districts: 25/30 MPH 200+–

All Signs are 48" x 48" Black on Orange Unless Otherwise Designated.

All spacing may be adjusted to accommodate interchange ramps, split intersections, and driveways.

**MINIMUM TAPER LENGTH = L (feet)**

<table>
<thead>
<tr>
<th>Lane Width (feet)</th>
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<th>30</th>
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<th>40</th>
<th>45</th>
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<th>55</th>
<th>60</th>
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<th>70</th>
</tr>
</thead>
<tbody>
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<td>L</td>
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</tr>
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</table>

**CHANNELIZING DEVICE SPACING FEET:***

<table>
<thead>
<tr>
<th>MPH</th>
<th>Taper</th>
<th>Tangent</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>40</td>
<td>80</td>
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<tr>
<td>35/45</td>
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<td>60</td>
</tr>
<tr>
<td>25/30</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

**LEGEND**

- **SIGN LOCATION**
- **ARROW PANEL**
- **CHANNELIZING DEVICES**
- **PROTECTIVE VEHICLE - RECOMMENDED**
- **PORTABLE CHANGEABLE MESSAGE SIGN**

**GENERAL NOTES**

1. Protective Vehicle Recommended - May Be a Work Vehicle.
2. Contact Region Traffic Office for Work Hour Restrictions.
3. PCMS Recommended.

**LEFT LANE AND CENTER TURN LANE CLOSURE - 5 LANE ROADWAY**

TCP 11

**WORK ZONE TRAFFIC CONTROL GUIDELINES**

**SAMPLE MESSAGE:**

PCMS

- 1
- 2
- Center Lane Closed
- Left Turning

**1.5 SEC 1.5 SEC**

Field locate in advance of lane closure signing.
SHORT DURATION WORK ZONES
Traffic Control Plans (TCP’s) 14 to 20

Introduction

Short duration work zones are work activities up to 60 minutes. Due to the short work time, simplified traffic control set-ups are allowed to reduce the hazards of traffic exposure to workers. The time it may take to set up a full complement of signs and devices could approach or exceed the amount of time it requires to perform the work.

Short duration work zones provide a safety benefit for both drivers and workers since the time duration is less than implementation of stationary work zones thereby reducing exposure time to traffic and work hazards. Motorists also receive a mobility benefit from reduced traffic impacts and associated rear-ending congestion crashes. These safety and mobility benefits are consistent with the department’s responsibility and policy to protect both drivers and workers while maintaining an acceptable level of mobility.

Careful consideration of traffic and roadway conditions must be given to each work zone prior to selecting the most appropriate traffic control set-up. Shoulder work and low-speed, low-volume traffic conditions may only require the use of the work vehicle hazard beacon and personal protective equipment. High-speed, high-volume lane work may require a full lane closure set-up, even though the work duration may be 60 minutes or less. Remember, short duration work is not a “short-cut”, it’s a traffic control method that reduces worker exposure to traffic hazards by using larger, more dominant and mobile equipment instead of many smaller devices (cones may still be recommended since they are quick to set up for small work zones).

Examples of short duration work zone operations include, re-lamping, pot hole repair, surveying, minor repairs, bridge inspection, field recon, pre-work layout, etc.

Guidance

The following guidance applies standards from the MUTCD to provide more specific direction to those involved in short duration work zones. The following provides decision making rationale to assist with selection of appropriate short duration traffic control and safety measures. Because of the complex and dynamic nature of all the elements involved in work zones the intent of this chapter is to assist supervisors and workers in decision making by resolving some of the confusion and subjectivity previously associated with short duration work zones. The included specific guidance and direction, rules, consideration chart and example TCP’s should lead to an informed choice. Remember, there is no single solution that fits all work zones. Reliance on work zone training, including a working knowledge of this section combined with sound judgment of the site conditions is the foundation for safe and effective short duration work zones.

- Consider stationary work zone measures with a full compliment of signs and devices first. Some work operations, traditionally classified as short duration, may be able to be conducted as longer term stationary work by linking several work areas together
under a lane or shoulder closure. Advantages of linking work operations may include reducing exposure of workers to traffic, efficiencies in completing tasks concurrently, reducing the number of lane closures in the same area, and overall reduction in impacts to traffic.

- Consider mobile operations. Other short duration operations may be able to be conducted as mobile operations by progressing through several short duration work areas by making intermittent stops. Advantages are shortened work operations to install traffic control devices and improved worker safety through use of mobile equipment (TMA’s, PCMS, mobile work vehicles, etc.) to reduce worker exposure to traffic hazards.

- Consider alternative work operations, materials and equipment, such as:
  
  o Work crews may be combined to accomplish work more effectively under mobile or stationary work zones, weekend or night closures, and other identified work locations or operations that may be difficult to accomplish with a small crew.

  o Identify “red zones” where short duration work zones are not a desirable choice due to poor traffic conditions (high volume, high speed, weaving areas, bridges, interchanges, etc.).

  o A specialized work zone traffic control crew could be considered for use to support work crew operations. The specialized team can provide a higher level of efficiency and safety for a work crew focused only on the work. This can also reduce the overall time duration, thereby reducing worker exposure to traffic hazards.

- Consider resources needed for unplanned short duration work (non-emergency)

  o These operations may be referred to as “call outs”, not necessarily an emergency but a short notice response to a report of debris, repairs, or other situation where the exact nature of the work or location may not be completely known.

  o An on-site assessment may allow work to proceed with available equipment and devices. Strategic placement of the work vehicle with warning beacon is important. Devices and signs may also be needed. If work is expected to last more than 60 minutes additional resources may be needed to implement a traditional stationary work zone. Work may have to be delayed until the proper work zone equipment and devices are available. Assistance from region WSDOT Incidence Response may also be appropriate.

**Key elements of short duration work zones**

  o Work Location – This element may be the most obvious but it is also the most important, at least initially, since it establishes the relationship to the next three
elements. The location directly influences the assessment of hazards, protection and warning. General roadway locations such as shoulders, lanes, medians, etc. are common but unique locations with narrow shoulders, bridges, undefined shoulders (no edge stripe), poor sight distance, tight radius curves, etc. require even more consideration.

- Hazards – This element is essential to determine and address safety hazards to workers and drivers. Traffic volume and speed is the primary hazard concern for workers in short duration work zones, while unexpected workers or equipment are the primary hazard for drivers. Assessment of all potential hazards at the work site is important to minimize the occurrence of an unexpected hazardous situation. Contingency plans and an escape route should be part of this assessment.

- Protection – This element establishes an appropriate level of worker protection based on assessment of the hazards involved. Positive worker protection is always recommended when practical but not necessarily required for less hazardous work zones. The use of a protective vehicle (work vehicle) can offer valuable worker protection in any work zone condition.

- Warning – This element provides for establishing the appropriate level of warning for drivers approaching and driving through the work zone. Advance warning to drivers is required when working within 15’ of the edge of the traveled way. In many short duration work zone locations the work vehicle warning beacon, assuming there is adequate sight distance, can provide this. Sign(s) may be needed for areas with reduced sight distance.

- Duration – This element is equally important as work location since it has a direct relationship to worker exposure to hazards. Duration also has the most influence over the other key elements. As mentioned in previous guidance, short duration work zones can offer safety and mobility benefits, but not at the risk of too much worker exposure to hazards.

**Short Duration Work Zone Condition**

Short duration work zones are categorized into three relative condition types. This helps to establish a practical application level of traffic control and safety devices based on hazard, protection and warning levels related to work location and time duration. The MUTCD allows for simplified traffic control procedures for short duration work, but does not go into any detail on what those simplified procedures might be. Establishing a work zone condition level helps to answer the question; “Which traffic control and safety devices are appropriate for use as part of the allowed simplified procedures?”

