City of Phoenix

TRAFFIC **BARRICADE** MANUAL

Revised 9th Edition

STREET TRANSPORTATION DEPARTMENT
Right-of-Way Management

KEY REFERENCE TABLES

Table 1 – Taper Length Calculations

Speed Limit	Formula
40 mph or under	$L = WS^2/60$
45 mph or over	$L = WS$

L = Taper Length (feet) / W = Width of Lane (feet) / S = Posted Speed Limit (mph)

Table 2 – Typical Taper Length And Spacing Between Devices

Speed Limit	Taper Length (L, feet)			Spacing Between Devices, feet	Minimum Number of Devices Needed
	Lane Width				
	10	11	12		
25	104	115	125	25*	6
30	150	165	185	30	7
35	204	225	245	35	8
40	267	293	320	40	9
45	450	495	540	45	13
50	500	550	600	50	13
55	550	605	660	55	13

* *Distance between traffic cones used for tapers should not exceed 25 feet regardless of speed.*

NOTE 1: Values shown in Table 2 are for merging tapers only. Other taper lengths should be approximately L/2 and number of devices appropriately halved.

NOTE 2: Advance warning signs should be placed a minimum distance (L) in advance of taper.

Table 3 – Taper Length Criteria For Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	At least L
Shifting Taper	At least 0.5 L
Shoulder Taper	At least 0.33 L
One-Lane, Two-Way Traffic Taper	50 feet minimum, 100 feet maximum
Downstream Taper	100 feet per lane

Table 4 – Tangent Length Criteria For Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Tangent	Recommended 2L, Minimum L
Shifting Tangent	Recommended L, Minimum 0.5 L

The City of Phoenix 2020 Traffic Barricade Manual (Manual) was prepared as a guide to enhance traffic safety and mobility for the public and to better manage temporary encroachments in the City of Phoenix (City) right of way. It is intended to help:

- Expedite construction projects while keeping workers and the public safe
- Minimize inconvenience and interference to the public, and
- Provide accessible temporary facilities for all users

The primary reason streets exist is to provide safe and efficient mobility. Therefore, streets shall remain unrestricted and functional as much as practical.

This 10th edition of the Manual augments and complements the Manual on Uniform Traffic Control Devices (MUTCD) and the Arizona Supplement to the MUTCD. The Manual was written to share the field experience and expertise of the City's traffic control inspectors and professional traffic engineers regarding what techniques have proven to work best on busy City streets. This document is consistent with the MUTCD, which specifies in Section 1A.13 that engineers, or those working under the direction of an engineer, may exercise judgment in the applicability, design, operation or installation of a traffic control device. This premise is important since the MUTCD cannot address all of the diverse conditions a practitioner faces in controlling traffic on city streets.

Differences exist between urban streets and higher speed rural highways due to characteristics unique to these facilities. Although urban engineers deal with many of the same design and traffic control issues that rural engineers encounter, urban conditions require more consideration of the following:

- Pedestrians, including those with disabilities
- Access demands at driveways and side street intersections
- Bus, light rail, and other forms of public transit
- Bicyclists

The City of Phoenix Traffic Barricade Manual was first published in 1961, with subsequent editions published in 1965, 1970, 1974, 1980, 1989, 1998, 2007, and 2017. To enable the Manual to be practical and helpful to the user, the City of Phoenix may periodically update portions of the Manual using instructional addenda. This edition of the Traffic Barricade Manual will be effective at the time of City Council adoption, superseding all previous versions.

The primary goal of the Manual is to provide guidance for implementing the most effective temporary traffic control practices and techniques for the City's urban public streets. This goal was achieved through various input received from staff, professional organizations, other City departments, utility companies, contractors and other users. The City expresses its appreciation to all those who contributed valuable input toward completion of this Manual.

The City is particularly appreciative of the general guidance and input provided by the following groups towards the completion of this Manual:

- City of Phoenix Mayor's Commission on Disability Issues
- American Traffic Safety Services Association (ATSSA), Arizona Chapter
- Associated General Contractors of America (AGC), Arizona Chapter
- Various Maricopa County Municipalities

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In 1960, the City of Phoenix recognized the need for an official Manual to provide positive and effective guidance for traffic control in construction and maintenance areas. The City of Phoenix published the first Traffic Barricade Manual[1] in 1961, a full decade before the U.S. Department of Transportation added guidance for work zone traffic control in the MUTCD[2].

Since that time, the City of Phoenix Traffic Barricade Manual (Manual) has become a common reference for urban work zones in Maricopa County and throughout the country. This 10th edition, like previous editions, is published as needed to share new ideas and guidance, while remaining in substantial conformance with the MUTCD.

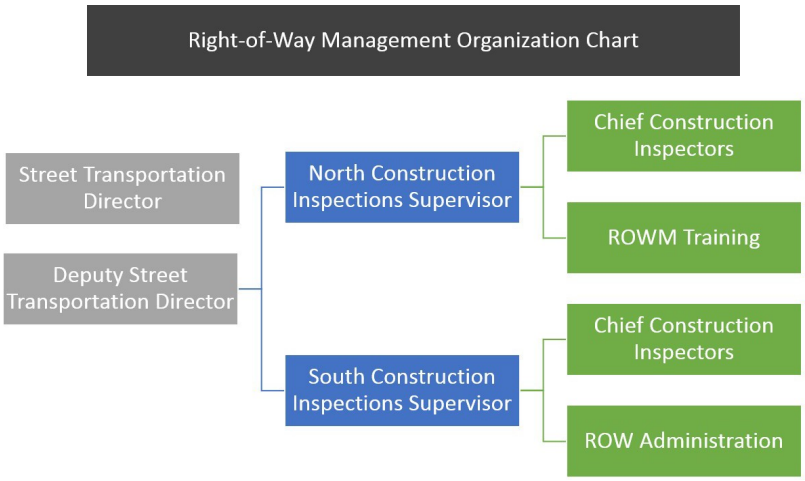
The primary function of street right-of-way (ROW) is to provide safe and efficient movement of people and goods, while its secondary function is to provide access for public utilities. To successfully accommodate both functions, City streets must be built with consideration as to how streets can be improved and/or repaired in a practical and efficient manner. Because the functions of a street are vitally important, essential construction, maintenance, and event activities within City street ROW shall be planned to minimize the disruption of traffic service and maximize access to adjacent land use.

What's New in the 2020 Revised Edition?

This Manual reinforces existing practices and introduces the new or revised procedures for managing ROW more effectively. This Manual includes improved guidance for:

- Removal of subsurface obstructions in the right-of-way.
- Allow use of automated flagging assistance devices (AFAD)
- Remove the use of raised pavement markers for temporary lane marking.
- Allow officers from other police agencies to direct traffic at construction sites.

1. *Phoenix City Code, Section 36-300: Official Traffic Barricade Manual. Contractors, utilities and other agencies are to abide by applicable Phoenix Ordinances when working in public ROW.*
2. *Manual on Uniform Traffic Control Devices, published by the U.S. Department of Transportation, Federal Highway Administration, as modified by the Arizona Supplement (Arizona law).*



Other Features:

Agency Self-Training: Effective management of street ROW can only be sustained by a combined effort of managers, superintendents, foremen, or lead personnel of all agencies that work in the ROW. The Manual has been prepared to help managers properly train their staff to determine which temporary traffic control methods work best on busy urban streets. It is incumbent upon agencies and contractors to familiarize and train those who supervise field crews to ensure that crews are competent with practices contained in both the Manual and the MUTCD.

Requesting Approval of New Devices: Given the constantly changing technology, the City encourages all participants to suggest new practices and products for consideration. However, new devices may not be used in City ROW before approval is granted. Requests for new product approval should be sent to:

City of Phoenix
Street Transportation Department
Attn: ROW Program Administrator
1101 East Jefferson Street
Phoenix, AZ 85034

The City's ROW Program Administrator will evaluate proposed products and respond in writing within 90 days. The submittal must include:

- Federal Highway Administration approval to experiment, including progress reports
- Product to be used, including specifications
- Specific application for the use of the device
- Crashworthiness test information
- Any previous field testing of the device
- Documentation of other jurisdictions that have approved the device

Purpose of the Traffic Barricade Manual

The purpose of the Traffic Barricade Manual (Manual) is to help ensure that during construction, maintenance, and event activities on City streets, reasonably safe conditions are sustained for motorists, bicyclists, pedestrians, transit riders, and workers. This edition of the Manual illustrates proven procedures that work well on different types of urban streets, including Arterial, Collector, and Local streets. Each updated edition is written using the current MUTCD as a base standard, in addition to incorporating local practices that work best on our urban streets.

An additional goal of the Manual is to achieve uniformity in implementing temporary traffic control in work zones or special events and to promote the use of the most effective and least disruptive methodology. The provisions contained in this Manual are substantially in compliance with the MUTCD Section 1A.07 and 1A.08, which reads as follows:

"The responsibility and authority for the design, placement, operation, maintenance, and uniformity of traffic control devices shall rest with the public agency or the official having jurisdiction."

The key prerequisite for optimizing traffic control involves applying techniques described in this Manual, including the use of engineering judgment to tailor traffic control to best fit a given situation. The provisions established herein apply to all persons occupying space designated for transportation and utilities within Phoenix ROW. For events, the provisions apply to the event sponsor or promoter.

Emergencies and incidents overseen by City of Phoenix Police and Fire personnel such as vehicle crashes, hazardous waste emergencies, or other major occurrences often require immediate response without the opportunity to deploy temporary traffic control resources. Nevertheless, even these incidents require the use of effective temporary traffic control strategies including police power, emergency vehicles with flashing lights, manual control of traffic, and/or flaggers. Flares and roll-up emergency signs are also commonly used. The longer the incident duration, the more consideration should be given to using established traffic control techniques, such as those prescribed in this Manual.

Chapter 1

Right-of-Way Management

Improved management of the ROW enhances traffic safety and mobility by minimizing unauthorized and improper street and sidewalk restrictions, and when they occur, minimizing the duration of restrictions. The goal is to achieve high levels of compliance with temporary traffic control rules to ensure that the impact upon the traveling public is minimized without delaying projects.

I. WHAT IS RIGHT-OF-WAY (ROW)?

ROW is land that has been dedicated or purchased for use by the traveling public at large. The land is in trust and is to be used for the public good rather than private gain. The Street Transportation Department is the administrating custodian of the City of Phoenix ROW and is charged with the responsibility of making sure it is operated in a manner that optimizes its safe use for the public. The Phoenix Police Department has authority over the ROW during emergencies.

II. WHY ARE RIGHT-OF-WAY MANAGEMENT PROCEDURES NECESSARY?

Management of the ROW is essential. When compliance with the Manual requirements decline, more violations of the Manual usually result, causing projects delays, higher costs, inconvenience, and potential impacts to the health, safety, and welfare of our citizens and visitors. Although the Manual is thorough in depicting when and how to restrict the ROW, an effective enforcement strategy has been utilized to gain compliance and to protect public safety.

Since September 2004, the City has used the Temporary Restriction and Closure System (TRACS) process to reserve space in the ROW and to coordinate work and events to minimize disruptions.

This emphasis on better management of the ROW for everybody's benefit was unanimously approved by City Council on April 16, 2004 and added to City Code as Article XV on September 1, 2004. Under this Council-approved policy, the cost to secure a TRACS permit remains free of charge.

III. COMPONENTS OF ROW MANAGEMENT

The five key components of ROW Management are:

1. ***Certification/ Training*** – Companies wanting to set and/or remove temporary traffic control must learn proper procedures by attending a training program to become certified.
2. ***Permitting Right-of-Way*** – ROW Management issues and manages TRACS permits for all persons requesting use of City of Phoenix ROW.
3. ***Penalties for Non-performance (Civil Sanctions)*** – Phoenix City Code provides the ROW Management section the ability to issue civil sanctions for non-compliance with the Manual.
4. ***Parking Meter Hooding Fees*** – Hooding fees are assessed to compensate the City for lost revenue while meters are not available for public use due to construction and/or events.
5. ***Authority to Impound Improper Devices*** – The City may remove/store unauthorized, abandoned, or improper traffic control devices.

IV. CERTIFICATION

Agencies or companies requesting to set up and/or take down traffic control devices **must** obtain **certification** from the City Traffic Engineer every year and complete training through the City every two years (per Phoenix City Code 31-201 and 31-202). There are two types of certification, both requiring a training class offered by the City:

Blanket Certification: The City of Phoenix "Blanket Certification" is required for any agency or company to set **AND** remove signs and barricades in the ROW. The certification fee is $750 annually per agency or company. Blanket Certification also requires the successful completion of the American Traffic Safety Services Association (ATSSA) Certification at the Supervisory Level, or equivalent training as approved by the Phoenix ROW Management Program Administrator. To complete this three-part ATSSA Certification, contact ATSSA at 1-800-272-8772.

City Code: 31-201 Temporary traffic control device installation and removal certification: Any party wishing to install and remove temporary traffic control devices within the public ROW shall obtain a certification issued by the City Manager's designee to engage in such activities. The City Manager's designee may, in their sole discretion, issue a certification upon the applicant's satisfactory completion and annual submission of the following:

A. A fully completed application.

B. An application fee in the amount of seven hundred fifty dollars ($750). The application fee entitles the certificate holder to attend the City's training program at no additional cost, and in addition as space is available, to allow the attendance of the certificate holder's personnel at no additional cost.

C. Proof of insurance or an acceptable program of self-insurance for bodily injury and property damage liability in an amount required by the City Finance Department, Risk Management Division. All such insurance shall name the City as an additional insured and shall be maintained throughout the term of certification.

D. A certificate from the American Traffic Safety Services Association at the "Supervisory Level" or equivalent as determined by the City Manager's designee in their sole discretion.

E. An agreement to protect, indemnify, defend, and hold harmless the City for a claim for damage to a person or property that may be brought against the City because of applicant's activity conducted under the certification.

F. Proof of successful completion within the two years immediately preceding the application date or within one year of the application date of the ROW Management training program established and administered by the City Manager's designee related to the Traffic Barricade Manual and temporary traffic control devices.

Take-Down Certification: "Take-Down Certification" is available for any agency or company that **ONLY** wants to remove signs and barricades from the ROW (not set them up). At times, authority to simply remove signs/barricades is desirable because it can be done immediately following work shut down and save service calls by barricade attendant services. Take-Down Certification is required every two years with annual certification fee of$250/year.

City Code: 31-202 Temporary traffic control device removal only certification: Any party wishing to remove temporary traffic control devices within the public ROW shall obtain a certification issued by the City Manager to engage in such activities. The City Manager may, in their sole discretion, issue a certification upon the applicant's satisfactory completion and submission of the following:

A. A fully completed application.

B. An application fee in the amount of two hundred fifty dollars ($250). The application fee entitles the certificate holder to attend the City's training program at no additional cost, and in addition as space is available, to allow the attendance of the certificate holder's personnel at no additional cost.

C. Proof of insurance or an acceptable program of self-insurance for bodily injury and property damage liability in an amount required by the City Finance Department, Risk Management Division. All such insurance shall name the City as an additional insured and shall be maintained throughout the term of the certification.

D. An agreement to protect, indemnify, defend, and hold harmless the City for a claim for damage to a person or property that may be brought against the City because of applicant's activity conducted under the certification.

E. Proof of successful completion within the two years immediately preceding the application date or within one year of the application date of the right-of-way management training program established and administered by the City Manager's designee related to the Traffic Barricade Manual and temporary traffic control devices.

To register for training, call the ROW Management Office at 602-534-5369. **Certifications SHALL be renewed every year.**

Phoenix City Code authorizes taking measures necessary to preserve and protect use of the public ROW. This includes issuing civil sanctions for violating the Manual or stipulations of the TRACS Permit. The civil sanctions for violations are shown in *Table 5*.

When serious violations of the TRACS permit occur, as determined by the Right of Way Management Program staff, additional penalties may be authorized beyond the base civil sanctions including:

- Suspension of the TRACS permit up to five business days.
- Doubling of sanctions up to **$2,500/day** for continuing violations. Sanctions may double for each consecutive day a violation is observed up to a maximum of $2500. Pursuant to the violation in the penalty table. Continuing means the same violation observed on the next consecutive day in the same location by the same contractor.

Repetitive sanctions: Each calendar day may be considered as a separate violation.

Impound of devices: ROW is not generally appropriate for storing devices and certainly unwarranted devices should not be left "active." If devices are improperly located as to present a hazard, or if device owners ignore requests to pick up devices in a timely manner, the ROW Management staff may exercise its right to impound such devices. If the devices are impounded and stored by the City, the owner of the devices may only be allowed to retrieve such devices from the City storage facilities following payment of a fee. The City may assess a fee to the owner to recuperate its cost for retrieving and storing the devices.

Table 5 – Summary of Violations and Penalties

(PCC 31-204, adopted 10/21/2009)

Violation	Description	Civil Sanction
1	Any party's act, error, or omission within the right-of-way that creates an imminent risk of death or injury	$1,500
2	Any party that restricts the right-of-way without proper certification or a right-of-way use permit	$1,000
3	Any party that restricts the right-of-way during peak traffic hours without proper authorization, as such peak traffic hours and authorization are described in the Traffic Barricade Manual	$1,000
4	Any party that fails to correct or cure a violation of the Traffic Barricade Manual within the time period stated on the notice of violation	$1,000
5	Any party that restricts the right-of-way at an intersection with traffic signals and such party does not engage in any activity for a period of one continuous hour	$1,000
6	Any party that improperly closes a sidewalk or closes a sidewalk without proper certification or a right-of-way use permit	$500
7	Any holder of a right-of-way use permit that fails to comply with the conditions, restrictions, limits, times, or location of the right-of-way use permit	$500
8	Any party that fails to install advance warning signs or fails to install advance warning signs that comply with the Traffic Barricade Manual	$500
9	Any party that fails to install traffic barricades or channelizing devices or fails to install traffic barricades or channelizing devices that comply with the Traffic Barricade Manual	$500
10	Any party that fails to remove an advance warning sign leaving the sign facing traffic after the traffic restriction has been removed	$250
11	Any holder of a right-of-way use permit that fails to remove traffic control devices from right-of-way within twenty-four hours after right-of-way use permit expires	$250
12	Any party that fails to install and maintain traffic control devices as described in chapter eight of the Traffic Barricade Manual	$250
13	Any party that renders a bus stop inaccessible without relocating it or taking other actions that maintain access	$250

Chapter 2

TRACS Permits

Streets and sidewalks are important public assets and can only be taken out of service when deemed appropriate by the City. Individuals, companies or agencies needing to use the ROW temporarily are required to secure a Temporary Restrictions and Closures (TRACS) Permit, which will authorize them to restrict the City's ROW. The permit process enables the City to:

- **Ensure** the ROW is reserved (except emergencies) for the permitted party's sole use and take that loss of functionality into consideration when assessing other nearby permit requests.
- **Provide** appropriate advance notification to others who may be adversely affected by the TRACS restrictions.
- **Monitor** the quality ofall temporary ROW restrictions and identify any improvements needed for safety and operations.

The TRACS permit system was designed so that:

- Permits can be requested and approved electronically, contingent upon the applicant complying with ALL provisions of the Manual and any other special requirements that may apply.
- Local Street and short-duration (less than one hour) restrictions during non-peak hours are typically exempt from the TRACS permitting process. Some projects on Local Streets may require a TRACS permit at the discretion of the Construction Inspections Supervisor, such as when a partial closure may impose an undue hardship on a neighborhood, school, or public facility such as a fire station. Other exceptions include complete closures, downtown restrictions and other rare circumstances. Additionally, a TRACS permit may be required when prior poor performance by a company or agency indicates a need for special oversight.

I. WHO NEEDS A TRACS PERMIT?

All persons, contractors, utility companies, event promoters, and other agencies, including City Departments, ***shall*** obtain a TRACS permit if they are restricting access (partial or complete closures) on all public Arterial (Major) or Collector streets. TRACS permits are also required for complete closures of Local streets, sidewalks, bike lanes and alleys, except as noted earlier in this chapter. The ROW Inspector may require a TRACS permit for a complete closure of a residential alley. The permit authorizes the restriction of the street, sidewalk, or any part of the ROW, but does not completely guarantee the requester exclusive rights to occupy a particular portion of the ROW. Weather, emergencies, incidents, or other projects and special events may require temporary restriction or suspension of activities; however, the City will make every effort to coordinate activities and reserve the space for permitted activities.

Requests for TRACS permits shall conform to regulations outlined in this Manual, as well as in the "Special Traffic Regulations" or "Downtown District Special Provisions" listed in the City Project Specifications or Permit. Deviation (other than emergencies) from those regulations shall have the prior approval of the Right-of Way Management Construction Inspections Supervisor.

The City reserves the right to require a TRACS permit for any planned work or event in the ROW.

II. HOW TO OBTAIN A TRACS PERMIT

In most cases, TRACS permits should be obtained through the following representatives in lieu of going directly through the Right-of-Way Management Office:

Special Events – The assigned Event Coordinator

Valet – The adjacent Property Owner or other Requestor

City Projects – The assigned City Inspector

County Projects – The County Project Supervisor

ADOT Projects – The ADOT Resident Engineer

Permits for projects not listed in the categories above may be obtained by contacting the Right-of-Way Management office at (602) 262-6235; Fax: (602) 256-3154; E-Mail: RMP@Phoenix.gov.

Figure 1 illustrates the TRACS application to obtain a TRACS permit.

Figure 1 – Sample TRACS Application

TRACS Permit Application
CONTRACTOR CONSTRUCTION

USE TAB TO FILL OUT FORM

48-Hours Advance Notice Required for Partial Closures & 72-Hours For Full Closures
Right-of-Way Closure Line: (602) 262-6235 Fax: (602) 256- 3154◊ email: rmp@phoenix.gov

Start Date: **End Date:**	**What street is this restriction on?**
From Street:	**To Street:**
COP PDD Civil Permit numbers:	
COP Department project/ permit numbers:	**Previous TRACS permit :**
Will the work site go through a signalized intersection? Yes ☐ **Will traffic signal operations need to be modified?** Yes ☐ **Will there be signal timing changes for this restriction?** Yes ☐ **72 –hour notification needed/Requested by city inspector only**	**Is this restriction on the LightRail track?** Yes 7☐ **feet from center of the track?** Yes ☐ **3 feet from the guideway curbing?** Yes ☐ **10 feet from the overhead wire** Yes ☐ **Working over the overhead wire?** Yes ☐ **Boring underneath the guideway?** Yes ☐
Will Police be on site for this project? Yes **Will there be a Speed Reduction for this project?** Yes ☐ **HOTLINE NUMBER:** ☐	**Contact LRT first before proceeding 602-652-5060**
GOVERNMENT CONTACT OVERSEEING PROJECT/ JOBSITE (if applicable) **Submit TRACS applications to the ASSIGNED CITY INSPECTOR/ PROJECT MANAGER/**	
City Contact/ Inspector & Phone:	**Email:**
GENERAL CONTRACTOR / GOVERNMENT AGENCY INFORMATION: **Company/Organization/ Government Agency hiring Contractor to do work**	
General Contractor/ Government Agency:	
Contact & Phone:	**Email:**
COMPANY CONTACT INFORMATION (Company/ Contractor performing/ working/ encroaching ROW)	
Sub-Contractor/ Company performing work:	
Contact & phone:	**Email:**
CERTIFIED BARRICADE COMPANY :	
EMERGENCY ACCESS MAINTAINED? Yes No --- If street is completely closed, can ER vehicles drive through?	
BARRICADE HOURS FOR TRACS PERMIT – What time are the barricades being setup and taken down daily? *Note: 24-hour setup only setup time on first day of restriction and takedown time on last day of restriction.*	
Mon-Fri Daytime Hours:	**Weekend Hours:** **Nighttime Hours:**
Work Type for this project:	
STREET RESTRICTIONS: Review TRACS Abbreviations for clarification on what is restricted for this permit. ***(include directions restricted, bus stops, edge lines, shoulder work, bike lanes, left & right turn lanes & LRT slip lanes)***	
Will restriction be setup 24 hours through duration of this permit? Yes ☐ No ☐	**Bike Lanes restricted?** Yes Direction : **NB EB SB WB** **Bus Bay relocation?** Yes ☐ Where: ☐ ☐ ☐ ☐
Lanes Restricted:	
Lanes Maintained:	
Misc Info:	
SIDEWALK RESTRICTIONS: *(include detailed info on pedestrian detour route including any crosswalk restrictions)*	
Will restriction be setup 24 hours through duration of this permit? Yes No	**Side of street that the sidewalk is being restricted: N E S W** **Crosswalks restricted?** Yes Which side? : **N E S W** **How many crosswalk legs are maintained?** ☐ ☐ ☐ ☐
Pedestrian Access maintained on same side of street with 36" ADA accessible path on all pedestrian walkways: **In Street:** ☐ **Explain:** **Out of Street:** ☐ **Explain:**	
Sidewalk Closed: **Explain Ped Detour Route:**	
DOWNTOWN PHOENX PARKING METERS: *(Parking Meters are requested M-F 6am or 2pm only)* Excluding City Holidays	
What is the reservation for parking meters for?	
Meter Hooding Date:	**Meter Hooding Time:** 6:00 a.m. 2:00 p.m.
Meter Unhooding Date:	**Meter Unhooding Time:** 6:00 a.m. ☐ 2:00 p.m. ☐
Meters to Hood: *(must provide meter numbers):*	☐ ☐
Hood Color: *Yellow Hoods*: Commercial Vehicle Parking Only: ☐	***Red Hoods*:** No Parking: ☐

III. REGULATIONS THAT GOVERN TRACS PERMITTING

TRACS permits require up to five different types of regulations:

A. Advance Notice Regulations

B. Nighttime Regulations

C. Citywide General Regulations

D. Downtown Special Regulations

E. Contractual Special Regulations

Advance notice is required for partial- or full-street ROW closures to notify persons and businesses that might be adversely affected. This also allows the Permit Holder ample time to coordinate activities surrounding the closure in a manner that would result in the least impact. Additionally, citywide requirements also apply, including special requirements for work performed in the downtown area. Lastly, special regulations may be imposed as a special condition for the issuance of the TRACS permit (stipulations).

A. Advance Notice Regulations

Providing advance notice of restricting public ROW is not just a courtesy, but is required to enable effective notification of transit, emergency personnel, and others affected. Permits will NOT be issued without the minimum required advance notice, except under emergency conditions. Emergency repair work requires urgent action, which eliminates the opportunity to comply with advance notice requirements.

Even in emergencies, it is imperative that the street or sidewalk restriction be called in to ROW Management Program staff as soon as practical.

Call (602) 262-6235 in case of emergency to report street or sidewalk closures:

Business hours: 6:30 a.m. to 3:30 p.m.

Non-business hours: Nights and Weekends

The minimum advance notice to ROW Management is contingent upon the classification of the street(s) and the type of restriction or closure. The following advance notification requirements provide the number of hours or days (excluding holidays and weekends) of advance notice needed. This advance notice can be completed with a TRACS permit application or by conducting a pre-construction meeting with ROW Management staff:

Table 6 – Minimum Advance Notice for Restrictions/Closures

Type of Facility	Notice to ROW Management Staff
Full closure of an Arterial or Collector street	10 days
Partial closure of an Arterial or Collector street	48 hours
Work affecting traffic near a traffic signal	48 hours
Work affecting bus/transit/rail stops	48 hours
Work affecting residential alleys*	72 hours
Work affecting commercial alleys	
Outside of Downtown*	24 hours
Downtown	48 hours

**Does not require TRACS permit application. Requires advance notice to Public Works.*

Work that will be performed near a traffic signal must be coordinated with the City's Traffic Signal Shop. Activities conducted adjacent to a transit stop should be coordinated with Valley Metro Bus or Rail, while work in the alleys must be coordinated with the City of Phoenix Public Works Department - Solid Waste Division. Provided below are telephone numbers for the entities identified above:

Signal Shop	(602) 262-6021
Transit Stops	(602) 464-5741
Solid Waste	(602) 262-7251
Valley Metro Rail	(602) 253-5000

Applicants seeking a permit for commercial alley closures will be required to coordinate with tenants adjacent to the alley prior to applying for the permit. The agencies identified above should always be contacted to determine whether or not the proposed work activity would adversely impact their facilities or activities prior to seeking a TRACS permit.

The ROW Management Program staff reserves the right to deny TRACS permits at any time, if in its judgment such traffic restrictions could result in an unwarranted or intolerable congestion/delays, major public inconvenience, or safety concerns. Work restricting traffic downtown, or on other high-volume Arterial streets is usually permitted during nights and weekends, as long as the work does not adversely impact other events and work activities.

B. Nighttime Regulations

To minimize disruption to traffic, crews may be requested to work at night during off-peak hours. In this case, an after-hours permit may be required to authorize work in residential areas. Permits may be granted for up to 30 days for hours including nights, weekends, and holidays and are issued under Phoenix City Code 23-14 for building and roadway construction by the Planning and Development and Street Transportation departments, respectively. The purpose of the permits is to authorize work yet minimize loud and disturbing noises in residential areas due to construction or maintenance activities.

C. Citywide Regulations

Except during emergencies when pre-approved in the contract or by the ROW Management Program office, 10 general traffic regulations apply during traffic restrictions:

1. Traffic restrictions ***are not*** permitted on Arterial/Collector streets during peak traffic hours (***6:00 a.m. to 8:30 a.m. and 4:00 p.m. to 6:30 p.m.*** weekdays).
2. **Minimum number of travel lanes** to be open to through traffic:
   a. If more than four lanes exist ..... Two will be open each way;
   b. If four or less lanes exist ..... One will be open each way
   c. On one-way streets..... Two lanes open
3. **Special requirements for work near signals:** Construction near signalized intersections will have greater impact on traffic congestion; therefore, special consideration is needed. It is imperative that restrictions within 300 feet of traffic signals be minimized, including limiting their duration. At multi-lane signals, restrictions often require that a left-turn lane be converted to a through lane to add through traffic capacity. Travel lane closures are normally allowed only during off-peak hours. Whenever traffic in any one direction at a multi-lane signalized intersection is restricted to only one through lane, the Permit Holder shall provide a uniformed Police Officer to Manually allocate available "green time" unless otherwise approved by City staff (See Chapter 5, Section 2 for more information).
4. **Quality requirements for traffic lanes:** Travel lanes (vehicular or bike) **shall** be considered "satisfactory" when paved with hot- or cold-mix asphalt. Where existing pavement is removed temporarily, a travel lane is not be considered "satisfactory" for through traffic unless graded reasonably smooth and maintained with approved, dust-free measures.
5. **Local access requirements:** Local access shall be maintained to all properties on all streets (Arterial, Collector, and Local) at all possible times. When local access cannot be maintained, it is the responsibility of the Permit Holder to notify the affected property owners, residents, or tenants a minimum of ***72 hours*** in advance. The reasons for the closures and alternate access accommodations shall be communicated to all affected property owners or tenants. Full, unimpeded access should be restored as soon as practical.
6. **Special access requirements for public facilities:** Fire stations, police stations, hospitals, transit facilities, and schools shall be maintained at all times. When access restrictions are necessary, the Permit Holder shall coordinate such access restrictions with the responsible person in charge of the affected facility.
7. **Special pedestrian accommodations:** Access to sidewalks (paved or unpaved), marked and unmarked crosswalks (especially school crosswalks), and bus stops shall be maintained open in a safe, usable condition as detailed in Chapter 3 of this ***Manual***, and/or in the **2010 ADA Standards for Accessible Design**. In the rare event when their function cannot be retained, ***it is the responsibility of the applicant*** to first prove that closure is necessary, and secondly, to locate a safe and reasonable alternative walkway that is fully accessible to a sight-impaired person or pedestrian in a wheelchair. Generally, this requires the Permit Holder to prepare and maintain a detour route before the day of the restriction to provide clean, safe, and accessible conditions for the duration of the work.

8. **Requirements to coordinate with special events:** Extensive coordination efforts are required for major events (e.g., parades, marathons, Fabulous Phoenix 4th of July) when they conflict with construction and maintenance activities.
9. **Requirements during holiday season:** During the time between the Friday after Thanksgiving through January 1, construction/maintenance activities are minimized on Arterial and Collector Streets to reduce traffic congestion near large retail shopping centers citywide. Traffic restrictions that would interfere with traffic flow near retail shopping areas and on high-volume streets are normally denied, but when crucial, ROW Management Program staff can pre-approve restrictions. Those requesting permits are encouraged to plan around this time period, since restrictions will rarely be approved.
10. **Removal of subsurface obstruction in the ROW:** Guidance on obstructions within the ROW is warranted due to the the increasing number of vertical (high rise) developments. Generally, all tower crane and/or similar foundations shall be located outside of the ROW, unless approved by the City with a Revocable Permit. Upon project completion the subsurface obstructions shall be removed to a depth of 20 feet below grade.

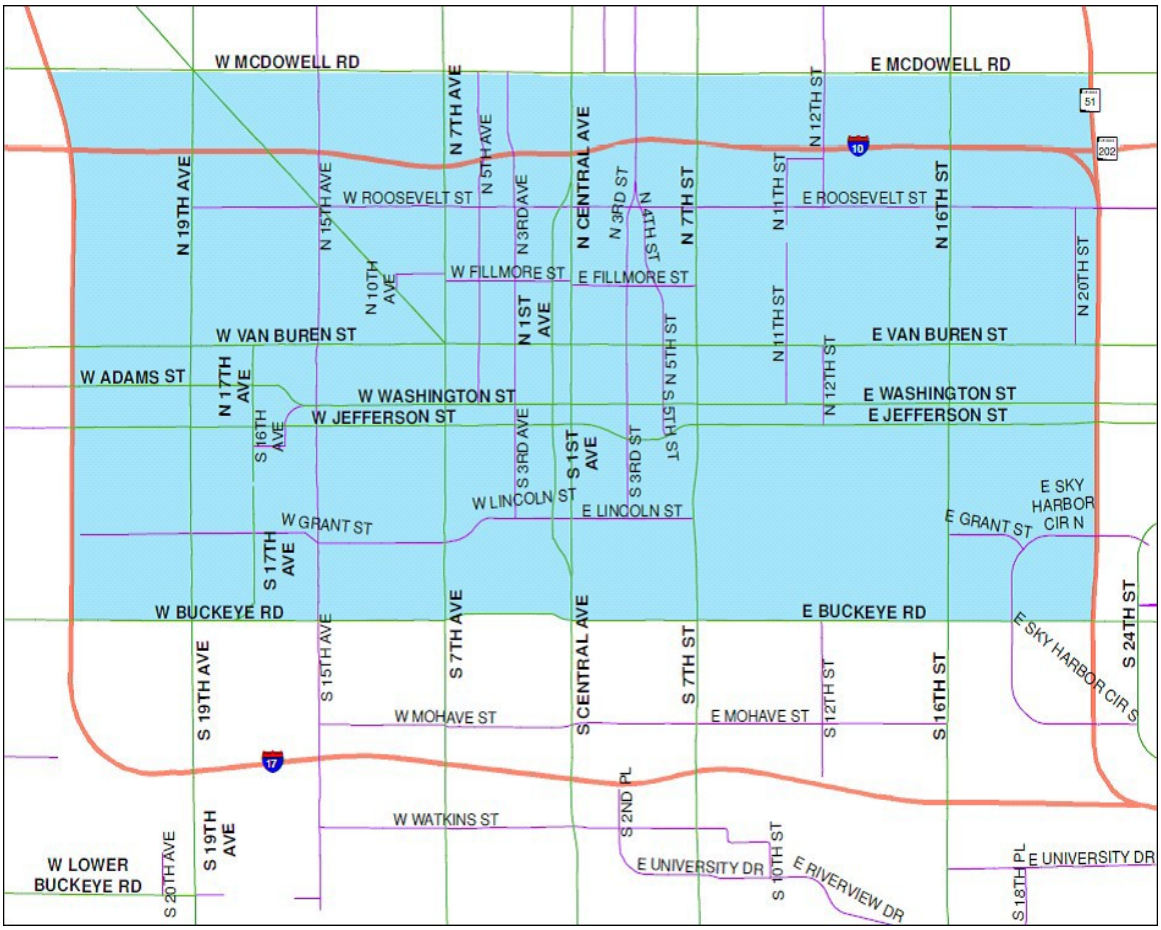
Coordination with other Permit Holders ***must*** occur between projects to ensure compatibility of temporary traffic control systems and avoid duplicate signing.

