STREET and UTILITY REPAIRS

WORK AREA PROTECTION GUIDE

City of CHAMPAIGN

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Street and Utility Repairs
Work Area Protection Guide

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INTRODUCTION:

This booklet was prepared to be used as a general guide by City, utility, and contractor construction crews during work operations on City right-of-ways and streets open to traffic. City Capital Improvement Projects (CIP) may include different standards within the contract documents, i.e. Illinois Department of Transportation (IDOT), etc.

The information contained within this document is consistent with the requirements of the Illinois Manual on Uniform Traffic Control Devices for streets and highways for work area protection on urban two-lane and multi-lane roads. This booklet is a guide that may not apply to long-term closings or other special circumstances and is not a substitute for the judgment of those responsible for work site safety. This document suggests procedures that should provide a reasonable level of safety; however, application of these guidelines cannot guarantee the safety of every work site. Each worker and supervisor should, therefore, be alert for any circumstance which could require procedures different from those included in this guide. Special attention should also be given to City Ordinances and procedures and to State requirements when work is being done on highways under the jurisdiction of the IDOT.

Properly used, work area protection helps prevent injury to employees and the public. Proper planning is essential in every job so that it is executed in a safe and orderly manner with a minimum of interference with the motorists.

NOTE: If the observed speed of the traffic is greater than the posted speed limit, the work zone set-up should reflect the greater speed. Each job site may dictate more traffic control than listed in this book.

GENERAL INFORMATION:

1. Any street closure and any arterial lane closure require a Press Release and public notification (see Appendix A-1 for procedure).

2. Whenever possible, the work site on a two-lane street or highway shall be confined to one traffic lane leaving the opposite lane open to traffic.

3. Whenever possible, work vehicles shall be parked on the same side of the street as the job site.

4. Whenever possible, workers shall remove themselves from the area of the work zone impacted by traffic.

5. Work vehicles may be used as an additional barricade with the flasher light lit, but not as a substitute for any work area protection that may be called for.

6. Under certain field conditions such as hills, crossroads, curves, driveways, etc., the spacing of work area protection should be adjusted as necessary.

7. All employees working on the job site along highly traveled roads should wear high visibility vests.

8. Flaggers shall wear high visibility vest when directing traffic.

9. Flaggers shall use the proper traffic control sign when directing traffic.

10. When two flaggers are necessary, they shall be in direct communication with each other at all times either by sight or radio communication.

11. When there is no work in progress and the flagger is not required, the “FLAGGER SYMBOL” Sign should be removed.

12. Remove or cover all signs or traffic control devices that do not apply to existing conditions. For example, if work is not being performed, the warning signs should either be taken down or covered.

13. When openings in or near the sidewalk are necessary, barricades should be properly placed so that anyone passing by would not inadvertently fall into the excavation.

14. All excavations or work that present a hazard, or must be left open overnight, shall be properly barricaded with advance warning and lighted barricades for the protection of the public (see Appendix A for overnight requirements).

CHANNELIZING DEVICES

Listed below is a summary of the requirements for each type of allowable channelizing device. Different traffic control arrangements will necessitate varying combinations of the following equipment. Different device requirements are necessary for day and night applications. For a comprehensive description of channelization device requirements, please refer to Appendix B of this guide, "Manual on Uniform Traffic Control Devices, Channelizing Device Requirements." Channelization devices shall be maintained to an acceptable level per the IDOT "Quality Standard for Work Zone Traffic Control Devices". *See common examples included at the end of this Introduction Section.*

1. Cones. Cones shall be predominantly orange and shall be made of a material that can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways, cones shall be not less than 450 mm (18 inches) in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a minimum of 700 mm (28 inches) in height.

   For nighttime use, cones shall be retroreflective or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 700 to 900 mm (28 to 36 inches) in height shall be provided by a 150 mm (6 inch) wide white band located 75 to 100 mm (3 to 4 inches) from the top of the cone and an additional 100-mm (4 inch) wide white band located approximately 50 mm (2 inches) below the 150 mm (6 inch) band.

Retroreflectorization of cones that are more than 900 mm (36 inches) in height shall be provided by horizontal, circumferential, alternating orange and white retroreflective stripes that are 100 to 150 mm (4 to 6 inches) wide. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 75 mm (3 inches) in width.

2. Tubular Markers. Tubular markers shall be predominantly orange and shall be not less than 450 mm (18 inches) high and 50 mm (2 inches) wide facing road users. They shall be made of a material that can be struck without causing damage to the impacting vehicle.

   Tubular markers shall be a minimum of 700 mm (28 inches) in height when they are used on freeways and other high-speed highways, on all highways during nighttime, or whenever more conspicuous guidance is needed.

   For nighttime use, tubular markers shall be retroreflectorized. Retroreflectorization of 700 mm (28 inches) or larger tubular markers shall be provided by two 75 mm (3 inch) wide white bands placed a minimum of 50 mm (2 inches) from the top, with a maximum of 150 mm (6 inches) between the bands.

3. Vertical Panels. Vertical panels shall be 200 to 300 mm (8 to 12 inches) in width and at least 600 mm (24 inches) in height. They shall have orange and white diagonal stripes and be retroreflectorized.