The condition levels are:

- A - represents the lowest level of work zone impacts and is typified by:
• Low traffic speed and volume.
• Time durations are short or very short, approximately 0 to 20 minutes. Work locations not within a traveled lane, such as shoulders, may be allowed up to 60 minutes.
• A wide variety of work locations may be encountered at this level.
• Minimum levels of warning, protection and hazards. A work vehicle with warning beacon and personal protective equipment may be adequate. See TCP’s.

• B- represents moderate work zone impacts and is typified by:

• Low or high traffic speed with low to moderate volumes.
• Moderate time durations, approximately 0 to 40 minutes. Work locations not within a traveled lane, such as medians, may be allowed up to 60 minutes.
• A wide variety of work locations may be encountered at this level that may include median, gore, lanes and intersections.
• Moderated levels of warning and protection, such as a spotter, cones or PCMS added to condition “A” devices would be typical considerations. Refer to TCP’s.

• C - represents the highest impact level and is typified by:

• High traffic speed and volume.
• Maximum time duration, up to 60 minutes.
• A wide variety of work locations may be encountered at this level, but all should be considered as presenting a significant hazard level even if time durations are short.
• All applicable traffic control and safety devices should be considered, such as PCMS, TMA’s and signs. See TCP’s.

While some of the elements within a particular work zone may not all exist within one condition, the relative types of elements that either identify the condition or are representative of those measures and values that could be applied to a work zone of that general condition level are shown. This is an important consideration for use, since it helps to clarify which types of devices could be applied to a work zone within practical time duration.

The short duration work zone condition level does not necessarily provide for a complete or final assessment, but it is a valuable tool for finding the best balance between time duration and the other work zone key elements. Time duration is an important consideration for short duration work zones; worker safety risk consideration cannot be ignored no matter how short the work time duration is. A common example of this condition is high-speed and high-volume traffic (urban freeway) with an in lane work location. Even though the work duration may be very short, work hazards as identified in condition “C” may need to be considered for mobile or stationary lane closures because the safety risk to workers and road users could be too great. Conversely, work zones typified by condition “A” may be allowed for longer (60 minutes maximum) duration since the safety risk to workers and road users is low.
Short duration Traffic Control Plans (TCP)

The example TCP’s in this section are representative of several types of short duration work zones. The TCP’s show the types of devices and equipment that can be applied for various work zone conditions. Work crews should review these TCP’s for application and use in establishing their work zones. Additional TCP’s should be developed to address work operations not covered by these TCP’s.

No distinction is made as to the type of work operation for these TCP’s. These TCP’s are typical by nature and are adaptable to most work operations such as surveying, maintenance work, utility work and some minor construction operations. Unique work crews and operations may need more specific TCP’s. The Region Traffic Offices can assist with TCP development.

Short duration work zone rules

1. **When working in a live lane or intersection workers must be adequately protected and/or warned as appropriate for the work zone condition.**
   - Positive protection – TMA’s, Buffer Vehicle, Barriers – (typically condition “C”).
   - Lane closure – Channelizing devices, PCMS, etc. – (typically condition “B”)
   - Spotter – Audible warning device or verbal as needed. – (typically condition “A” or “B” when working between adequately safe gaps in traffic. Sufficient warning allows worker to safely return to shoulder)
   - Escape routes/plans must be considered prior to starting work.

2. **Drivers must be adequately warned as they approach the work zone** – (see sight distance chart on TCP 27) Consider the following types of warning:
   - Flashing warning beacon on work vehicle
   - Warning signs
   - PCMS, Arrow Board (caution mode), Flag Tree or other approved dominant device.
   - TCP’s and work zone condition dictate the specific level of warning required.

3. **Several intermittent work operations within a one-mile area lasting for more than 60 minutes should be considered for a mobile or stationary work zone and are not typically acceptable for short duration work zone operations. An assessment of the most effective and safe operation should be made.**

4. **Live traffic areas (lanes & intersections) in high speed and high volume work locations** may not be good candidates for short duration work zones since the conditions are not desirable for driver warning or worker protection. Work zone condition “C” would apply to most of these type of locations and may be acceptable.
based on a positive site assessment and working only on the shoulder or adjacent lane as follows:

- No unprotected work in interior lanes of multi-lane, (3 or more lanes) roads and no “island” work areas are allowed.
- Lanes of multi-lane roads may only be accessed from the adjacent shoulder. (see TCP 19)
- Intersections may be accessed following the same manner as above and consideration should be given to incorporating the existing intersection control into the work zone traffic control……all red signal control or all way stop control may supplement the selected traffic control measures. (see TCP’s 28 & 29).

5. Short duration flagging operations are not allowed. All flagging requirements must be complied with and there currently is no exception for short duration work. Emergencies are the only exception to full flagging requirements. Flagging is defined by the MUTCD as stopping, directing or alerting road users. For the purposes of this section a spotter or worker may, and should be prepared to, warn or stop drivers of errant or unexpected vehicles, but not as a routine form of traffic control.

6. A determination of a safe work location as it relates to acceptable worker exposure to potential traffic hazards must be made. A basic determination can be made by observing traffic conditions (speed, volume, location, visibility, etc.) and assessing the following conditions:

- Is the work location out of the traffic path? (shoulder, median, sidewalk, etc.)
- Is there sufficient time for a worker to safely walk (not run) to and return from the work location? (across lanes to shoulder, into lane and back, etc., typically condition “A”)
- Are there other hazards (traffic or non-traffic) at the location that could affect worker safety?
- Is there an effective contingency or escape plan?
- Is there adequate sight distance from the work location to approaching traffic? (see chart TCP 27)

Understanding the intent and application of this section should provide valuable guidance while at the same time provide for the flexibility needed to respond to a wide variety of work operations. As with any work zone, worker safety and driver safety should be the first priority when planning for and conducting work operations. This is of even greater concern for short duration work zones since workers may be without the benefit of positive protection and extensive driver warning. Motorists may tend to encounter short duration work zones unexpectedly with a minimum of guidance and protection. Supervisors should be confident that the guidance of this section is understood and applied by their work crews, that worker and driver safety is acceptable or improved through the use of short duration work zones and that the balance between safety and work duration is appropriate.
Very Short Duration Work Zones

The overall guidance of the short duration work zone section of this guidebook applies to work zones that may last up to 60 minutes. However, it is important to recognize that many work actions or portions of work operations may take only a few seconds or minutes to perform. These types of actions might be:

- Debris retrieval; locating drainage structures or other roadway features or components
- Retrieval of lost cargo; work zone sign or device installation and removal
- Crash debris retrieval; a survey “shot”, monument or other reference check
- Crossing or walking along the roadway, motorist assistance

In many cases it is necessary and allowable for workers to walk on a roadway shoulder, cross traffic lanes or momentarily step into a lane to access work locations or to perform work. These actions can only be accomplished if they are not in conflict with traffic or other hazards and it is safe to do so. See the applicable rules of this section for worker safety and protection.

Very short duration work is typified by the following:

- The primary intent is not to conduct an actual work operation in total, but more related to gathering information, accessing a location, or a non-repetitive action as described above.

- Generally these actions occur at isolated locations or the locations are spaced far enough apart that they would constitute separate work zones.

- Equipment is usually not required, other than the possibility of simple hand tools.

Because of the very short duration and nature of these actions, there is a possibility that adequate work zone measures may not be fully considered by those involved or by supervisors. Even though these are very short duration actions, the key work zone elements must still be considered. High worker exposure locations, such as in a live lane and undesirable traffic conditions, such as high volumes, would still dictate the decision on implementing the appropriate work zone. It may be acceptable to perform some very short duration actions under work zone condition “A” & “B”, with the minimum required equipment and devices. In most cases this would be a strategically placed work vehicle with warning beacon and personal protective equipment. It is recommended to apply more work zone safety measures if the level of safety can be raised without adding to worker exposure time. Working in teams of two, where one worker can act as a spotter from a safe location, may be a good example of an additional safety measure. The workers ability to maintain awareness of traffic conditions and potential hazards is a key concern.