D. Special Downtown Requirements

Given the growing amount of development and special events occurring in Downtown Phoenix, unique additional protective requirements apply to ensure coordination with businesses, residents, events, and other projects.

The City of Phoenix Downtown District area is bounded by Buckeye Road to the south; McDowell Road to the north; Black Canyon Freeway (I-17) to the west; and Papago Freeway (I-10) to the east. The map in *Figure 2* illustrates the general limits of the Downtown District.

Figure 2 – Downtown Right of Way Management Area Map



Except during emergencies or when provided for in the "General Traffic Regulations" or given prior approval from the Street Transportation ROW Management Program Section, the following minimum traffic control requirements shall prevail for all traffic restrictions in the Downtown District:

- Traffic restrictions are not permitted on Arterial or Collector streets during the morning peak hour and ending sooner during the evening peak hours (6:00 a.m. to 8:30 a.m. and 4:00 p.m. to 6:30 p.m.).
- All street closures in Downtown Phoenix **require** TRACS permits.
- A minimum of forty-eight (48) hours' notice is required for partial closure of commercial alleys in the Downtown District. These facilities provide critical services to the adjacent land uses. Eliminating access may cause major disruption to critical downtown business activities. Prior to the restriction, the applicant shall coordinate with adjacent tenants. Suitable arrangements for alley service shall be made and coordinated with the Downtown Phoenix Partner- ship at 602-254-8696 and the Downtown Police Unit at 602-534-6432.
- A minimum of 72-hours' notice is required for complete closure of a commercial alley.

E. Contractual Special Regulations

Other special regulations may apply when imposed either through the contract or as part of the TRACS process.

IV. TEMPORARY TRAFFIC CONTROL PLANS: WHEN ARE THEY REQUIRED?

Good, effective traffic control requires complete and careful planning. Prepared ahead of time, Traffic Control Plans (TCPs) can make construction, maintenance, and special events more efficient and safer. A TCP may be required depending on the complexity of the temporary traffic control needed, the type of restriction requested, the type of traffic that exists, and the overall impact on adjacent land use.

On most minor projects, the typical illustrations contained in this Manual can be applied and constitute a pre-approved TCP. Special Traffic Regulations or Provisions may be incorporated into bid documents that enable contractors, and often times, City crews, to develop alternative TCPs that may be used, but only if the responsible agency determines the alternative TCP will result in at least as good of a result as those provided in the project plans or specifications. For maintenance/minor utility projects not requiring bidding, it is important that sufficient planning be given to selecting the best temporary traffic control system needed before occupying the temporary traffic control work zone. Additionally, when several work zone activities exist near each other, it is essential that advance co- ordination efforts take place between ALL projects to ensure that duplicate signing is not used and to ensure compatibility of temporary traffic control systems between projects.

The purpose of a *TCP* is to encourage proper planning as to the time of day, sequence of construction, degree of restriction required, and temporary traffic control needed. Well-thought- out advance planning can provide not only efficient and safe results, but also minimize impacts to traffic levels of service, provide access, and maintain mobility for all modes of travel.

TCPs may range in complexity from use of typical illustrations depicted in this Manual to a detailed site plan showing signing, striping, barricading, detours, pedestrian walkways, bike lanes, construction fences, and project phasing. In all cases, the required TCP needs to satisfactorily and responsibly address requirements of this Manual. For large or unusual projects, advance consultation and review during the planning/design phase is ***strongly encouraged*** to avoid delays. Pre-consultation also ensures that projects become a truly cooperative and partnered effort between those working in the ROW and those traveling in the ROW.

A TCP is usually required for long-term or complex projects such as detours and channelization for bridge construction, street restrictions for building construction walkways and fences, major utility construction, special events, and arterial street closures.

TCPs may be required for other projects and permits, as needed, at the discretion of the Project Inspector, ROW Management Program, and/or other City department officials.

Due to the nature of traffic operations along frontage roads and at or near freeway traffic interchanges, a TCP should be prepared for traffic restrictions on those facilities. **A permit from the Arizona Department of Transportation is typically required.**

V. HOW DO I OBTAIN A HAUL PERMIT?

A Haul Plan and Permit may be required under Chapter 36 of the Phoenix City Code to move large quantities of fill material (greater than 10,000 cubic yards, or if haul exceeds 20 days in length). Below is a checklist developed by the Planning and Development Department to guide contractors on this process.

A. Haul Plan Checklist

Figure 3 – Sample Haul Plan Checklist

City of Phoenix
PLANNING & DEVELOPMENT DEPARTMENT

Haul Plan
Checklist

KIVA #: _____ **Project Name:** _____

Reviewed By: _____ **Phone:** _____ **Date:** _____

Engineer: _____ **Phone:** _____

The purpose of this checklist is to offer comments on plan design for haul plans required for all hauls over 10,000 cubic yards and to set the minimum submittal requirements for Haul plans. The source of the Haul plan design policy is City Code Chapter 36.

This checklist serves to minimize redline comments on the check prints and to maintain consistency among plan reviewers on plans for hauls in excess of 10,000 cubic yards. Plan approval, issuing permits, and certain grading clearances depend on compliance with the comments made on the check prints and this checklist. The designer of record shall satisfy themselves of the completeness and accuracy of the design.

A completed checklist must be attached to the Haul plans when submitted for first review. The following Certification Statement must be signed by the Designer of record certifying that all applicable requirements on this checklist have been met.

CERTIFICATION

I CERTIFY THAT THE REFERENCED PLANS COMPLY WITH ALL APPLICABLE CITY ORDINANCES AND STANDARDS, INCLUDING FEDERAL, STATE AND COUNTY REQUIREMENTS AND REGULATIONS. IN ADDITION, I CERTIFY THAT THIS CHECKLIST HAS BEEN COMPLETED ENSURING ALL ITEMS LISTED ARE PROPERLY ADDRESSED. I UNDERSTAND THAT IF I FAIL TO ADDRESS ALL APPLICABLE ITEMS IN THIS CHECKLIST, THE PLANS MAY BE IMMEDIATELY RETURNED TO ME WITHOUT ANY FORMAL REVIEW BEING PERFORMED.

Designer's Name: _____

Designer's Signature: _____ **Date:** _____

Please complete and return this checklist and the check prints with each submittal. Discussion of redline comments on plans or this checklist should be directed to the plan reviewer listed above.

Engineer of record **(DES)** must fill out all boxes in the first column as either [√] (Addressed) or [N/A] (Not Applicable).

Civil plan reviewer **(RVW)** shall check the second column as [X] (Required) when requirements have not been properly addressed.

REQUIRED SUBMITTALS

DES	RVW	
☐	☐	Plan sheets shall be 24" X 36"; submit five (5) sets of Haul plans and a completed and signed Grading and Drainage Plan Checklist.

This publication can be made available in alternate formats (Braille, large print or digital media) upon request. Contact Planning & Development at (602) 262-7811 voice or (602) 534-5500 TTY.

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WEB/dsd_trt_pdf_00049

TRT/DOC/00049
126-63D Rev. 6/13

City of Phoenix Planning & Development Department
Haul Plan, Checklist – Page 2 of 4 TRT/DOC/00049

GENERAL REQUIREMENTS

A haul plan and permit are required if 10,000 cubic yards or more of material is moved or if haul exceeds 20 days in length.

DES RVW

☐ ☐ Provide a vicinity map.

☐ ☐ Property the owner's name, address and phone number (for both source and disposal sites.)

☐ ☐ Provide the contractor's name, address and phone number.

☐ ☐ Provide a north arrow and bar scale; scale shall not be smaller than 1" - 40'.

☐ ☐ Provide the address of the source and disposal sites. In the event of more than one source or disposal site request, a separate Haul Plan for each site will be required. Each disposal site requires a separate Grading and Drainage Plan and Permit.

☐ ☐ Provide a legend identifying grades or symbols.

☐ ☐ Provide dates and hours haul operations will begin and end.

☐ ☐ Provide the amount of haul in cubic yards.

☐ ☐ Provide approval lines as follows:

_____ _____
Right-Of-Way Manager **Date**

☐ ☐ Upon reviewer's request, provide original and five (5) blue line prints to the City "for signature."

GENERAL NOTES:

☐ ☐ A Haul Permit is required under Chapter 36 of the Phoenix City Code.

☐ ☐ Haul Permits must be obtained prior to or concurrently with the Grading and Drainage Permit.

☐ ☐ Excavating Contractor must give location for wasting excess excavation and a letter from the owner giving permission for dumping. The dumping site will require a Grading and Drainage Permit. If a City of Phoenix landfill is to be utilized, dependent on the landfill to be used, a per ton rate will be assessed. Information/permits can be obtained through Solid Waste Management, telephone (602) 262-7251.

☐ ☐ Street Transportation Right-Of-Way Management Section shall be notified 48 hours before any hauling begins. Contact the Right-Of-Way Management Section at (602) 262-6235.

☐ ☐ An approved Haul Plan shall be on the job site at all times. Deviations from the plan must be preceded by an approved plan revision.

☐ ☐ Traffic control measures shown shall conform to the latest edition of the City of Phoenix Barricade Manual and the Arizona Supplement to the Manual on Uniform Traffic Control Devices 2009 Edition..

☐ ☐ The City of Phoenix Police Department enforces laws regulating the operation of commercial vehicles. This includes enforcement of federal, state, county, and local laws and ordinances. Questions regarding Commercial Vehicle Enforcement may be directed to the Commercial Vehicle Enforcement Supervisor at (602) 495-7813 (Traffic Bureau South) or (602) 495-6784 (Traffic Bureau North).

☐ ☐ Streets and sidewalk sweeping will be utilized as necessary to ensure that streets and sidewalks will be kept clean and safe, as directed by the Planning & Development and/or Street Transportation inspector.

☐ ☐ Periodic and final inspections will identify if the need for street repairs are required. Any damage determined to be the result of the haul will be paid by the contractor.

DES RVW

☐ ☐ Contractor shall submit a weekly report to the Street Transportation Department Right-Of-Way

City of Phoenix Planning & Development Department
Haul Plan, Checklist – Page 3 of 4 TRT/DOC/00049

Management listing all complaints including the name, address, phone number of the complainant, time and date the complaint was received and what action was taken to mitigate the complaint.

☐ ☐ Contractor is responsible to resolve all complaints. If complaints are unresolved, the contractor may be required to revise the Haul Plan or the permit may be revoked as directed by Street Transportation Right-Of-Way Manager.

☐ ☐ Tracking onto city streets is prohibited and shall be prevented. Contractor shall provide an ABC all weather surface at the point trucks exit the sites. If the ABC is not adequate in the opinion of the approval agents, AC will be installed with a tire wash area as required. The truck's tires will be washed clean prior to entering City streets. Tire wash area shall be drained, flushed, and re-filled as required to prevent tracking dirt onto City streets.

☐ ☐ Water trucks shall be provided to prevent dust on job and all trucks shall have tarps to prevent blowing dust from trucks. Sweeper shall be provided as per City of Phoenix request or as deemed necessary.

☐ ☐ Trucks will be checked for excess dirt on trailers and/or side-boards and cleaned before leaving the job site so as to prevent spilling dirt on streets.

Traffic Control Details to be Shown on Plan

☐ ☐ Show the access to the site.

☐ ☐ Provide the days and hours of operation.

☐ ☐ Night hauls require special submittal and approval. City Code Sections 23-14(h) and (i) authorize issuance of permits for extended construction work hours beyond 6:00 p.m., if certain conditions are met. The Planning & Development Department issues private development permits.

☐ ☐ Provide the number of trucks to be used.

☐ ☐ Provide the frequency of trucks entering and leaving the site.

☐ ☐ Show the primary and alternate haul routes to be used to and from the source and disposal sites.

☐ ☐ Show traffic control measures utilized including police officers, flagmen, signs, barricades, detours, etc.

☐ ☐ Provide a written plan of action detailing methods the contractor will use to prevent tracking dirt onto City streets. Including, but not limited to:

DES RVW

☐ ☐ A minimum of 300 feet of temporary asphalt installed and maintained clean at each access point to City streets.

☐ ☐ Provide continuous clean-up of all streets used for hauling.

☐ ☐ Inspect and repair street damage on the route caused by the haul.

☐ ☐ Methods, other than tire washing, that the contractor proposes to use to prevent tracking.

ADDITIONAL INFORMATION

☐ ☐ Payment of a $500.00 cash bond is required per Ordinance G-2817. The bond is required to secure the cost of the removal of any spillage in the City Right-of-Way. The bond will be returned after project acceptance upon the recommendation of the inspector.

☐ ☐ Permit fees are required per Ordinance G-2817 and will be based on the amount of material to be hauled.

☐ ☐ A portion of the haul route for this development is within STATE, COUNTY, or OTHER CITY jurisdiction and is subject to review and approval by that public agency.

DES RVW

☐ ☐ A maximum of 30 trucks per route will be permitted during daytime haul operations (one truck exiting

City of Phoenix Planning & Development Department
Haul Plan, Checklist – Page 4 of 4 TRT/DOC/00049

every two minutes) with a maximum of 60 trucks allowed per route during night-time operations (one truck exiting every minute).

☐ ☐ All plans revised after the original approval shall be resubmitted for review. The nature of the revision must also be called out on the cover sheet and on the sheet(s) to be revised. The revision number itself shall consist of a numeral within a triangle. △

☐ ☐ Discussion of redline comments on plans or in this checklist should be directed to the plan reviewer.

APPROVAL PROCESS:
The following is the process for getting the haul plan permitted:

☐ ☐ The "hauler" will submit five (5) copies of the haul plan to the Street Transportation – Right Of way Management Section. Office location and hours of operation is, 1101 E. Jefferson Street, Phoenix, AZ, Monday thru Friday 7:30 A.M. to 3:30 P.M. Main entrance is located in the north side of the building.

Streets will review the plan and call the hauler to pick up. The hauler will receive two approved copies from Street Transportation.

☐ ☐ The hauler will bring two approved plan sets to Planning & Development Department - Counter 8 on the second floor of Phoenix City Hall located at 200 W. Washington Street, Phoenix, AZ., for permitting.

VI. HOW DO I OBTAIN A VALET PERMIT?

Valet Parking is defined as the operation of a Valet Parking Service that accepts possession of a vehicle within the ROW for the purpose of parking a vehicle for the operator and/or retrieving a parked vehicle and returning it to the operator within the ROW, regardless of whether a fee is charged.

A. Application Requirements

- Valet applications must include the names, addresses, emails, and telephone numbers of the applicant, adjacent property owner/lessee, and the valet company.

B. Valet Operation Requirements

- A Traffic Control Plan and a Valet Parking Plan shall be submitted for review ten (10) business days prior to commencement of valet operations. The Valet Parking Plan provides a written description and aerial plan of the valet station and the valet route plan to the vehicle storage location. This plan shall include placement of directional signs to the valet service and service stand/station location for drop-off and pick-up activities; this plan shall also include the hours of operation.
- All traffic control devices used for Valet Operation shall meet City standards as defined in this Manual.
- When valet operations are proposed during the planning and design phase, the Street Transportation Department must review and approve locations.
- All valet operations must be ADA-accessible.
- To operate valet in City ROW, the valet company must have current proof of insurance per City requirements.
- Some valet operations may require an on-site off-duty Phoenix Police Officer.
- If the valet operations require parking meters to be taken out of service, the applicant will be responsible for all associated hooding fees per City ordinance.

- Once Traffic Control and Valet Parking plans are submitted, an on-site meeting with the applicant and the area Right-of-Way inspector will be scheduled by the ROW Administrator.
- Valet operations that take place entirely on private property will not be reviewed by the Street Transportation Department.

An approved temporary right-of-way use permit (TRACS) will be issued to the Valet provider when all permit and plan applications are deemed suitable.

VII. PARKING METERS

The Permit Holder shall keep metered parking spaces functional and open for parking at all practical times. When parking meters must be hooded or removed, the Permit Holder shall notify the appropriate City Project Inspector who in turn, will notify the Street Transportation Department.

The Street Transportation staff responsively hoods/removes meters when warranted, and when doing so facilitates the work. To minimize potential damage/theft to meters, there are times when meter heads may need to be removed. Any posts damaged during construction shall be the responsibility of the Permit Holder to repair or replace at his/her expense. Other parking meter post removals, relocations, or installations shall be done by the Permit Holder as provided for in the plans, or as directed by the Parking Meter Supervisor. Where required, the Street Transportation Department will provide parking meter posts.

To request taking parking meters out of service, a minimum 48-hour advance notice is required to the ROW Management Program office at (602) 262-6235.

A party seeking to take a parking meter out of service to reserve curb space shall request a TRACS permit. This request is to include justification to the **ROW Administrator** stating the designated purpose and time requested. Currently, the fee to hood meters is $35 per city block of meters, with an additional charge of $10 per meter per day for the duration of the project meters will be taken out of service. The Permit Holder can cancel their application if they contact the ROW Management Program office at least 24 hours prior to meter hooding to avoid being billed. **Without proper cancellation, Permit Holders will be billed for reserved meters even if they do not end up using the metered space.**

Figure 4 – Valet Application

STREET TRANSPORATION DEPARTMENT – TRAFFIC SERVICES DIVI
RIGHT-OF-WAY MANAGEMENT
1101 E. Jefferson St Phoenix, Arizona 85034
Phone: (602) 262-6235 - **Fax:** (602) 256.3154 – Email: rmp@phoenix.gov

Valet Application

Street Restrictions and Parking Meter Hooding

Use this form for all Valet Companies that are staging in the COP row,
Fill in completely and accurately.
A TRACS permit will be processed depending on the information of this form.

Event name for valet	
Valet company name –	Contact ROW 602-262-6235 if valet company is not registered— Further requirements needed prior to new valet companies being permitted and approved
Contact, email and address of valet company	
Dates & times of valet event	
Name of business hiring valet services:	
Contact, email and address of business hiring valet	
Authorized barricade company name for set-up and take-down	
Time & date for meter hoodings 6AM and 2PM are the only choices, weekends and holidays not included	
Meter numbers to be hooded: Applicant MUST provide ALL meter numbers to be hooded Yellow: commercial vehicle parking Red: No parking	
Valet Staging location:	Street Name:
	Between streets:
	Exact address:
Attach Insurance Documents and Map To and From Parking Location Send to: 1101 E Jefferson St Phoenix, AZ 85034	General Liability Insurance: YES: Workman's Compensation: YES: City of Phoenix listed as an Additional Insured: YES:

PLEASE ATTACH MAP OF PARKING LOCATION TO AND FROM

Chapter 3

Accommodating Pedestrian and Bicyclist Safety

Proper advanced planning for pedestrian and bicyclist movement near temporary work zones is as important as planning for vehicular traffic. It is particularly important that any time pedestrian or bicyclist services will be affected (e.g., transit stops, access, bike lanes, or sidewalks) by a project or special event, a Contractor or crew performing the work give full consideration to the adverse impacts their work may cause. A goal of the City of Phoenix is to minimize adverse impacts to pedestrian and bicyclist facilities. This requires proper planning to preserve as much service as practical. When service requires disruption, alternative but practical service should be provided. Cognitive, mobility, or visually impaired pedestrians require additional planning and accommodations.

I. PEDESTRIAN CONSIDERATIONS

Except during emergencies, pedestrian service should be fully preserved at every crosswalk (marked or unmarked) and other facilities intended for use by pedestrians, unless reasonable alternatives are provided. During temporary traffic control work zones, the facilities must be kept safe and usable by the Permit Holder at all times, unless the City gives ***prior*** approval. Any time temporary disruptions of pedestrians are required, those planning the activity must provide temporary accommodation of pedestrians that meet the satisfaction of local, state, and federal requirements.

Temporary traffic control work zones that affect normal pedestrian flow should provide the most effective ways of maintaining access to local businesses, facilities, bus stops, and crosswalks. The provisions for protection of pedestrian service outlined in this Manual are applicable to all persons doing work that influences pedestrian facilities (sidewalks or marked/unmarked crosswalks). The Manual offers six fundamental principles for successfully accommodating pedestrians through work zones as follows:

1. Traffic and pedestrian safety must be an integral and high-priority element in every project, from planning through design and construction.
2. Pedestrian and traffic movements should be inhibited as little as practical and planned to reduce exposure to potential hazards.
3. Pedestrians and motorists should be guided in a clear and positive manner while approaching, traversing, and leaving work zones.
4. Routine inspection of traffic control devices must be performed.

5. Personnel must be adequately trained in the proper management of pedestrian and traffic control, so they are qualified to make work zone safety decisions in the selection, placement, and maintenance of traffic control devices.
6. Pedestrian paths through the work zones should replicate as nearly as practical the elements of the existing path and be accessible to people using mobility devices like wheelchairs and those with limited sight.

Where the full pedestrian facility cannot be kept functional, it is essential that a clearly defined accessible path be developed at a minimum width of 36 inches. When it is not practical to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60-inch passing space should be provided at least every 200 feet to allow individuals in wheelchairs to pass. Accordingly, special care is important in placing traffic control devices and other equipment/material. If a 36-inch clear walkable surface cannot be kept clear, it is not considered functional. On the rare occasion when it is required to take sidewalks out of service, alternative and accessible provisions must be made. The only exception to this is on the rare occasion when a walkway has to be ***totally*** closed for safety reasons. Consequently, accommodations must be made for businesses and transit stops that require pedestrian access at or near the closure. Reference Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) and Chapter 6, Sections 6D.01 and 6D.02 of the MUTCD for additional information.

When a temporary work zone requires the closing of pedestrian facilities such as marked or unmarked crosswalks or walkways, provisions shall be made in advance by the Permit Holder to provide fully accessible, alternate temporary walkways that direct pedestrians through a reasonably safe, usable, and convenient route. The geometry and alignment of the facility should meet the applicable requirements of the ADAAG. Anyone requesting a complete or partial walkway closure on one side of the street must first accommodate pedestrians on accessible alternative paths on the same side of the street to prevent:

- Pedestrians from having to cross streets twice
- Disruption of transit services
- Interference with business accesses

Temporary walkways can be designated using portions of the existing sidewalk, or on rare occasions, in the adjacent parking lane if conditions and capacity permit. If a travel lane is authorized, the walkway should be properly delineated. See *Figure 6* for an example.

Figure 5 – Sidewalk Diversion Out-of-Street

Figure 6 – Sidewalk Diversion In-Street

If walkway closures are necessary, the alternative provisions must provide pedestrians with a suitable path consistent with ADAAG guidelines. The facilities should only be taken out of service for the minimum time necessary.

Additionally, the following actions need to be taken:

- Walkways shall always be clearly identified, wheelchair usable, and shielded from motor vehicle traffic. A smooth, continuous hard surface shall be provided throughout the entire length of the temporary pedestrian facility. There should be no curbs or abrupt changes in grade or terrain that could cause pedestrians to trip or serve as a barrier to wheelchair use.
- Unless a covered walkway or construction fence is required, barricades, cones, and signs may be used, as deemed appropriate. A continuous detectable edging on at least one side should be provided throughout the length of the facility such that pedestrians using a cane can follow it. The upper surface of the continuous barricade must be smooth and suitable for hand trailing. For temporary walkways, see *Figures 5 and 6 on pages 24 and 25.*
- When pedestrian paths are redirected on the same side of the street, the "PEDESTRIAN" sign, with an appropriate direction arrow, shall be used to direct pedestrians to the alternate walkway.

When pedestrian paths are being maintained in advance of a full closure, the "SIDEWALK CLOSED AHEAD" sign shall be placed at the appropriate end(s) of the block where pedestrians have the last opportunity to use a crosswalk to cross the street. Special care shall be taken to place the sign, so it is prominently visible, yet leaves the required 36-inch minimum width. Additionally, reasonable care shall be taken to ensure that sign placement leaves adequate maneuvering room for disabled users to be able to cross to the other side of the street or continue on the accessible path to their regular destination. *(See Figures 7 and 8 on pages 26 and 27).*

For complete sidewalk closures, "SIDEWALK CLOSED CROSS HERE" signs shall be provided at the crosswalk nearest each end of the closure. Where there is no pedestrian landing area on the far

side of an intersection, "near-side" signs with the same message supplemented with additional standard barricades, should be placed to clarify the sidewalk on the far side is inaccessible. "SIDEWALK CLOSED" signs shall also be placed adjacent to the actual sidewalk closure.

II. PEDESTRIAN REQUIREMENTS FOR BUILDING DEMOLITION / CONSTRUCTION

In downtown areas where demolition or construction of buildings near sidewalks occurs, special provisions need to be made in most circumstances to protect pedestrians and restrict access to construction activity. If the activity has the potential for dropping loads or creating hazards for pedestrians on the sidewalk, a covered walkway shall be provided for pedestrian protection. This is commonly necessary when the building wall is within six feet of the walkway, or when the distance of the walkway from the building is less than one-half the height of the exterior wall. Engineering judgment will determine when a covered walkway is necessary but is generally not required if the walkway is a greater distance than one-half of the height of the exterior wall from the building. In that case, a construction fence is typically required to be installed prior to beginning either construction or demolition sites.

A Contractor intending to demolish or construct buildings in the influence area of pedestrian facilities must submit a professionally prepared temporary work zone traffic control and/or walkway plans to the Street Transportation Department/ROW Management Program Section for approval prior to obtaining a permit.

No loading or unloading of material, staging, or stopping of vehicles will be allowed on the street side of walkways and fences without approval from the ROW Management Program Section.

Gates and/or temporary fencing serving as access to the construction site shall not open out into the street or impede pedestrian walkways. Access to fire hydrants, traffic signal control boxes, manholes, and other utilities shall be maintained at all times.

Figure 7 – Sidewalk Closure Midblock (Access Retained to Business/Bus Stop)

Figure 8 – Sidewalk Closure at Corner

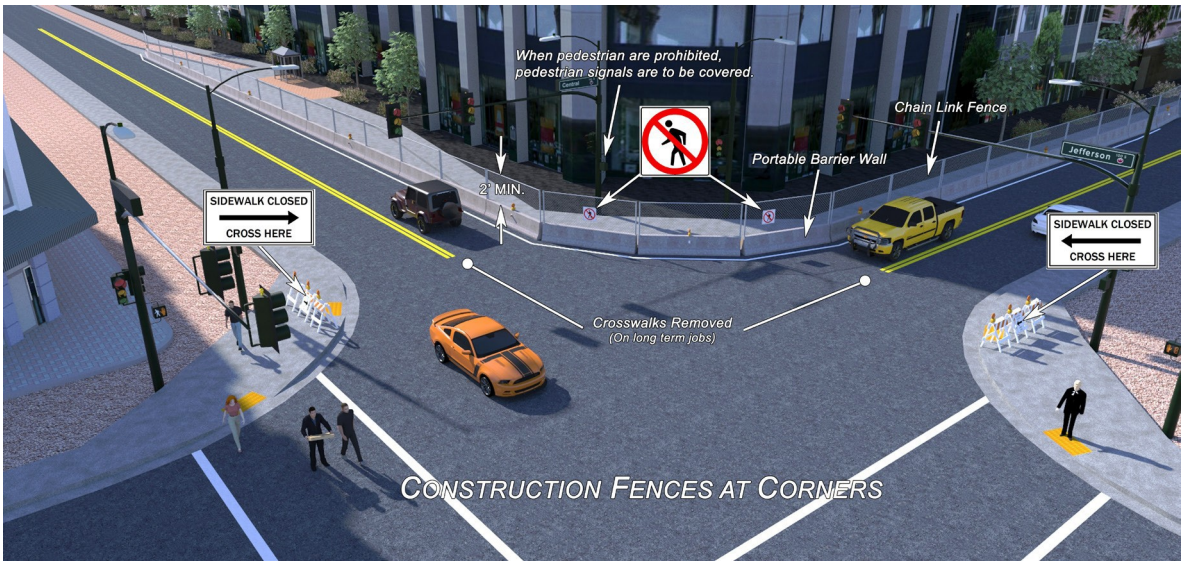


Figure 9 – Covered Pedestrian Walkway

III. COVERED PEDESTRIAN WALKWAYS

Constructing a covered walkway in the ROW requires a separate construction-building permit from the City of Phoenix Planning and Development Department.

Covered walkway requirements include:

- Construct using suitable material to support the loads to be imposed upon the structure. Minimum design requirements for the floor and roof shall be 150 pounds per square foot live load uniformly loaded.
- Maintain the walkway in good, clean condition, free of any debris, and fresh in appearance at all times.
- Repair damaged walkways and fences immediately.
- Coordinate with Traffic Signal section to maintain access to pedestrian push buttons and visibility to pedestrian signal heads.
- Place pedestrian directional signs (R11-11PHX) at the entrance to the covered walkway to give guidance to pedestrians.

City of Phoenix
PLANNING & DEVELOPMENT DEPARTMENT

Pedestrian Walkways / Construction Protection Policy

Issue Date:	May 1, 2016
Code/Section:	2012 IBC 3306 Table 3306.1 [Traffic Barricade Manual Reference]
Approved:	TRT August 6, 2012
Developed By:	Mark Sipes, P.E., Structural Engineer, P&D Team Leader
References:	Street Transportation Department Traffic Barricade Manual; 2012 International Building Code (IBC)

PURPOSE:

To ensure covered pedestrian walkway protection is properly permitted and inspected while providing safe pedestrian travel in the right-of-way adjacent to a construction site.

POLICY:

Section 3306 in the 212 IBC provides design standards for covered walkways used for pedestrian protection including minimum dimensions for width and height, design loads, placement relative to construction, etc. Chapter 3 in the Street Transportation Department's Traffic Barricade Manual addresses placement of covered walkways relative to intersections and includes conflict avoidance for pedestrians at intersections.

The following steps will help ensure that proposed covered walkways will be reviewed for both IBC and Traffic Barricade Manual requirements for pedestrian protection during construction and that the proper permits are issued:

The Contractor will coordinate a meeting with the Street Transportation Department Planning, Design & Programming Division where the site plan will be reviewed, and comments will be provided for pedestrian signal conflicts and/or other conditions of interest. The Contractor will provide signed and sealed construction drawings including details and structural calculations along with a site plan indicating the walkway locations.

1. The Contractor will bring two copies of their submittal to the PDD Commercial Building Services Counter for log in for permit review at the counter.
2. The permit (SE for the walkway and lighting) will be a temporary permit to expire with the building permit. Site inspections will be performed throughout the duration of the permit. Since it is a temporary condition, a revocable right-of-way permit from the Street Transportation Department is not required. However, a permit for the use of the public right-of-way will be required from the Street Transportation Department, Traffic Services Division and administered by the ROW Management Office.
3. Points of contact to help coordinate reviews are the development review coordination staffin the Street Transportation Department. ROW Management Office 1101 E Jefferson St. Phoenix, AZ 85034 Closure Request 602-262-6235, email rmp@phoenix.gov.

IV. BICYCLIST CONSIDERATION

A. General Requirements

Bicyclists may legally use both street and sidewalk and need to be considered under both conditions. When work encroaches upon a bike lane, shared-use path, shared lane, and signed bike route as identified on the City of Phoenix's bike map or clearly marked in the field, an accessible, safe, and clearly defined route shall be provided. Maximum effort should be made to provide a convenient bicycle way separated from active work areas. Bicyclists shall not be led into direct conflicts with mainline traffic, work site vehicles, or equipment moving through or around the traffic control zone. The work zone shall also not force a bicyclist into an unsafe condition, such as grating, debris, or an abrupt stop within moving traffic lanes as part of traffic control. Bicycle lanes and other identified bicycle routes shall be kept free of obstructions. If bicyclists cannot be accommodated through the work area with facilities comparable to pre-construction conditions, bicycle detours shall be considered.

Shared-use Paths – Construction on off-street shared-use paths shall provide an alternate route or maintain a 5-foot clear and clean path in both directions for bicyclists. If 5 feet cannot be maintained, an alternated route for bicyclists shall be provided either by use of an alternate smooth continuous hard surfaced path or a temporary bike lane on the street.

Bicycle Lanes – Permit Holder shall maintain all existing bike lanes. During construction, temporary bike lanes may be delineated by cones but at no time shall the clear width of a bike lane be less than 5 feet. The Permit Holder shall maintain a clear and clean path of travel for bicyclists at all times. Any bike lane that is effectively narrowed below 5 feet is considered a bike laneclosure.

Bike lanes may be closed but only with an approved TRACS Permit. Closing a bike lane requires the same signage and traffic control as a travel lane.

The Permit Holder shall seek to safely accommodate bicycles through the work area and shall use advance signage that the bicycle lane is closed at a place where the cyclist can modify their route when necessary.

For example, when bicycle lanes are closed, advanced signing should be installed to warn the bicyclists and the motorists of the change in conditions and give users ample time to adjust their behavior. Any time a bike lane is closed, proper signing shall indicate "BIKE LANE CLOSED AHEAD" and "BICYCLES MAY USE FULL LANE" (R4-11).

Bike Route – Certain streets on the bicycle route network may not have painted bicycle lanes but are nonetheless important because they provide connectivity to the rest of the network. In particular, some bike routes allow bicycles to travel side-by-side with cars in the same lane. These streets are identified as having wide right-hand curb lanes. A curb lane is measured from the curb to the nearest lane line. Wide curb lanes are those that are approximately 22 feet or more in width on streets with parking, or 14 feet or more on streets without parking. The Contractor should maintain these widths wherever practical. If a wide curb lane will be affected during construction, the Contractor shall post a "Bicycles May Use Full Lane" R4-11 sign at the beginning of the block.

B. Work Area Accommodation

The Permit Holder shall accommodate bicyclists in work areas as follows:

1. The Permit Holder shall provide safe and protected bicycle access into, through and out of the work area, including proper channelization and signage.
2. The Permit Holder shall ensure the roadway surfaces are frequently cleaned or swept to minimize exposure to bicyclists.
3. For travel lanes which continue through the work area, the Permit Holder shall provide advance warning to bicyclists and motorists of any transition into and out of the travel lanes.
4. For travel lanes which continue through the work area, the Permit Holder shall consider motor vehicle travel speed, grade, pavement condition, length of work area, lighting, and sight distance to determine if lane widths are sufficient to accommodate both motorists and bicyclists.
5. The Permit Holder will avoid requiring bicyclists to dismount their bicycles while traversing a work area, whenever feasible, and will provide advance notice to bicyclists when bicycling through the work area cannot be safely accommodated.

C. Bicycle Facility Closures

If the ROW Management Administrator determines that temporarily closing a bicycle facility traversing the work area is required for the safety of bicyclists, such closure requires the same level of signage and traffic control design considerations as when a travel lane is closed. The Permit Holder should include a bicycle facility closure setup within the proposed traffic control plan for review and approval by ROW Management before closing any bicycle facility.

Determination to close a bicycle facility will include consideration of the needs of all bicyclists who use the bicycle facility under normal conditions, including daily commuters as well as recreational and novice bicyclists. The conditions to be considered to close a bicycle include:

1. Removal or reduction of existing travel lanes and/or bicycle lanes through the work area and the ability to effectively transition bicyclists into and out of motor vehicle traffic;
2. Motor vehicle and bicycle travel speeds;
3. Grades, pavement discontinuities, abrupt elevation changes, and pavement friction degradation;
4. Significant amount or frequency of pavement grindings, potholes, steel plates, or utility lids;
5. Length and duration of work area; and
6. Lighting and sight distance.

D. Additional FHWA Information for Permit Holder Guidance

Bicyclists can experience difficulties when traveling through construction zones, particularly when roadway space is constrained and when pavement conditions are rough. In some instances, sudden pavement changes in construction zones can represent a severe hazard to bicyclists.

Through-bicycle movement must also be maintained. Bicyclists can share a lane over a short distance. On longer projects and on busy roadways, a temporary bike lane or wide outside lane may be provided. Bicyclists should not be routed onto sidewalks or onto unpaved shoulders. Debris should be

swept to maintain a reasonably clean riding surface in the outer 5 or 6 feet of roadway. Bicyclists have a low tolerance for surface grade changes and excessive bumps should be avoided. The placement of advance construction signs should not obstruct either the pedestrian or the bicyclist. Where this is not practical, placing signs half on the sidewalk and half on the roadway may be the best solution.

Bicyclists have a legal right of access to most highway facilities and provisions for their safe conduct through work zones are necessary.

