Ontario

Book 7

Ontario Traffic Manual

April 2022

Temporary Conditions

Field Edition

MINISTRY OF TRANSPORTATION

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ISBN 978-1-4868-5851-4 (Print)
ISBN 978-1-4868-5852-1 (PDF)

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2 Introduction

2.1 Purpose of the Manual

OTM Book 7 provides practical guidance regarding the use of traffic control devices in temporary work zones within the road right-of-way in Ontario.

- **This Field Edition is intended to be used purely as a reference while in the field** implementing temporary traffic control and is not intended for design of its plans.
- **The Office Edition should be used to design traffic control plans**, as it includes all relevant details and rationale for design choices.

Safety for highway users and workers is paramount, especially workers who set-up, operate and remove traffic control measures.

2.2 Legal Authority

Ministry of Labour, Training and Skills Development (MLTSD) – The MLTSD, through the Occupational Health and Safety Act (OHSA) and Regulations for Construction Projects, R.S.O. 1990 and O.Reg. 213/91 as amended, has the legal authority to regulate the safety of provincially regulated workers. This includes measures to protect workers from health and safety hazards on the job, including requirements related to traffic control persons (TCP) who direct traffic through or around a highway construction site.

While OTM Book 7 can be used as a tool to provide reasonable precautions that should be taken on construction projects, the OHSA and its regulations take precedence over OTM Book 7 in matters of worker safety and only the OHSA and its regulations are enforced by the MLTSD.

The Ministry of Transportation Ontario (MTO) – The MTO, through the Highway Traffic Act (HTA), Public Transportation and Highway Improvement Act, and various related statutes, has the legal authority and responsibility to regulate and control traffic on a highway and regulate and control motor vehicles that operate in the province.

Municipalities – Individual municipalities have the legal authority and responsibility, through the Municipal Act and various regional municipality acts, to regulate and control traffic on their highways. The authority and responsibility also apply to construction and maintenance activities on highways.

Road Authority – Defined as the body (municipal or provincial) that has legal jurisdiction over a highway.

Traffic signs, pavement markings, traffic control signals, and other devices to regulate, warn, or guide traffic are to be installed only under the approval of the road authority.

When authorized, contractors, utility companies, or others may install

temporary condition signs and devices to protect highway users, workers, and equipment, subject to the guidelines of Book 7, the OHSA and its regulations, and the requirements of the road authority.

Contractors may be authorized by the road authority to slow upstream traffic (e.g. rolling closures). The contractor may also implement short-term highway closures, as authorized by the road authority. It is the road authority's decision whether to use contractor staff or police for these operations.

Regulatory devices may need to be supported by applicable legislation, regulations, or by-laws. Effective traffic control requires both the appropriate application of traffic control devices and reasonable, effective enforcement.

2.3 Training

All users must be trained on how to use OTM Book 7 as well as develop an understanding of the general principles and theories shown throughout the manual. There are three types of users of the OTM Book 7:

1. Traffic Control Persons (TCP);
2. Workers who design traffic control plans; and
3. Workers who set-up, operate, and remove traffic control measures.

To achieve safe and effective traffic control appropriate training of involved in the planning and installation of traffic control systems is essential. Training outcomes are:

- Experience in the implementation of traffic control in the field, relevant to the work being done.
- A good working knowledge of all potential hazards.
- The ability to consider factors that impact communication to the driver.
- The ability to install effective traffic control setups that are safe for all road users.

Job specific training must be included for all users in accordance with the OHSA and the applicable regulations. Users should be trained using the Office Edition to fully understand how and when modifications to the layouts may be required.

- For more information on TCP, refer to Section 4.4.2 of the Office Edition.
- Workers who design traffic control plans to protect both workers and road users:

    a) Shall be a **competent** worker;

    b) Shall be knowledgeable in standards and guidelines of OTM Book 7 and the Regulations for Construction Projects;

c) Shall be able to recognize the design elements of work zone traffic control; and

d) Shall be given **adequate training** with respect to techniques and procedures for designing effective, efficient and safe traffic control plans.

Section **67 (6)** of the O.Reg. 213/91 for Construction Projects requires that the worker who **set up, operate, or remove measures** on a roadway or a shoulder of a roadway:

a) Shall be a **competent** worker;

b) Shall not perform any other work while setting up or removing the measures; and

c) Shall be given **adequate written and oral instructions**, in a language that they understand, with respect to setting up or removing the measures.

Section **23** of the O.Reg. 145/00 requires that the worker who **directs vehicular traffic** that may be a hazard to workers on a public way:

a) Shall not direct vehicular traffic for more than one lane in the same direction;

b) Shall not direct vehicular traffic if the normal posted speed limit of the public way is more than 90 kilometres per hour;

c) Shall be a **competent** worker;

d) Shall not perform any other work while setting up or removing the measures; and

e) Shall be given adequate **written and oral instructions**, in a language that they understand, with respect to directing vehicular traffic, and those instructions shall include a description of the signals that are to be used.

A **Competent worker** means a worker who:

- Is qualified because of knowledge, training and experience to perform the work;
- Is familiar with the Occupational Health and Safety Act and with the provisions of the regulations that apply to the work; and
- Has knowledge of all potential or actual danger to health or safety in the work.

Public way means a highway or other street, avenue, parkway, driveway, square, place, bridge, viaduct, or other open space to which the public has access, as of right or by expressed or implied invitation.

2 Layouts for Temporary Work Zones

Table A Work Zone Component Dimensions: Mobile, Intermittent, and Very Short Duration Work (Non-freeways)

		Normal Posted Regulatory Speed (NPRS) Limit [2]				
Label	**Description**	**50 km/h or lower**	**60 km/h**	**70 km/h**	**80 km/h**	**90 km/h**
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
A [1]	Taper Length for Full Lane Closure (m)	60	85	100	100	110
B [1]	Shoulder Taper (m) [3]	20	30	35	35	40
C [1]	Longitudinal Buffer Area (LBA) (m) [4]	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m) [5]	6	6	9	9	12
	Minimum Number of Markers for Taper	at least 4 markers	at least 5 markers	at least 5 markers	at least 7 markers	at least 8 markers
E [1]	Minimum Tangent between Tapers (m)	60	85	100	100	110
F [1]	Distance between Construction Signs (m) [6]	30	30	60	60	80
G	Mobile Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	–	–	35	45	50
	Stationary Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H [1]	Sight Distance (m)	150	150	200	250	250

Notes for Table A:

1. *Table A distances are based on good visibility and should be increased if visibility is poor.*

2. *The regulatory maximum speed posted on a highway applies under normal conditions; that is, when no construction zone or work activity is present. Guideline provisions required in OTM Book 7 are based on normal posted regulatory speed, and not on temporarily reduced construction zone regulatory or advisory speeds.*

3. *Shoulder taper is used for roadside work, which includes shoulder work and roadway edge work.*

4. *LBA and LIDG are not required, but are strongly recommend, at speeds of 60 km/h or lower. However, they should always be used for closed lanes on multi-lane roads if space permits.*

5. *Markers are channelizing devices. Application guidelines are shown in Table E. Cones with reflective collars may be used for daytime or night-time operations on non-freeways.*

6. *Distance between Construction Signs ('F') also refers to the required distance for the placement of a TC Warning Sign ahead of the hazard where referenced in Section 4.2.8.5 of the Office Edition for the individual signs. For more details on the positioning and installation of signs, refer to Section 4.2.8.4 of the Office Edition.*

Table B Work Zone Component Dimensions: Short and Long Duration Work (Non-freeways)

		Normal Posted Regulatory Speed (NPRS) Limit [2]				
Label	**Description**	**50 km/h or lower**	**60 km/h**	**70 km/h**	**80 km/h**	**90 km/h**
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
A [1]	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B [1]	Shoulder Taper (m) [3]	20	30	55	60	70
C [1]	Longitudinal Buffer Area (LBA) (m) [4]	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m) [5]	6	9	9	12	12
	Minimum Number of Markers for Taper	at least 5 markers	at least 7 markers	at least 9 markers	at least 11 markers	at least 13 markers
E [1]	Minimum Tangent between Tapers (m)	60	85	155	180	200
F [1]	Distance between Construction Signs (m) [6]	50	90	120	140	150
G	Mobile Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	–	–	35	45	50
	Stationary Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H [1]	Sight Distance (m)	150	150	200	250	250

Notes for Table B:

1. *Table B distances are based on good visibility and should be increased if visibility is poor.*

2. *The regulatory maximum speed posted on a highway applies under normal conditions; that is, when no construction zone or work activity is present. Guideline provisions required in OTM Book 7 are based on normal posted regulatory speed, and not on temporarily reduced construction zone regulatory or advisory speeds.*

3. *Shoulder taper is used for roadside work, which includes shoulder work and roadway edge work.*

4. *LBA and LIDG are not required, but are strongly recommend, at speeds of 60 km/h or lower. However, they should always be used for closed lanes on multi-lane roads if space permits.*

5. *Markers are channelizing devices. Application guidelines are shown in Table E. Cones with reflective collars may be used for daytime or night-time operations on non-freeways.*

6. *Distance between Construction Signs ('F') also refers to the required distance for the placement of a TC Warning Sign ahead of the hazard where referenced in Section 4.2.8.5 of the Office Edition for the individual signs. For more details on the positioning and installation of signs, refer to Section 4.2.8.4 of the Office Edition.*

Table C Work Zone Component Dimensions: Freeways

		Normal Posted Regulatory Speed (NPRS) Limit [2]			
Label	**Description**	**80 km/h**	**90 km/h**	**100 km/h**	**110 km/h**
A [1]	Taper Length for Full Lane Closure (m)	220	250	300	300
B [1]	Shoulder Taper (m) [3]	75	85	100	100
C [1]	Longitudinal Buffer Area (LBA) (m) [4]	60	75	95	110
D	Maximum Distance between Markers (m) [5]	12	24	24	24
E [1]	Minimum Tangent between Tapers (m)	220	250	300	300
F [1]	Distance between Construction Signs (m) [6]	160	180	200	200
G	Mobile Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	45	50	55	60
	Stationary Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

Notes for Table C:

1. *Table C distances are based on good visibility and should be increased if visibility is poor.*

2. *The regulatory maximum speed posted on a highway applies under normal conditions; that is, when no construction zone or work activity is present. Guideline provisions required in OTM Book 7 are based on normal posted regulatory speed, and not on temporarily reduced construction zone regulatory or advisory speeds.*

3. *Shoulder taper is used for roadside work, which includes shoulder work and roadway edge work.*

4. *For freeways, the required protection for stationary work operations are LBA, Buffer Vehicle, and LIDG.*

5. *Markers are channelizing devices. Application guidelines are shown in Table E. Cones with reflective collars may be used for daytime ID, VSD, or SD operations only. Construction markers or flexible drums must be used for all other conditions.*

6. *Distance between Construction Signs ('F') also refers to the required distance for the placement of a TC Warning Sign ahead of the hazard where referenced in Section 4.2.8.5 of the Office Edition for the individual signs. For more details on the positioning and installation of signs, refer to Section 4.2.8.4 of the Office Edition.*

Table D Typical Usage of Signs through a Temporary Work Zone

Sign No.	Sign Name	Advance Warning Area	Approach Area	Transition Area	Longitudinal Buffer Area	Work Area	Termination Area
TC-1	Construction Ahead	X					
TC-1A	Construction 1 km Ahead	X					
TC-1B	Construction 2 km Ahead	X					
TC-2A	Road Work (square A frame)		X			X	
TC-2B	Road Work (diamond portable sign stand)		X			X	
TC-3	Lane Closed Ahead		X				
TC-4	Lane Closure Arrow			X			
TC-5	Detour Ahead	X					
TC-5A	Detour 1 km Ahead	X					
TC-5B	Detour 2 km Ahead	X					
TC-7	Detour-Turn Off/ Diversion		X	X		X	
TC-7tA	Road Closed Tab		X	X		X	
TC-7tB	Local Traffic Only Tab		X	X		X	
TC-9	Roadside Diversion Warning		X				
TC-10	Detour Markers	X	X				
TC-11	Narrow Lanes		X			X	
TC-12	Flashing Arrow Board		X	X			
TC-12	Flashing Arrow Board (Truck Mounted)		X	X		X	
TC-13	Pavement Ends	X	X	D	D	X	D [1]
TC-14	Bump Ahead	X	X	D	D	X	D [1]
TC-15	Bump	X	X	D	D	X	D [1]
TC-16	Turn & Curve	X	X	D	D	X	X
TC-17t	Advisory Speed Tab	X	X			X	X
TC-18	Chevron Alignment	X	X	X	D	X	X
TC-19	Grooved Pavement	X	X	D	D	X	D [1]

1. Consider increasing the work area to include the signs before the termination area.

X = Typical Use

D = Discouraged

Sign No.	Sign Name	Advance Warning Area	Approach Area	Transition Area	Longitudinal Buffer Area	Work Area	Termination Area
TC-20	Prepare to Stop	X	X			X	D [1]
TC-21	Traffic Control Person Ahead		X				
TC-22	Traffic Control (STOP/ SLOW) Paddle		X				
TC-23	Signals Ahead		X				
TC-23B	Remote Control Device Ahead		X				
TC-24	Uneven Lanes	X	X	D	D	X	X
TC-25	Lane Designation Direction			X			
TC-27	Do Not Pass When Flashing (mobile)	X	X	X	X	X	X
TC-31	Truck Entrance			D	D	X	X
TC-32	Temporary Bridge	X	X	D	D	X	X
TC-33	Low Bridge Ahead	X	X	D	D	X	D [1]
TC-34	Two Way Traffic	X	X	D	D	X	X
TC-35	Ramp Closed Ahead	X	X	D	D	X	D [1]
TC-36	Maximum Speed (advisory)	X	X			X	
TC-37	Soft Shoulders	X	X	D	D	X	X
TC-39	No Exit	Used on side roads where no exit exists					
TC-40	Pedestrian Direction	May be used off road in all areas					
TC-41	Bicycle Lane Detour	X	X				
TC-42	Bicycle Lane Detour Ends						X
TC-43	Bicycle Lane Closed		X				
TC-44	Do Not Use Radio Transmitter	X					
TC-45	Resume Use of Radio Transmitter						X
TC-61	New Roadway Open	X					
TC-62	Alternate Highway Route	X					

1. Consider increasing the work area to include the signs before the termination area.

X = Typical Use

D = Discouraged

Sign No.	Sign Name	Advance Warning Area	Approach Area	Transition Area	Longitudinal Buffer Area	Work Area	Termination Area
TC-64	Road Closing/ Restriction Notice	X				X	
TC-65	Road Closing Notice	X				X	
TC-66 to TC-81	Information Signs	X					
TC-90	Speed Fines Doubled		X	X	X	X	
TC-101	Share the Road		X				
TC-102	Share Use Lane Single File		X				
Ra-2	Yield			X			
Rb-1	Maximum Speed (regulatory)	X	X			X	
Rb-10	No Straight Through		X	X	X	X	
Rb-11	No Right Turn		X	X	X	X	
Rb-12	No Left Turn		X	X	X	X	
Rb-25	Keep Right (Rb-25R) or Keep Left (Rb-25L)			X		X	
Rb-31	Do Not Pass	X	X			X	
Rb-41 to Rb-47	Turn Lane Designation			X		X	
Rb-66	Motor Vehicle Passing Prohibited		X				
Rb-70	Dismount and Walk			X			
Rb-90A	Construction Zone Begins	X					
Rb-90B	Construction Zone Ends						X
Rb-91	Yield to Oncoming Traffic			X			
Rb-92	Road Closed					X	
Wb-1A	Yield Ahead		X				
	Portable Variable Message Signs	X				X	

1. Consider increasing the work area to include the signs before the termination area.

X = Typical Use

D = Discouraged

Table E Usage of Channelizing Devices, Barricades, and Barriers

	Device					
	Cones [2] TC-51A (450 mm)	Cones [2] TC-51B (700 mm) TC-51C (1000 mm)	Marker TC-52 (1200 mm)	Barrel TC-54 (1000 mm)	Barricades TC-53A TC-53B	Temporary Construction Barrier System (TCBS)
Zone Painting	ID, VSD, SD	SD	No	No	Not required	Not required
Two-lane Roads	No	ID, VSD, SD	SD, LD	SD, LD	LD [1]	Not required
Multi-lane Roads (Non-freeways)	No	ID [1], VSD [1], SD [1]	SD [1], LD [1]	SD, LD	LD [1]	Required in certain scenarios [4]
Freeways	No	No	No	ID, VSD, SD, LD [3]	No	LD (more than 5 days)

Notes for Table E:

1. For NPRS 70 km/h and lower.

2. All cones require white reflective cone collars.

3. Less than 5 days or where it is not practical to install barrier.

4. TCBS may be used to protect work zones and drivers. For example, TCBS is required for excavation work on multi-lane roads. For more information on TCBS, refer to Section 4.5.3 of the Office Edition.

Legend:
ID = Intermittent Duration
VSD = Very Short Duration
SD = Short Duration
LD = Long Duration
No = Must not be used

Table F Nomenclature for Layout Decision Matrix

Abbreviation	Explanation
Two-Lane, Two-Way	
TG	Two-Lane, Two-Way - General
TS	Two-Lane, Two-Way - Segment
TI	Two-Lane, Two-Way - Intersection
TO	Two-Lane, Two-Way - Roundabout
Multi-Lane Undivided	
UG	Multi-Lane, Undivided - General
US	Multi-Lane, Undivided - Segment
UI	Multi-Lane, Undivided - Intersection
UO	Multi-Lane, Undivided - Roundabout
UR	Multi-Lane, Undivided - Ramp
Multi-Lane Divided	
DG	Multi-Lane, Divided - General
DS	Multi-Lane, Divided - Segment
DI	Multi-Lane, Divided - Intersection
DO	Multi-Lane, Divided - Roundabout
DR	Multi-Lane, Divided - Ramp
Freeway	
FG	Freeway - General
FS	Freeway - Segment
FR	Freeway - Ramp

Table G Decision Matrix: Layouts

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Two-Lane, Two-Way						
General						
	Designated Construction Zone Signing					TG-1
	Reduced Speed Zone Signing				TG-2	
Segment						
Shoulder/ Intermittent	Intermittent Work		TS-1	TS-2	TS-3	
	Shoulder Work	TS-4			TS-5	
Encroachment/ Shift/Diversion	Lane Encroachment	TS-6			TS-7	
	Parking Lane Shift				TS-8	
	Partial Lane Shift: Wide Platforms				TS-9	
	Roadside Diversion					TS-10
1 Lane Closed	Zoning Painting	TS-11				
	Lane Closed or Occupied	TS-12				
	Lane Closed or Occupied (Yield to Oncoming Traffic)		TS-13			
	Lane Closed or Occupied (Traffic Control Persons)			TS-14	TS-15	
	Lane Closed (Portable Lane Control Signals)				TS-16	
	Lane Closed (Yield to Oncoming Traffic)			TS-17	TS-18	
	Lane Closed (Automated Flagger Assistance Device)		TS-19			
	Lane Closed (Traffic Control Persons)					TS-20
2 Lanes Closed/ Detour	Route Detour (Alternative Roads)				TS-21	
	Detour Signs and Devices					TS-22
Pedestrian/ Cyclist Accomodation	Pedestrian Detour: Sidewalk Closure				TS-23	
	Bicycle Lane Diversion: Bicycle Lane Shift				TS-24	TS-25
	Bicycle Lane Diversion: Temporary Path				TS-26	
	Bicycle Lane Diversion: Single File				TS-27	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Intersection						
Shoulder/ Intermittent	Intermittent Work: Intersection		TI-1	TI-2	TI-3	
1 Lane Closed	Zoning Painting: Intersection Turn Arrows			TI-4	TI-5	
	Zoning Painting: Intersection Stoplines and Crosswalks			TI-6	TI-7	
	Intersection: Near-Side Lane Closed (TCP)			TI-8	TI-9	
	Intersection: Far-Side Lane Closed (TCP)			TI-10	TI-11	
	Work in Intersection: (TCP)			TI-12	TI-13	
	Intersection: Far-Side Lane Closed (Detour)				TI-14	
	Work in Intersection: Near-Side Lane Closed (Detour)					TI-15
Pedestrian/ Cyclist Accomm-odation	Pedestrian Detour: Crosswalk Closure				TI-16	
	Pedestrian Detour: Crosswalk and Sidewalk Closure				TI-17	
	Cyclist: Detour				TI-18	
	Bicycle Lane Closed: Dismount and Walk				TI-19	
Roundabout						
Encroachment/ Shift/Diversion	Roundabout: Encroachment			TO-1	TO-2	
1 Lane Closed	Roundabout: Quadrant Closed (Traffic Control Persons)				TO-3	
2 Lanes Closed/ Detour	Roundabout: One Exit Closed (Detour)				TO-4	

Multi-Lane Undivided						
General						
	Designated Construction Zone Signing					UG-1
	Reduced Speed Zone Signing				UG-2	
Segment						
Shoulder/ Intermittent	Intermittent Work		US-1	US-2	US-3	
	Shoulder Work	US-4			US-5	
Segment						
Encroachment/ Shift/Diversion	Lane Encroachment	US-6			US-7	
	Parking Lane Closed			US-8	US-9	
	Partial Lane Shift: Narrow Lanes					US-10
	Lane Realignment					US-11
1 Lane Closed	Zone Painting: Right or Left Lane Closed	US-12				
	Lane Closed of Occupied	US-13				
	Left Lane Closed or Occupied	US-14				
	Two-Way Left Turn Lane Closed			US-15	US-16	
	Lane Closed				US-17	
	Left Lane Closed				US-18	
	Passing Lanes: Single-Lane Direction Closed				US-19	
	Passing Lanes: Centre Lane Closed				US-20	
2 Lanes Closed/ Detour	Four Lane Road: Two Lanes Closed				US-21	
	Five Lane Road: Two Through Lanes Closed				US-22	
	Five Lane Road: Through Lane and Left Turn Lane Closed				US-23	
	Six Lane Road: Center Lane or Two Lanes Closed				US-24	
	Route Detour (Alternative Roads)				US-25	
	Detour Signs and Devices					US-26

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Pedestrian/ Cyclist Accomodation	Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk			US-27	US-28	
	Pedestrian Accommodation: Mid-Block Sidewalk Detour onto Roadway				US-29	
	Pedestrian Detour: Sidewalk Closure				US-30	
	Bicycle Lane Diversion: Bicycle Lane Shift				US-31	US-32
	Bicycle Lane Diversion: Temporary Path				US-33	
	Bicycle Lane Diversion:Single File				US-34	
Intersection						
1 Lane Closed	Zone Painting: Intersection Turn Arrows			UI-1	UI-2	
	Zone Painting: Intersection Left Lane Closed			UI-3	UI-4	
	Zone Painting: Intersection Right Lane Closed			UI-5	UI-6	
	Intersection: Near-Side Right or Left Through Lane Closed			UI-7	UI-8	
	Intersection: Right Turn Lane Closed			UI-9	UI-10	
	Intersection: Left Turn Lane Closed			UI-11	UI-12	
	Intersection: Far-Side Lane Closed			UI-13	UI-14	
	Intersection:Lane Adjacent to Right Turn Lane Closed				UI-15	
	Intersection: Lane Adjacent to Left Turn Lane Closed				UI-16	
	Intersection: Right Turn Lane (Far-Side Right Lane Closed)				UI-17	
	Intersection: (Left Turn Lane Open) Far-Side Left Lane Closed				UI-18	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
2 Lanes Closed/ Detour	Intersection: Right Turn Lane and Adjacent Through Lanes Closed			UI-19	UI-20	
	Intersection: Left Turn and Adjacent Through Lanes Closed			UI-21	UI-22	
	Work in Intersection: Right Lane Closed				UI-23	
	Work in Intersection:Left Lane Closed				UI-24	
	Work in Intersection: Road Closed (Detour) - Option 1				UI-25	
	Work in Intersection: Two Lanes Closed - Option 2				UI-26	
Intersection						
Pedestrian/ Cyclist Accommodation	Pedestrian Accommodation: Intersection Sidewalk Detour onto Roadway				UI-27	
	Pedestrian Detour: Crosswalk Closure				UI-28	
	Pedestrian Detour: Crosswalk and Sidewalk Closure				UI-29	
	Cyclist: Detour				UI-30	
	Bicycle Lane Closed: Dismount and Walk				UI-31	
Roundabout						
Shoulder/ Intermittent	Roundabout: Encroachment			UO-1	UO-2	
1 Lane Closed	Roundabout: Inside Lane Partially Closed			UO-3		
	Roundabout: Outside Lane Partially Closed			UO-4		
	Roundabout:Left Exit or Partial Outside Lane Closed			UO-5		
	Roundabout: Inside Lane Closed				UO-6	
	Roundabout: Outside Lane Closed				UO-7	
	Roundabout: Left Exit or Partial Outside Lane Closed				UO-8	
2 Lanes Closed/ Detour	Roundabout: One Exit Closed (Detour)				UO-9	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Ramp						
1 Lanes Closed	Lane Closed at Exit Ramp				UR-1	
	Lane Closed at Exit Ramp with a Deceleration Lane				UR-2	
	Lane Closed at Entrance Ramp				UR-3	
	Lane Closed at Entrance Ramp with an Acceleration Lane				UR-4	
	Ramp Closed				UR-5	
	Right Developed Lane Closed				UR-6	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Multi-Lane Divided						
General						
	Designated Construction Zone Signing					DG-1
	Reduced Speed Zone Signing				DG-2	
Segment						
Shoulder/ Intermittent	Intermittent Work		DS-1	DS-2	DS-3	
	Shoulder Work	DS-4			DS-5	
Encroachment/ Shift/Diversion	Lane Encroachment	DS-6			DS-7	
	Parking Lane Closed			DS-8	DS-9	
	Partial Lane Shift: Narrow Lanes					DS-10
	Lane Realignment					DS-11
1 Lane Closed	Zone Painting: Right or Left Lane Closed	DS-12				
	Lane Closed or Occupied	DS-13				
	Left Lane Closed or Occupied	DS-14				
	Lane Closed				DS-15	
2 Lanes Closed/ Detour	Six Lane Road: Center Lane or Two Lanes Closed				DS-16	
	Route Detour (Alternative Roads)				DS-17	
	Detour Signs and Devices				DS-18	
Pedestrian/ Cyclist Accomodation	Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk			DS-19	DS-20	
	Pedestrian Accommodation: Mid-Block Sidewalk Detour onto Roadway				DS-21	
	Pedestrian Detour: Sidewalk Closure				DS-22	
	Bicycle Lane Diversion: Bicycle Lane Shift				DS-23	DS-24
	Bicycle Lane Diversion: Temporary Path				DS-25	
	Bicycle Lane Diversion: Single File				DS-26	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Intersection						
1 Lane Closed	Zone Painting: Intersection Turn Arrows			DI-1	DI-2	
	Zone Painting: Intersection Left Lane Closed			DI-3	DI-4	
	Zone Painting: Intersection Right Lane Closed			DI-5	DI-6	
	Intersection: Near-Side Right or Left Through Lane Closed			DI-7	DI-8	
	Intersection: Right Turn Lane Closed			DI-9	DI-10	
	Intersection: Left Turn Lane Closed			DI-11	DI-12	
	Intersection: Far-Sided Lane Closed			DI-13	DI-14	
	Intersection: Lane Adjacent to Right Turn Lane Closed				DI-15	
	Intersection: Lane Adjacent to Left Turn Lane Closed				DI-16	
	Intersection: Right Turn Lane (Far-Sided Right Lane Closed)				DI-17	
	Intersection: (Left Turn Lane Open) Far-Sided Left Lane Closed				DI-18	
2 Lanes Closed/ Detour	Intersection: Right Turn Lane and Adjacent Through Lanes Closed			DI-19	DI-20	
	Intersection: Left Turn and Adjacent Through Lanes Closed			DI-21	DI-22	
	Work in Intersection: Right Lane Closed				DI-23	
	Work in Intersection:Left Lane Closed				DI-24	
	Work in Intersection: Road Closed (Detour) - Option 1				DI-25	
	Work in Intersection: Two Lanes Closed - Option 2				DI-26	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Intersection						
Pedestrian/ Cyclist Accommodation	Pedestrian Accommodation: Intersection Sidewalk Detour onto Roadway				DI-27	
	Pedestrian Detour: Crosswalk Closure				DI-28	
	Pedestrian Detour: Crosswalk and Sidewalk Closure				DI-29	
	Cyclist: Detour				DI-30	
	Bicycle Lane Closed: Dismount and Walk				DI-31	
Roundabout						
Shoulder/ Intermittent	Roundabout: Encroachment			DO-1	DO-2	
1 Lane Closed	Roundabout: Inside Lane Partially Closed			DO-3		
	Roundabout: Outside Lane Partially Closed			DO-4		
	Roundabout: Left Exit or Partial Outside Lane Closed			DO-5		
	Roundabout: Inside Lane Closed				DO-6	
	Roundabout: Outside Lane Closed				DO-7	
	Roundabout: Left Exit or Partial Outside Lane Closed				DO-8	
2 Lanes Closed/ Detour	Roundabout: One Exit Closed (Detour)				DO-9	
Ramp						
1 Lane Closed	Intersection: Right Turn Lane and Adjacent Through Lanes Closed				DR-1	
	Intersection: Left Turn and Adjacent Through Lanes Closed				DR-2	
	Work in Intersection: Right Lane Closed				DR-3	
	Work in Intersection:Left Lane Closed				DR-4	
	Work in Intersection: Road Closed (Detour) - Option 1				DR-5	
	Work in Intersection: Two Lanes Closed - Option 2				DR-6	

Closure Type	Typical Layout Title	Duration				
		Mobile	ID	VSD	SD	LD
Freeway						
General						
	Designated Construction Zone Signing					FG-1
	Reduced Speed Zone Signing				FG-2	
Segment						
Shoulder/ Intermittent	Shoulder Work	FS-1			FS-2	
Encroachment/ Shift/Diversion	Partial Lane Shift: Narrow Lanes					FS-3
	Lane Realignment					FS-4
1 Lane Closed	Zone Painting: Right or Left Lane Closed	FS-5				
	Right or Left Lane Closed or Occupied	FS-6				
	Right or Left Lane Closed			FS-7	FS-8	
2 Lanes Closed/ Detour	Six Lane Road: Centre Lane or Two Lanes Closed				FS-9	
Ramp						
1 Lanes Closed	Lane Closed at Exit Ramp				FR-1	
	Lane Closed at Exit Ramp with a Deceleration Lane				FR-2	
	Lane Closed at Entrance Ramp				FR-3	
	Lane Closed at Entrance Ramp with an Acceleration Lane				FR-4	
	Ramp Closed				FR-5	
	Right Developed Lane Closed				FR-6	

2.1 General Notes to Layouts

1. A note in brackets under/beside a sign name or within a box (ie. (NPRS 70 km/h or greater) or (Long Duration)) indicates the sign is only required when that criterion is present.

2. The TC-1 and TC-2 are both required for Long Duration operations. The TC-1 is to be installed and remain in place continuously for the duration of the project. The TC-2 is to be in place to indicate workers are present and also indicates the start of the approach area. Additional TC-2 signs should be included in each work area within a long work zone that has multiple work areas. The TC-2 must be removed, covered, or dismounted and placed faced down when workers are not present. For SD only the TC-2 is required.

3. The TC-1A and TC-1B are not always shown on the Layouts. The TC-1A is required for Long Duration rural or freeway operations. Long Duration Freeway operations also require the TC-1B.

4. A work area, as shown on the Layouts, may or may not contain a work vehicle depending on the work activity. A work vehicle may be used as a traffic control device only as shown on the Layouts. If used as a traffic control device the work vehicle must have either four-way flashers (4WF) plus 360 Beacon, rotating LED amber lights, or TC-12 as indicated. Where a work vehicle is present with 4WF plus 360 Beacon, rotating LED amber lights, and/or TC-12 the work vehicle can replace markers only where indicated in the Layouts.

5. The regulatory maximum speed posted on a highway applies under normal conditions; that is, when no construction zone or work activity is present. Guideline provisions required in OTM Book 7 are based on normal posted regulatory speed, and not on temporarily reduced construction zone regulatory or advisory speeds.

6. An end taper on shoulder work is optional but encouraged.

7. Lane encroachments on freeways are not recommended except where necessary for some mobile maintenance activities. For mobile operations use FS-1 maintaining a 3.5 m lane width. For stationary operations use FS-3 or FS-7.

8. Lane closed means lane closed or occupied.

9. Signs and devices are oriented on the Layouts in the direction of travel they are intended to provide guidance to.

10. Signs that are shown on the Layouts with a 60 m offset indicate the sign is to be repeated on the opposite shoulder.

11. The typical layouts are categorized by the geometrics of the roadway (two-lane, multi-lane non-freeway, freeway, roundabout, intersection), number and location of closed/occupied lanes, and the duration of work. They are applicable to all types of work operations, including planning, surveying and other pre-engineering activities. The only exceptions are Paving and Painting operations.

    Paving operations, although included as mobile operations by Ministry of Labour Trades and Skills Development (MLTSD),

are considered stationary operations for the purpose of traffic control and the appropriate SD or LD typical should be used (not mobile).

Layouts specific to Painting operations are shown in TS-11, US-12, DS-12, FS-5, TI-4 to TI-7, UI-1 to UI-6, and DI-1 to DI-6.

For additional requirements for Freeway Zone Painting and Freeway Paving operations see Sections 5.2.3 and 5.2.4 of the Office Edition.

12. As required by OHSA and its regulations, Temporary Construction Barrier System (TCBS) must be used for stationary operations on freeways, to separate workers from traffic, where the duration of the work is longer than five days. Barrier-mounted delineators should be used with TCBS. Where TCBS are not feasible on freeways and a 3.0 m minimum lateral clearance from a live lane of traffic cannot be achieved, an LBA plus BV plus LIDG must be used. TCBS should also be considered for use on non-freeways where the duration is longer than five days, to separate workers from traffic or to separate opposing traffic on multi-lane undivided roads.

13. Use of BV
Freeways:

    All Buffer Vehicles (BV) used on freeways must be crash trucks (CT).

    For operations that require five days or less to complete, or where barriers are not feasible, CT and both an LBA and LIDG are required for stationary operations and one or more CT are required for mobile operations.

    CT are not required on freeways where a lateral off set of 3.0 m or more exists between the work area and traffic.

    CT are not required for ID and VSD work on freeway shoulders. CT are required for Mobile operations on freeway shoulders.

    Non-Freeways:

    BVs are not specifically required on non-freeways under the MLTSD regulations. If a BV is used on a non-freeway, the appropriate LBA and LIDG should be used for stationary operations.

    On multi-lane roads for normal posted regulatory speeds of 70 km/h or higher, a CT is preferred over a blocker truck.

14. Where a Layout for ID is not presented in Table G for a listed Configuration it is not feasible to set-up, do the work, and take down the required devices within 15 minutes therefore the measures for VSD work must be used.

15. Where a Layout for VSD is not presented in Table G for a listed Configuration it is not feasible to set-up, do the work, and take

down the required devices within 30 minutes therefore the measures for SD work must be used.

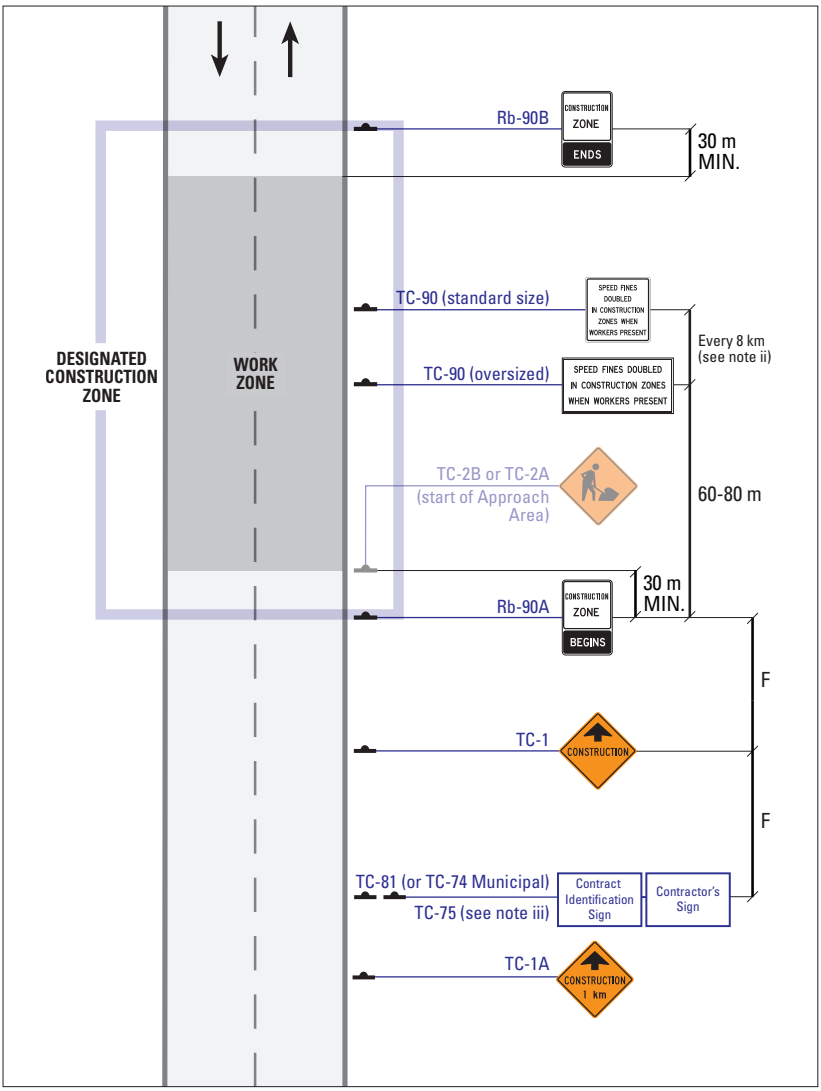
16. Approval of the Road Authority is required for use of traffic control devices not shown in OTM Book 7.

17. Layouts in OTM Book 7 meet most common scenarios. For situations not shown in OTM Book 7 or when Layouts require modifications to accommodate site specific conditions follow the fundamental principles in Sections 2, 3, and 4 of OTM Book 7 Office Edition.

