Temporary Traffic Control Manual

For Street Construction and Maintenance Operations in the City of Appleton

Prepared by the City of Appleton
Department of Public Works
Engineering Division – Traffic Section

2016

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Important Phone Numbers

Appleton Work Zone Hotline **832-2379**

Appleton Department of Public Works **832-6474**

Appleton Police Department **832-5500**

Permits/Parking Meter Bagging **832-6474**

General Questions Regarding This Manual **832-5580**

This Temporary Traffic Control Manual shall be utilized in conjunction with and is intended to supplement the current version of the Wisconsin Manual on Uniform Traffic Control Devices (MUTCD), as published by the Wisconsin Department of Transportation. The basic principles embodied in the MUTCD have been refined to allow them to better apply to urban traffic conditions.

Compliance with the MUTCD and this manual (including supplements and errata) is required of all persons, agencies, contractors, and City of Appleton personnel occupying public rights-of-way within the City of Appleton (hereinafter referred to as "the City"). Failure to comply with this manual shall constitute a violation of municipal code and, as such, subject those responsible to municipal citation(s) and/or other actions as described herein.

All City-issued permits or permissions involving roadway obstruction shall be subject to immediate revocation, modification, and/or issuance of municipal citation(s) if the requirements of the permit/contract documents and this manual are not met or if unfavorable traffic conditions develop during the period the obstruction is permitted as determined by the Traffic Section.

1. General Information

Part A: Purpose & Intent

The purpose of this manual is to set forth the basic principles and standards to be observed by all those who perform work in public rights-of-way so as to provide safe and effective work areas and to warn, control, protect, and expedite vehicular and pedestrian traffic. Although each situation should be dealt with individually, conformity with the general provisions and techniques established herein is required by law. In particular situations not adequately covered by the provisions of this manual, the protection of the traveling public and the worksite will dictate the measure to be taken, consistent with the general principles set forth herein as required by the Traffic Section.

Part B: Responsibility

All persons, agencies, contractors, and City of Appleton personnel performing work within or infringing upon the street right-of-way shall conduct said work to acceptable standards of safety and efficiency and, except where specified in the contract or permit documents, shall be responsible for the following:

1. Obtaining all necessary permits and/or permission to perform work in the street right-of-way from the Department of Public Works and complying with any/all conditions set forth therein.

2. Supplying, installing, and maintaining all traffic control devices, equipment, and personnel as outlined in this manual unless specific instructions to the contrary are included in the contract documents or on the permit.

3. Scheduling and expediting the work to minimize inconvenience to the public.

4. Providing adequate safeguards for the worksite and the general public as outlined herein.

5. Providing notification as required herein.

6. In the case of public works contracts, complying with any/all traffic-related requirements set forth therein.

2. Definitions

Average Daily Traffic (ADT)	Within this document, ADT values for any given roadway (or portion thereof) are documented on the City's web site. In the absence of any ADT values, an estimated value will be provided by the Traffic Section.
Arterial, Collector, or Special Status Roadway	Within this document, those public roadways functionally classified as 'Arterial,' 'Collector' or 'Special Status' roadways and identified as such on the City's official Arterial/Collector Plan (included herein).
Central Business District (CBD)	Within this document, that area which is defined as such on the City's official Arterial/Collector Plan (included herein).
Contract Documents	Documents associated with a City of Appleton public works contract.
Contractor	Anyone authorized to conduct work in the street right-of-way.
Local Roadways	Within this document, those roadways functionally classified as 'Local' roadways and identified as such on the City's official Arterial/Collector Plan (included herein).
Parking Lane	That portion of the roadway intended for parked vehicles as defined by parking stall pavement markings or, if none, the legal parking area located within eight feet of the face of curb.
Public Works Contract	A written agreement between the City and a contractor covering the performance by both parties and enforceable by law.
Shall	A mandatory condition. Where certain requirements in this manual are described with the 'shall' stipulation, it is mandatory that these requirements be met.
Should	An advisory condition. Where the word 'should' is used in this manual, it is considered to be an advisable message, recommended but not mandatory.
Street, Roadway, Right-of-Way, or Highway	The entire width between boundary lines of any way or place when any part thereof is open to the use of the public, as a matter of right, for the purpose of vehicular traffic.
Temporary Traffic Control (TTC) Zone	The entire section of roadway between the first advance warning sign through the last traffic control device, where traffic returns to its normal path and conditions.
Traffic Control Plan (TCP)	A plan for handling traffic through a specific street or highway work zone or project.
Traffic Section	A subsection of the City of Appleton's Department of Public Works, to include the City Traffic Engineer and his/her designee(s).

3. General Requirements

Part A
General

All temporary traffic control (TTC) devices shall conform in both design and usage to the requirements set forth in this manual. Traffic control for in-street work shall strictly conform to this manual unless otherwise stipulated on the permit or in the contract documents. In the case of emergency work requiring temporary traffic control, refer to Section 8.

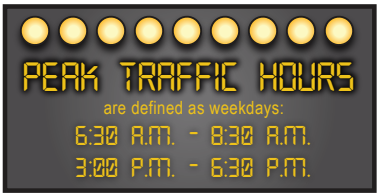
Construction/maintenance vehicles which encroach onto the traveled portion of any public roadway for any reason shall be equipped with high intensity vehicle safety lights/equipment as required herein and as deemed adequate by the Traffic Section.

Part B
Permits to be Kept on Site

Permits, when required, shall be kept at the job site at all times. Failure to do so invalidates the permit.

Part C
Time of Work

No obstructions shall be permitted in the traveled way on arterial streets, collector streets, special status streets, on any street within the Central Business District (CBD) or within 250' of a traffic signal during peak traffic hours without authorization from the Traffic Section unless otherwise specified in the contract documents or, in the case of emergency work, as defined herein.



Whenever two or more contractors or agencies are planning work within the public right-of-way at the same general location, they shall make arrangements to schedule or coordinate their work to maintain continuity of traffic signing.

The Traffic Section may impose additional limitations on the time and/or duration of work. The contractor may be required to discontinue work if a possible conflict exists with special events, such as parades, or seasonal conditions.

Part D
Application of Temporary Traffic Control

Work duration is a major factor in determining the number and types of devices used in temporary traffic control zones. The duration of a temporary traffic control zone is defined relative to the length of time a work operation occupies a spot location.

The five categories of work duration and their time at a location shall be:

LONG-TERM STATIONARY (LTS) TTC zones:
(Work that occupies a location more than 3 days)

There is ample time to install and realize benefits from the full range of temporary traffic control procedures and devices that

are available for use. Generally, increased number of channelizing devices, temporary roadways, and temporary traffic barriers are used. Since LTS operations extend into nighttime, retroreflective and/or illuminated devices shall be used. Inappropriate pavement markings in LTS temporary traffic control zones shall be removed and replaced with temporary markings, unless otherwise permitted by the Traffic Section.

INTERMEDIATE-TERM STATIONARY (ITS) TTC zones
(Work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.)

It may not be feasible or practical to use procedures or devices that would be desirable for LTS temporary traffic control zones. The increased time to place and remove these devices in some cases could significantly lengthen the project, thus increasing exposure time. Since ITS operations extend into nighttime, retroreflective and/or illuminated devices shall be used.

SHORT-TERM STATIONARY (STS) TTC zones
(Daytime work that occupies a location for more than 1 hour, but less than 12 hours, during a single daylight period.)

It may not be feasible or practical to use procedures or devices that would be desirable for LTS temporary traffic control zones. The increased time to place and remove these devices in some cases could significantly lengthen the project, thus increasing exposure time.

SHORT DURATION (SD) Operations
(Work that occupies a location from 15 minutes up to 1 hour.)

MOBILE Operations
(Work that moves intermittently or continuously, occupying any given location for no more than 15 minutes. Examples of Mobile operations include activities such as refuse collection, pothole patching, traffic signal repairs/maintenance, tree trimming and utility operations.)

These activities typically require the use of devices having greater mobility, such as signs and high intensity vehicle safety lights mounted on trucks. Vehicles that are equipped and operated as required may be used in place of most static signs and channelizing devices as set forth below and in the appendices.

Vehicles engaging in Short Duration or Mobile operations shall comply with the minimum requirements set forth herein. Vehicles without adequate warning equipment as defined herein shall be prohibited from conducting Short-Duration and Mobile operations.

Part E
Work Area

In general, unless the section of street is to be completely closed to vehicular traffic, work shall be accomplished such that as few traffic lanes as possible are blocked. Work shall be scheduled and work areas laid out to permit:

1. The maximum number of traffic lanes normally available to be opened in the direction of the heaviest flow of traffic during peak traffic hours.

2. Maintenance of two-way traffic at all times, except on “one-way” streets. Additional width for facilitating traffic flow may be obtained by prohibiting on-street parking adjacent to the work zone.

3. Provision for safe and protected bicycle and pedestrian ways.

4. The contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, and any other needed actions to protect the life, health, and safety of the public and shall perform any measures or actions the Traffic Section may deem necessary to protect the public and property. The contractor shall maintain all work area traffic control devices in a proper condition on an around-the-clock basis whether or not work is actively being pursued and shall assure that tools and equipment are properly stored and excavation bridging is secure and adequately covering excavation(s).

5. Potential overhead obstructions, such as trees and power lines, shall be identified and accommodated for in the TCP as necessary.

Part F
Placing and Removing Signs and Equipment

Proper placement of signs, channelizing devices, and construction equipment is essential to ensure safe, smooth traffic operation in and around the construction area.

The following procedures shall be adhered to:

1. No TTC equipment shall be installed except immediately before the work begins. However, if such signs need to be installed as matter of convenience in advance of the scheduled work, they shall be effectively covered or turned away from all traffic until work begins.

2. Street occupancy shall cease and TTC devices (including advance lane closure signage) shall be removed as soon as work is completed each day. Failure to remove such signage may result in removal by City crews at the contractor's expense, revocation of permit and/or issuance of one or more municipal citations.

3. Unless otherwise required by the Traffic Section, a minimum of 10 feet shall remain between the outer edge of any work area or roadway obstruction and any painted roadway centerline or lane line (if present), unless provisions have been made to safely shift traffic across the painted line in accordance with the principles and requirements set forth in this manual.

4. Signs shall not be placed in a way that obstruct pedestrians, unless the signs are related to a sidewalk closure.

5. Signs shall not be placed in a designated bicycle lane unless authorized by the Traffic Section.

Part G
Speed and Parking Control

In those areas where construction operations have changed road conditions, additional hazards such as reduced lane width, open trenches, temporary roadway, etc., may be considered as evidence of need for an alteration of the legal (or posted) speed limit. Requests for alteration of the legal speed limits on City streets must be submitted to the Traffic Section.