   Vertical panels shall be mounted with the top a minimum of 900 mm (36 inches) above the roadway. Where the height of the vertical panel itself is 900 mm (36 inches) or greater, a panel stripe width of 150 mm (6 inches) shall be used.

   Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward at an angle of 45 degrees in the direction vehicular traffic is to pass. Vertical panels used on freeways, expressways, and other high-speed roadways shall have a minimum of 169,000 mm^2 (270 $inches^2$) retroreflective area facing vehicular traffic.

4. Drums. Drums used for road user warning or channelization shall be constructed of lightweight, deformable materials. They shall be a minimum of 900 mm (36 inches) in height and have at least a 450 mm (18 inch) minimum width regardless of orientation. Metal drums shall not be used. The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 100 to 150 mm (4 to 6 inches) wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 75 mm (3 inches) wide. Drums shall have closed tops that will not allow collection of construction debris or other debris.

5. Type I, II, or III Barricades. Stripes on barricade rails shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Except as noted in the Option, the stripes shall be 150 mm (6 inches) wide.

   The minimum length for Type I and Type II barricades shall be 600 mm (24 inches) and the minimum length for Type III barricades shall be 1,200 mm (48 inches). Each barricade rail shall be 200 to 300 mm (8 to 12 inches) wide. Barricades used on freeways, expressways, and other

high-speed roadways shall have a minimum of 169,000 mm^2 (270 $inches^2$) of retroreflective area facing road users.

Ballast shall not be placed on top of any striped rail. Barricades shall not be ballasted by nondeformable objects such as rocks or chunks of concrete. Ballast shall not extend into the accessible passage width of 1,500 mm (60 inches).

A sign shall be installed with appropriate legend concerning permissible use by local road users. Adequate visibility of the barricades from both directions shall be provided.

6. Direction Indicator Barricades. The direction indicator barricade shall consist of a one-direction large arrow sign mounted above a diagonal striped, horizontally aligned, retroreflective rail.

   The one-direction large arrow sign shall be black on an orange background. The stripes on the bottom rail shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. The stripes shall be 100 mm (4 inches) wide. The one-direction large arrow sign shall be 600 x 300 mm (24 x 12 inches). The bottom rail shall have a length of 600 mm (24 inches) and a height of 200 mm (8 inches).

7. Temporary Traffic Barriers as Channelizing Devices. Temporary traffic barriers serving as TTC devices shall conform to requirements for such devices as set forth throughout Part 6.

   Temporary traffic barriers shall not be used solely to channelize road users, but also to protect the work space. If used to channelize vehicular traffic, the temporary traffic barrier shall be supplemented with delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility.

8. IDOT – Quality Standard for Work Zone Traffic Control Devices. The following pages illustrate common examples of quality standards. The full standard can be obtained from the City Engineer or the IDOT web site at http://www.dot.state.il.us/workzone/wztcd2004r.pdf

Taper Length and Spacing for Chanelizing Devices (cones, tubular markers, barrels, or Type II barricades):

Speed Limit MPH	Taper Length per Lane Width in Feet			Number of Cones	Spacing of Cones Along Taper in Feet
	10	11	12		
25	105	115	125	6	25
30	150	165	180	7	30
35	205	225	245	8	35
40	270	295	320	9	40
45	450	495	540	13	45
50	500	550	600	13	50
55	550	605	660	13	55

1. Note: Taper length may be modified to provide access to side streets.
2. Note: Spacing for cones on tapers for one-lane, two-way roadways should be at 20-foot spacing regardless of the speed. High traffic areas may require closer spacing (i.e., 5 to 10 feet).

Sign Size Designation Guidelines:

Posted Speed Limit	Class of Road		
	2-Lane	Multi-Lane	IDOT
40 and below	36”	36”	48”
45 and above	48”	48”	48”

Typical Sign Spacing Distances:

Table 6H-3. Meaning of Letter Codes on Typical Application Diagrams

	Distance Between Signs**		
Road Type	**A**	**B**	**C**
Urban (low speed)*	30 (100)	30 (100)	30 (100)
Urban (high speed)*	100 (350)	100 (350)	100 (350)
Rural	150 (500)	150 (500)	150 (500)
Expressway/Freeway	300 (1,000)	450 (1,500)	800 (2,640)

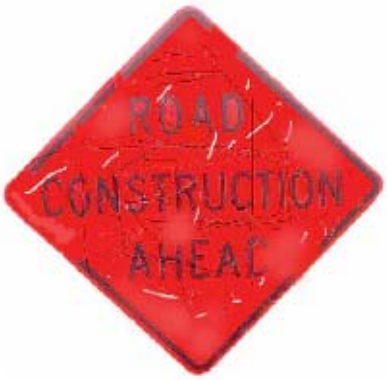
*Speed category to be determined by highway agency.
**Distances are shown in meters (feet). The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-48. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The third sign is the first one in a three-sign series encountered by a driver approaching a TTC zone.)

Typical Applications: The following section shows traffic control diagrams for typical application.