2.2 Legend of Symbols used in the Typical Layouts

Legend

Symbol	Description
	Traffic Control Devices TC-51, TC-52 or TC-54
	Sign
	Traffic Control Person (TCP)
	Work Vehicle, Sign Truck, Blocker Truck, or Crash Truck
	Flashing Amber Light
 Beacon + 4WF	Vehicle Four-Way Flashers and 360° Beacon
	Work Area
	Portable Traffic Control Signal
	Barricades: TC-53A, TC-53B or temporary concrete barrier
	Automated Flagger Assistance Device
	TC-12 Arrow Mode
	TC-12 Bar Mode
	AODA-Compliant Ramp



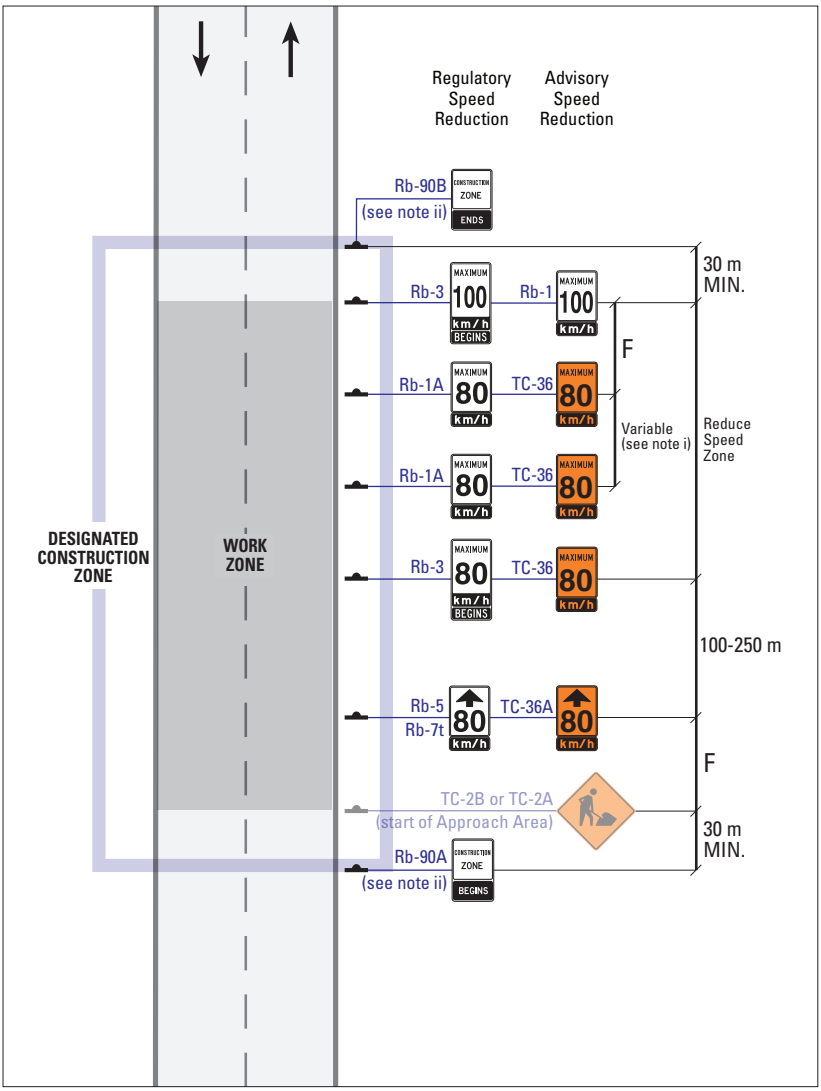
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) The same signing is required in the opposite direction.
ii) Recommended but not required.
iii) Where required by contract.
iv) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts. Locations of TC-1, TC-1A, TC-1B shown in TG-1 overrides the locations shown in other layouts when used in conjunction with TG-1.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TG-1 Designated Construction Zone Signing



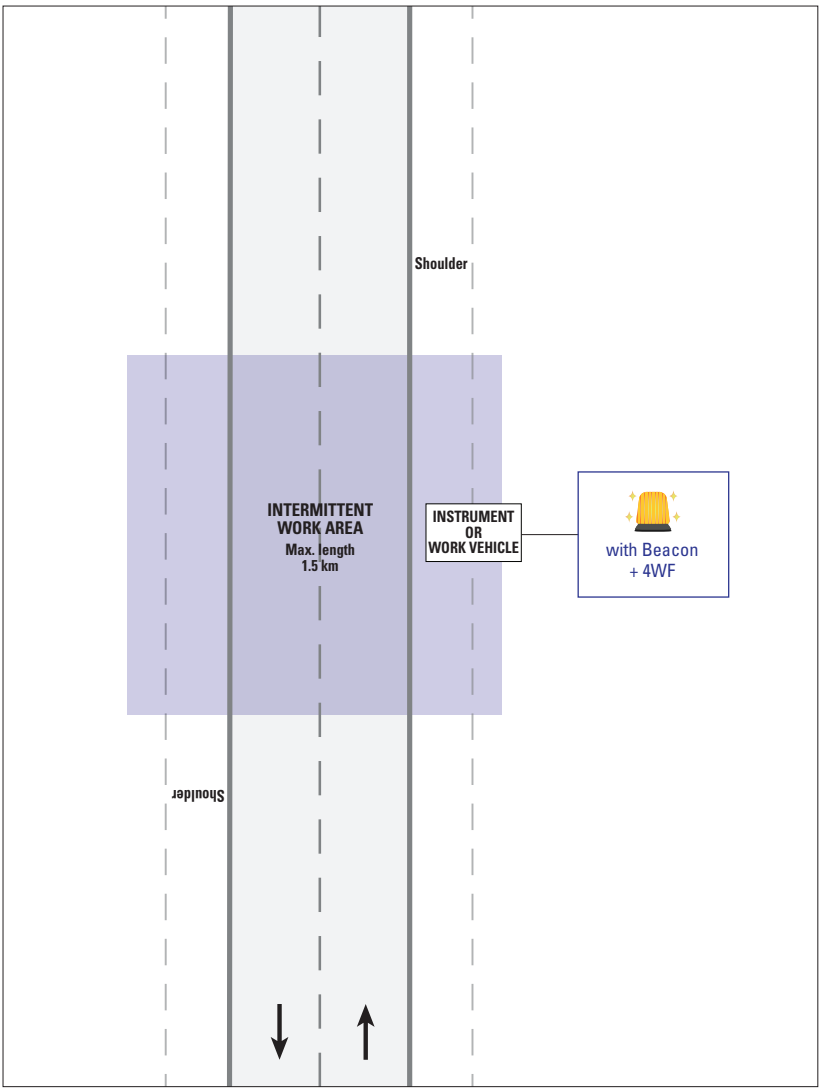
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Refer to Regulation 615 of the Highway Traffic Act and OTM Book 5 for distance between regulatory speed limit signs.
ii) For Regulatory Speed Reduction, a Designated Construction Zone must be established and signed as per TG-1.
iii) The same signing is required in the opposite direction.
iv) Reduced Speed Zone may include all of or only part(s) of the Designated Construction Zone.
v) Additional signs may be required based on the length of zone.
vi) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TG-2 Reduced Speed Zone Signing



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
H	Sight Distance (m)	150	150	200	250	250

NOTES

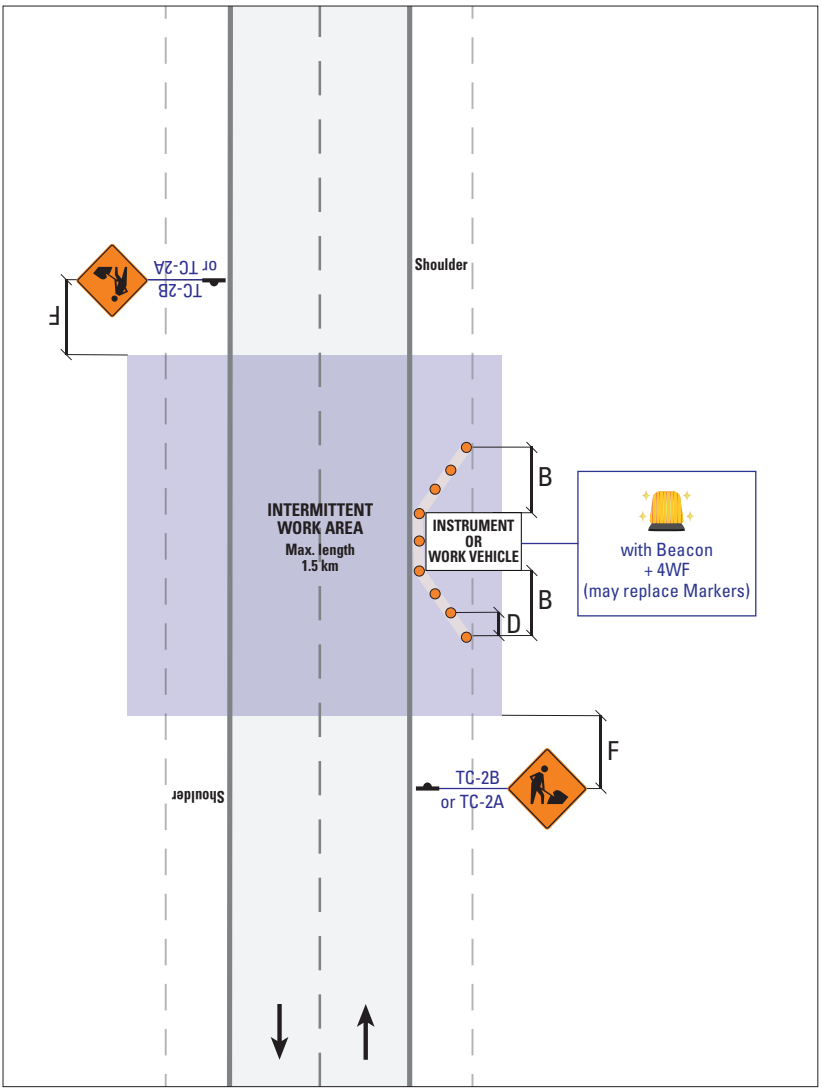
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance (refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e. distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e. surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TS-1 Intermittent Work



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	50	90	120	140	150
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) Termination Taper optional.
ii) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.

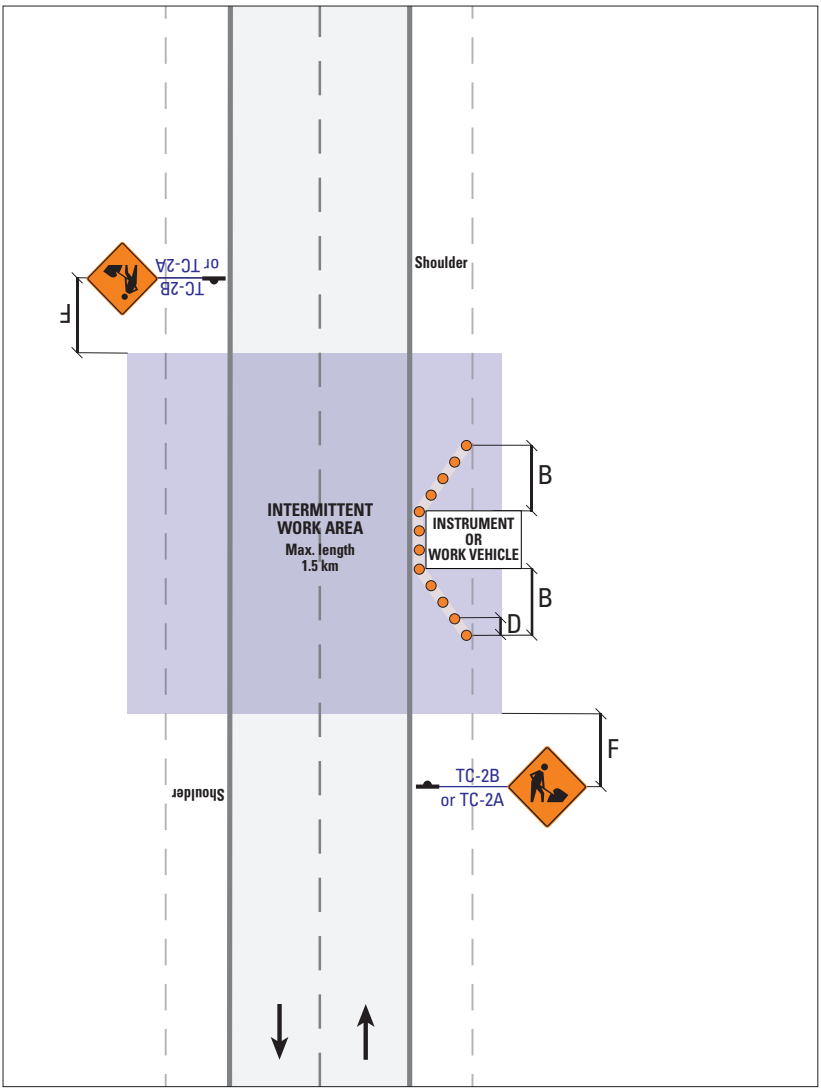
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance (refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e. distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e. surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TS-2 **Intermittent Work**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) Termination Taper optional.
ii) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.
iii) A Work Vehicle with a TC-12 may replace Markers.

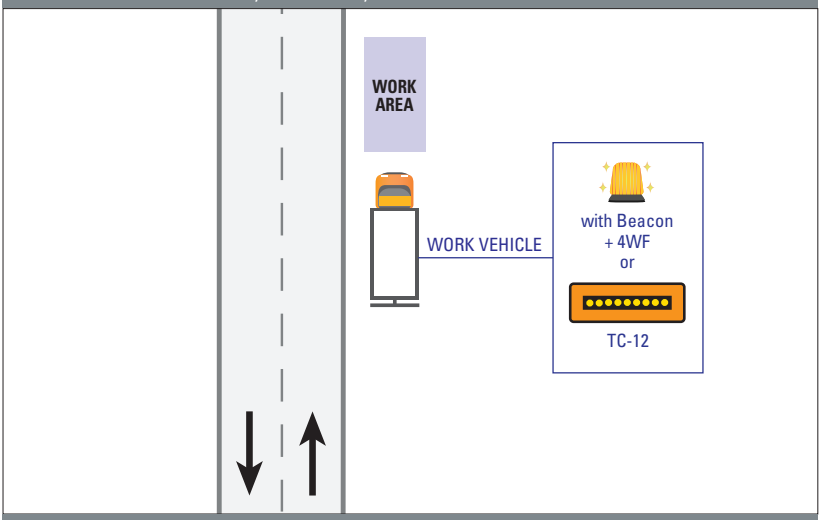
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance (refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e. distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

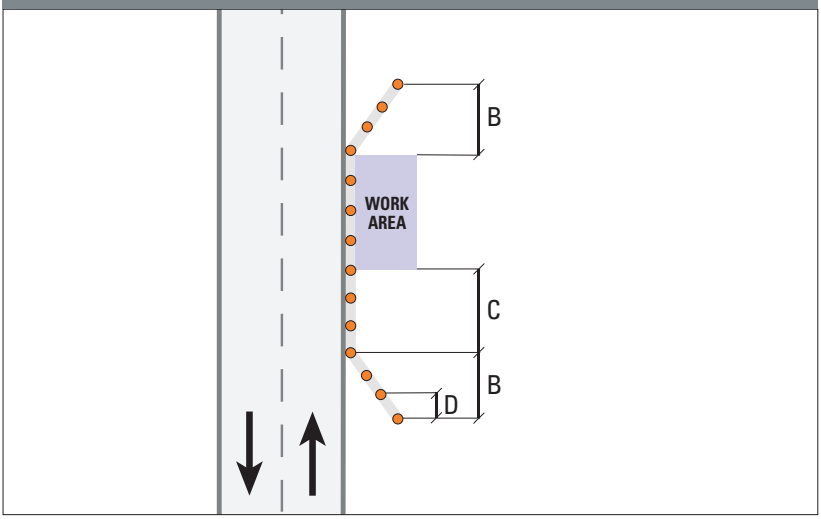
Note: this would allow for a single worker operation (i.e. surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD

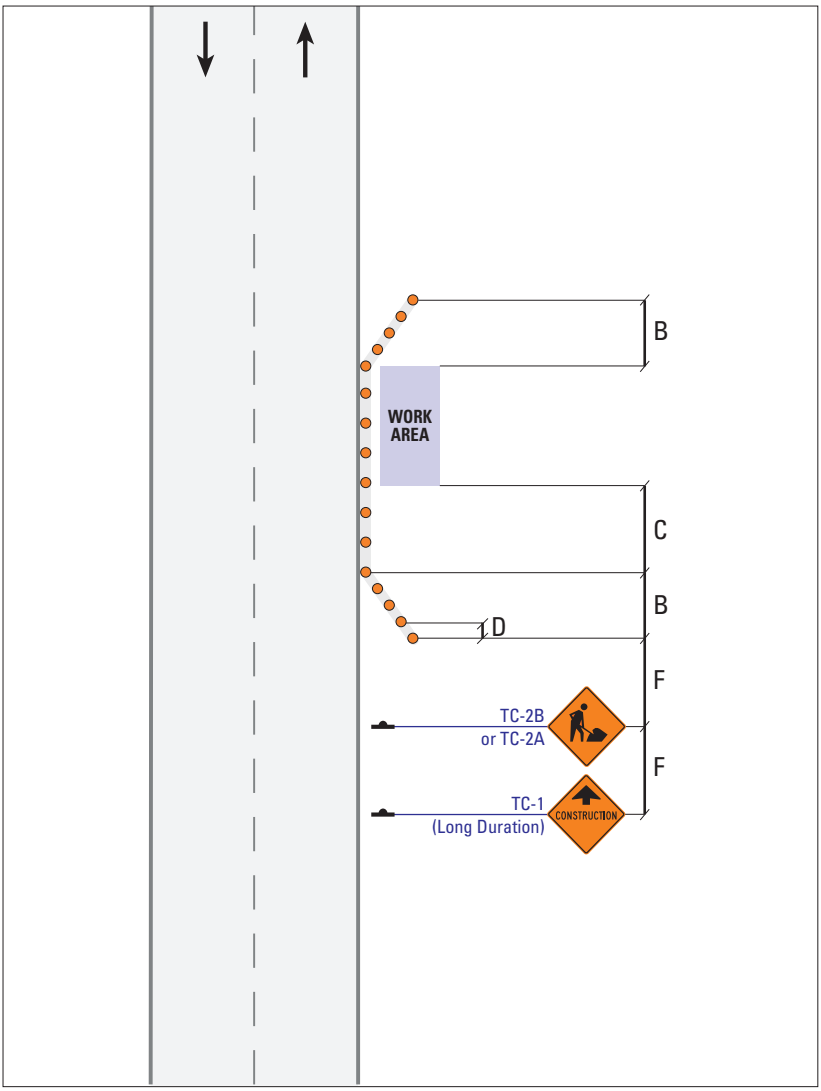


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Termination Taper optional.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

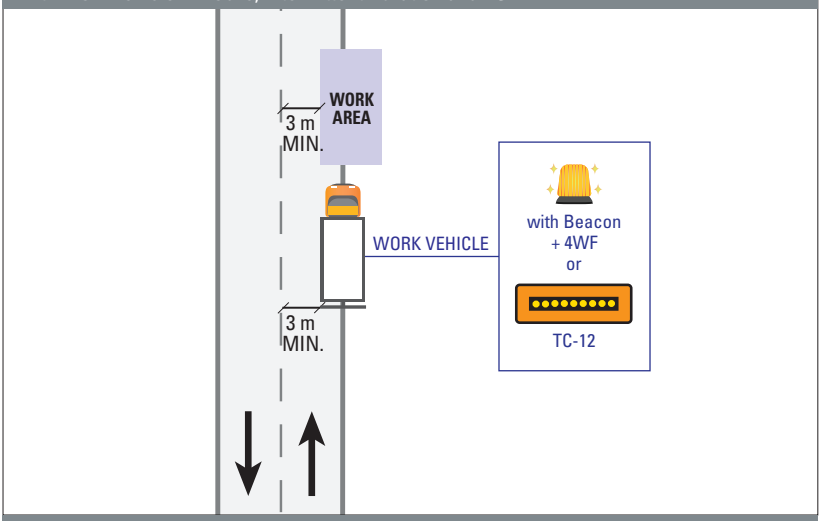
NOTES

i) Termination Taper optional.
ii) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.
iii) A Work Vehicle with a TC-12 may replace Markers for Short Duration work.

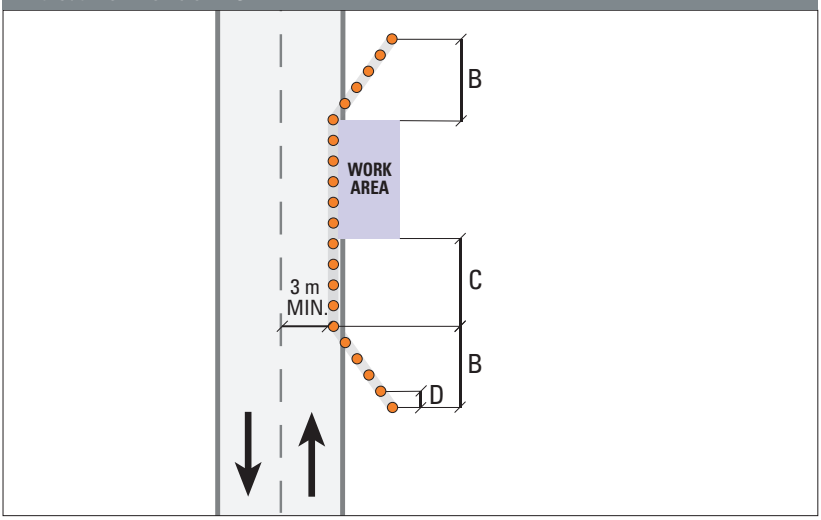
For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-5 Shoulder Work

With Work Vehicle – Mobile, Intermittent Duration and VSD



Without Work Vehicle – VSD



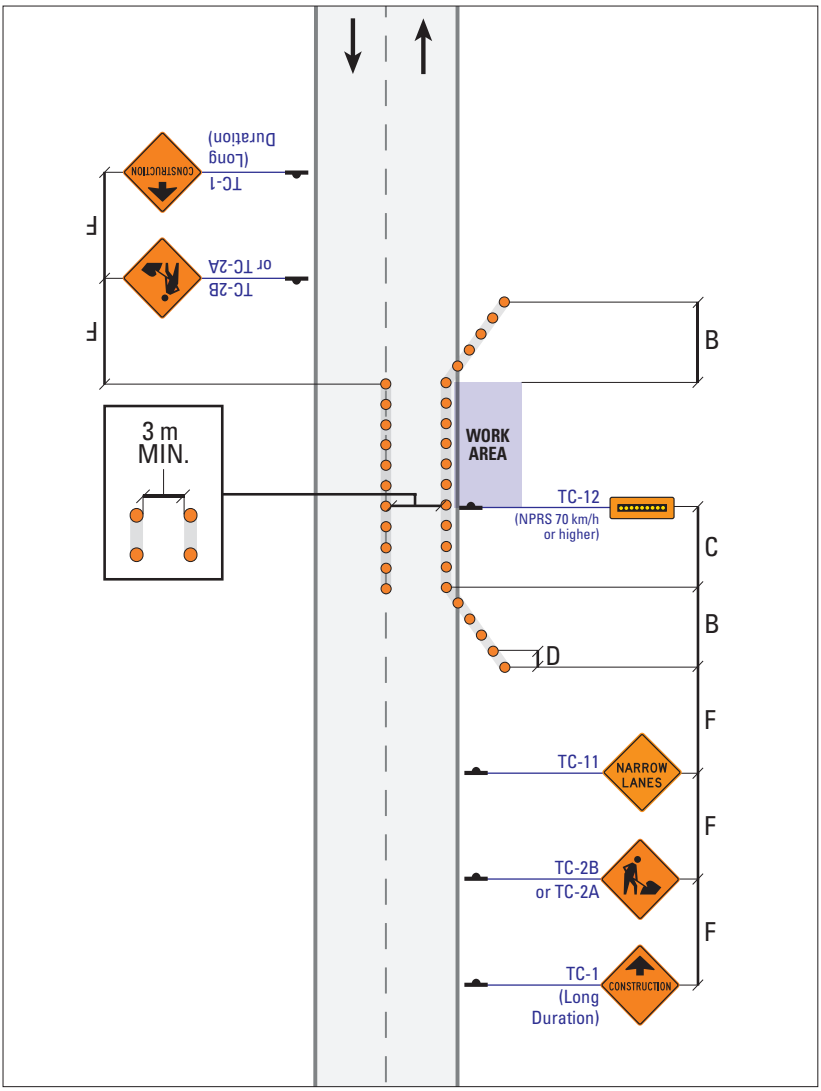
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Termination Taper optional.
ii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TS-6 **Lane Encroachment**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If Available Lane Width (ALW) is less than 3 m, use Partial Lane Shift (See TS-8, TS-9) or Lane Closures (TS-15, TS-20, TS-16).

ii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

iii) Centreline Markers are optional and are to be used if lane keeping is an issue.

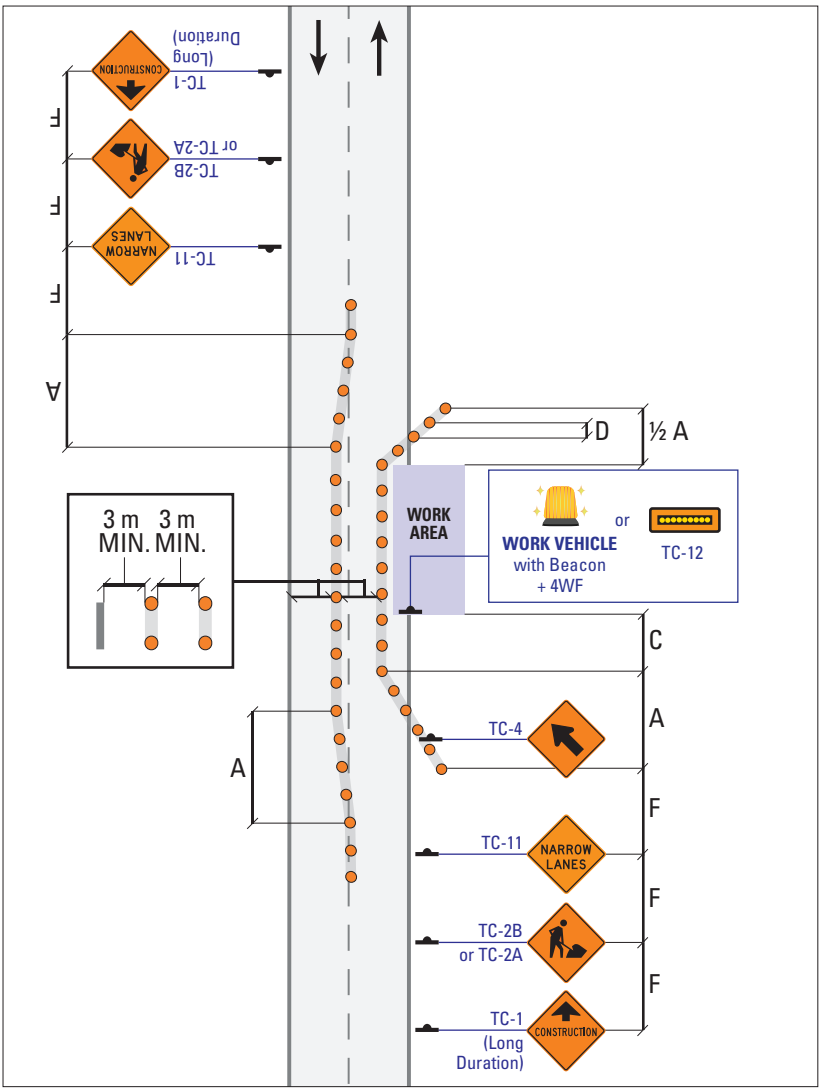
iv) On unpaved roads with Low Volume (<3000 vehicles per day):
Where remaining roadway width is at least 6 m, and ALW is less than 3 m, use Rb-91, a distance F upstream of start of Taper, and move the TC-1 and TC-2B an additional distance F upstream.

v) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.

vi) A Work Vehicle with a TC-12 may replace Markers for Short Duration work where NPRS is 60 km/h or lower.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-7 Lane Encroachment



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

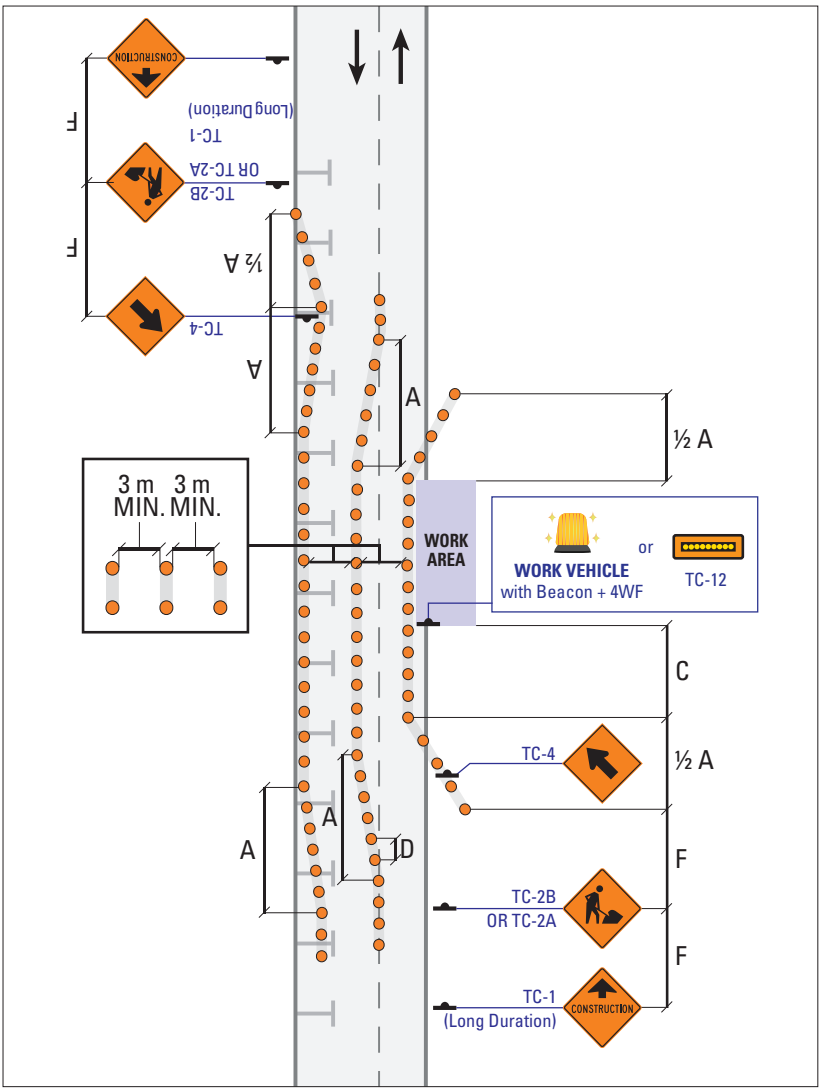
i) Remaining roadway must be at least 6 m plus the width of channelizers. A lane width must be at least 3 m in each direction.

ii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

iii) Traffic should not be shifted onto a surface texture different from the main roadway without a Posted Speed Reduction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-8 **Partial Lane Shift**



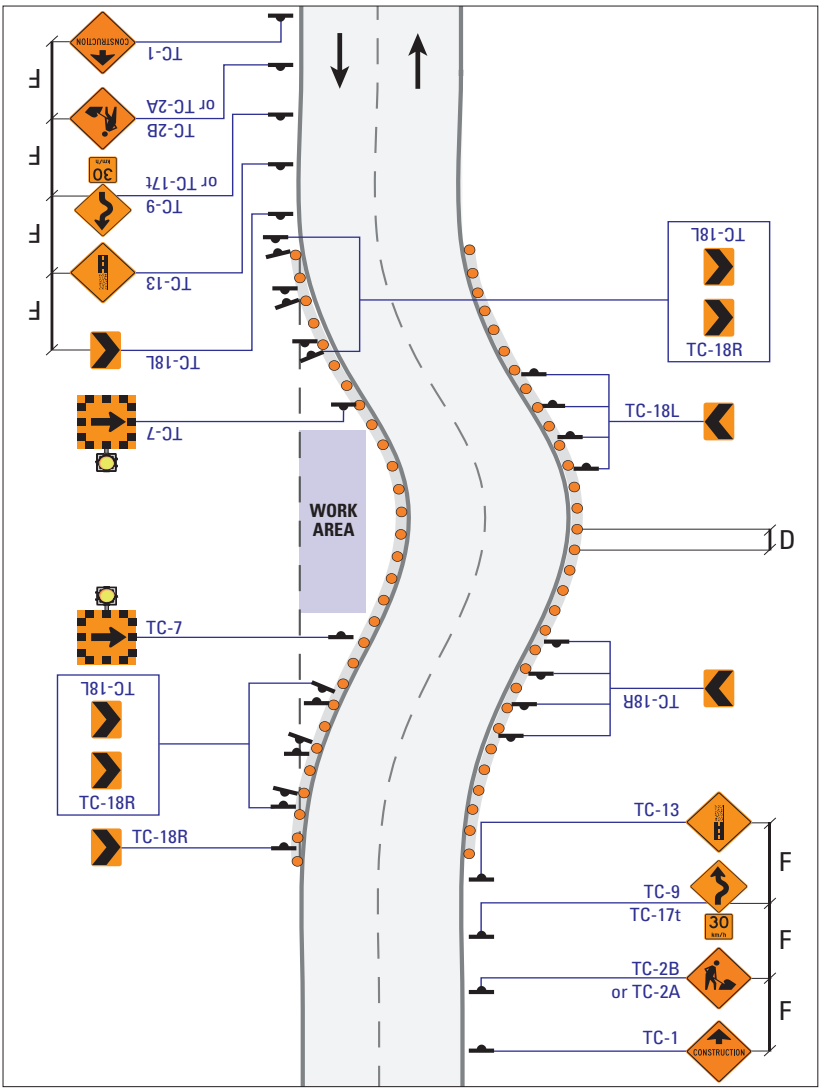
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Remaining roadway must be at least 6 m plus the width of channelizers. A lane width must be at least 3 m in each direction.
ii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.
iii) Traffic should not be shifted onto a surface texture different from the main roadway without a Posted Speed Reduction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-9 **Partial Lane Shift: Wide Platform**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
F	Distance between Construction Signs (m)	50	90	120	140	150

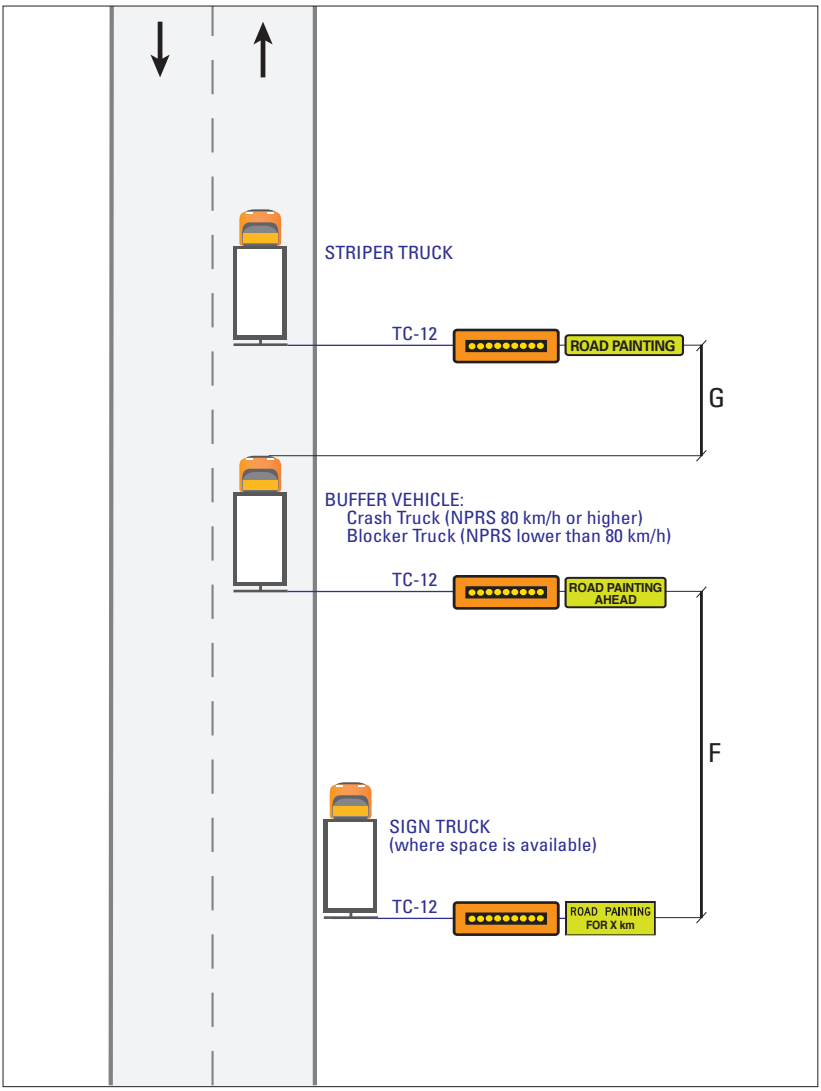
NOTES

i) Traffic should not be shifted onto a surface texture different from the main roadway without a speed reduction.

ii) If the diversion is paved, temporary pavement markings are required, including Edge Lines, and the TC-13 should not be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-10 Roadside Diversion



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	30	30	60	60	80
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	-	-	35	45	50

NOTES

i) A Crash Truck must be used on High Volume roads and/or where the NPRS is 80 km/h or higher. Road Authorities, other than MTO, may not require a Buffer Vehicle on Low Volume roads with NPRS lower than 80 km/h.

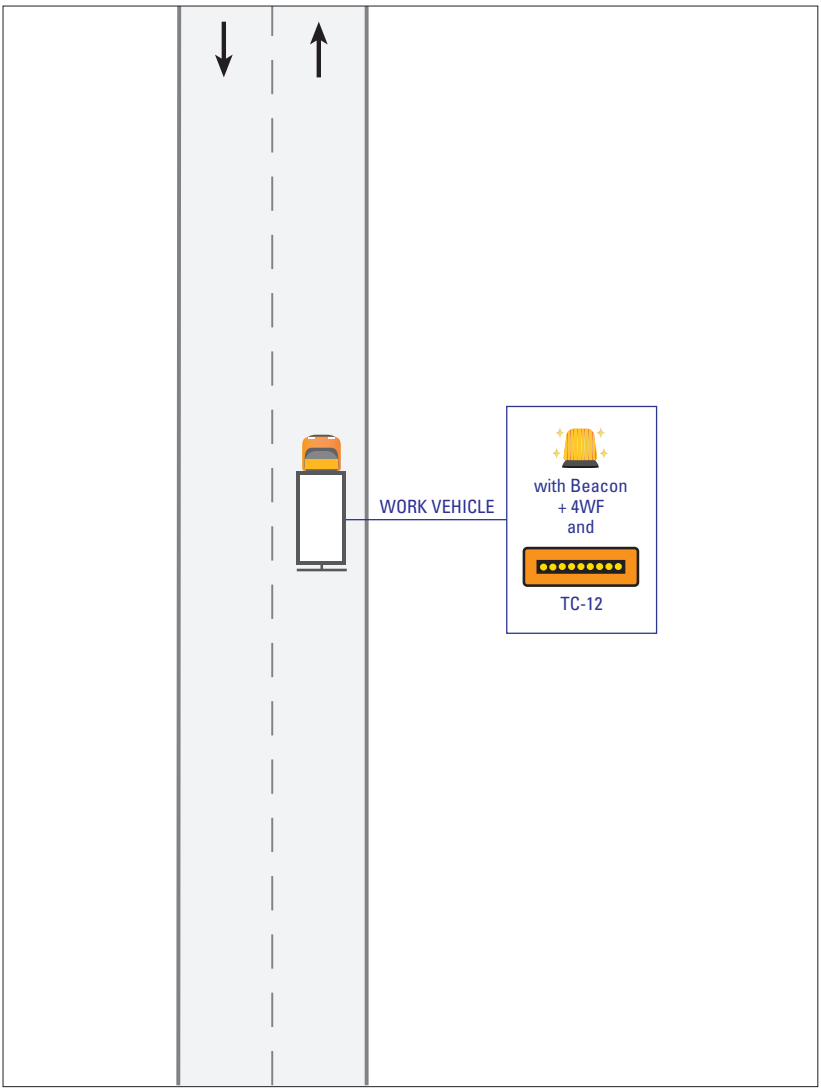
ii) Where shoulder is Intermittent, Sign Truck should drive with traffic flow until shoulder becomes available.

iii) The distance between Sign Truck and Buffer Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other specific conditions.

iv) Alternately, the Sign Truck on the shoulder may have a programmable VMS displaying approved message warning of line painting operations ahead.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

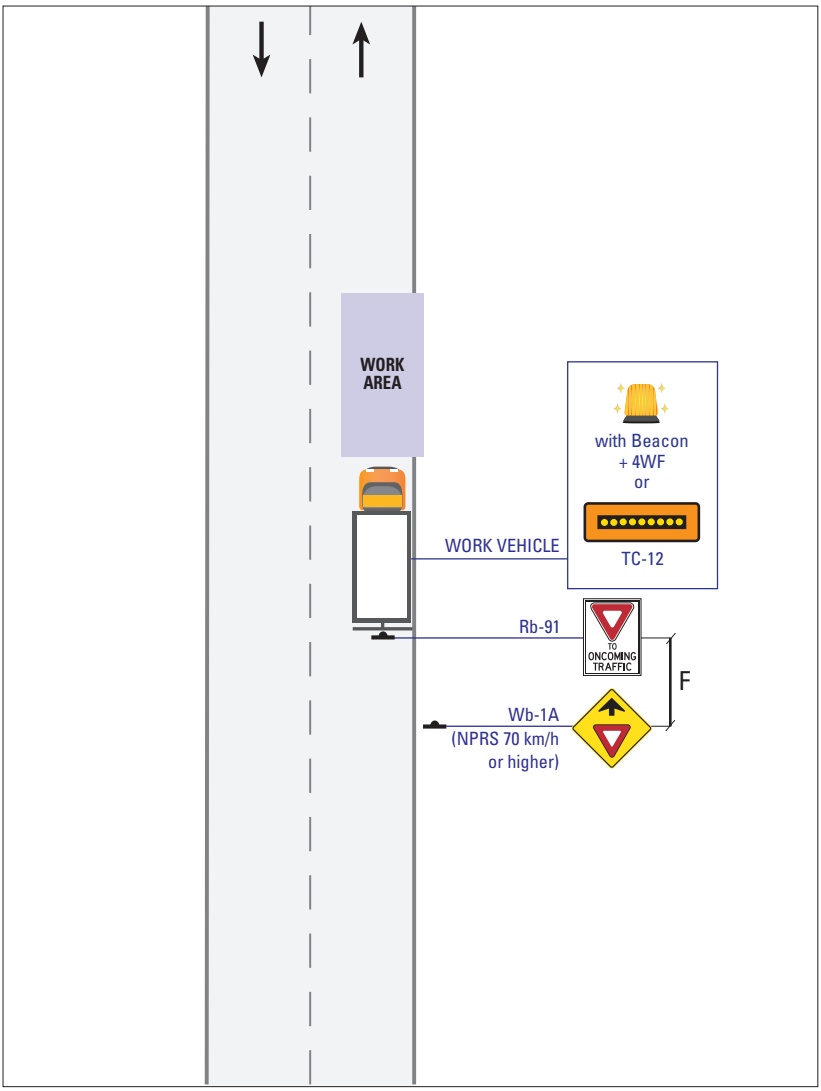
TS-11 **Zone Painting**



NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TS-12 **Lane Closed or Occupied**



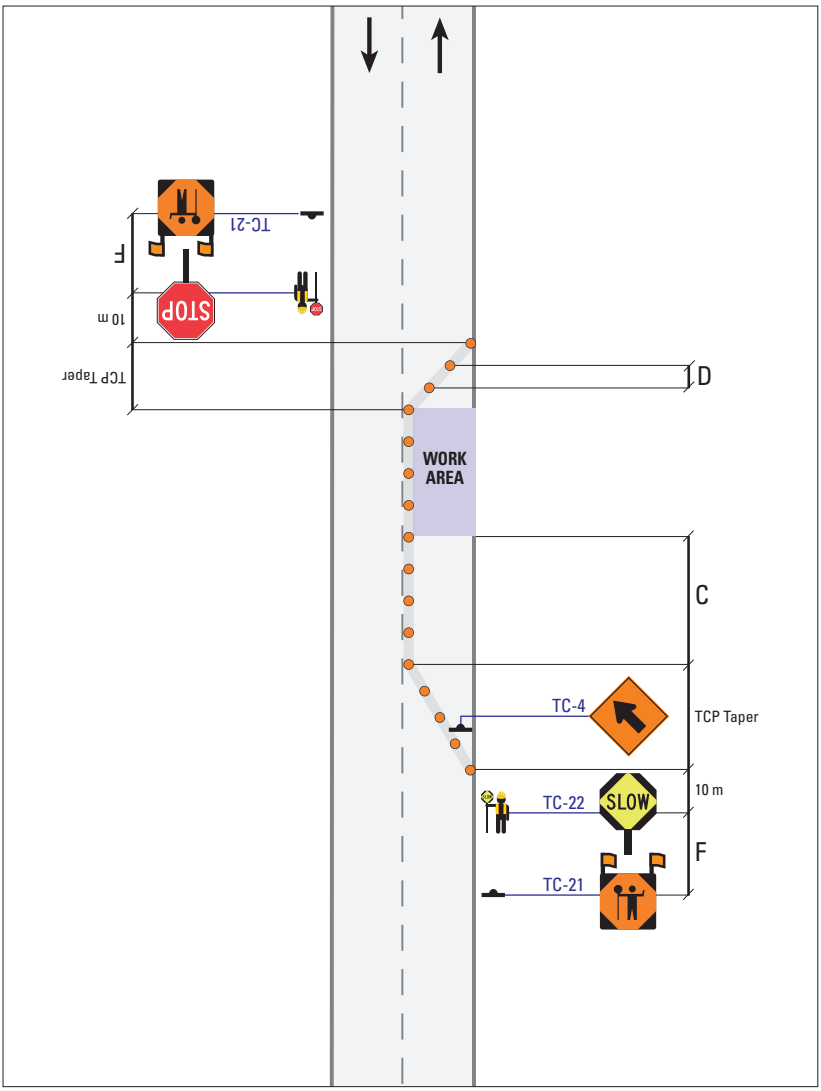
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	30	30	60	60	80
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) Use only on roads with Low Traffic Volume (< 3000 vehicles per day).
ii) To be used for short length Work Areas (< 150 m).
iii) May also be used on roads with no centreline.
iv) Use only where there is unobstructed visibility of oncoming traffic in both directions.
v) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4. If Work Vehicle has a TC-12, it must be in bar mode.
vi) Wb-1A is not required unless sight distance (H) is not available.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TS-13 **Lane Closed or Occupied (Yield to Oncoming Traffic) (Low Volume Roads)**



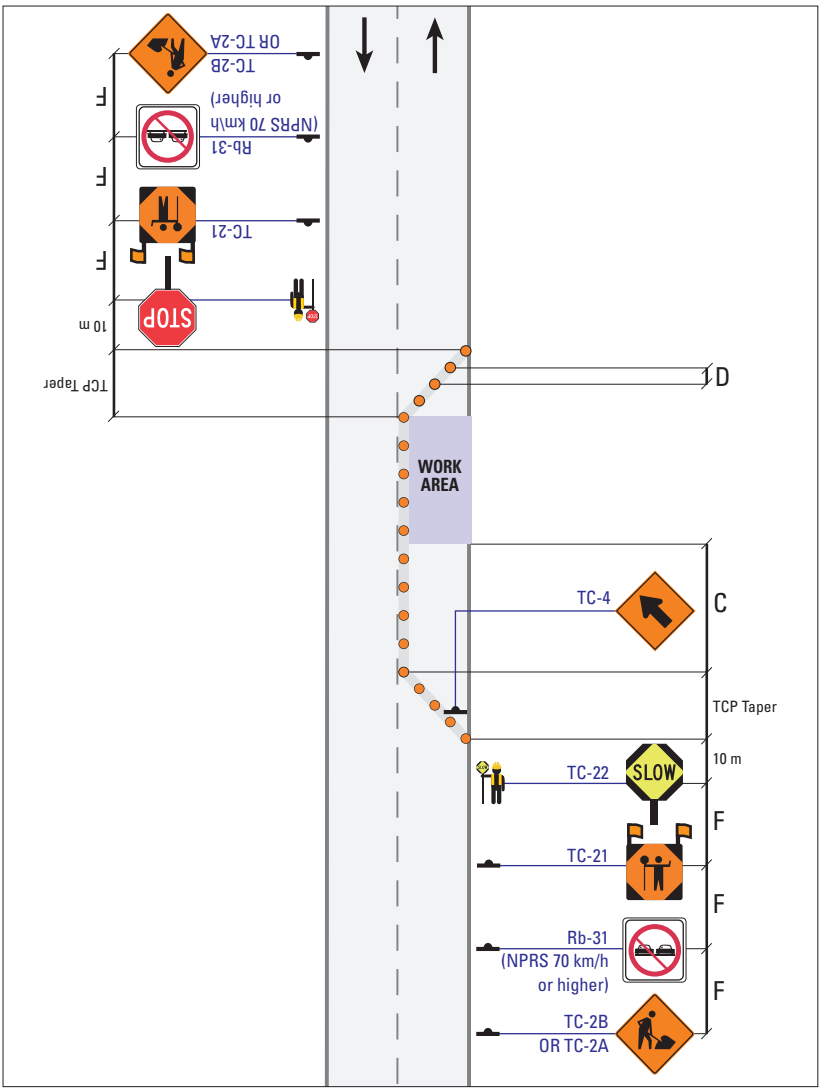
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) Work on Low Traffic Volume roads (<3000 vehicles per day) with a Normal Posted Regulatory Speed lower than 70 km/h, the Markers are not required.
ii) On high speed (NPRS 70 km/h or higher) or where lane keeping/compliance is an issue, consider using TS-20 Lane Closed (Traffic Control Persons).
iii) For Short Duration projects on MTO highways, it is recommended to use TS-20.