Parking restrictions should be established within construction and maintenance areas where parked vehicles may contribute to hazardous road conditions and/or restrict traffic flow. In areas where parking meters are present, the contractor shall make requests to the Parking Division (832-6474) at least 24 hours in advance for installation of meter covers restricting such parking. Where no meters are present, the contractor shall confer with the Traffic Section at least 48 hours in advance to arrange for borrowing of temporary "No Parking" signs (to be placed and returned by the contractor).

Part H
Permanent Traffic Control Devices

Street name signs, traffic signs, signals and other traffic control devices are erected by the City to safeguard vehicular and pedestrian traffic. Quite often a conflict will exist between these devices and construction and repair work.

Since conditions may vary greatly with different projects, no attempt will be made in this manual to designate a specific course of action for each situation. The Public Works Inspector or, if none, the contractor shall confer with the Traffic Section (832-5580) prior to beginning work and as necessary throughout the job. Unless previous arrangements have been made, the Contractor shall not alter or remove existing control devices.

Part I
Intermittent Work

Often it is necessary for certain vehicles to stop for a few minutes within the roadway area in order to perform routine service, such as street light maintenance, manhole inspection, and concrete delivery. In such cases, specifications for the use of temporary traffic control devices need not be complied with to the extent specified herein, however:

1. Such vehicles shall be equipped with and operating approved high intensity vehicle safety lighting or arrow boards.

2. Approved warning devices shall be mounted on the vehicle as high as necessary to be seen by approaching motorists.

3. Supplemental traffic cones (or other suitable channelizing device) shall be used to channelize or divert traffic around the vehicle. Such devices shall remain in place until all work has been completed and the vehicle is ready to be moved.

4. Signs, barricading and channelization, as required elsewhere in this manual, are required for all vehicles stopped in the street for more than a few minutes.

5. Time-of-day restrictions shall be observed.

4. Procedure for Obtaining Permission to Work in City Streets

Except as set forth herein, all persons wishing to perform work or stock materials within the street right-of-way shall apply for and receive a permit to partially or completely obstruct any street, sidewalk, or alley. Such restrictions include, but are not limited to, partial or full lane closures, temporary parking restrictions, sidewalk obstructions or closures, detours, complete street closures, and pedestrian rerouting, as well as the placing of building materials or equipment on streets, sidewalks, or alleys. Persons performing any work which will result in such an obstruction shall contact, in advance, the Public Works Department at 832-6474, located on the 5th floor of the Appleton City Center building to determine what approvals may be required.

Such permits are not required when the work will be completed by City personnel or contractors that are performing work as a part of a City public works project.

Part A
Review and Approval

Regardless of whether or not a permit is required, work meeting any of the following criteria shall require review and approval from the Traffic Section prior to commencement:

1. Full closure of any roadway, or
2. Obstruction or alteration of any traveled lane exceeding 1 hour on arterial, collector, special status and CBD roadways, or
3. Obstruction or alteration of any traveled lane on arterial roadways during peak traffic hours.

Part B
Traffic Control Plans (TCP)

When the work being considered meets any of the criteria set forth above, the contractor shall submit an acceptably-prepared TCP to the Traffic Section for review and approval unless otherwise directed by the Traffic Section.

Part C
Advance Notice of Work

After receiving the required permission to work in the street right-of-way as described above, the contractor shall provide 24 hours advance notice to the Traffic Section before any work may commence. Additional advance notice may be required for projects that are more complex in nature.

Part D
Commencement of Work

Work shall not commence until the TCP has been approved by the Traffic Section, permits (if required) have been issued, and notification requirements have been satisfied. All work shall strictly comply with the approved TCP.

5. Materials for Traffic Control

Unless otherwise specified/permitted by the Traffic Section or identified in the contract documents, all temporary traffic control signs and devices shall conform to the Wisconsin Department of Transportation Standard Specifications for Highway and Bridge Construction (hereafter referred to as the WisDOT Specifications), latest edition with errata and revisions, except as noted below:

1. Orange work zone traffic control signs: Type H (ASTM D4956 Type III or IV) sheeting shall be permitted on designated Local roads.
2. Drums and flexible tubular markers: ASTM D4956 Type III or IV sheeting shall be permitted.
3. Barricades: ASTM D4956 Type III or IV sheeting shall be permitted.

All temporary traffic control devices shall have a readable company name along with telephone number at which a responsible party can be reached. Devices not meeting this requirement shall not be permitted for use.

Portable sign stands shall not be used for more than a duration of seven continuous days and nights (except for certain signs as permitted in the MUTCD). Portable signs used in compliance with this manual shall be properly ballasted to minimize wind-related problems.

Part A
Road Closure Devices

Type 3 barricades shall be used for long-term and intermediate-term roadway closures. When used for the purpose of road blockage, barricades should be no further apart than five feet to prevent vehicles from driving between them. If it is necessary to provide access for special traffic, signs reading “ROAD CLOSED TO THRU TRAFFIC” shall be used. Signs displaying “ROAD CLOSED LOCAL TRAFFIC ONLY” shall NOT be used, unless specifically authorized by the Traffic Section.

Part B
Illumination and Lighting Devices

All traffic control devices, except parking and pedestrian control signs, used during the hours of darkness shall be properly reflectorized as described elsewhere herein. Amber flashing lights shall be mounted on all barricades placed within the roadway during hours of darkness. In addition to these requirements, other devices may be required, such as:

1. High Intensity Vehicle Safety Lights (Vehicle mounted)
   The purpose of this specification is to provide guidance for effective and consistent vehicle safety lighting in the construction work zone. It applies day or night to all mobile equipment working in or near a work zone.

   Vehicle safety lights shall be continuously and obviously visible to an observer circling the vehicle in a 1,000 foot radius. Lights shall be operating when the vehicle decelerates to enter a construction work zone, and when the vehicle leaves the work zone to enter the traveled traffic lane. Vehicles conducting short duration or mobile operations shall operate vehicle safety lights at all times.

   Vehicles with inadequate high intensity vehicle safety lighting, as determined by the Traffic Section, may be prohibited from conducting certain types of TTC operations.

2. Advance Warning Illuminated Arrow Panel (Arrow Boards)
   Unless otherwise permitted by the Traffic Section, the use of approved illuminated arrow panels is required when any of the following conditions are present:

   a) lane closures or shifts on roadways with a posted speed limit of 35 miles per hour or greater, or

   b) lane closures or shifts on roadways within the CBD, or

   c) whenever required by a specific diagram included in the appendices of this manual, or

   d) under special circumstances as determined by the Traffic Section.

Part C
Channelizing Devices

Cones are not permitted as a channelizing device for work zones exceeding 12 hours in duration. When used, cones used as channelizing devices shall be a minimum of 28” in height, except when used on Local roadways.

Arrow boards shall comply with the following:

PANEL TYPE	POSTED ROADWAY SPEED LIMIT	MINIMUM SIZE	MINIMUM # OF LAMPS	MINIMUM LEGIBILITY DISTANCE
A	25-30 MPH	48" x 24"	12	1/2 MILE
B	35-40 MPH	60" x 30"	13	3/4 MILE

Arrow boards shall be continuously visible and identifiable at the minimum legibility distances indicated above. Further, they shall be in proper working order and shall be properly aimed. The Traffic Section may, at its discretion, deem an arrow board's condition to be unsatisfactory and require its immediate replacement.

6. Detours and Street Closures

Several elements are involved whenever it is deemed necessary before or during the course of a project to close an existing street and create a detour. Detours shall be provided for all closures to arterial and collector streets unless otherwise permitted by the Traffic Section.

Part A
Permission and Notification

Notification shall be given to and permission obtained from the Traffic Section as outlined in this manual. The contractor shall submit for review and approval detour schedules and diagrams showing the steps required to maintain the detour during each phase of construction and showing the type, number and placement of all traffic control equipment. The submittal shall include a proposed schedule indicating when specific signs, barricades and pavement markings will be activated and deactivated.

When construction work is being conducted on a street that is closed to through traffic, the requirements for signing (particularly advanced signing), channelizing devices, lighting, and work area protection, may differ from those indicated in this manual.

Generally, the following guidelines should be adhered to. However, each situation should be evaluated on the basis of traffic volume and speed, familiarity of motorists with the roadway, and sight distance.

1. All open excavations, ditches, spoil banks, etc., shall be properly marked with barricades. Also, obstructions such as poles, curbing, etc., which due to the construction, are in a position where they could be struck by a vehicle, should be properly identified by barricades, drums, etc.

2. The path of the vehicle through the construction area shall be properly identified by channelizing devices, especially where the route has been altered or existing paint striping or channelization has been obscured or removed due to the construction activities. This is especially important at night.

3. The detour route shall be clearly marked where it intersects other major cross streets so that motorists will be less likely to turn prematurely.

4. Arterial roadways shall, whenever possible, be detoured onto other arterial roadways. Collector streets shall, whenever practical, be detoured onto collector streets or arterial streets.

5. The use of street name plaque signs shall be required for detours when:
   a) an arterial roadway or truck route is closed/detoured, or
   b) when a collector/special status roadway is closed/detoured for a duration of seven or more calendar days, or
   c) when the possibility of overlapping detours exists, or
   d) when required by the Traffic Section.

6. Supplemental signs that provide additional driver information (i.e. "No Access to "X" Street") may be required by the Traffic Section.

7. Installation, Maintenance, and Inspection

Before work is scheduled to begin, the contractor shall check all signs, pavement marking material, and control devices that are to be used. All devices shall be:

- Standard in size, shape, color, or message
- In good condition, not needing repair and meeting the quality standards set forth in the WisDOT Specifications
- Reflectorized if intended for use during hours of darkness
- Used in accordance with this manual

If a particular device does not meet all of the above requirements, the contractor shall immediately replace it with one that does. Additional devices shall be available to replace any that may be damaged while the work is in progress.

The contractor shall review all traffic signs and control devices for location, visibility, adequacy and manner of use after each setup and at least once every 24 hours to ensure all signs and control devices are in compliance with this manual. Inadequacies shall be corrected immediately.

In the case of City public works projects, City Public Works Inspectors shall be responsible for conducting and documenting daily reviews as described above. Identified deficiencies shall be immediately reported to the contractor for corrective action and follow-up shall be provided as necessary to obtain compliance.

8. Emergency Work

Emergency work is hereby defined as that work which must be completed immediately to correct or contain an immediate hazard to public safety. By its nature it cannot be pre-planned. However, standard procedures and requirements shall apply whenever practical. Examples of emergency work include watermain breaks, traffic signal malfunctions, certain utility operations and police and fire operations.