1. Provide for and sign an appropriate alternate route when activities close a designated (signed) shared-use path or shoulder bikeway. Where horizontal separation for bicycles and pedestrians existed prior to work, give consideration to separating during work.
2. When laying out alternative shared-use paths, make sure no overhead obstructions present a direct hazard to normal bicycle operation.
3. Riding surfaces are important for safe bicycle operation. Loose gravel, uneven surfaces, milled pavement, and various asphaltic tack coats endanger the bicyclist. Consider the condition of the surface the bicyclist will be required to use.

Chapter 4

Accommodating Worker Safety

Everybody benefits when workers are able to complete their work in a safe environment. The unexpected nature of work zones and the constantly changing conditions that exist within work zones make workers particularly vulnerable to errant drivers. It is important that workers be trained by their employers to maximize safety when working in or near the roadway. This chapter provides guidance regarding two key components of promoting worker safety:

- **Safety Apparel (Personal Protective Equipment):** Workers exposed to risks of moving roadway traffic or work equipment should wear high-visibility safety apparel
- **Service Vehicles and Equipment:** Should be planned so as to minimize worker exposure to risk from roadway traffic and work equipment

This chapter addresses how Personal Protective Equipment (PPE) and service vehicles can help promote worker safety. Additionally, this chapter augments the national MUTCD with regard to surveyors who have the difficult job of working within roadways, often for short periods of time where it is not practical to set up a full array of devices.

I. HIGH-VISIBILITY SAFETY APPAREL

All workers exposed to the risks of moving roadway traffic or construction equipment should wear high-visibility safety apparel meeting the requirements of the International Safety Equipment Association (ISEA) "American National Standard for High-Visibility Safety Apparel and Headwear" (referenced in Section 1A.11 in the MUTCD), or equivalent revisions, and labeled as ANSI 107-2004 (or current edition) standard performance for Class 2 or 3 risk exposure. A competent person designated by the employer to be responsible for the worker safety plan within the activity area of the job site should make the selection of the appropriate class of garment.

For daytime and nighttime activity, flaggers shall wear safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Safety Apparel and Headwear" (referenced in Section 1A.11 in the MUTCD) and labeled as meeting the ANSI 107-2004 (or current edition) standard performance for Class 2 risk exposure. The apparel background (outer) material color shall be either fluorescent orange-red or fluorescent yellow-green as defined in the standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of **1,000 feet** (300 m). The retro-reflective safety apparel shall be designed to clearly identify the wearer as a person.

II. HOW SERVICE VEHICLES CAN BEST BE USED TO PROMOTE SAFETY

Worker safety can be enhanced with proper use of service vehicles. Service vehicles covered in this section are those required by the nature of their work to travel slowly or stop for brief periods on City streets. Some large vehicles that routinely stop on streets, such as sanitation trucks and buses, are not considered service vehicles. They are exempt from the requirements spelled out in this chapter due to their sheer size, design, and/or their alternative provisions for safety. Service vehicle operations are the backbone of the fleet, which allow effective maintenance of utilities, traffic control, pavement, and other roadway infrastructure.

The City of Phoenix recognizes that service vehicles supporting short-term or mobile work warrant special procedures to complete their work safely and efficiently. If the full array of traffic control required for intermediate or long-term activity was required for service vehicles, the result could be counterproductive to both safety and functionality of the street system. The set-up and take-down time, effort, and cost would typically take longer than the time needed to complete the task at hand. Road closures lose functionality of streets for longer than necessary and workers would be exposed to a greater risk longer than necessary.

Instead, this section outlines special equipment that service vehicles may use in place of the full array of devices specified throughout this Manual when performing short-term/mobile activities. This special equipment has been found to provide at least equal overall safety as if the full array of devices is used. Arizona Revised Statutes already require vehicles to be equipped with warning devices deemed adequate for normal stops while driving in traffic. The special equipment described in this chapter is specifically for service vehicles that stop frequently in traffic or need to be positioned unusually in the traveled way.

Service vehicle operations are prohibited on Arterial and Collector Streets during peak traffic hours, except when authorized by ROW Management Program Section or under emergency/ disaster conditions governed by Police and Fire personnel. During all other times, service vehicle operators need to plan their work to minimize the extent of restriction.

When service vehicles must travel slowly or stop for brief periods, they shall display one of the following operating high-level warning light systems. *(See Figure 10, page 36).*

- **Two Rotating Flashers, Strobe Light High-Level Warning Light Device or LED High Intensity Flashers** – These devices are designed to provide 360-degree visibility and may be used in combination with, or incorporated into, a "light bar" for added visibility.
- **One Arrow Panel** – Approved arrow panels shall be used in combination with rotating flashers or strobe lights to highlight service vehicles and warn motorists of lane shifts or work activities.

Flashing lights on service vehicles need to be located so that they remain in full view, front and rear, and are not obscured by dump beds, vehicle-mounted equipment, or work activities. Minimum mounting height is 7 feet. The arrow panel shall be mounted on a vehicle, trailer, or other suitable support. Minimum-mounting height should be 7 feet from the roadway to the bottom of the panel, except on vehicle-mounted panels, which should be as high as practical. **Minimum panel size is 48 x 24 inches per the MUTCD Section 6F.61 on Arrow Boards and minimum panel mounting height is 7 feet per the MUTCD Section 6F.60 on Portable Changeable Message Sign.**

For slow-speed mobile activities, standard operating procedures are to use special warning devices and the vehicle's four-way hazard warning flashers. On arterial streets, these vehicles must be equipped with one arrow panel to warn motorists of lane shifts or work activities. Mobile operations include pavement marking and street sweeping activities where equipment typically moves along the road at slow speeds.

When service vehicles stop for brief periods, standard operating procedure is to display the special warning devices and the vehicle's four-way hazard warning flashers. For short-term durations, work zones are limited to 250 feet including taper. On arterial streets, traffic cones should be placed a minimum of 10 feet from the rear of the vehicle or in a short taper (using six cones spread out about 50 feet). Placing flags on the upper rear corners of the vehicle has been found to be a relatively inexpensive and effective way to further enhance visibility.

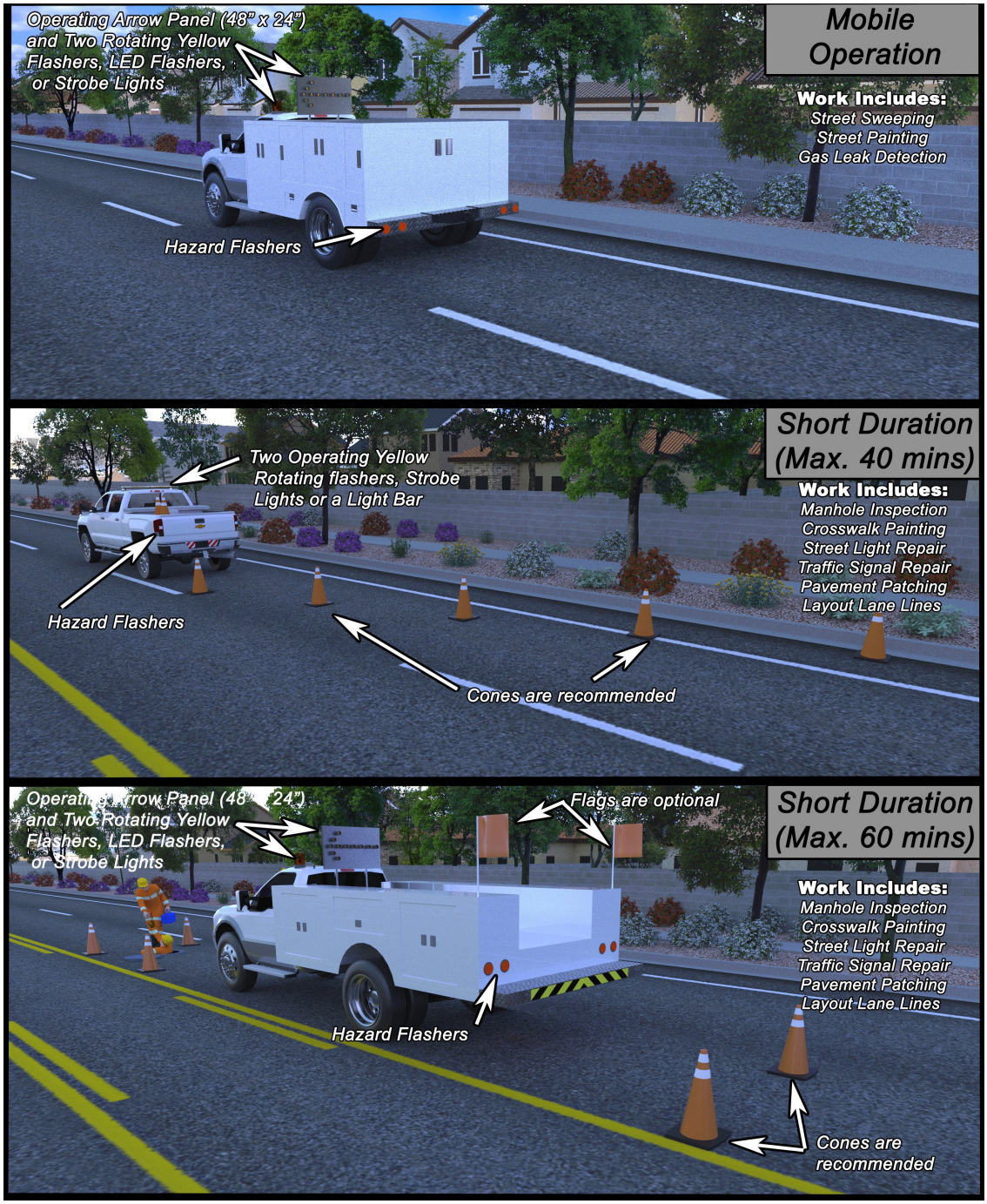
Arrow panels are effective because they provide both warning and directional information ahead of time to motorists when the restriction causes traffic to change lanes. Because they are more effective than flashing lights, arrow panels are certainly preferable and, in some cases, mandatory to support work zones.

With the special equipment specified below, service vehicles are authorized to conduct short-term/ mobile work for up to:

- **40 minutes if equipped** with two rotating flashing, strobe light, or LED high-level flashers
- **60 minutes if equipped** with approved arrow panels.

The more extensive signing, barricading, and channelization specified elsewhere in this Manual are necessary for service vehicles where they will be stopped in the street for more than one hour. Similarly, signs, barricades, and channelizing devices should normally be used for slow-moving or intermittent stops operations such as pavement crack sealing and tree trimming on Arterial and Collector Streets. These devices normally can be set up in short sections and moved as work progresses.

Figure 10 – Service Vehicle Operation



III. SPECIAL INFORMATION FOR SURVEYOR WORKERS

The very nature of urban survey work is potentially hazardous, not only for the survey workers themselves, but also for the traveling public. The surveyor enters the street as a pedestrian but becomes a worker once he/she stops in the street. Workers are responsible for ensuring appropriate traffic control is in place and wearing protective clothing/apparel with high visibility markings.

For safety and efficiency reasons, ***surveying is not permitted on Arterial or Collector Streets during peak traffic hours***, except when such work is being performed in areas that are already under construction and the contract special provisions allow restrictions, or with the prior approval of the Street Transportation Department, ROW Management Program Section.

When surveyors need to temporarily occupy a reference point in the street, surveyors must have:

- Class 3 High visibility safety apparel
- Traffic cones or other standard barricade devices
- A flagger or a police officer whenever unable to see oncoming traffic

When surveyors are working in areas under construction, the approved temporary traffic regulations that apply to the Permit Holder apply to the surveyor as well. All traffic restrictions shall be coordinated in advance through the assigned inspection group or other authorized agency. "SURVEY CREW" warning signs properly placed in advance of the working area is valuable in alerting motorists of the surveyor's presence in traffic. The flag-type high-level warning device is extremely valuable for survey work, as it may be seen over the top of preceding vehicles. Therefore, the ***use of high-level warning devices is mandatory*** any time an instrument is set up in the street for durations longer than a short duration.

When survey work requires restricting a full traffic lane or when restricting traffic during hours of darkness, temporary traffic control devices (advance warning signs, barricades, and channelization) shall be provided and placed properly as required elsewhere in this ***Manual*** for those particular conditions.

Chapter 5

Existing Traffic Control Devices

Permit Holders are responsible for maintaining all traffic signs and pavement markings in their construction zones and for restoring the permanent traffic signs and pavement markings upon completion of their work.

During temporary traffic control operations, it is important to make sure that existing traffic control devices remain compatible with the temporary traffic control being deployed. This includes, but is not limited to, signs, parking meters, traffic signals, and pavement markings. The devices that remain applicable to the affected traffic must be maintained, while other devices must be covered, relocated, or in rare cases, completely removed. Requirements for each group of devices are detailed in this section.

I. TRAFFIC SIGNS

All signs shall be maintained upright, clean, and in full view of the intended traffic by the Permit Holder at all times. If these signs interfere with construction, the Permit Holder shall temporarily relocate the signs to permit construction, but the devices must be kept in full effective view of the intended traffic. Portable signs may be helpful to augment other signs, which temporarily cannot be placed in their optimum position.

Existing signs that are no longer applicable shall be removed by the Permit Holder, taking care not to damage the signs. The signs are to be salvaged by carefully storing them out of the way on the adjacent property line.

The Street Transportation Department shall be notified immediately of all sign removals by calling (602) 262-6449. When construction is complete, the Street Transportation Department will reset all needed signs at permanent locations. The assigned inspector shall notify the Street Transportation Department for sign replacements prior to completion.

II. TRAFFIC SIGNALS

The Permit Holder shall notify the ***Street Transportation Department, Traffic Signal Shop (602-262-6021)*** a minimum of 48 hours prior to the start of any underground construction in the vicinity of signalized intersections.

The Permit Holder shall keep existing signal equipment fully operational and in full view of traffic at all times. The only exception is when pre-approved by the City Traffic Signal Engineer specified in this Manual, or reflected in the City Project Permit, Plans and Specifications. When necessary, vehicle detector sensing devices (typically inductive loops) and pedestrian push buttons may be de-activated with prior approval. However, they shall be reactivated or replaced by the Permit Holder

in an expedited manner when work is completed. The request must be accompanied by a full explanation of why it is necessary to do so, what alternative procedures shall be used to accommodate traffic, and what efforts are being made to minimize the time the detectors will be out of service. Left-turn arrows shall be de-activated when left-turn prohibitions are in effect. If traffic conditions are such that traffic signals cannot efficiently operate without sensor loops, the Permit Holder may have to deploy, at their cost, alternative detection devices. **Forty-eight-hour advance notice by the Project Inspector to the Traffic Management Center through email at phxtmc@phoenix.gov is required for this type of work.**

The Signal Shop will, upon request, provide the approximate locations of all underground signal equipment (conduits, junction boxes, vehicle detector sensing devices, etc.). The exact location of underground equipment shall be determined by the Permit Holder prior to excavation. During all work, the Permit Holder shall exercise due care to prevent damage to existing traffic signal equipment. If damage occurs, the Signal Shop must be notified immediately so that they can restore traffic signal operations. The Permit Holder will contact Arizona Bluestake (811) and will pothole all existing underground utilities to determine their exact location.

Responsibility for permanent repair/replacement of damaged equipment shall be:

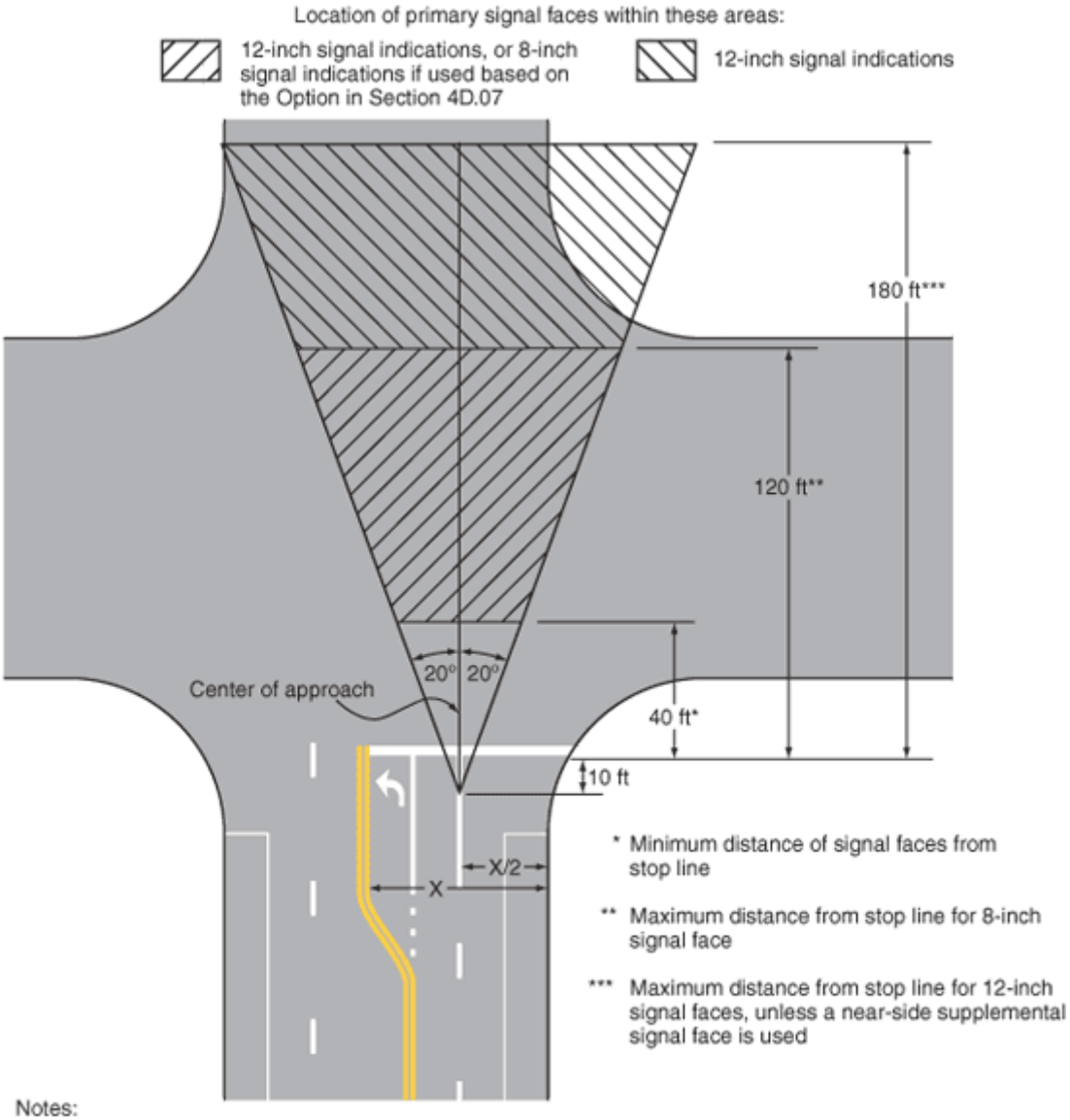
- **At the Permit Holder's expense IF** the damage done was not preceded by a request for City blue stake/identification of equipment prior to the start of work.
- **At the City's expense IF** the damage done was preceded by a request for City blue stake/identification where appropriate time was given for the City to mark the underground equipment and the City failed to do so.

When existing signal equipment cannot be maintained, the Permit Holder shall, at their expense, have a qualified electrical Contractor move signal equipment to a temporary location. Another option is to provide temporary equipment capable of ensuring continuity of all signal functions (except vehicle detector sensing devices). The location and type of temporary signal equipment must be preapproved by the Traffic Signal Engineer.

Signal equipment modifications shall be coordinated with the Signal Shop by the Permit Holder a minimum of **72 hours** in advance of work. When temporary or new equipment is installed to replace existing equipment, it shall be fully operational before the existing equipment is removed. The Permit Holder shall restore signal equipment to its proper location as soon as practical after all the work in the immediate area is completed. Traffic signal pedestrian push buttons must remain operational and accessible to pedestrians at all times unless provisions are made for Manual control or fixed-time operation of the traffic signal.

It is important that drivers be provided with at least two signal indications within the 40-degree cone of vision approaching the signal *(see Figure 11, page 41)*. If traffic is to be repositioned in such a manner that two signal heads will not be within the driver's 40-degree cone of vision, the Traffic Signal Engineer shall be contacted immediately at (602) 262-4693. The illustration on the following page shows approximate signal head locations for good visibility.

Figure 11 – Lateral and Longitudinal Location of Primary Signal Faces (Figure 4D-4, MUTCD, 2009)



Notes:

1. See Section 4D.11 for approaches with posted, statutory, or 85th-percentile speeds of 45 mph or higher
2. See Section 4D.13 regarding location of signal faces that display a CIRCULAR GREEN signal indication for a permissive left-turn movement on approaches with an exclusive left-turn lane or lanes

III. REMOVAL OF CONFLICTING PAVEMENT MARKINGS

Existing pavement markings that cause driver confusion by conflicting with the intended vehicle path (indicated by barricades and channelization devices) shall be removed or obliterated by the Permit Holder, as directed by the Street Transportation Department. The City of Phoenix requires use of vertical traffic control devices instead of pavement markings to minimize driver confusion in work zones. This usually means that substantial pavement marking obliteration is only required on long-term or high-speed projects such as detours, special channelization for bridge construction, realignment for building construction, and similar fixed location projects. However, using engineering judgment, the City of Phoenix reserves the right to require the removal or obliteration of existing pavement markings anywhere that driver confusion exists due to pavement markings.

If pavement-marking obliteration is needed, a method should be used which leaves minimal pavement scars and effectively removes existing markings. High-pressure washing should be used to remove existing markings. Slurry seal (MAG Specification, Section 332) may also be used to obliterate markings.

When used, slurry seal shall be applied over existing markings in strips at least 24 inches wide. Markings that become exposed shall be recovered with slurry seal. Painting over existing markings with black paint or asphalt material is not typically acceptable, except for short durations with pre-approval from the Street Transportation Department.

IV. SCHOOL ZONES

Work zone signs in or near a **School Zone** can divert driver attention from school zone signs and street markings. The arrival and dismissal times of school children, buses, and parents dropping off children also create issues that may affect driver recognition of signs and warnings. Therefore, the following policy shall be followed when working in or near school zones:

- No work shall occur the hour before school starts and the hour after school ends, unless approved by the School Safety Coordinator or it is deemed an emergency by the City inspector.
- Contact with the school is required to determine the appropriate time that has the least impact on the school during construction or maintenance activity. Every effort shall be made to limit the effect on bus routes, crosswalks, and parent pick-up/drop-off access. A two-week lead time should be given to allow for notification to parents and school bus drivers of any changes in routes or entrances.
- School zone signs shall not be obscured or removed by any Permit Holder. School zone signs to be relocated for construction delineation shall be placed nearest to their original position and should be a minimum 15 feet from any barricade or sign.
- When practicable, work shall be performed when school is not in session including weekends, summer, and fall/spring breaks.
- A preconstruction meeting shall be held with the City Inspector to determine the best course of action. The School Safety Coordinator from the Street Transportation Department should be contacted for complex or long-term projects near schools.

- Contact Information for **School Safety Coordinator: (602) 534-2020 or (602) 262-6284**
- When construction occurs in a school zone during school hours, a Temporary Traffic Control Plan is required.
- Pedestrian pathways on the same side of street will be established and maintained at all times.
- In the case of School Zones at major intersections, an off-duty police officer may be required. In any case, flagging operations shall not be allowed while the school zone isestablished.

Chapter 6

Temporary Traffic Control Device Applications

Temporary traffic control can be provided by using physical devices or by employing Manual control using police officers or flaggers. Physical devices will be discussed in this chapter, while Manual control of traffic using police or flaggers will be discussed in Chapter 7.

I. WHY USE TEMPORARY TRAFFIC CONTROL DEVICES?

Temporary traffic control devices are used to alert and guide road users through locations where roadways have been temporarily reconfigured for maintenance, construction, special events, or incidents. Temporary traffic control devices fall into five basic categories:

- Signs
- Barricades and Channelizing Devices
- High-Level Warning Devices
- Pavement Markings
- Portable Barriers

II. REMOVAL OF TEMPORARY TRAFFIC CONTROL DEVICES WHEN NOT APPLICABLE

Removal of temporary traffic control devices when not applicable has traditionally been a recurring problem. The City's ROW Management Program includes substantial fines for non-compliance in this area. The Manual **requires** that advance warning signs and barricade devices be immediately removed from drivers' sight lines when no longer applicable.

III. SIGN REQUIREMENTS AND APPLICATIONS

Signs are a very important part of temporary traffic control. They shall be placed in advance and at applicable points throughout traffic restrictions to provide navigational guidance to drivers. It is especially important to use initial warning signs in advance of traffic restrictions to prepare drivers for conditions ahead.

Temporary traffic control signs in Phoenix follow the same basic standards for signs specified in the MUTCD regarding size, color, and shape. However, based on engineering judgment and experience, a few variations are used because they have been determined to work better than nationally prescribed suggestions. Two notable variations include the size of the double arrow warning sign and the D1-108: Business Access blue sign color used in temporary traffic control zones. Otherwise, Warning and Guide signs in temporary traffic control areas shall have a black legend on an orange background.

Most, but not all, signs used in Phoenix temporary traffic control zones are included in this Manual. Each sign shall be displayed only for the specific purpose envisioned in this Manual. Uniformity of signs used contributes to effectiveness so that similar conditions will be similarly marked with the same type of signs. Doing so will help enable motorists to become conditioned to the required action indicated by signs. The less variation in signs, the fewer responses the motorist will have to learn.

A. Sign Size Requirements

Guidelines for sign sizes, colors, and shapes are shown in *Figure 12 (page 50), Figure 13 (page 53)*, and the MUTCD. The size of sign needed is dependent on the size and speed of the road in question, and how far out of the direct line-of-sight of the driver the signs are placed. Signs placed within roadways offer optimum line-of-sight visibility to drivers, which mean they work well at a smaller size sign than would normally be used if mounted at the side of the road. Larger signs are important on higher speed, rural highways where signs are mounted well away from the edge of roadways. Accordingly, the sign sizes shown reflect the suggested sizes for signs installed within roadways (warning and regulatory signs). The size of sign used may need to be increased for emphasis and where unusual conditions exist, making larger signs desirable. For signs mounted on posts along the side of the street (street-side supports), signs typically will be larger than shown in the illustration. There are some sizes where the size of legend/stroke width on the sign controls the final sign size, as the final product must offer good legibility.

B. Sign Sheeting Requirements

Historically, engineer-grade retro-reflective material has successfully been used in temporary traffic control zones throughout the world, and specifically in Phoenix. Newer products have emerged, however, which are substantially brighter. Additionally, the cost of higher-grade materials has come down. Combining that with the fact that competition in the sign industry has resulted in the quality level of engineer-grade material being reduced has resulted in national practitioners gradually upgrading to newer types of sheeting, except for signs where colors offer substantial contrast (i.e., black on white). This conversion by many agencies nationally has been spurred by those eager to achieve the advantages offered by brighter, longer-lasting signs. Furthermore, the addition of fluorescent characteristics to warning signs has strengthened conspicuity of signs, particularly during twilight hours.

Current standards include the following:

- Fluorescent Orange Prismatic (ASTM Type VII or brighter) warning signs to be used for the first advance warning sign(s) in a temporary traffic control zone. This includes, but may not be limited to, "Road Work Ahead," "Shoulder Work Ahead," and "Special Event Ahead" signs.
- Fluorescent Orange Prismatic (ASTM Type VII or brighter) warning signs for the double arrow or "splitter" signs (W12-1 and W12-1a) to compensate for their small size.
- High-intensity prismatic sheeting, or better, will be required for all other orange signs/barricades (ASTM Type IV).

Additionally, based on research which has shown that the engineer-grade black-on-orange signs do not provide the needed brightness and contrast, **all other black-on-orange sheeting for signs and barricades are required to be high-intensity, reflective sheeting (ASTM Type IV) or brighter.**

C. Nighttime Sign Requirements

All signs used for temporary traffic control operations during hours of darkness must:

- Be equipped with operating Type-A flashing barricade warning lights when mounted on portable supports.
- Be equipped with operating Type-B flashing warning lights when authorized to be mounted on street-side supports for advance warning at Arterial street construction projects.
- Have a minimum application of 150 square inches of orange, weather-proof, high intensity (minimum) retro-reflective sheeting on the back of signs exposed to opposing traffic. The retro-reflectorized sheeting is to be placed in strips not less than 5 inches wide along each outer edge of the sign. Signs placed in two-way left-turn lanes will have at least one Type I (or Type II with approved ballast) barricade placed a **maximum** of 10 feet behind the sign to alert opposing traffic.

All signs are to be mounted on standard vertical supports with minimum heights to the bottom of the sign panel as follows.

D. Portable Support Sign Height

Regulatory Signs:

- 36 inches, except sign codes R4-7a and 8a (KEEP RIGHT/LEFT)
- 12 inches for sign codes R9-102L&R (SIDEWALK CLOSED/PEDESTRIANS) and sign code R11-7A (SIDEWALK CLOSED AHEAD CROSS HERE), which shall be 24" x 30"

Warning Signs:

- 12 inches, except for W1-6 (large 36" arrow)

Guide Signs:

- 24 inches

Combination Regulatory and/or Warning Signs:

- 12 inches

Post-Mounted Signs:

- 84 inches (7 feet) (Secondary signs may be 6 feet above sidewalk)

E. Sign Mounting Procedures and Placement

Standard vertical supports used for barricades, vertical panels, and flag trees are also acceptable for mounting portable signs. Suitable ballast should be placed on the base of all portable signs that are unattended.

Metal and wood signposts, such as those commonly used to mount permanent traffic signs and steel streetlight poles, are acceptable sign supports. However, signs shall not be typically mounted on wood utility poles or placed in areas intended for pedestrians. Where necessary to do so, care shall be taken to minimize interference with pedestrians and wheelchair accessibility.

As a general rule, portable signs are to be located on the right side of the street when right-lane traffic is restricted, and additionally on the centerline or median, when left-lane traffic is restricted. Post-mounted signs ***shall*** be located on the right side of the street and in protected medians. Where special emphasis is required, and where more than one lane of traffic in any one direction is affected, dual signs should be provided approximately opposite each other. Care shall be taken when signs are placed in the two-way left-turn lane to not obstruct access to or from driveways or intersecting streets.

Portable supports should be used for short-term and moving operations. Street side supports may be used when authorized for construction speed limit and advance warning signs on long-term, fixed construction operations, such as major street reconstruction.

For maximum mobility on certain types of construction and maintenance operations, signs may be mounted on a vehicle stationed in advance of the work or moving along with it. This may be the working vehicle, pavement marking equipment, crack-sealing equipment, or a vehicle provided expressly for this purpose.

IV. TYPES OF SIGNS

Temporary traffic control signs fall into the following three major categories:

A. Regulatory Signs

B. Street Closure Signs

C. Guide Signs

D. Warning Signs

A. Regulatory Signs

Regulatory signs impose legal obligations or restrictions and are enforceable by the Police Department (City Code 36-300). To be enforced, their use must be approved by the Street Transportation Department, ROW Management Program Section. Special care must be used to ensure proper placement, use, maintenance, and ***removal*** of all temporary regulatory signs in a timely fashion. Conflicting existing regulatory signs shall be covered or removed.

The Permit Holder provides all regulatory signs. Commonly used signs are illustrated in *Figure 12* on the following page.

Regulatory signs used in construction and maintenance areas shall be the shape and color shown in the illustrations. They shall be used as follows:

- **Turn Restriction Signs:** NO LEFT (RIGHT) TURN (R3-1 and R3-2) signs are used whenever turns may cause excessive congestion at intersections during restrictions. A minimum of two signs (one on the near side and one on the far side of the intersection) is required for each direction of traffic affected. When buses can safely turn, "EXCEPT BUSES" panels should be considered and attached at the bottom of each sign when turn restrictions affect transit routes. Panels with hourly restrictions (e.g., "6 - 8:30 AM AND 4 - 7 PM MON-FRI") shall be used when turn restrictions are required only during specific hours.
- **Mandatory Turn Signs** are used to show motorists when they must turn right or left from a special turning lane, separated from the through traffic lane. A minimum of two signs (one in advance and one at the intersection) is required for each direction of traffic affected. These signs must always be used in conjunction with the W12-1 lane split sign, otherwise motorists may be led to believe through lanes exist on both sides of the sign.
- **"KEEP RIGHT/LEFT" (R4-8a and 7a) signs** shall be used at, or near, the start of all channelization, except where the "DOUBLE ARROW" W12-1 sign is used. The "KEEP RIGHT" (R4-7a) sign shall be used on both sides of intersections where temporary center line channelization is required.

B. Street Closure Signs

The "ROAD CLOSED TO THROUGH TRAFFIC" (R11-4) sign shall be used for closures of arterial streets where only local access is permitted. Where used, the proper "DETOUR ARROW" and detour instructions (M4-10) shall be displayed. "ROAD CLOSED AHEAD" and "DETOUR AHEAD" signs are to be used approximately 300 feet and 600 feet, respectively, in advance of all arterial and collector street closures (further for high-speed roadways). Mandatory turn lanes approaching street closures shall be closed.

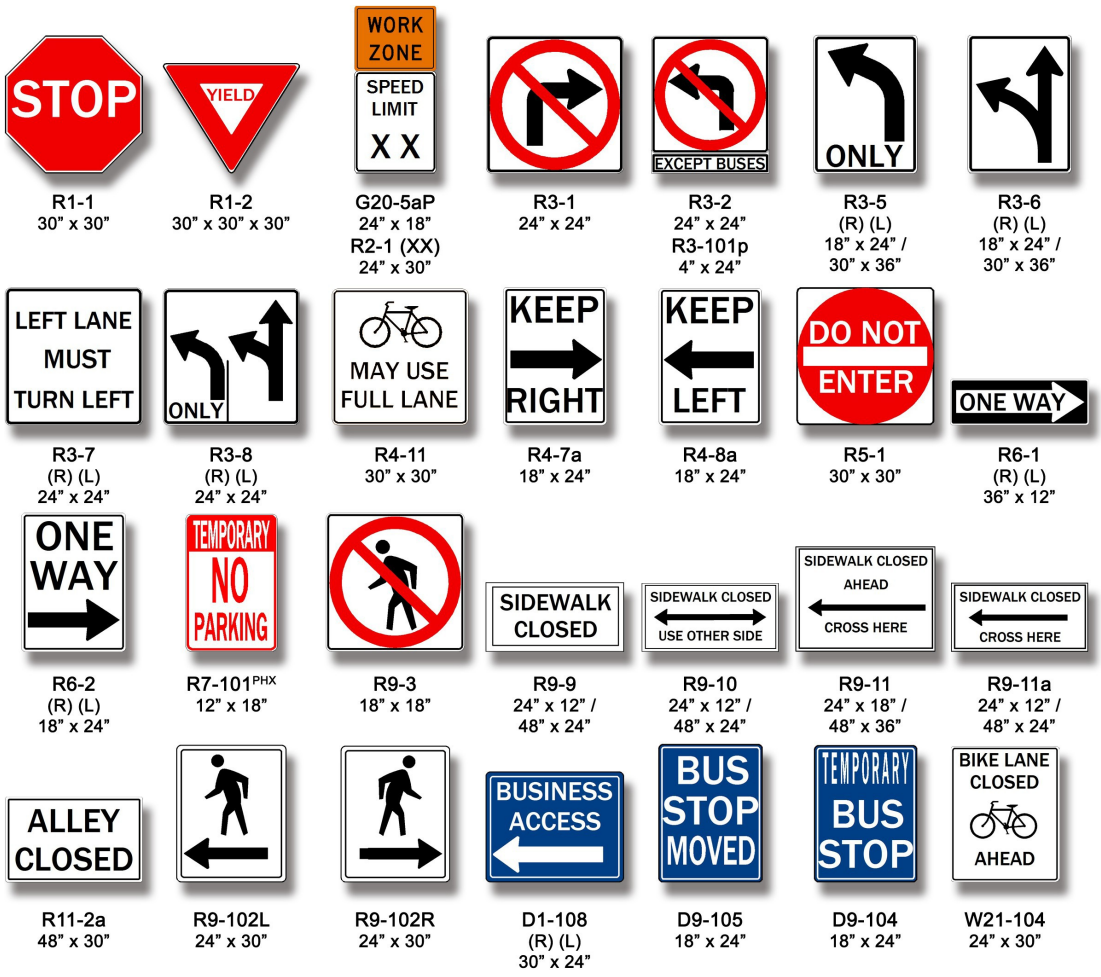
The "ROAD CLOSED" (R11-2) sign shall be used for all Collector and Local street closures when only local access is allowed. A "LOCAL TRAFFIC ONLY" panel shall be displayed unless approved by the Street Transportation Department, ROW Management Program Section.