Normally, specific TCP’s are not required for these very short actions since the typical example TCP’s for very short duration work zones can cover a wide variety of applications.
Short Duration Work Zone Considerations Chart

This chart provides for a logical process to evaluate short duration work zones based on the five key elements described earlier and several related issues for each element. Consideration of these elements in a step-by-step process will help to ensure that an adequate assessment is made leading to selection of the appropriate traffic control and safety measures incorporated into the Traffic Control Plan (TCP). The chart alone does not provide for a complete or final decision on the level of traffic control and safety measures needed, but is a valuable tool for conducting the assessment and identifying issues that need to be addressed.

Step 1
Consider the work zone location
- Lane – traffic hazard, see TCP’s for work zone details
- Intersection – traffic hazard, see TCP’s for work zone details
- Median – potential traffic hazards on both sides
- Shoulder – consider narrow shoulders and potential for errant vehicles
- Off Roadway – traffic control is not required for work areas 15’ or more off the traveled edge, but protection should be considered.

Step 2
Consider hazards to workers and road users
- Traffic – volume, speed, configuration, driver confusion
- Equipment – clearance to traffic, operator access
- Fall/Trip – clear worker path, barriers, obstacles
- Debris – crash, cargo, etc. (remove manually or equipment)
- Other – as determined at the site

Step 3
Consider worker protection measures
- Positive Protection – TMA, buffer/shadow vehicle (may be a work vehicle), barriers
- Devices – cones, drums, etc., may alert drivers and delineates work and traffic separation
- Spotter – effective to warn workers (requires safe location for spotter)
- Escape Route or Refuge – as part of a contingency plan for unexpected events

Step 4
Consider road user warning measures (may include guidance and protection as needed)
- Dominant Warning Devices – PCMS, Arrow board, flag tree
- Signs – advance warning message or specific to work operation
• Channelizing & Warning Devices – cones, drums, type A or B lights
• Vehicle Warning Beacon – requires adequate sight distance
• Protective Equipment – TMA, buffer/shadow vehicle (may be a work vehicle), personal protective equipment

Step 5

Consider **time duration** of work (directly related to worker & road user exposure to hazards)
• Low – 0 to 20 minutes
• Moderate – 0 to 40 minutes
• High – 0 to 60 minutes, consider stationary or mobile traffic control
High traffic volume and high-speed work locations require careful consideration of traffic control devices as shown on the typical TCP’s regardless of how short the time duration may be.

Step 6

Consider which **Short Duration TCP** is appropriate for the work operation based on the previous 5 consideration steps and any other considerations that may be applicable. Also, consider the need to develop a new TCP if the example TCP’s do not fit the work operation. Contact the Region Traffic Office for assistance.
SHORT DURATION WORK ZONES

DO’S and DON’TS

Don’t –

• Take “short cuts” or hurry to accomplish work. Determination of all work zone hazards is a must.
• Run across or “dodge” traffic in live lanes.
• Work in a live lane under adverse traffic conditions or without proper traffic control in place……..even if it’s only for a minute or few seconds.
• Assume that shoulder areas are automatically safe because you are not in a live traffic lane. Distracted, aggressive or impaired drivers may encroach into shoulder areas. Also, oversize loads may present a hazard.
• Turn your back to oncoming traffic if possible. Awareness of traffic is an important self-protection element.
• Put yourself in an unexpected location that may surprise a driver.

Do –

• Use the work vehicle as protection and warning whenever possible.
• Take advantage of any resources that provide protection and warning without causing additional worker exposure. (TMA’s, buffer/shadow vehicles, PCMS, etc.)
• Plan ahead. Poor planning is not a valid excuse for lack of equipment, devices or awareness of traffic conditions.
• Whenever possible, find the safest available location to park or unload equipment.
• Avoid high traffic volume hours and locations. Plan ahead for better traffic conditions or consider alternate work operations.
• Work on the same side of the road as the work vehicle and warning beacon whenever possible.
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)

A - ALLOWED, VEHICLE *1 REQUIRED. ALL OTHER DEVICES OPTIONAL.
B - ALLOWED, VEHICLE *1 REQUIRED. CONSIDER USE OF SPOTTER, DEVICES. VEHICLE *2 AND LOW VOLUME WORK HOURS.
C - NOT ALLOWED, CONSIDER MOBILE OR STATIONARY TCP’S.

NOTES:
1. STOPPING TRAFFIC FOR UP TO 20 MINUTES MAY ALSO BE ALLOWED.
   (CONTACT & COORDINATE WITH REGION TRAFFIC OFFICE)
2. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS, SEE TCP 27 FOR SIGHT DISTANCE CHART.
3. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

LEGEND

- WARNING BEACON - REQUIRED
- SIGN LOCATION - TRIPOD MOUNT
- CHANNELIZING DEVICE
- TRUCK MOUNTED ATTENUATOR (RECOMMENDED) (PCMS OPTIONAL)
- PROTECTIVE VEHICLE - REQUIRED
- PROTECTIVE VEHICLE
- ARROW PANEL - CAUTION MODE (RECOMMENDED)

TYPICAL SHORT DURATION LANE CLOSURE
2 LANE OPERATION
TCP 14
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)

A - ALLOWED, VEHICLE #1 REQUIRED, ALL OTHER DEVICES OPTIONAL.
B - ALLOWED, VEHICLE #1 REQUIRED, CONSIDER USE OF SPOTTER, DEVICES.
C - NOT ALLOWED, CONSIDER MOBILE OR STATIONARY TCP'S.

NOTES:
1. VEHICLE #3 MAY BE NEEDED BASED ON TRAFFIC VOLUMES.
2. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS, SEE TCP 27 FOR SIGHT DISTANCE CHART.
3. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

LEGEND

- WARNING BEACON - REQUIRED
- SIGN LOCATION - TRIPOD MOUNT
- CHANNELIZING DEVICE
- TRUCK MOUNTED ATTENUATOR (RECOMMENDED)
- PROTECTIVE VEHICLE - REQUIRED
- PROTECTIVE VEHICLE
- PROTECTIVE VEHICLE
- ARROW PANEL - REQUIRED
- ARROW PANEL - CAUTION MODE (RECOMMENDED)

TYPICAL SHORT DURATION LANE CLOSURE
MULTI-LANE OPERATION
TCP 15
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)

A - ALLOWED - CONSIDER USING A SPOTTER
B - ALLOWED - SPOTTER AND/OR CHANNELIZING DEVICES RECOMMENDED, CONSIDER TMA AND/OR PCMS/ARROW CAUTION MODE.
C - ALLOWED - SPOTTER, CHANNELIZATION DEVICES AND PCMS/ARROW RECOMMENDED, CONSIDER TMA.

NOTES:
1. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS, SEE TCP 27 FOR SIGHT DISTANCE CHART.
2. NARROW SHOULDERS THAT DO NOT PROVIDE FOR WORK OPERATIONS WITHOUT LANE ENROCCHMENT - 10' LANE MINIMUM, REQUIRES LANE CLOSURE, SEE TCP 14 OR 15.
3. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

** ROADWAY EXAMPLE REPRESENTS TYPICAL LOCATION.
OPTIONAL LOCATION MAY BE - LEFT OR RIGHT SHOULDERS, MEDIAN OR CORE AREA

LEGEND

- WORK VEHICLE W/ WARNING BEACON
- SIGN LOCATION - (SEE NOTE 1)
- CHANNELIZING DEVICE
- SPOTTER
- ARROW PANEL - TYPE "B" (CAUTION MODE)
- TMA TRUCK MOUNTED ATTENUATOR (RECOMMENDED)

TYPICAL SHORT DURATION SHOULDER WORK
TCP 16
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)

A - ALLOWED - CONSIDER USING A SPOTTER, WORK VEHICLE REQUIRED.
B - ALLOWED - SPOTTER AND/OR CHANNELIZING DEVICES RECOMMENDED. CONSIDER TMA AND/OR PCMS/ARROW CAUTION MODE.
C - ALLOWED - CHANNELIZATION DEVICES AND PCMS/ARROW, TMA, SPOTTER RECOMMENDED.