For further detail on Work Zone components see Table A (pg. 4), and TCP Table (pg. 264).

TS-14 Lane Closed or Occupied (Traffic Control Persons)



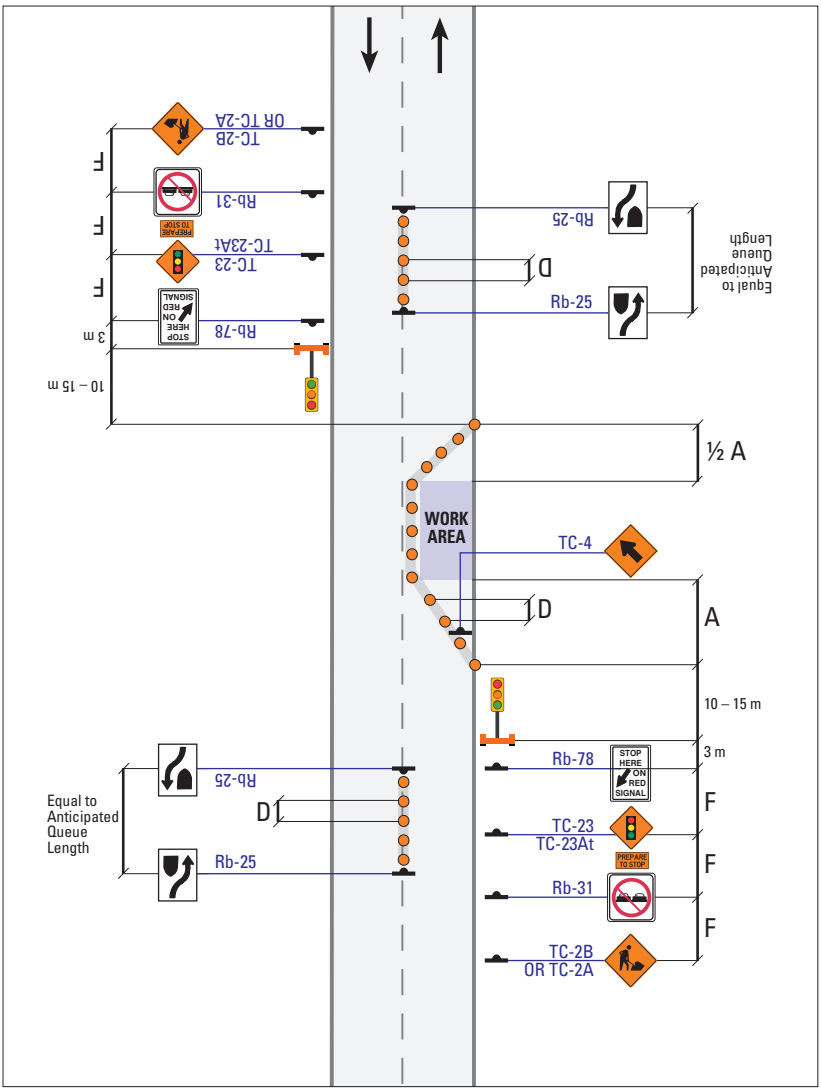
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) On high speed (NPRS 70 km/h or higher) or where lane keeping/compliance is an issue, consider using TS-20 Lane Closed (Traffic Control Persons).
ii) For Short Duration projects on MTO highways, it is recommended to use TS-20.

For further detail on Work Zone components see Table B (pg. 6), and TCP Table (pg. 264).

TS-15 Lane Closed or Occupied (Traffic Control Persons)



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

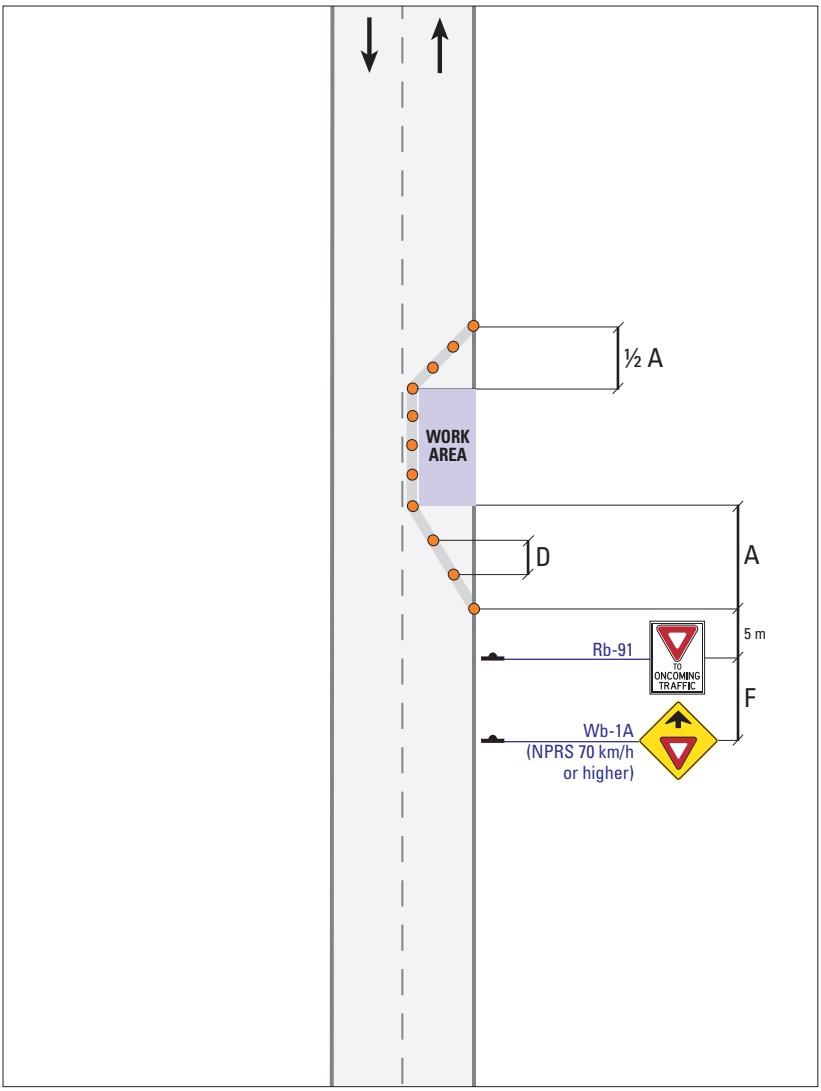
NOTES

i) To determine the appropriate timing of the lane control signals, see Section 4.

ii) Lane control signals are only to be used while the contractor is on site and on roads with NPRS of 90 km/h or lower. Portable signals that are to operate during Long Duration work, or when no contractor is present, are Portable Temporary Traffic Signals (PTTS) and require Road Authority approval of layout and signal timing. MTO applications require the completion of PHM-125 (see OTM Book 12).

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-16 Lane Closed (Portable Lane Control Signals)



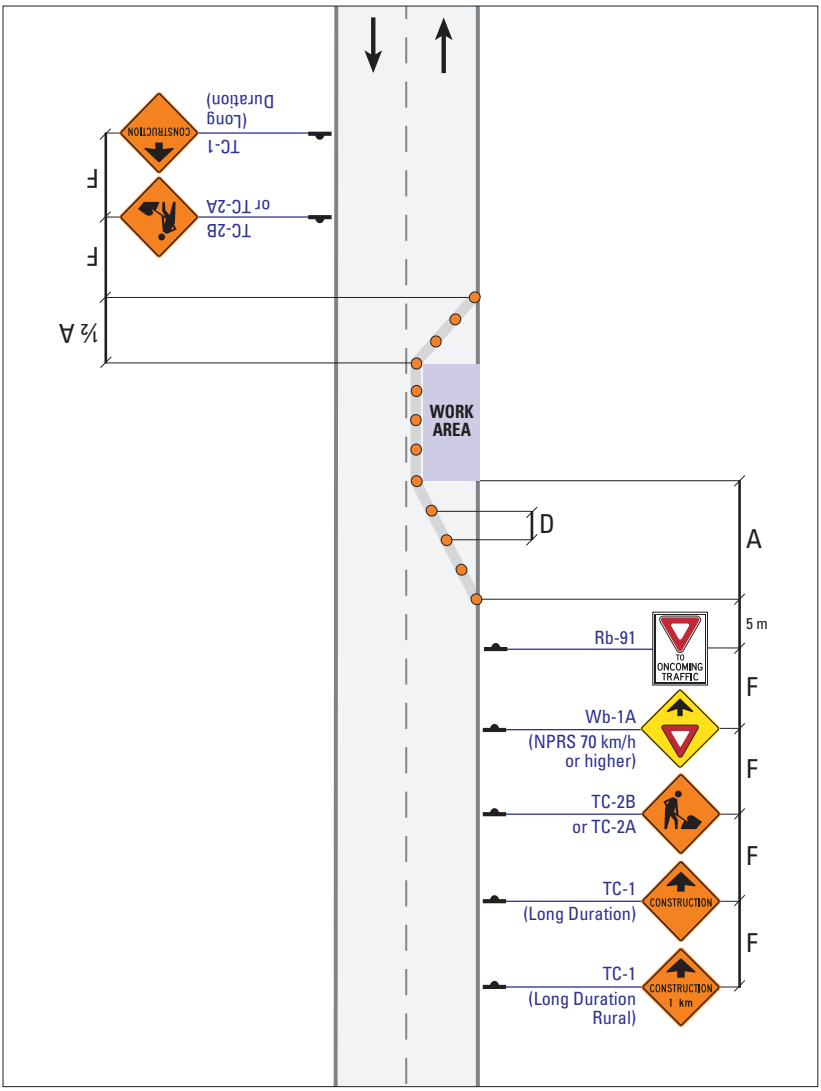
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) Use only on roads with Low Traffic Volume (< 3000 vehicles per day).
ii) To be used for short length Work Areas (<150 m).
iii) May also be used on roads with no centreline.
iv) Use only where there is unobstructed visibility of oncoming traffic in both directions.
v) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4. If Work Vehicle has a TC-12, it must be in bar mode.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TS-17 Lane Closed (Yield to Oncoming Traffic) (Low Volume Roads)



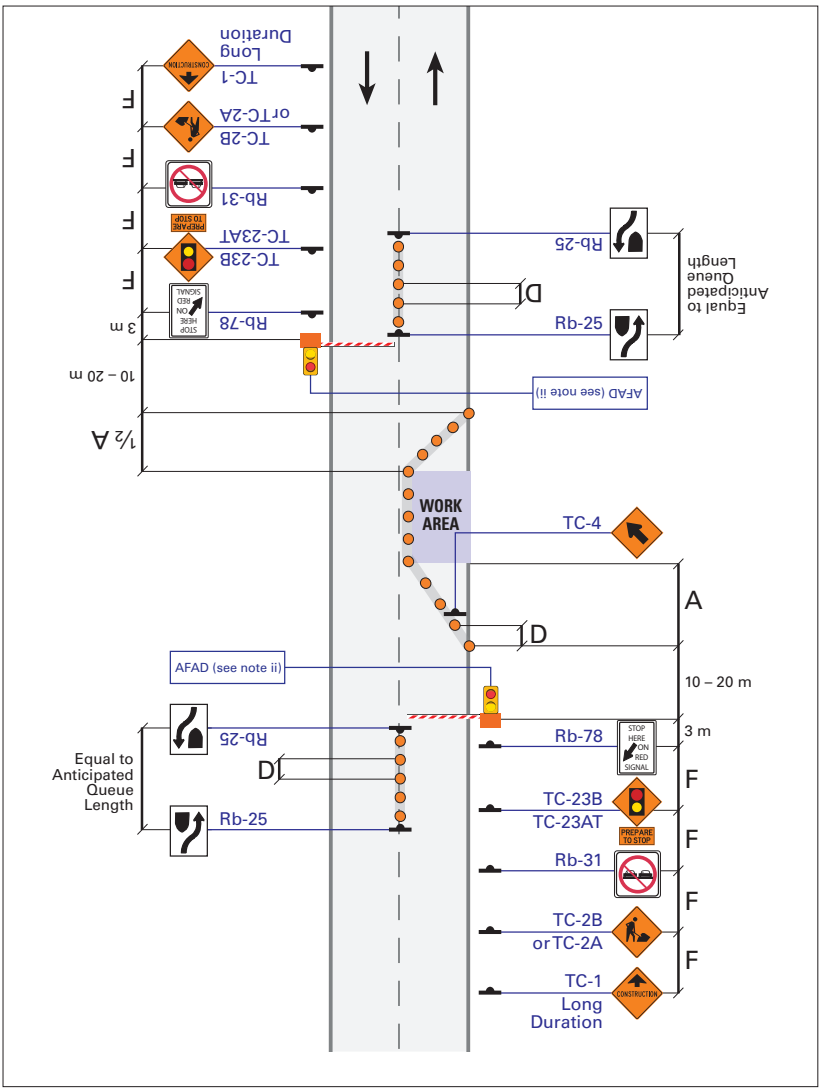
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Use only on roads with Low Traffic Volume (< 3000 vehicles per day).
ii) To be used for short length Work Areas (<150 m).
iii) May also be used on roads with no centreline.
iv) Use only where there is unobstructed visibility of oncoming traffic in both directions.
v) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4. If Work Vehicle has a TC-12, it must be in bar mode.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-18 Lane Closed (Yield to Oncoming Traffic) (Low Volume Roads)



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

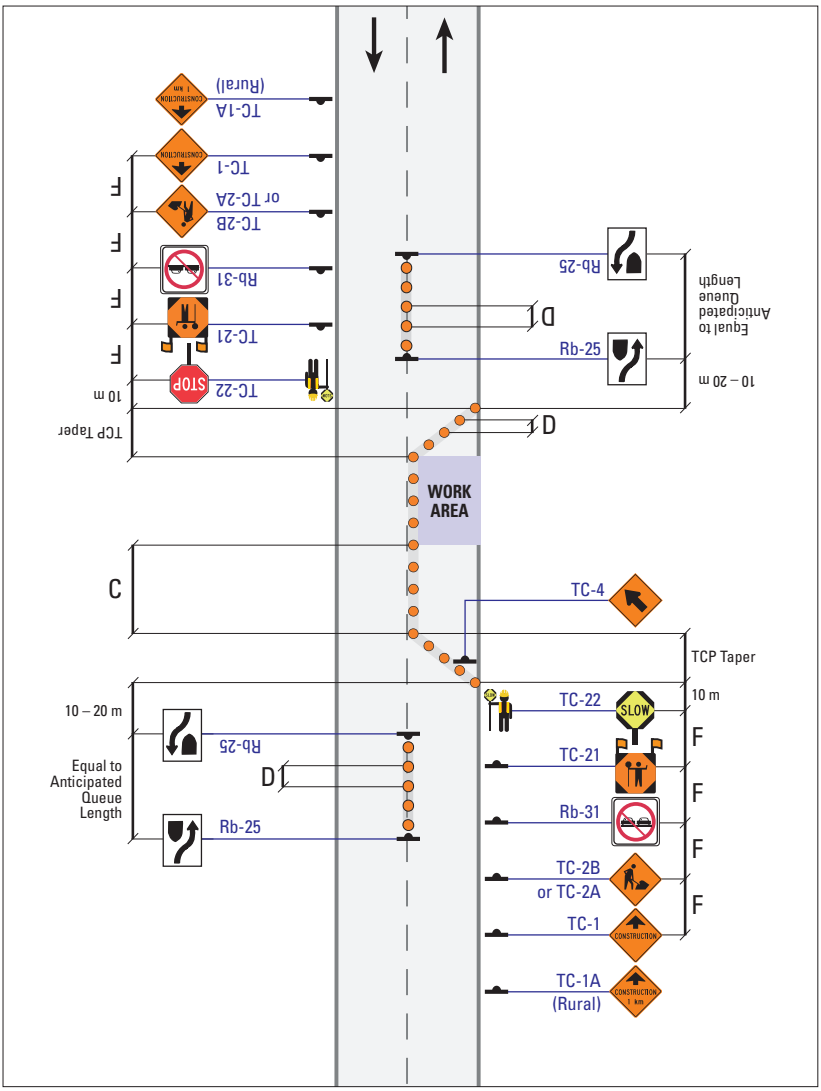
NOTES

i) An AFAD shall not be operated unless a TCP is positioned close enough to enable them to display a TC-22 STOP/SLOW paddle to control traffic in the event of an AFAD malfunction and

ii) If the AFAD is within a designated bilingual area and the municipality has passed a bylaw under the FLSA section 14(1), the Rb-79 must be bilingual as should the TC23At sign.

For further detail on Work Zone components, see Table A for Intermittent and Very Short duration work and see Table B (Short/Long, pg. 6).

TS-19 Lane Closed (Automated Flagger Assistance Device)



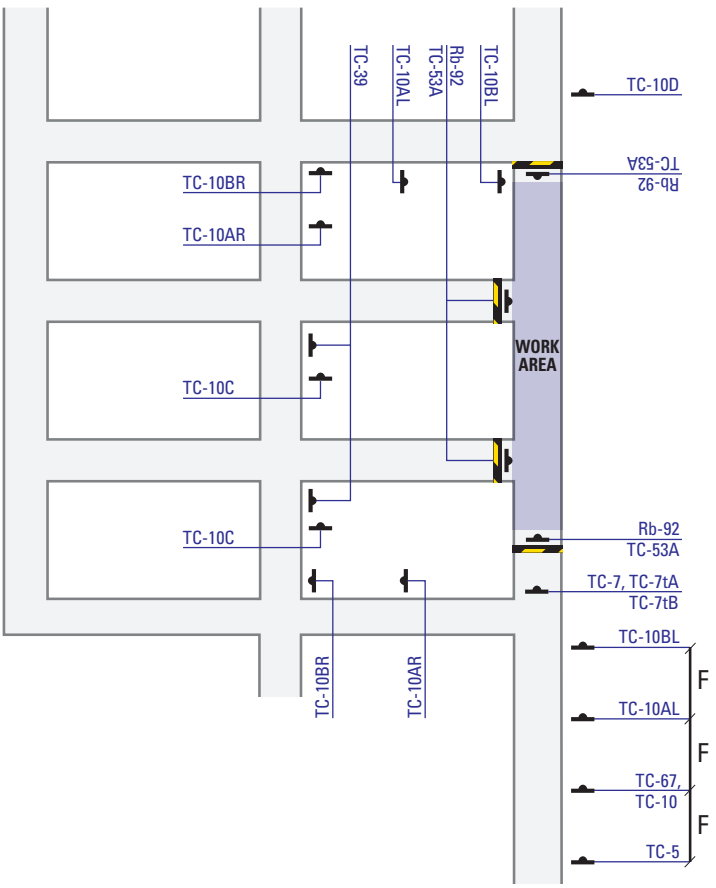
		Normal Posted Regulatory Speed (km/h)				
Label	**Description**	**50**	**60**	**70**	**80**	**90**
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Centreline Markers between the Rb-25 signs are optional and may be used in one or both approaches if lane keeping becomes an issue. For projects on MTO highways, it is recommended to use Markers in both approaches.

For further detail on Work Zone components see Table B (pg. 6), and TCP Table (pg. 264).

TS-20 Lane Closed (Traffic Control Persons)



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) See TS-22 for Sign Details.
ii) The same approach to signing is required in the opposite direction.
iii) TC-54 can be used in place of TC-53A.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-21 Route Detour (Alternative Roads)

The following signs are to be used in the layout for Route Detour – see TS-21.

TC-10


TC-10AR

Other tabs may be used with the 

sign as follows:


TC-10BR


TC-10C


TC-10ER


TC-10FR


TC-10AL


TC-10BL

TC-10D


TC-10EL


TC-10FL

Roundabout Fish-hook tabs:


TC-10BRr


TC-10ALr


TC-10Cr

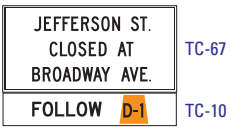
TC-39

TC-5

Rb-92

TC-7
TC-7tA
TC-7tB

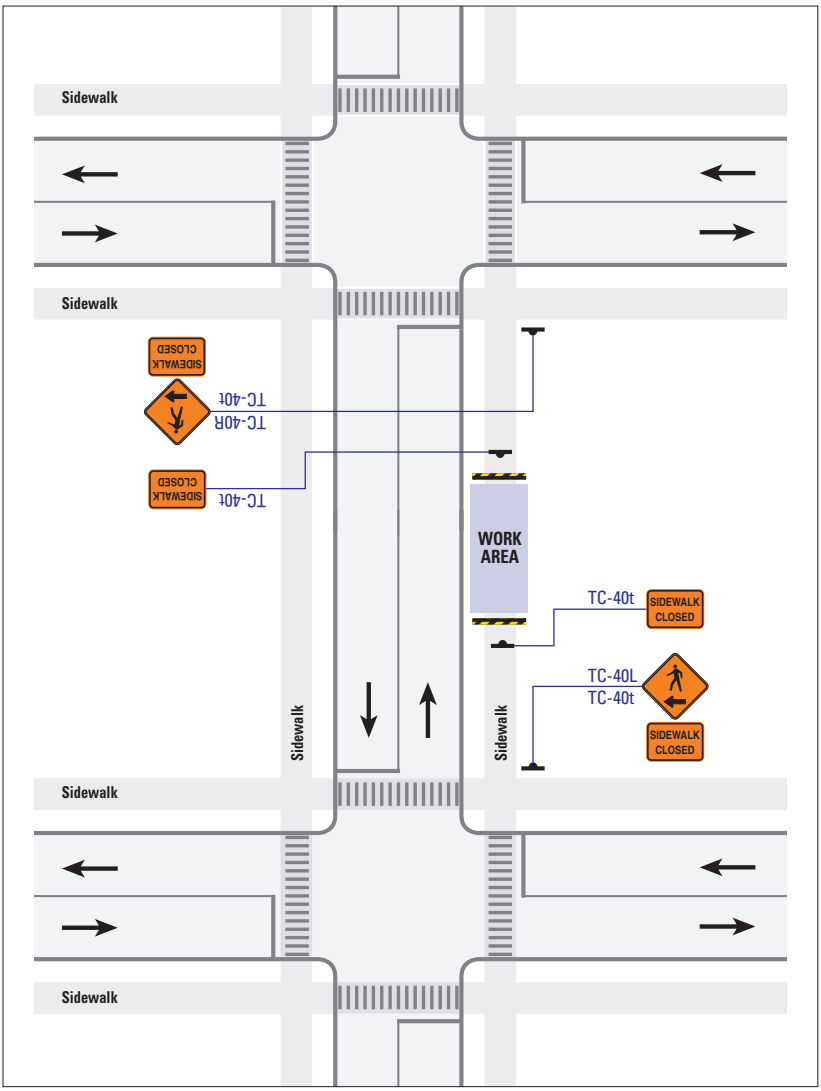

TC-53A



TC-67
TC-10

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

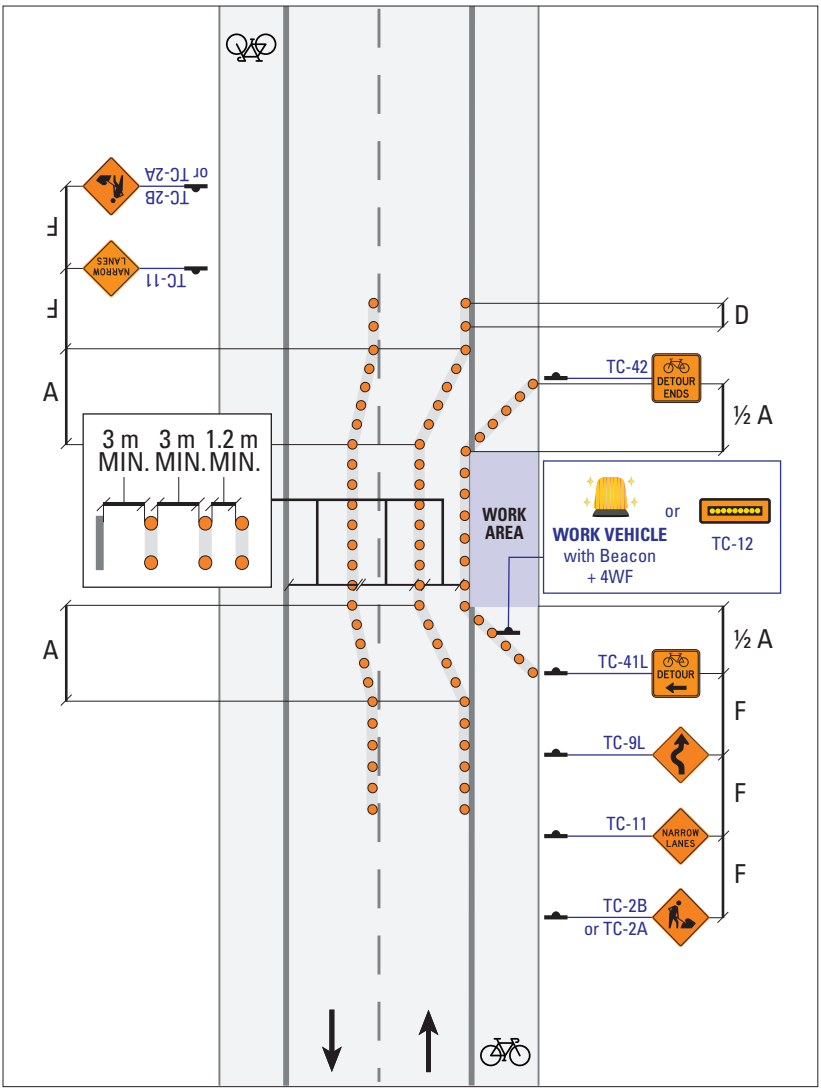


NOTES

i) TC-40L/R Pedestrian Direction sign must be placed at the nearest upstream controlled pedestrian crossing (traffic signal or Pedestrian Crossover) in each direction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-23 **Pedestrian Detour: Sidewalk Closure**



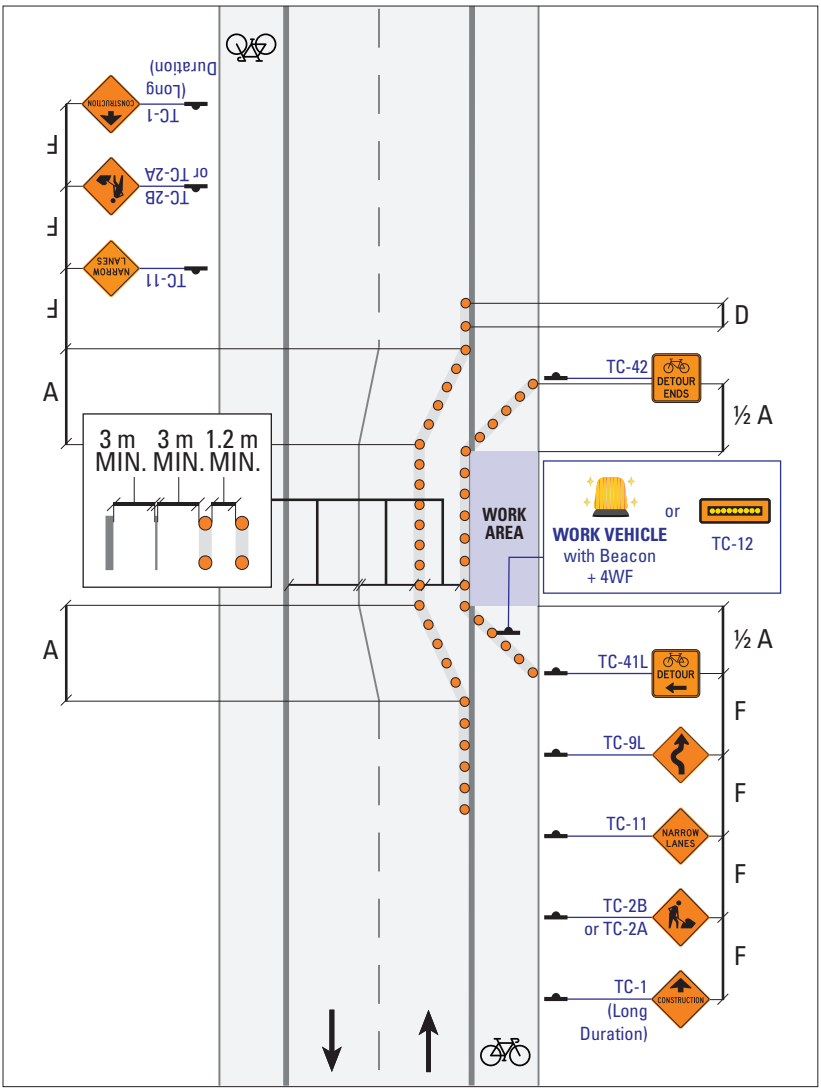
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, TC-54 should be used in place of TC-51.
ii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-24 Bicycle Lane Diversion: Bicycle Lane Shift



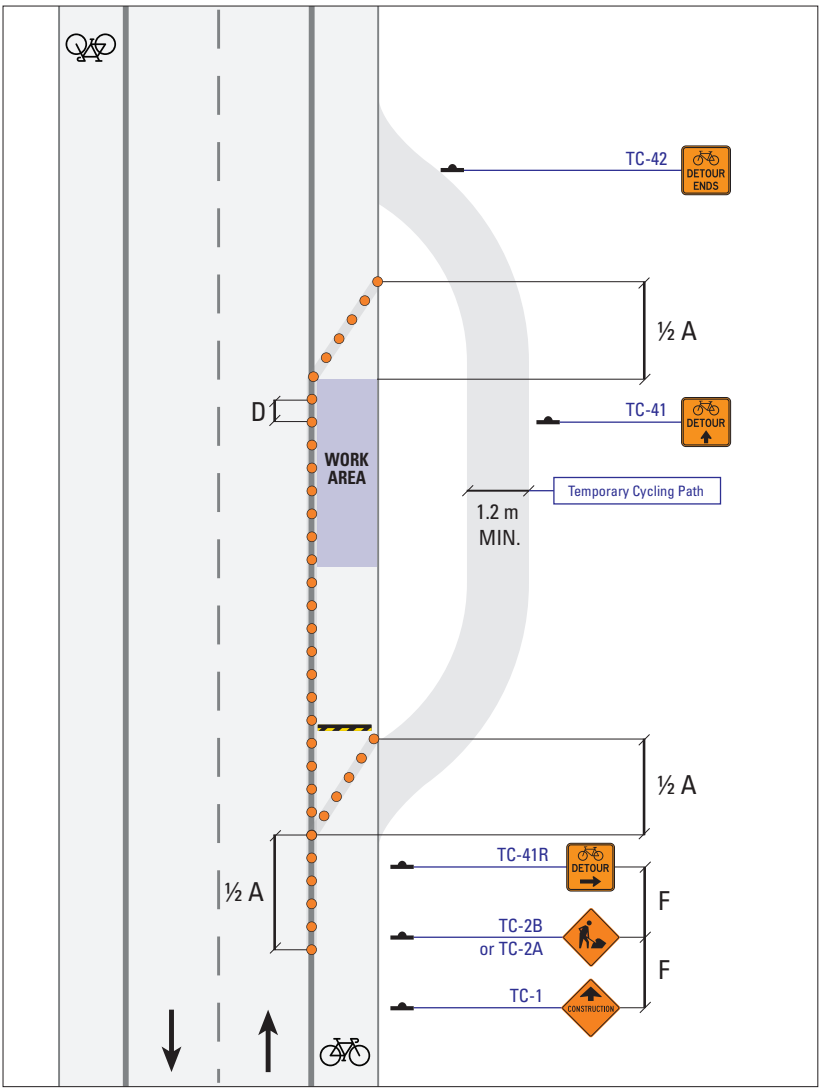
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, TC-54 should be used in place of TC-51.
ii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-25 Bicycle Lane Diversion: Bicycle Lane Shift

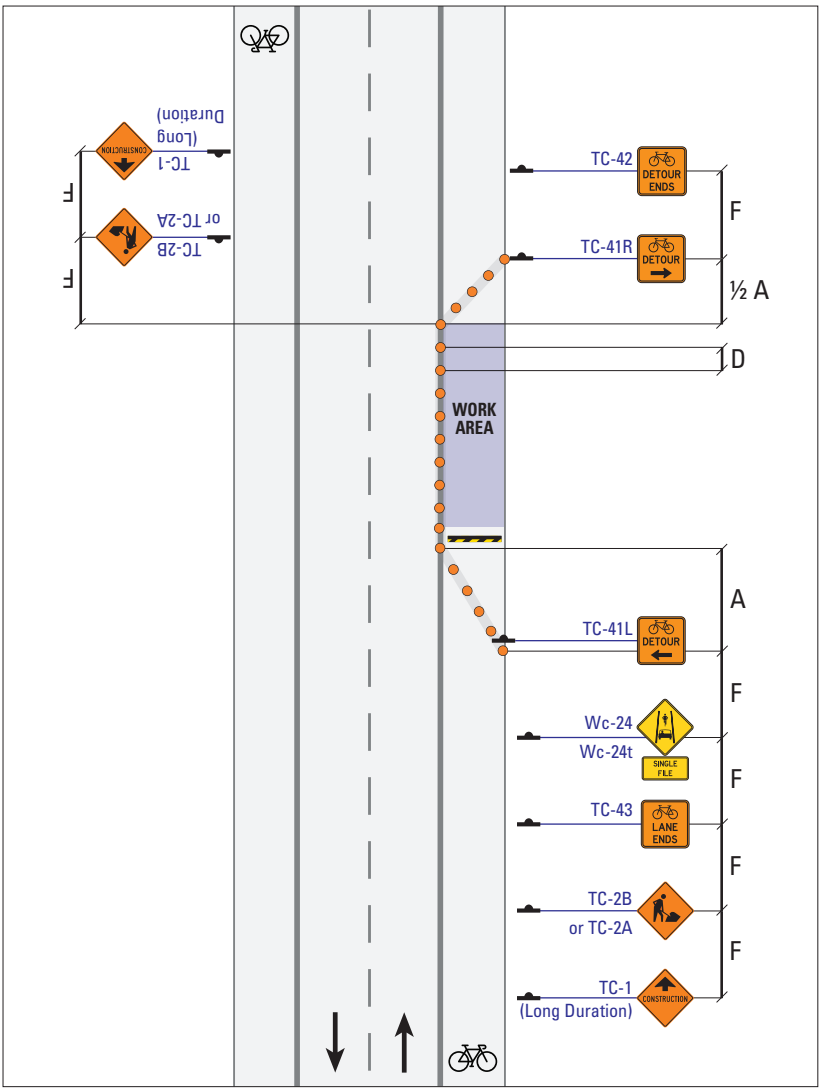


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-26 **Bicycle Lane Diversion: Temporary Path**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

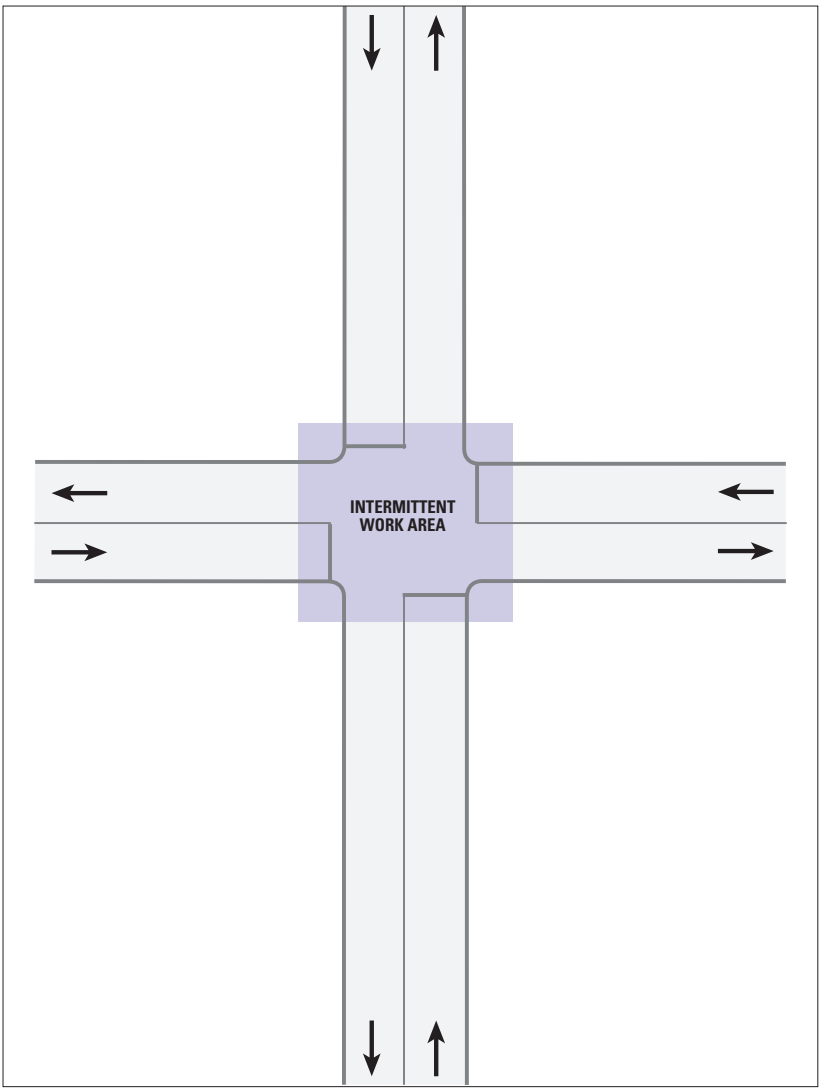
NOTES

i) AODA-compliant ramps are required if the curb is raised.
ii) Ensure signage is visible for drivers to be aware of merging cyclists.

Shared lane only to be used if considered by OTM Book 18 or MTO Bikeways Design Manual, Desirable Cycling Facility Nomograph. Otherwise, cycling Detour should be provided.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TS-27 Bicycle Lane Diversion: Single File



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) Any equipment or Work Vehicles that continuously occupy the shoulder should comply with TS-1.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required.

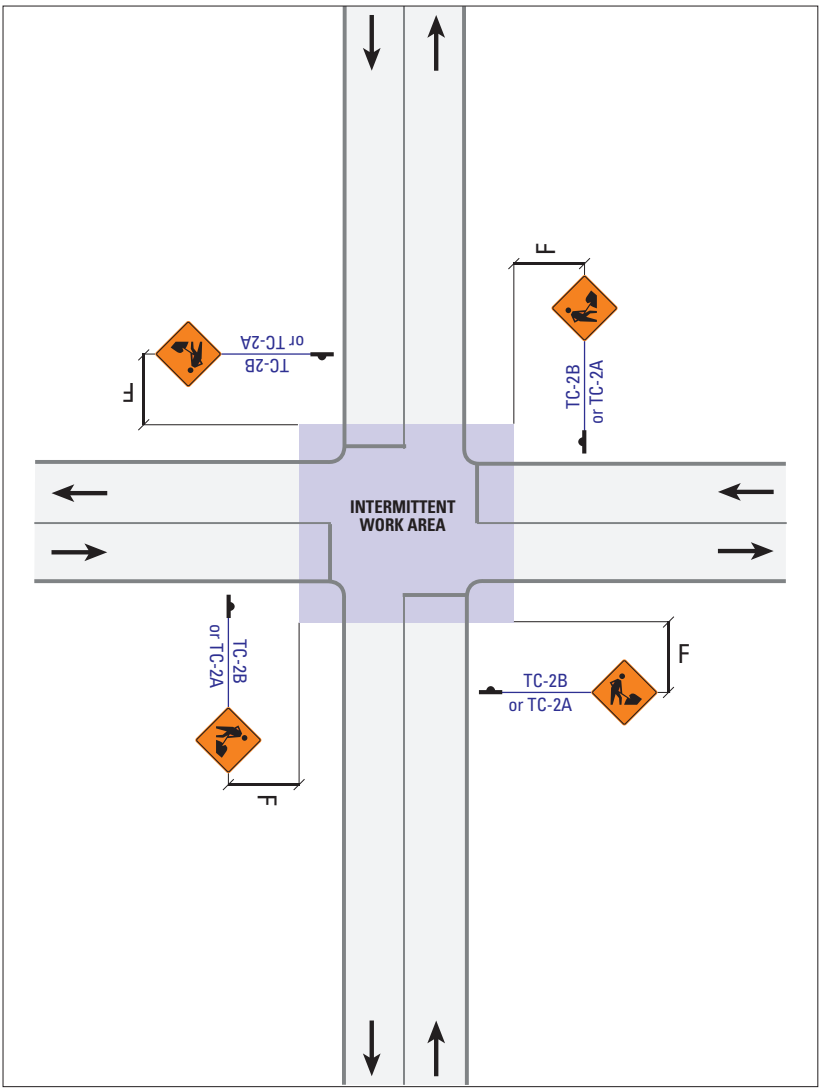
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TI-1 Intermittent Work: Intersection



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	30	30	60	60	80
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) Any equipment or Work Vehicles that continuously occupy the shoulder should comply with TS-2.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required.