The "ALLEY CLOSED" (R11-2A PHX) sign shall be used for all alley closures.

The "DETOUR" (M4-9A) sign with arrow shall be used to mark detour routes when required by ROW Management Program Section.

The "BUSINESS ACCESS" (D1-108) sign may be required where access becomes a problem on major and Collector Streets that are closed for construction. It is installed on a barricade adjacent to the "ROAD CLOSED" sign when requested by ROW Management Program Section.

Figure 12 – Regulatory Signs



R1-1
30" x 30"

R1-2
30" x 30" x 30"

G20-5aP
24" x 18"
R2-1 (XX)
24" x 30"

R3-1
24" x 24"

R3-2
24" x 24"
R3-101p
4" x 24"

R3-5
(R) (L)
18" x 24" /
30" x 36"

R3-6
(R) (L)
18" x 24" /
30" x 36"

R3-7
(R) (L)
24" x 24"

R3-8
(R) (L)
24" x 24"

R4-11
30" x 30"

R4-7a
18" x 24"

R4-8a
18" x 24"

R5-1
30" x 30"

R6-1
(R) (L)
36" x 12"

R6-2
(R) (L)
18" x 24"

R7-101PHX
12" x 18"

R9-3
18" x 18"

R9-9
24" x 12" /
48" x 24"

R9-10
24" x 12" /
48" x 24"

R9-11
24" x 18" /
48" x 36"

R9-11a
24" x 12" /
48" x 24"

R11-2a
48" x 30"

R9-102L
24" x 30"

R9-102R
24" x 30"

D1-108
(R) (L)
30" x 24"

D9-105
18" x 24"

D9-104
18" x 24"

W21-104
24" x 30"

R11-2 (100)
24" x 30"

R11-2*
(Collectors & Locals)
48" x 30"
8" Bottom Panel

R11-104*
(Arterials)
("To Thru Traffic" for Soft Closure)
M4-10
96" x 48" with 8" Panel

*R11-104 (arterials) & R11-2 (collector and locals) are used to partially or fully close streets. For partial closures, the TO THRU TRAFFIC is added to the R11-104, while LOCAL TRAFFIC ONLY is added to the R11-2 (slower speed collector & local streets)

C. Guide Signs

Guide signs are used to direct motorists on detour routes and provide information in advance of street closures. Guide signs used in temporary traffic control areas are generally rectangular with a black legend on an orange background.

Guide signs most frequently used are "DETOUR" (W20-2) signs with arrows, as shown with the "STREET CLOSED" (W20-3) signs in *Figure 13*. "DETOUR" sign and detour instructions are incorporated into the design of the STREET CLOSED TO THROUGH TRAFFIC" sign.

When required, the Permit Holder shall provide separate "DETOUR" signs, with the appropriate arrow, at locations along a specific detour route as directed by ROW Management Program staff. When required, detailed detour route instructions and/or State and Federal route symbols shall also be provided and attached to the detour signs.

At times, when alternate detour routes for street closures are offset or points of closure are at locations where detours are not available, it is necessary to provide additional guide information signs. These signs generally have a legend similar to "SR-51 TO MCDOWELL EB CLOSED-USE 24TH ST" or "GREENWAY SB TO 1-17 CLOSED - USE 19TH AVE", with appropriate detour arrows. These signs shall be rectangular with a minimum size of 48 inches by 48 inches. The legend shall be black on an orange or fluorescent orange background.

The Permit Holder shall provide these guide signs, as specified in the City project or permit "Special Traffic Regulations," or as directed by the Street Transportation Department, ROW Management Program Section. The "SIDEWALK CLOSED" (R9-9) sign and "PEDESTRIANS PROHIBITED" (R9-3) sign shall be used for walkway closures as provided for in Chapter 3 of this Manual. **Special attention shall be given when contemplating the closure of pedestrian paths** to ensure that safe, reasonable, and accessible alternative walkways exist. Closures should only be requested, and subsequently approved when doing so is absolutely necessary for safe operation. Even then, maintaining access to businesses and transit stops must be taken into consideration. When complete closure is allowed, typically to ensure safety, advance warning of the conditions should be given by carefully positioning a "SIDEWALK CLOSED AHEAD" (R9-11/R9-11a) sign, so as not to impede pedestrian access. The pedestrian symbol/arrow sign shall be used to guide pedestrians to alternate walkways.

D. Warning Signs

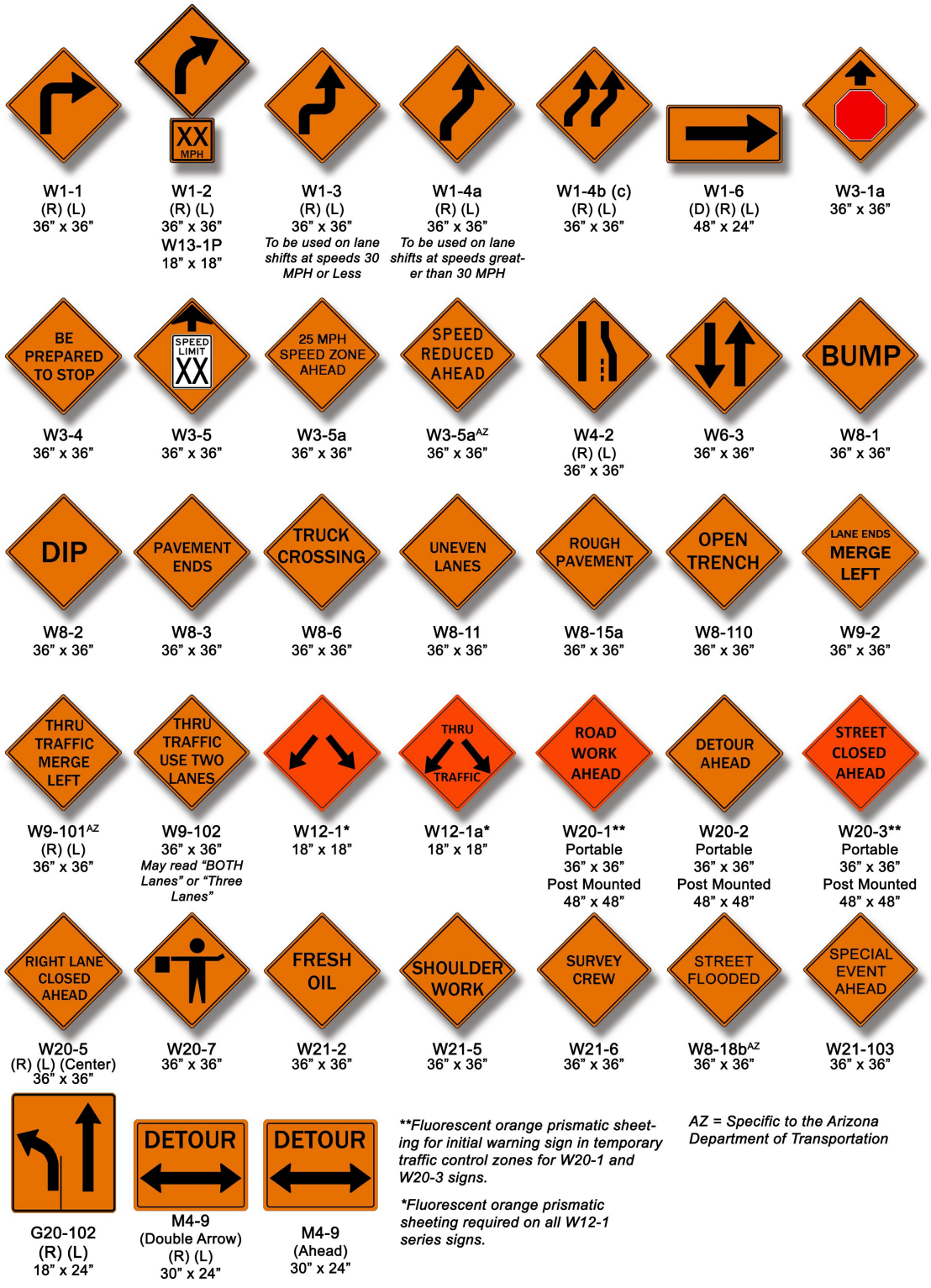
Warning signs are used to notify unfamiliar motorists of specific hazards or restrictions in temporary traffic control zones. Within construction zones there may be a variety of temporary roadway conditions, such as reduced width, open excavations, or pavement removal. Motorists must be properly alerted well in advance to provide adequate time to react safely.

All warning signs are provided by the Permit Holder. Commonly used signs are illustrated in *Figure 13.*

Warning signs used in temporary traffic control zones shall be diamond shaped, except as shown in the warning sign illustrations. They shall have a black legend and/or symbol on an orange or fluorescent orange background. The warning signs illustrated shall be used for only those situations indicated by their legend or symbol. Distances such as 500 feet, 1,000 feet, 1/4 mile, or 1/2 mile may be used in place of the word "AHEAD" on advance warning signs and numerals may be used in place of words (e.g., "2" instead of "TWO").

The "ROAD WORK AHEAD" (W20-1) sign shall be used in advance of all construction and maintenance areas, except for exempt process (slow moving or short duration work in service vehicles). Minimum spacing for advance warning signs in advance of channelization should be equal to the taper lengths shown in *Tables 2, 3, & 4.*

Figure 13 – Warning Signs



***Fluorescent orange prismatic sheeting for initial warning sign in temporary traffic control zones for W20-1 and W20-3 signs.

**Fluorescent orange prismatic sheeting required on all W12-1 series signs.

AZ = Specific to the Arizona Department of Transportation

V. WORK ZONE SPEED LIMIT PROCEDURES

Speed limit signs are regulatory signs, and procedures for establishing work zone speed reductions may be appropriate. Procedures for determining when work zone speed reductions are required are outlined here. Speed reduction in work zones are required when the following conditions exist for temporary traffic control work zones:

- Roadway grade differential
- Roadway geometric changes
- Insufficient lighting for driver visibility
- Major traffic shift
- Flagging operation
- Lane Width Reductions

Research has shown that achieving large speed reductions in work zones is difficult, and it is preferable to not reduce speeds in work zones more than 10 miles per hour, except in unusual circumstances. Where speed limits are posted, the speed limit signs will conform to the following:

"SPEED LIMIT" signs are to be co-mounted with "WORK ZONE" signs when reducing speed limits within construction areas. Combining "WORK ZONE" and "SPEED LIMIT" signs has been found to be an effective method of encouraging speed reductions. Most motorists associate the lower speed limits with work zone activities and will adjust their speeds accordingly. Typically, there shall be a minimum of one sign combination in advance of construction, and a minimum of three signs per one-half mile for each direction of traffic affected. The large, post-mounted "WORK ZONE" and "SPEED LIMIT" signs may also be combined on posts at the side of the street for arterial street widening projects. At other locations, small signs on portable supports may be used. Existing, conflicting "SPEED LIMIT" signs shall be covered or removed.

Figure 14 – Work Zone Sign

G20-5aP

The "SPEED LIMIT 25" (R2-1) sign is typically used where the existing pavement has been removed, or where traffic is being maintained on temporary detour roads, on unpaved shoulders, or on traffic lanes that are severely restricted.

The "SPEED LIMIT 35" (R2-1) is commonly used where traffic is being maintained on new asphalt paving during the completion of street paving projects, and in most construction zones, on improved streets where restricted traffic is maintained on a reduced number of lanes.

Speed limits by State law shall not be reduced by local agencies in increments greater than 10 miles per hour. The "SPEED LIMIT 35" sign is also used for interim speed reduction in construction areas until construction progress requires 25 miles per hour.

VI. BARRICADES AND OTHER CHANNELIZING DEVICES

Channelizing devices are the most important part of temporary traffic control in temporary traffic control areas. They are used to warn, and alert motorists of conditions created by work activities in or near the roadway and to guide roadway users. They are also used to separate vehicular traffic from the workspace, pavement drop-offs, pedestrians, and opposing traffic. They are not intended to be physical barriers. Channelizing devices should always be used in groups to warn and guide traffic.

Flag rope may be used between barricades and channelizing devices to provide additional guidance and security. In some major construction areas, and in areas with substantial pedestrian traffic, the use of fencing may be necessary for maximum safety.

New and improved guidance is evolving to better design for those with low vision. Increasingly, in long-term work zones, the techniques listed in this paragraph may no longer be appropriate depending upon the alignment of newly defined pedestrian paths. Designers should consider evolving technology, and where practical, design for pedestrians with low vision. The key to doing so is to provide continuous detectable bottom and top rails on channelization devices without gaps. See Sections 6F.63 and 6F.74 of the MUTCD for additional information.

Channelizing devices used to guide motorists must provide a smooth, gradual transition when moving traffic from one lane to another or onto a bypass detour, or when reducing the width of the street. This smooth, gradual transition is referred to as the "taper length." **The minimum desirable taper length formulas, calculated taper lengths, and spacing of devices for tapers are shown in Tables 7 and 8.**

It is the responsibility of the Permit Holder to provide and maintain temporary traffic control devices. All temporary traffic control devices shall be stabilized with sandbags, or other approved material (ballast), when necessary. Ballast shall be placed on the lower parts of the frame, or on the base, and not placed on top of any striped rail. The use of rocks, concrete blocks, concrete, or asphalt chunks, etc. as ballast is not permissible.

Channelization devices work as a system. Periodic reminder signing (such as "KEEP RIGHT/LEFT" signs) may need to be placed at frequent enough intervals that the proper message is self-evident to drivers. Channelization signs and devices must be provided whenever:

- Traffic is moved across the street center line;
- The existing center line is obliterated; or
- Traffic is maintained in other than the normal traffic lanes.

Minimum desirable taper lengths apply to streets of relatively flat grade and straight alignment. Adjustments may be desirable to provide adequate sight distance on the approach to channelization, and to accommodate cross streets and adjacent driveways. In urban areas characterized by short block lengths and driveways, longer tapers have not proven to be better than shorter ones. The reason for that is that extended tapers tend to encourage sluggish operation and encourage drivers to delay lane changes unnecessarily to the last moment, which creates friction.

When more than one lane is closed, a tangent length of channelization between the two closed lanes of no more than twice the taper length is desirable to distinguish between the two separate lane closures. Experience has shown that on busy streets with short block lengths, other factors make it imprudent to use that much distance. However, having some tangent clearly operates better than having none. *(See Table 4, page ii).*

When lanes are not closed, but rather re-directed, a shifting taper (½ L) using channelizing devices is helpful to clarify the driver's path. This is particularly useful in urban areas with all but extended long duration work where the three-dimensional channelizing devices overpower non-applicable pavement markings. *(See Tables 1 and 3, page ii).* Spacing for devices used in tangent areas between tapers should be the same as the spacing for devices used in the adjacent tapers.

Channelizing devices are also used to protect workers in the street and to guide and protect pedestrians. Consequently, it is important that the design of channelizing devices be substantial enough to provide protection, yet not pose a threat to road users should a collision occur.

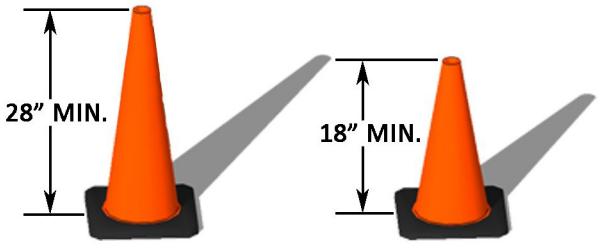
Typical uniform applications of channelizing devices are shown in the illustrations included in this Manual. Situations not illustrated shall be handled in conformance with the general methods set forth.

Traffic Cones: Traffic cones are used to channelize traffic, divide opposing traffic lanes, divide traffic lanes when two or more lanes are open in the same direction, and delineate minor maintenance operations. When traffic cones are used to divide traffic lanes or delineate minor maintenance operations, spacing should not exceed 50 feet.

Traffic cones are effective for **daytime** channelization of traffic and to delineate minor maintenance areas. Traffic cones are versatile because they are portable and if struck, they will not damage vehicles. They can be set up and removed quickly. When traffic cones are used, it is necessary to check them often because vehicles frequently move them. Cones are normally not considered suitable for nighttime use, except under emergency conditions, or special circumstances approved by a ROW Management Program administrator.

All cones shall be orange and a minimum of 28" in height, with the exception that 18' cones may be used during day hours and on local streets. For nighttime use, cones shall be retro-reflectorized.

Figure 15 – Traffic Cones



Nighttime and/or Arterial or Collector Roadway **Daytime and Local Roadway**

Steps should be taken to minimize the possibility of cones being blown over or displaced by wind or moving vehicular traffic. Cones may be doubled up to increase their weight.

Some cones are constructed with bases that can be filled with ballast. Others have specially weighted bases, or weight such as sandbag rings can be dropped over the cones and onto the base to provide added stability. Ballast should be kept to the minimum amount needed.

When traffic cones are used to channelize traffic, they shall be placed using an appropriate taper where applicable. Taper lengths should be as shown in *Table 2*. Because cones are smaller and less visible than standard barricades, ***spacing between cones used to channelize traffic should not exceed 50 feet for tangents and 25 feet for tapers, regardless of speed.***

Cones should not be used for pedestrian channelization or as pedestrian barriers in work zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes.

Vertical Panel Channelizing Devices: Vertical panels are devices to enable 24-hour channelization. They are used in place of traffic cones when channelization is needed during nighttime hours. They are versatile because their height and amount of retro-reflective sheeting makes them substantially more visible than normal pavement markings. They are portable, lightweight, and use less street width than standard barricades. Professional experience indicates that at city speeds, vertical panels (when properly placed) override any existing pavement markings; therefore, positive guidance pre- vails to the point that existing pavement markings can remain, as they do not induce driver confusion.

Markings on vertical panel channelizing devices shall be alternate orange and white stripes, sloping down at a 45-degree angle to the side on which traffic must pass. When used to divide two traffic lanes in the same direction, the stripes shall slope down to the side on which traffic is being diverted. *(See Figure 16, page 60)*. Both stripes (orange and white) shall be reflective with **Type IV (minimum)** high intensity retro-reflective sheeting.

Vertical panels shall be constructed of suitable material to the dimensions shown in *Figure 16,page 60*. The base and panel support should be substantial, designed to prevent overturning, and yet sturdy enough to ensure they do not become a projectile. Because the base can be an obstacle to traffic when

overturned, the base and support should be designed to minimize damage to a vehicle if struck. The base and panel support shall be galvanized, aluminum, or white in color, except rubber bases, which may be black.

Vertical panels are used to channelize traffic, divide opposing lanes of traffic, divide traffic lanes when two or more lanes are maintained open in the same direction, and in place of standard barricades where space is limited. When vertical panels are used to channelize traffic, they shall be placed on a taper to guide motorists past hazards. Taper lengths and vertical panel spacing should be as shown in *Table 2, page ii*.

When vertical panels are used in place of standard barricades to ***delineate hazards*** parallel to traffic, spacing should not exceed ***50 feet.*** When used to divide opposing lanes of traffic or divide two or more lanes traveling in the same direction, spacing should not exceed ***75 feet*** for short distances and ***150 feet*** for extended distances.

Vertical panels used during nighttime hours shall have an approved and operating barricade warning light mounted on top of panels that are components of a merge or shift taper. Warning lights are optional on tangent sections of the traffic control setup. Steady-burn warning lights should be considered by permit holder for use in areas with fog or snow, severe vertical or horizontal roadway curvature, nearby vertical drops or trenching, unlit roadways, and usually cluttered environments.

Type C, steady-burn warning lights shall be used in a series to channelize or guide traffic through merge or shift tapers, while Type A, flashing warning lights shall be used to delineate hazards at night.

Drums as channelizing devices are rarely used on urban streets in the Phoenix area due to space constraints. If drums are proposed for use, refer to Section 6F.67 of the MUTCD.

Barricades: Barricades used in the City of Phoenix shall be three types: Type I, II, and III. *(See Figure 16, page 60)*. Markings for all barricade panels shall be alternate orange and white stripes sloping down at a 45-degree angle to the side on which traffic is to pass. Both stripes (orange and white) shall be retro-reflective with Type IV (minimum) sheeting.

All barricades shall be constructed of suitable materials to the dimensions shown in *Figure 16, page 60.* Barricade supports shall be substantial enough to support what they hold.

Types I and II barricades are intended to channelize traffic through temporary traffic control work zones. Types I and II barricades are also used to delineate hazards in or near the street or sidewalk, or to close local and Collector Streets or sidewalks and alleys. When used to ***delineate hazards*** parallel to traffic, spacing should not exceed 75 feet. When used to close streets, sidewalks, and alleys, spacing should not exceed 5 feet.

Type I and II barricades used to channelize traffic shall be placed on a taper to guide motorists past hazards. Taper lengths and barricade spacing should be as shown in *Table 2, page ii.*

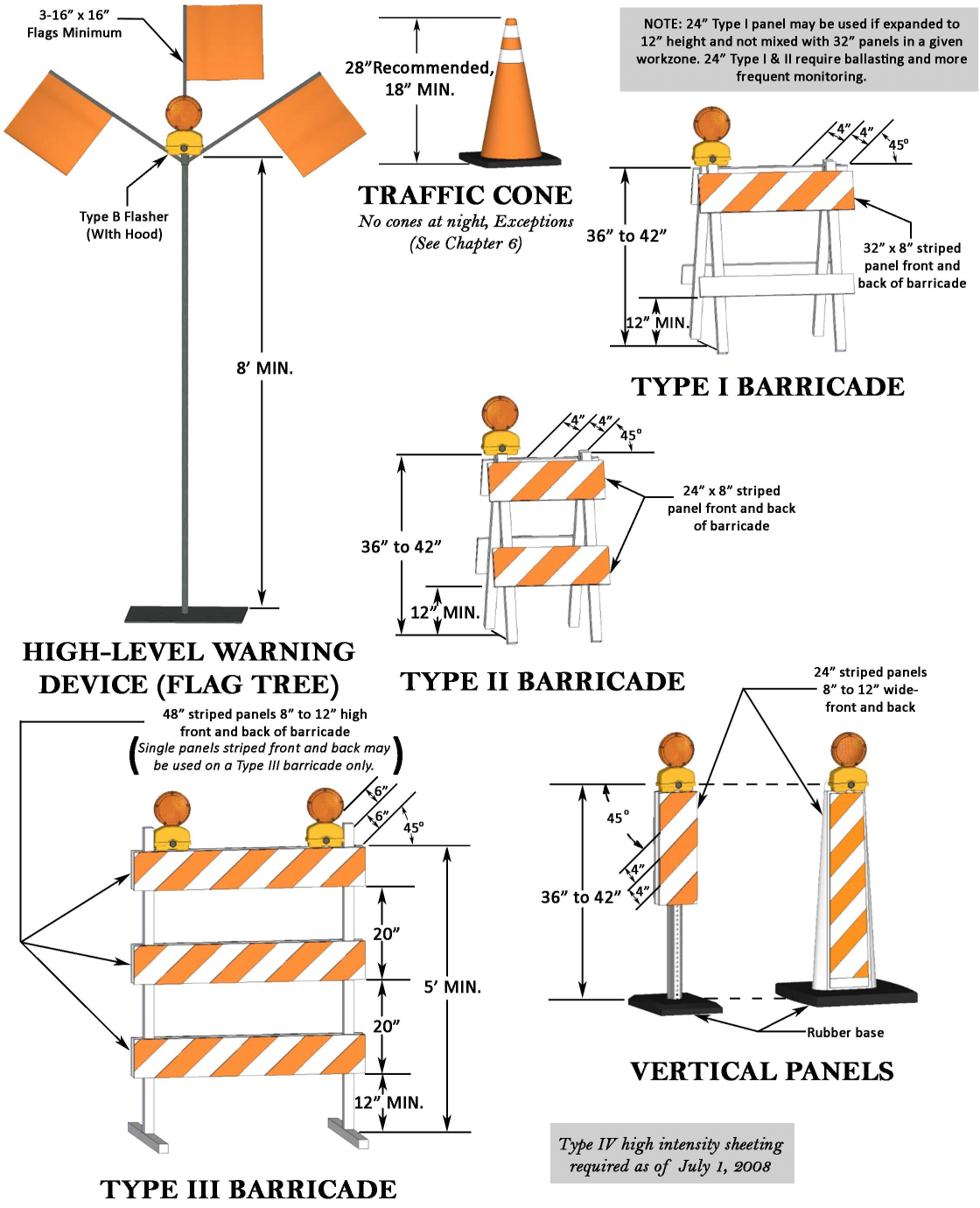
Type III barricades are used for complete street closures of Arterial streets when they are under construction. They shall be placed with a minimum of one on each side of the "STREET CLOSED TO THROUGH TRAFFIC" (R11-4) sign, and one centered on the back of the sign. Additional Type III barricades shall be used as required to close the street to through traffic.

Barricades used during hours of darkness shall have an approved operational barricade warning light attached. The warning light shall be mounted above the top panel and on the end of the barricade

closest to traffic. Type A flashing warning lights are used to delineate hazards and close streets, sidewalks, and alleys. Type C steady-burn warning lights are used in a series to channelize traffic and guide traffic through construction areas.

Types I, II, and III barricades are to have the responsible party's (Permit Holder) name and phone number placed near the bottom of the lowest panel. The letters are to be clearly legible and not less than one inch or more than two inches in height.

Figure 16 – Barricades and Other Devices



VII. BARRICADE WARNING LIGHTS

Barricade warning lights are yellow and mounted atop appropriate traffic control devices to call attention to the device and to provide alignment information to motorists. They shall be mounted on signs, barricades, and channelizing devices, as specified in this ***Manual***. Warning lights are optional on vertical panels that are components of tangent sections of the traffic control setup. However, steady-burn warning lights on vertical panels should be considered by permit holder for use in areas with fog or snow, severe vertical or horizontal roadway curvature, nearby vertical drops or trenching, unlit roadways, and usually cluttered environments. All barricade warning lights shall be in operation during nighttime hours.

Warning lights are portable, battery or solar powered, lens directed, enclosed light, which must be maintained so that the light provides proper illumination during nighttime hours.

Warning lights are to have minimum seven-inch diameter lenses that emit a yellow light and comply with the current Institute of Transportation Engineers "Purchase Specifications for Flashing and Steady-Burn Warning Lights." See Section 1A.11 of the MUTCD for additional information.

The four types of warning lights include: Type A, low-intensity flashing warning lights; Type B, high-intensity flashing warning lights; Type C, steady-burn warning lights; and Type D, 360-degree steady-burn warning lights.

- ***Type A, Low-Intensity Flashing Warning Lights*** are used to help warn drivers during night-time hours. In Phoenix, they shall be used on all signs mounted on portable supports and on all channelizing devices (except cones and tubular markers) used to mark hazards and close streets. Type A warning lights are not intended to guide traffic.
- ***Type B, High-Intensity Flashing Warning Lights*** are used to help warn drivers both daytime and nighttime and shall be used on advance warning signs that are street mounted for major street construction and on "Flag Type" High-Level warning devices when used at night.
- ***Type C, Steady-Burn Warning Lights*** are to be used on barricades and vertical panel channelizing devices when used to guide traffic, form tapers, and delineate centerlines, lane lines, and the edge of the traveled way. Type C warning lights may be used on devices to mark hazards, but they are generally less effective than flashing lights for this purpose.
- ***Type D, 360-degree Steady-Burn Warning Lights*** may be used during nighttime hours to delineate the edge of the traveled way, or on the outside of a curve. Type D warning lights may be used in place of Type C warning lights.

VIII. HIGH-LEVEL WARNING DEVICE (FLAG TREE)

High-level warning devices (flag trees) are effective traffic control devices. They are particularly helpful in cities with busy streets because they are designed to be seen over the top of preceding vehicles. This height is particularly effective in providing drivers with advance notification of the need to shift or merge lanes. Use of a high-level warning device (flag tree) is required for advance warning of closures. When a closure is active during night hours, an arrow panel is required in place of a high-level warning device (flag tree).

Along with being required for advance warning of all lane closures, a high-level warning device (flag tree) is required in other circumstances such as flagging operations, surveying, etc. On fixed-location projects, high-level warning devices (flag trees) should be placed within or behind the channelization near the center of the area closed.

High-level warning devices (flag trees) shall display two or more flags supported so that the lowest point of the flags is 8 feet or more above the street. *(See Figure 16, page 60)*. The flags shall be orange or fluorescent orange in color, and 24 inches square or larger. The flag support and base shall be substantial to resist overturning by wind. The flag support shall be galvanized, aluminum, or white in color.

During hours of darkness, each high-level warning device (flag tree) must be equipped with a minimum of one Type B High-Intensity Flashing Warning Light mounted more than 8 feet above the street. If equipped with a remote battery, the battery shall be mounted at the base, at ground level, to provide additional stability.

One high-level warning device (flag tree) is required for each direction of traffic affected. The devices shall be placed within, or behind the channelization, near the center of the area closed. Additional high-level warning devices (flag trees) may be used to support signs.

IX. FLASHING DEVICES AND APPLICATIONS

Rotating flasher and strobe light-type high-level warning devices are typically vehicle mounted. Electrically operated, rotating Sealed Beam or halogen lamp flashers, or strobe light flashers, may be used instead of, or in addition to, flag type high-level warning devices. Rotating Sealed Beam flashers shall consist of one or more Sealed Beam units at least four inches in diameter, rated at a minimum of 30,000 candlepower each. They shall emit a yellow light with a flash rate of 70 to 110 flashes per minute. LED flashers shall consist of multiple LEDs with a minimum rating of 0.5 watts each and is capable of multiple flashing patterns with a range of 65 to 240 flashes per minute.

Halogen lamp flashers shall consist of one or more halogen lamps with a minimum rating of 50 watts, generating 50,000 candlepower each, reflected in a rotating or alternating pattern by high-quality parabolic reflectors. They shall emit a yellow light with a flash rate of 70 to 120 flashes per minute. Strobe light flashers shall be rated at a minimum of one million candlepower at the bulb. They shall emit a yellow light with a flash rate of 80 to 120 flashes per minute.

Rotating flashers or strobe lights shall be mounted on a vehicle or other substantial support. When practical, they shall be mounted at a minimum height of 8 feet above the street. The vehicle or other support with flashers in operation shall be positioned behind the required channelization and near the center of the area closed, except when used on a moving service vehicle.

Use of rotating flashers or strobe light-type high-level warning devices is particularly desirable during nighttime hours. They should be used instead of the flag-type high-level warning device, with flasher attached, whenever practical.

X. ARROW BOARDS

Arrow boards provide additional advance warning and directional information to assist in diverting traffic, which is especially effective under high-volume traffic conditions and at night. An arrow board's primary function is to provide advance warning of closed traffic lanes. Arrow boards are designed to flash directional arrows or chevrons. Arrow boards are powerful devices that can be seen far ahead of time and are required for use on Arterial streets when lanes are fully closed at night. If two lanes are closed sequentially, an arrow board is required for the first one to get the driver's attention. The only exceptions will be emergencies, or when service vehicles are used instead. A common example of when arrow boards may be required is when geometric conditions prevent the normal advance warning and taper/tangent distances from being achieved.

Arrow panels shall be rectangular (except type D, which are intended for use on service vehicles and have no panel). In the case of type D, the arrow length is 48", with an arrowhead width of 24." Arrow panels should meet the following specifications:

Figure 17 – Advance Warning Arrow Board Display Specifications (Figure 6F-6, MUTCD, 2009)

Operating Mode	Display (Type C arrow board illustrated) (right arrow shown; left is similar)
1. At least one of the three following modes shall be provided:	
Flashing Arrow	 Merge Right
Sequential Arrow	 Merge Right
Sequential Chevron	 Merge Right
2. The following mode shall be provided: Flashing Double Arrow	 Merge Right or Left
3. At least one of the following modes shall be provided: Flashing Caution or Alternating Diamond Caution	 Flashing Caution or Flashing Caution or Alternating Diamond Caution

Arrow Board Type	Minimum Size	Minimum Legibility Distance	Minimum Number of Elements
A	48 x 24 inches	1/2 mile	12
B	60 x 30 inches	3/4 mile	13
C	96 x 48 inches	1 mile	15
D	None*	1/2 mile	12

*Length of arrow equals 48 inches, width of arrowhead equals 24 inches

NOTES:

Type A arrow panels are appropriate for use on low-speed urban streets.

Type B arrow panels are intended for use on intermediate speed facilities and for moving operations on high-speed roadways.

Type C arrow panels are intended for use on high-speed, high-volume facilities such as freeways and expressways; however, they may be used on City streets when additional warning is desirable.

Minimum mounting height should be 7 feet from the roadway surface to the bottom of the board, except on vehicle-mounted panels which should be as high as practical. Arrow boards must be in compliance with the specifications provided in Section 6F.61 of the *MUTCD*.

Arrow boards should be positioned on the shoulder, or in the parking lane, and at the beginning of the taper, where practical. When width is restricted, the arrow board should be positioned behind the required channelization near the start of the merging taper. When arrow boards are used to close multiple lanes during nighttime hours, a separate arrow board shall be used for each closed lane.

Since use of arrow boards can cause unnecessary lane changing, their best use is for closed lanes. In general, they should not be used for shoulder or roadside work activities.

XI. PORTABLE CHANGEABLE MESSAGE SIGNS

Mobile, electronic sign displays, such as portable changeable message signs, may be mounted on a trailer. Experience has proven the effectiveness of providing advance notice of projects though the use of portable changeable message signs. This notice can be provided up to 14 days in advance of the work. Careful attention should be given to the placement of these signs, so they do not impede pedestrians, block driveways, or create visibility obstructions. changeable message signs must be placed on public right-of-way. A portable changeable message sign may be used to simulate an arrow board display.

XII. TEMPORARY PAVEMENT MARKINGS

Temporary pavement markings may be used to guide traffic in temporary traffic control areas when clean, hard surfaced street or detour roadway surfaces exist. Temporary pavement markings must be kept clean at all times. Normally, they should be used in combination with signs and channelizing devices. Upon project completion, temporary pavement markings shall be removed, and permanent markings replaced. See Section III for the removal of conflicting pavement markings for acceptable obliteration methods.

The Street Transportation, Traffic Services division can approve reflective paint lines, pavement marking tape, or raised pavement markers to be used for temporary traffic control. Temporary pavement markings are generally used on paved detours and on arterial street construction between the completion of asphalt layers. ***Unless specifically approved otherwise by the Traffic Services Division*** when used on arterial street construction, temporary left-turn lanes shall be marked at all signalized intersections.

Reflective paint lines shall be applied with a suitable paint striping machine using City of Phoenix specifications for traffic paint and reflective glass beads, or an approved substitute. Paint lines shall have a minimum wet film thickness of 15 MILS with 6 pounds of glass beads applied per gallon of paint.

A two-week minimum notice is required for overlays. This allows sufficient time for the City of Phoenix Field Investigators to create work orders in order to schedule striping and pavement marking work.

Although vertical panels may be used to separate directional traffic flow during overlay construction, one application of paint striping or overlay markers for the entire street must be provided within forty-eight hours after completion of the overlay project on Arterial and Collector streets. This includes center lines, two-way left turn lanes, turn lanes, and white dashed lane lines. Other final striping such as pavement arrows and crosswalks are normally completed by City crews. All striping layout should be based on a striping plan and completed in coordination with the Street Transportation Sign Shop.

Reflective pavement marking tape, specifically manufactured for pavement marking, may be used in place of paint lines for temporary applications. Pavement marking tape shall be durable and have the appearance and reflectivity of paint lines. Application of short pieces of pavement marking tape to form dashed lines instead of pavement striping is not acceptable. Centerline markings are to be two 4-inch-wide yellow lines with a 5-inch space between.

Lane line markings are to be 4-inch-wide white lines, placed with 15 lineal feet of marking and 25 lineal feet of space between markings. ***When approaching marked crosswalks at unsignalized locations, the lane markings shall be 6 inches wide and solid, rather than dashed, to inhibit lane changing and speed and to enhance notification that a crosswalk exists.*** Edge lines are to be 4-inch-wide continuous white lines.