The contractor conducting the emergency work shall, at the earliest possible opportunity, notify the City at the numbers listed below if the work will involve: (1) a complete roadway closure of any roadway, or (2) a partial closure of any arterial, collector, CBD or special status roadway:

During the Day.....Appleton Traffic Section (832-2379)
Nights/Weekends.....Appleton Police Department (832-5500)

9. Enforcement

It shall be the responsibility of the contractor to comply with the requirements set forth in this manual, on the permit (if applicable) and in the contract documents of any public works project (if applicable). Should the contractor fail to comply with these requirements, the Appleton Police Department, City Traffic Engineer, Director of Public Works and/or their designees shall have the authority to issue municipal citations and/or immediately stop all work until compliance has been achieved and the underlying issues have been resolved to the satisfaction of the Traffic Section. Additionally, the contractor may be required to immediately backfill or adequately cover existing excavations. Suspended work shall not be resumed until the required corrections have been implemented.

Any work required by City forces or contractors to achieve compliance with the manual shall be paid for by the contractor conducting the work. In addition, municipal and/or state citation(s) may be issued to those directly responsible for the construction activities.

10. Miscellaneous Provisions

Part A
Dumpsters and Other Containers

All persons, contractors, and other agencies must apply for and obtain a Street Occupancy Permit to place a construction dumpster or storage container within street right-of-way. This permit must be approved by the Director of Public Works, City Traffic Engineer or their designee(s), prior to the placement of the dumpster or storage container on City streets.

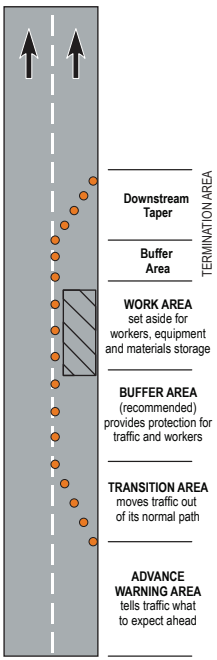
Dumpsters shall be located as required by the permit and fully within the designated parking lane as close to the curb as possible. In addition to any/all requirements set forth on the permit, the dumpster shall be equipped with retroreflective tape two inches (2") in width and twenty-four inches (24") in length (as a minimum) applied vertically along each vertical corner of dumpster. Other similar configurations may be approved at the discretion of the Traffic Section.

Typical Application Diagrams

The following diagrams are examples of the application of standards, guidance, and options in the MUTCD, the Wisconsin Supplement and accepted practices. These typical layouts are not a substitute for engineering judgment and need to be adapted to fit the conditions of a particular site. The diagrams are not to scale, and the number of channelizing devices shown might not be the number needed at the work site. The notes and tables on the diagrams provide important information. Read them carefully before using the diagrams. The diagrams and tables generally indicate minimums.

	Channeling Device		Warning Sign
	Arrow Channel Board		Type III Barricade
	Flagger Symbol		Work or Shadow Vehicle with Vehicle Safety Lighting Activated
	Sign Support		Work Area

Components of a Traffic Control Zone



Taper Length Criteria for Work Zones

The table below lists the five types of tapers and their lengths used in temporary traffic control. The length of each type of taper is based on formulas using the speed of the traffic and the width of the offset (or lane width).

TYPE OF TAPER	TAPER LENGTH
Merging Taper – The number of lanes is reduced on a multi-lane road	1x Length minimum
Shifting Taper – A lateral shift, but no reduction to the number of travel lanes	1/2 Length minimum
Two-way Traffic Taper – Opposing directions of traffic share one open lane	50 feet minimum 100 feet maximum
Downstream Taper – The work area ends and traffic resumes normal driving	100 feet per lane minimum

FORMULAS FOR LENGTH

SPEED LIMIT	FORMULA
40 MPH or LESS	$L = WS^2 / 60$
45 MPH or LESS	$L = W \times S$

L = Taper Length in feet W = Width in offset (lane width or lane shift) in feet
S = Posted speed limit, off peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph

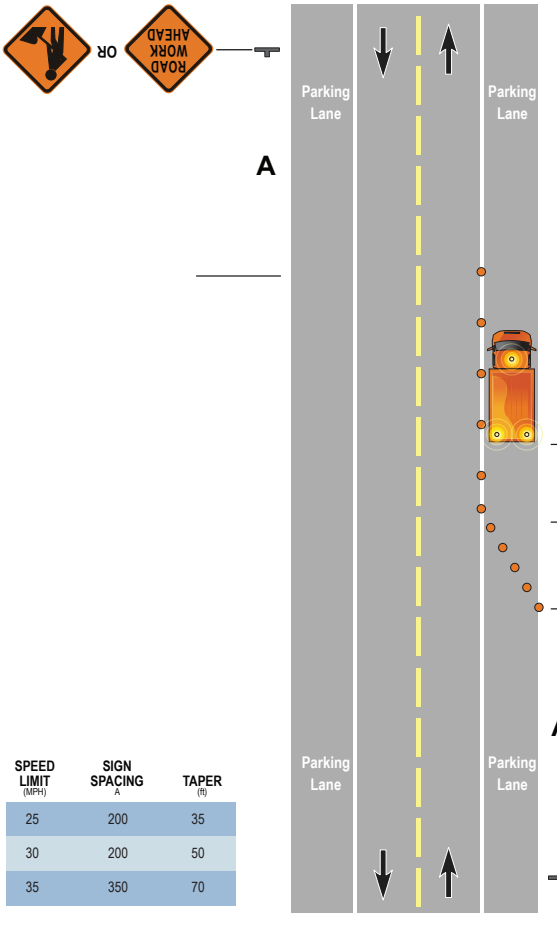
LENGTH (feet)

SPEED (MPH)	Width of Offset (ft)			
	10	11	12	15
25	105	115	125	160
30	150	165	180	225
35	205	225	245	310
40	270	295	320	400
45	450	495	540	675

Work on Parking Lane

Intermediate Stationary Operation

DPW TRAFFIC



APPLICATION OF THIS DIAGRAM

WORK DURATION	1 HOUR OR LESS
ROADWAY CLASS	ANY 2-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	35 MPH OR LESS
TIME OF DAY	OFF-PEAK ONLY

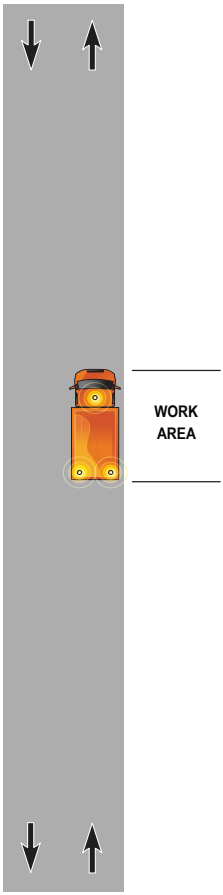
SPEED LIMIT (MPH)	SIGN SPACING A	TAPER (ft)
25	200	35
30	200	50
35	350	70

Notes:

1. If encroachment into the adjacent traffic lane is permitted by the Traffic Section, a 10-foot minimum clear lane width shall be maintained (11 feet in the case of truck/bus routes).
2. If there is encroachment into the traffic lane, a ROAD NARROWS sign may also be required.
3. For short duration work (60 minutes or less), the channelizing devices may be omitted if a vehicle with approved high intensity vehicle safety lighting is used.
4. When the work area is at least 2 feet from the traffic lane on roads with low volumes and speeds of 35 mph or less, the advance warning sign for the opposite direction may be omitted.
5. All orange work zone traffic control signs used on ARTERIAL roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.

Half-Road Closure on Road with Low Volume

Mobile Operation



APPLICATION OF THIS DIAGRAM

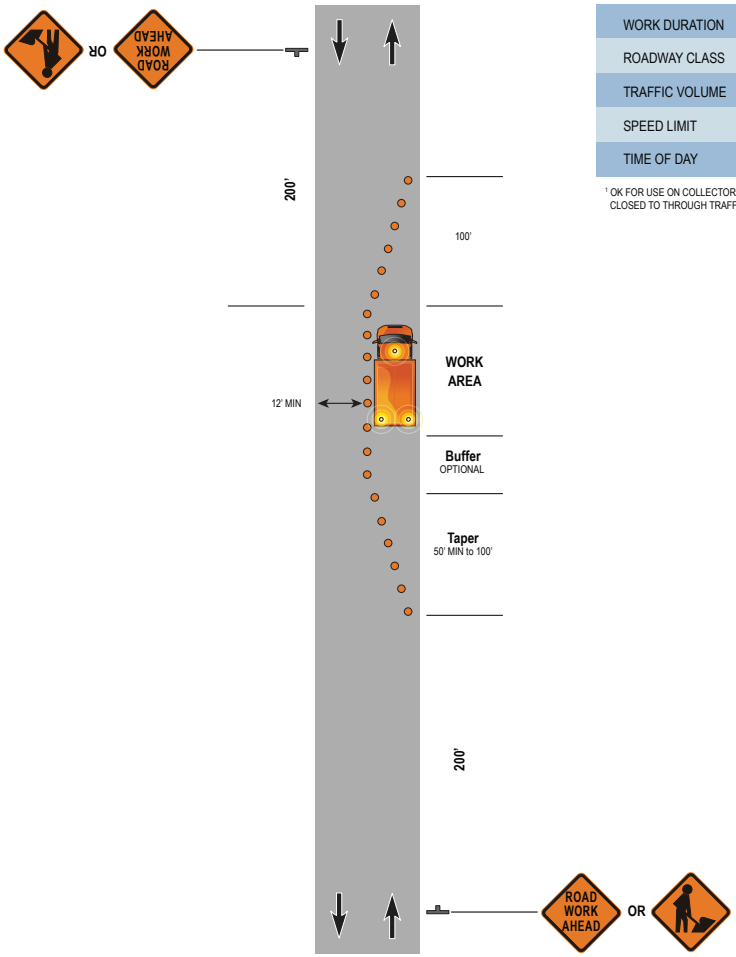
WORK DURATION	15 MIN.OR LES
ROADWAY CLASS	LOCAL
TRAFFIC VOLUME	UP TO 400 ADT
SPEED LIMIT	25 MPH OR LES
TIME OF DAY	ANY

Notes:

1. This layout may be used when volumes are low, work areas are short, sight distance is good, and traffic can easily see the roadway beyond. It shall not be used on designated ARTERIAL, COLLECTOR, SPECIAL STATUS or CBD roadways.
2. Approved high intensity vehicle safety lights shall be utilized.
3. Where traffic does not self-regulate effectively, one or two flaggers, or YIELD sign or STOP signs for each direction near the beginning of the tapers shall be used with required advance warning signs as described on following pages.