NOTES:
1. WORK VEHICLE W/BEACON LOCATED IN SAME QUADRANT AS WORK LOCATION.
2. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS. SEE TCP 27 FOR SIGHT DISTANCE CHART.
3. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

LEGEND
- WORK VEHICLE W/ WARNING BEACON
- CHANNELIZATION DEVICE
- ARROW PANEL
= SIGN LOCATION
○ PROTECTIVE VEHICLE *1 REQUIRED

TYPICAL SHORT DURATION WORK OPERATION INTERSECTION LOCATION
(SEE GUIDANCE TEXT FOR ADDITIONAL DIRECTION)
TCP 17
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)

A - ALLOWED - CONSIDER USING A SPOTTER
B - ALLOWED - SPOTTER RECOMMENDED WORKER ACCESS TO LANE ALLOWED BASED ON SITE ASSESSMENT OF TRAFFIC CONDITIONS.
C - NOT ALLOWED - SEE TCP 3 FOR WORK ZONE REQUIREMENTS.

NOTES:
1. VERY SHORT WORK OPERATIONS MAY BE CONDUCTED AT VARIOUS LOCATIONS OR A WORKER MAY WALK TO THOSE LOCATIONS AS PART OF THE WORK OPERATION.
2. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS. SEE TCP 27 FOR SIGHT DISTANCE CHART.
3. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

** ROADWAY EXAMPLE REPRESENTS - LEFT OR RIGHT SHOULDERS, MEDIAN OR GORE AREA

LEGEND

WORK VEHICLE W/ WARNING BEACON
SPOTTER

TYPICAL VERY SHORT DURATION WORK OPERATION
(SEE GUIDANCE TEXT FOR ADDITIONAL INFORMATION)
TCP 18
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)
A - ALLOWED - CONSIDER USING A SPOTTER
B - ALLOWED - SPOTTER RECOMMENDED WORKER ACCESS TO LANE ALLOWED BASED ON SITE ASSESSMENT OF TRAFFIC CONDITIONS.
C - NOT ALLOWED - SEE TCP 15 FOR WORK ZONE REQUIREMENTS.

NOTES:
1. WORKER(S) MUST MOVE TO SHOULDER ADJACENT TO WORK LANE IF TRAFFIC APPROACHES PRIOR TO COMPLETION OF WORK.
2. REPEATED ACCESS TO WORK LANE NOT ALLOWED. SEE TCP 15 FOR WORK ZONE REQUIREMENTS - CONDITION "C"
3. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS, SEE TCP 27 FOR SIGHT DISTANCE CHART.
4. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

LEGEND
💧 SPOTTER
🚧 WORK VEHICLE W/ WARNING BEACON

TYPICAL VERY SHORT DURATION WORK OPERATION (SEE GUIDANCE TEXT FOR ADDITIONAL DIRECTION) TCP 19
WORK ZONE CONDITION (SEE CONDITION GUIDANCE)
A - ALLOWED - CONSIDER SPOTTER, WORKER ACCESS TO OR ACROSS LANE(S) ALLOWED BASED ON SITE ASSESSMENT OF TRAFFIC CONDITIONS.
B - ALLOWED - SPOTTER RECOMMENDED CONSIDER ADDITIONAL WARNING.
C - NOT ALLOWED - SEE TCP 28 & 29 FOR WORK ZONE REQUIREMENTS.

NOTES:
1. WORK VEHICLE W/BEACON LOCATED IN SAME QUADRANT AS WORK LOCATION.
2. REPEATED ACCESS TO WORK LANE NOT ALLOWED, SEE TCP FOR WORK ZONE REQUIREMENTS - CONDITION "C".
3. RESTRICTED SIGHT DISTANCE REQUIRES ADDITIONAL ADVANCE WARNING DEVICES OR SIGNS, SEE TCP 27 FOR SIGHT DISTANCE DATA.
4. RECOMMEND WORKING DURING APPROPRIATE RED PHASE IF SIGNALIZED.
5. REFER TO PAGE 17 FOR ROLL AHEAD AND BUFFER DATA INFORMATION.

TYPICAL VERY SHORT DURATION WORK OPERATION INTERSECTION LOCATION
(SEE GUIDANCE TEXT FOR ADDITIONAL DIRECTION)
TCP 20
ROLLING SLOWDOWN
Traffic Control Plan (TCP) 21

A rolling slowdown is a legitimate form of traffic control commonly practiced by the WSP, contractors and highway maintenance crews. This use is valuable for emergency, or very specific short duration closures (e.g. to set bridge girders, pick debris from the roadway, to push a blocking disabled to the shoulder, or to pull power lines across the roadway). The traffic control vehicles form a moving blockade, which reduces traffic speeds and creates a large gap in traffic, or clear area, allowing very short-term work to be accomplished without completely stopping the traffic.

Other traditional forms of traffic control should be considered first and be the primary choice when possible. If the slowdown is to be a scheduled operation, then the Regional Traffic Office needs to be contacted with a work request so a site specific traffic control plan (TCP) can be developed and/or reviewed and approved. The gap in traffic created by the rolling slowdown, and other traffic issues, should be addressed on an approved TCP. Also, use of WSP is encouraged whenever possible, at a minimum coordination is necessary.

In the event of debris in the roadway, a blocking disabled vehicle, or other emergency, the use of experience and resources at hand, along with sound judgment and common sense, will suffice in lieu of an approved, site specific, TCP. TCP 21 on page 51 has been developed as a guideline to represent the basic requirements for performing a safe and effective rolling slowdown. Site specific TCP’s can be developed based on this plan.

Equipment availability is a prime consideration. Before starting this operation, ensure there are at least one traffic control vehicle (with flashing amber lights) per lane to be slowed, and one vehicle to cover every point of access onto the ‘rolling slowdown’ segment of roadway. (Only during emergencies should less than one traffic control vehicle per lane be considered.) Truck mounted PCMS boards stating, “Slow or Stopped Vehicles” or “Rolling Slowdown In Progress” are very helpful. Be sure that every crewmember participating is well briefed and knows what is needed from them. Good communications for this operation are essential!

The traffic control vehicles leading the rolling slowdown must enter the roadway far enough upstream from the work operation site to allow a clear area in front of them to develop. The traffic control vehicles will work into position so that each lane is controlled. As in every other form of traffic control, sight distance is important, so that drivers are not surprised. While traveling at a fixed and reduced rate of speed, a gap in traffic must be created which is long enough to provide the estimated time needed for the work to be done.

A separate traffic control vehicle, “chase vehicle”, shall follow the slowest, or last, vehicle ahead of the blockade. When that last vehicle passes, the crew can begin the work operation.

All ramps and entrances to the roadway between the moving blockade and work operation must be temporarily closed using traffic control equipment and personnel. Each of those ramps must remain closed until the crew doing the work gives the “all clear” signal, or until the front of the moving blockade passes the closed on-ramp(s).

Radio communications between the work crew and the moving blockade are required so the speed of the blockade can be adjusted, if necessary, to increase or decrease the closure time. Release traffic only after you have confirmation that all workers and their vehicles are clear of the roadway.

(January 2006) Work Zone Traffic Control Guidelines
This plan depicts the minimum requirements to perform an emergency rolling slowdown. If the slowdown is, or can be, a planned event, then a site specific traffic control plan should be developed and approved by the region traffic office prior to the operation occurring.