Barrier lines for mandatory turn lanes, pavement edge tapers, and lane transitions are to be 10-inch-wide white lines. Normal crosswalk lines are to be white and 10 inches wide while school zone 15 mph crosswalks are to be yellow.

As part of an overlay/slurry/fog operation, raised reflective pavement markers may be used instead of, or in conjunction with, paint or tape markings. Raised reflective pavement markers are most helpful when installed on unlit curves, unlit areas, and on detours.

Centerline markers shall be yellow, while lane line and edge markers shall be white. When used instead of centerlines, the spacing between raised reflective pavement markers shall not exceed 10 linear feet on straight alignments and 5 linear feet on curves. Spacing between markers used to supplement centerlines, lane lines, and edge lines shall not exceed 40 linear feet on straight alignments and 20 linear feet on curves.

Lane lines shall be in groups of three markers, spaced 5 linear feet apart, with 15 linear feet of space between groups on straight alignments and 10 linear feet of space between groups on curves.

When reflective markers are used to supplement edge lines, their spacing should be at least twice as frequent as the adjacent lane lines.

The contractor must completely remove the markers at the end of the project, prior to the City permanently striping the roadway. The contractor is responsible for all damage to the pavement caused by the removal of the raised reflective pavement markers.

XIII. TEMPORARY TRAFFIC SIGNALS

A temporary traffic signal system may be used to control vehicular traffic movements at construction or maintenance work areas, when a traffic engineering study indicates it is necessary. The Traffic Operations Division must specifically approve each use.

All traffic signal control equipment shall meet the applicable standards and specifications prescribed in Parts IV and VI of the *MUTCD*. If a temporary traffic control signal is installed, the "TRAFFIC SIGNAL AHEAD" (W3-3) sign shall be placed in advance of all approaches.

If it is desired to use temporary traffic signals, the Permit Holder shall prepare a detailed Traffic Control Plan (TCP) showing the location, use, timing, and hours of operation at each work area for approval prior to installation. Signal controller phasing and timing must be pre-approved by the Street Transportation Department, Traffic Services Division. Only Police Officers or properly trained Police Assistants under the direct on-site supervision of a Police Officer, may Manually control permanent or temporary traffic signals, unless otherwise approved by the Street Transportation Department, ROW Management Program Section.

XIV. CONCRETE BARRIER

Portable barriers are usually precast, reinforced concrete units, commonly referred to as Jersey Barriers or Temporary Traffic Barrier Walls (TBW). These devices are approximately 36 inches high, vary in length, and taper from a wide base to a narrow top. They are designed to be physical barriers placed parallel to traffic lanes to help prevent penetration of vehicles leaving the traveled way, there- by minimizing injuries to vehicle occupants, and to protect workers, bicyclists, and pedestrians.

The four primary functions of TBWs are to:

1. Keep vehicular traffic from entering work areas, such as excavations or material storage sites;
2. Separate workers, bicyclists, and pedestrians from motor vehicle traffic;
3. Separate opposing directions of vehicular traffic; and
4. Separate vehicular traffic, bicyclists, and pedestrians from the work area as false work for bridges and other exposed objects are being used.

Portable barriers shall only be used in combination with the required signs and supplemented with standard barricades and channelizing devices for improved daytime and nighttime visibility. Barriers may serve the additional function of channelizing traffic. When serving this function, barriers shall be light in color and equipped with vertical panels, marking tape, and barricade warning lights. The first two warning lights at the start of a continuous barrier shall be Type B, flashing warning lights. All other warning lights shall be Type C, steady-burn warning lights. Spacing for barricade warning lights and vertical panels shall be as required for vertical panel channelizing devices in this Manual.

The traffic approach ends of all portable barriers shall be protected from vehicle impact by the use of impact attenuators or flaring the ends to be outside the clear zone. When space permits, approach ends shall be flared at a 45-degree angle to a minimum of 10 feet from the traveled way. When space does not permit, barrier ends shall be protected with impact attenuators, as required in the *MUTCD* and the *AASHTO Roadside Design Guidelines*.

XV. WATER-FILLED BARRIER

Standard "water-filled" barriers are suitable for use with the following stipulations:

- Water-filled barriers are to be placed parallel to the direction of traffic flow.
- The traffic approach or angled "flared-ends" are to be standard precast reinforced concrete units.
- The devices may only be placed on Phoenix streets after proper review of the entire work zone and approval of the specific TCP.

Chapter 7

Manual Traffic Control – Police and Flaggers

Manual control of traffic is essential at times, in order to add the human decision element to complex temporary traffic control situations. By using human judgment, Police Officers and flaggers can accomplish things that no physical traffic control device can do. Police Officers and flaggers can visually assess traffic conditions and respond accordingly.

Use of Police Officers for Manual control of traffic is expensive but essential during complex temporary traffic control work. Police control is often required at traffic signals when lane closures exist. It is essential that human judgment be present (police) at signals to allocate green time to best move traffic through the intersection.

When an officer is required by the Street Transportation Department, uniformed Phoenix, Maricopa County Sheriff's Office, Department of Public Safety, and State Capital law enforcement officers are preferred for traffic control in Phoenix. Using officers from these agencies expedites enforcement (citation writing) and ensures reliability. The City seeks officers equipped with portable radio/phone to enable prompt contact with appropriate Phoenix police, and those who display a firm understanding of traffic safety and operations. If officers from these entities are not available, you may use other State of Arizona POST certified police officers.

I. POLICE CONTROL

On-duty Police Officers are only available for use during emergency conditions and for traffic control during restrictions by City Departments when traffic conditions warrant. On-duty Police Officer use is coordinated by the Police Department Information Desk. Call 602-262-7626 Monday through Friday from 7:30 a.m. to 3: 00 p.m.

Off-duty Police Officers are to be hired by the Permit Holder for traffic control when required. Off-duty Police Officers can be arranged contractually, or if Phoenix Police Officers are unavailable through agencies, Permit Holders may arrange for them by calling the same number listed above if 24-hour advance notice is provided. Police Officers that are alert, visible, and accommodating can be a valuable public relations asset for both the City and the Permit Holder. Conversely, they can create a poor image for the City if they are not contributing to the efficient and safe movement of traffic. Since officers wear an official uniform, their performance reflects powerfully upon Phoenix.

Expectations of the City and employers of Police Officers hired to provide Manual traffic control are set high. When police officers are hired to support construction/maintenance/special event efforts, expectations are that officers will:

- Perform in a manner that favorably reflects on the City of Phoenix
- Manually operate signals in such a manner so as to benefit pedestrians, public vehicular traffic, and the Permit Holder
- Position themselves in such a manner as to have access to the traffic signal cabinet, yet maintain a full view (360-degree vision) of ALL traffic movements
- Station their vehicle in a manner that does not block sidewalks or traffic

Upon arrival at the job site, the off-duty Police Officer shall:

- Contact the Permit Holder or assigned City inspector to receive detailed instructions on how the movement of the displaced traffic is to be sequenced through the signalized intersection
- Be equipped with the proper equipment (e.g., highly visible safety vest, signal cabinet access key, two-way radio, etc.) as required to perform this vital temporary traffic function
- Ensure that physical obstructions (e.g., no vehicles parked on sidewalks and/or near the signal controller cabinet) prevent access for pedestrians with disabilities
- "Stand-their-post" at all times except for during planned breaks (e.g., not simply watching work being performed, etc.). As with any employer, breaks need to be coordinated with the Permit Holder. This includes work shift changes for continuous operation of the intersection

Additionally, other **duties** of off-duty Police Officers assigned to temporary traffic control sites may include, and are not limited to, the following:

- Keep traffic lanes functional, and free of all illegally parked vehicles
- Enforce properly signed turn restrictions at intersections to achieve the required number of through lanes to maintain traffic flow
- Request a copy of the approved TRACS permit and the Traffic Control Plan from the Permit Holder
- Confirm work zone set-up has proper advance warning of critical issues such as lane closures
- Do what is necessary to affect Manual traffic control when needed to cope with unforeseen, traffic pattern changes such as during bridge beam erection and blasting operations
- Observe, and immediately report, traffic problems to the appropriate inspection staff
- Enforce speed limits/other restrictions in or near the work zone
- Assist as needed with temporary traffic control setup and takedown activities
- Assist flagging operations as needed by providing a more authoritative presence to motorists

II. FLAGGER CONTROLS

Flaggers (see definition) should be alert, courteous, neat, and possess a sense of responsibility for the safety of the public and work crews. Flaggers shall be certified by the American Traffic Safety Services Association (ATSSA) or an equivalent credited training institution by **one year after the Manual is adopted by the Phoenix City Council** and must have registration card and photo identification on person during flagging operations.

For daytime and nighttime activity, flaggers shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107-2004 publication entitled "American National Standards for High-Visibility Apparel and Headwear (see Section 1A.11 of the MUTCD). Flaggers shall also wear an approved hard hat and incorporate the use of an authorized STOP/SLOW sign to Manually control traffic. The STOP/SLOW sign shall be 18 inches wide and octagonal shape with 6-inch Series C letters. The STOP face shall have a red background with white letters and border. The SLOW face shall have an orange background with black letters and border. The sign shall be mounted on a suitable staff to support the sign a minimum of 5 feet from the ground when in use.

The use of flags for controlling traffic is limited to emergency use only. Flagging procedures are illustrated in *Figure 18*, *page 70*.

Flaggers shall be stationed at a readily visible location on the shoulder, or behind channelization, in advance of the restriction. Flagger stations shall be marked with a high-level warning device (flag tree). "FLAGGER AHEAD" and "BE PREPARED TO STOP" signs shall also be used in advance of each station. **At no time should a Flagger be allowed to stand in the traveled portion of the roadway or cross a traffic lane to stop more than one lane of traffic.**

Each Flagger station shall be illuminated during nighttime hours. All traffic control devices, including the STOP/SLOW sign and the Flagger's vest, shall be reflectorized. Signs, barricades, and channelization in advance of each Flagger station shall have barricade warning lights attached and in operation.

Flaggers are limited by the ***MUTCD*** to flagging operations that can be accomplished from the edge of the traveled way, but Police Officers are authorized by City Code to direct traffic as required. Police Officers can operate traffic signals, control multiple lanes of traffic, complete intersections, and even permit/prohibit specialized lane movements. They can also assist pedestrians and enforce traffic restrictions.

III. POLICE OFFICER AND FLAGGER FUNCTIONS

Police Officers or flaggers, depending on the situation, are required at locations where equipment is intermittently blocking or crossing a traffic lane, or where ***only one traffic lane*** is available for two directions of travel.

Police Officers carry with them the broad authority of State Law to control traffic, and also possess special training. Those characteristics make Police Officers essential (required) at locations such as:

- Multiple-lane, signalized intersections when traffic is restricted to **one through traffic lane** in any one direction,
- Additionally, Police Officers may be required at signalized intersections when restricted to less than the normal number of lanes.

Police officers or flaggers, depending on the situation, are required when a large number of trucks enter and leave construction sites. Use of Police Officers is mandatory whenever Manual control of traffic cannot be performed by Flaggers from the edge of the roadway. Police Officers or Flaggers shall be provided for Manual traffic control as required by ROW Management Program as specified in this Manual.

Figure 18 – Flagging Procedures

To Stop Traffic **To Alert and Slow Traffic** **Traffic May Proceed**

Flaggers shall use a Stop/Slow paddle on a 5' staff and a high level warning device (flag tree) at all times.

Daytime: Flagger must wear ANSI Class II or better vest with a hard hat.

Nighttime: Flagger must wear ANSI Class III apparel with a hard hat and be visible by use of a light tower or other direct light.

IV. AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD) – CERTIFIED FLAGGER:

AFADs are used to control road uses in advance and within a temporary traffic control (TTC) zone. These devices are designed to be remotely operated by a certified flagger who is positioned out of the traffic lane(s).

Only red/yellow lens AFADs will be permitted. The AFADs use remotely controlled lenses and a gate arm to alternately control vehicular traffic. For additional information see the Manual of Uniform Traffic Control Devices (MUTCD) Part 6.

The use of AFADs shall conform to one of the following methods:

- Method 1: an AFAD at each end of the TTC zone, or
- Method 2: an AFAD at one end of the TTC zone and a certified flagger at the opposite end of the TTC zone.

The AFAD shall be furnished, installed, and operated in accordance with the latest addition of the MUTCD.

AFAD Flaggers:

Flaggers shall be certified by the International Municipal Signal Association (IMSA), American Traffic Safety Services Association (ATSSA), or an approved organization, in accordance with ADOT Standard Specification 701-3.13.

An AFAD shall be remotely operated only by a flagger who has been trained on the operation of the AFAD. Flaggers operating an AFAD shall not leave the AFAD unattended at any time while the AFAD is being used. Flaggers operating AFADs shall be trained for a contingency plan in the event of the malfunction of various components of an AFAD.

A single certified flagger may simultaneously operate two AFADs if both of the following conditions are present:

- The flagger has an unobstructed view of the AFAD(s) and,
- The flagger has an unobstructed view of approaching traffic in both directions

Installation and Removal: The contractor shall install the AFADs in accordance with the manufacturer's instructions and recommendations, and to the satisfaction of the Engineer.

The AFADs shall be in use during single lane closures and as directed by ROW Management. When not in use, the AFADs shall be removed and lenses shall not be visible to the traveling public.

Chapter 8

Quality Requirements for Traffic Control Devices

To be effective, a traffic control device (permanent or temporary) must be of high quality and:

- Fulfill a need;
- Command attention;
- Convey a clear, simple meaning;
- Command respect from road users; and
- Give adequate time for proper response.

I. QUALITY OF TEMPORARY TRAFFIC CONTROL DEVICES

The City of Phoenix fully supports the **Quality Guidelines for Temporary Traffic Control Devices and Features (2016 edition)** published by the American Traffic Safety Services Association (ATSSA). Phoenix staff worked with ATSSA in creating photographs that depict signs and barricades in clear stages of degradation. The intent was to define what varying quality levels of signs and barricades were required to command respect from road users. The ATSSA results are shown in the following pages. Inspectors and barricade companies who assess the effectiveness of their devices to **determine** if they fall into at least the "MARGINAL" category should regularly use these graphics. It is important to remember that for safety reasons, and to not risk receiving notices of violation, temporary traffic control devices should always meet or exceed the "**MARGINAL**" category.

The 2009 Manual on Uniform Traffic Control Devices (MUTCD) provides the following support guidance in Section 1A.01 on Temporary Traffic Control (TTC) devices.

"The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets and highways throughout the Nation."

"Traffic control devices notify road users of regulations and provide warning and guidance needed for the uniform and efficient operation of all elements of the traffic stream in the manner intended to minimize the occurrences of crashes."

Traffic control devices are a necessary part of TTC work zones to warn road users of hazards, advise them of the proper path through the work zone, delineate areas where they may not operate, and to separate them from the workers. This is accomplished by the deployment of a setup of devices. The success of a setup depends on the visibility of each device at the time of a project's initial installation as well as throughout the life of the project. Since it is not practical to require new devices at all times, guidelines are needed to evaluate the condition of used devices to ensure continued effective- ness. The guidelines in this publication should aid in the determination of the quality of used devices.

The use of TTC work zone devices subjects them to wear that does not occur with permanent devices. Much of this wear occurs during the storage, shipment, installation, relocation, and removal of devices causing deterioration in appearance. Whenever a high number of worn and damaged devices appear on the same project, the general appearance of the TTC work zone deteriorates, reducing the level of safety provided to the workers, pedestrians, bicyclists, and traveling public.

These guidelines have been developed in an effort to offset the deterioration in appearance of TTC work zone devices. A determination of the condition of device quality should be made at several stages: while in storage, during preparation for delivery to the TTC work zone, during initial set up and periodically during the course of the work. Suppliers and Contractors are encouraged to apply this guideline prior to delivery of devices to the jobsite. Doing so will minimize agency involvement and reduce costs related to on-site replacement.

FHWA policy requires that all roadside appurtenances such as traffic barriers, barrier terminals and crash cushions, bridge railings, sign and light pole supports, and TTC work zone hardware used on the National Highway System meet the crashworthy performance criteria contained in the AASHTO Manual for Assessing Safety Hardware (MASH). All temporary traffic control devices placed in City ROW should conform to these requirements.

The FHWA Safety Website identifies all such approved traffic control devices and includes copies of FHWA acceptance letters for each of them. In the case of proprietary items, links are provided to manufacturers' websites as a source of detailed information on specific devices.

Crashworthiness and crash testing information on devices described in Part 6 of the MUTCD are found in AASHTO's "Roadside Design Guide."

II. QUALITY CLASSIFICATIONS

The quality of the TTC zone devices in this guideline has been divided into three categories: acceptable, marginal, and unacceptable.

At the time of the initial set up or at the time of major stage changes, one hundred percent (100%) of each type of device (cones, tubular markers, drums, barricades, vertical panels, signs, warning lights, arrow panels, changeable message signs, pavement tape, and raised pavement markers) shall be classified as "acceptable." Throughout the duration of the project, the percentage of acceptable devices may decrease to seventy-five percent (75%) of the initial quantity, as a result of damage and/or deterioration during the course of the work, with the remainder of the devices in the marginal category. Unacceptable devices or situations that are found on the jobsite shall be replaced or the situation corrected within twelve (12) hours of notification or as specified in the contract specifications.

Acceptable: Devices that meet the quality requirements in this Manual for this classification and all other requirements such as design, size, color, weight, etc. in the plans and specifications shall be considered to be acceptable for use on highway construction or contract maintenance projects.

Marginal: The term "Marginal" for the purpose of this Manual means "marginally acceptable," reaching the lower end of acceptability. Devices that meet the quality criteria for marginal as described in this Manual may remain in the TTC zone until their number exceeds the specified percent-

age of that type of device or until it is determined that they have become unacceptable. Should the percentage of devices in the marginal category exceed the specified percentage, the proper number of those devices shall be replaced so as to bring the percent of marginal devices to the specified percentage or less.

Unacceptable: Devices in this category shall not be delivered to the jobsite. When found in the TTC zone, they shall be replaced or repaired within 12 hours of notification or as contained in the contract specifications.

Use of temporary traffic control devices found in City of Phoenix ROW rated as Unacceptable may result in fines per City Code 31-204. Devices in the "Marginal" category will not result in fines.

The following photographs, together with the accompanying description, should be used as a guide to determine if the device is acceptable, marginal or unacceptable. A direct comparison of each device to this guideline is not required for rejection of devices; however, this guideline should be used to resolve disputes. One aid in avoiding potential disputes is to retain samples of devices in each category to supplement the photographs shown in the evaluation guides that follow.

III. APPLICATION OF THE QUALITY GUIDELINE

Application of this guideline provides the means to meet the requirements of Section 1A.05 of the MUTCD, which states:

"Physical maintenance of traffic control devices should be performed to retain legibility and visibility of the device, and to retain the proper functioning of the device. Clean, legible, properly mounted devices in good working condition command the respect of road users."

IV. QUALITY GUIDELINES FOR CHANNELIZING DEVICES AND SIGNS

This guideline applies to all channelizing devices and signs that are furnished by the agency, supplier, Subcontractor, or Contractor and used for traffic control in TTC zones.

All channelizing devices and signs shall conform to the requirements of the MUTCD with regards to size, shape, color, placement, and legend. Special signs, if required, are normally detailed in the plans. All are devices required to meet AASHTO MASH standards and shall be approved for use by the FHWA.

Signs shall be substantially plumb to the pavement. Sign positioning at the work site should be determined based on-site conditions. Usually the sign spacing may be increased if a design location proves to be unsuitable. Signs mounted on temporary mounts that are not vertical by design (A-Frame barricade for example) should be as near vertical as practical.

For barricades or vertical panels to be used in TTC work zones, all requirements shall be met to the satisfaction of the contracting agency. Vertical panels shall be erected and maintained in a vertical position. Barricades shall be considered unacceptable if they have bent or twisted legs, unfinished or excessively rusty metal parts, unfinished wooden rails, or deformation of the support assembly to the extent that the barricade panel is not reasonably parallel to the roadway surface.

Channelizing devices and signs should be constructed and ballasted to perform in a predictable manner when inadvertently struck by a vehicle. Channelizing devices and signs should be crashworthy. Fragments or other debris from the device or the ballast should not pose a significant hazard to road users or workers.

Any situation where there are more than two adjacent channelizing devices missing or substantially out of alignment will cause an unacceptable situation.

The evaluation guide that follows is to be used to evaluate the quality of the reflective face and general appearance of signs, barricades, vertical panels, and cones.

Work Zone Signs Quality Evaluation Guide

Figure 19 – Work Zone Signs Quality Evaluation Guide

Acceptable:

There are several abrasions on the surface, but very little loss of lettering. There has been no touch-up of the lettering. This message is legible per the design criteria of the MUTCD

Marginal:

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. This message is legible per the design criteria of the MUTCD.

Unacceptable:

Signs with asphalt splatter 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 50 percent (50%). There is noticeable color fading, and the message is illegible per the design criteria of the MUTCD.

Barricade Quality Evaluation Guide

Figure 20 – Type I, II, or III Barricade or Vertical Panels Quality Evaluation Guide

Acceptable:

Panel is not deformed to an extent so as to decrease the panel's target value. There are several abrasions on the surface, but very little loss of reflective sheeting. The orange is vivid, and the stripes provide contrast.

Marginal:

There are numerous surface abrasions through the panel surface. Some color fading is evident; however, it is free of large areas of residue or missing reflective material. The orange is vivid and the stripes provide contrast.

Unacceptable:

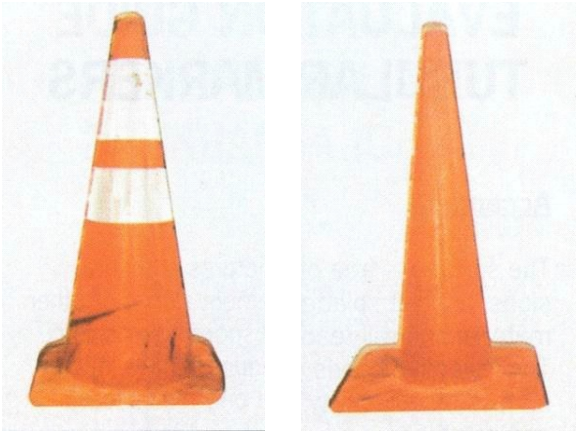
The surface is marred over a high percentage of the panel area. There is noticeable loss of reflectivity and obvious color fading. Panels with asphalt splatter and/or cement slurry, or any combination of missing and covered reflective material similar in area to that shown here would also make a panel unacceptable.

Cone Quality Evaluation Guide

Figure 21 – Traffic Cone Quality Evaluation Guide

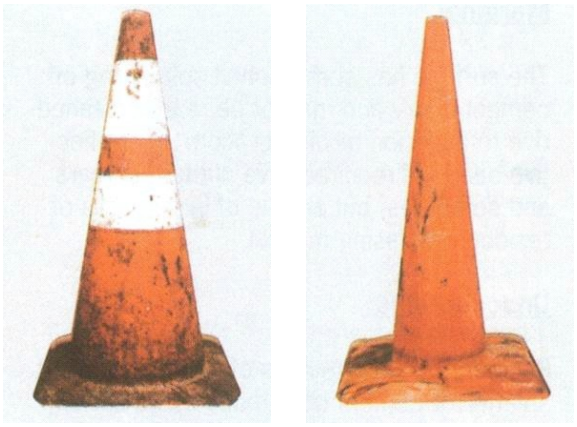
Acceptable:

The conical shape should remain clearly identifiable with no significant distortion and must be free standing in its normal position. The surface is free of punctures and abrasions. The surface is free of asphalt splatter, cement slurry or other material and will readily respond to washing. The reflective bands, if required, have little or no loss of reflectivity, with only minor tears and scratches.



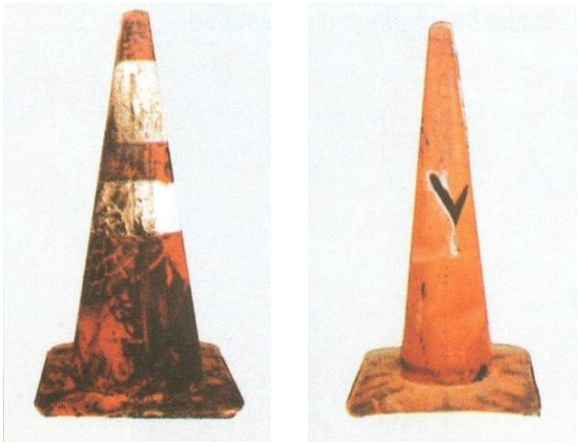
Marginal:

The surface has some asphalt splatterings or cement slurry and may not be readily cleaned due to abrasion and discoloration. The reflective bands, if required, have numerous tears and scratches, but are free of large areas of residue or missing material.



Unacceptable:

Punctures and large areas of staining asphalt splatter or cement slurry make these an unlikely candidate for improvement. Large areas of missing or stained reflective material make the cone unacceptable.



V. WARNING LIGHTS

Acceptable: This standard applies to all Type A, B, and C warning lights, advance warning arrow panels, and portable changeable message signs that are furnished by the agency, supplier, Subcontractor, or Contractor and used for traffic control in work zones.

The use and placement of Type A, B, and C warning lights, advance warning arrow boards, and portable changeable message signs are specified in the contract documents. All Type A, B, and C warning lights, advance warning arrow boards, and portable changeable message signs shall be in accordance with the most current version of the MUTCD.

For Type A, B, and C warning lights to be functioning properly, they must meet the MUTCD criteria which states: "Type A low intensity flashing warning lights and Type C steady burn warning lights shall be maintained so as to be capable of being visible on a clear night from a distance of 3,000 feet. Type B high intensity flashing warning lights shall be maintained so as to be capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1,000 feet".

The evaluation guide that follows is to be used to evaluate the appearance and function of Type A, B, and C warning lights, advance warning arrow panels, and changeable message signs. Because of the different types of advance warning arrow panels approved for use, the evaluation guide will address each type (mode) of panel separately.

Any warning light, arrow panel, or changeable message sign that is out of alignment from the intended driver's line of vision shall be considered to be "unacceptable."

Acceptable: One hundred percent (100%) of all warning lights must be properly operating and meeting the MUTCD specifications.

Marginal: Not less than ninety percent (90%) of the warning lights must be properly operating and meeting the MUTCD specifications with no more than three (3) adjacent lights failing.

Unacceptable: Less than ninety percent (90%) of the warning lights properly operating and meeting the MUTCD specifications, or more than three (3) adjacent lights failing, or more than one (1) Type B warning light failing for more than twelve (12) consecutive hours or as specified in the contract document.

VI. ARROW BOARDS

A. Arrow Board (Flashing Arrow Mode, or Sequential Arrow)

Acceptable: Not more than one (1) lamp out in stem and none out in arrowhead, and dimming properly.

Marginal: Two (2) or fewer lamps out in stem. No lamps out in the head. Dimming properly.

Unacceptable: Any lamp out in the head, or more than two (2) lamps out in the stem or arrow panel not dimming properly.

Note: *Any operating lamp that is out of alignment will be considered "unacceptable."*

B. Chevron Mode

Acceptable: No lamps out in any chevron segment.

Marginal: Not more than one (1) lamp out in any one chevron segment, and dimming properly.

Unacceptable: Two (2) or more lamps out in any one chevron segment, or not dimming properly.

Note: *Any operating lamp that is out of alignment will be considered "unacceptable."*

C. Arrow Board (Caution Mode – Bar or Corners)

Acceptable: Four (4) or more lamps operating and dimming properly.

Marginal: Minimum of four (4) lamps functioning, dimming properly.

Unacceptable: Less than four (4) lamps functioning or not dimming.

Note: *Any operating lamp that is out of alignment will be considered "unacceptable."*

D. Arrow Board (Double-Arrow Mode)

Acceptable: Not more than one (1) lamp out in stem and none out in arrow heads, and dimming properly.

Marginal: Two (2) lamps out in stem, but both heads completely functional with no lamps out and dimming properly.

Unacceptable: Any lamps in heads out or more than two (2) lamps out in the stem, or arrow panel not dimming properly.

VII. CHANGEABLE MESSAGE SIGNS

Acceptable: Ninety percent (90%) or more of the pixels per character module are operating properly.

Marginal: No less than ninety percent (90%) of the pixels per character module are operating properly.

Unacceptable: Less than ninety (90%) of the pixels per character module are operating properly or not performing within the criteria of the MUTCD.

VIII. PAVEMENT TAPE, PAINT, AND RAISED PAVEMENT MARKERS

The guideline applies to all temporary pavement marking furnished and/or installed by a supplier, Subcontractor, or Contractor for traffic control in TTC zones. These markings include tape, paint, and temporary raised pavement markers.

The use and placement of pavement markings are specified in the contract documents. All markings shall be in accordance with the current version of the MUTCD.

The evaluation guide that follows is to be used to evaluate the appearance, function, and acceptability of temporary pavement markings in TTC zones.

A. Pavement Marking Tape and Paint

Acceptable: All pavement marking tape or paint required (solid lines and broken lines) is in place and meets all material specifications.

Marginal: No more than ten percent (10%) of all tape, paint, message or symbol, or no more than two (2) consecutive broken lines, or no more than fifty (50) continuous feet of solid line is missing.

Unacceptable: More than 10% of all tape, paint, message or symbol, more than two (2) consecutive broken lines, or more than fifty (50) continuous feet of solid line is missing.

B. Raised Pavement Marker Installation and Maintenance

Acceptable: All temporary raised pavement markers required are in place and meet all material specifications.

Marginal: No more than ten percent (10%) of the total raised pavement markers or no more than three (3) consecutive temporary raised pavement markers are missing.

Unacceptable: More than ten percent (10%) of the total raised pavement markers or more than three consecutive temporary raised pavement markers are missing.

C. Raised Pavement Marker Removal

Acceptable: All temporary raised pavement markers have been removed without damage to the existing pavement, or the removal was followed by the appropriate overlay/fog/slurry surface treatment.

Unacceptable: Any damage to the pavement surface as a direct result of the removal of the temporary raised pavement markers. The contractor is responsible for repairing all damage to the pavement caused by the removal of the markers.

IX. STORAGE OF TEMPORARY TRAFFIC CONTROL DEVICES

Property dedicated for public roadways and walkways belong to the public and need to be kept clear for public travel rather than used for private benefit, such as storage of signs and barricades. Too often, inconsiderate street/sidewalk workers leave barricades/signs sloppily across sidewalks or where they virtually preclude access to buildings, crosswalks, sidewalks or bus stops. When this happens, it imposes two adverse impacts: impedes accessibility and/or selfishly forces users to take lengthy alternate routes. This creates a tort liability risk for both the public entity and the company/individual responsible for using the ROW to store the devices.

Temporary devices cannot be stored in the ROW for extended periods of time because of appearance, vandalism, and the main fact that the ROW belongs to the general public. When temporary traffic control devices are allowed to be stored in the ROW, the “cluster” method shall apply to minimize problems. Certified temporary traffic control providers are expected to strategically place and “cluster” the devices in a professional manner, which will not impose physical obstructions to a pedestrian, bicyclist, motorist, or person in a wheelchair, and will minimize the probability of drawing public complaints.

Chapter 9

Special Events

The City allows and often supports special events in the public ROW. However, events are only allowed if the organizer follows the documented rules and regulations. City policy allows and encourages City staff, event organizers, the Downtown Phoenix Partnership, barricade companies, and others to coordinate when it comes to planning, staging, implementing, and approving special events in the City right-of-way or adjacent to the right-of-way.

I. SPECIAL EVENT POLICY

The City's special event policy guides both City staff and event organizers on how events should be operated when these special events are held on public streets. The ultimate goal of the policy is to protect the health, safety, and welfare of the citizens of Phoenix by regulating the time, place, and manner of conduct of special events and by establishing permit requirements. There are often races, parades, and other recreational or competitive events that require usage of the streets and public right-of-way. The City of Phoenix supports these events because they provide outdoor recreation, add to the quality-of-life for residents and tourists, generate community involvement, and often serve as a fund raiser for community agencies and non-profit organizations.

Street restrictions and closures related to special events can have negative effects on the community. Closed streets can cause significant inconvenience and delays for road users, residents, and businesses. Access to/from homes and businesses may be temporarily rerouted or closed, reducing quality of life and business operations.

The goals of the special event policy are to:

- Maximize the positive results of these special events;
- Set forth a clear and consistent plan to manage special events and street restrictions;
- Allow fair access and use of public streets and facilities;
- Establish communication between the community and City personnel; and
- Regulate and codify the process in which events can be permitted and held safely.

II. PLANNING AN EVENT ON CITY STREETS

A special event review of the proposed route and closures by the Fire, Planning and Development, Police, Public Transit, Street Transportation, and other involved departments is crucial to safety, traffic flow, and commerce. As part of the special event review process, it is important to understand the following:

- Public announcements, internet pages, or advertisements by event planners or promoters will have no bearing on the determination by the City of Phoenix on whether or not to allow the event.
- The City of Phoenix Special Event review may adjust the route and time for safety and the overall good of the community and businesses. If the event cannot be safely run or conflicts with another event, it may be denied. In addition, approved recurring events can be reserved in advance.
- The event promoters or organizers must provide advance notice to the City of Phoenix and coordinate the event with the Police Department to allow for the proper staffing of officers. The Street Transportation Department will review the temporary traffic control plans and may or may not issue temporary use permits for street restrictions.

For more information, use the following link:

http://www.phoenix.gov/specialevents

Appendix A-1

Temporary Traffic Control Illustrations

The following pages show typical applications of signs, pavement markings, and channelizing devices. They illustrate strategies that have proven to be effective and efficient throughout Phoenix and represent the most common methods required for the uniform application and placement of standard traffic control devices. Specific situations, not specifically illustrated, need to be addressed making best use of the general principles described in this Manual, the MUTCD, and these illustrations. The illustrations are "typical" situations, and where applicable, differentiate between daytime and 24- hour treatments.

Notes about the Illustrations:

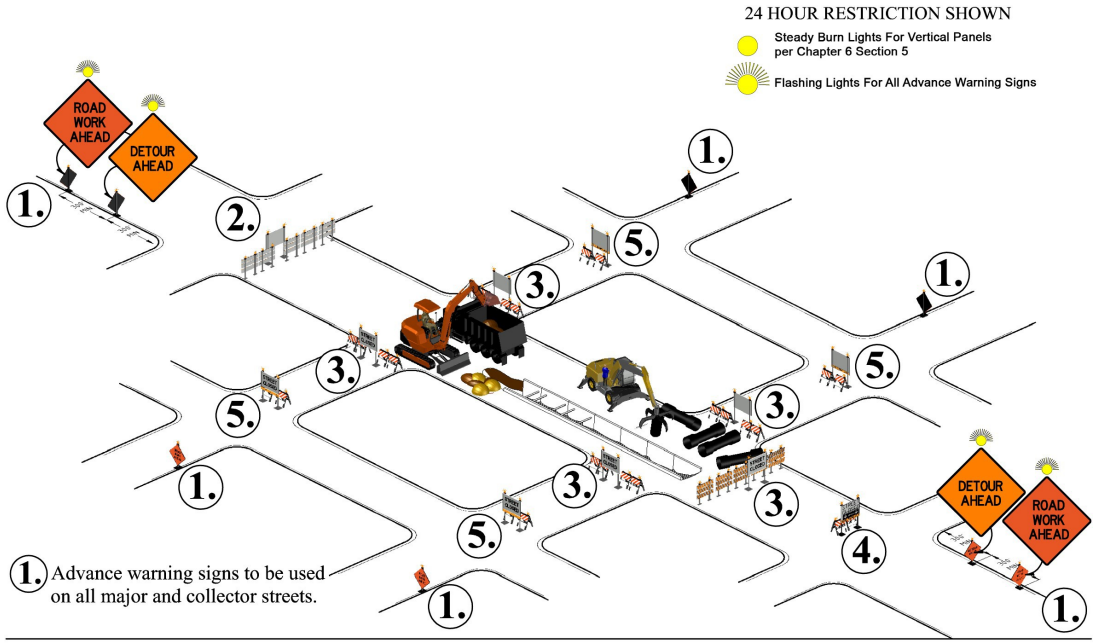
The "ROAD WORK AHEAD" sign is the key "lead" sign used to advise of an upcoming temporary traffic control work zone. Barricades, vertical panels, and channelizing devices are normally used to:

- Define the proper paths for motorists, pedestrians, and bicyclists through the work zone;
- Mark hazards such as holes, equipment, materials, and drop-offs;
- Close streets; and
- Separate workers, pedestrians, and bicyclists from vehicular traffic

Traffic cones are normally used during daylight hours only. During the hours of darkness, they must be replaced with standard channelizing devices. Exceptions are rarely granted and must be approved by the ROW Program Administrator.