Half-Road Closure on Road with Low Volume

Short Duration Operation



APPLICATION OF THIS DIAGRAM

WORK DURATION	UP TO 1 HOUR
ROADWAY CLASS	LOCAL[1]
TRAFFIC VOLUME	UP TO 400 ADT
SPEED LIMIT	25 MPH OR LESS
TIME OF DAY	DAYLIGHT ONLY

[1] OK FOR USE ON COLLECTORS DURING OFF-PEAK HOURS OR IF CLOSED TO THROUGH TRAFFIC IF APPROVED BY TRAFFIC SECTION

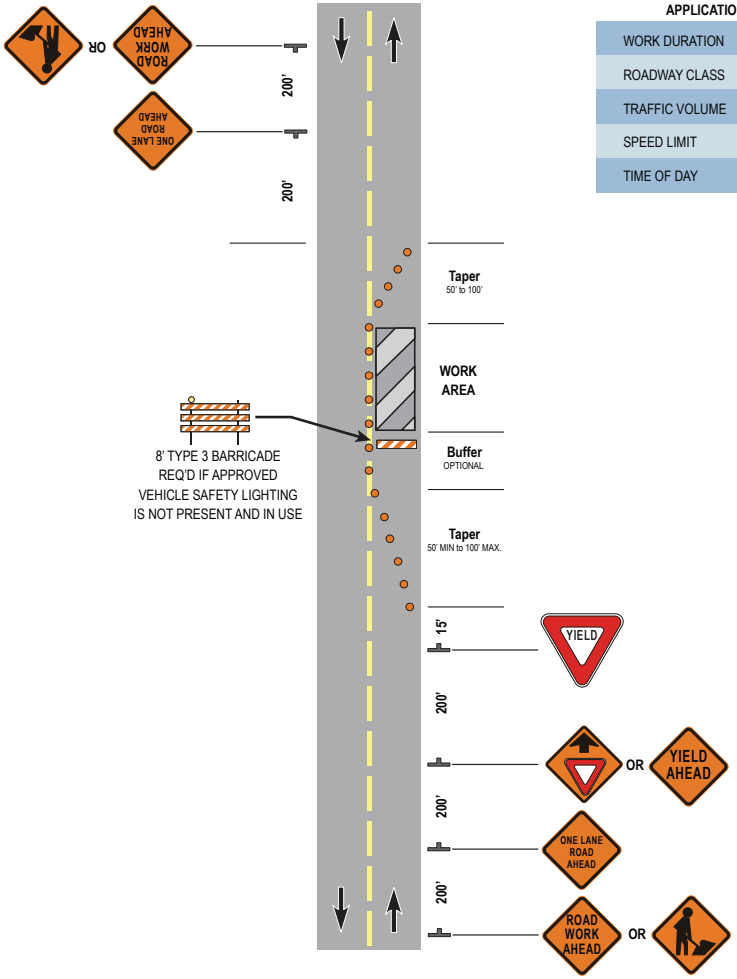
Notes:

1. This layout may be used when volumes are low, work areas are short, sight distance is good, and traffic can easily see the roadway beyond. It shall not be used on designated ARTERIAL, COLLECTOR, SPECIAL STATUS or CBD roadways.
2. Approved high intensity vehicle safety lights shall be utilized.
3. Where traffic does not self-regulate effectively, one or two flaggers, or YIELD sign or STOP signs for each direction near the beginning of the tapers shall be used with required advance warning signs as described on following pages.

Half-Road Closure on Road with Low Volume

Intermediate-Term Stationary Operation

APPLICATION OF THIS DIAGRAM	
WORK DURATION	UP TO 7 DAYS
ROADWAY CLASS	LOCAL
TRAFFIC VOLUME	UP TO 400 ADT
SPEED LIMIT	25 MPH OR LESS
TIME OF DAY	ANY



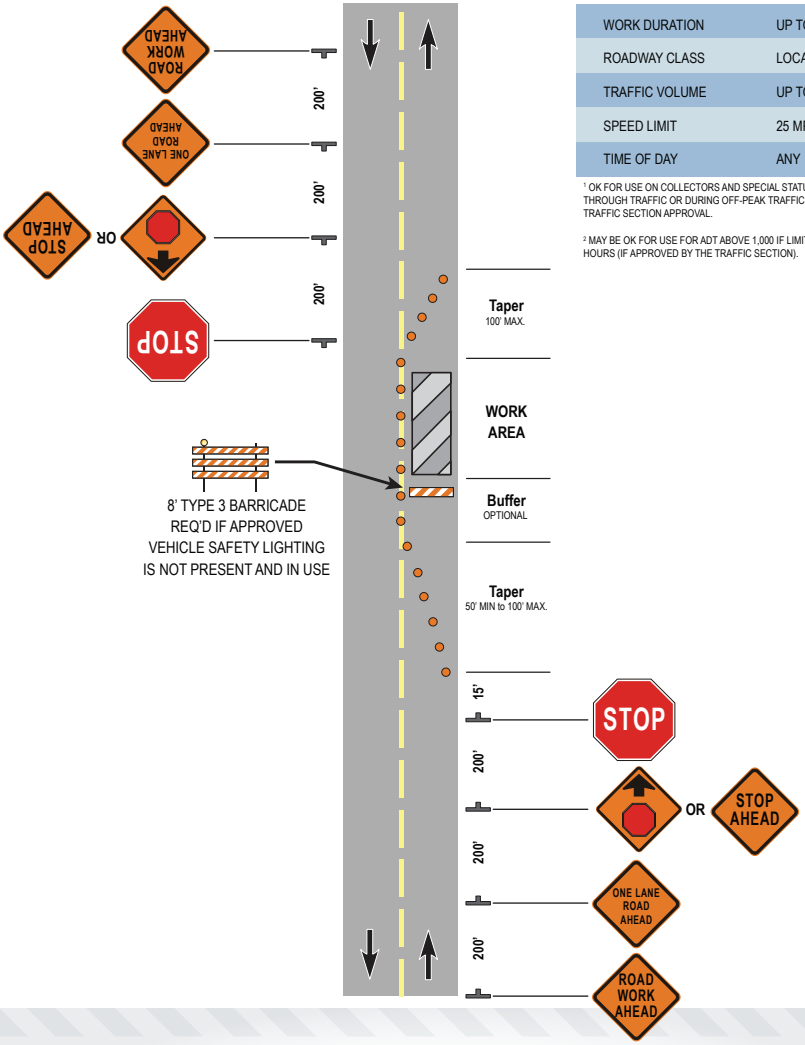
Notes:

1. This layout may be used when volumes are low, work areas are short, sight distance is good, and traffic can easily see the roadway beyond. It shall not be used on designated ARTERIAL, COLLECTOR, SPECIAL STATUS or CBD roadways.
2. The YIELD sign shall only be used with permission of the Traffic Section.
3. Where traffic does not self-regulate effectively, one or two flaggers, or STOP signs for each direction near the beginning of the tapers may be used with required advance warning signs as described on following pages.

Half-Road Closure on 2-Lane Road with Moderate Volume

Intermediate-Term Stationary Operation

DPW TRAFFIC



APPLICATION OF THIS DIAGRAM

WORK DURATION	UP TO 7 DAYS
ROADWAY CLASS	LOCAL[1]
TRAFFIC VOLUME	UP TO 1,000 ADT[2]
SPEED LIMIT	25 MPH OR LESS
TIME OF DAY	ANY

[1] OK FOR USE ON COLLECTORS AND SPECIAL STATUS IF CLOSED TO THROUGH TRAFFIC OR DURING OFF-PEAK TRAFFIC HOURS WITH TRAFFIC SECTION APPROVAL.

[2] MAY BE OK FOR USE FOR ADT ABOVE 1,000 IF LIMITED TO OFF-PEAK HOURS (IF APPROVED BY THE TRAFFIC SECTION).

Notes:

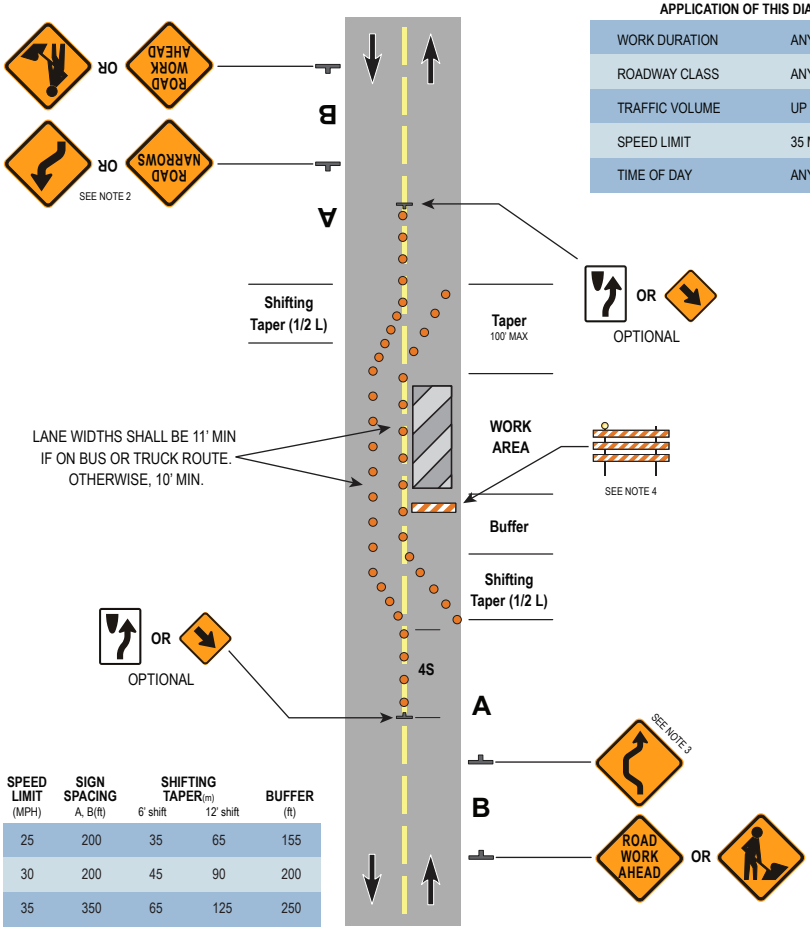
1. This layout may be used when volumes are less than 1,000 ADT, work areas are short, sight distance is good, and traffic can easily see the roadway beyond. It shall not be used on designated ARTERIAL roadways.
2. STOP signs shall only be used with permission of the Traffic Section.
3. Where traffic does not self-regulate effectively, one or two flaggers may be used with required advance warning signs as described on following pages.
4. Approved high intensity vehicle safety lights shall be utilized if Type 3 barricade is not used.