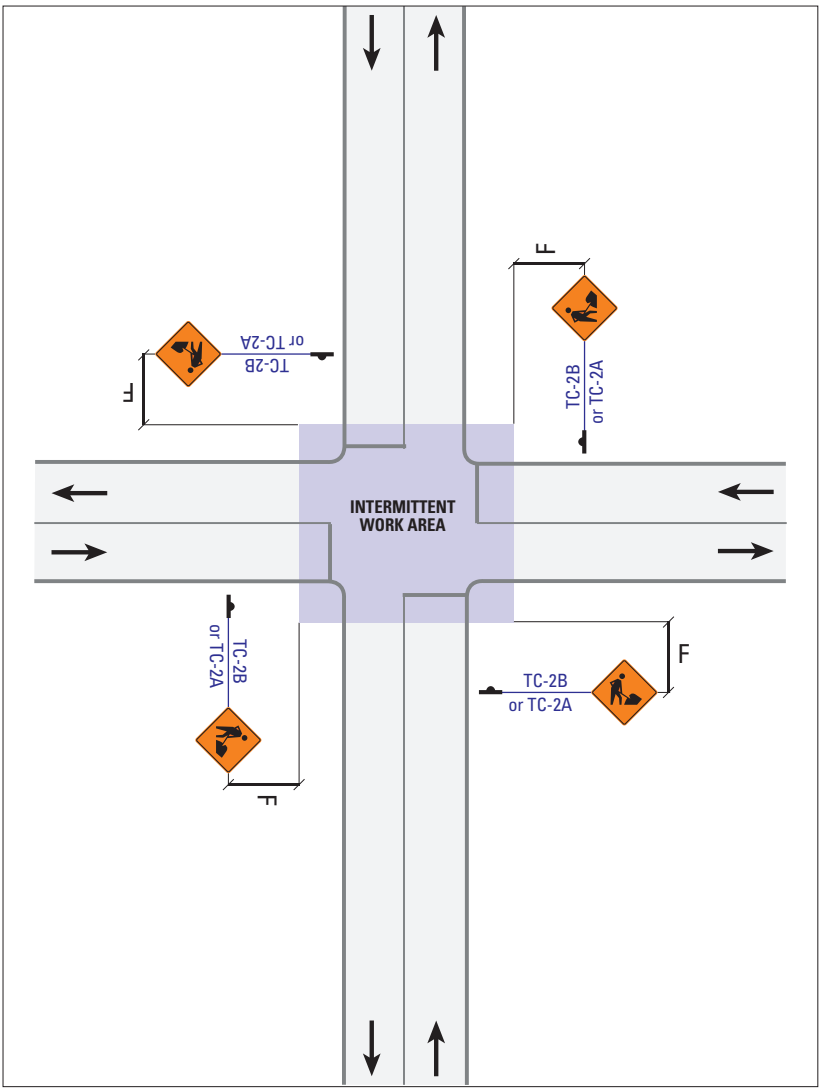
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TI-2 Intermittent Work: Intersection



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) Any equipment or Work Vehicles that continuously occupy the shoulder should comply with TS-3.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required.

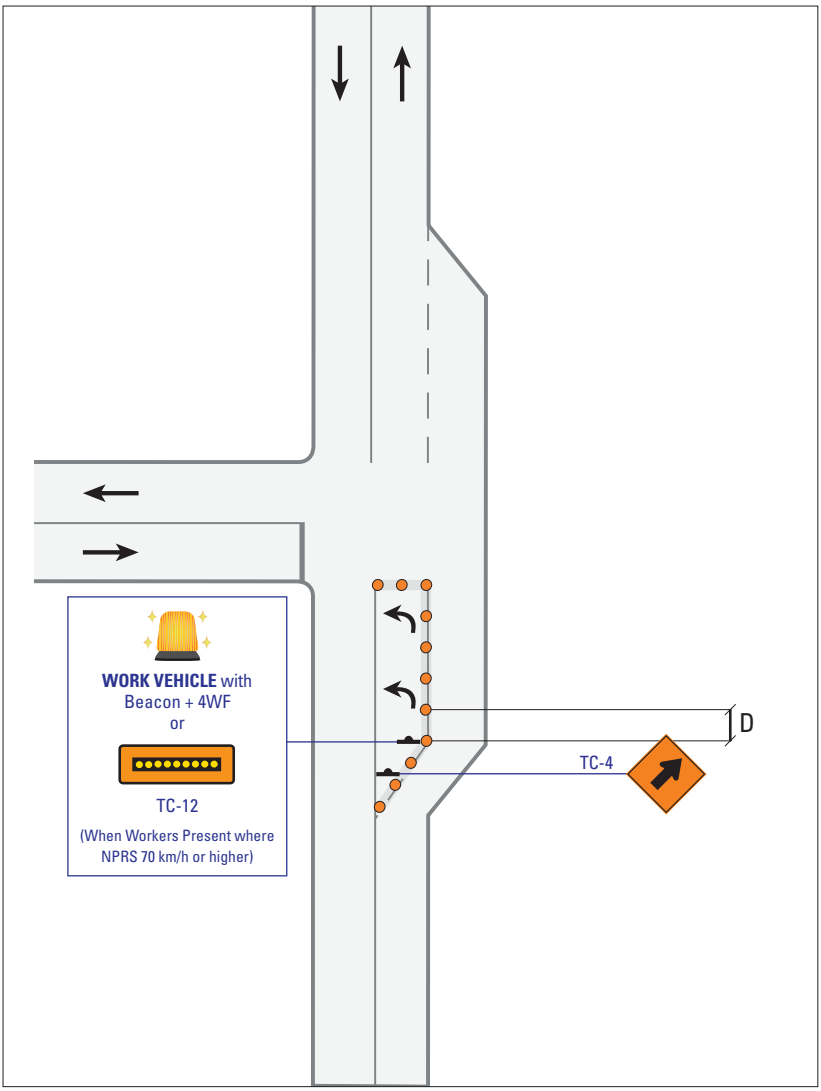
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-3 Intermittent Work: Intersection



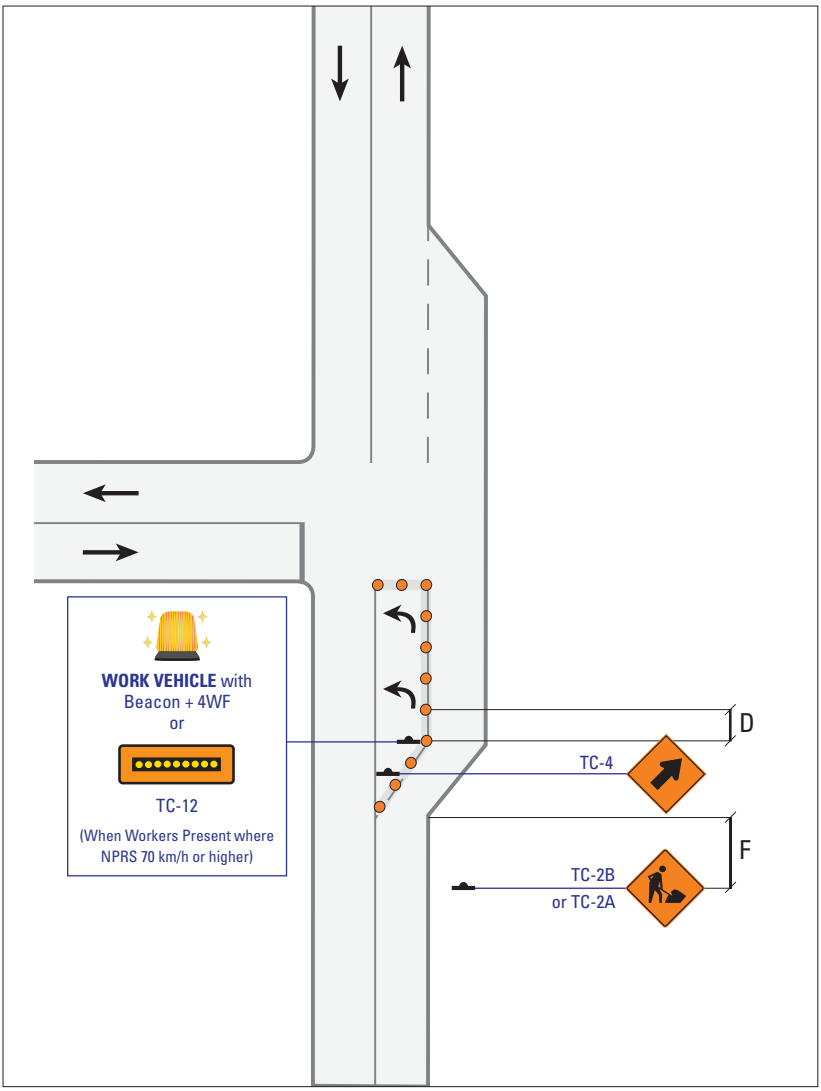
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Centreline Delineation required if workers present.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TI-4 Zone Painting: Intersection Turn Arrows



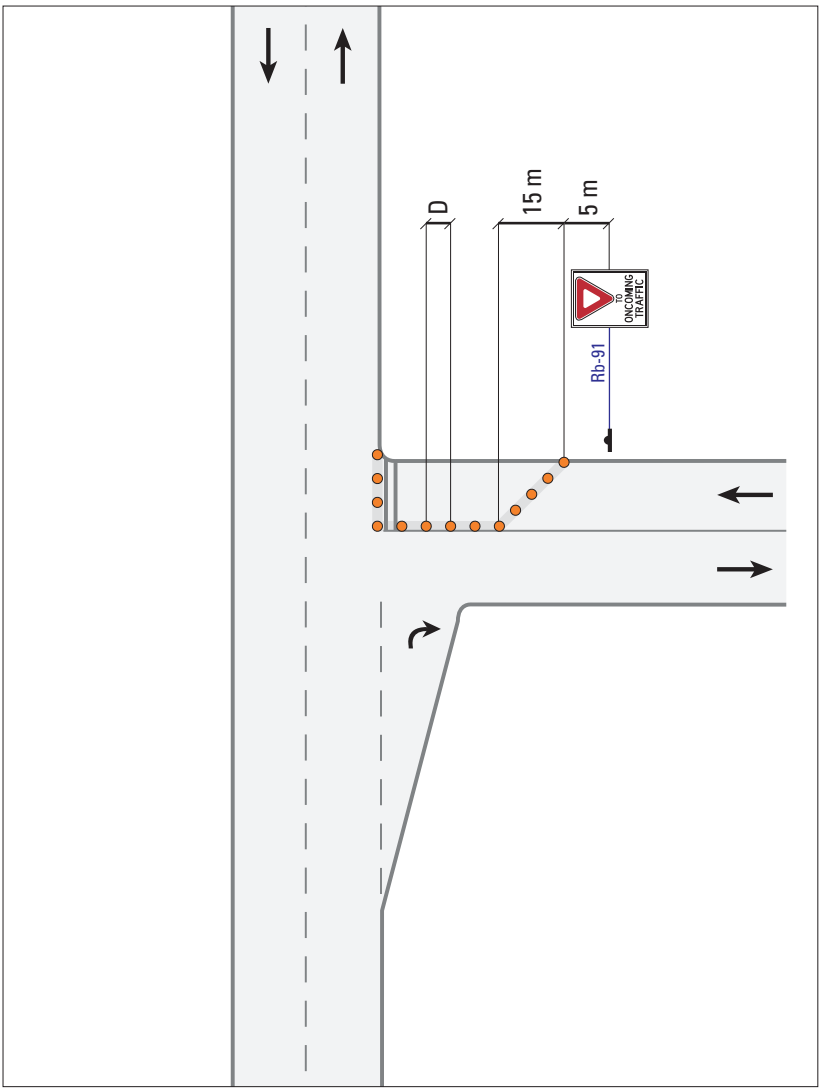
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Centreline Delineation required if workers present.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-5 Zone Painting: Intersection Turn Arrows



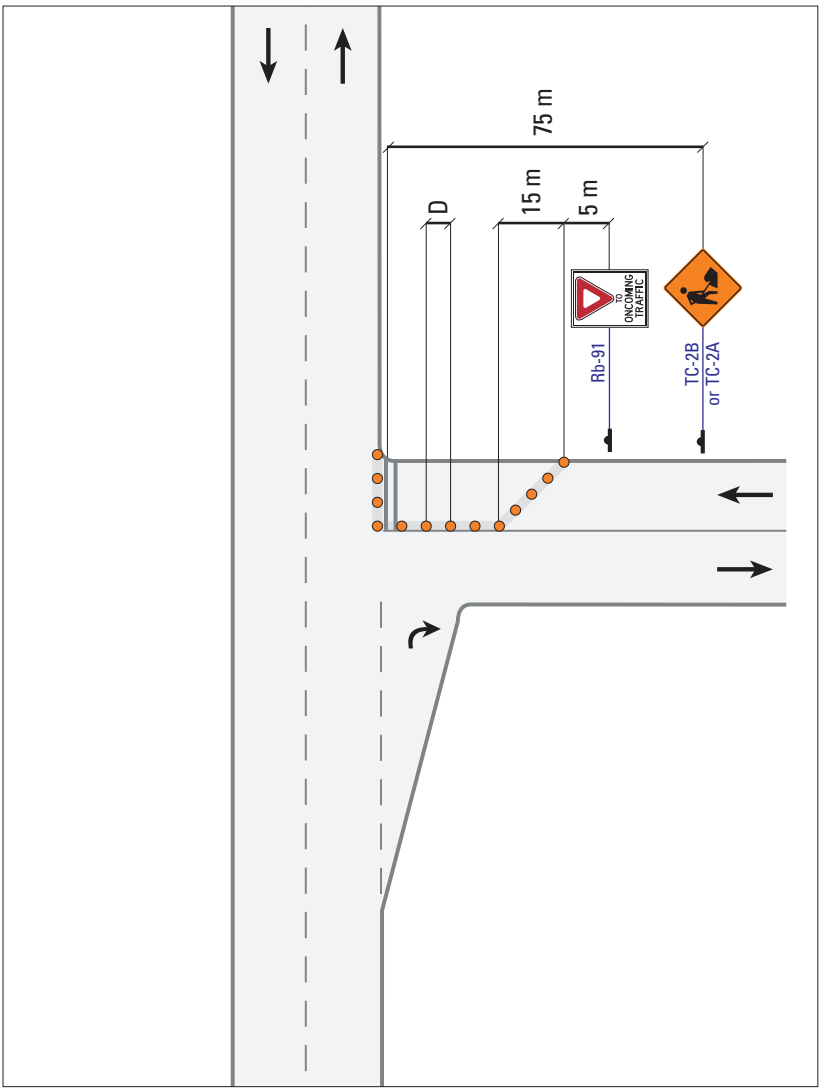
Label	Description	Normal Posted Regulatory Speed (km/h)		
		50	60	70
D	Maximum Distance between Markers (m)	6	6	9
	Minimum Number of Markers for Taper	4	5	5

NOTES

i) Use only on highways with Low Traffic Volume (<3000 vehicles per day) and low speed (<70 km/h).
ii) It may be necessary to paint the stop line and crosswalks in sections to maintain traffic flow.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TI-6 Zone Painting: Intersection Stoplines and Crosswalks



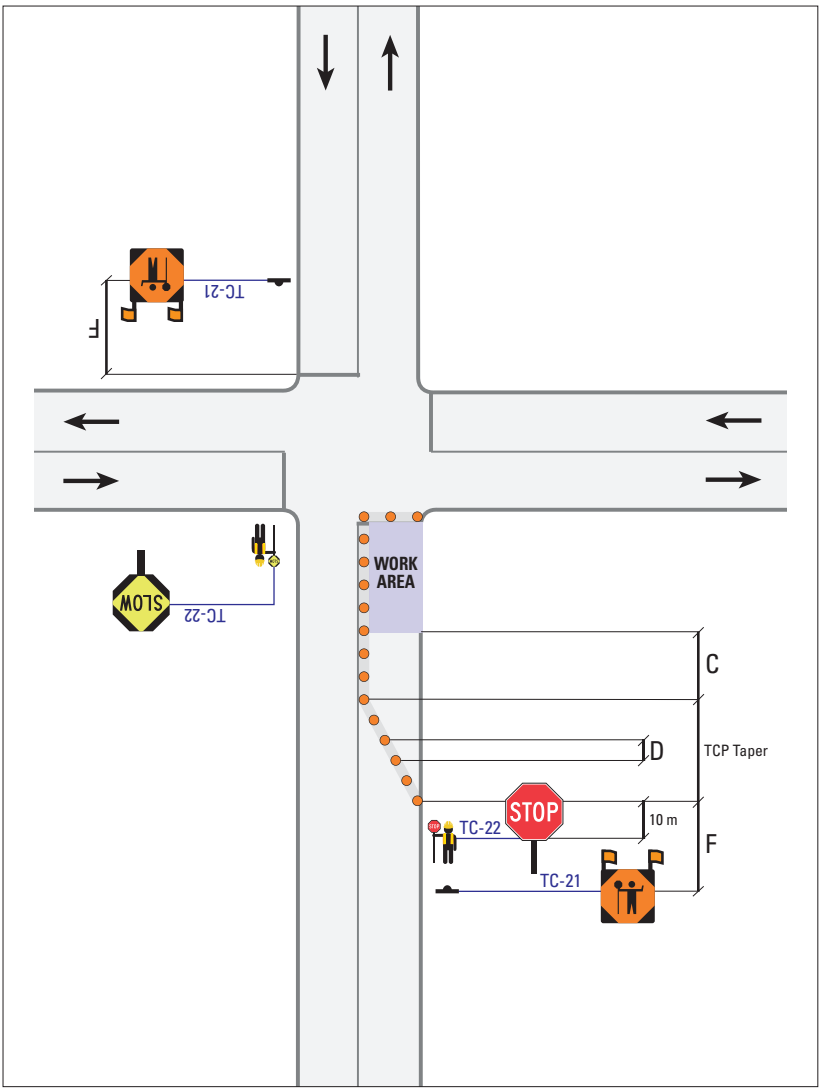
Label	Description	Normal Posted Regulatory Speed (km/h)		
		50	60	70
D	Maximum Distance between Markers (m)	6	9	9
	Minimum Number of Markers for Taper	5	7	9

NOTES

i) Use only on highways with Low Traffic Volume (<3000 vehicles per day) and low speed (<70 km/h).
ii) It may be necessary to paint the stop line and crosswalks in sections to maintain traffic flow.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-7 Zone Painting: Intersection Stoplines and Crosswalks



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

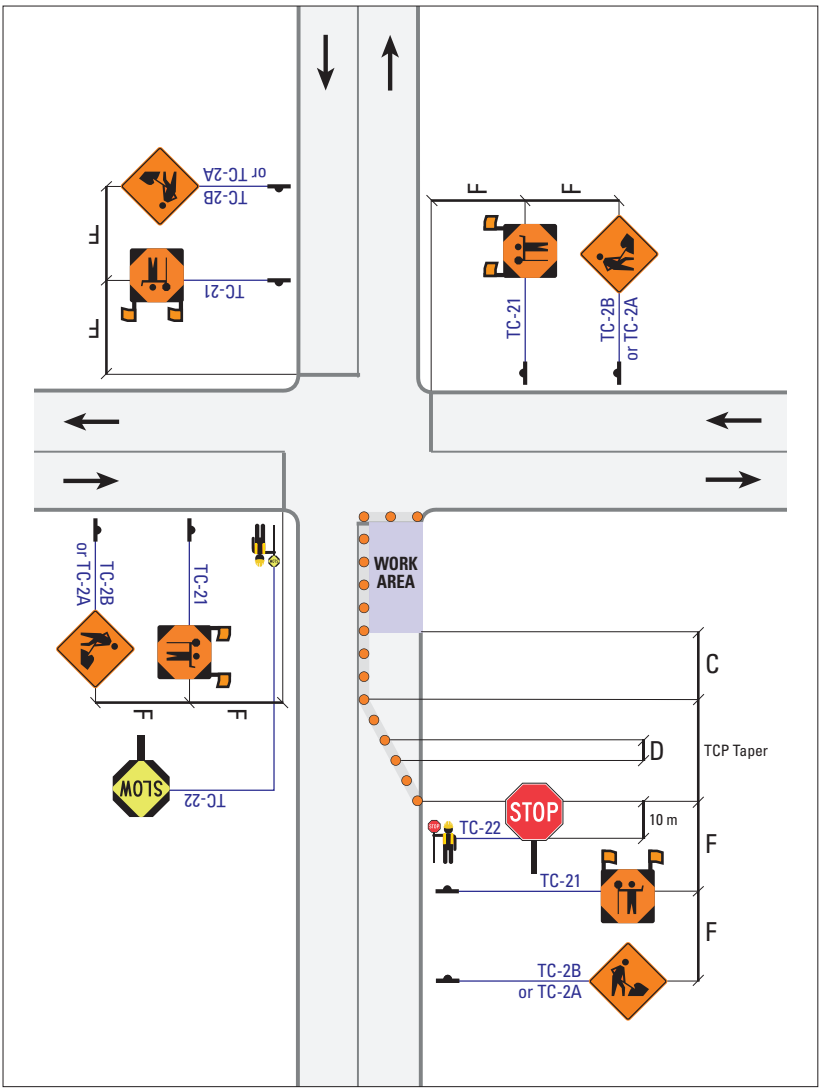
NOTES

i) For Remote Control Device, see TS-19 as an example but this layout will need to be modified for the appropriate duration and highway configuration.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required. Care should be taken by the TCP to coordinate with any intersection control such as traffic signals or STOP signs.

For further detail on Work Zone components see Table A (pg. 4), and TCP Table (pg. 264).

TI-8 **Intersection: Near-Side Lane Closed (TCP)**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

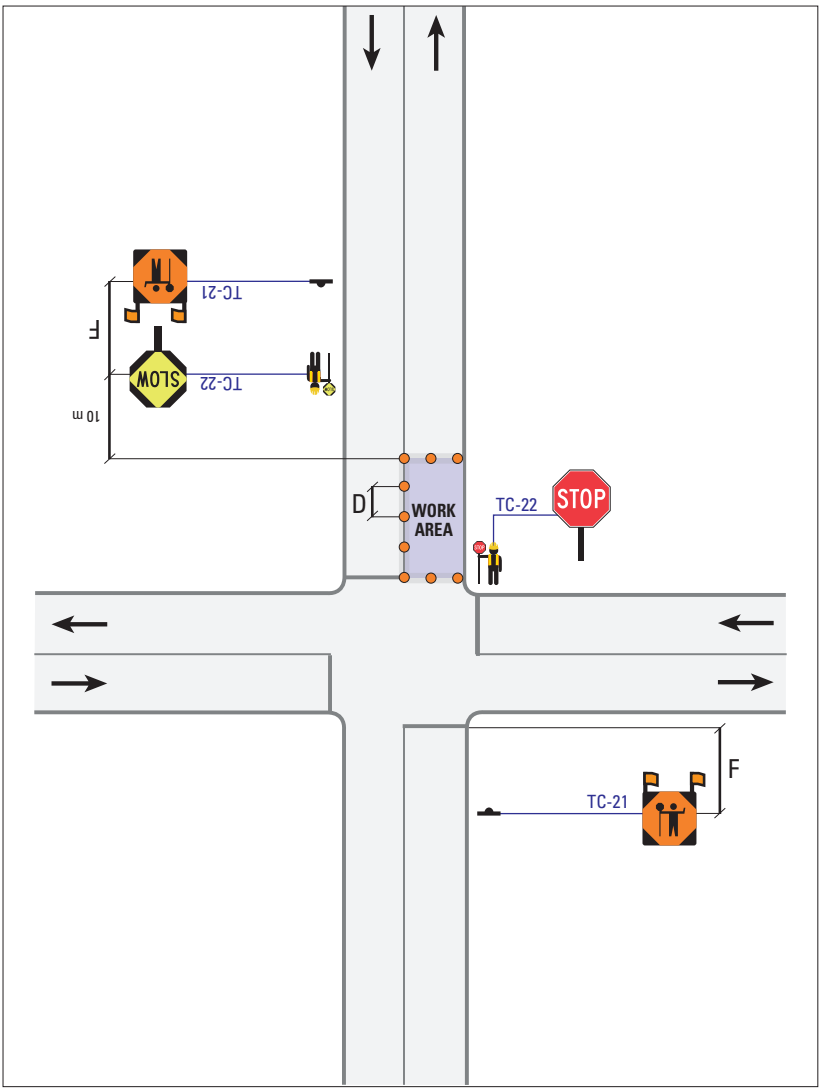
NOTES

i) For Remote Control Device, see TS-19 as an example but this layout will need to be modified for the appropriate duration and highway configuration.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required. Care should be taken by the TCP to coordinate with any intersection control such as traffic signals or STOP signs.

For further detail on Work Zone components see Table B (pg. 6), and TCP Table (pg. 264).

TI-9 **Intersection: Near-Side Lane Closed (TCP)**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	9	12
F	Distance between Construction Signs (m)	30	30	60	60	80

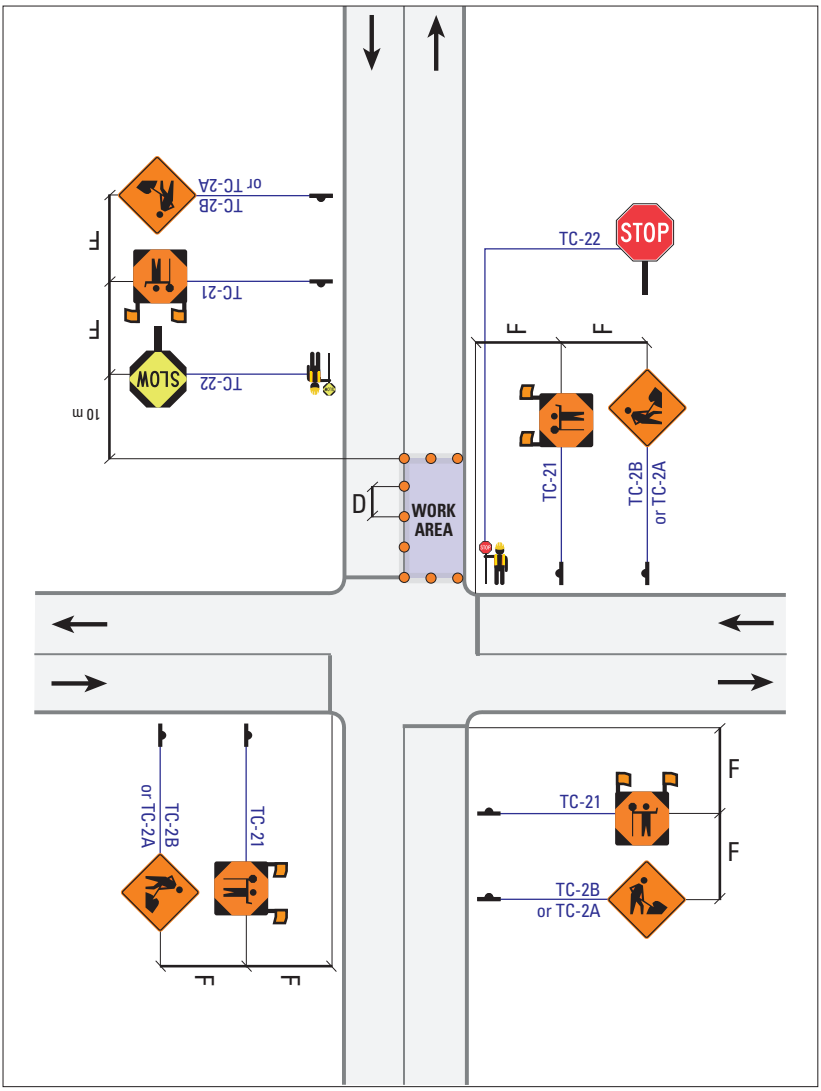
NOTES

i) For Remote Control Device, see TS-19 as an example but this layout will need to be modified for the appropriate duration and highway configuration.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required. Care should be taken by the TCP to coordinate with any intersection control such as traffic signals or STOP signs.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TI-10 Intersection: Far-Side Lane Closed (TCP)



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
F	Distance between Construction Signs (m)	50	90	120	140	150

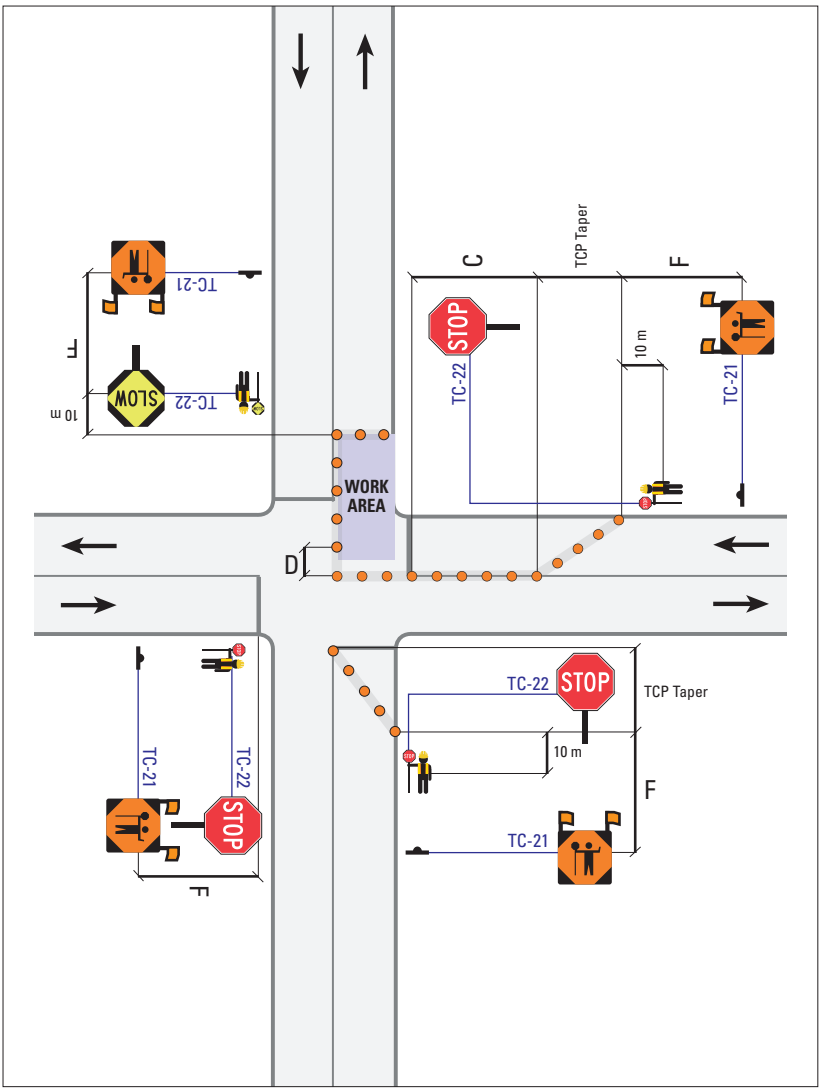
NOTES

i) For Remote Control Device, see TS-19 as an example but this layout will need to be modified for the appropriate duration and highway configuration.

ii) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required. Care should be taken by the TCP to coordinate with any intersection control such as traffic signals or STOP signs.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-11 Intersection: Far-Side Lane Closed (TCP)



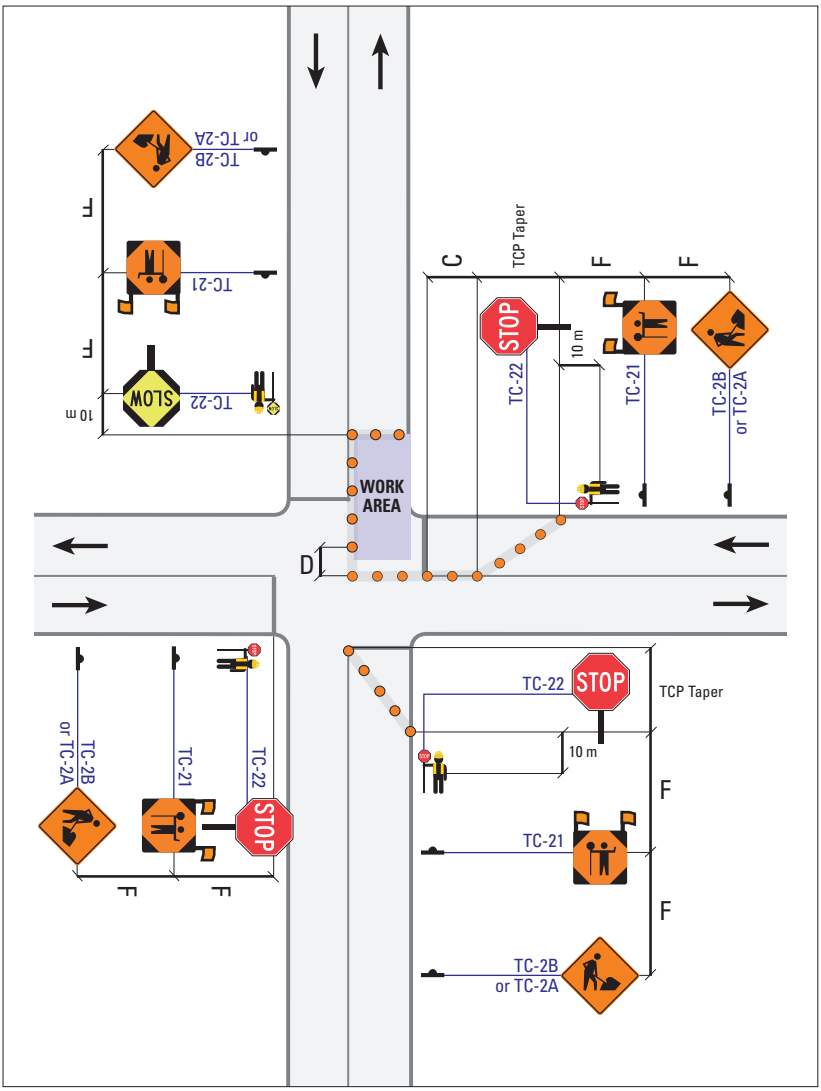
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required. Care should be taken by the TCP to coordinate with any intersection control such as traffic signals or STOP signs.

For further detail on Work Zone components see Table A (pg. 4), and TCP Table (pg. 264).

TI-12 **Work in Intersection: (TCP)**



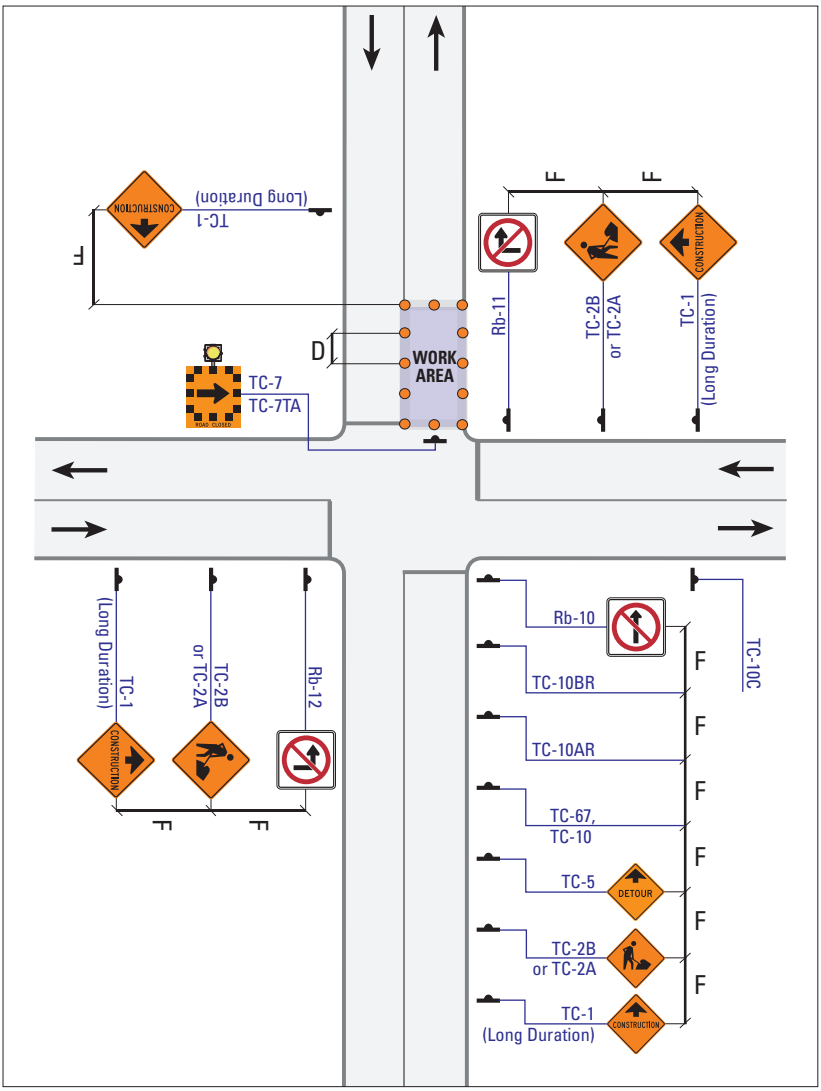
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) When Traffic Volumes are High or when the intersection is signalized, consult the Road Authority to determine whether police assistance is required. Care should be taken by the TCP to coordinate with any intersection control such as traffic signals or STOP signs.

For further detail on Work Zone components see Table B (pg. 6), and TCP Table (pg. 264).