Acceptable - This is an example of an **acceptable** sign. It is not new. There are abrasions on the surface but very little loss of lettering. There has been no touch-up of the lettering.

Marginal - This is an example of a sign with **marginal** acceptability. Of the many surface abrasions throughout the sign face, many are within the individual letters of the message. The sign surface is free of any residue. Although some color fading is evident, the background color and reflectivity are still apparent at night.

Unacceptable - This is an example of an **unacceptable** sign. Signs with asphalt splatter and/or cement slurry or any combination of missing and/or covered reflective material similar in area presented would also make a sign **unacceptable**. Some letters have a loss of more than 50%. There is noticeable color fading.



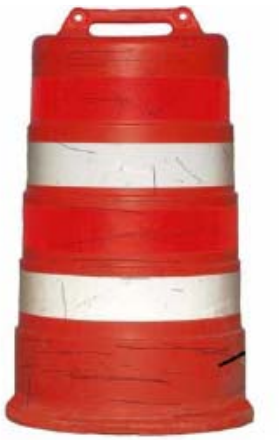
Please Note: Signs shall be fluorescent orange in color. Signs shall have retro-reflective sheeting. Signs with bends and dents that alter the size and/or shape of the sign are unacceptable. These photos are to be used as examples of the condition of the sheeting only.

Acceptable - This is an example of an **acceptable** panel. It is not new. There are several abrasions on the surface but very little loss of reflective sheeting. The orange is vivid and the stripes provide contrast that is clearly visible with low beam headlights at night.

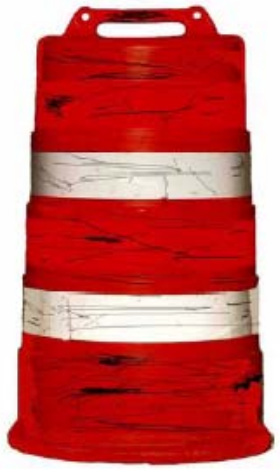
Marginal - This is an example of a panel with **marginal** acceptability. There are numerous surface abrasions throughout the panel surface. Some color fading is evident; however, it is free of large areas of residue or missing reflective material. The colors, stripes, and reflectivity are visible and discernible with low beam headlights at night.

Unacceptable - This is an example of an **unacceptable** panel. The surface is marred over a high percentage of the panel area. There is noticeable loss of reflectivity and obvious color fading. Panels with asphalt splatter and/or cement slurry, or any combination of missing and/or covered reflective material similar in area presented would also make a panel **unacceptable**.

Acceptable - This is an example of an **acceptable** drum. It is not new. The sheeting has only minor tears and scratches. It will readily respond to washing.

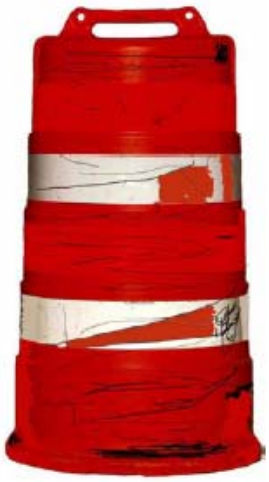


Marginal – This is an example of a drum with **marginal** acceptability. The sheeting has numerous tears and scratches; however, it is free of large areas of residue or missing reflective material. Some fading is evident. It may not readily respond to washing.



Unacceptable - This is an example of an **unacceptable** drum. The large areas of missing reflective material make this drum **unacceptable**. Drums with asphalt splatter and/or cement slurry, or any combination of missing and/or covered reflective material similar in area presented would also make a drum **unacceptable**. Large areas of fading are evident. It will not respond to washing.

Note: Fluorescent orange sheeting is required on drums



Acceptable – These are examples of **acceptable** cones. Although they are not new the surfaces are free of punctures and abrasions, and the color is bright. The surfaces may be dirty, but will readily respond to washing.

Marginal – These are examples of cones with **marginal** acceptability. The surfaces are dirty and may not be readily cleaned due to abrasion and discoloration.

Unacceptable - This is an example of **unacceptable** cones. Punctures and large areas of staining make these an unlikely candidate for improvement. Also, large areas of asphalt splatter and/or cement slurry would make cones **unacceptable**.

Acceptable - This is an example of an **acceptable** paddle. It is not new. There are several abrasions on the surface but very little loss of lettering. There has been no touch-up of the lettering. The sheeting color is vivid with contrasting colors. The handle color is the same as the sheeting color. The paddle is 6' high from pavement to bottom of sign. The surface may be dirty but will readily respond to washing.

Marginal - This is an example of a paddle with **marginal** acceptability. Of the many surface abrasions throughout the paddle face, many are within the individual letters of the message. The paddle surface is free of any residue. Although some color fading is evident, the background color and reflectivity are still apparent at night. The surface is dirty and may not be readily cleaned due to abrasion and discoloration.

Unacceptable - This is an example of an **unacceptable** paddle. Paddles with asphalt splatter and/or cement slurry of an amount similar to the abrasions that are evident throughout the face of this sign are **unacceptable**. Some letters have a loss of more than 20 percent. Color fading is noticeable.

TYPICAL APPLICATIONS