Work in Travel Lane on 2-Lane Collector/Arterial with Moderate Volume

Stationary Operation

APPLICATION OF THIS DIAGRAM

WORK DURATION	ANY
ROADWAY CLASS	ANY 2-LANE
TRAFFIC VOLUME	UP TO 10,000 ADT
SPEED LIMIT	35 MPH OR LESS
TIME OF DAY	ANY



SPEED LIMIT (MPH)	SIGN SPACING A, B(ft)	SHIFTING TAPER(m) 6' shift	SHIFTING TAPER(m) 12' shift	BUFFER (ft)
25	200	35	65	155
30	200	45	90	200
35	350	65	125	250

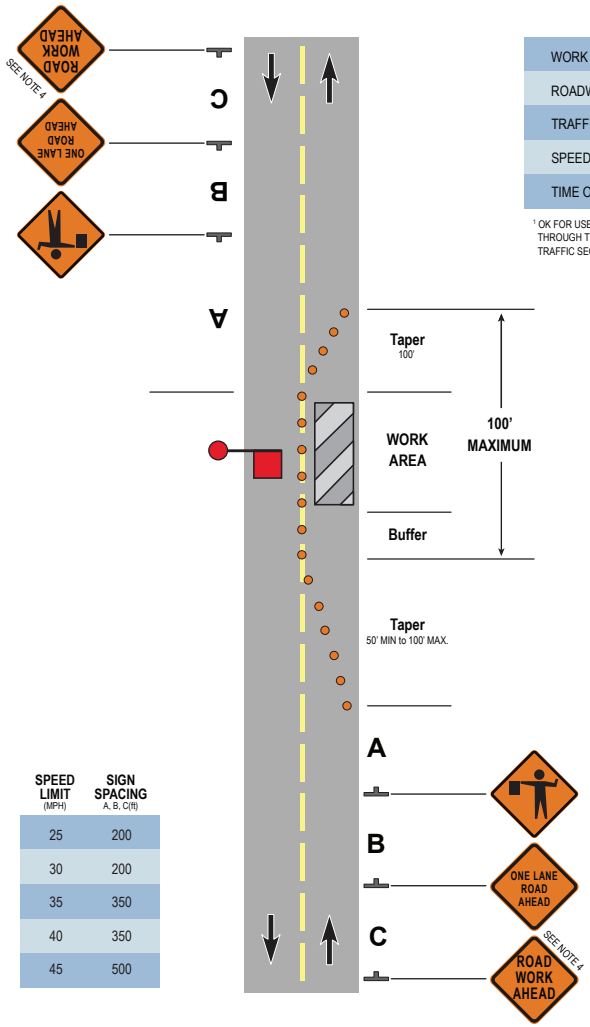
Notes:

1. Where pavement markings conflict with the temporary travel lane, the channelizing devices separating opposing traffic shall have a maximum spacing in feet of half (1/2) the speed limit in mph.
2. The ROAD NARROWS or Reverse Turn signs are optional where the lane shift requires only a minor deviation in travel path. The Reverse Curve/Turn sign is appropriate for larger deviations in the travel path.
3. If the tangent is more than 600 feet, the Reverse Curve/Turn sign shall be used instead of the Double Reverse Curve sign.
4. Approved high intensity vehicle safety lights shall be utilized if Type 3 barricade is not used.
5. All orange work zone traffic control signs used on ARTERIAL and COLLECTOR roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.

Lane Closure on Two-Lane Road with Low Volume

One-Flagger Operation

Appleton DPW TRAFFIC



APPLICATION OF THIS DIAGRAM

WORK DURATION	ANY
ROADWAY CLASS	LOCAL[1]
TRAFFIC VOLUME	UP TO 1,500 ADT
SPEED LIMIT	45 MPH OR LESS
TIME OF DAY	ANY

[1] OK FOR USE ON COLLECTORS & SPECIAL STATUS IF CLOSED TO THROUGH TRAFFIC OR DURING OFF-PEAK TRAFFIC HOURS WITH TRAFFIC SECTION APRROVAL.

SPEED LIMIT (MPH)	SIGN SPACING A, B, C (ft)
25	200
30	200
35	350
40	350
45	500

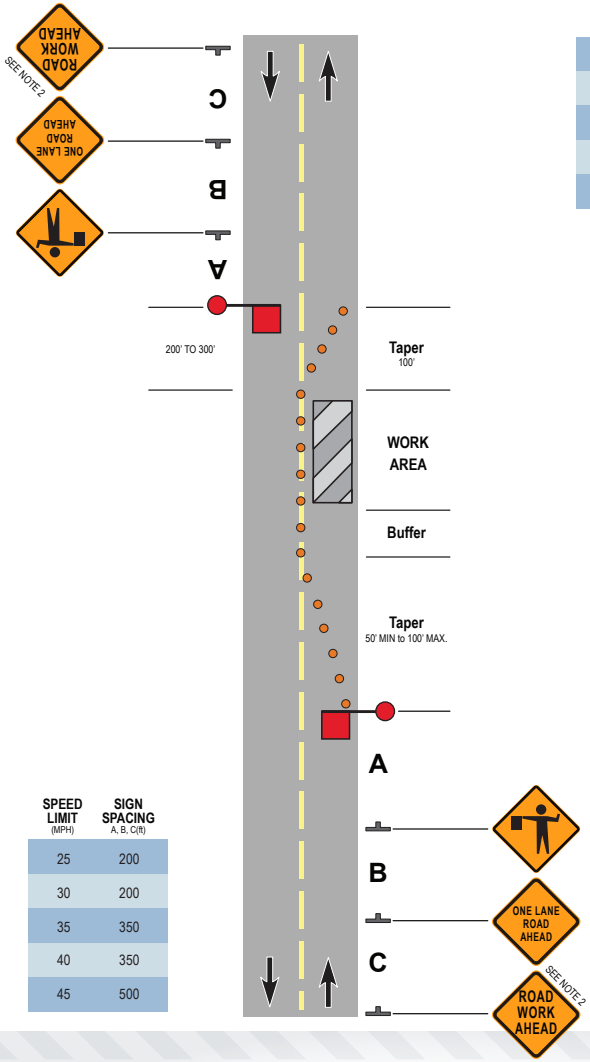
Notes:

1. A single flagger may be adequate for roadways with low volumes that have short, straight work areas. When one flagger is used, the flagger shall be visible to approaching traffic from both directions.
2. Set the buffer lengths based on available space at the site. The total length of the TTC zone must be short enough that drivers can see the approaching traffic beyond the work area.
3. The flagger shall use approved flagging procedures and equipment/apparel in accordance with the MUTCD.
4. For short duration work (60 minutes or less), the ROAD WORK AHEAD signs may be omitted.

Lane Closure on Two-Lane Road with Moderate Volume

Two-Flagger Operation

APPLICATION OF THIS DIAGRAM	
WORK DURATION	ANY
ROADWAY CLASS	ANY 2-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	45 MPH OR LESS
TIME OF DAY	ANY



SPEED LIMIT (MPH)	SIGN SPACING A, B, C(ft)
25	200
30	200
35	350
40	350
45	500

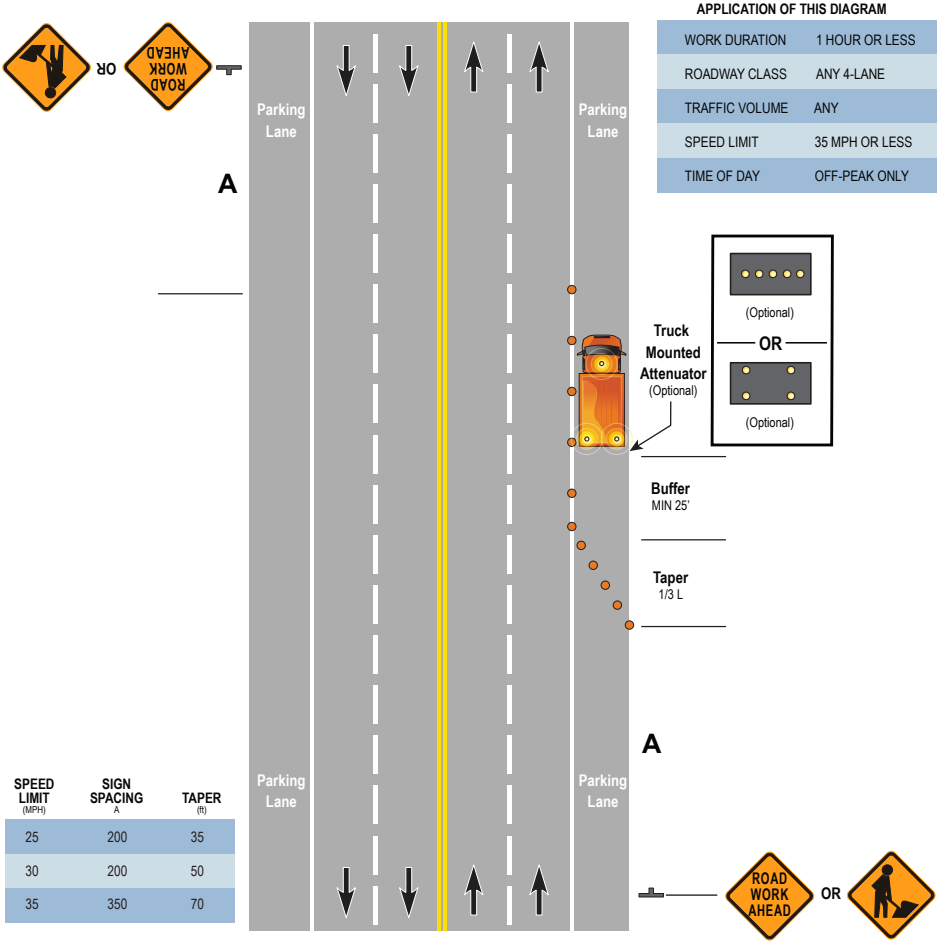
Notes:

1. The flagger shall use approved flagging procedures and equipment/apparel in accordance with the MUTCD.
2. For short duration work (60 minutes or less), the ROAD WORK AHEAD signs may be omitted.
3. All orange work zone traffic control signs used on ARTERIAL and COLLECTOR roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.