TI-13 **Work in Intersection: (TCP)**



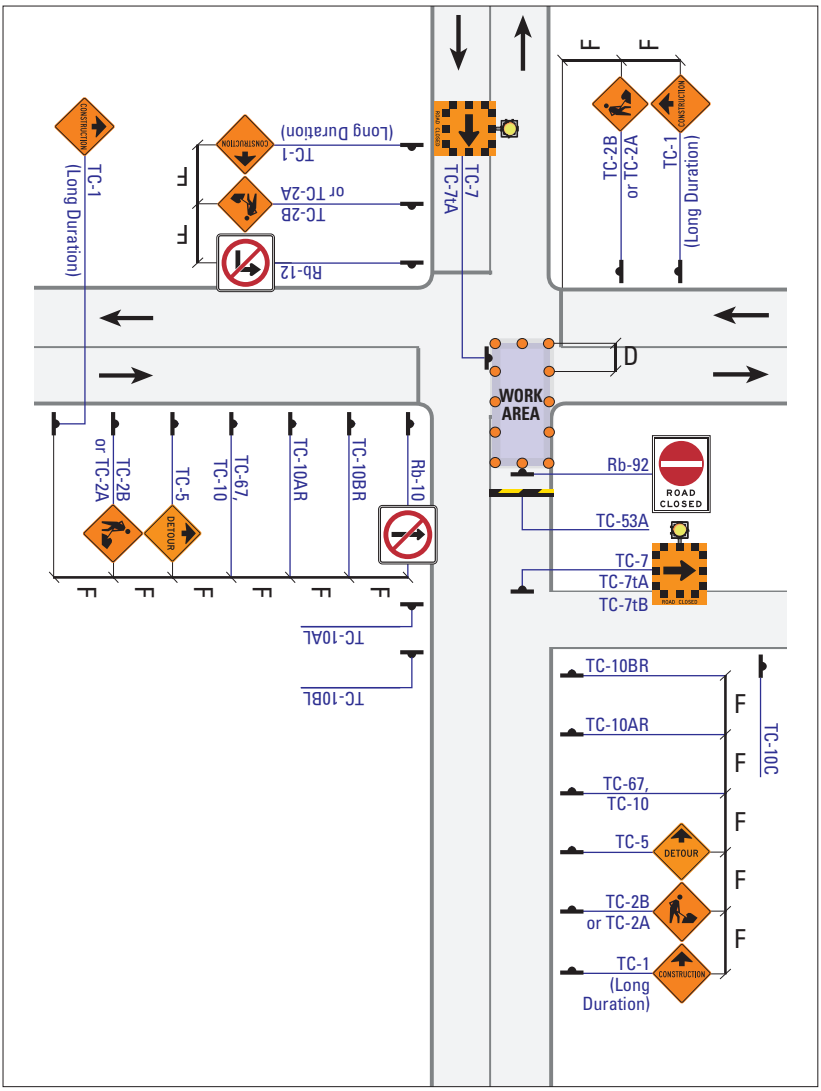
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce space between TC-54.
ii) This layout is to be used if an alternate Route Detour is available; if not, TCP are required and the layout shown in TI-11 should be used.
iii) See TS-21 and TS-22 for Detour signs and layout.
iv) Flashing Amber Light above TC-7 must not be used at intersections with active signals.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-14 Intersection: Far-Side Lane Closed (Detour)



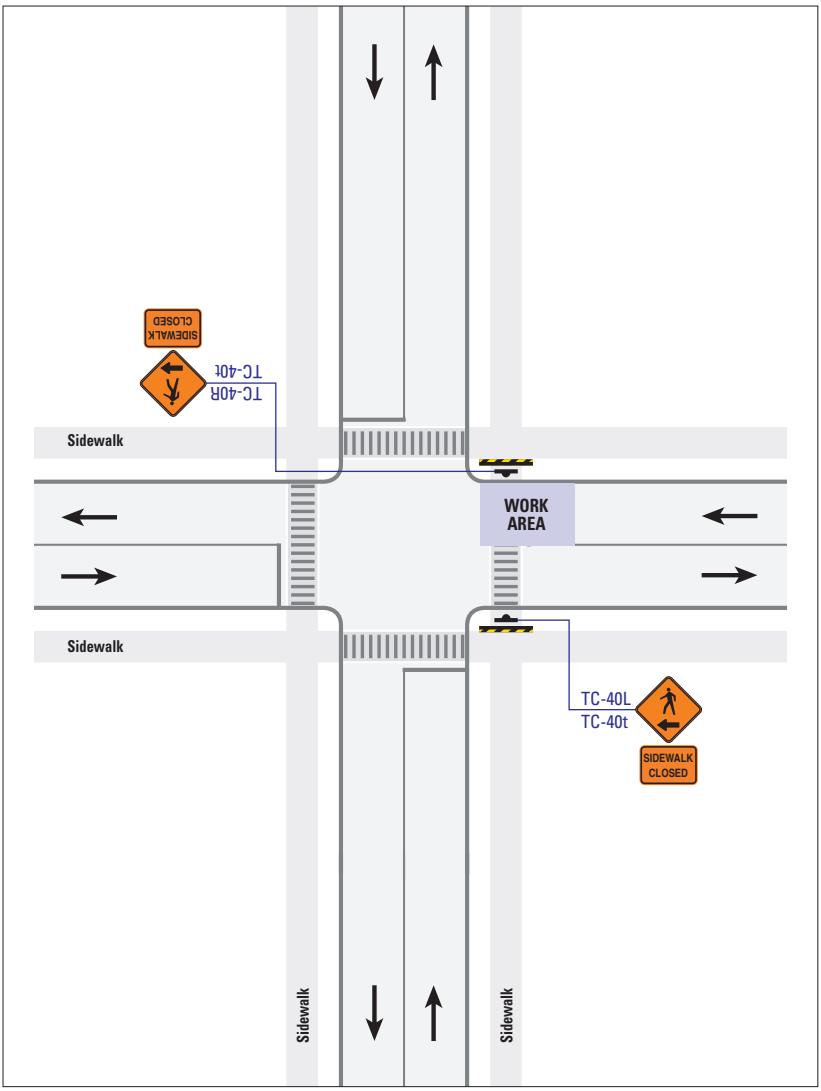
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce space between TC-54.
ii) This layout is to be used if an alternate Route Detour is available; if not, TCP are required and the layout shown in TI-11 should be used.
iii) See TS-21 and TS-22 for Detour signs and layout.
iv) Flashing Amber Light above TC-7 must not be used at intersections with active signals.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-15 Work in Intersection: Near-Side Lane Closed (Detour)

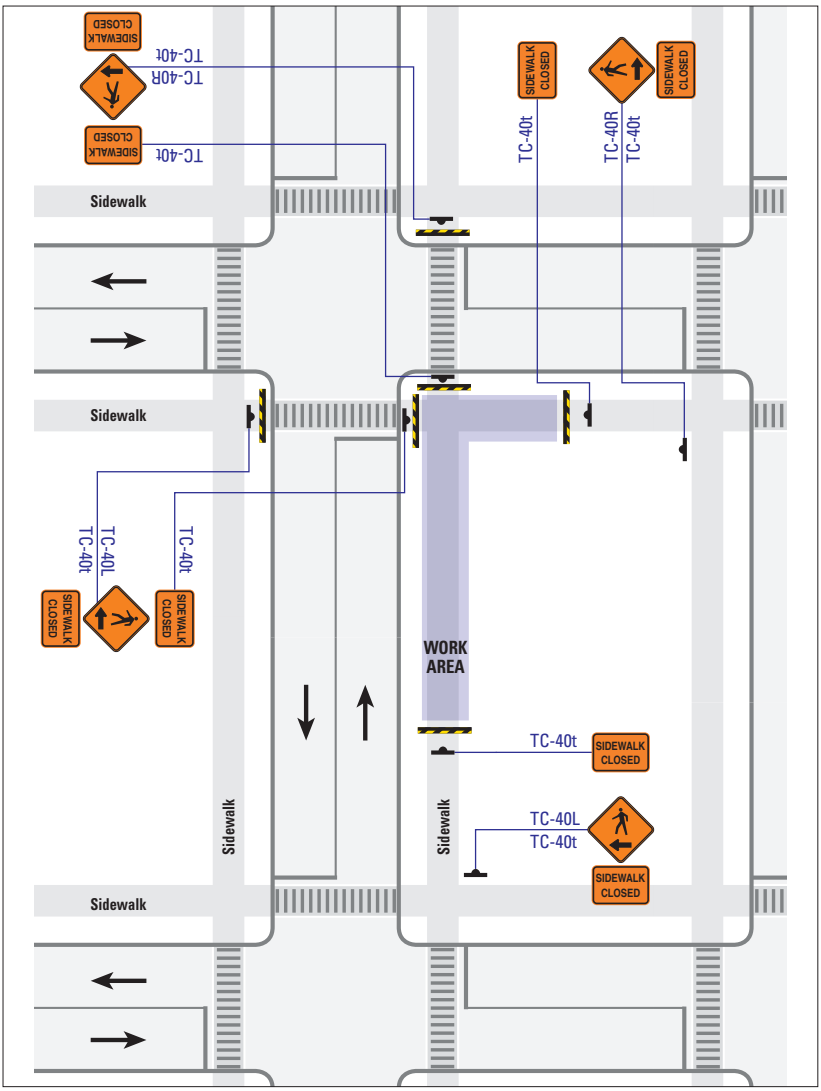


NOTES

i) Supplementary layout. This layout shows pedestrian signage only and shall be used in conjunction with other appropriate layouts.
ii) See TS-21, TS-22, and TI-9 for required signage for vehicle Detour.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-16 Pedestrian Detour: Crosswalk Closure

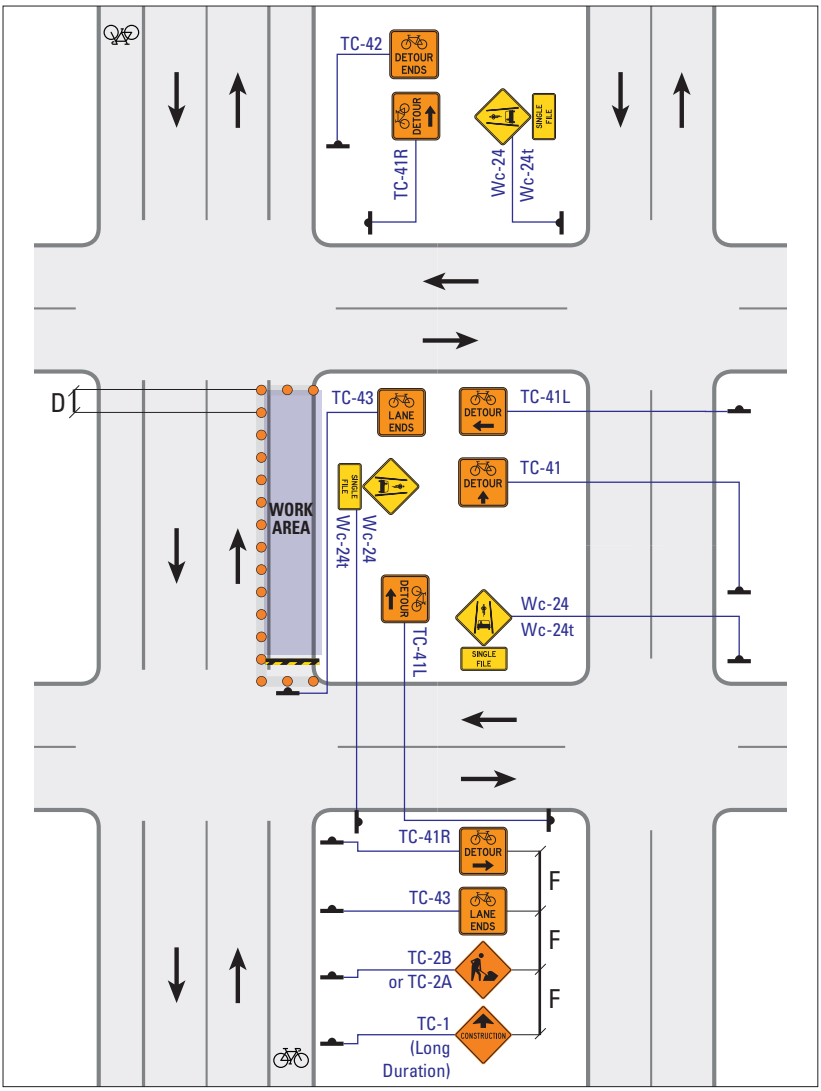


NOTES

i) TC-40L/R Pedestrian Direction sign must be placed at the nearest upstream controlled pedestrian crossing (traffic signal or Pedestrian Crossover) in each direction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-17 **Pedestrian Detour: Crosswalk and Sidewalk Closure**



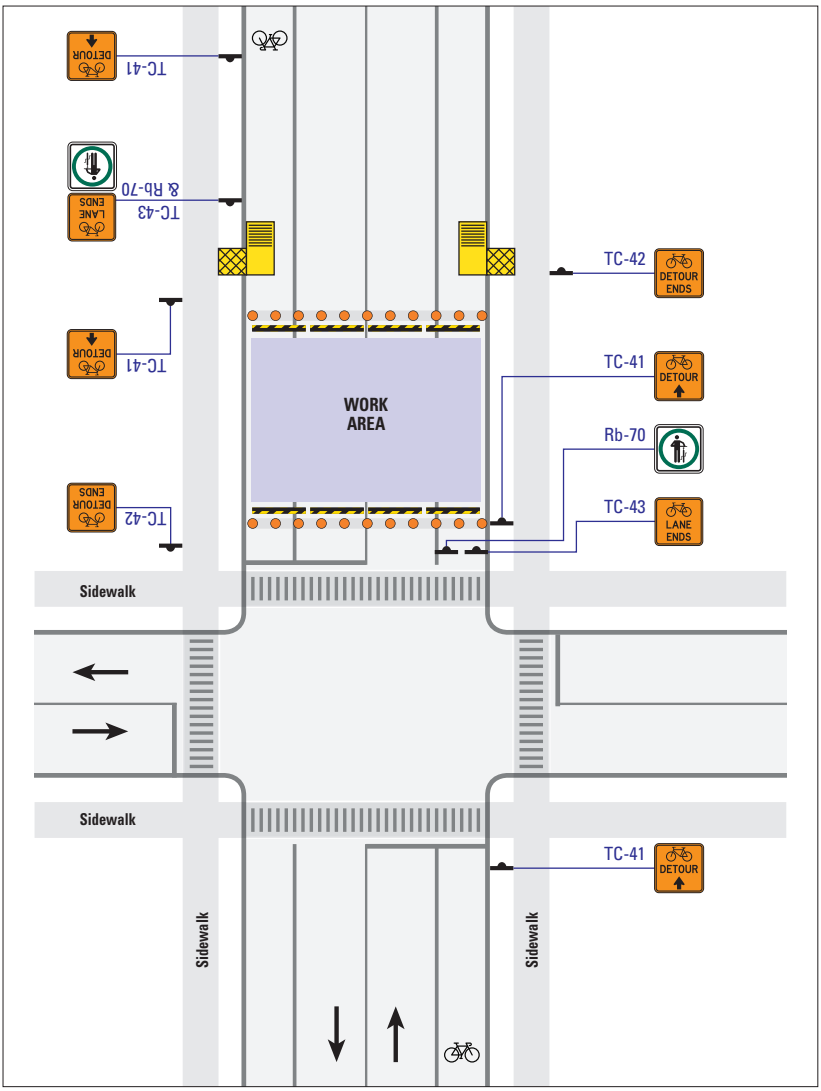
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

Shared lane only to be used if considered by OTM Book 18 or MTO Bikeways Design Manual, Desirable Cycling Facility Nomograph. Otherwise, cycling Detour should be provided.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-18 **Cyclist: Detour**

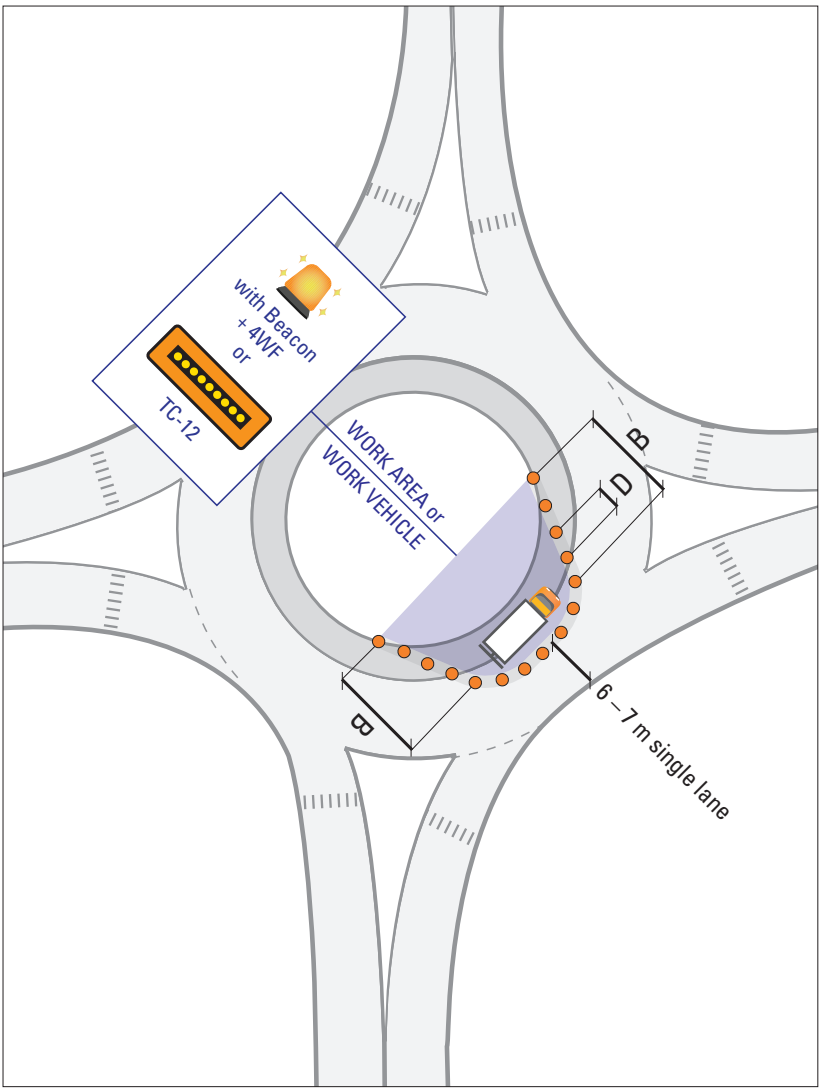


NOTES

i) Supplementary layout. This layout shows cyclist signage only and shall be used in conjunction with other appropriate layouts.
ii) See TS-21 & TS-22 for required signage for vehicle Detour.
iii) Ramps must be AODA-compliant.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TI-19 **Bicycle Lane Closed: Dismount and Walk**



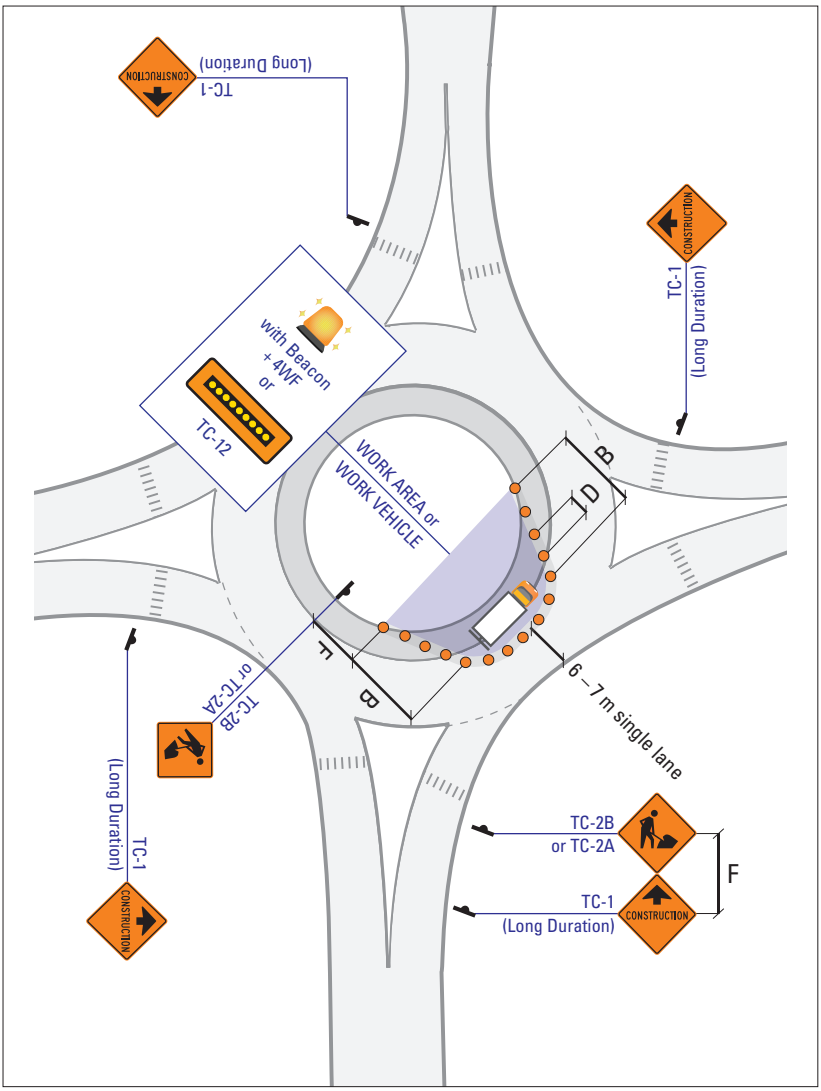
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Total width of 6 m must be maintained. If minimum lane widths cannot be maintained then see Lane Closure layouts.
iii) Markers are not required if a Work Vehicle with Beacon + 4WF or TC-12 is present.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

TO-1 **Roundabout: Encroachment**



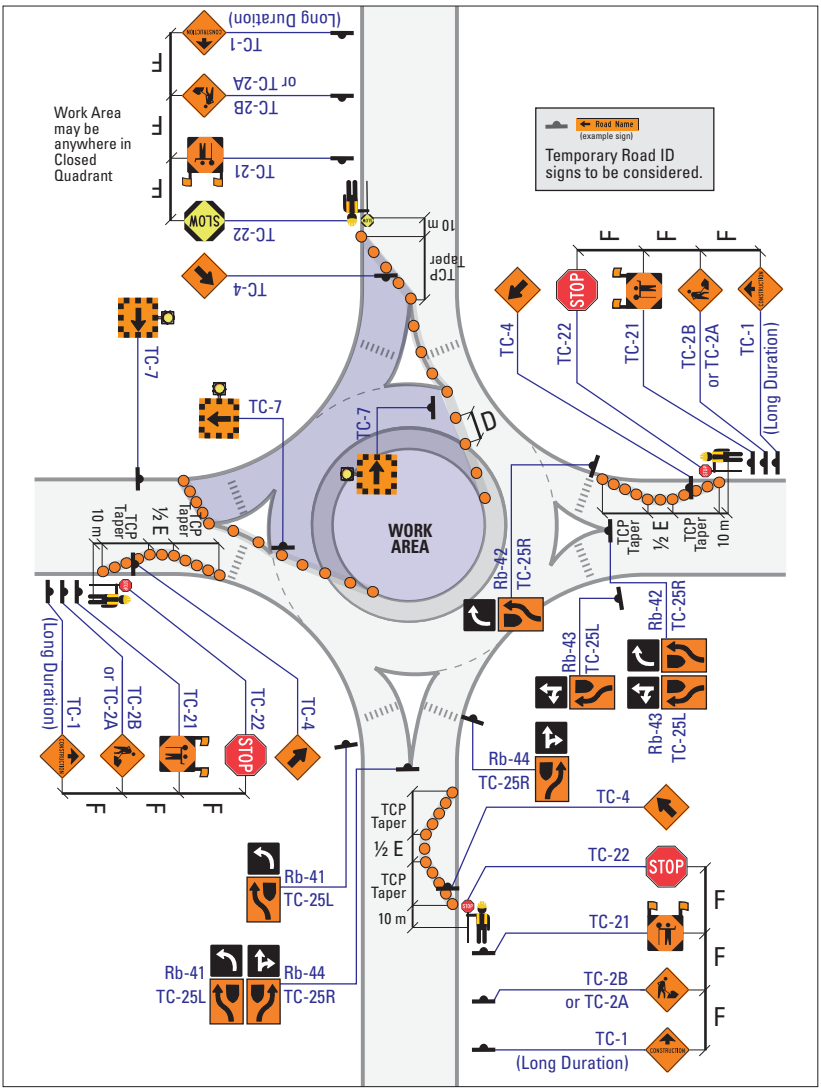
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Total width of 6 m must be maintained. If minimum lane widths cannot be maintained then see Lane Closure layouts.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TO-2 Roundabout: Encroachment



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
TCP	Taper Length for TCP Presence (m)	15	20	25	30	30
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) TCP must be in communication with each other to ensure only one entrance has a TC-22 showing SLOW at any time. TCP must be present at all times.

ii) Roundabout must be cleared before next entrance has SLOW indication.

iii) For Long Duration, TC-1 is required distance F in advance of the TC-2A or TC-2B on each approach. For Long Duration, TC-1A is also required on Rural Highways and/or if the NPRS is 70 km/h or higher.

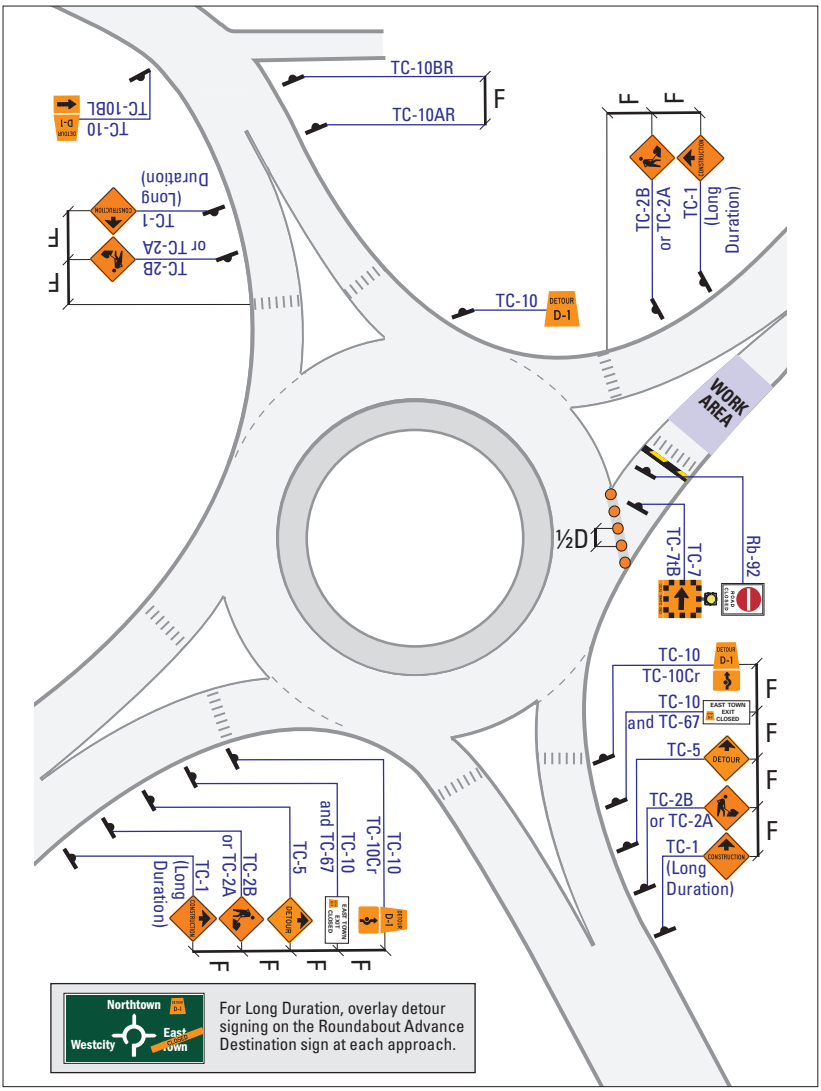
iv) Use of AFAD or PLCS is NOT permitted.

v) Permanent signs (such as Rb-21, Rb-19, Rb-20, Rb-25, and overhead guide signs) that may conflict with the direction of travel the motorist is being directed must be covered. Permanent signing must be restored once contractor leaves site.

vi) Any existing signs that contradict or that are duplicated should be covered.

For further detail on Work Zone components see Table B (pg. 6), and TCP Table (pg. 264).

TO-3 Roundabout: Quadrant Closed (Traffic Control Persons)



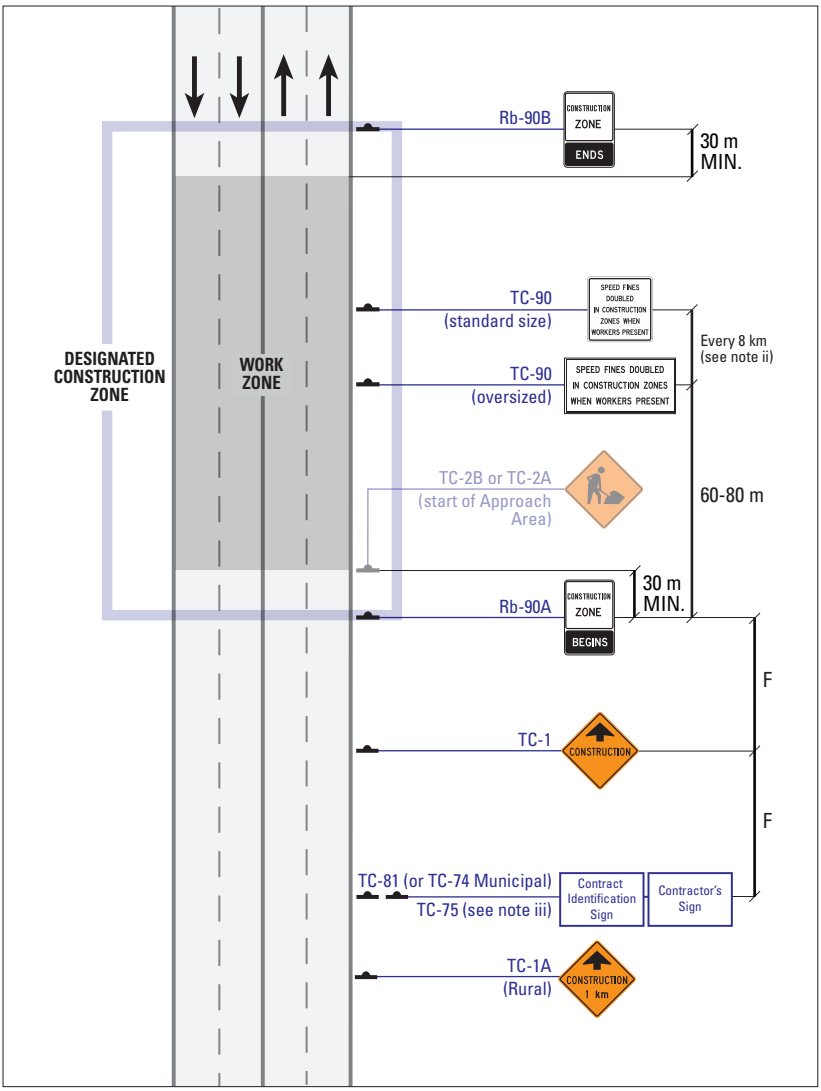
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) See TS-21 and TS-22 for Detour signing in advance and beyond the Roundabout.
ii) Any existing signs that contradict or that are duplicated should be covered.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

TO-4 Roundabout: One Exit Closed (Detour)



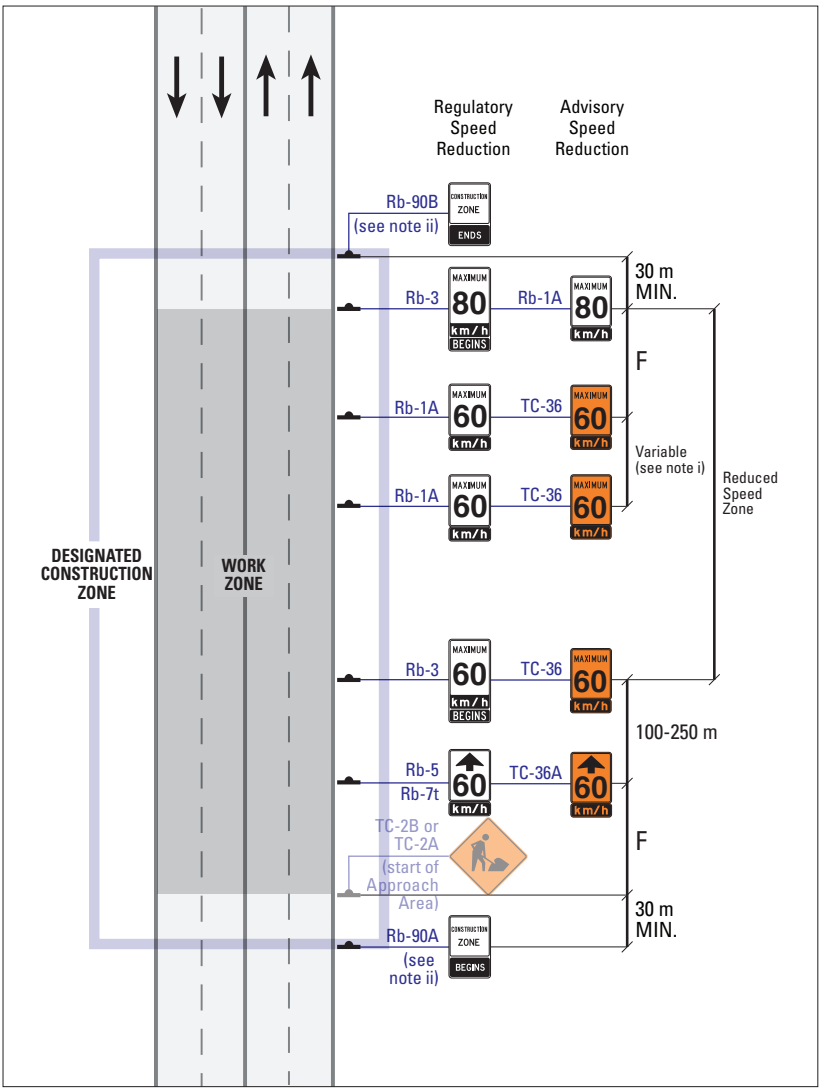
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) The same signing is required in the opposite direction.
ii) Recommended, but not required.
iii) Where required by contract.
iv) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts. Locations of TC-1, TC-1A, TC-1B shown in UG-1 overrides the locations shown in other layouts when used in conjunction with UG-1.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UG-1 Designated Construction Zone Signing



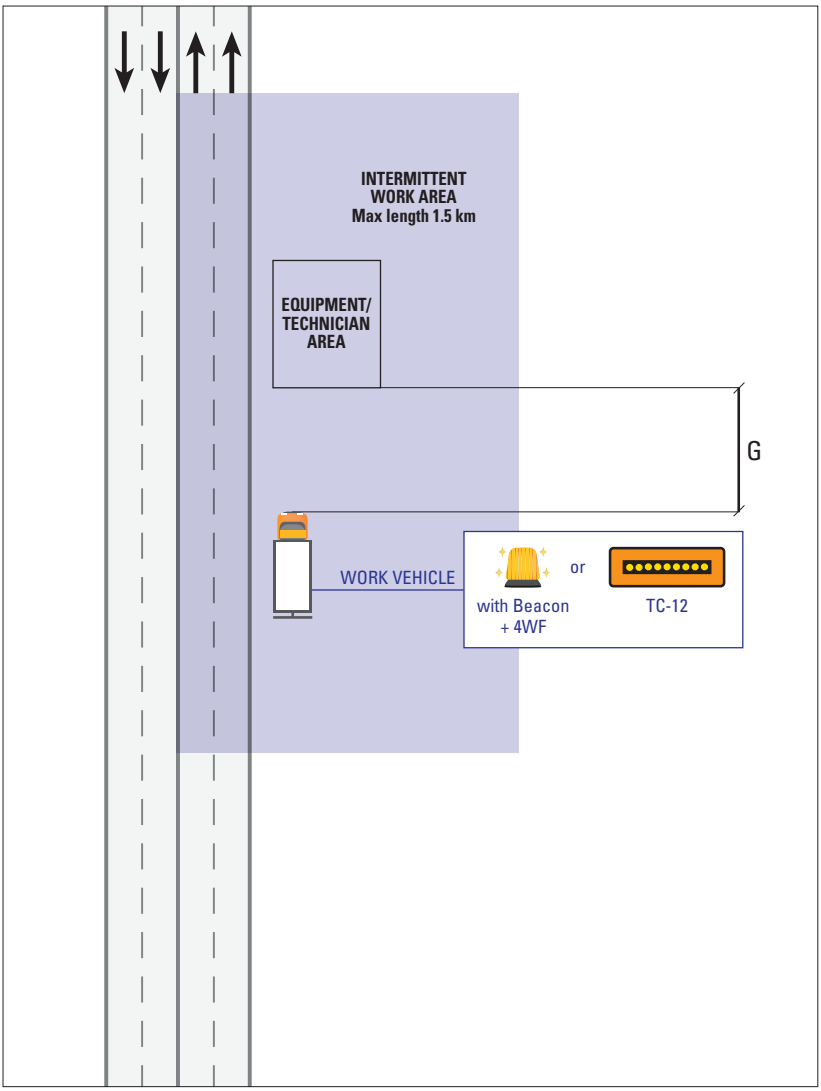
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Refer to Regulation 615 of the Highway Traffic Act and OTM Book 5 for distance between regulatory speed limit signs.
ii) For Regulatory Speed Reduction, a Designated Construction Zone must be established and signed as per UG-1.
iii) Reduced Speed Zone may include all of or only part(s) of the Designated Construction Zone.
iv) Additional signs may be required based on the length of zone.
v) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UG-2 Reduced Speed Zone Signing



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H	Sight Distance (m)	150	150	200	250	250

NOTES

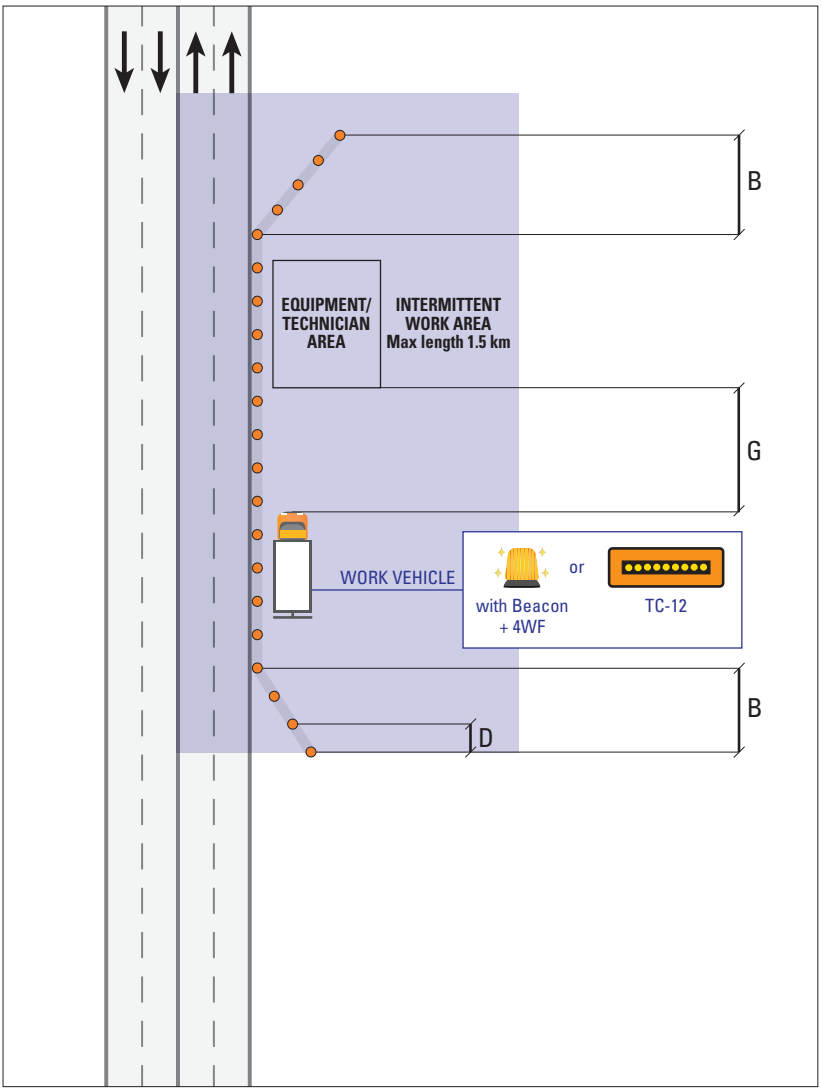
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-1 **Intermittent Work**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H	Sight Distance (m)	150	150	200	250	250

NOTES

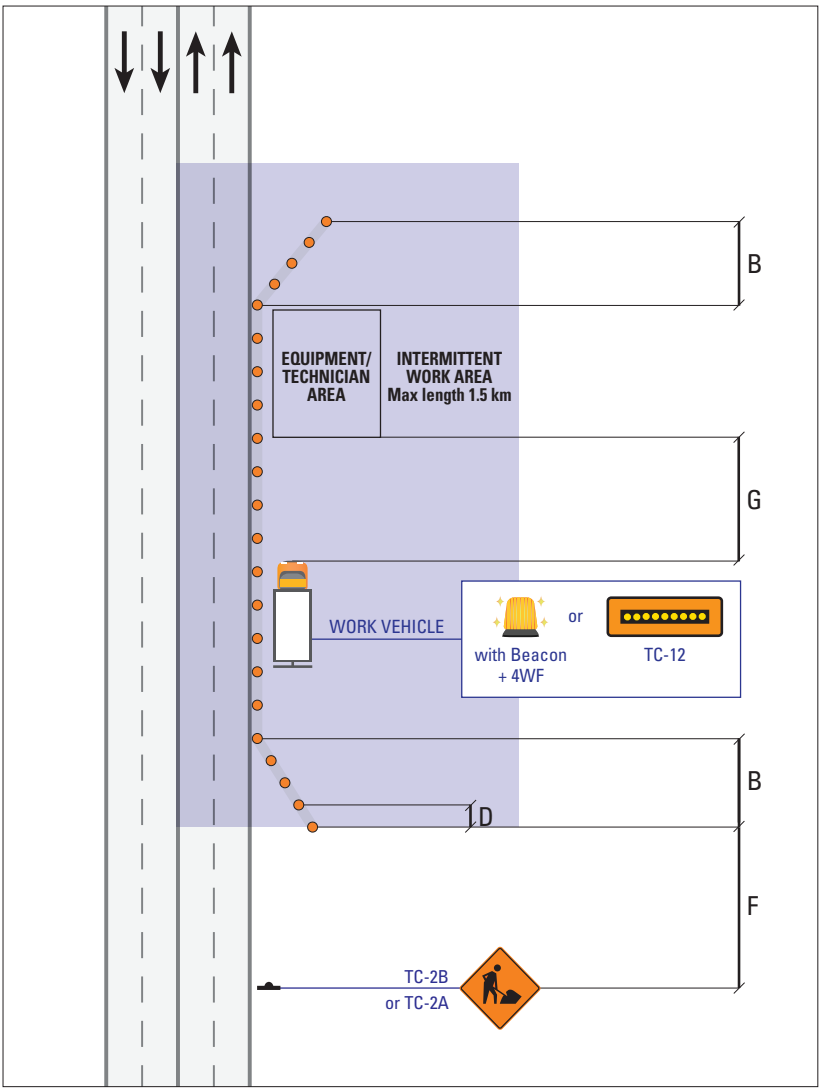
i) A Work Vehicle with a TC-12 may replace Markers.

Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, debris cleanup:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) A Work Vehicle with a TC-12 may replace Markers.

Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, surveying:

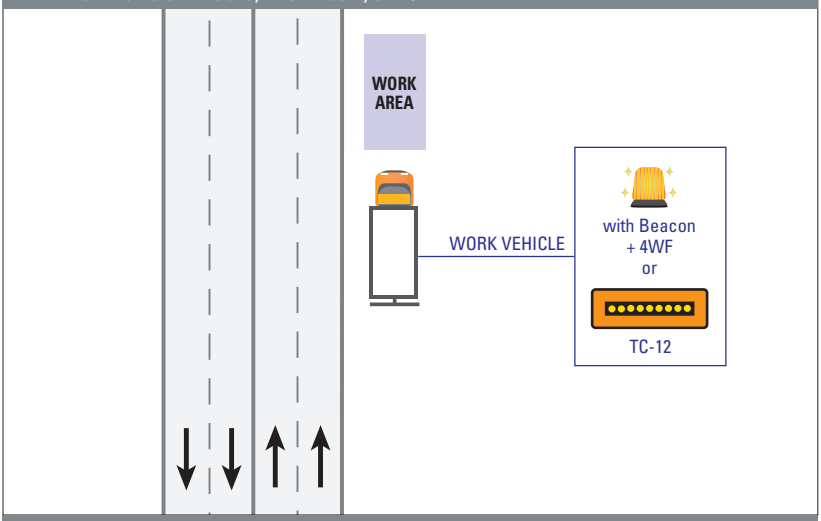
- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

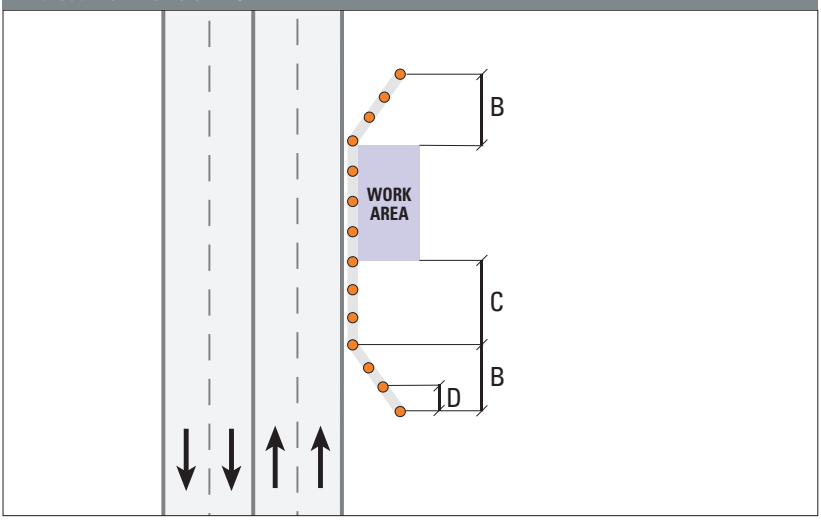
For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-3 Intermittent Work

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD

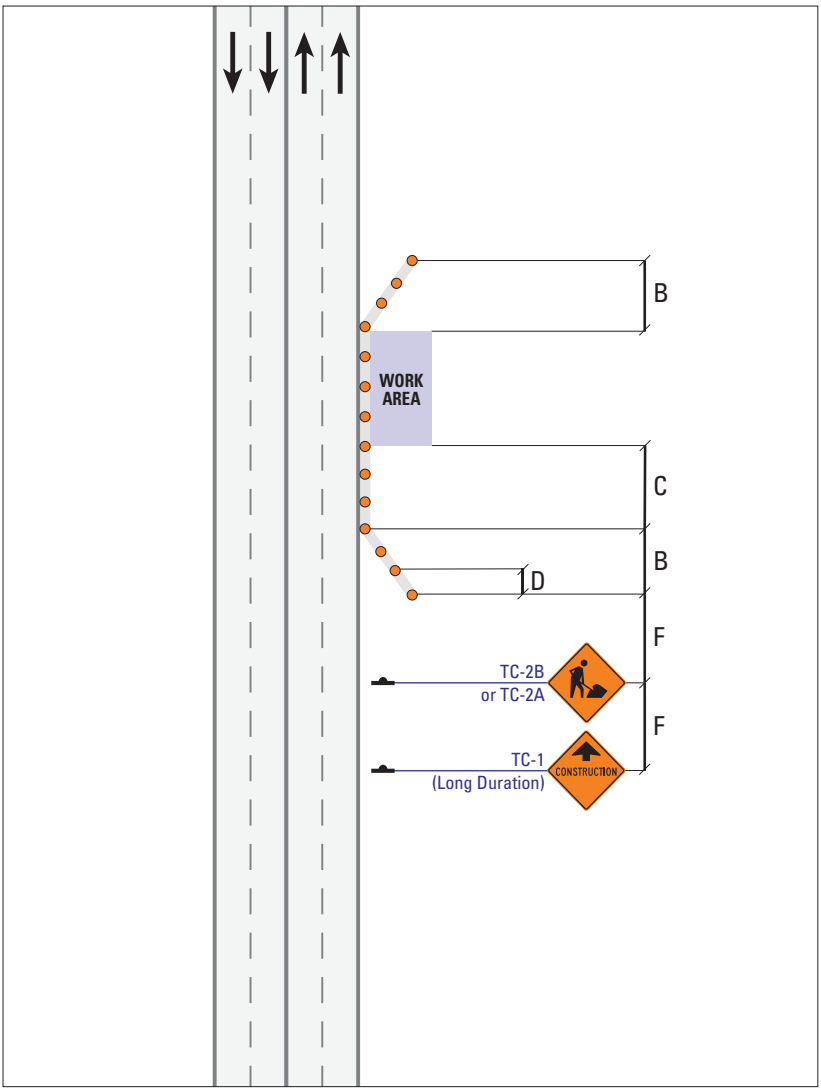


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Termination Taper optional.
ii) When a vehicle on shoulder with TC-12 enters a live lane, the TC-12 in bar mode must be switched to arrow mode.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



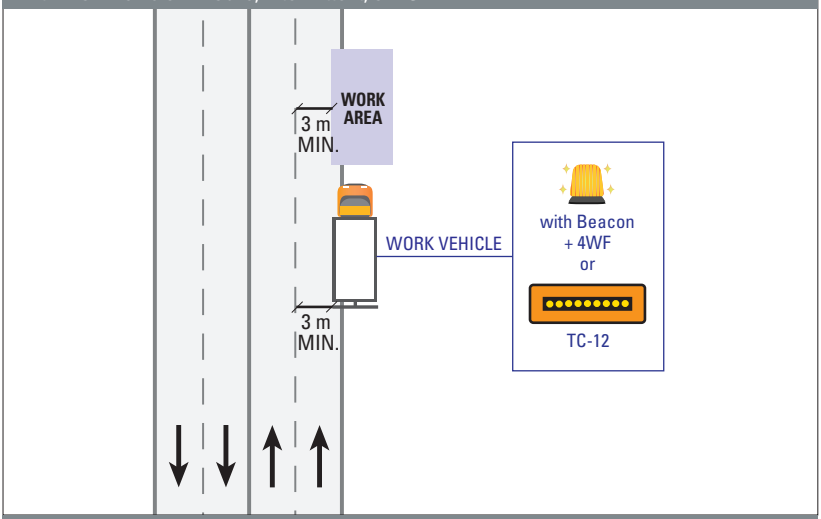
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

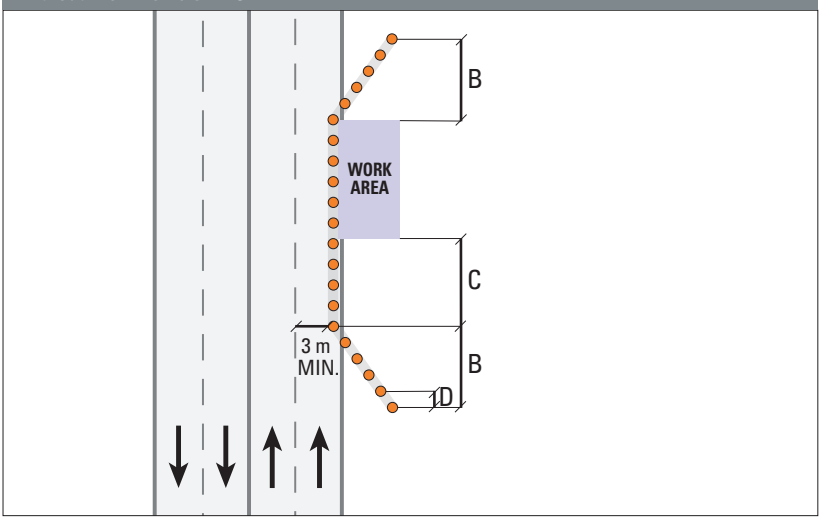
i) Termination Taper optional.
ii) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.
iii) A Work Vehicle with a TC-12 may replace Markers for Short Duration work.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD



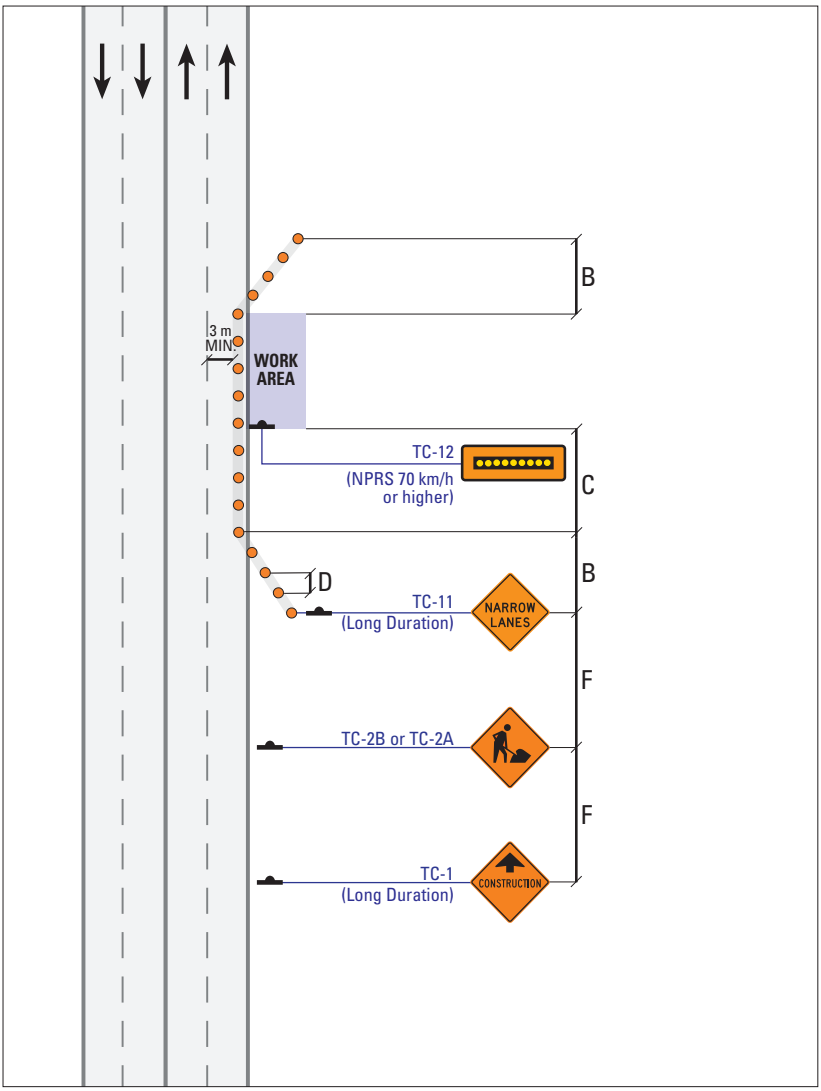
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Termination Taper optional.
ii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-6 **Lane Encroachment**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

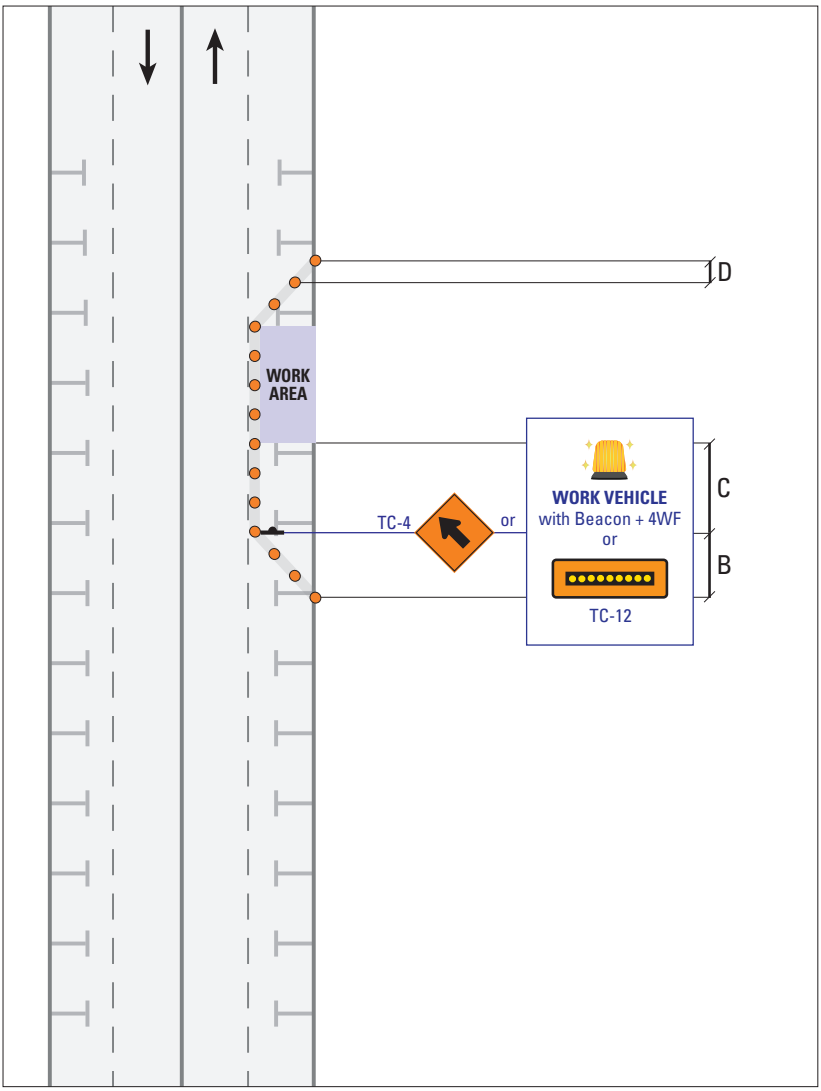
i) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.

ii) A Work Vehicle with a TC-12 may replace Markers for Short Duration work where NPRS is 60 km/h or lower.

iii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-7 **Lane Encroachment**



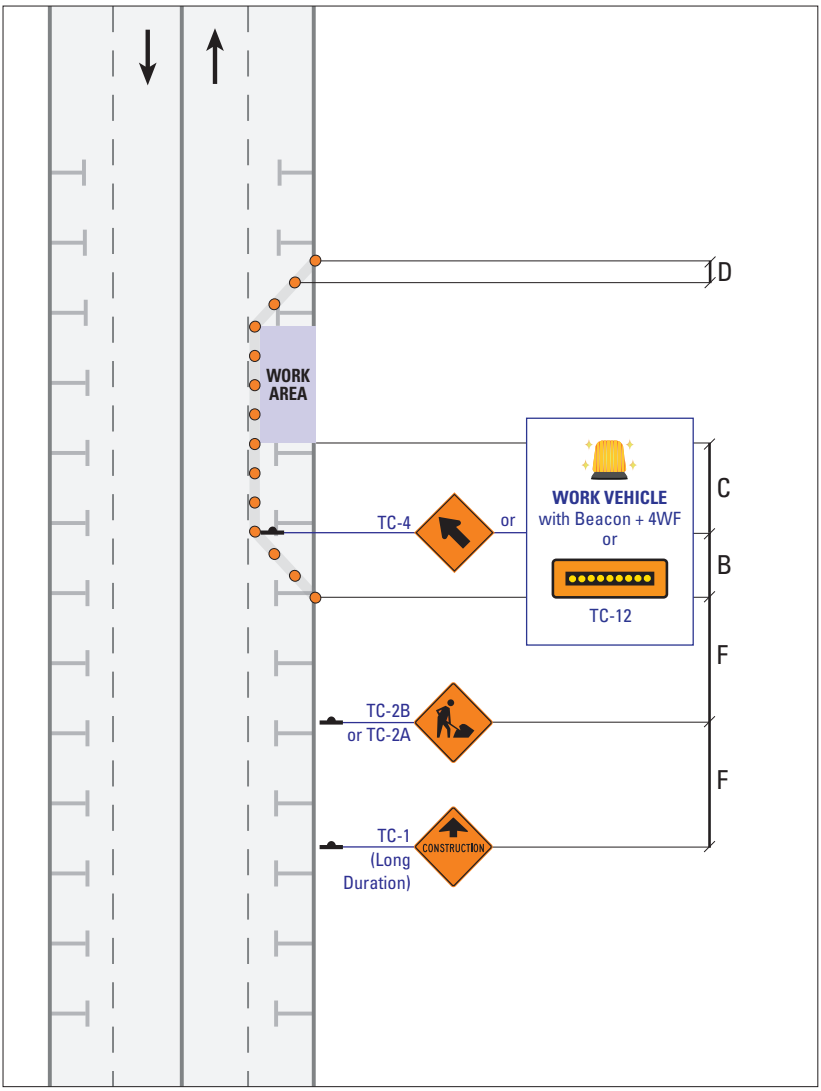
		Normal Posted Regulatory Speed (km/h)			
Label	Description	50	60	70	80
B	Shoulder Taper (m)	20	30	35	35
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60
D	Maximum Distance between Markers (m)	6	6	9	9
	Minimum Number of Markers for Taper	4	5	5	7

NOTES

i) A Work Vehicle with Beacon + 4WF or a TC-12 in bar mode can replace Markers.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-8 Parking Lane Closed



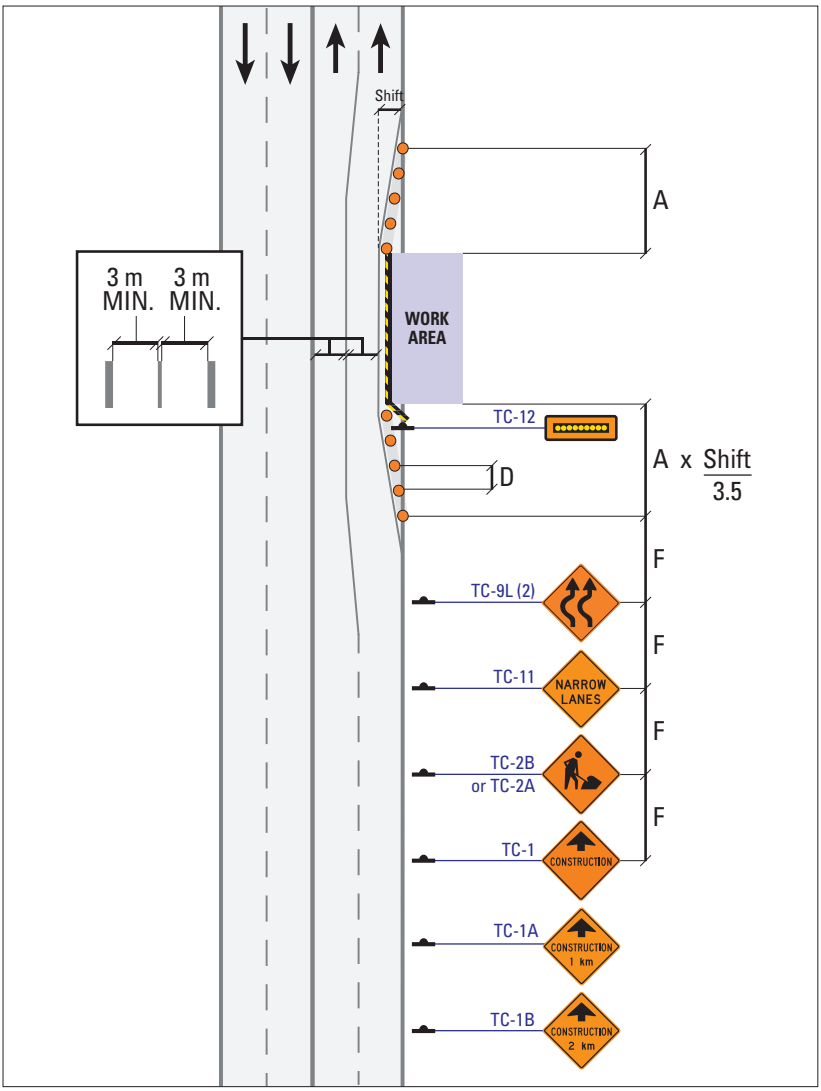
		Normal Posted Regulatory Speed (km/h)			
Label	Description	50	60	70	80
B	Shoulder Taper (m)	20	30	55	60
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60
D	Maximum Distance between Markers (m)	6	9	9	12
	Minimum Number of Markers for Taper	5	7	9	11
F	Distance between Construction Signs (m)	50	90	120	140

NOTES

i) Placement of TC-1 or TC-2 may need to be adjusted if visibility is obstructed due to parked vehicles.
ii) For Short Duration work, a Work Vehicle with Beacon + 4WF or a TC-12 in bar mode can replace Markers.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-9 Parking Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

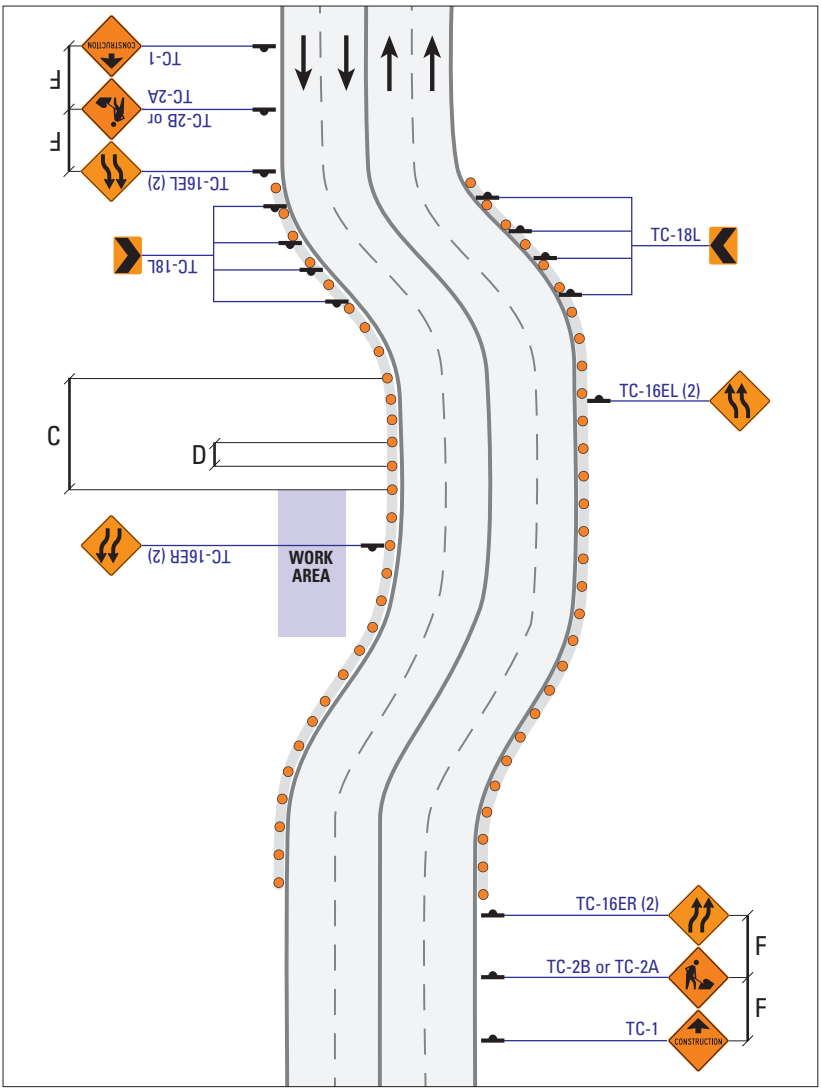
NOTES

i) Minimum lane width is 3 m. Additionally, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

ii) For narrowed lanes exceeding 2 km, use a TC-16EL (ER) in place of the TC-9L (R). Add an additional TC-16ER (EL) at the beginning of end Taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-10 Partial Lane Shift: Narrow Lanes



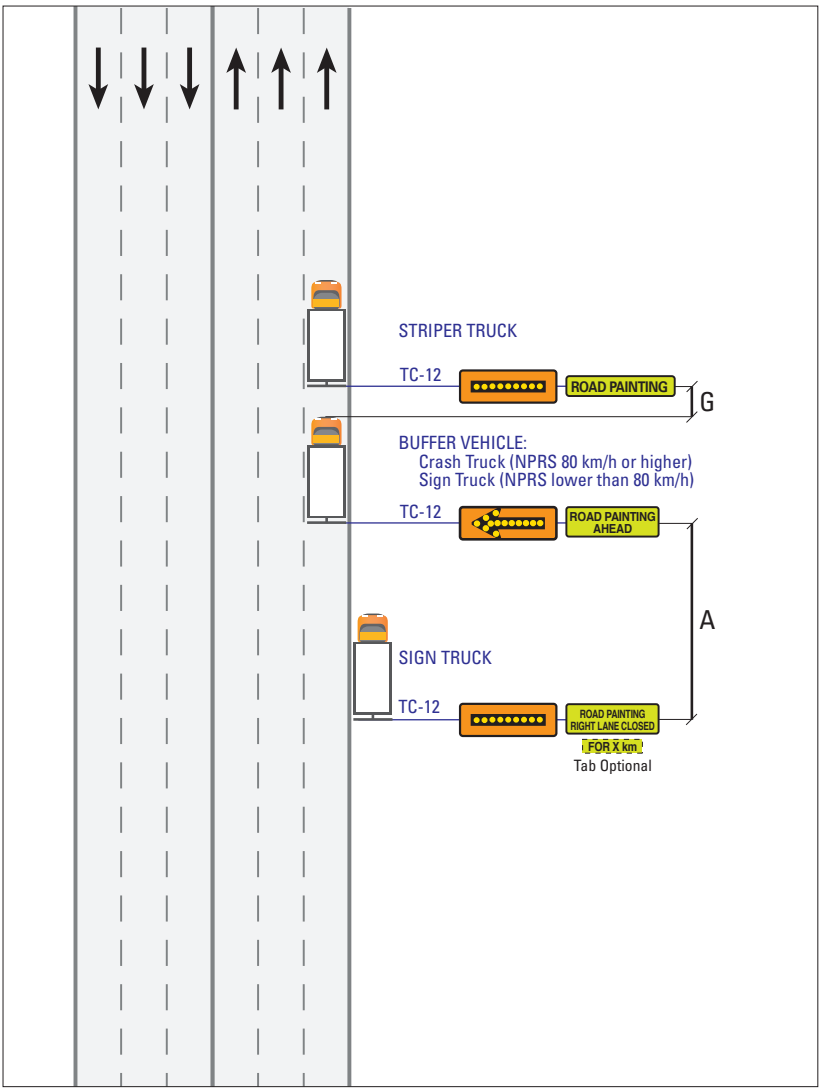
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Refer to OTM Book 6 for the appropriate placement of TC-18L.
ii) Markers used for additional Delineation through Tangent on the far-side of the Work Area are optional.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-11 Lane Realignment



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	–	–	35	45	50

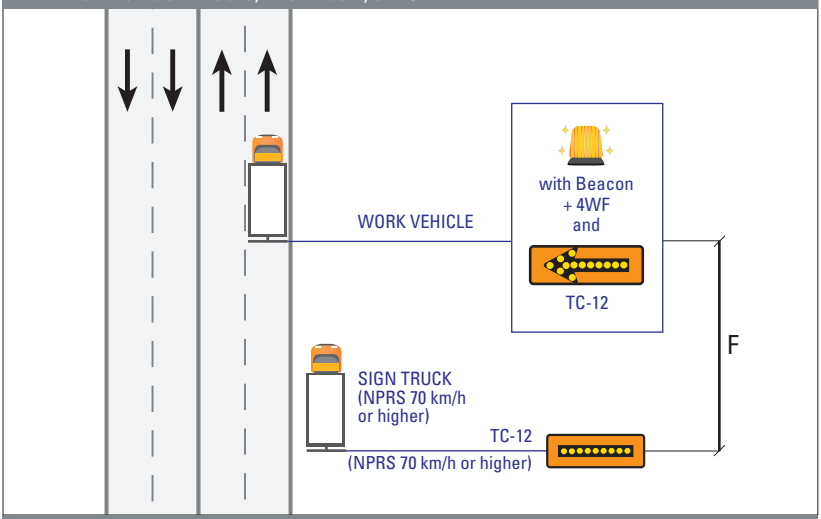
NOTES

i) MTO requirements illustrated. Other Road Authorities may not require a "ROAD PAINTING" information sign.
ii) Sign Truck may be replaced by an approved equivalent VMS.
iii) Where shoulder is intermittent, Sign Truck should drive with traffic flow in arrow mode until shoulder becomes available.
iv) Left Lane Closed mirror image, but the Sign Truck should follow behind, in the same lane as the Buffer Vehicle.
v) The distance between Sign Truck and Buffer Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other specific conditions.

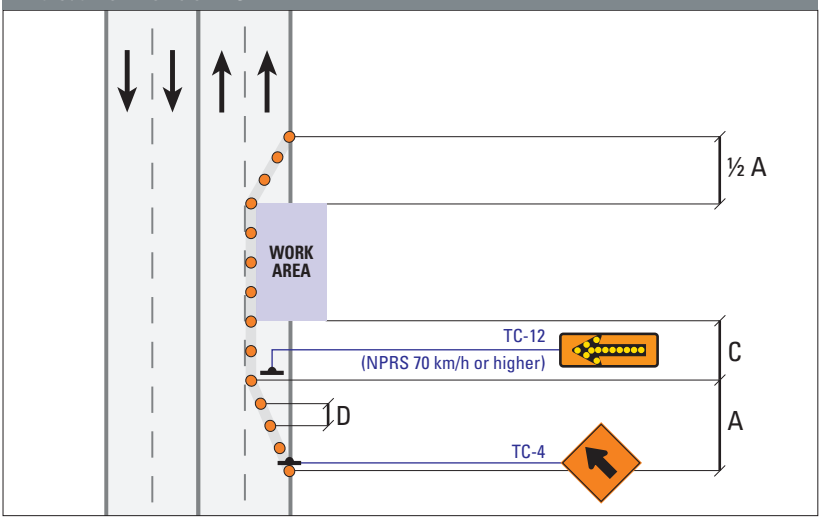
For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-12 Zone Painting: Right or Left Lane Closed

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

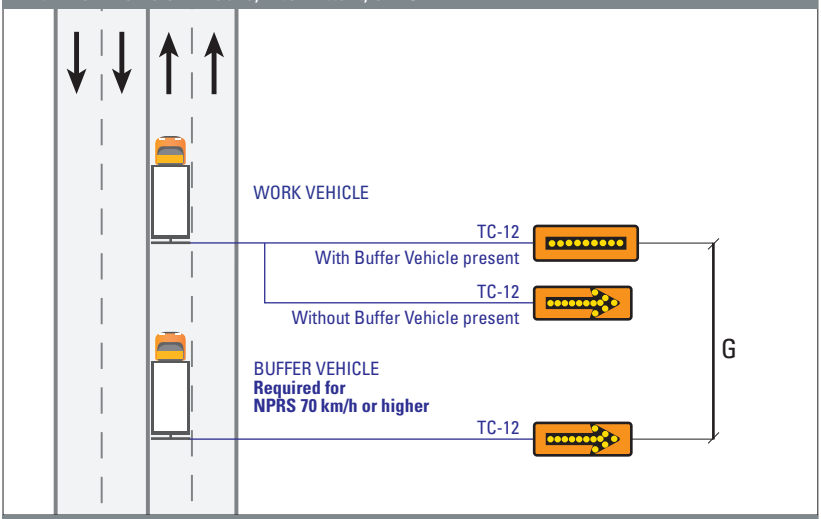
NOTES

i) Distance between Sign Truck and Work Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other site specific conditions.
ii) Where shoulder is intermittent, Sign Truck should drive with traffic flow until shoulder becomes available.
iii) Left Lane Closed, see US-14.

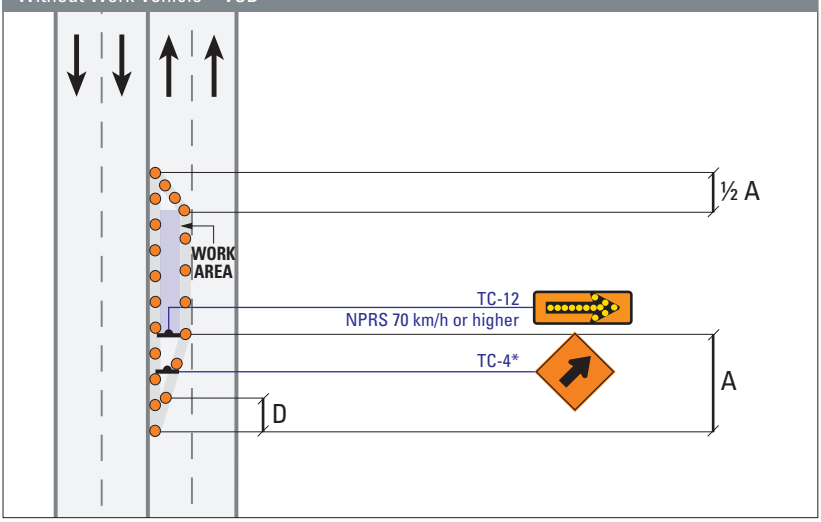
For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-13 Lane Closed or Occupied

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	–	–	35	45	50

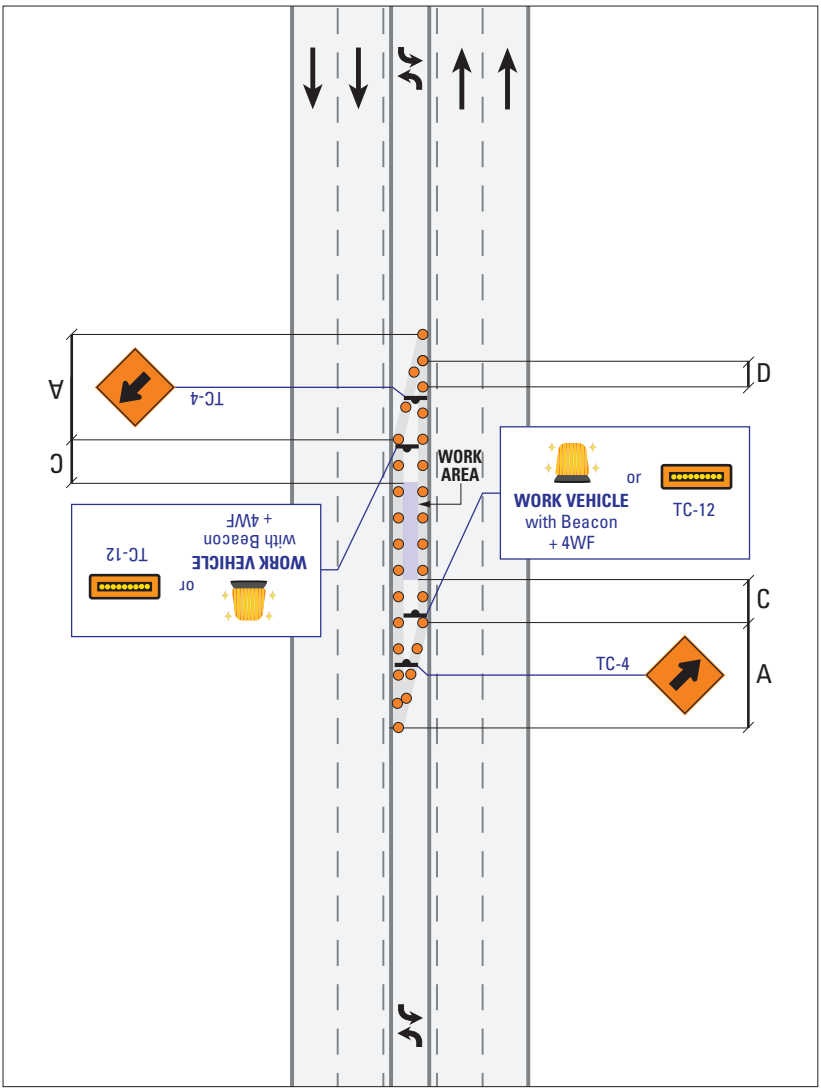
NOTES

i) Distance between Sign Truck and Work Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other site specific conditions.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-14 **Left Lane Closed or Occupied**



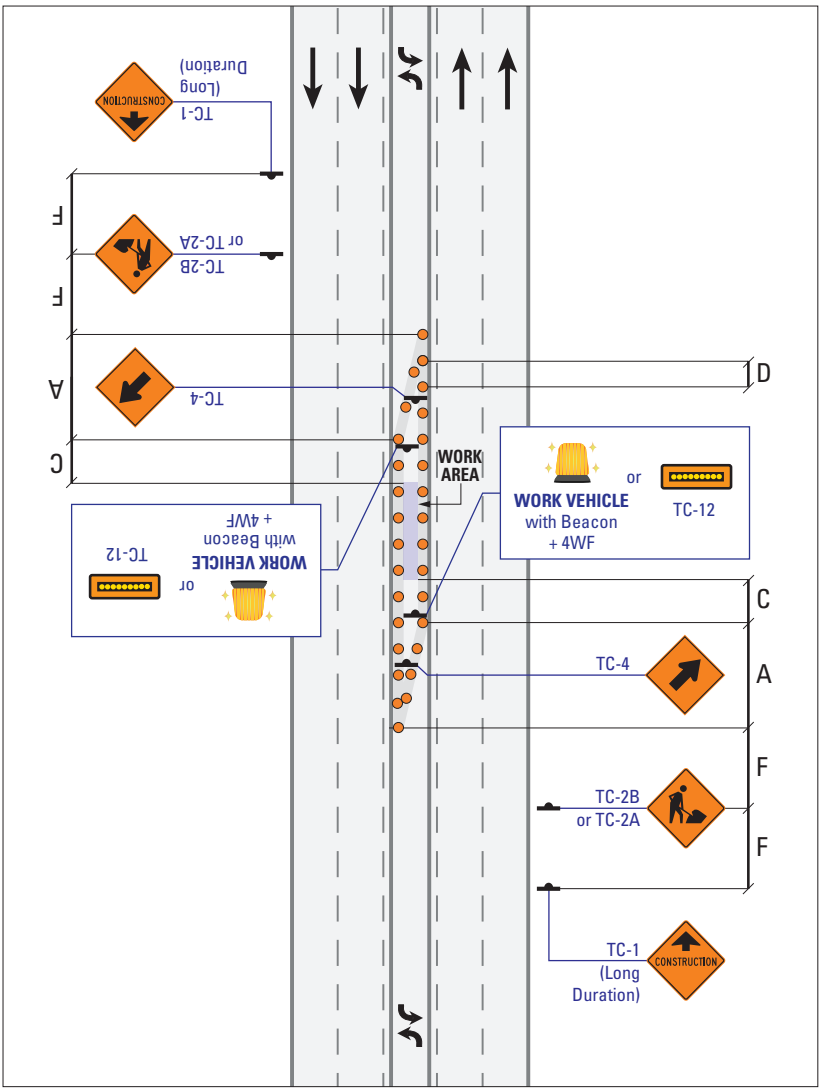
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Where TC-12 is used and the NPRS is 60 km/h or lower, Markers are not required.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-15 Two-Way Left Turn Lane Closed

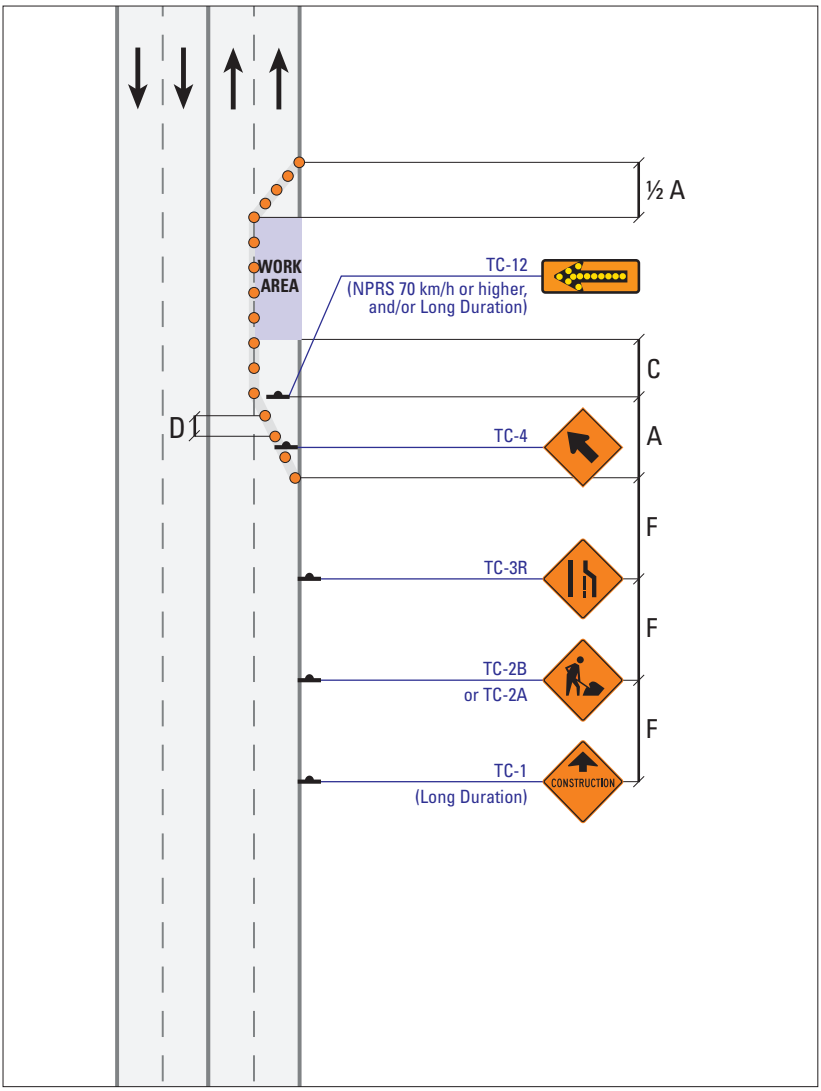


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-16 Two-Way Left Turn Lane Closed



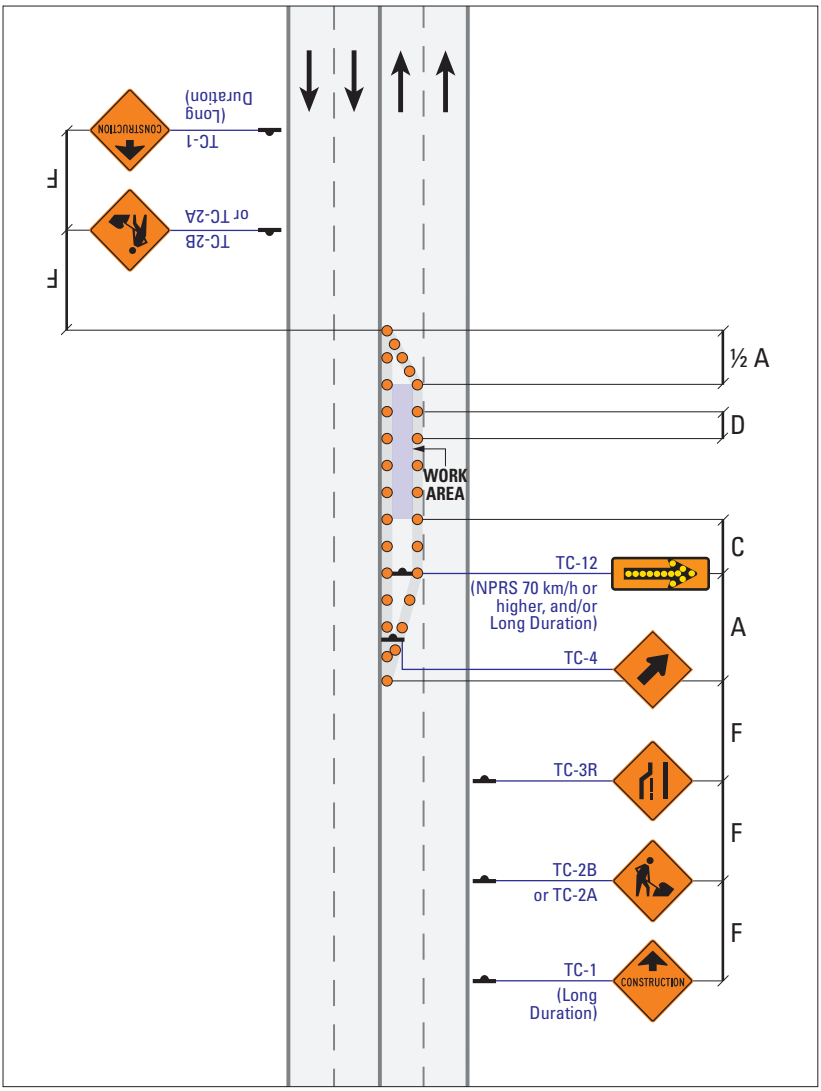
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) For Left Lane Closed Undivided or with no shoulder, see US-18.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-17 Lane Closed