LEGEND

- Truck Mounted Attenuator (Recommended)
- Warning Beacon - Required
- Arrow Panel - Caution Mode (Required)

OPERATIONAL NOTES

1. All work vehicles shall use warning beacons.
2. The number of vehicles shown is a minimum. If possible use one vehicle per lane during closure.
3. WSP shall be notified and on site when available.
4. All on-ramp traffic shall be stopped during slowdown.
MOBILE WORK ZONES
Traffic Control Plans (TCP’s) 22 to 27

Mobile work zones are work activities that typically move along the road either intermittently or continuously. Frequent short stops may be used for pothole patching, litter cleanup, herbicide spraying, lane marker replacement or other similar operations. Channelizing devices, truck mounted signs or Portable Changeable Message Signs (PCMS), warning lights and flaggers may be needed for these operations.

Mobile work zones also include slow moving operations where workers and equipment move along the road without stopping. Operations such as sweeping and paint striping are typical mobile operations. The warning signs move ahead with the work, usually mounted on a shadow vehicle. Truck mounted signs or PCMS, Truck Mounted Attenuator (TMA) and warning lights are some of the devices that may be used for moving operations. Messages for truck mounted PCMS’s should conform to standard work messages whenever possible. Contact the Region Traffic Office Staff for assistance with selecting appropriate messages.

Mobile work zones are well suited to maintenance operations and can be an efficient way to accomplish many types of work, but due to the moving nature of these operations it is imperative that the crew is carefully coordinated. Careful consideration of traffic and roadway conditions as they relate to the specific operation must be done prior to starting work.

The following TCP’s show typical examples of mobile work zones.

Many work operations that may have been previously conducted as short-term operations can be significantly improved by converting to a mobile operation. Contact the region traffic office for assistance.
TYPICAL FREEWAY APPLICATION
(ACTUAL NUMBER OF LANES MAY VARY)

LATERAL CLEARANCE DETAIL

RECOMMEND
2' MINIMUM CLEARANCE TO LANE EDGE FROM WORK VEHICLES

LEFT LANE LEFT SHOULDER

DISTANCE VARIES
(NEAREST WIDE SHOULDER AREA LEFT OR RIGHT)

MEDIAN BARRIER
NO WORKERS OR EQUIPMENT ALLOWED ON OPPOSITE DIRECTION SHOULDER WITHOUT IMPLEMENTING APPROPRIATE TRAFFIC CONTROL MEASURES

SLOW MOVING OR CLOSED VEHICLES

SAMPLE MESSAGE

PCMS

1 2

FIELD LOCATE IN ADVANCE OF LANE CLOSURE.
(TRUCK MOUNTED OR TRAILER MOUNTED OPTIONAL)

OPERATIONAL NOTES

1. SHADOW VEHICLE #1 MOUNT SHOULDER CLOSURE SIGN ON BACK OF VEHICLE. DO NOT OBSCURE ARROW PANEL, MAINTAIN 1000 TO 1500 OF SIGHT DISTANCE TO APPROACHING TRAFFIC (TIMA RECOMMENDED).

2. PROTECTIVE VEHICLE #2, POSITION VEHICLE TO PROVIDE PROTECTION OF CREW, MAINTAIN ROLL-AHEAD DISTANCE (TIMA RECOMMENDED).

3. 2' MINIMUM CLEARANCE RECOMMENDED BETWEEN LANE EDGE AND WORK VEHICLE. ADJACENT LANE MUST BE CLOSED IF ADDITIONAL CLEARANCE IS REQUIRED OR IF WORK ACTIVITIES ADVERSELY INFLUENCE TRAFFIC.

4. CONTACT REGION TRAFFIC MANAGEMENT CENTER PRIOR TO WORK BEGIN AND END.

5. PCMS RECOMMENDED.

LEGEND

ARROW PANEL - TYPE "B" (CAUTION MODE)

TRUCK MOUNTED ATTENUATOR

WARNING BEACON - REQUIRED

MOBILE FREEWAY OPERATION
LEFT SHOULDER CLOSED
TCP 22
### PROTECTIVE VEHICLE ROLL AHEAD DISTANCE = R

Roll ahead distances vary and shall be determined in field based on work operation and site specific conditions.

Use of a truck mounted attenuator recommended.

### TYPICAL FREEWAY APPLICATION

(actual number of lanes may vary)

- LEFT LANE CLOSED
- MEDIAN BARRIER
- WORK AREA
- MEDIAN
- SHOULDER
- NO WORKERS OR EQUIPMENT ALLOWED ON OPPOSITE DIRECTION SHOULDER WITHOUT IMPLEMENTING APPROPRIATE TRAFFIC CONTROL MEASURES.

### OPERATIONAL NOTES

1. SHADOW VEHICLE #1, MOUNT LANE CLOSURE SIGN ON BACK OF VEHICLE. DO NOT OBSCURE ARROW PANEL. MAINTAIN 1000' TO 1500' OF SIGHT DISTANCE TO APPROACHING TRAFFIC (TMX RECOMMENDED).
2. PROTECTIVE VEHICLE #2. POSITION VEHICLE TO PROVIDE PROTECTION OF CREW, MAINTAIN ROLL AHEAD DISTANCE (TMX RECOMMENDED).
3. 2' MINIMUM CLEARANCE RECOMMENDED BETWEEN LANE EDGE AND WORK VEHICLE. ADJACENT LANE MUST BE CLOSED IF ADDITIONAL CLEARANCE IS REQUIRED OR IF WORK ACTIVITIES ADVERSELY INFLUENCE TRAFFIC.
4. CONTACT REGION TRAFFIC MANAGEMENT CENTER PRIOR TO WORK BEGINS AND AFTER ENDING.
5. PCMS RECOMMENDED.

### LEGEND

- ARROW PANEL - TYPE "B" MIN.
- TRUCK MOUNTED ATTENUATOR
- WARNING BEACON - REQUIRED
TYPICAL FREeway APPLICATION
(ACTUAL NUMBER OF LANES MAY VARY)

OPERATIONAL NOTES

1. ADVANCE WARNING VEHICLE #1, MOUNT LANE CLOSURE SIGN ON BACK OF VEHICLE, MAINTAIN 1000' TO 1500' SIGHT DISTANCE TO APPROACHING VEHICLES. (TMA RECOMMENDED)

2. SHADOW VEHICLE #2, MOUNT LANE CLOSURE SIGN ON BACK OF VEHICLE. DO NOT OBSCURE ARROW PANEL. MAINTAIN 1000' TO 1500' SIGHT DISTANCE TO APPROACHING TRAFFIC. (TMA RECOMMENDED).

3. PROTECTIVE VEHICLE #3, POSITION VEHICLE TO PROVIDE PROTECTION OF CREW. MAINTAIN ROLL AHEAD DISTANCE (TMA RECOMMENDED).

4. 2' MINIMUM CLEARANCE RECOMMENDED BETWEEN LANE EDGE AND WORK VEHICLE. ADJACENT LANE MUST BE CLOSED IF ADDITIONAL CLEARANCE IS REQUIRED OR IF WORK ACTIVITIES ADVERSELY INFLUENCE TRAFFIC.

5. CONTACT REGION TRAFFIC MANAGEMENT CENTER PRIOR TO WORK BEGIN AND END.

6. PCSM RECOMMENDED.

MOBILE FReeway OPERATIN
MIDDLE LANE WORK AREA
TCP 24

LEGEND

ARROW PANEL - TYPE "B" MIN.

TRUCK MOUNTED ATTENUATOR (RECOMMENDED)

WARNING BEACON - REQUIRED
**PROTECTIVE VEHICLE ROLL AHEAD DISTANCE = R**

Roll ahead distances vary and shall be determined in field based on work operation and site specific conditions.

Use of a truck mounted attenuator recommended.

---

**PCMS**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow yield to moving oncoming vehicle traffic</td>
<td></td>
</tr>
<tr>
<td>1.5 sec 1.5 sec</td>
<td></td>
</tr>
</tbody>
</table>

Truck mounted PCMS (optional)

---

**OPERATIONAL NOTES**

1. Work vehicle and protective vehicle shall use warning beacons.
2. Protective vehicle shall maintain 500'-1000' of sight distance to approaching traffic.
3. Contact regional traffic office staff for assistance with specific in lane operations such as striping, fog seal, etc. that require additional plans and details.
4. "Do not pass" sign can be replaced with "pass with care" sign when appropriate.
5. PCMS recommended.