Parking Lane Closure on 4-Lane Road

Intermediate Stationary Operation

DPW TRAFFIC



APPLICATION OF THIS DIAGRAM

WORK DURATION	1 HOUR OR LESS
ROADWAY CLASS	ANY 4-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	35 MPH OR LESS
TIME OF DAY	OFF-PEAK ONLY

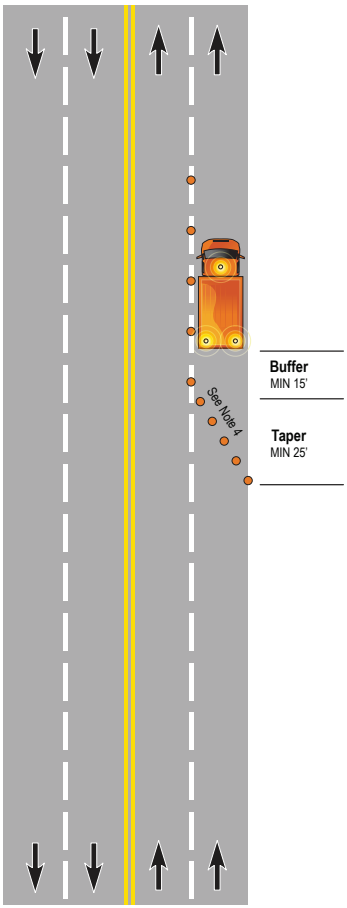
SPEED LIMIT (MPH)	SIGN SPACING A	TAPER (ft)
25	200	35
30	200	50
35	350	70

Notes:

1. If encroachment into the adjacent traffic lane is permitted by the Traffic Section, a 10-foot minimum clear lane width shall be maintained (11 feet in the case of truck/bus routes).
2. For short duration work (60 minutes or less), the channelizing devices may be omitted if a vehicle with approved high intensity vehicle safety lighting is used.
3. All orange work zone traffic control signs used on ARTERIAL roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.

Work in Travel Lane on 4-Lane Collector/Arterial

Mobile Operation (15 minutes or less)



APPLICATION OF THIS DIAGRAM

WORK DURATION	15 MIN. OR LESS
ROADWAY CLASS	ANY 4-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	45 MPH OR LESS
TIME OF DAY	OFF-PEAK DAYLIGHT HOURS ONLY

Notes:

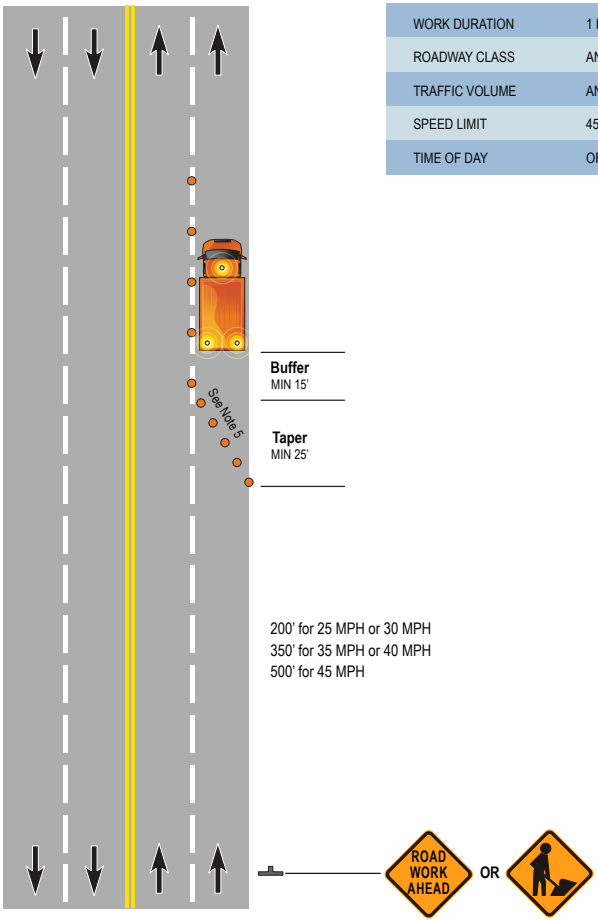
1. This layout may be used for maintenance-type operations where work areas are short and sight distance is good.
2. This layout can be reversed for left lane closures. In this case, channelizing devices are required along the centerline of the roadway.
3. Approved high intensity vehicle safety lighting shall be utilized.
4. If cones are used as channelizing devices, they shall be a minimum of 28 inches in height.

Work in Travel Lane on 4-Lane Collector/Arterial

Short-Duration Operation (15 minutes to 1 hour)

APPLICATION OF THIS DIAGRAM

WORK DURATION	1 HOUR OR LESS
ROADWAY CLASS	ANY 4-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	45 MPH OR LESS
TIME OF DAY	OFF-PEAK ONLY

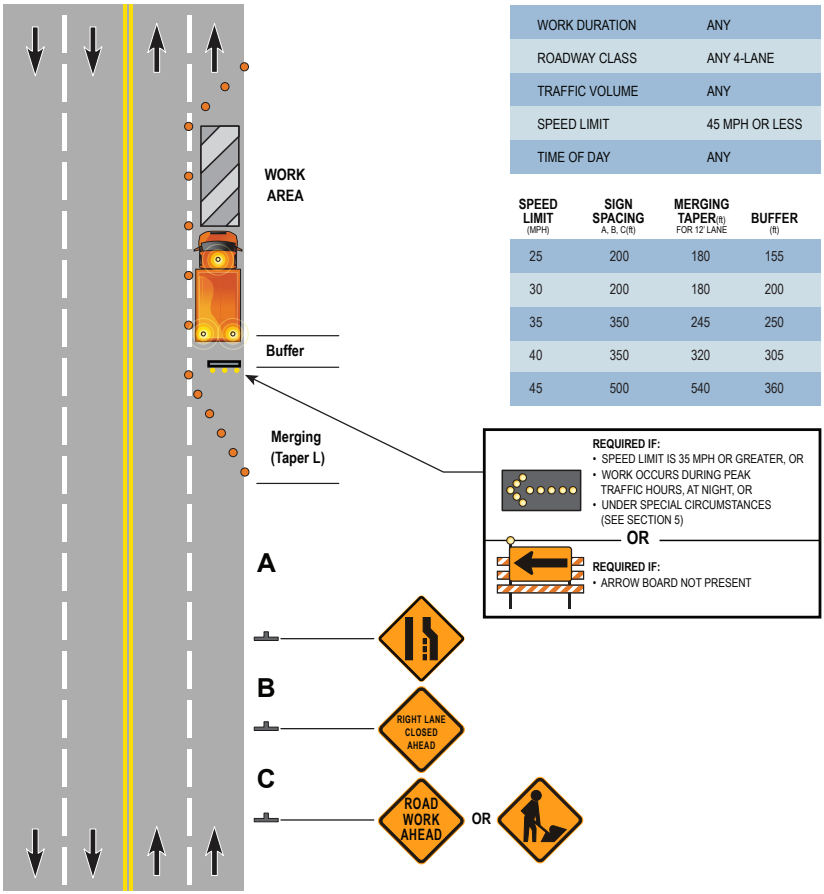


Notes:

1. This layout may be used for maintenance-type operations where work areas are short and sight distance is good.
2. This layout can be reversed for left lane closures. In this case, channelizing devices are required along the centerline of the roadway.
3. Approved high intensity vehicle safety lights shall be utilized.
4. All orange work zone traffic control signs used on ARTERIAL and COLLECTOR roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.
5. If cones are used as channelizing devices, they shall be a minimum of 28 inches in height.

Work in Travel Lane on 4-Lane Collector/ Arterial/Special Status

Intermediate/Long-Term Stationary Operation



APPLICATION OF THIS DIAGRAM

WORK DURATION	ANY
ROADWAY CLASS	ANY 4-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	45 MPH OR LESS
TIME OF DAY	ANY

SPEED LIMIT (MPH)	SIGN SPACING A, B, C(ft)	MERGING TAPER(ft) FOR 12' LANE	BUFFER (ft)
25	200	180	155
30	200	180	200
35	350	245	250
40	350	320	305
45	500	540	360

Notes:

1. When a side road intersects the roadway within the work zone, additional devices shall be erected to channelize traffic from/to the side road and, as a minimum, a ROAD WORK AHEAD sign shall be placed on each side street approach. Turn prohibition signs may also be required by the Traffic Section.
2. This layout can be reversed for left lane closures. In this case, channelizing devices are required along the centerline of the roadway.
3. If a raised median is present, additional advance warning signage may be required.
4. All orange work zone traffic control signs used on ARTERIAL and COLLECTOR roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.
5. If cones are used as channelizing devices, they shall be a minimum of 28 inches in height.