Devices used during darkness must be equipped with fully operating warning lights, as specified. Only Type C steady-burn warning lights are to be used on devices placed to guide traffic (tapers, centerlines, lane lines, or edge lines). Only Type A or Type B flashing warning lights are to be used on signs and flag type high-level warning devices as specified. Type A flashing warning lights should be used on devices marking hazards because they have proven to be the most effective for this application.

Figure 22 – Street Closure Signing (Hard and Soft)



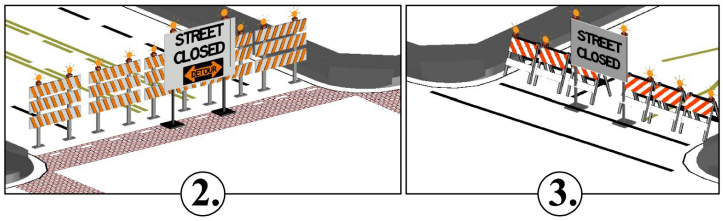
HARD CLOSURES

2. R11-4 sign (without To Thru Traffic phrase) with Type III barricades to cover the full width of the roadway. To be used for all other major and collector hard closures.*

3. R11-2 sign (without Local Traffic Only panel) with Type I barricades to cover the full width of the roadway. To be used for all other local hard closures.*

MAJOR/ COLLECTOR STREETS
Use R11-4

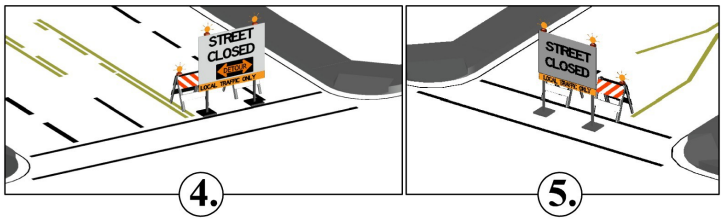
LOCAL STREETS
Use R11-2



HARD CLOSURES

4. R11-4 sign (with **To Thru Traffic** phrase) with Type III barricades. To be used for all other major soft closures.*

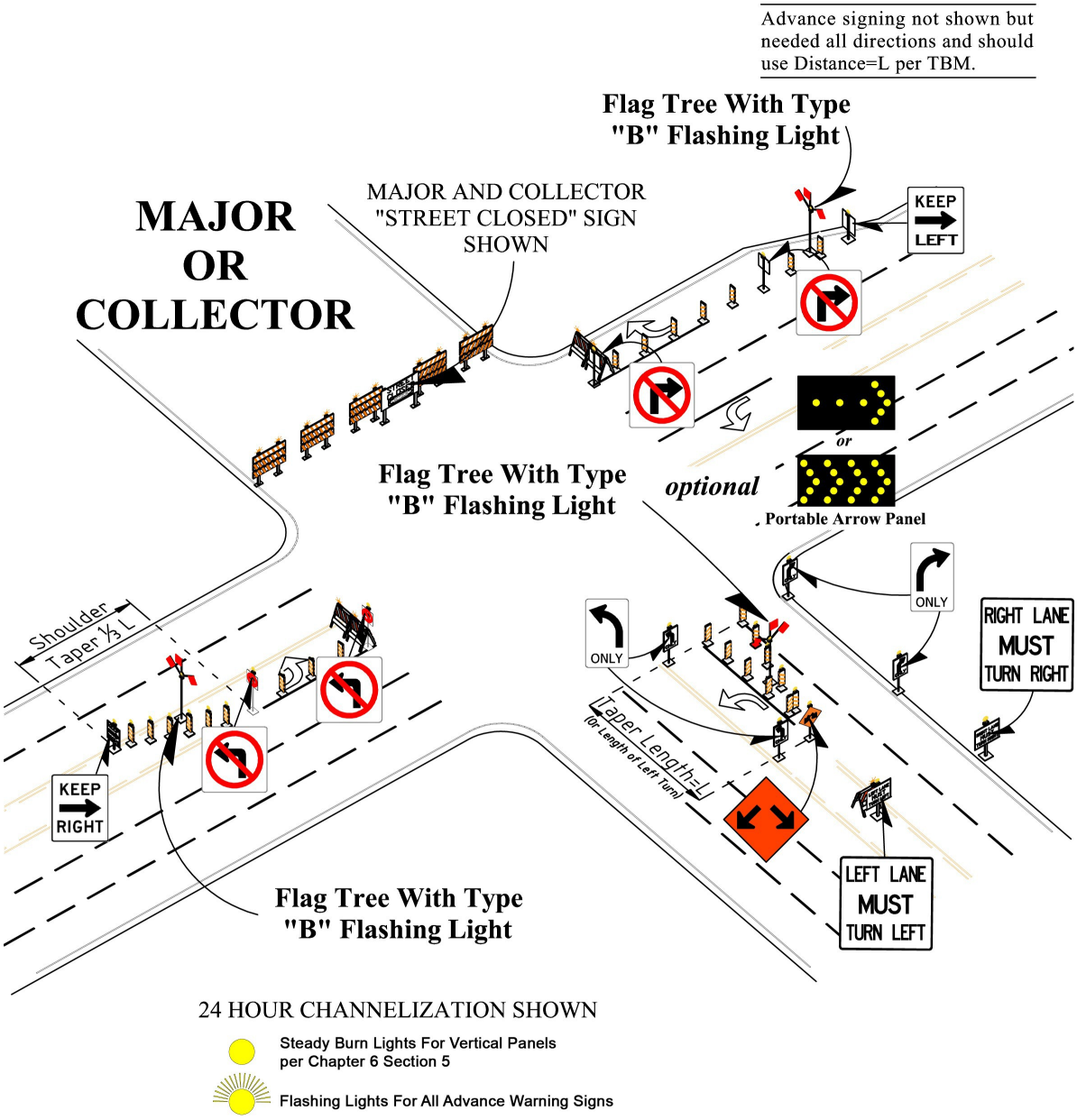
5. R11-2 sign (with Local **Traffic Only** panel) with Type I barricades. To be used for collector and local soft closures.*



NOTE: Existing mandatory turn lanes approaching hard closures shall be closed. *(See Figure 14)*
**Reference Figure 7 for signage, Figure 8 for equipment*

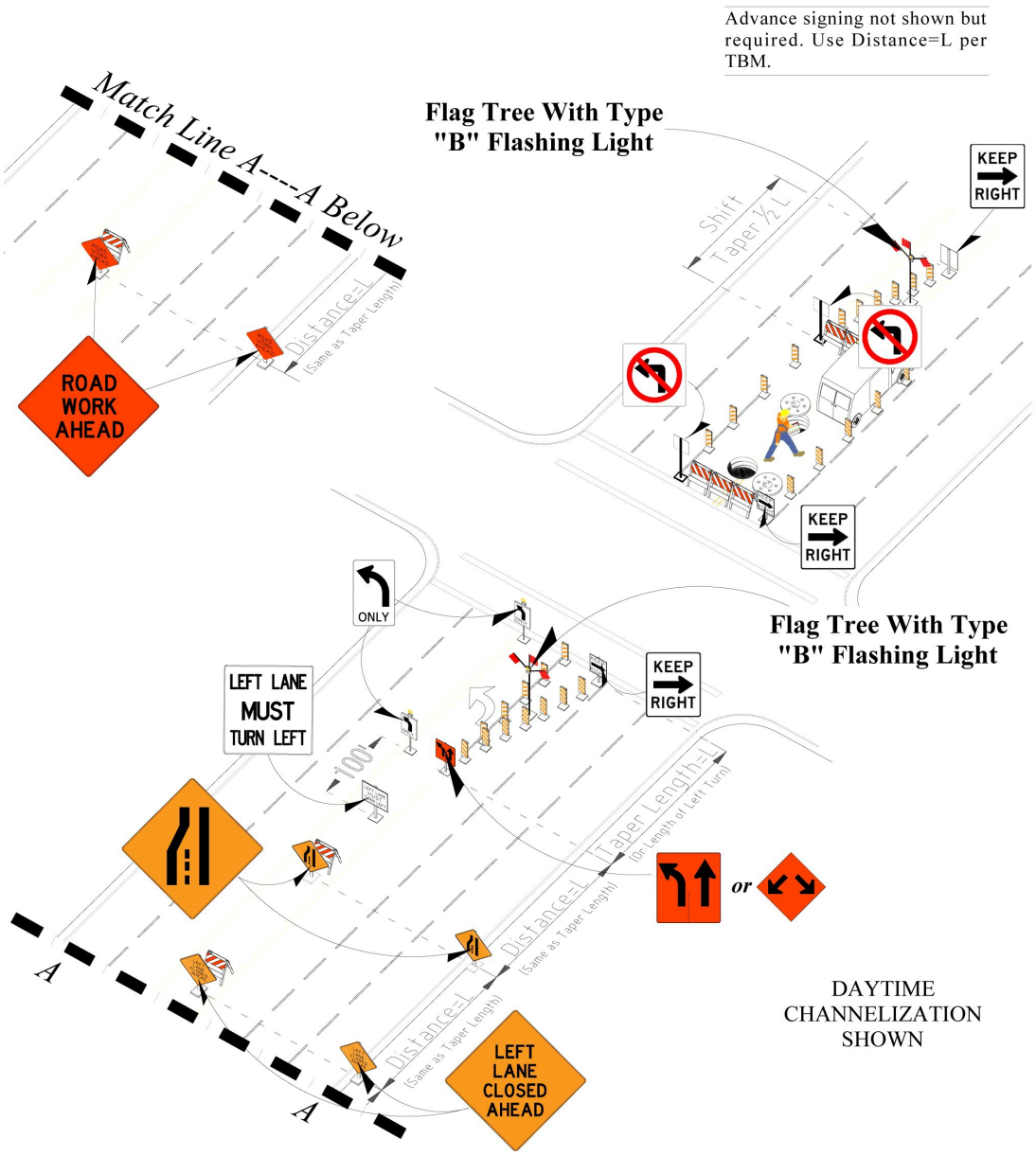
STREET CLOSURE SIGNING (Hard and soft)

Figure 23 – Turn Lane Treatments for Hard Closures



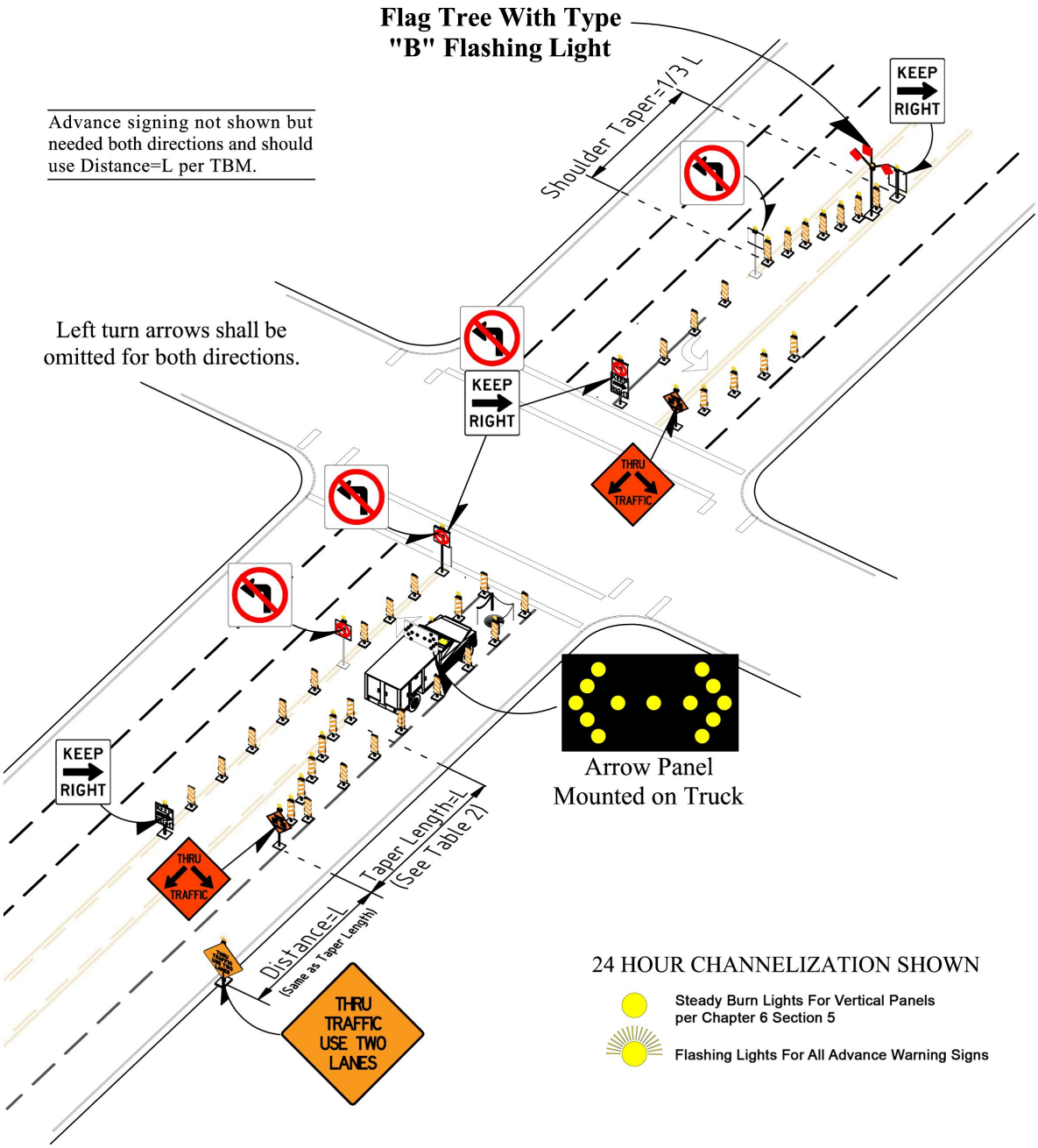
TURN LANE TREATMENTS FOR HARD CLOSURES

Figure 24 – Thru Lane Closed (Maintain Two Lanes – Downtown use)



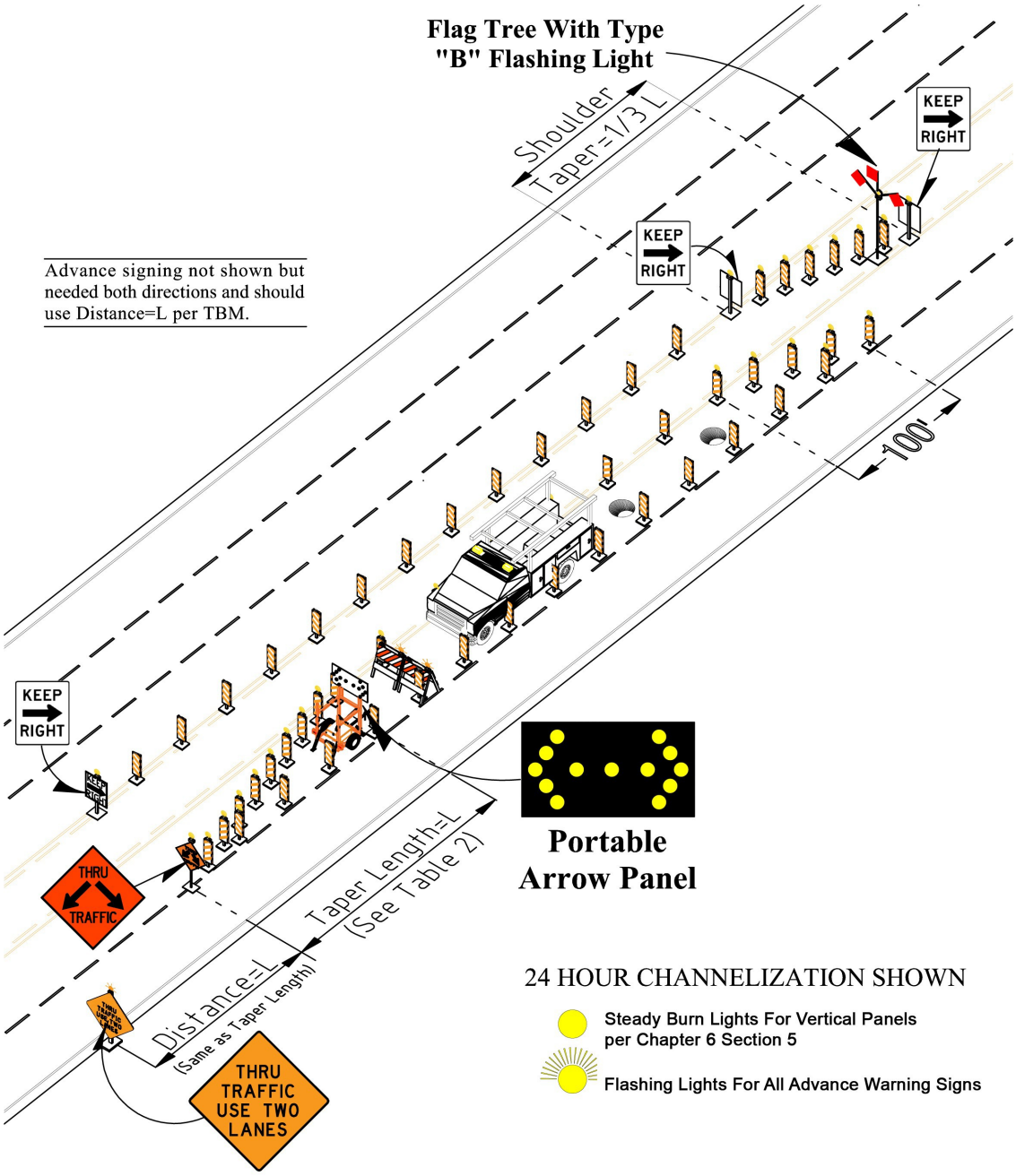
LEFT THRU LANE CLOSED
(Maintain two lanes- Downtown use)

Figure 25 – Left Thru Lane Closed (Maintain two thru lanes by prohibiting left turns)



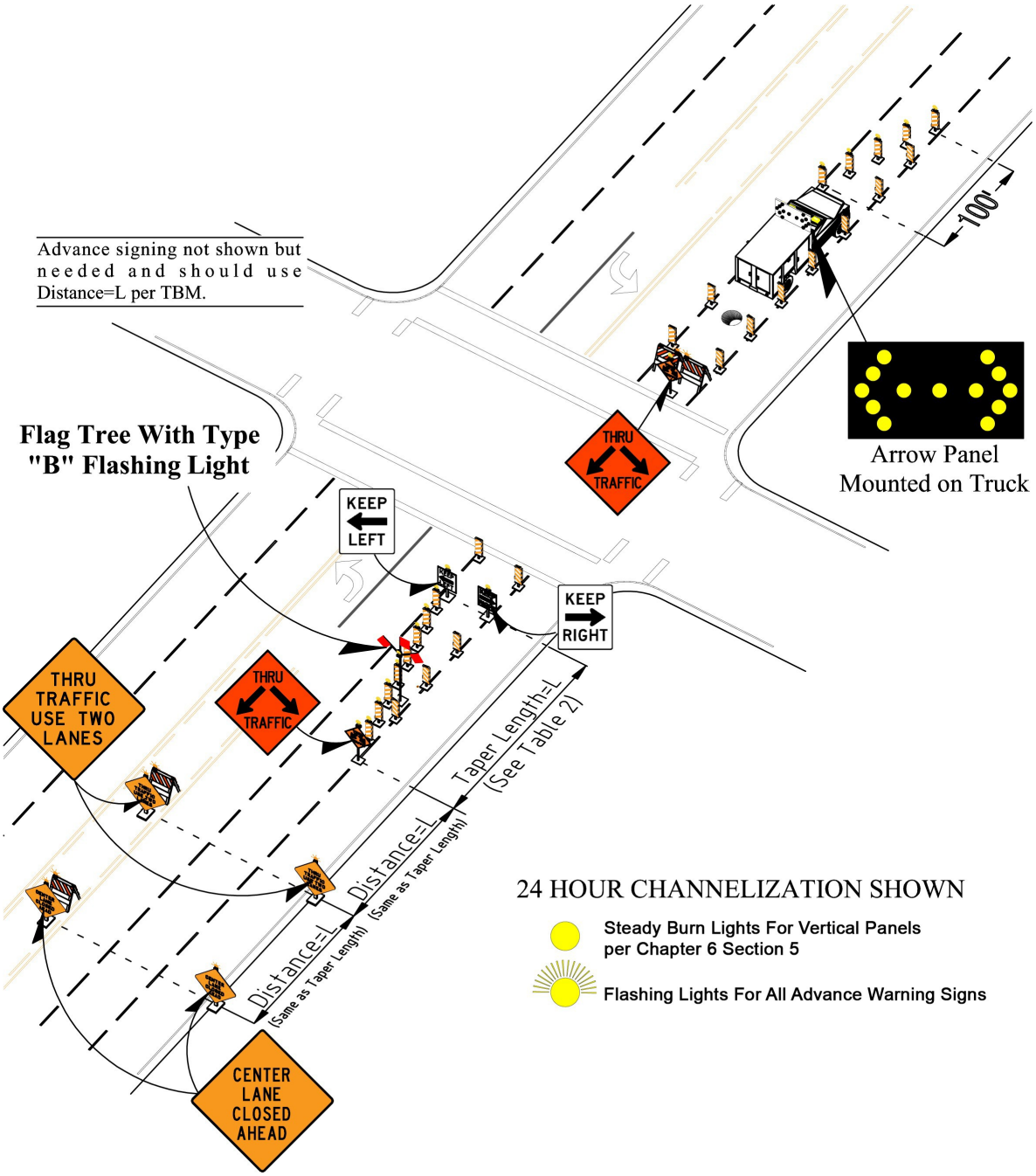
LEFT THRU LANE CLOSED
(Maintain two lanes by prohibiting left turns)

Figure 26 – Mid-block Left Lane Closed – Maintain two lanes using left turn lane



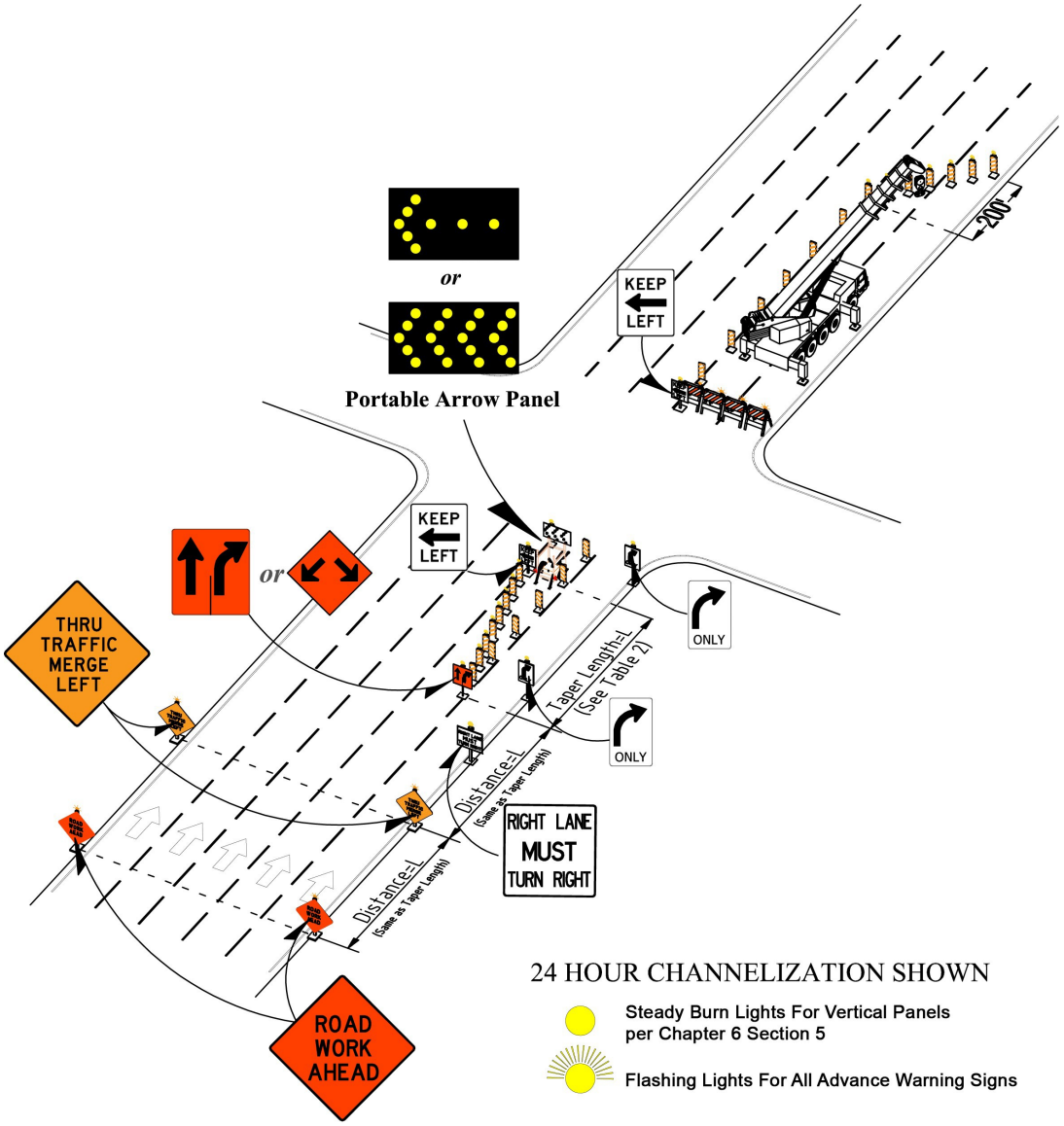
MIDBLOCK LEFT LANE CLOSED
(Maintain two lanes using left turn lane)

Figure 27 – Center Thru Lane Closed (Maintain two thru lanes)



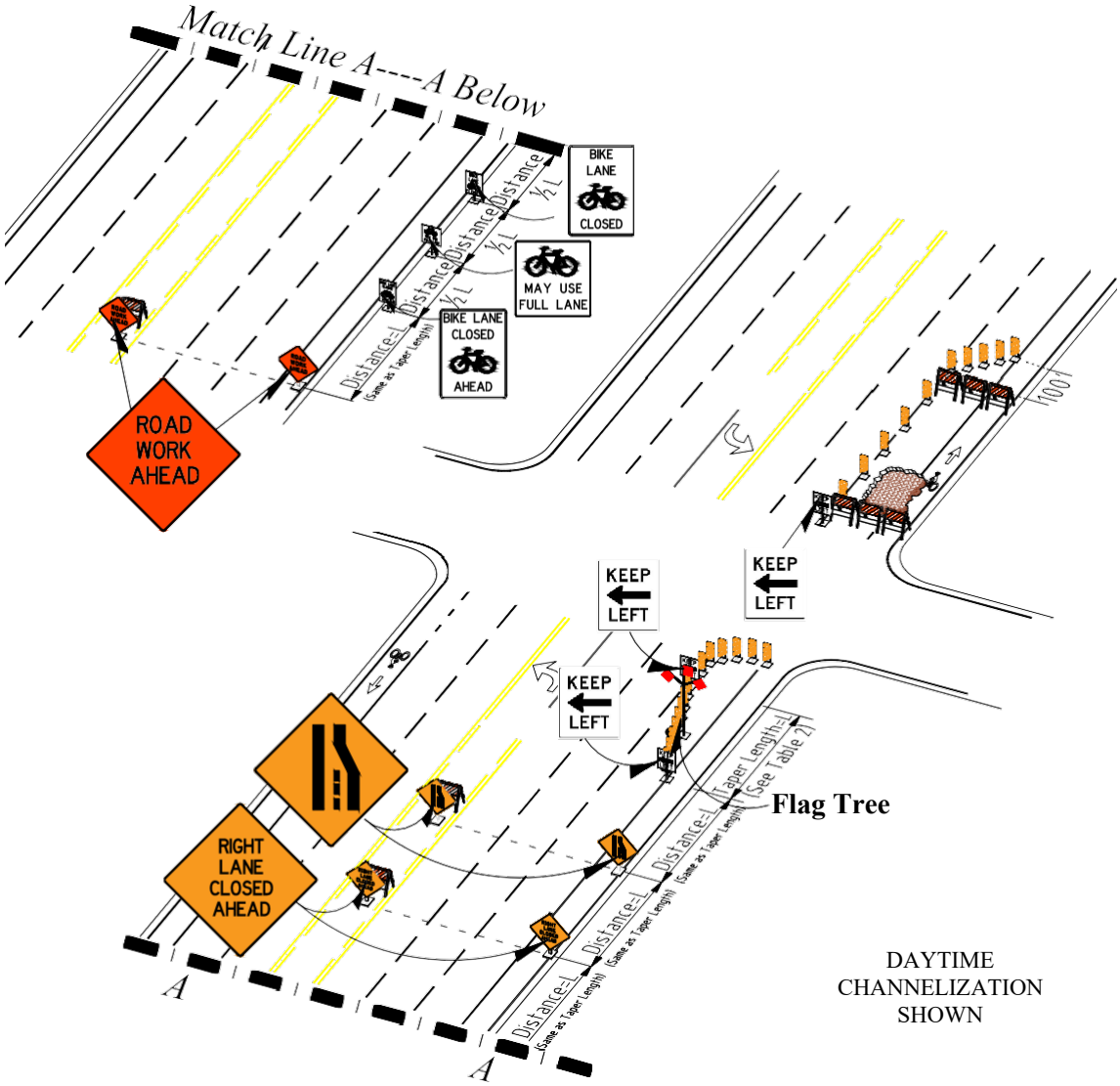
CENTER THRU LANE CLOSED
(Maintain two thru lanes)

Figure 28 – One-Way Street - Right 2 Lanes Closed (Create right turn lane – Downtown use)



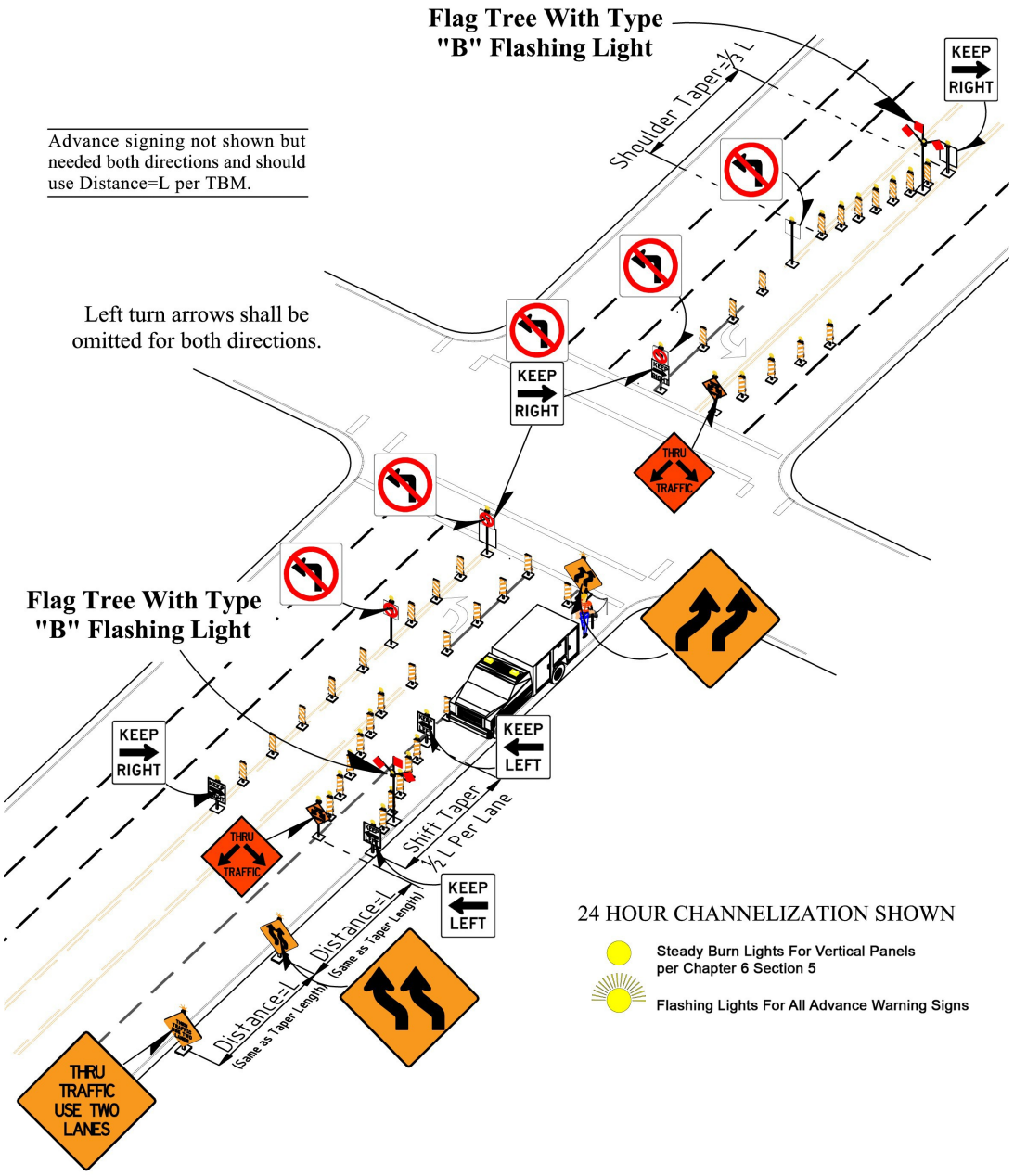
ONE WAY STREET-RIGHT 2 LANES CLOSED
(Create right turn lane- Downtown use)

Figure 29 – Right Curb Lane/Bike Lane Closed (Maintain two thru lanes; end bike lane)



RIGHT CURB LANE/BIKE LANE CLOSED (Maintain two thru lanes; end bike lane)

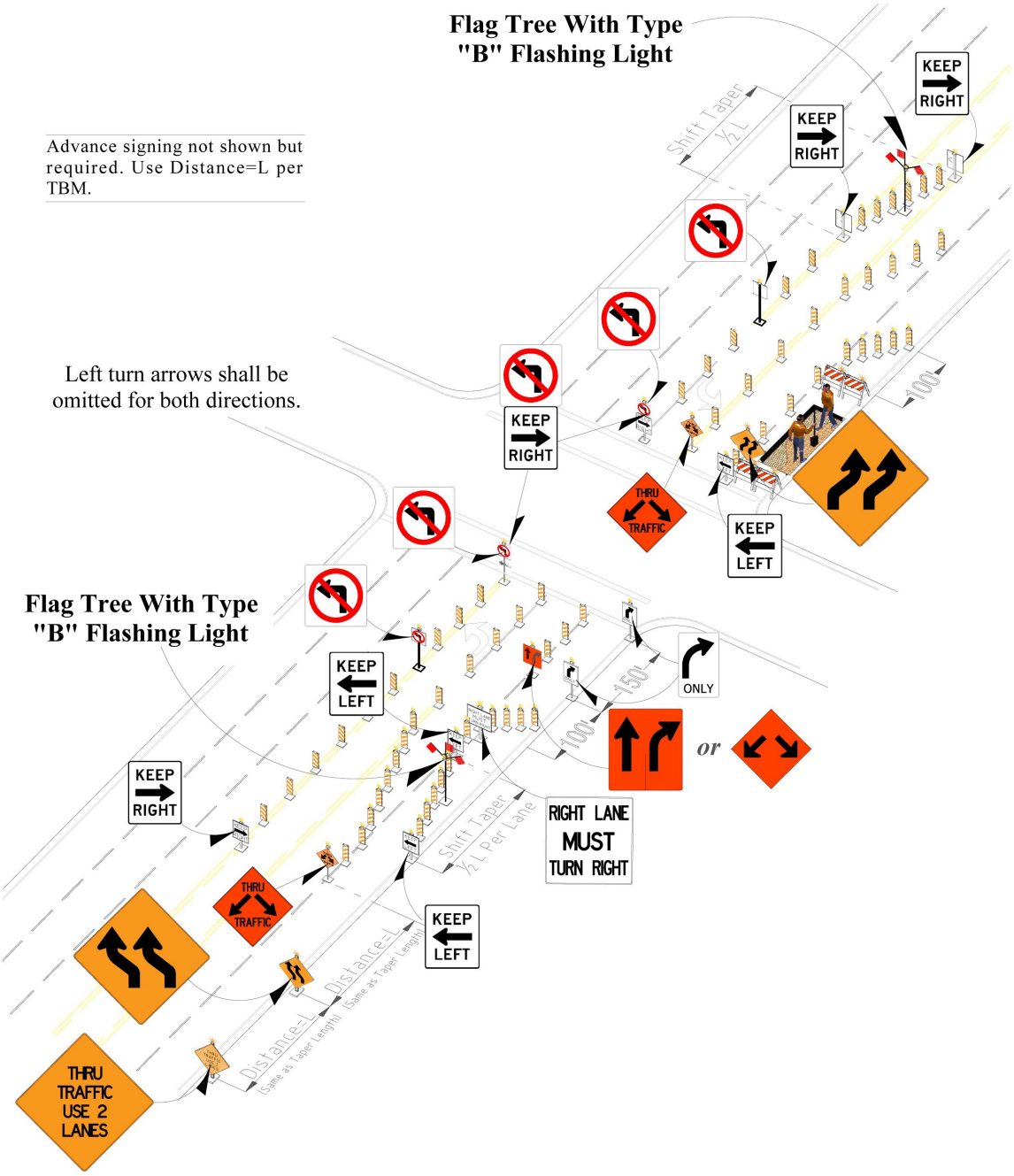
Figure 30 – Nearside Thru/Right Lane Closed (Maintain two thru by prohibiting left turns)