---

**LEGEND**

- Arrow panel - type "B" (caution mode)
- TMA - truck mounted attenuator (recommended)
- Warning beacon - required

---

**TYPICAL MOBILE OPERATION**

Two lane roadway

Lane closure

TCP 25
PROTECTIVE VEHICLE ROLL AHEAD DISTANCE = R
ROLL AHEAD DISTANCES VARY AND SHALL BE DETERMINED IN FIELD BASED
ON WORK OPERATION AND SITE SPECIFIC CONDITIONS.
USE OF A TRUCK MOUNTED ATTENUATOR RECOMMENDED

OPERATIONAL NOTES
1. WORK VEHICLE AND PROTECTIVE VEHICLE SHALL USE WARNING BEACONS.
2. PROTECTIVE VEHICLE SHALL MAINTAIN 500'-1000' OF SIGHT DISTANCE TO APPROACHING TRAFFIC.
3. CONTACT REGIONAL TRAFFIC OFFICE STAFF FOR ASSISTANCE WITH SPECIFIC IN-LANE OPERATIONS
   SUCH AS STRIPING, FOG SEAL, ETC. THAT REQUIRE ADDITIONAL PLANS AND DETAILS.

LEGEND
ARROW PANEL - TYPE "B" (CAUTION MODE)
TRUCK MOUNTED ATTENUATOR (RECOMMENDED)
WARNING BEACON - REQUIRED

TYPICAL MOBILE OPERATION
TWO LANE ROADWAY
SHOULDER CLOSURE
TCP 26
SIGHT DISTANCE DATA
MIN. STOPPING SIGHT DIST. = S

<table>
<thead>
<tr>
<th>SPEED LIMIT MPH</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISTANCE FEET</td>
<td>155</td>
<td>200</td>
<td>250</td>
<td>305</td>
<td>360</td>
<td>425</td>
<td>495</td>
<td>570</td>
<td>645</td>
</tr>
</tbody>
</table>

DISTANCES SHOWN ARE MINIMUMS, USE ADDITIONAL DISTANCE WHEN POSSIBLE.

SHADOW VEHICLE MAINTAIN MIN. SIGHT DISTANCE "S" (SEE CHART) TO APPROACHING TRAFFIC.

GENERAL NOTES
1. DAYLIGHT HOURS ONLY.
2. RADIO CONTACT BETWEEN WORK CREW AND SHADOW VEHICLE REQUIRED.
3. PCMS RECOMMENDED.

MOBILE SHOULDER OPERATION WITH LANE ENCROACHMENT
TCP 27
INTERSECTION OPERATIONS
Traffic Control Plans (TCP’s) 28 to 30

Traffic control at intersections requires specific attention because traffic is usually in-bound from all directions. The traffic on all approaches needs to be given the same advance warning with the messages on the warning signs to be appropriate for the situation ahead of them. When an intersection is to be controlled by flaggers, always be sure that an existing signal does not give the drivers a conflicting message. For example, don’t stop traffic when the signal is green. It is always best to turn off the signal during flagging operations.

The traffic control plans in this section show a pair of rather complex intersections. In general, use these examples as guidelines and prepare specific traffic control plans for the intersections you will be working in, showing the lanes and turning movements as they appear on the roadway.
**BUFFER DATA**

**LONGITUDINAL BUFFER SPACE = B**

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (feet)</td>
<td>155</td>
<td>200</td>
<td>250</td>
<td>305</td>
<td>360</td>
<td>425</td>
<td>495</td>
<td>570</td>
<td>700</td>
<td></td>
</tr>
</tbody>
</table>

**PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE**

<table>
<thead>
<tr>
<th>TYPICAL PROTECTIVE VEHICLE TYPE WITH TMA</th>
<th>TYPICAL PROTECTIVE VEHICLE WITH TMA</th>
<th>STATIONARY OPERATION</th>
<th>MINIMUM TAPER LENGTH = L (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 4 YARD DUMP TRUCK, SERVICE TRUCK, FLAT BED, ETC.</td>
<td>MAXIMUM WEIGHT 15,000 LBS.</td>
<td>30 MIN.</td>
<td>50</td>
</tr>
<tr>
<td>* A PROTECTIVE VEHICLE IS RECOMMENDED REGARDLESS IF A TMA IS AVAILABLE. IF NO TMA IS USED, THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO SHIELD WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MINIMUM TAPER LENGTH = L (feet)**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL HIGHWAYS</td>
<td>106</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>305</td>
<td>360</td>
<td>425</td>
<td>495</td>
<td>570</td>
<td>700</td>
</tr>
<tr>
<td>URBAN STREETS</td>
<td>115</td>
<td>165</td>
<td>225</td>
<td>285</td>
<td>345</td>
<td>405</td>
<td>465</td>
<td>525</td>
<td>595</td>
<td>700</td>
</tr>
</tbody>
</table>

**SIGN SPACING = X (feet)**

1. **RURAL HIGHWAYS**
   - 60/65 MPH: 800'+-
   - 45/55 MPH: 500'+-
2. **URBAN STREETS**
   - 25 MPH or LESS 100'+-

**OPTIONAL IF 40 MPH OR LESS**

**GENERAL NOTES**

1. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
2. RECOMMEND EXTENDING CHANNELIZING DEVICE TAPER ACROSS SHOULDER. 1/3 TAPER.
3. IF EXISTING SIGNAL IS PRESENT, SIGNAL SHALL BE SET TO "RED FLASH MODE" OR TURN OFF DURING FLAGGING OPERATIONS.
4. LAW ENFORCEMENT OFFICER MAY BE USED IN LIEU OF FLAGGERS TO CONTROL INTERSECTION TRAFFIC.
5. FOR SPEED LIMIT OF 30 MPH OR LESS USE SIGN W-1 & W-4 IN LIEU OF SIGN W-2.
6. MAINTAIN A MINIMUM OF ONE ACCESS POINT FOR EACH BUSINESS WITHIN WORK AREA LIMITS.
7. CONSIDER USING PEMS FOR ADDITIONAL ADVANCE WARNING.

**LEGEND**

- **SIGN LOCATION**
- **FLAGGING STATION**
- **CHANNELIZING DEVICES**
- **PROTECTIVE VEHICLE - RECOMMENDED**
- **WARNING BEACON - REQUIRED**

**INTERSECTION LANE CLOSURE**

TCP 28
BUFFER DATA

LONGITUDINAL BUFFER SPACE = B

<table>
<thead>
<tr>
<th>SPEED MPH</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (feet)</td>
<td>65</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
</tr>
</tbody>
</table>

PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE

| TYPICAL PROTECTIVE VEHICLE WITH TMA ROLL AHEAD STATIONARY OPERATION (feet) |
|-----------------------------|-----------------------------|
| 4 YARD DUMP TRUCK           | 30 MIN.                     |
| SERVICE TRUCK               |                             |
| FLATBED TRUCK               |                             |

MINIMUM WEIGHT: 5,000 LBS., MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION.

ROLL AHEAD STOPPING DISTANCE ASSUMES DRY PAVEMENT

A PROTECTIVE VEHICLE IS RECOMMENDED REGARDLESS IF A TMA IS AVAILABLE. IF NO TMA IS USED THE PROTECTIVE VEHICLE SHALL BE STRATEGICALLY LOCATED IN THE FIELD TO SHIELD WORKERS AND NO ROLL AHEAD DISTANCE IS SPECIFIED.