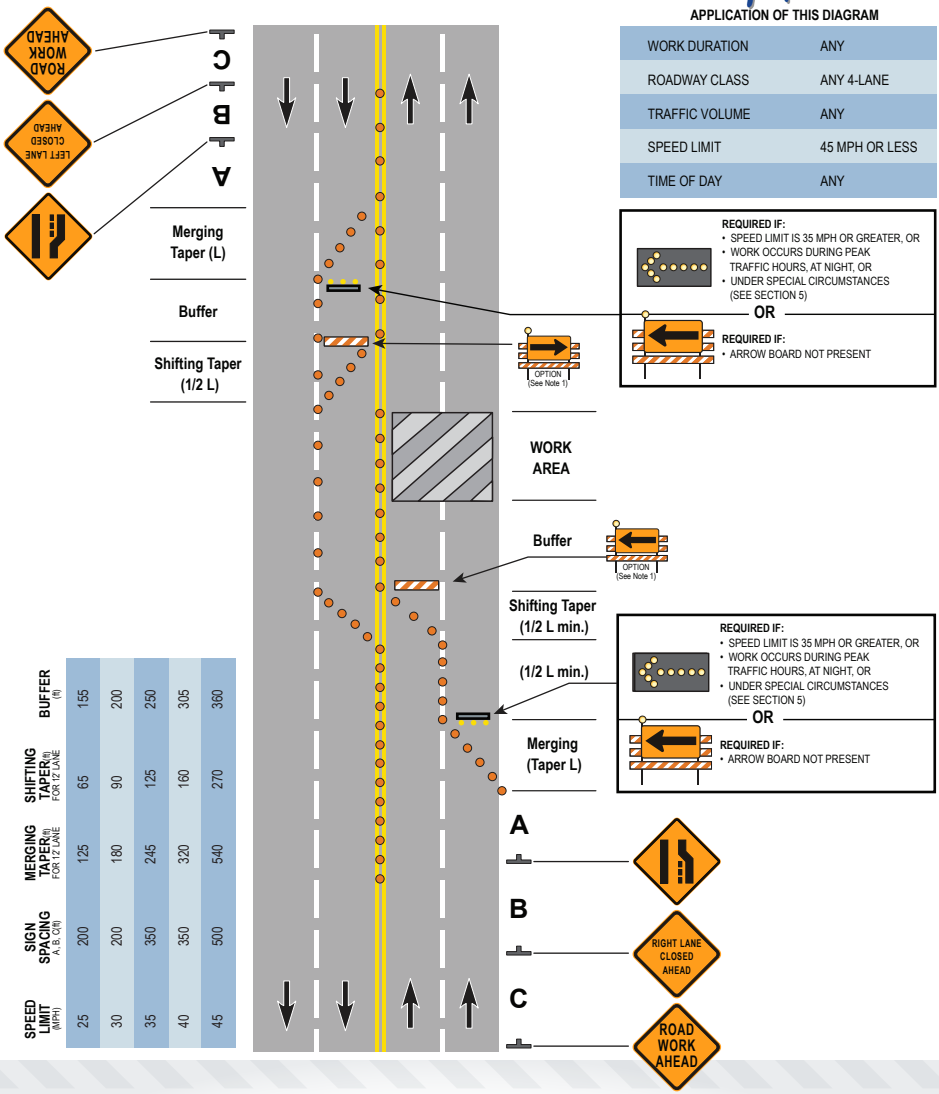
Half Road Closure on Multi-Lane Roadway

Intermediate/Long-Term Stationary Operation

DPW TRAFFIC

APPLICATION OF THIS DIAGRAM

WORK DURATION	ANY
ROADWAY CLASS	ANY 4-LANE
TRAFFIC VOLUME	ANY
SPEED LIMIT	45 MPH OR LESS
TIME OF DAY	ANY



SPEED LIMIT (MPH)	SIGN SPACING A, B, C (ft)	MERGING TAPER (ft) FOR 12 LANE	SHIFTING TAPER (ft) FOR 12 LANE	BUFFER (ft)
25	200	125	65	155
30	200	180	90	200
35	350	245	125	250
40	350	320	160	305
45	500	540	270	360

Notes:

1. Items noted as "Optional" may be required by the Traffic Section based on special circumstances.
2. When a side road intersects the roadway within the work zone, additional devices shall be erected to channelize traffic from/to the side road and, as a minimum, a ROAD WORK AHEAD sign shall be placed on each side street approach. Turn prohibition signs may also be required by the Traffic Section.
3. If a raised median is present, additional advance warning signage may be required.
4. All orange work zone traffic control signs used on ARTERIAL and COLLECTOR roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.

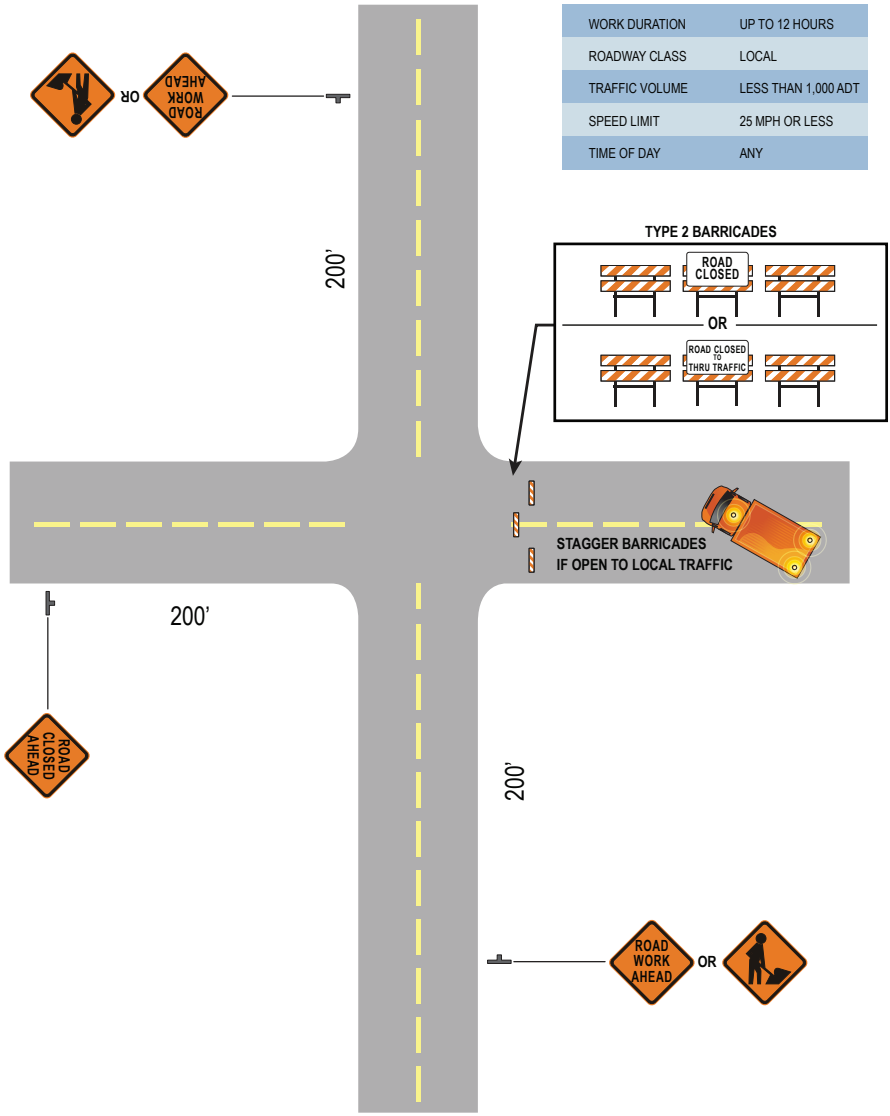
Typical Road Closure on Local Roadway

Short-Term Stationary Operation

Appleton DPW TRAFFIC

APPLICATION OF THIS DIAGRAM

WORK DURATION	UP TO 12 HOURS
ROADWAY CLASS	LOCAL
TRAFFIC VOLUME	LESS THAN 1,000 ADT
SPEED LIMIT	25 MPH OR LESS
TIME OF DAY	ANY



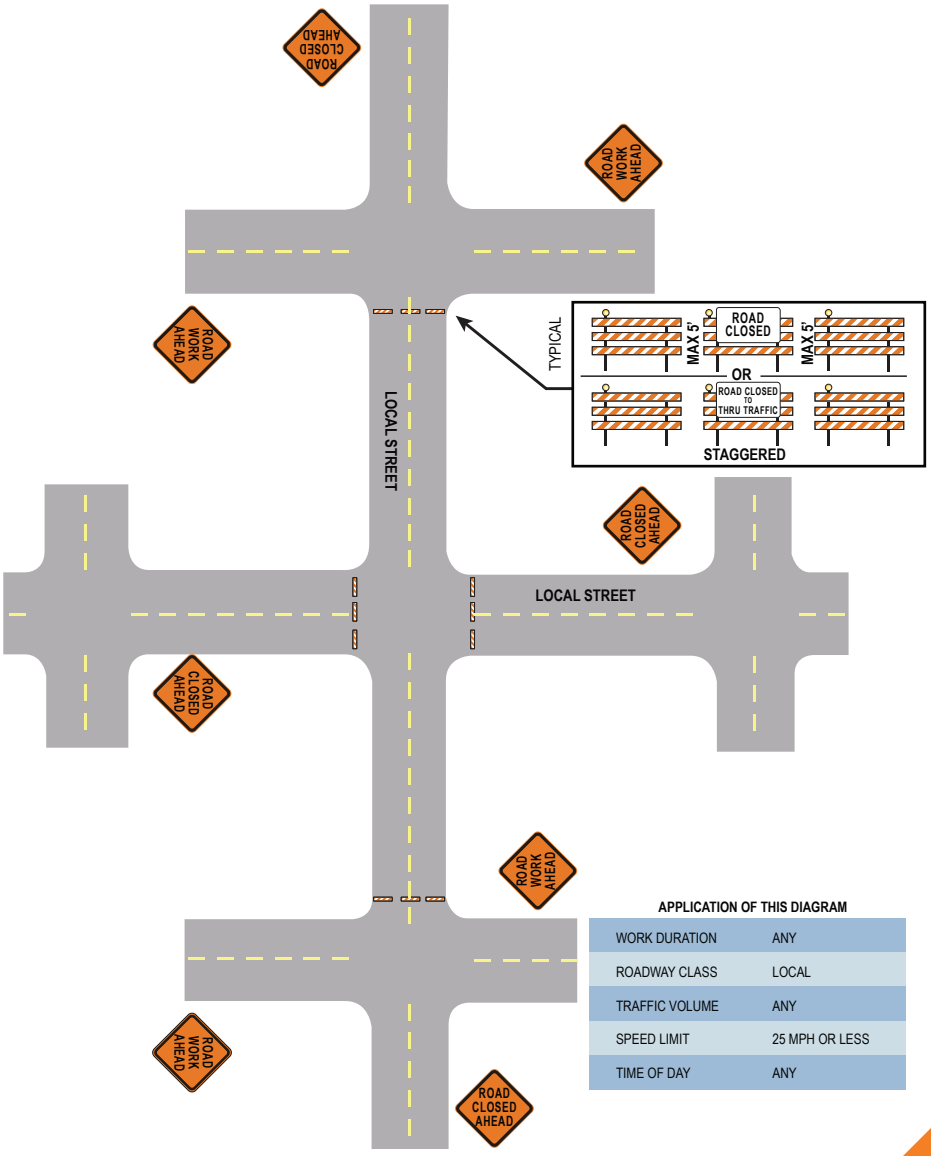
Notes:

1. This diagram is intended for use with PLANNED road closures that will be taken down at the end of each work day. For longer-term closures see subsequent diagrams.