NEARSIDE RIGHT/ THRU LANE CLOSED

(Maintain two lanes by prohibiting left turns)

Figure 31 – Far-side Right Lane Closed (Maintain two lanes prohibiting left turns and create right turn lane)

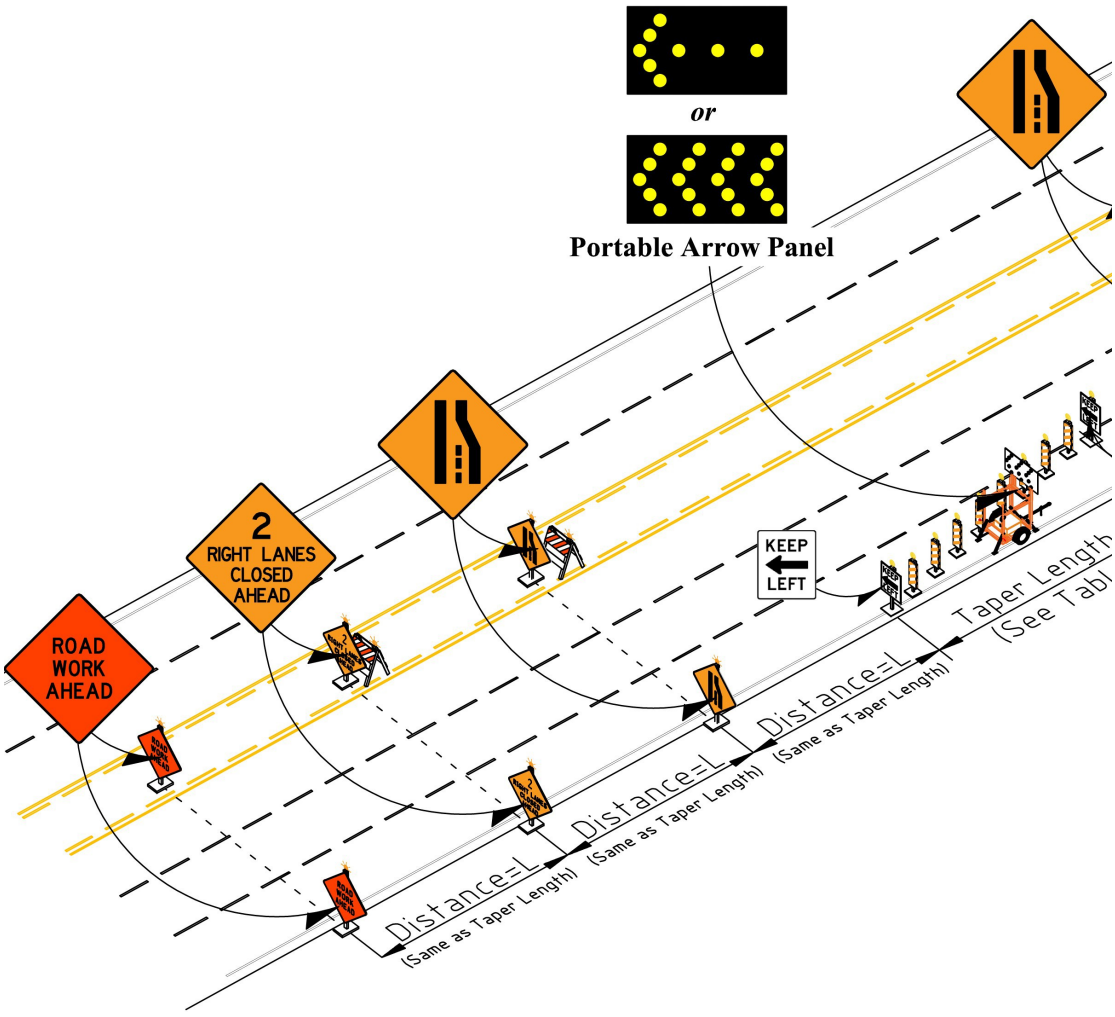


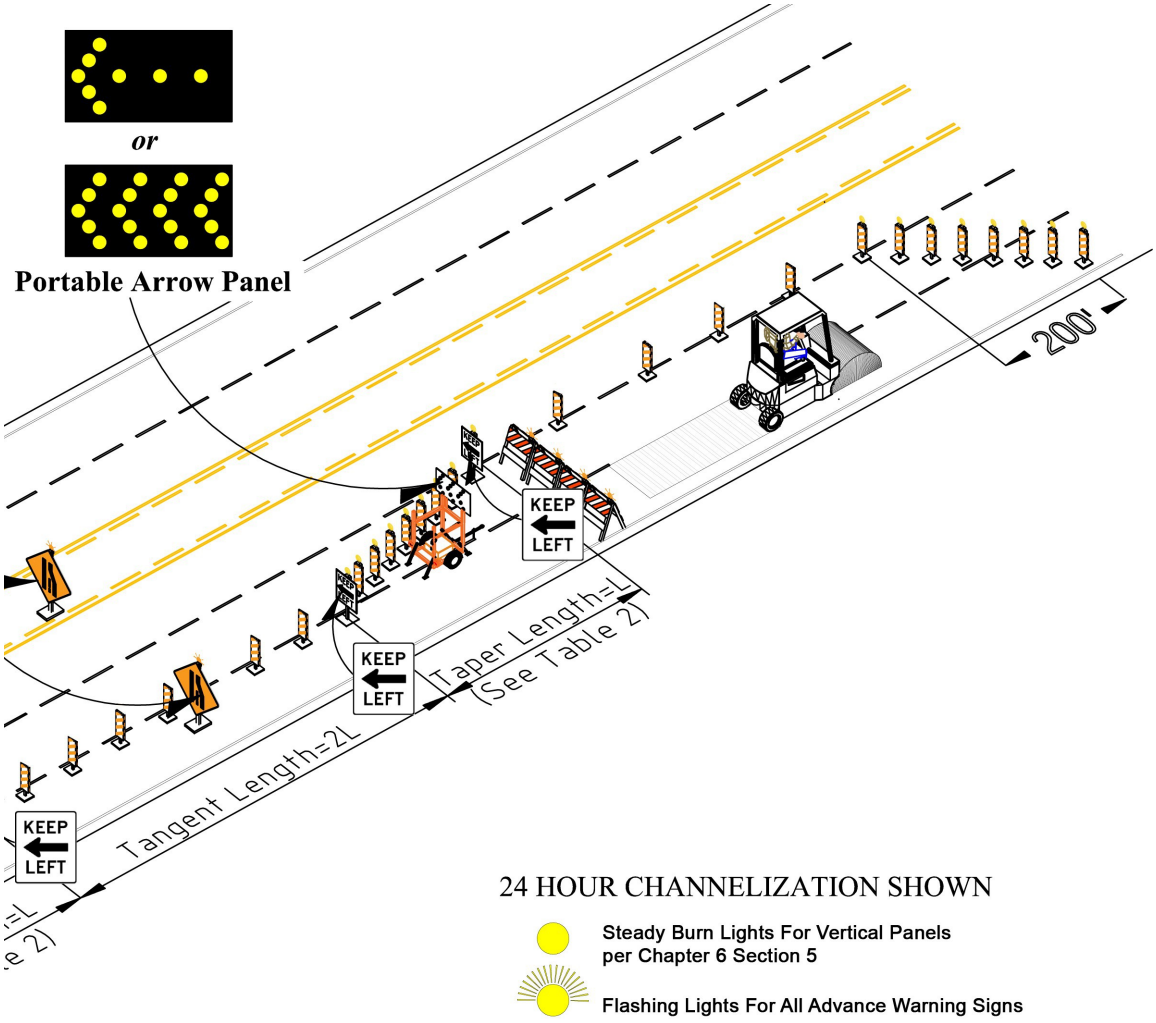
FARSIDE RIGHT LANE CLOSED

(Maintain two lanes prohibiting left turns and create right turn lane)

Figure 32 – Midblock 2 Right Lanes Closed (Maintain one thru lane)

Advance signing not shown but needed both directions and should use Distance=L per TBM.

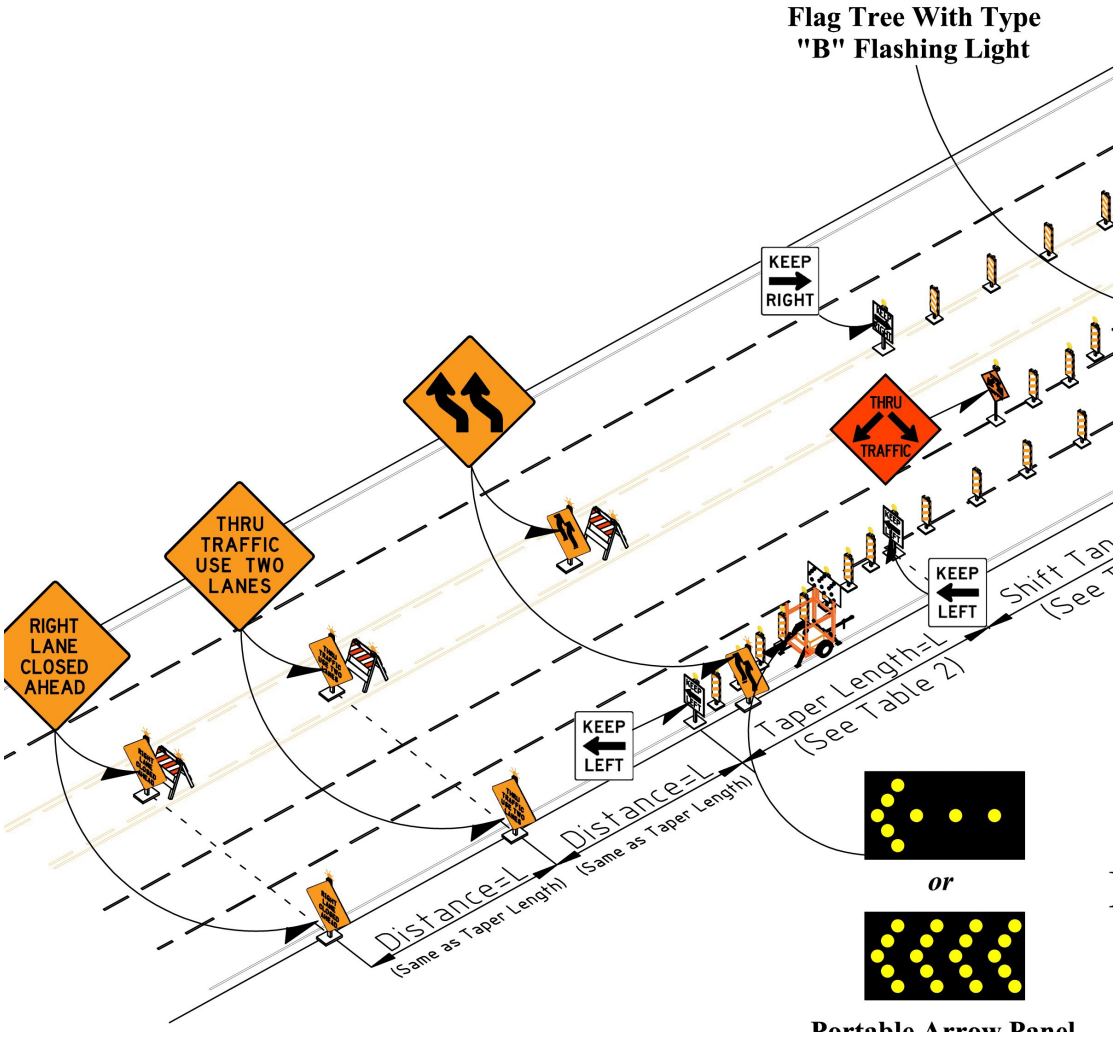


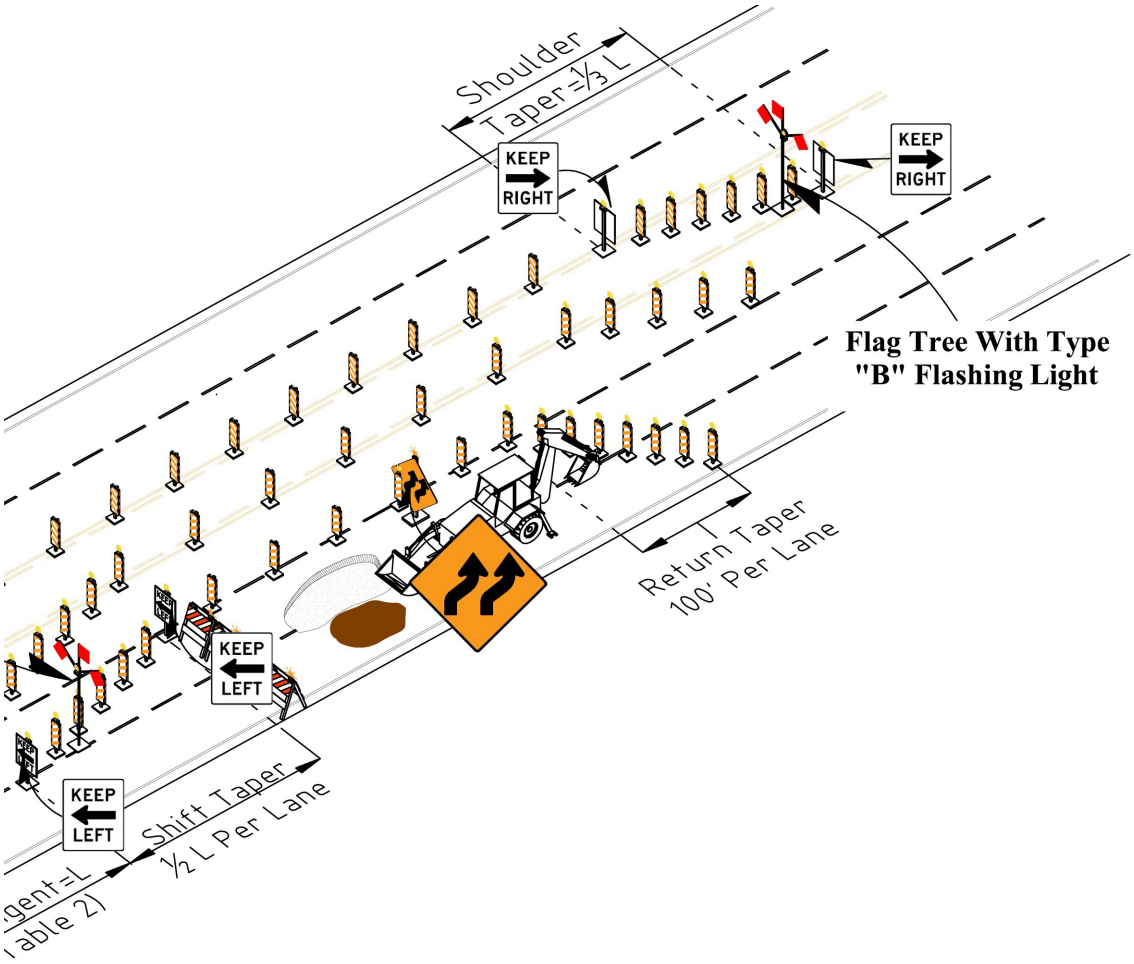


MIDBLOCK TWO RIGHT LANES CLOSED
(Maintain one thru lane)

Figure 33 – Midblock 2 Right Lanes Closed (Maintain two lanes using left turn lane)

Advance signing not shown but needed both directions and should use Distance=L per TBM.

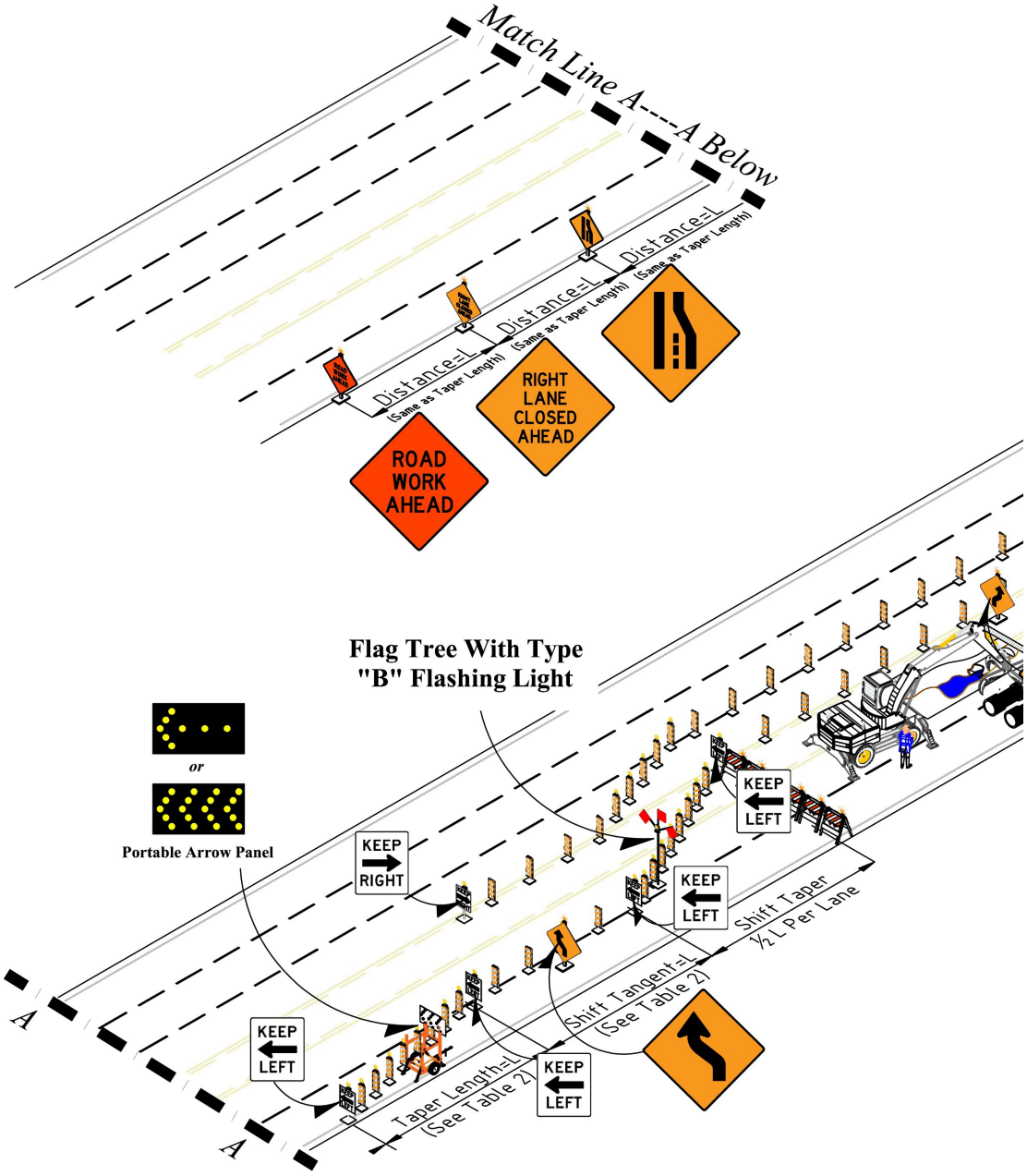


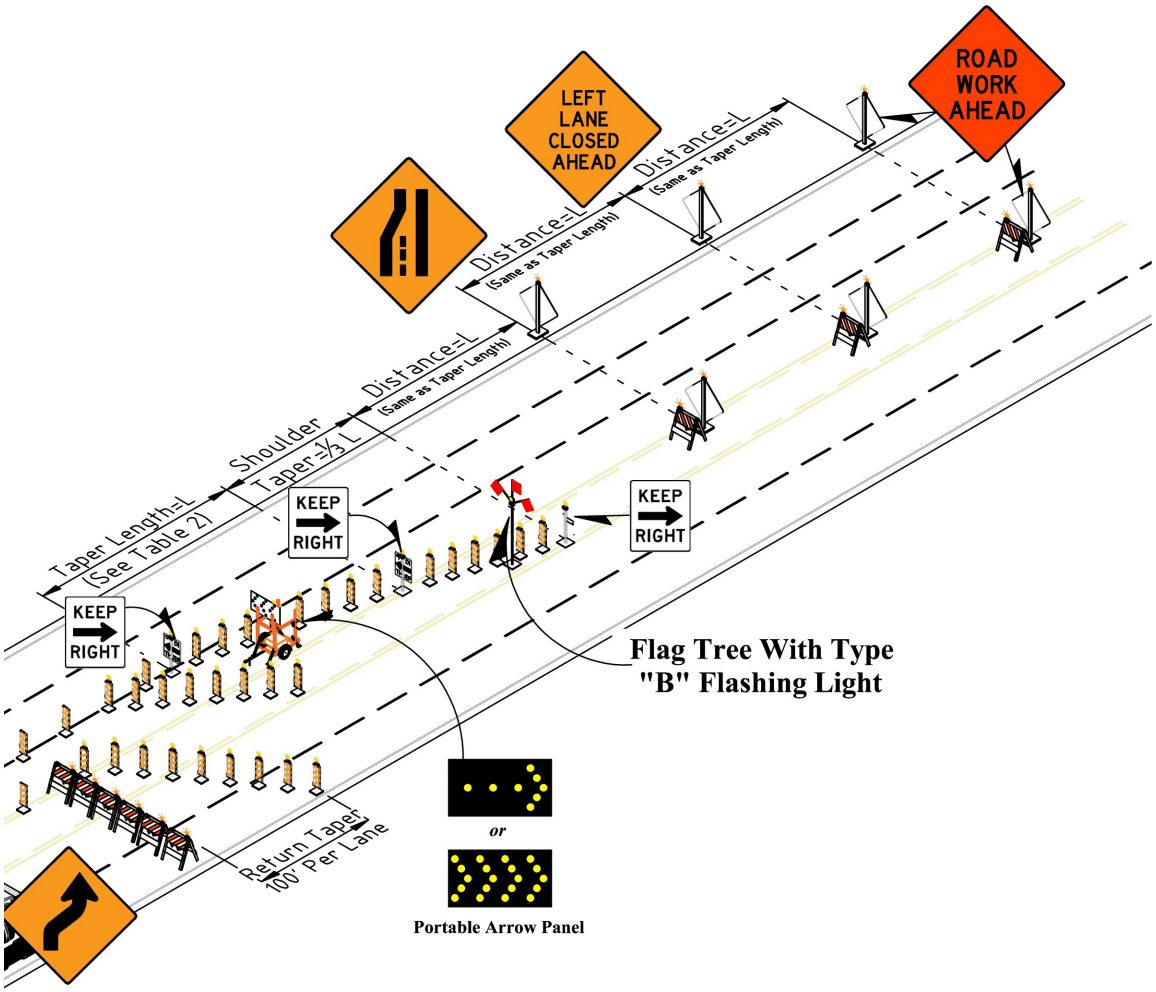


MIDBLOCK TWO RIGHT LANES CLOSED
(Maintain two lanes using left turn lane)

Figure 34 – Entire Direction Closed (Maintain one thru lane across centerline)

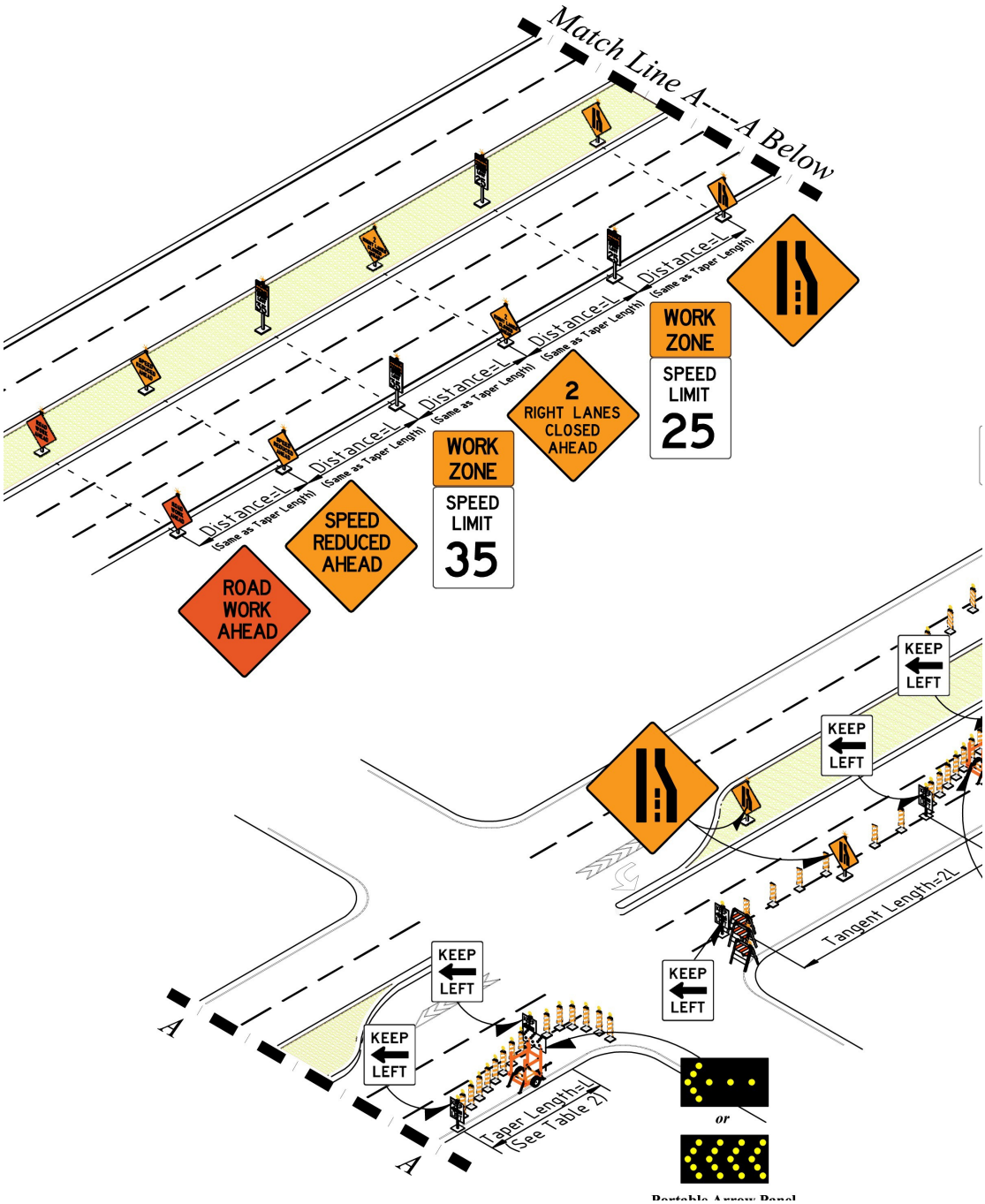
If two lanes are dropped a tangent of 2L shall be used between first and second tapers. *(See Figure 23)*

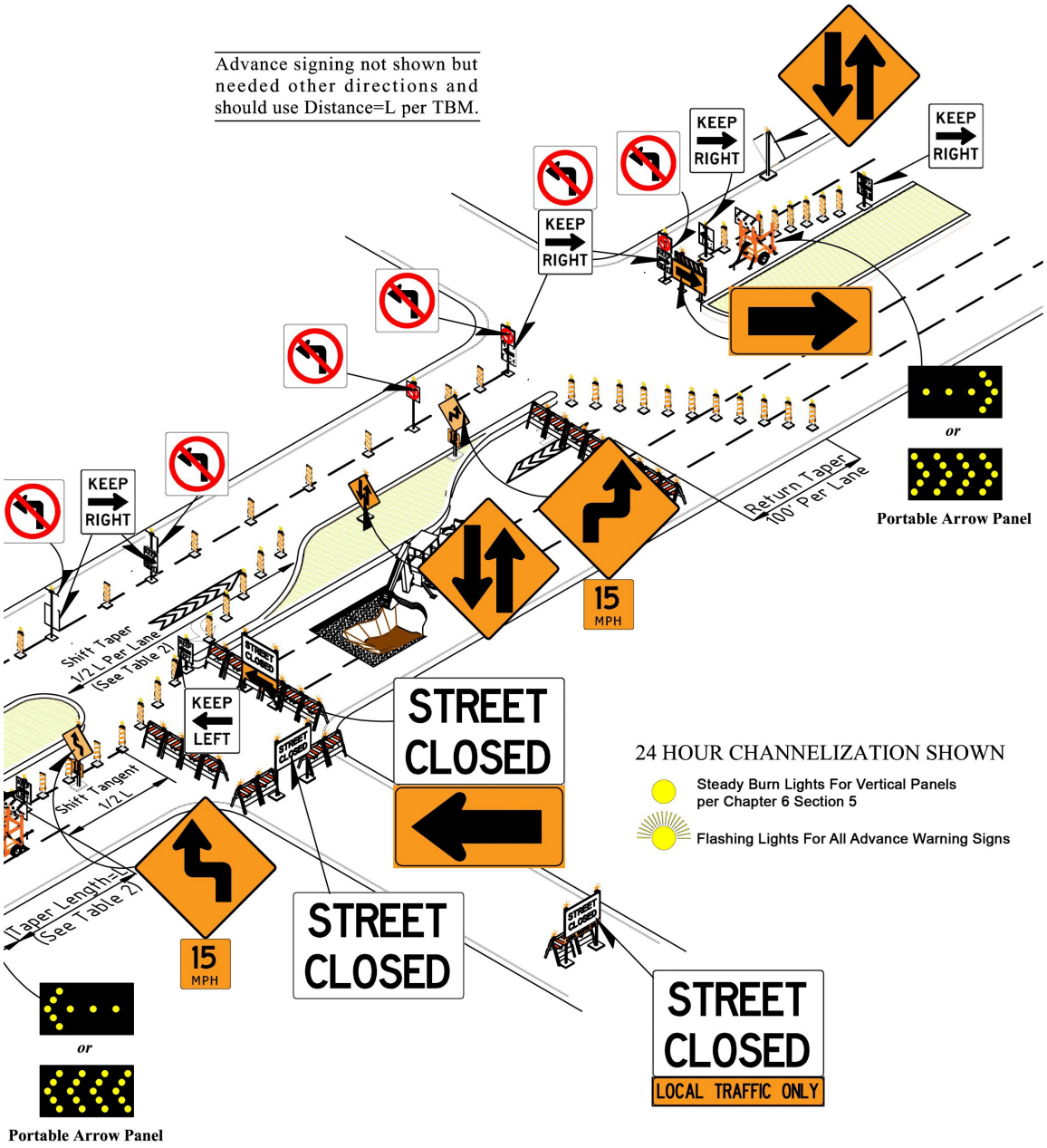




ENTIRE DIRECTION CLOSED
(Maintain one thru lane across centerline)

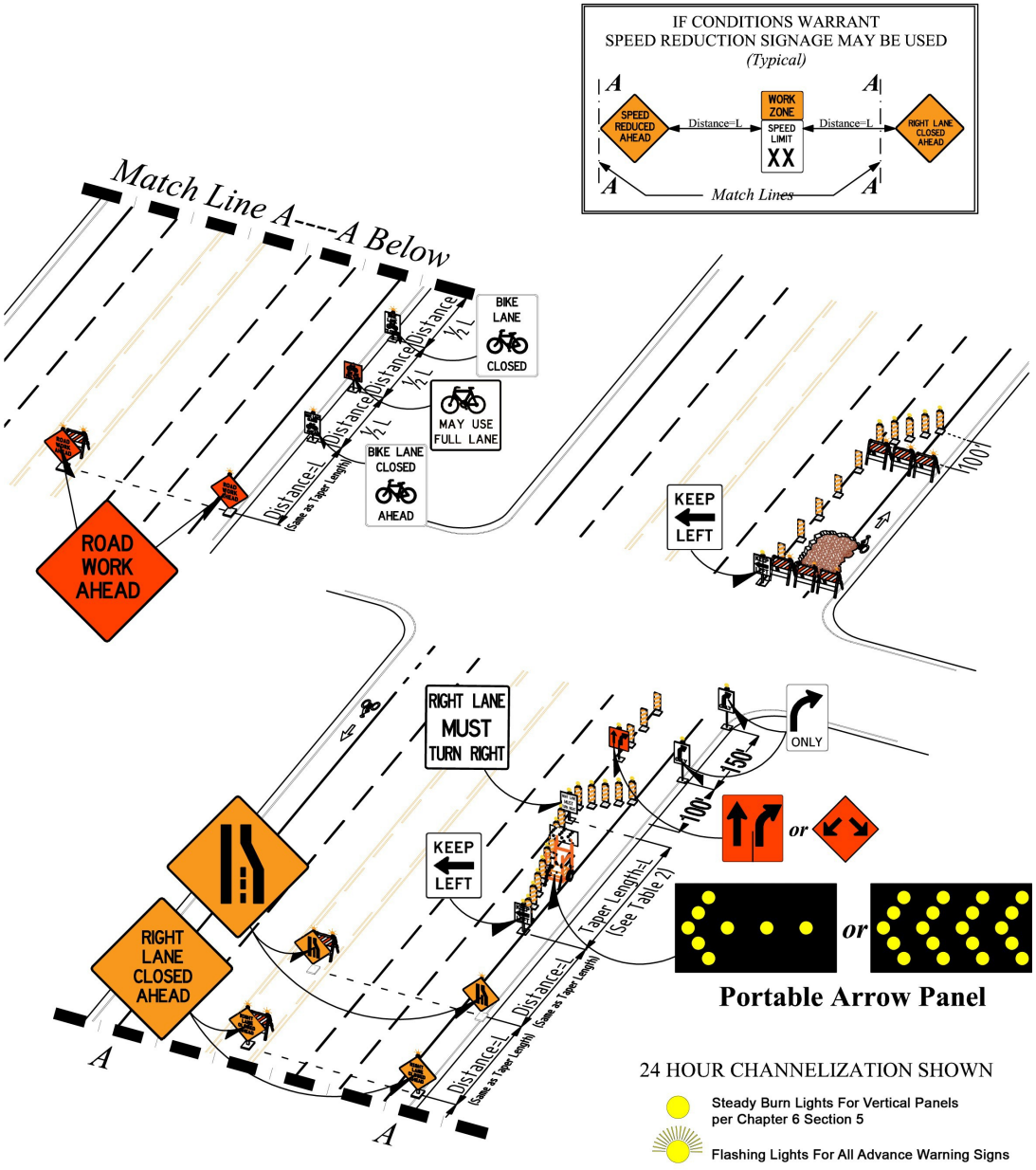
Figure 35 – Entire Direction Closed (Raised medians – Maintain one thru raised median)