** CHANNELIZING DEVICE SPACING (feet)**

<table>
<thead>
<tr>
<th>MPH</th>
<th>TAPER</th>
<th>TANGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/70</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>55/75</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>60/80</td>
<td>55</td>
<td>85</td>
</tr>
</tbody>
</table>

** GENERAL NOTES **

1. PROTECTIVE VEHICLE RECOMMENDED - MAY BE A WORK VEHICLE.
2. RECOMMEND EXTENDING CHANNELIZING DEVICE TAPER ACROSS SHOULDER. (L/3 TAPER)
3. IF EXISTING SIGNAL IS PRESENT, SIGNAL SHALL BE SET TO "RED FLASH MODE" OR TURN OFF DURING FLAGGING OPERATIONS.
4. LAW ENFORCEMENT OFFICER MAY BE USED IN LIEU OF FLAGGERS TO CONTROL INTERSECTION TRAFFIC.
5. CONSIDER USING TPHMs FOR ADDITIONAL ADVANCE WARNING.
6. MAINTAIN A MINIMUM OF ONE ACCESS POINT FOR EACH BUSINESS WITHIN WORK AREA LIMITS.
7. RECOMMEND CLOSING LANE IN ADVANCE OF FLAGGING LOCATION WHEN MULTIPLE LANES ARE ON APPROACH LEG.

SIGN SPACING = X (feet) (11)

<table>
<thead>
<tr>
<th>SPEED MPH</th>
<th>60/65</th>
<th>80+</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL ROADS</td>
<td>45/55</td>
<td>50+</td>
</tr>
<tr>
<td>RURAL ROADS &amp; URBAN ARTERIALS</td>
<td>35/40</td>
<td>35+</td>
</tr>
<tr>
<td>RURAL ROADS, URBAN ARTERIALS, RESIDENTIAL &amp; BUSINESS DISTRICTS</td>
<td>25/30</td>
<td>200-</td>
</tr>
<tr>
<td>URBAN STREETS</td>
<td>25 MPH OR LESS</td>
<td>100+</td>
</tr>
</tbody>
</table>

** ALL SIGNS ARE 48" x 48" BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED. **

1) ALL SPACING MAY BE ADJUSTED TO ACCOMODATE INTERSECTION ROADS, AT-GRADE INTERSECTIONS, AND DRIVEWAYS.
2) THIS SPACING MAY BE REDUCED IN URBAN AREAS TO FIT ROADWAY CONDITIONS.

MINIMUM TAPER LENGTH + L (feet)

<table>
<thead>
<tr>
<th>LANES WIDTH (feet)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>105</td>
<td>120</td>
<td>270</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
<td>650</td>
<td>700</td>
<td>750</td>
</tr>
<tr>
<td>11</td>
<td>110</td>
<td>125</td>
<td>285</td>
<td>475</td>
<td>525</td>
<td>575</td>
<td>625</td>
<td>675</td>
<td>725</td>
<td>775</td>
</tr>
<tr>
<td>12</td>
<td>120</td>
<td>135</td>
<td>295</td>
<td>485</td>
<td>535</td>
<td>585</td>
<td>635</td>
<td>685</td>
<td>735</td>
<td>785</td>
</tr>
</tbody>
</table>

** LEGEND **

• SIGN LOCATION
• Flagging station
• CHANNELIZING DEVICES
• ARROW PANEL
• PROTECTIVE VEHICLE - RECOMMENDED
• WARNING BEACON - REQUIRED
EMERGENCY OPERATIONS
Traffic Control Plan (TCP) 31

The immediate response to an emergency situation must, by necessity, make use of whatever devices and equipment are available. Assistance from the Washington State Patrol and WSDOT Incident Response Team may be appropriate. The use of flares is allowed unless flammable material is present, electronic flares are an option.

Implement the appropriate traffic control plan (lane closure, etc.) if the situation is expected to last longer than 60 minutes. This allows for a short duration operation, until traffic control assistance arrives.

Response to an emergency situation is inherently more dangerous than planned situations. Do not expose yourself to a life-threatening situation. Wait for assistance and protect yourself at all times.
SPECIAL DETAILS AND TCP’S
Traffic Control Details (TCD’s) 1 to 5

The following detail plans show the placement of signs, channelizing devices, and pavement markings, which are difficult to show on other traffic control plans or where additional guidance is necessary. A detail is also included as a guideline for signing a chip seal operation (TCD 4) and this includes an example reduced speed limit scenario. Be sure to include specific warning signs along with any reduction in the legal speed so the drivers have proper expectancy and know why they are being asked to slow down.
WARNING SIGNS
LOCATE AS NEEDED FOR SITE CONDITIONS
TO SUPPLEMENT WARNING SIGNS

ABRUPT LANE EDGE
W21-801
48" x 48"
3’/0

NO SHOULDER
W8-1801
48" x 48"
B/0

OPERATIONAL NOTES
1. SHOULDER EXCAVATION SHALL BE LIMITED TO ONE SIDE OF ROADWAY AT A TIME.
2. TYPE "C" STEADY BURN LIGHTS ARE RECOMMENDED ON CHANNELIZATION DEVICES TO PROVIDE ADDITIONAL DELINEATION.
3. REFER TO STD. SPEC. 1-07.23 FOR ADDITIONAL DETAILS ON THE MITIGATION REQUIREMENTS FOR DROP OFF PROTECTION.

SHOULDER WORK AREA PROTECTION
NON-WORKING HOURS
TCD 1
**SIGN SPACING = X (feet)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Speed</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeways &amp; Expressways</td>
<td>55/70 MPH</td>
<td>1500'--</td>
</tr>
<tr>
<td>(OR AS PER MUTCD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural Highways</td>
<td>60/65 MPH</td>
<td>800'--</td>
</tr>
<tr>
<td>Rural Roads</td>
<td>45/55 MPH</td>
<td>500'--</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>35/40 MPH</td>
<td>350'--</td>
</tr>
<tr>
<td>Rural Roads, Urban Arterials</td>
<td>25/30 MPH</td>
<td>200'-- (2)</td>
</tr>
<tr>
<td>Residential &amp; Business Districts</td>
<td>25/30 MPH</td>
<td>25 MPH or LESS 100'-- (2)</td>
</tr>
</tbody>
</table>

ALL SIGNS ARE 48" x 48" BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED.

1. All spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.
2. This spacing may be reduced in urban areas to fit roadway conditions.

**NOTES**

1. REFER TO TCP3 FOR TYPICAL LANE CLOSURE SIGNING DETAILS, DEVICE SPACING REQUIREMENTS AND LANE CLOSURE TAPER LENGTHS.
2. MOTORCYCLES USE EXTREME CAUTION SIGNS (W21-1701) SHALL BE INSTALLED WHEN THE FOLLOWING ROADWAY CONDITIONS EXIST:
   - GROOVED PAVEMENT
   - ABRupt LANE EDGE
   - STEEL PLATES
   - LOOSE GRAVEL OR EARTH
SPECIFIC SIGNS FOR EACH OF THE CONDITIONS NOTED SHALL BE INSTALLED ALONG WITH MOTORCYCLES USE EXTREME CAUTION SIGNS.
**TYPICAL SECTION A-A**

**TEMPORARY TRAFFIC CONTROL DEVICES**

- **EXISTING EDGE STRIPE**
- **EXISTING LANE STRIPE**

**CHANNELIZING DEVICE SPACING (FEET)**

<table>
<thead>
<tr>
<th>MPH</th>
<th>TAPER</th>
<th>TANGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/70</td>
<td>40</td>
<td>90</td>
</tr>
<tr>
<td>35/45</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>25/30</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

**BUFFER DATA**

<table>
<thead>
<tr>
<th>LANE WIDTH (FEET)</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEED (MPH)</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

**PROTECTIVE VEHICLE WITH TMA ROLL AHEAD DISTANCE**

- **TYPICAL PROTECTIVE VEHICLE TYPE WITH TMA**
- **TYPICAL PROTECTIVE VEHICLE WITH TMA (LOADED WEIGHT 6,000 LBS)**
- **MINIMUM WEIGHT 15,000 LBS, MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS**
- **ROLL AHEAD STOPPING DISTANCE ASSUMES DRY PAVEMENT**