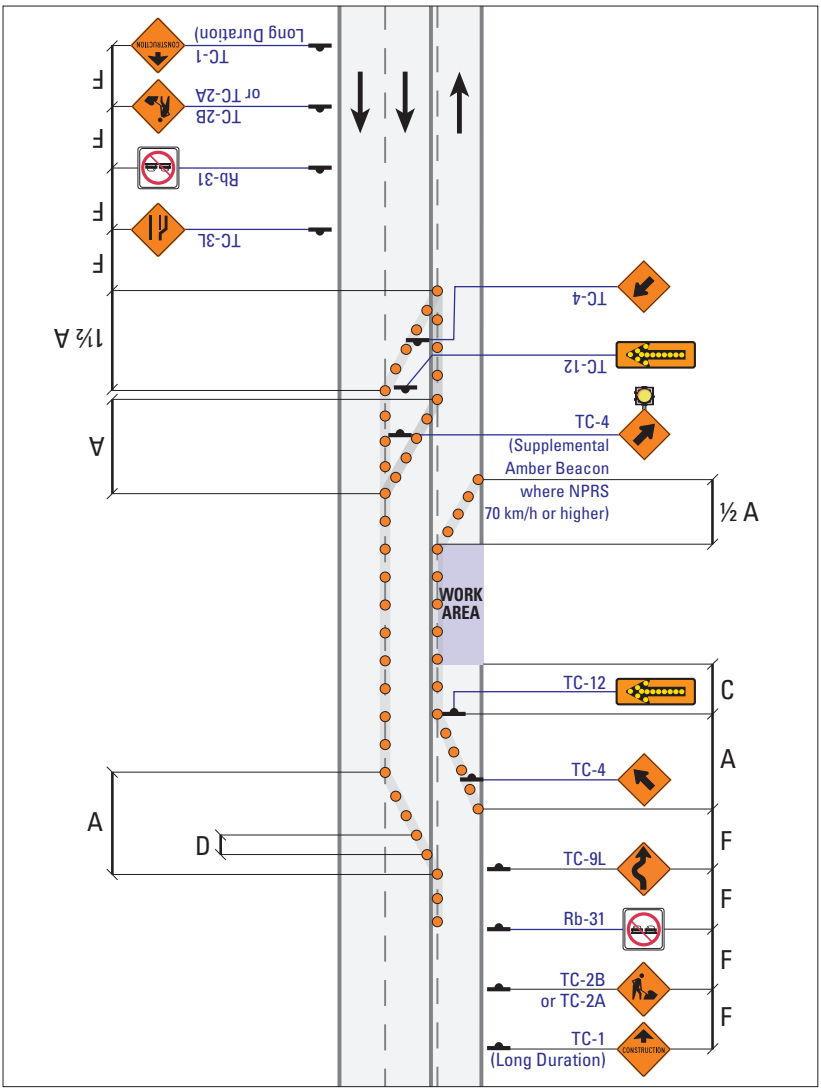


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-18 Left Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

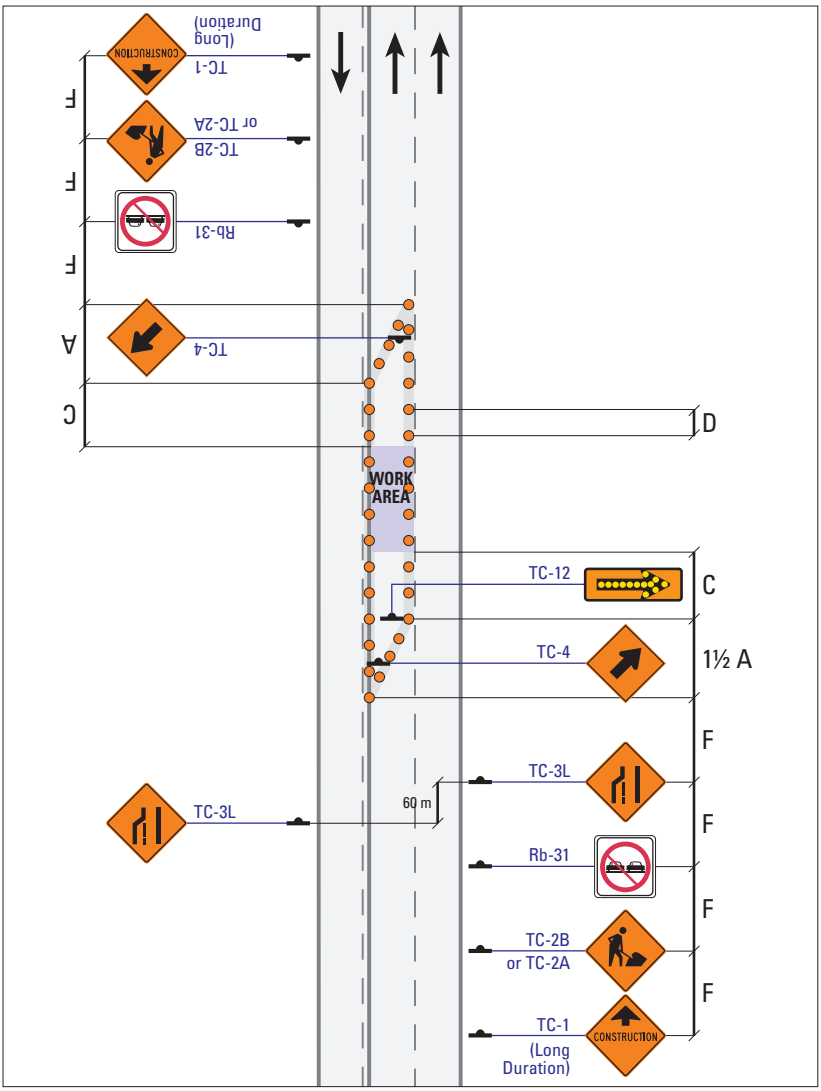
i) The added lane should be allowed to redevelop only if there is sufficient remaining lane length to permit safe passing.

ii) For High Volume roads or Long Duration work longer than five days, the use of Temporary Concrete Barriers should be considered to separate opposing traffic.

iii) For diversions exceeding 1 km, use a TC-16EL (ER) in place of the TC-9L (R), and add an additional TC-16ER (EL) at the beginning of end Taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-19 Passing Lanes: Single-Lane Direction Closed



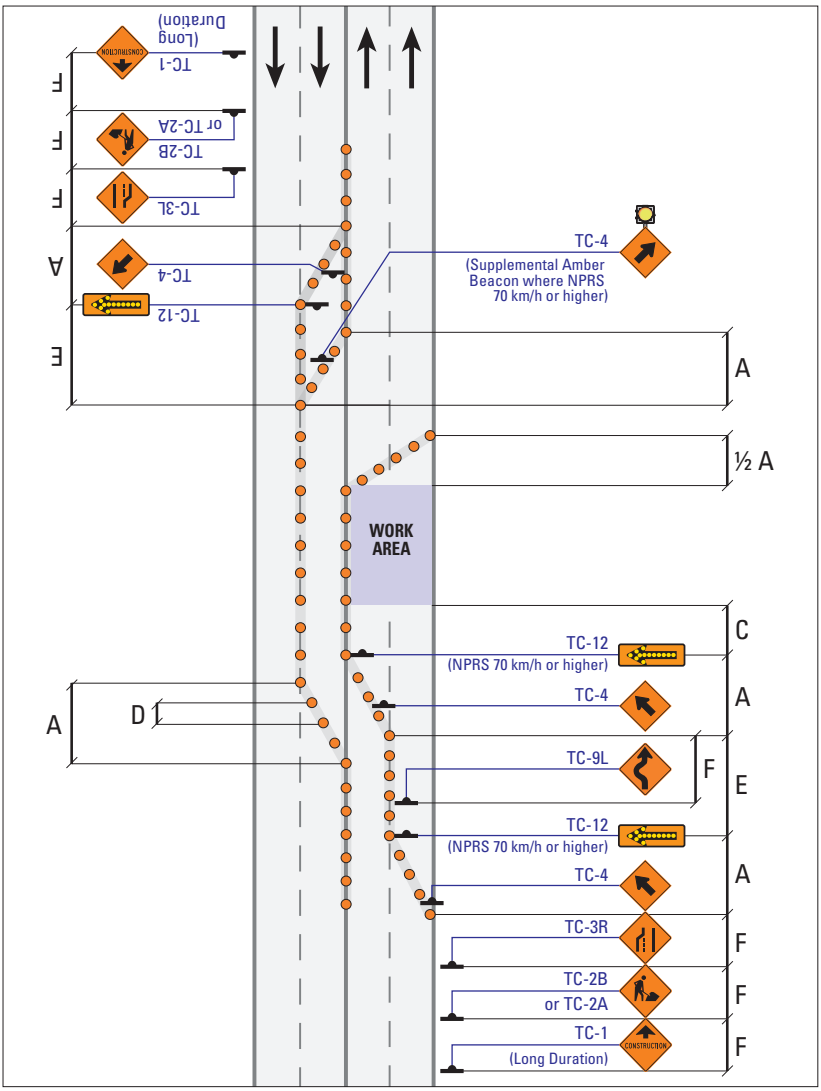
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) For High Volume roads or Long Duration work longer than five days, the use of Temporary Concrete Barriers should be considered to separate opposing traffic.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-20 Passing Lanes: Centre Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

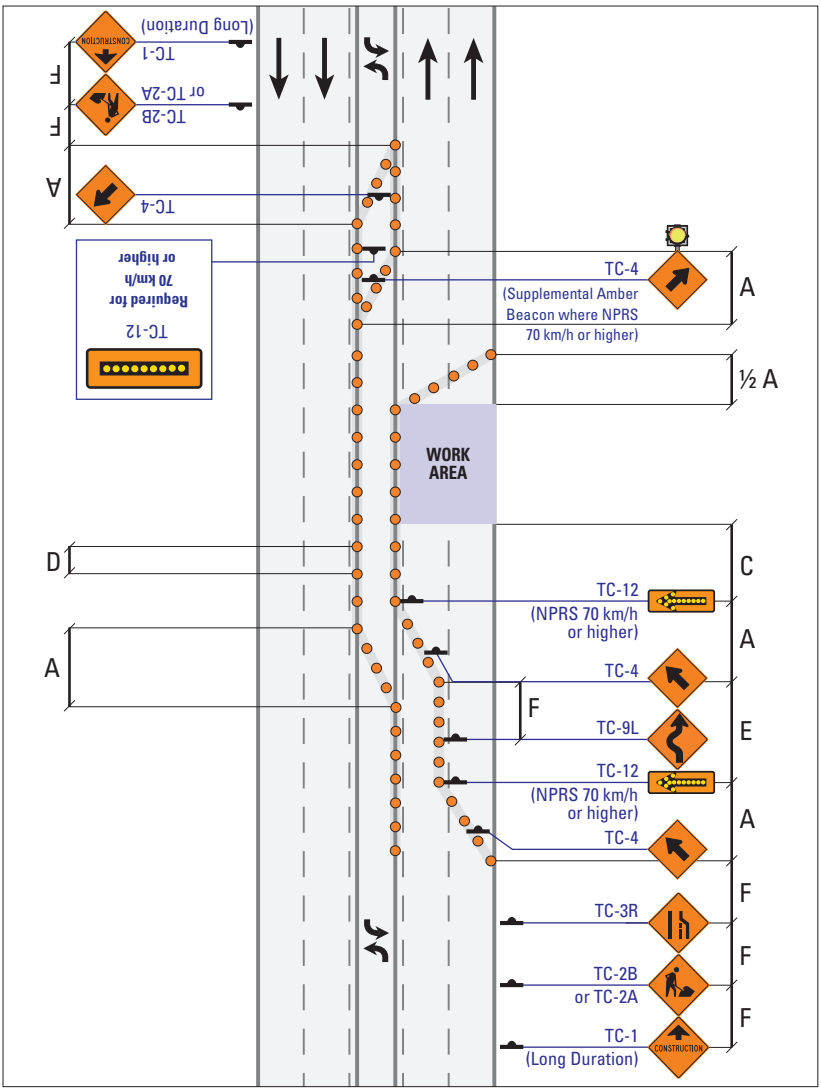
NOTES

i) For High Volume roads or Long Duration work longer than five days, the use of Temporary Concrete Barriers should be considered to separate opposing traffic.

ii) For diversions exceeding 1 km, use a TC-16EL (ER) in place of the TC-9L (R), and add an additional TC-16ER (EL) at the beginning of end Taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-21 Four Lane Road: Two Lanes Closed



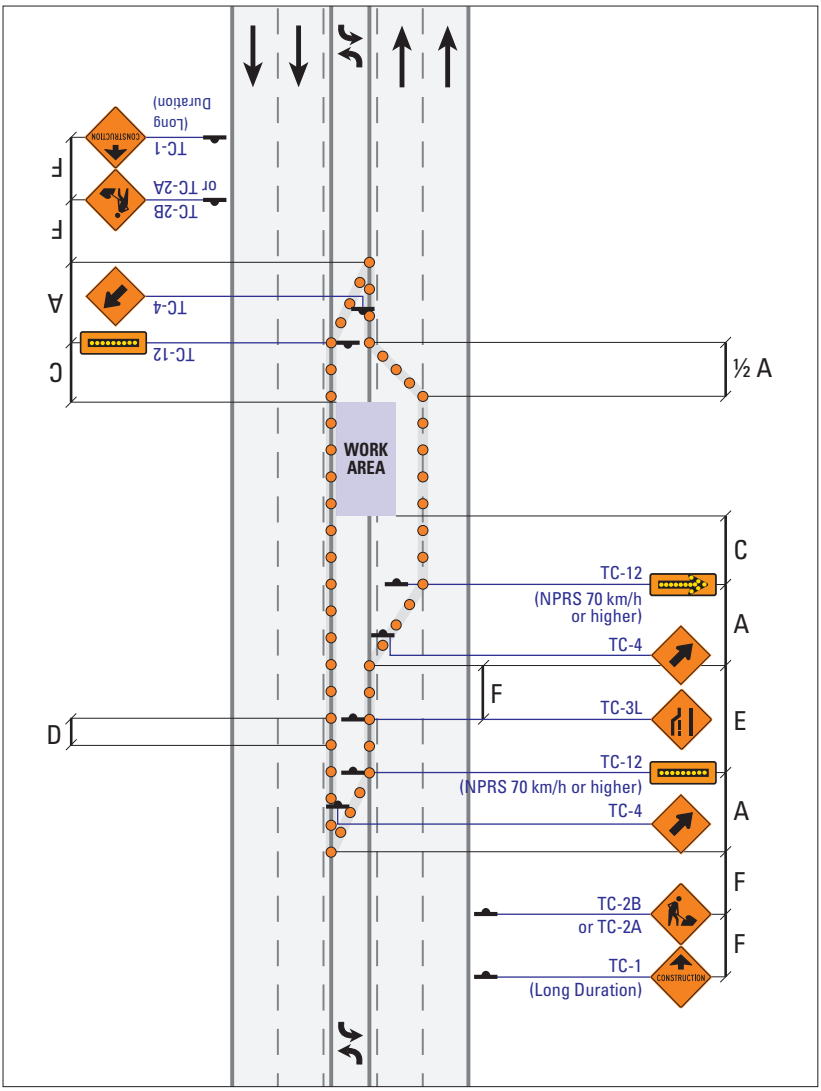
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) For diversions, exceeding 1 km, use a TC-16 EL (ER) in place of the TC-9L (R) and add an additional TC-16 ER (EL) at the beginning of end Taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-22 **Five Lane Road: Two Through Lanes Closed**

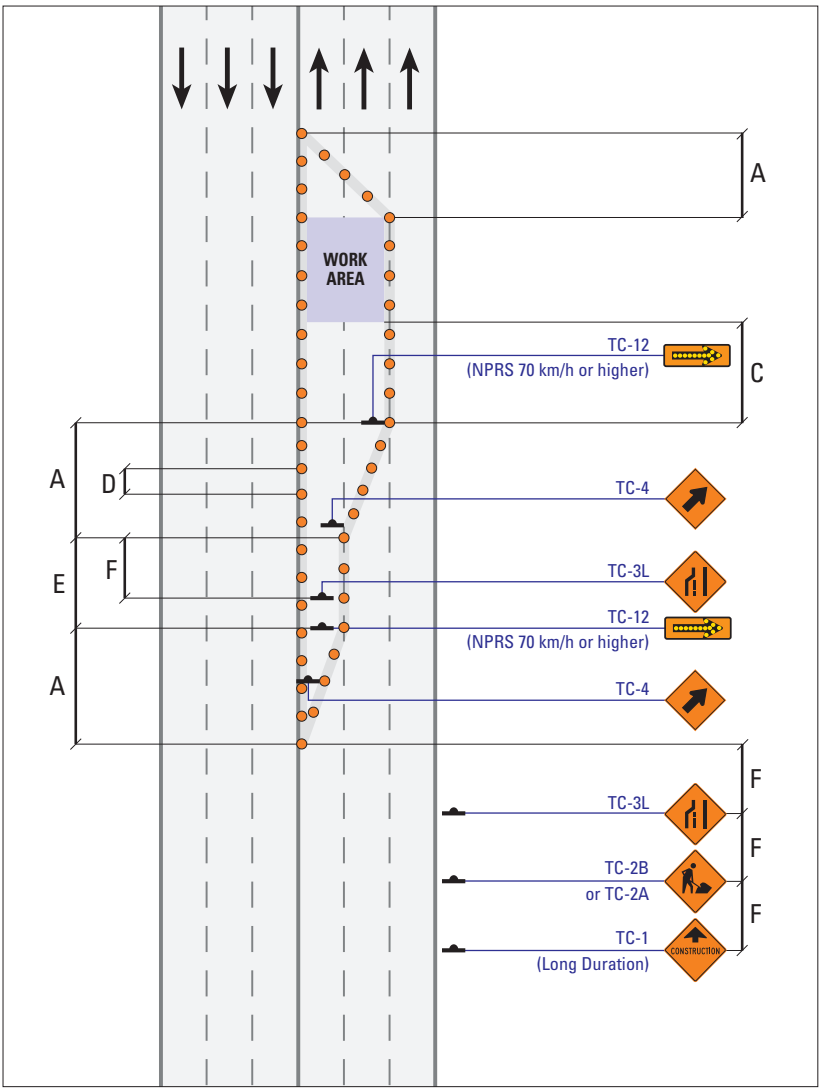


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-23 Five Lane Road: Through Lane and Left Turn Lane Closed



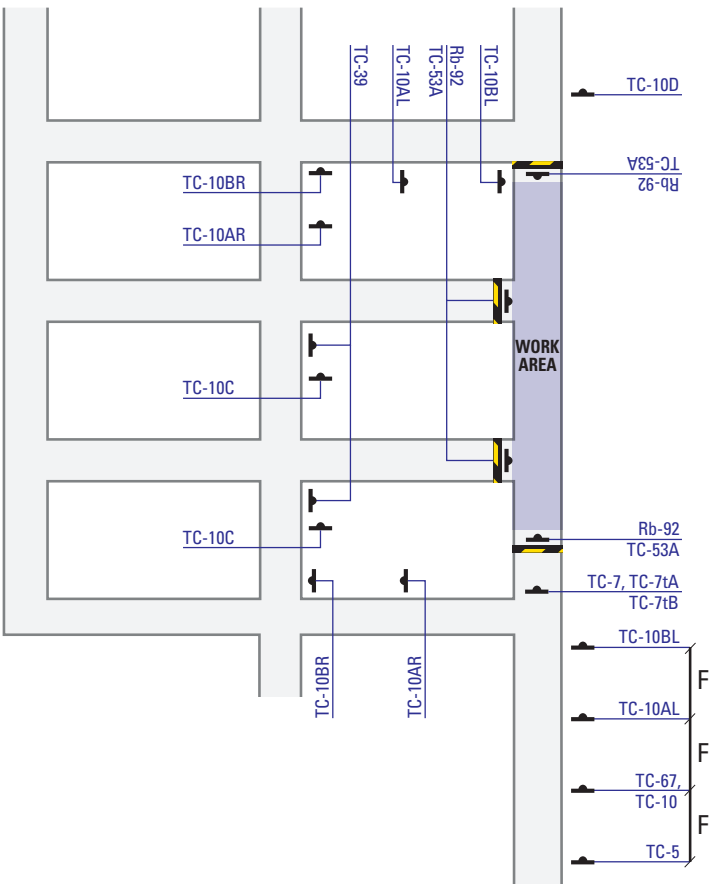
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Right Lanes Closed: mirror image, except for TC-3, TC-2, and TC-1.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-24 **Six Lane Road: Left Two Lanes Closed**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) See US-26 for Sign Details.
ii) The same approach to signing is required in the opposite direction.
iii) TC-54 can be used in place of TC-53A.
iv) If space is insufficient to install a TC-67, it may be replaced with a TC-65.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-25 Route Detour (Alternative Roads)

The following signs are to be used in the layout for Route Detour – see US-25.

TC-10


TC-10AR

Other tabs may be used with the 

sign as follows:


TC-10BR


TC-10C


TC-10ER


TC-10FR


TC-10AL


TC-10BL

TC-10D


TC-10EL


TC-10FL

Roundabout Fish-hook tabs:


TC-10BRr


TC-10ALr


TC-10Cr

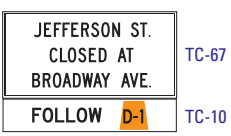
TC-39

TC-5

Rb-92

TC-7
TC-7tA
TC-7tB

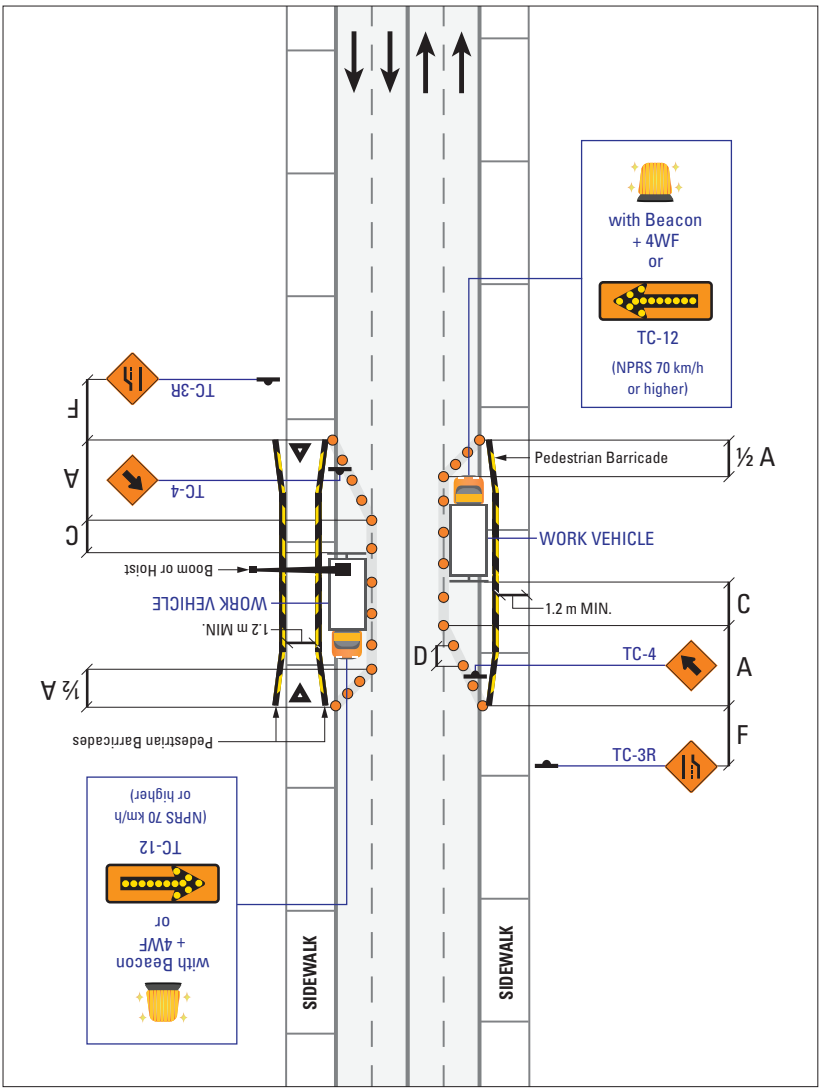

TC-53A



TC-67
TC-10

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).



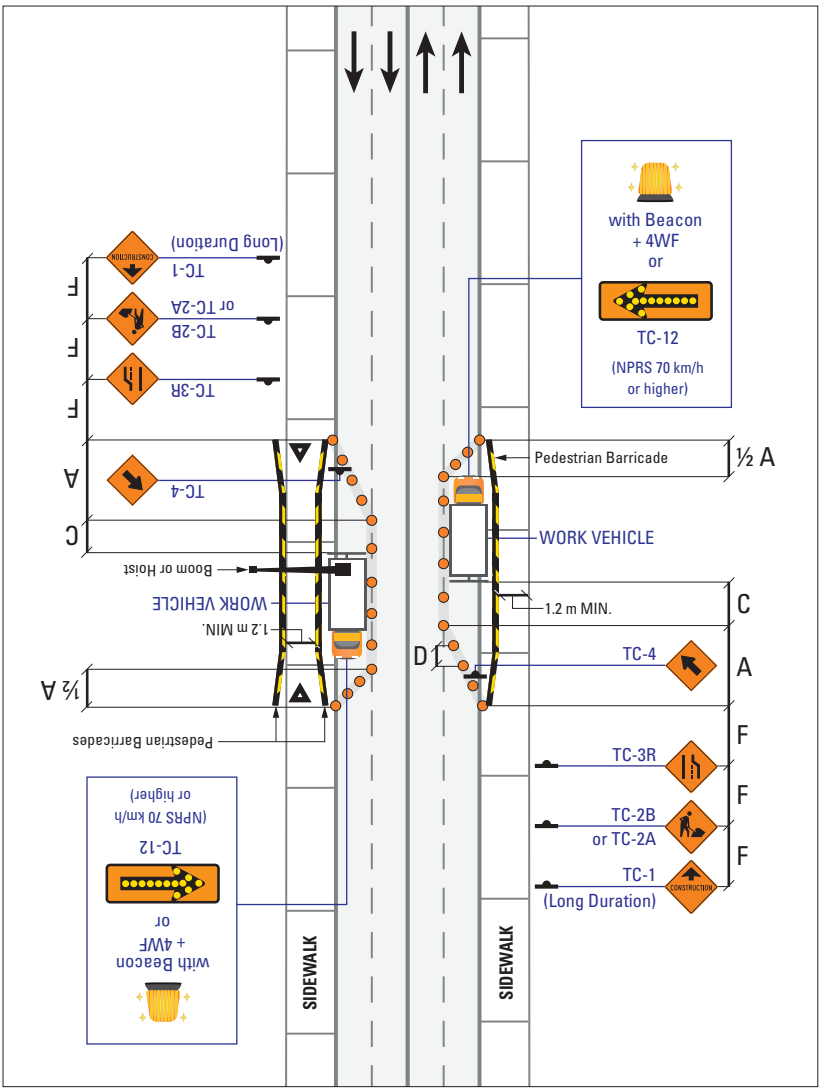
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) ▲ Location of Pedestrian Controllers if required (e.g., use of Booms or Hoists). Pedestrian passage under Boom is acceptable when Boom is not in motion and when Hoisting is not underway. Where activities at a Work Area could endanger the public (e.g., trenches, excavation), Pedestrian Barricades must be used.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

US-27 **Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk**



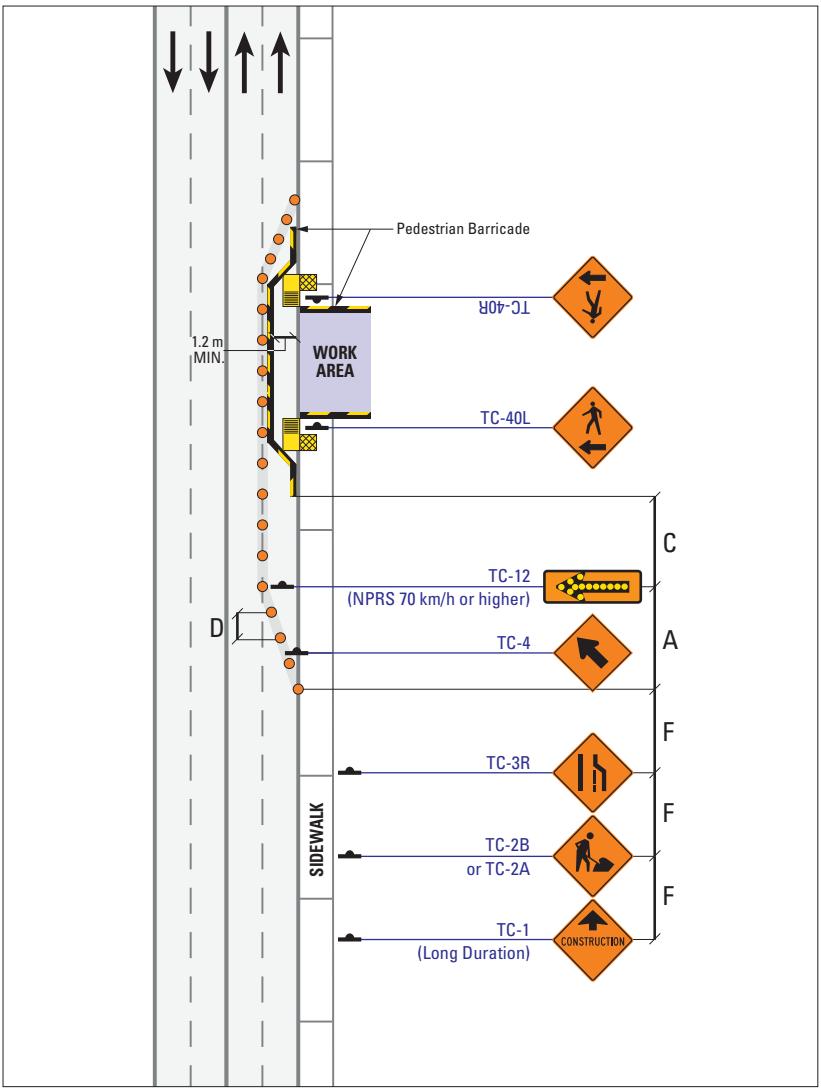
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) ▲ Location of Pedestrian Controllers if required (e.g., use of Booms or Hoists). Pedestrian passage under Boom is acceptable when Boom is not in motion and when Hoisting is not underway. Where activities at a Work Area could endanger the public (e.g., trenches, excavation), Pedestrian Barricades must be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-28 **Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk**



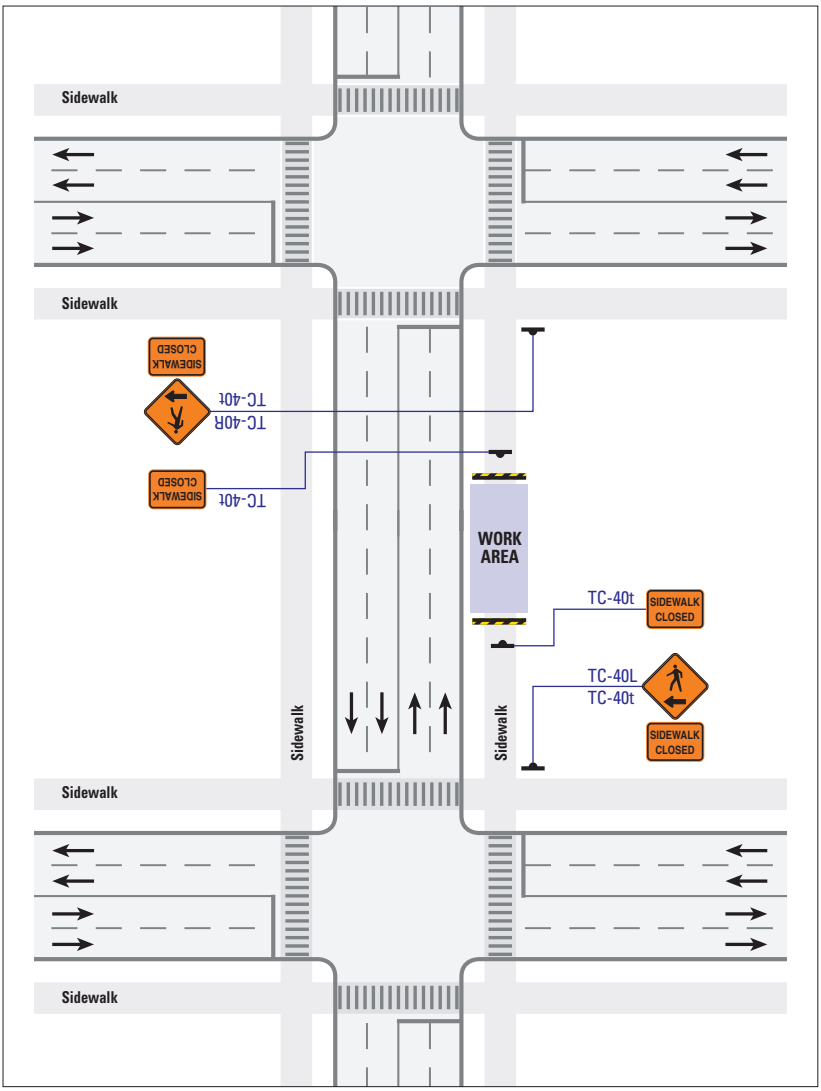
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) For Sidewalk Closures of Long Durations, a boardwalk and railing should be provided instead of Pedestrian Barricades.
ii) If close to a crosswalk, pedestrians can be directed to the opposite side of the street with a TC-40 and TC-40T installed at the crosswalk.
iii) Minimum width of the temporary walkway is 1.2 m.
iv) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-29 **Pedestrian Accommodation: Mid-Block Sidewalk Detour onto Roadway**

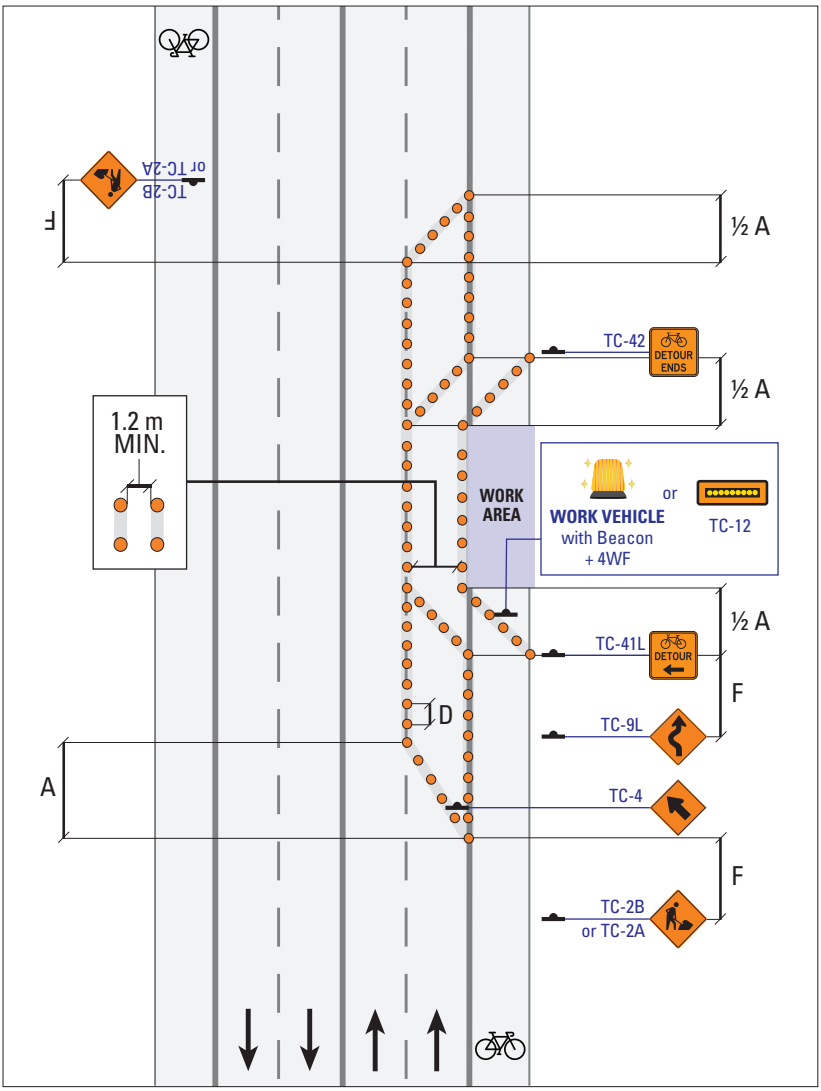


NOTES

i) TC-40L/R Pedestrian Direction sign must be placed at the nearest upstream controlled pedestrian crossing (traffic signal of Pedestrian Crossover) in each direction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-30 **Pedestrian Detour: Sidewalk Closure**



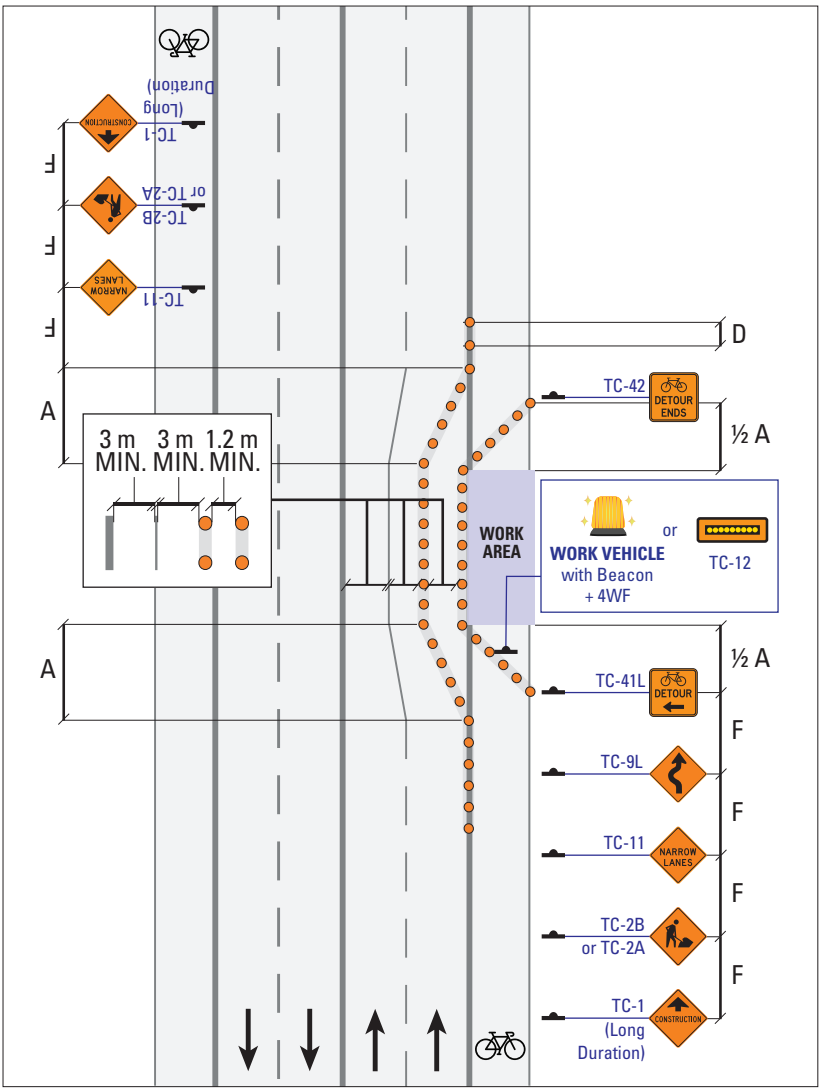
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, TC-54 should be used in place of TC-51.
ii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-31 Bicycle Lane Diversion: Bicycle Lane Shift



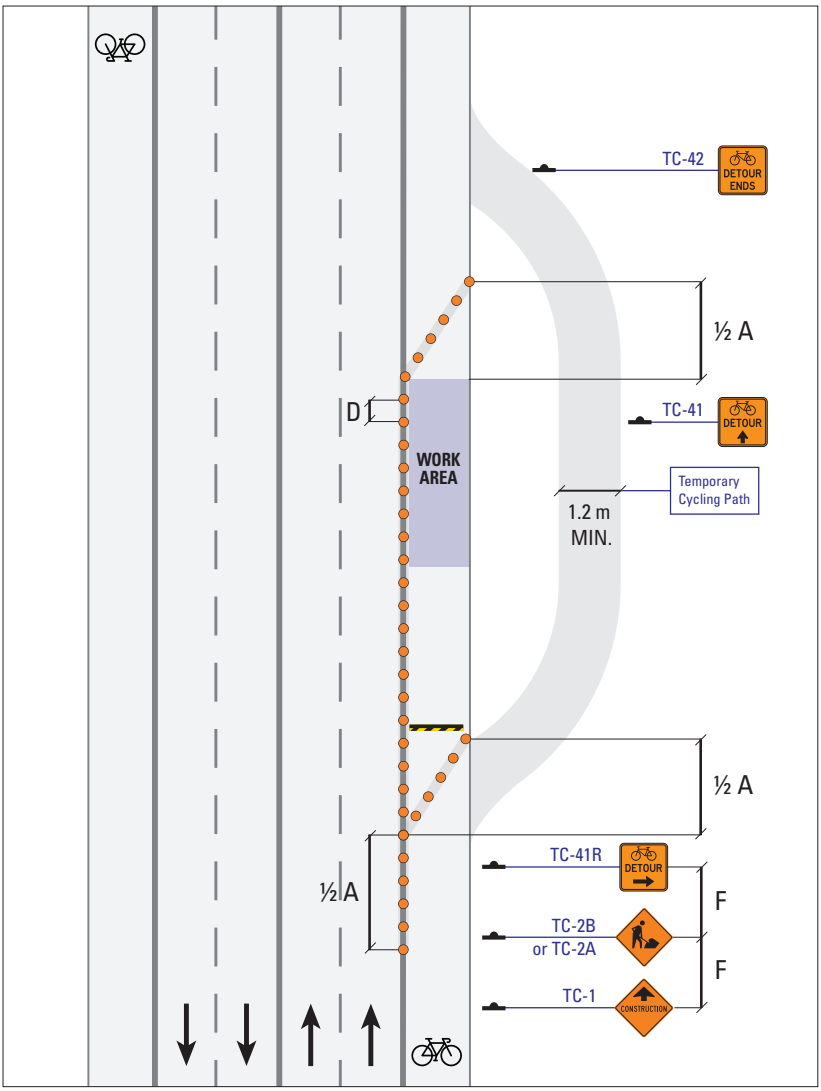
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, TC-54 should be used in place of TC-51.
ii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-32 Bicycle Lane Diversion: Bicycle Lane Shift

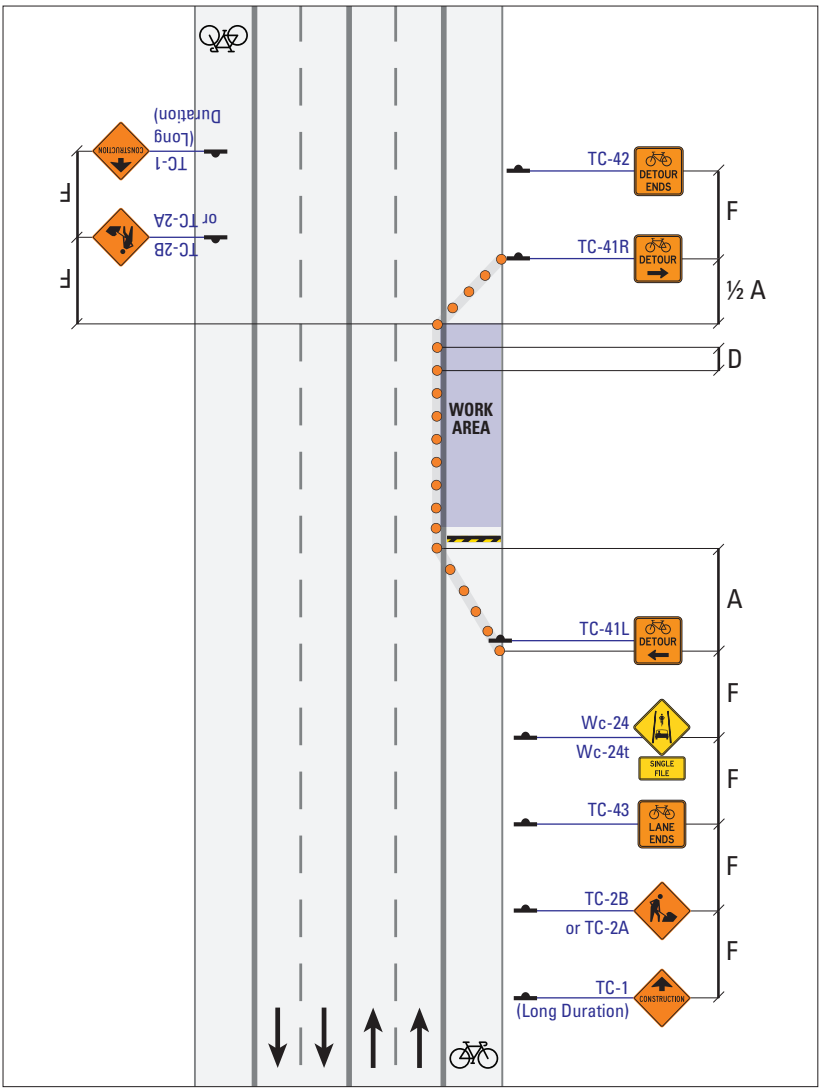


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-33 Bicycle Lane Diversion: Temporary Path



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

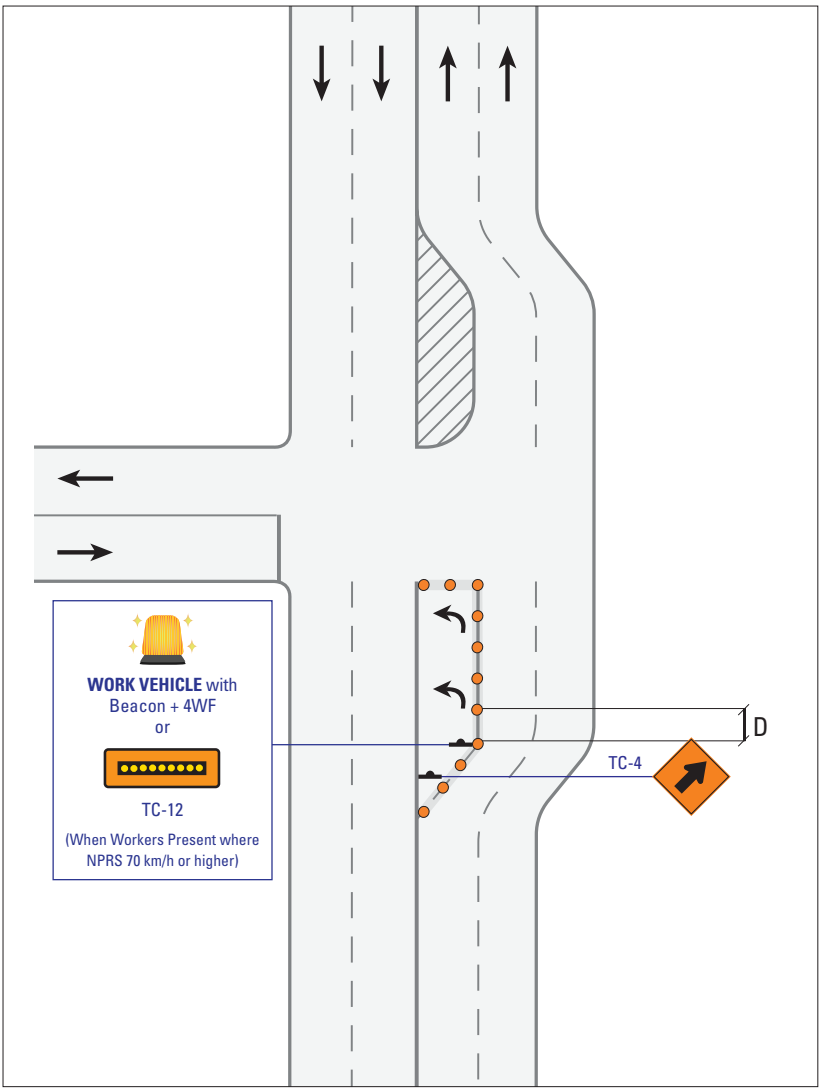
NOTES

i) AODA-compliant ramps are required if the curb is raised.
ii) Ensure signage is visible for drivers to be aware of merging cyclists.