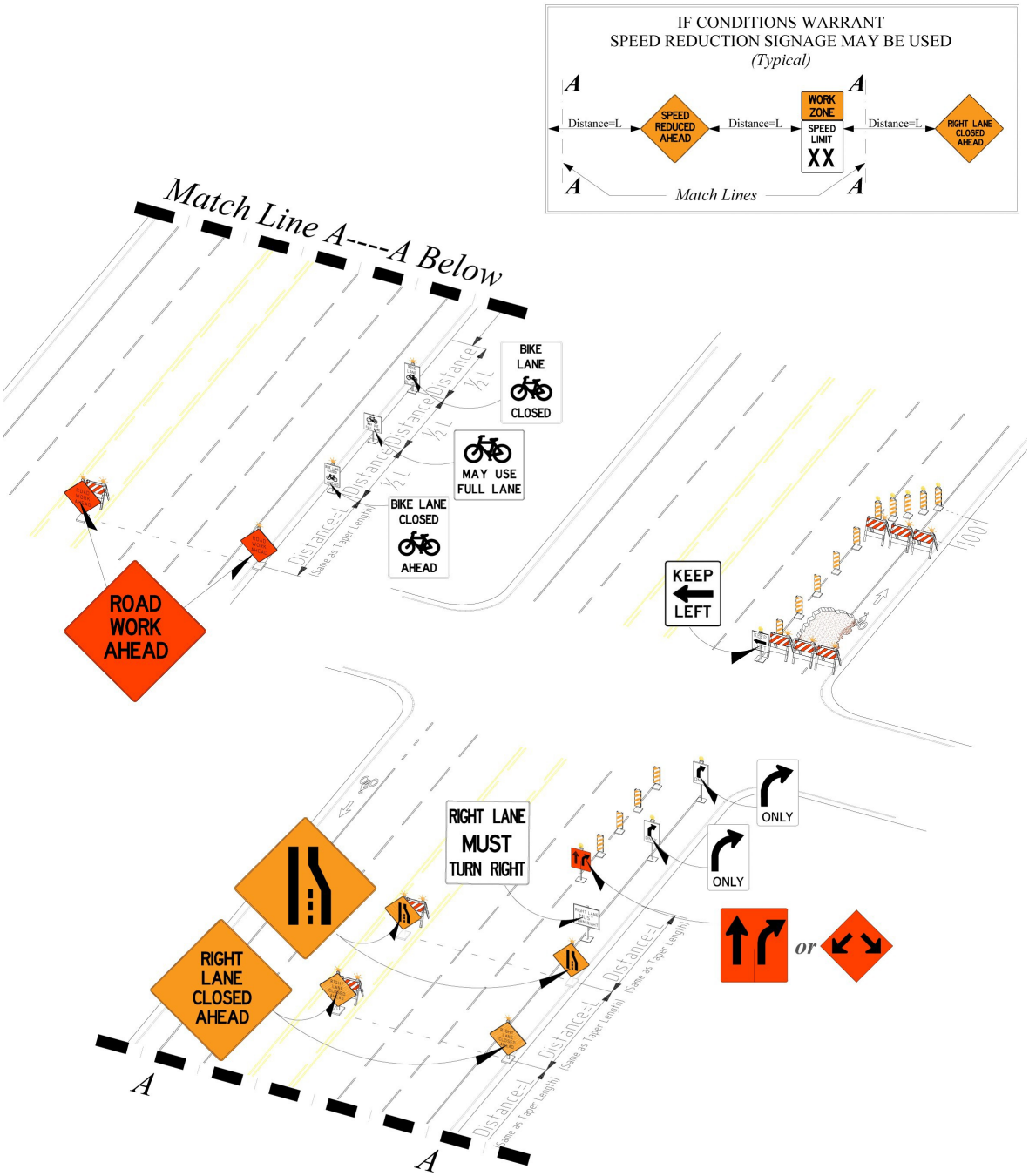
ENTIRE DIRECTION CLOSED (RAISED MEDIANS) (Maintain one lane thru raised median)

Figure 36 – Far-side Bike / Right Lane Closed (Create right turn lane)



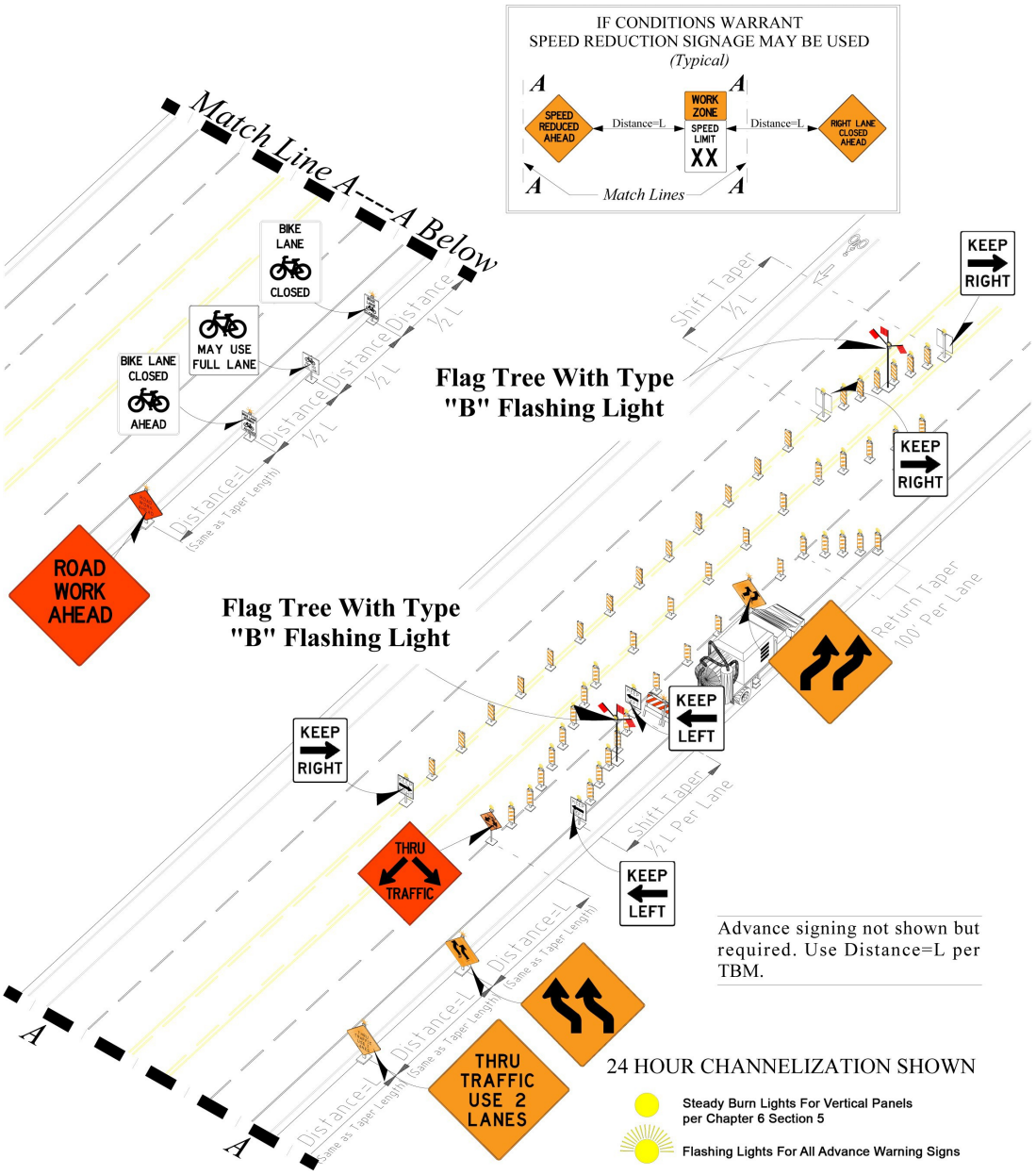
FARSIDE RIGHT/BIKE LANE CLOSED
(Create right turn lane)

Figure 37 – Far-side Bike / Right Lane Closed (Create right turn lane – Downtown use)



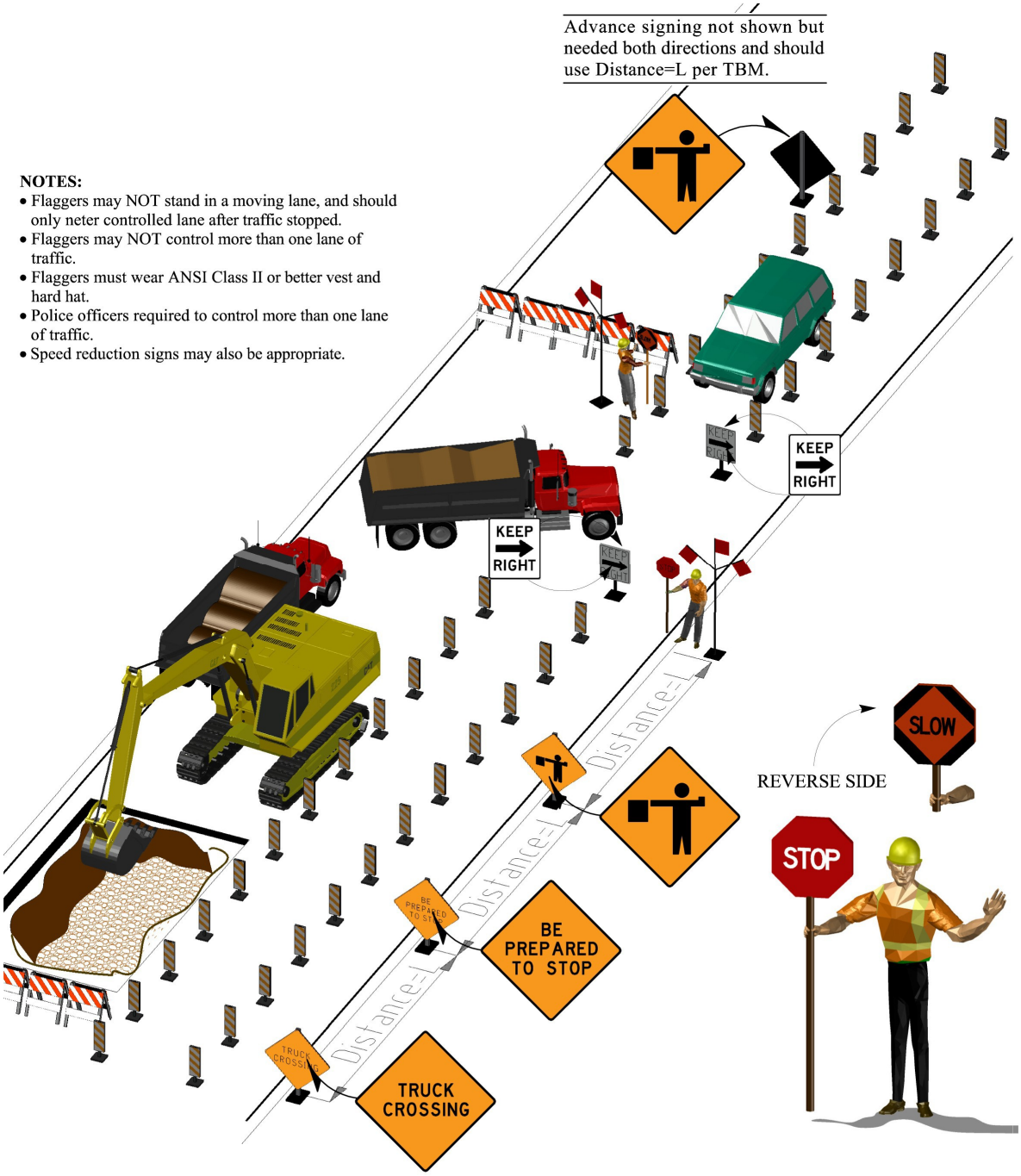
FARSIDE RIGHT/BIKE LANE CLOSED
(Create right turn lane- Downtown use)

Figure 38 – Midblock Bike/Right Lane Closed (Maintain two thru lanes using two-way left turn lane)



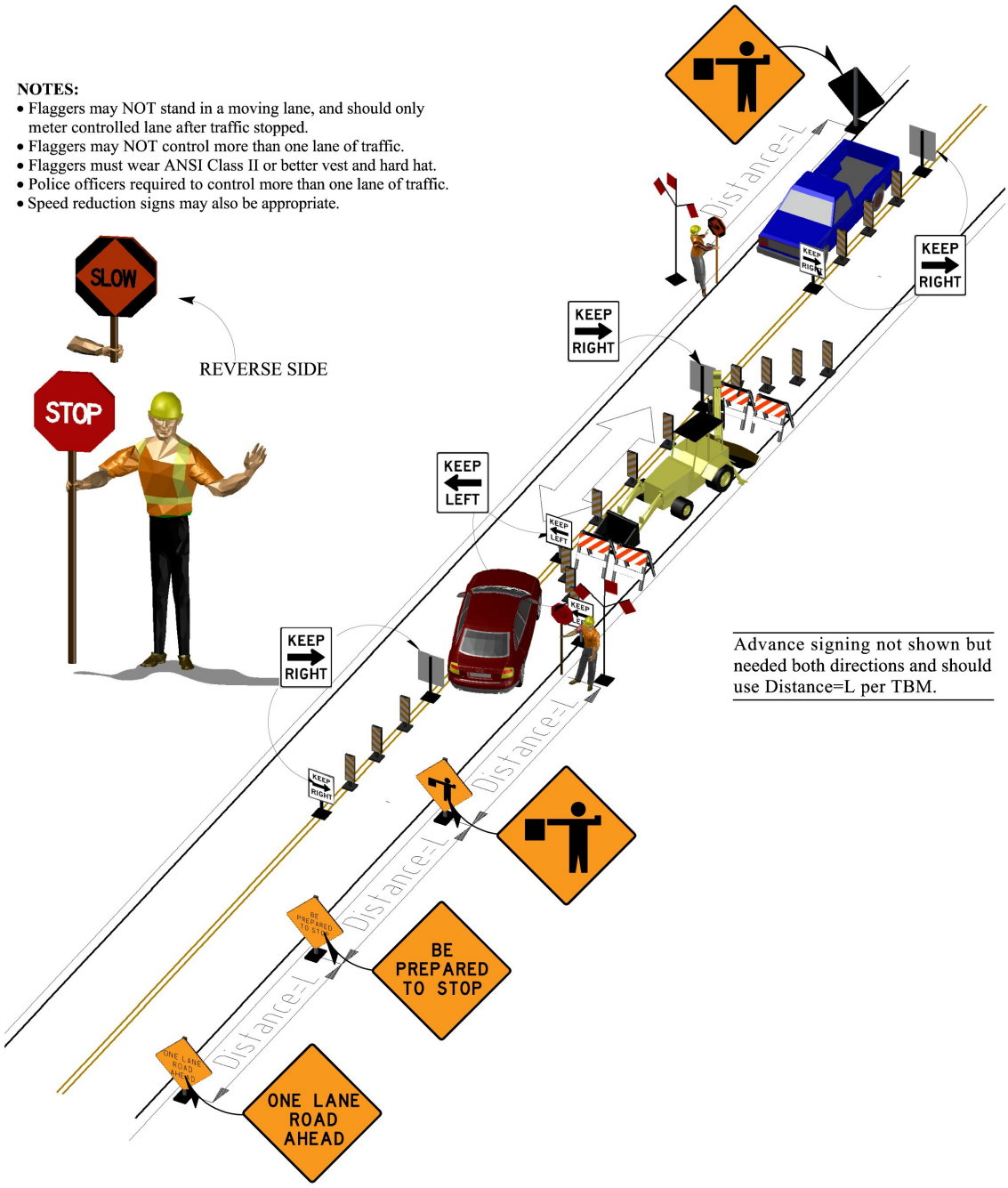
MIDBLOCK BIKE / RIGHT LANE CLOSED
(Maintain two thru lanes using two-way left turn lane)

Figure 39 – Flagging to Facilitate Construction (To stop traffic as needed)



FLAGGING TO FACILITATE CONSTRUCTION
(To stop traffic as needed)

Figure 40 – One Lane Two-Way Traffic using Flaggers (Scene 1: Pre-warners and approach)



ONE LANE TWO-WAY TRAFFIC USING FLAGGERS
(To control traffic with flaggers)

Appendix A-2

Definitions

ADVANCE NOTICE (FOR PERMIT APPROVAL): Represent the number of days in advance, excluding holidays and weekends, that requestor must provide to ROW Management before being allowed to begin work, typically:

- Minimum 10 days for full closures
- Minimum 48 hours for lane restrictions, except emergencies or other extenuating circumstances – see Chapter 2 Regulations that Govern TRACS Permits for additional information).

ADVANCE PUBLIC NOTICE (TO START WORK): Represents the number of days in advance, excluding holidays and weekends, that the public must be notified before beginning work, as determined by ROW Management staff, typically for dynamic message board placement:

- Minimum 5 days for lane restrictions when required by ROW Management
- 5 - 10 days for full closures

ALLEY (Commercial): Passageways for local access to the rear of lots or buildings in commercial areas. Alleys are not streets or highways, and are not intended for use by through traffic. The junction of an alley with a street does not constitute an intersection.

ALLEY (Residential): Same as above, only for local access to residential land uses.

ARTERIAL STREETS: Streets designated as Major Arterial or Arterial streets on the most current City of Phoenix Street Classification Map on file with the City Clerk. They are generally located at one-mile intervals.

BARRICADE: A device used for channelizing pedestrians or traffic or shielding an area, depending on the application. These may include Type I, II, or III barricades, drums, cones, vertical panels or other acceptable devices.

BICYCLE: A device, including a racing wheelchair, that is propelled by human power and on which a person may ride that has either:

- Two tandem wheels, either of which is more than 16 inches in diameter, or
- Three wheels in contact with the ground, any of which is more than 16 inches in diameter
- Or as referenced in Arizona State Statute 28-101.

BICYCLE LANE: A portion of a roadway designated by signs and/or pavement markings for preferential or exclusive use by bicyclists.

BICYCLE ROUTE: A bikeway designated for use by bicyclists by an authorized agency using appropriate directional guide signs.

BICYCLE BOULEVARD: A low-speed street which has been "optimized" for bicycle traffic. Bicycle boulevards discourage cut-through motor-vehicle traffic but allow local motor-vehicle traffic. They are designed to give priority to bicyclists as through-going traffic.

CHANGEABLE MESSAGE SIGN: A fixed or portable electronic sign that is capable of displaying more than one message, changeable Manually, by remote control, or by automatic control.

CHANNELIZING DEVICES: Temporary traffic control devices used in conjunction with one another to guide and warn road users of conditions created by road work, emergencies or special event activities in or very near the roadway. They may be used to divert traffic around temporary obstructions and to guide traffic along their intended path.

CITY FORCES: Work crews (e.g., Water Services Department, Street Maintenance Division, etc.) working in the right-of-way and employed by the City of Phoenix.

CITY PERMITS: There are various types of city permits. The two most common types of permits associated with working in the right-of-way include: (1) TRACS permit issued by the Right-of-Way Management Office and (2) Right of Way Permit issued by Planning and Development to perform construction for private development.

CITY PROJECT: A project performed under contract with the City of Phoenix.

CITY STREETS: Arterial, collector, and local streets in Phoenix. This does not include private streets or state or county-maintained roadways, highways, freeways or expressways.

COLLECTOR STREETS: Streets designated as "Collector" on the most recent Phoenix Street Classification Map on file with the City Clerk. They are generally located at half-mile intervals.

CRASHWORTHY: Traffic control devices that have crash tested successfully through the AASHTO Manual for Assessing Safety Hardware (MASH).

CROSSWALK: That part of a roadway at an intersection included within the prolongations or connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in absence of curbs, from the edges of the traversable roadway or any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing by lines or other markings on the surface, or as stated in Arizona Revised Statute 28-601.

DAYLIGHT HOURS (DAYTIME): Hours from sunrise to sunset.

DELINEATORS: Retro-reflective devices mounted at the side of a roadway in a series, or on the roadway surface to delineate the alignment of the roadway during hours of darkness. Delineators are for guidance, and are not considered warning devices.

DETECTABLE: Having a continuous edge within six inches of the surface so that pedestrians who have visual impairments can sense its presence and receive usable guidance information.

DETOUR (ROADWAY): A temporary rerouting of road users onto an existing street(s) or a newly created bypass route, in order to avoid a construction, maintenance, emergency or special event area.

DIVERSION: A temporary rerouting of road users. A diversion is created when traffic is rerouted along or through the work zone or other protected area.

EMERGENCY: An event that requires urgent response by the agency or company responding to the emergency. The first responders should leave a message at 602-262-6235 (if emergency is after business hours) and again during business hours to provide the location, type of emergency, and expected duration. Urgent notification to ROW Management is required to coordinate emergency with other nearby traffic restrictions.

ENGINEERING ASSESSMENTS: There are two types; engineering judgment and engineering studies. Both involve evaluation of pertinent information and application of appropriate principles and practices by trained personnel familiar with local conditions to decide the applicability, design, operation, or installation of a traffic control device. Engineering assessments shall be exercised by an engineer, or an individual working under the supervision of an engineer using procedures established by the engineer. Application of engineering judgment does not require documentation. An engineering study needs documentation at the time the study is conducted, but need not be retained forever.

FLAGGER (CERTIFIED): A certified person wearing a vest and hard hat, using a STOP/SLOW paddle, stationed to assist with traffic control in restricted areas. Flaggers are limited to controlling traffic in one traffic lane only and should position themselves outside of the traveled lane until traffic is stopped. Safety apparel requirements are outlined in the MUTCD, Section 6E.02.

INTERSECTION: The area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways joining at any other angle may come in conflict. If a highway includes two roadways thirty or more feet apart, each crossing of each roadway of the divided highway by an intersecting highway is a separate intersection. If the intersecting highway also includes two roadways thirty or more feet apart, each crossing of two roadways of the highways is a separate intersection. (Reference, Arizona Revised Statute 28-601.) The junction of an alley with a public street does not constitute an intersection.

INTERSECTION INFLUENCE AREA: An area where traffic may be impacted by intersection operations, usually at least 300 feet in all directions approaching the intersection, especially near traffic signals.

LOCAL STREETS: All minor public streets within the City of Phoenix not otherwise designated as Arterial or Collector Streets on the Phoenix Street Classification Map.

MAJOR SHOPPING CENTER: A large, regional, high-volume retail indoor or outdoor mall, as specifically defined in the annual holiday moratorium letter to right-of-way users.

MAJOR STREET: Streets designated as Major Arterial on the most current City of Phoenix Street Classification Map.

MULTIPLE LANES: Two or more through traffic lanes in any one cardinal direction.

NIGHTTIME HOURS : Hours from one-half hour after sunset to one-half hour before sunrise, and any other time when persons or objects may not be clearly discernible at a distance of five hundred feet.

OFF-PEAK TRAFFIC HOURS: Times not defined as “peak traffic hours.” Hours between 8:30 a.m. to 4:00 p.m. (reduced to 9:00 a.m. on Reverse Lane streets) and 6:30 p.m. to 6:00 a.m., Monday through Friday.

PAVED: A mixed, bituminous concrete, or Portland cement concrete roadway surface that provides both structural strength (weight bearing) and a seal.

PEAK TRAFFIC HOURS: Hours between 6:00 a.m. to 8:30 a.m. (extended to 9:00 a.m. on Reverse Lane streets) and 4:00 p.m. to 6:30 p.m., Monday through Friday.

PEDESTRIAN: Any person afoot. A person who uses an electric personal assistive mobility

device or a Manual or motorized wheelchair is considered a pedestrian unless the Manual wheelchair qualifies as a bicycle. For the purposes of this definition, "motorized wheelchair" means a self-propelled wheelchair that is used by a person for mobility (ARS §28-101.41).

PEDESTRIAN ESCORT (WORK ZONE): A person wearing proper apparel such as a vest and hat, using a flag and/or STOP paddle to gain motorist attention, and stationed to assist with pedestrian traffic control in restricted areas.

PEDESTRIAN FACILITIES: A general term denoting improvements and provisions made to accommodate or encourage walking and wheelchair use.

PEDESTRIAN HYBRID BEACON (PHB): A PHB is a special type of hybrid beacon used to warn and control traffic at an un-signalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

PERMIT HOLDER: Contractors, utility companies, city crews, or any other person authorized to work in the city right-of-way.

POLICE DEPARTMENT: The City of Phoenix Police Department.

POLICE OFFICER: A uniformed City of Phoenix, Maricopa County Sheriff's Office, or Department of Public Safety (including State Capitol Police) law enforcement officer, on-duty or off-duty, duly authorized to enforce the Arizona Revised Statutes and the Phoenix City Code in the City of Phoenix.

PUBLIC RIGHTS-OF-WAY (ROW): All land in the City of Phoenix dedicated and/or expressly reserved for transportation purposes such as vehicular, light rail, bicyclist and pedestrian traffic and/or installation and maintenance of utilities.

RAISED PAVEMENT MARKER: A device mounted on or in a road surface that has a height generally not exceeding approximately 1 inch above the road surface for a permanent marker, or not exceeding approximately 2 inches above the road surface for a temporary flexible marker, and that is intended to be used as a positioning guide and/or to supplement or substitute for pavement markings.

REGULATORY SIGN: A sign giving notice to road users of traffic laws or regulations.

RESTRICTION (STREET OR SIDEWALK): Any reduction to the normal flow/access of vehicular, bicyclist or pedestrian traffic in the public ROW.

RETROREFLECTIVITY: A surface property that allows a large portion of the light coming from a point source to be returned back to that source.

REVERSE (REVERSIBLE) LANE: A traffic lane marked by double dashed yellow lines, usually at or near the center of a street, used during certain weekday peak hours for through traffic in opposing directions and other hours as a two-way left-turn lane (e.g., 7th Avenue and 7th Street).

RIGHT-OF-WAY MANAGEMENT (ROW Management): A City of Phoenix program within the Street Transportation Department – Traffic Services Division (formerly Traffic Operations Division) established in 2004. Its goal is to enhance traffic safety and mobility by minimizing unauthorized/ improper street and sidewalk restrictions without delaying projects.

RIGHT-OF-WAY MANAGEMENT INSPECTOR: Chief Construction Inspectors in the Right of Way Management Section authorized to carry out the goals and objectives of the Right of Way Management program and issue Notices-of-Violation to right of way users.

RMP: The Right of Way Management Program

RMP Administrator: The Construction Inspections Supervisor(s) designated to administer the Right of Way Management Program.

ROADWAY (TRAVELED WAY): That portion of street ordinarily used for vehicular travel, bicycles and parking, but exclusive of the sidewalk, berm, or shoulder, even though these areas may be used by persons riding bicycles or other human-powered vehicles.

SOLID WASTE DIVISION: The Solid Waste Division for the Phoenix Public Works Department.

SIDEWALK: That portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property intended for use by pedestrians. In temporary traffic control zones, accessible temporary sidewalk detours/diversions are to be constructed and maintained similar to the sidewalk it replaced.

SCHOOL: A public or private educational institution recognized by the State Education Authority for one or more grades K-12 or as otherwise defined by the state.

SCHOOL ZONE: A designated roadway segment approaching, adjacent to, and beyond school buildings or grounds, or along which school related activities occur.

SPECIAL TRAFFIC REGULATIONS: "Special Traffic Regulations" included in the City Project specifications, or attached to City Permits, prepared by the Street Transportation Department for the specific traffic situations detailed therein.

STATE: State of Arizona.

STREET: A general term for denoting a public way for the purpose of vehicular, bicycle, and pedestrian travel, including the entire area within the ROW.

STREET TRANSPORTATION DEPARTMENT: The Phoenix Street Transportation Department.

TRAFFIC: Pedestrians, ridden or herded animals, vehicles and other conveyances either singly or together while using a highway for purposes of travel (ARS §28- 601.28).

TRAFFIC SIGNAL: Any electronic traffic control device using green, yellow and red indications and by which traffic is alternately directed to stop and permitted to proceed.

TRAFFIC CONTROL DEVICES: Signs, traffic signals, markings, barricades, and channelizing devices used to regulate, warn, or guide traffic by the authority of a public agency having jurisdiction. Traffic control devices are to be in substantial conformance with those illustrated in this Manual or in the Manual on Uniform Traffic Control Devices.

TRAFFIC SIGNAL SHOP: The Traffic Signal Shop of the Street Transportation Department, Operations Traffic Services Division 602-262-6021. (24 hours)

WARNING SIGN: A sign that gives notice to road users of a situation that might not be readily apparent.

WEEKDAYS: Days of the week, starting at 6:00 a.m. on Monday, and ending at 6:30 p.m. on Friday.

WEEKENDS: Days of the week starting at 6:30 p.m. Friday and ending at 6:00 a.m. on Monday.

Appendix A-3

Emergency Contact Information

(All numbers, unless indicated otherwise, have a "602" prefix)

To report temporary traffic control signs or barricades in poor condition or inappropriately positioned, call the RMP Hotline at (602) 262-6235 or e-mail: RMP@phoenix.gov.

When an emergency occurs, such as a street cave in, water line or gas line break, damaged sewer, telephone, or electric lines, the first responders shall notify the affected agencies immediately, followed up by a TRACS permit request.

During the normal workweek, the following agencies shall also be notified:

City of Phoenix City Operator ..... . 262-6011 or 262-6300

Police Department ..... 911 or 262-6151

Street Transportation Department:

Street Maintenance Dispatch 19 262-6441

Traffic Signal Dispatch 262-6021

Right of Way Management 262-6235

Utility Inspection Section 534-1400

Design & Construction Management 495-2050

During weekends, holidays, and nights when the above offices are closed, the following shall also be notified.

The following City of Phoenix telephone numbers may be useful:

Planning and Development Department

Construction Permits 262-7811

Fire Department ..... 911 or TTY 495-5555

Police Department, (Off-Duty Officers) 262-7626

Public Works Department 262-7251

Solid Waste Division 262-7251

Public Transit 262-7242

Street Transportation Department 262-6284
Street Closures.....262-6235
Traffic Signal Underground Location 262-6204
Water Services Department 262-6251
Water Distribution 262-6509
Wastewater Collections.....262-6691

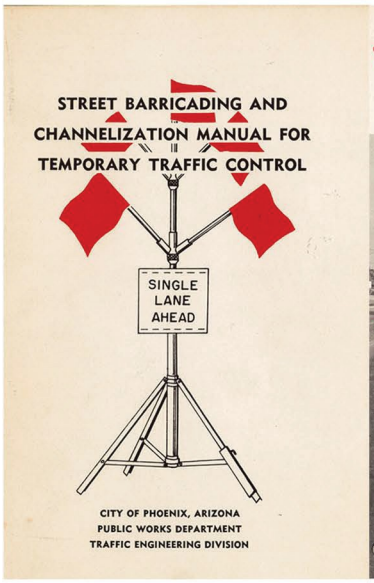
Other Agencies:

Arizona Department of Transportation.....712-7355
ADOT Central District Office (Construction)..... 712-8965
ADOT Central District Maintenance Office 712-6664
Arizona Department of Public Safety..... 223-2000
Arizona Public Service Company 371-7171
APS Emergency (Except outages)..... 258-5483
Blue Stake, Underground Utility Locations 811
Century Link Communications 1-800-244-1111
Cox Communications.....623-594-1000
Kinder Morgan Pipeline 278-8564
Maricopa County Department of Transportation 506-8600
Maricopa County Sheriff's Office.....876-1011
Rural Metro Fire Department 480-945-6311
..... 1-800 352-2309
Salt River Project (Electric Costumer Service) 236-8888
Irrigation Water.....236-3333
Power emergencies 236-8811
Southwest Gas Company 271-4277
METRO (Valley METRO or METRO Light Rail)..... 253-5000

Americans with Disabilities Act (ADA) Information

Upon request, this publication can be made available in Braille, large print, or audiocassette tape by contacting the Street Transportation Department at (602) 262-6284 or at TTY (602) 256-4286

History of the Manual



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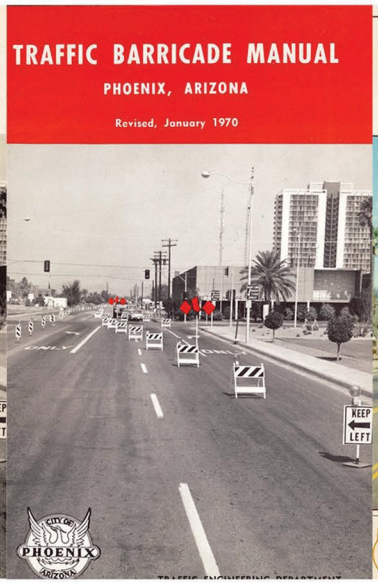

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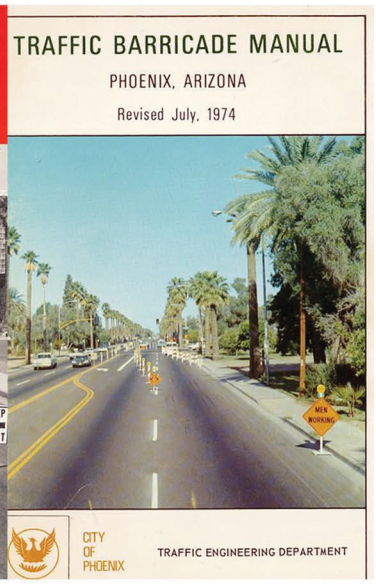

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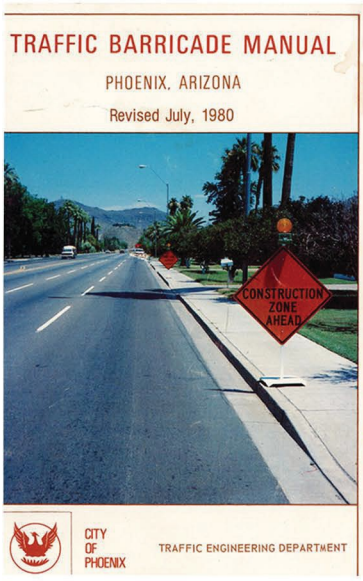

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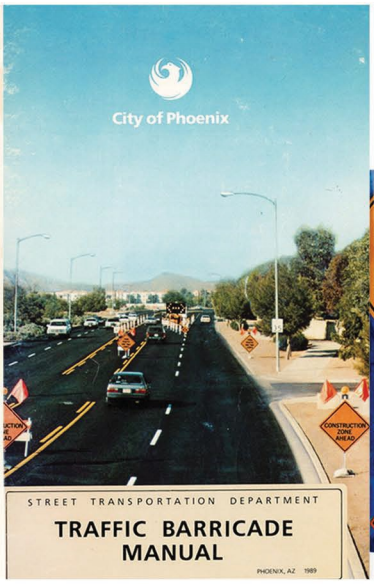

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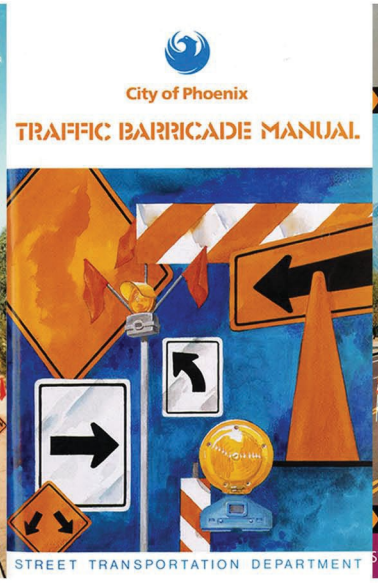

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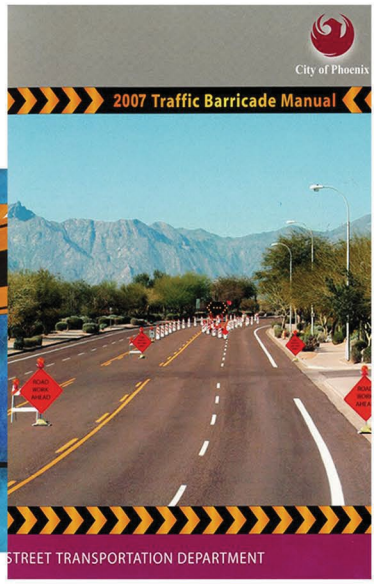

2007

City of Phoenix
STREET TRANSPORTATION DEPARTMENT