Typical Road Closure on Local Roadway – No Detour

Long-Term Stationary Operation

DPW TRAFFIC



APPLICATION OF THIS DIAGRAM

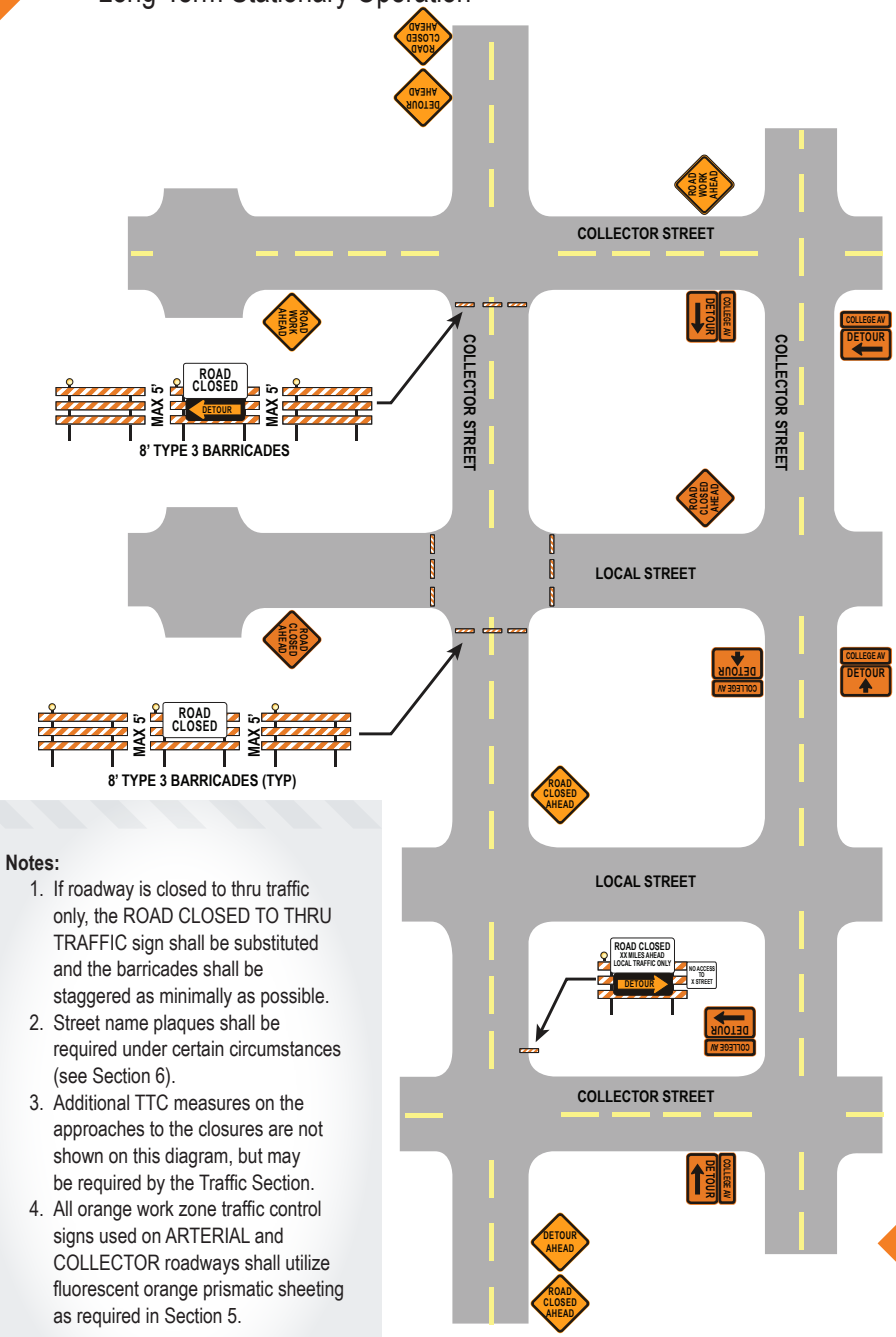
WORK DURATION	ANY
ROADWAY CLASS	LOCAL
TRAFFIC VOLUME	ANY
SPEED LIMIT	25 MPH OR LESS
TIME OF DAY	ANY

Notes:

1. If roadway is closed to thru traffic only, the ROAD CLOSED TO THRU TRAFFIC sign shall be substituted and the barricades shall be staggered as minimally as possible.

Typical Road Closure on Collector Roadway – with Detour

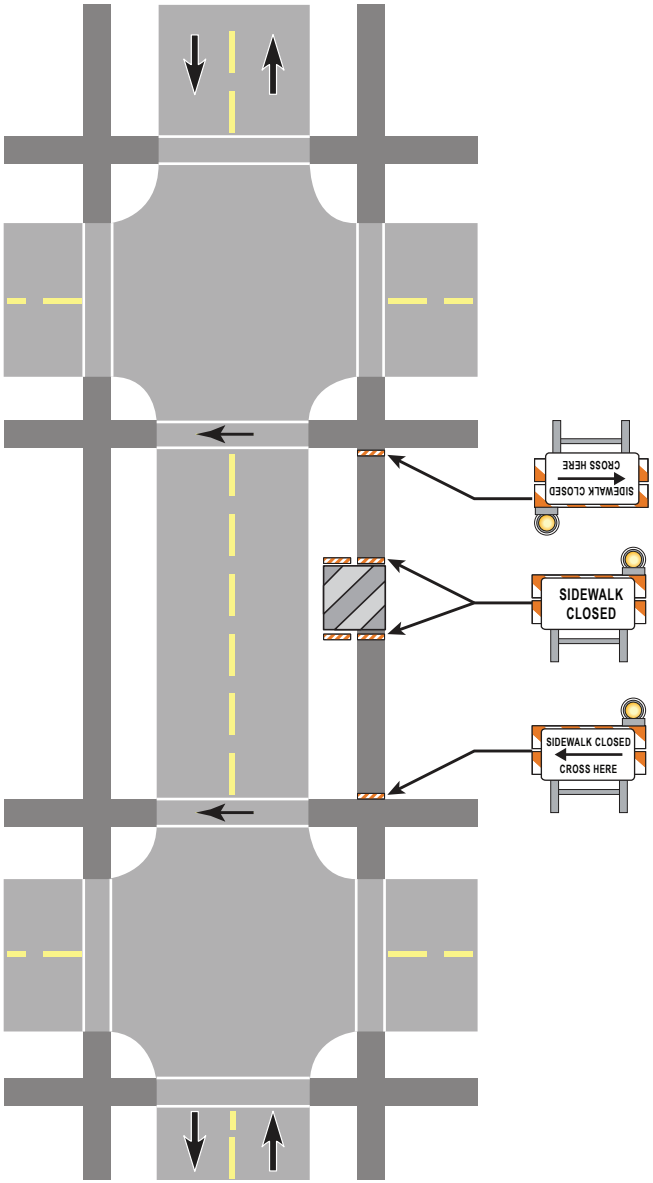
Long-Term Stationary Operation



Notes:

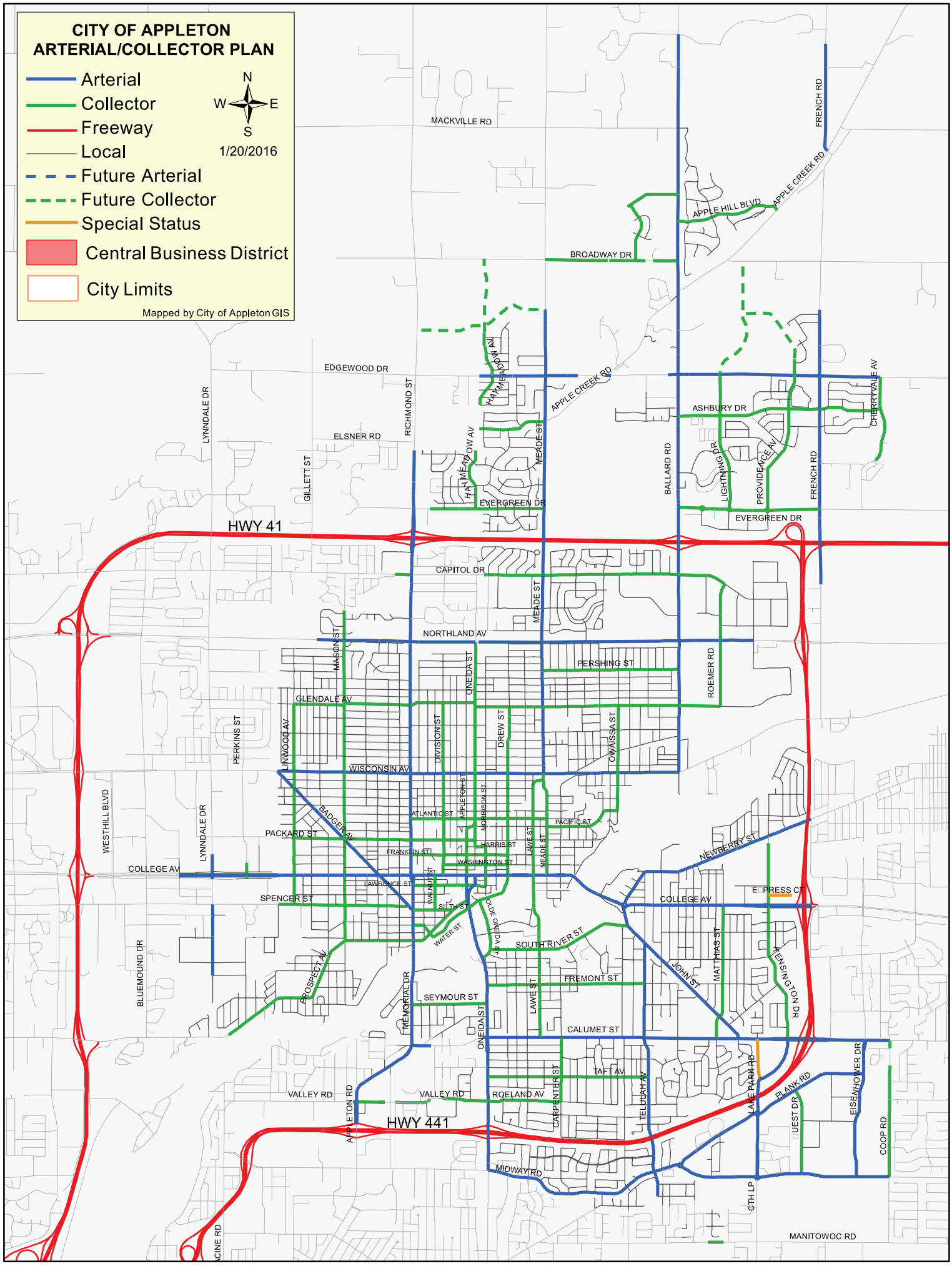
1. If roadway is closed to thru traffic only, the ROAD CLOSED TO THRU TRAFFIC sign shall be substituted and the barricades shall be staggered as minimally as possible.
2. Street name plaques shall be required under certain circumstances (see Section 6).
3. Additional TTC measures on the approaches to the closures are not shown on this diagram, but may be required by the Traffic Section.
4. All orange work zone traffic control signs used on ARTERIAL and COLLECTOR roadways shall utilize fluorescent orange prismatic sheeting as required in Section 5.

Sidewalk Closure (Pedestrian Detour)



Notes:

1. Additional advance warning may be required.
2. Sidewalk closures shall be provided per this diagram when overhead work takes place above the sidewalk or in areas close enough to the sidewalk that the work could potentially create a safety hazard for pedestrians, as determined by the Traffic Section.
3. Only the traffic control devices related to pedestrians are shown. Other devices may be required.

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