- **MINIMUM TAPER LENGTH = L (FEET)**

<table>
<thead>
<tr>
<th>LANE WIDTH (FEET)</th>
<th>25</th>
<th>50</th>
<th>70</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSTED SPEED (MPH)</td>
<td>10</td>
<td>158</td>
<td>185</td>
<td>205</td>
<td>210</td>
<td>200</td>
<td>190</td>
<td>180</td>
</tr>
</tbody>
</table>

**NOTES**

1. **PROTECTIVE VEHICLE RECOMMENDED MAY BE A WORK VEHICLE.**
2. **CONTACT REGION TRAFFIC OFFICE FOR WORK HOUR RESTRICTIONS.**
3. **RECOMMEND EXTENDING DEVICE TAPER ACROSS SHOULDER, (1/3 TAPER)**
4. **USE TRANSVERSE DEVICES IN CLOSED LANE EVERY 1000'- (RECOMMENDED).**
5. **TRAFFIC SAFETY DRUMS RECOMMENDED FOR ALL TAPERS ON HIGH SPEED ROADS. (SEE DEVICE MATRIX)**
6. **PCMS RECOMMENDED.**

**LEGEND**

- **WARNING BEACON - REQUIRED**
- **SIGN LOCATION**
- **ARROW PANEL**
- **CHANNELIZING DEVICES**
- **PROTECTIVE VEHICLE - RECOMMENDED**
- **PCMS**
- **PORTABLE CHANGEABLE MESSAGE SIGN**

**SAMPLE MESSAGE**

**PCMS**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**RIGHT LANE CLOSED AHEAD**

**ROAD WORK AHEAD**

**SEE SHEET NOTE 4**

**FIELD LOCATE + 1 MILE IN ADVANCE OF LANE CLOSURE.**

---

**TYPICAL LANE CLOSURE WITH SHIFT**

**TCD 3**
**LEGEND**

- **SIGN LOCATION**
- **WORK AREA LIMITS**

**TYPICAL SPEEDZONE DETAIL**

**CHIP SEAL PROJECTS**

**TCD 4**

---

1. **GENERAL NOTES**
   - Refer to lane closure plans for lane closure details and signing.
   - The tables provided are an aide for determining sign locations. The values contained in the tables should be considered minimums and applied in the field with respect to site conditions.
   - Contact the region traffic engineer for additional guidance if needed due to unusual site conditions or traffic characteristics.
   - Regulatory speed limit signing is not a substitute for work zone signing required to warn motorists.
   - Speed zone signing shall only remain in place for as long as the reduced speed condition applies.
   - Contact the region traffic office for special sign orders, speed reduction notices, etc.
   - See TCD 1 for temporary pavement marking details.
   - Motorcycle warning signs are required as per WAC 468-95-315.
   - Speed limit reduction shall conform to RCW 47.48.020.

---

**SIGN SPACING = X (feet) (1)**

<table>
<thead>
<tr>
<th>Freeways &amp; Expressways</th>
<th>55/70 MPH</th>
<th>500+++</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads &amp; Expressways</td>
<td>60/65 MPH</td>
<td>600+++</td>
</tr>
<tr>
<td>Roads &amp; Urban Arterials</td>
<td>45/55 MPH</td>
<td>500+++</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>35/40 MPH</td>
<td>350+++</td>
</tr>
<tr>
<td>Residential Districts</td>
<td>25/30 MPH</td>
<td>200+++</td>
</tr>
</tbody>
</table>

All signs are 48" x 48" black on orange unless otherwise designated.

---

**1. REFER TO LANE CLOSURE PLANS FOR LANE CLOSURE DETAILS AND SIGNING.**

---

**2. THE TABLES PROVIDED ARE AN AIDE FOR DETERMINING SIGN LOCATIONS. THE VALUES CONTAINED IN THE TABLES SHOULD BE CONSIDERED MINIMUMS AND APPLIED IN THE FIELD WITH RESPECT TO SITE CONDITIONS.**

---

**3. CONTACT THE REGION TRAFFIC ENGINEER FOR ADDITIONAL GUIDANCE IF NEEDED DUE TO UNUSUAL SITE CONDITIONS OR TRAFFIC CHARACTERISTICS.**

---

**4. REGULATORY SPEED LIMIT SIGNING IS NOT A SUBSTITUTE FOR WORK ZONE SIGNING REQUIRED TO WARN MOTORISTS.**

---

**5. SPEED ZONE SIGNING SHALL ONLY REMAIN IN PLACE FOR AS LONG AS THE REDUCED SPEED CONDITION APPLIES.**

---

**6. CONTACT THE REGION TRAFFIC OFFICE FOR SPECIAL SIGN ORDERS, SPEED REDUCTION NOTICES, ETC.**

---

**7. SEE TCD 1 FOR TEMPORARY PAVEMENT MARKING DETAILS.**

---

**8. MOTORCYCLE WARNING SIGNS ARE REQUIRED AS PER WAC 468-95-315.**

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**9. SPEED LIMIT REDUCTION SHALL CONFORM TO RCW 47.48.020.**

---

**NOTE:**

- No suggested minimum distances are provided for these speeds. The placement location is dependent on site conditions and other signage to provide an adequate advance warning for the driver.
WORK OPERATIONS THAT REMOVE OR OBSCURE EXISTING PAVEMENT MARKINGS MUST PROVIDE FOR TEMPORARY MARKINGS UNTIL THE PERMANENT MARKINGS ARE APPLIED. TEMPORARY MARKINGS MAY BE USED UNTIL IT IS PRACTICAL AND POSSIBLE TO INSTALL PERMANENT MARKINGS. THE DETAILS BELOW SHOW VARIOUS COMMON APPLICATIONS. CONTACT THE REGION TRAFFIC OFFICE FOR ASSISTANCE WITH MORE COMPLEX SITUATIONS.

MULTI-LANE ROADWAYS

A.C.P.

36' 4' 40'

(2) 4' YELLOW TAPE STRIPE

2 LANE ROADWAYS

A.C.P. OVERLAY - TEMPORARY STRIPLING TAPE SHALL BE INSTALLED IN CONJUNCTION WITH "PASS WITH CARE" AND "DO NOT PASS" SIGN LOCATIONS.

CHANNELIZING DEVICES

A.C.P.

4' 36' 40'

CHANNELIZING DEVICES

A.C.P. OVERLAY - TEMPORARY STRIPLING TAPE - 4' YELLOW CENTER STRIPE

B.S.T.

WHITE T.R.P.M.'S

CHANNELIZING DEVICES

CHANNELIZING DEVICES

B.S.T. OVERLAY - T.R.P.M. (CHIP SEAL MARKER) - 4' YELLOW CENTER STRIPE

TEMPORARY EDGE STRIPES ARE NOT REQUIRED FOR THE ABOVE SITUATIONS BUT IF USED, T.R.P.M.'S MAY BE USED ON A PATTERN SPACING OF 5' O.C. TO SIMULATE A SOLID LINE. TEMPORARY ROADSIDE DELINEATION WITH CHANNELIZATION DEVICES SHOULD BE CONSIDERED, BUT ARE OPTIONAL. DO NOT USE A "SKIP" PATTERN OF TAPE STRIPE TO SIMULATE AN EDGE STRIPE.

FOR LONG TERM PROJECTS, A TEMPORARY CHANNELIZATION/PAVEMENT MARKING PLAN SHOULD BE DEVELOPED.

CHANNELIZATION DEVICE SPACING - TANGENT 200' -
CURVES 100' -
TAPERS 1/2 L

T.R.P.M. = TEMPORARY RAISED PAVEMENT MARKER

TEMPORARY PAVEMENT MARKING DETAILS
TCD 5