Shared lane only to be used if considered by OTM Book 18 or MTO Bikeways Design Manual, Desirable Cycling Facility Nomograph. Otherwise, cycling Detour should be provided.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

US-34 **Bicycle Lane Diversion: Single File**



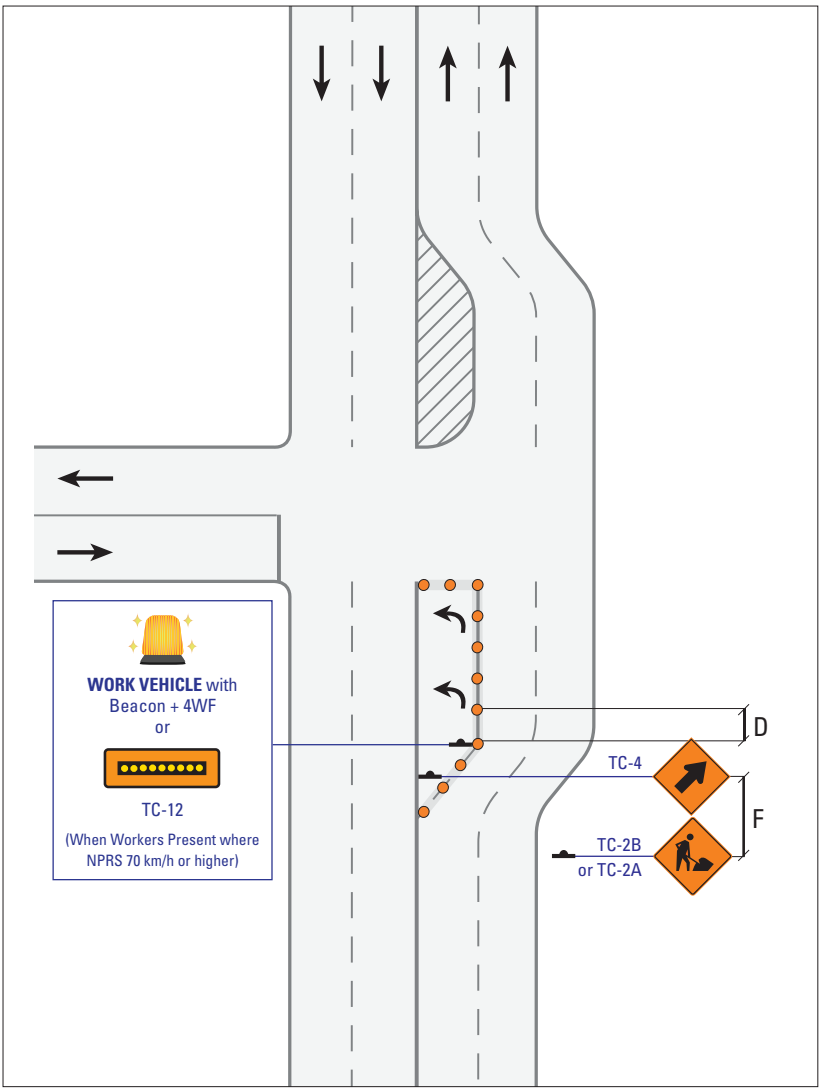
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Centreline Delineation required if workers present.
ii) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-1 Zone Painting: Intersection Turn Arrows



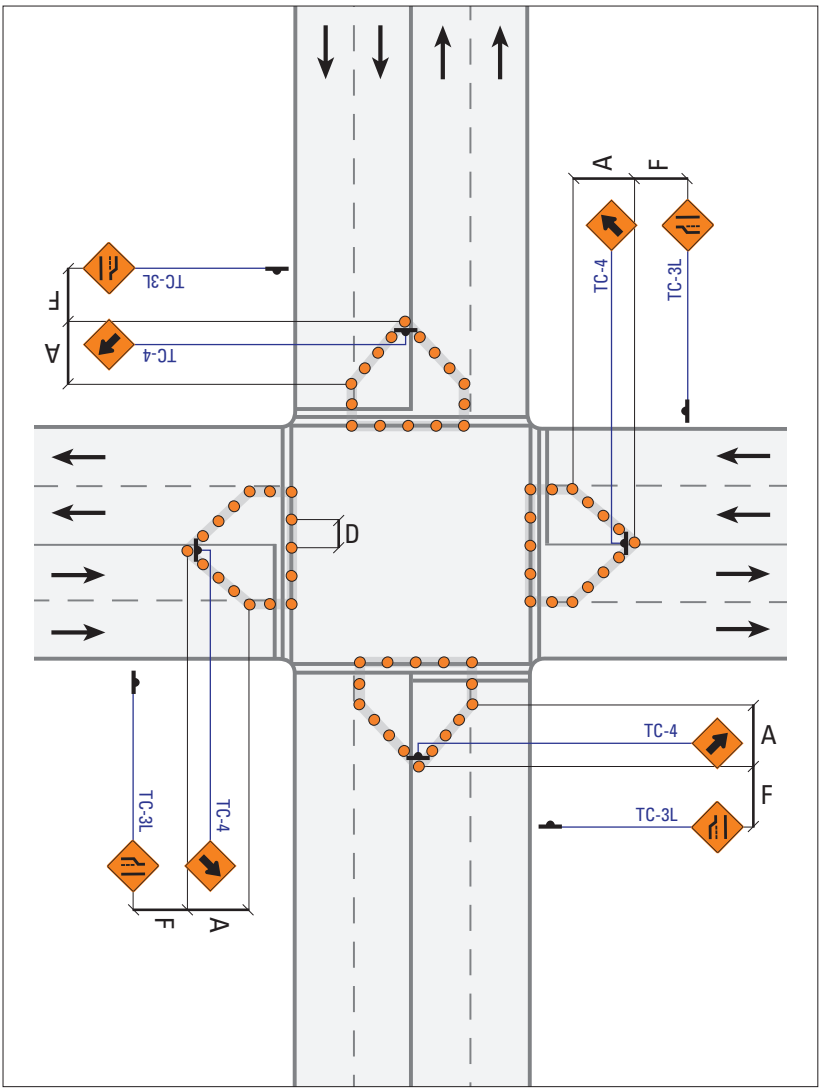
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Centreline Delineation required if workers present.
ii) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-2 **Zone Painting: Intersection Turn Arrows**

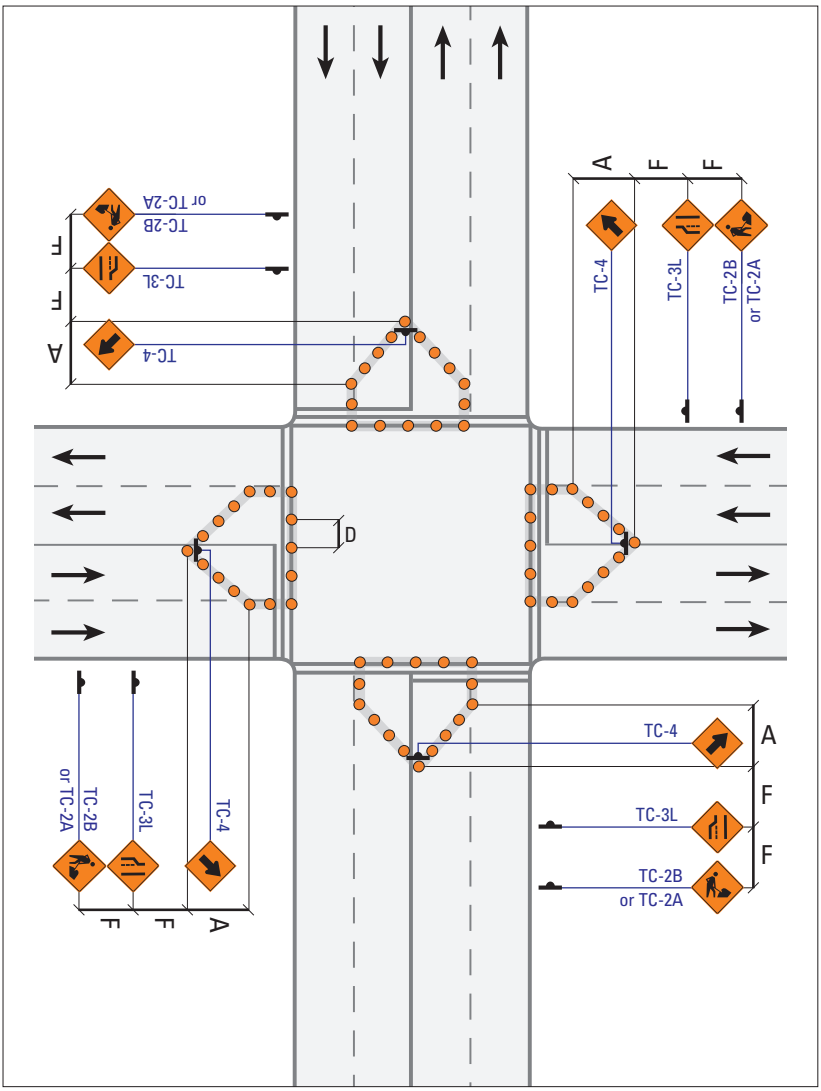


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-3 **Zone Painting: Intersection Left Lane Closed**

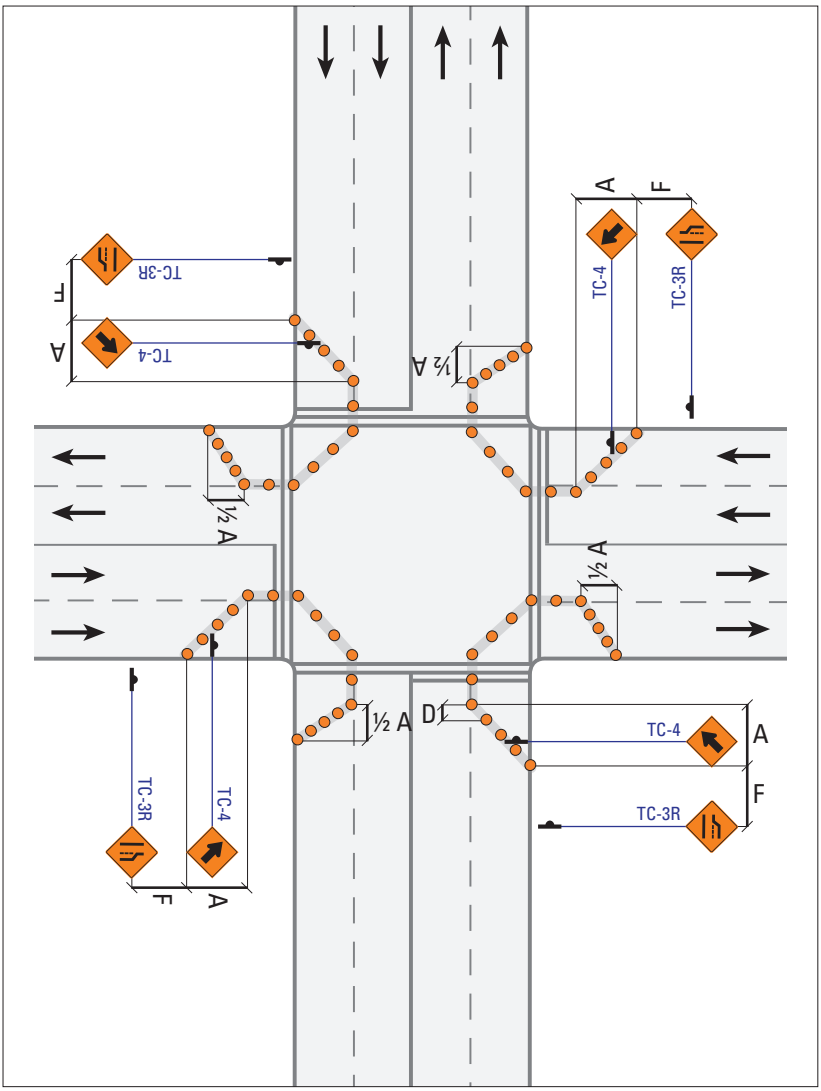


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-4 Zone Painting: Intersection Left Lane Closed

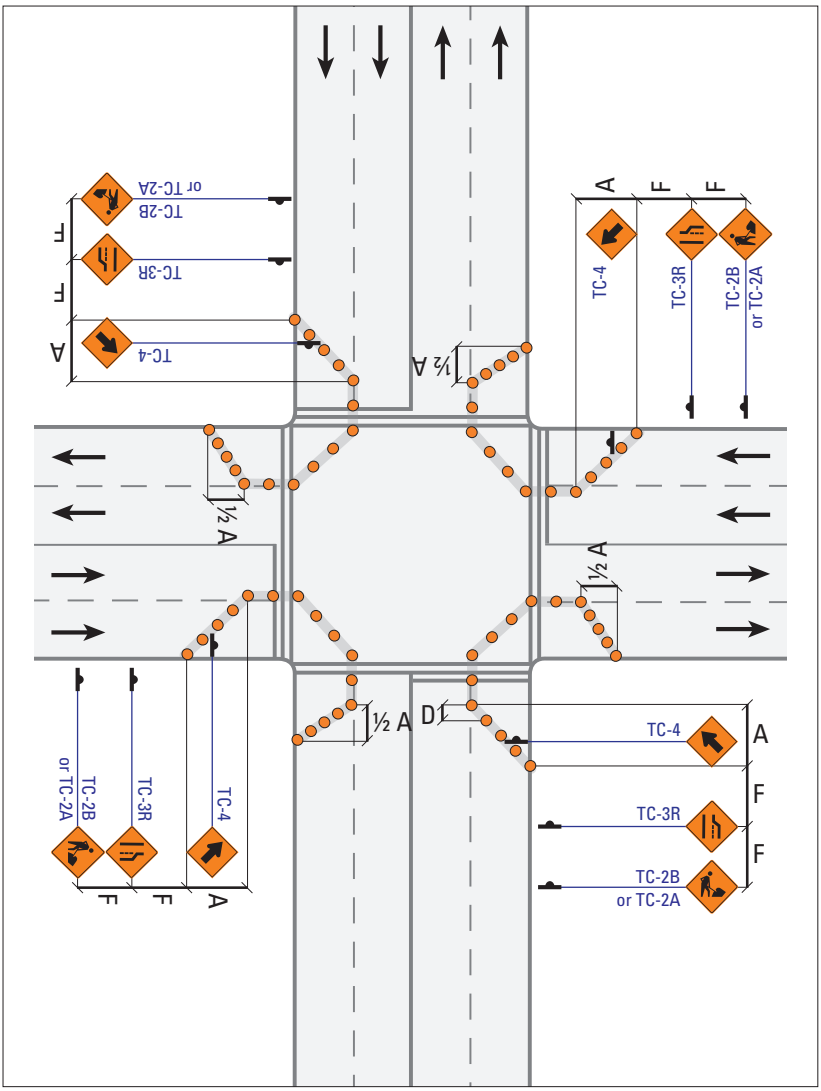


Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-5 **Zone Painting: Intersection Right Lane Closed**

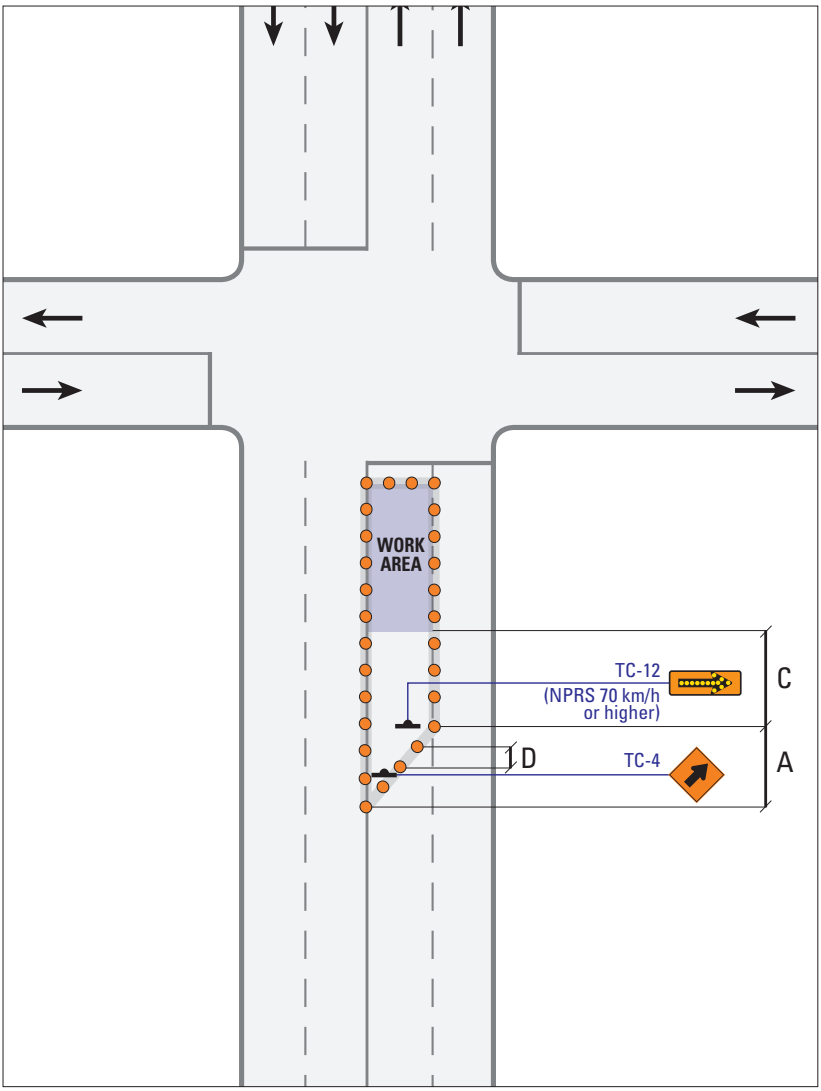


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-6 Zone Painting: Intersection Right Lane Closed



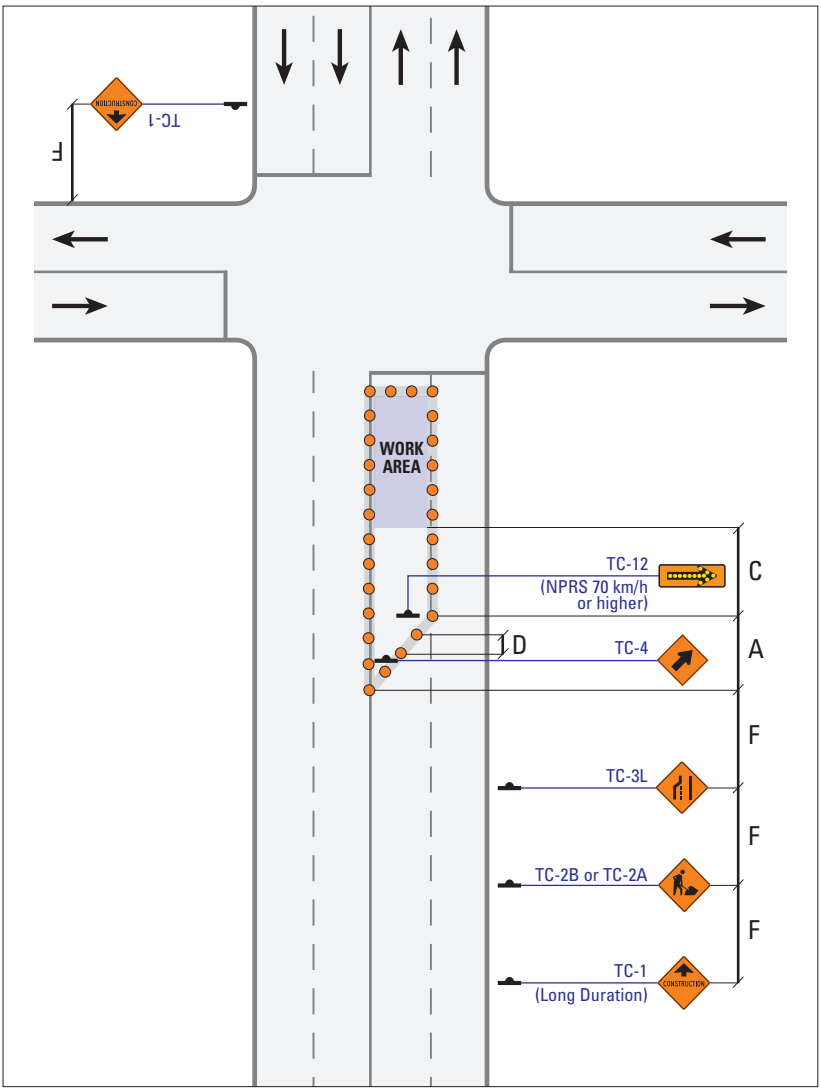
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	100
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Right Through Lane Closed: mirror image (for Markers, TC-12, TC-4).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-7 **Intersection: Near-Side Right or Left Through Lane Closed**



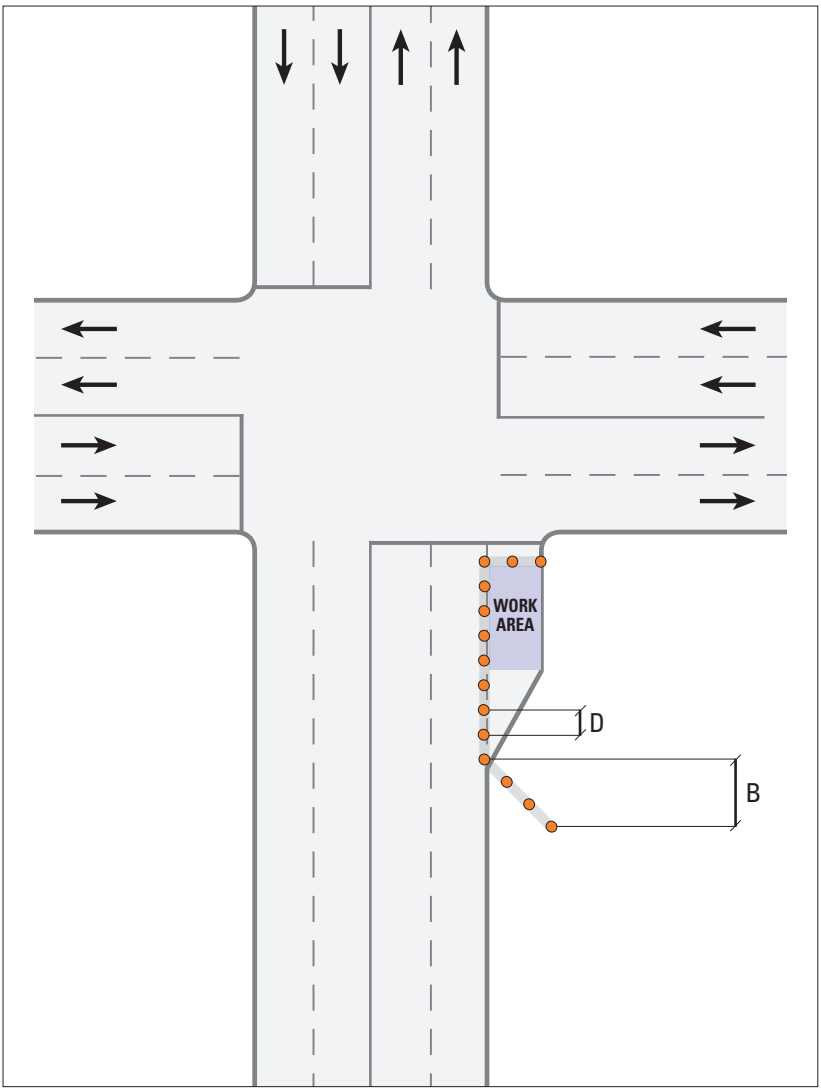
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Right Through Lane Closed: mirror image (for Markers, TC-12, TC-4).

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-8 **Intersection: Near-Side Right or Left Through Lane Closed**

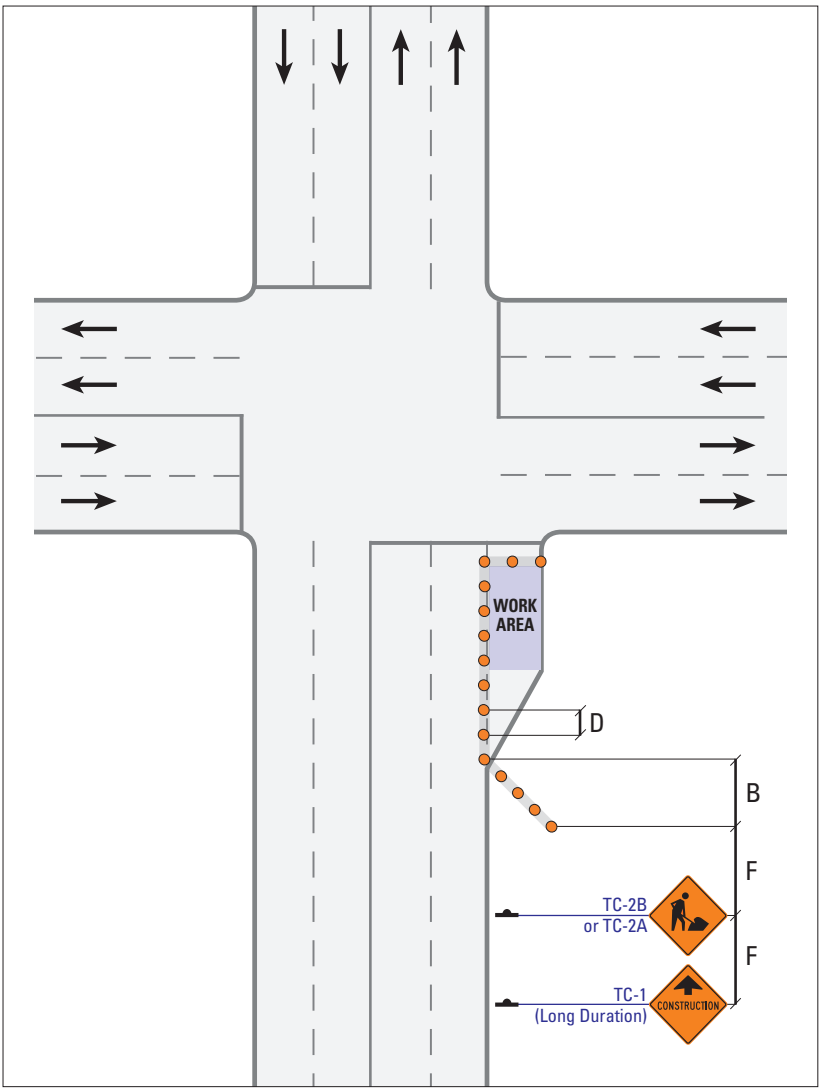


Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-9 **Intersection: Right Turn Lane Closed**

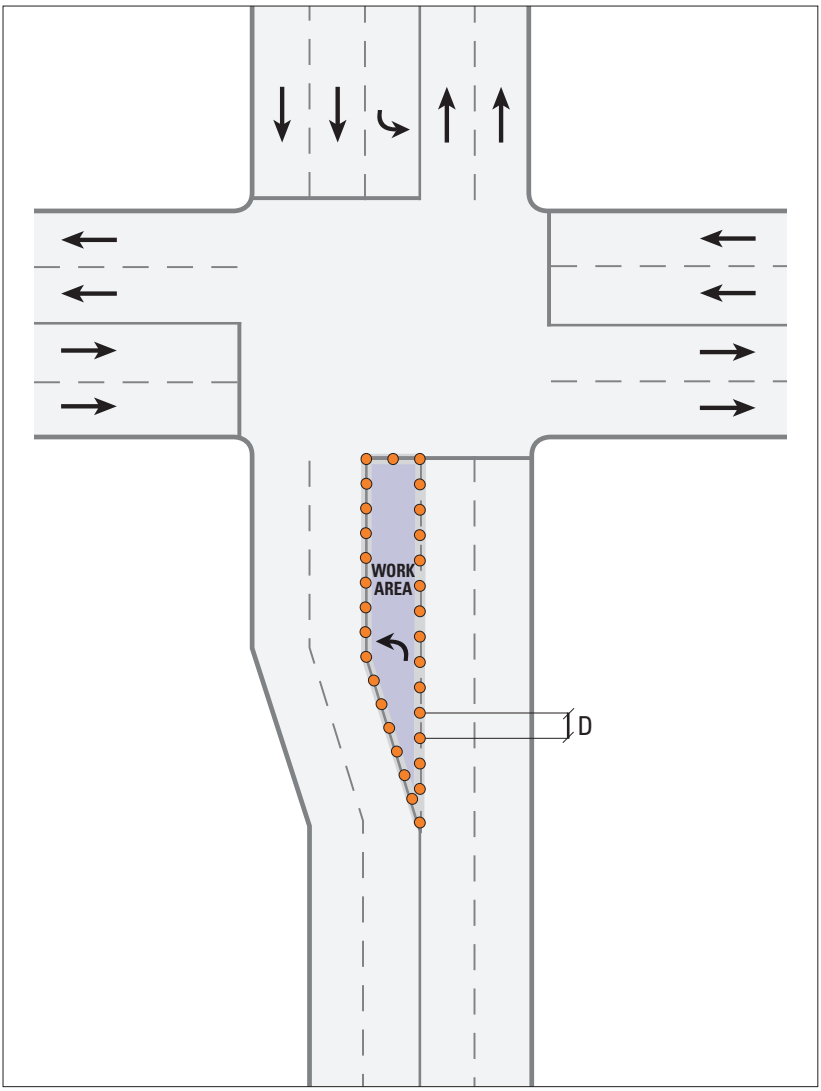


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-10 **Intersection: Right Turn Lane Closed**



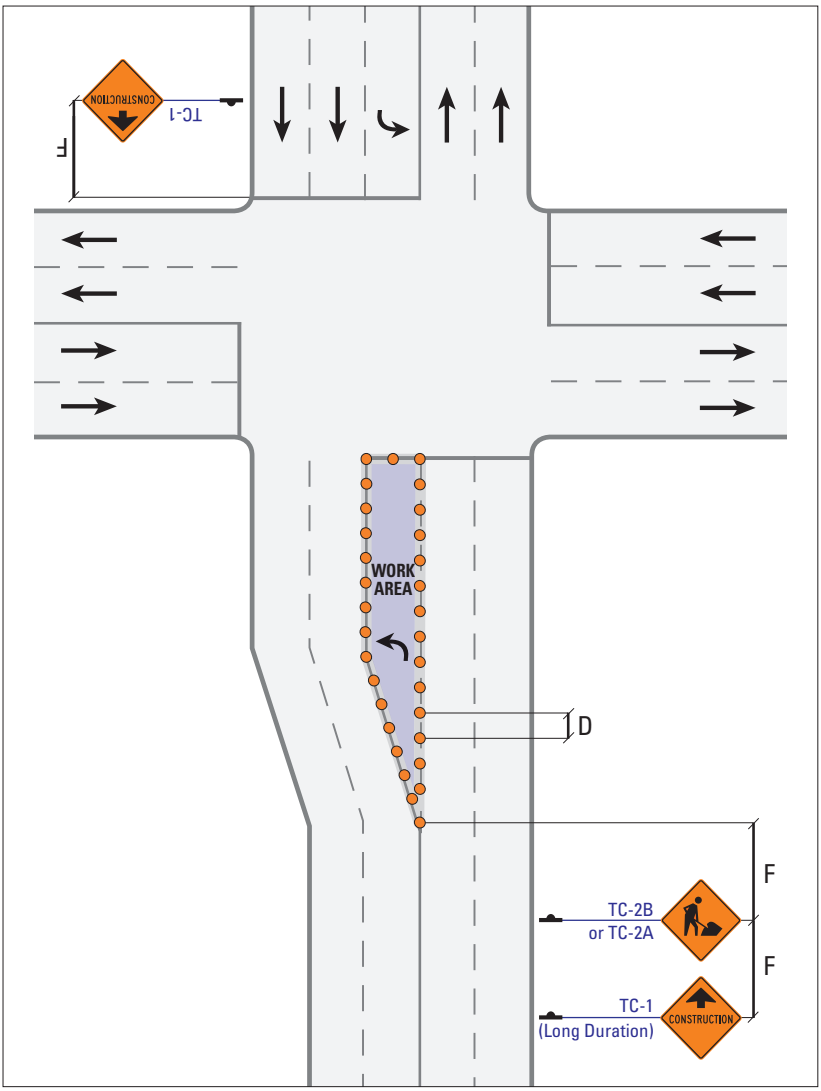
Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-11 Intersection: Left Turn Lane Closed



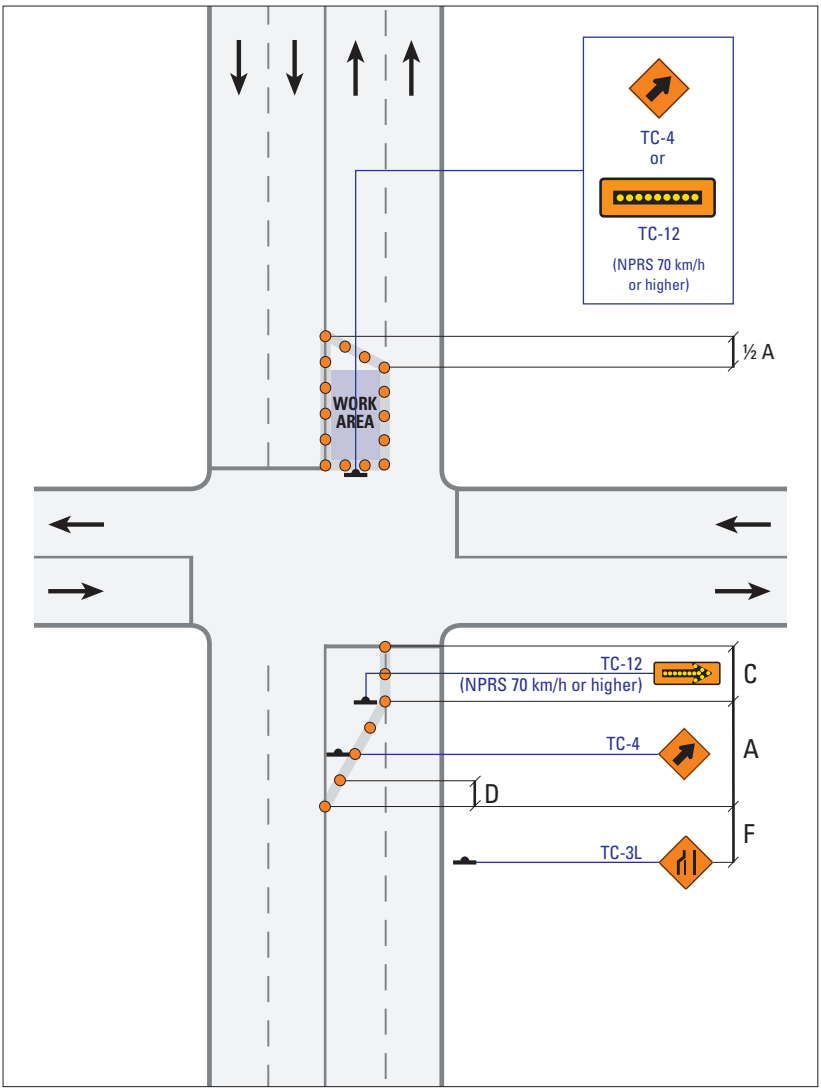
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-12 Intersection: Left Turn Lane Closed



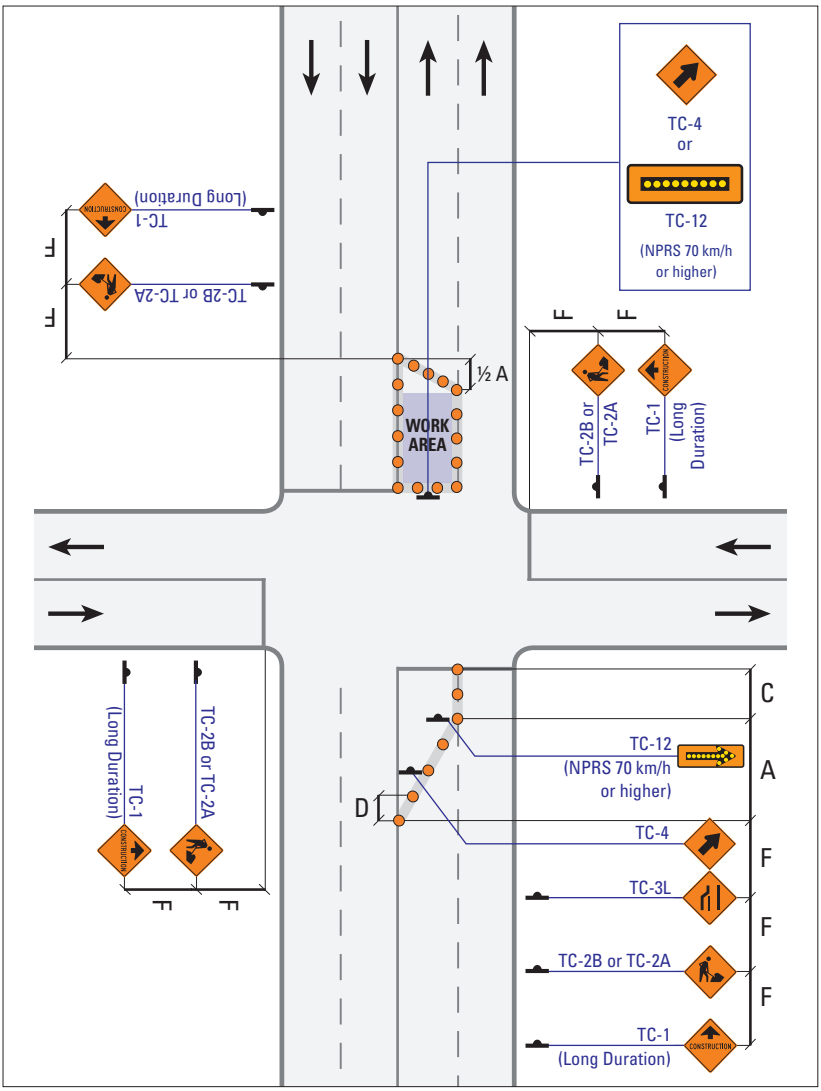
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) Right Lane Closed: mirror image.
ii) Measures should be taken to make sure on-street parking is not allowed next to the Work Area or Taper.
iii) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-13 Intersection: Far-Side Lane Closed



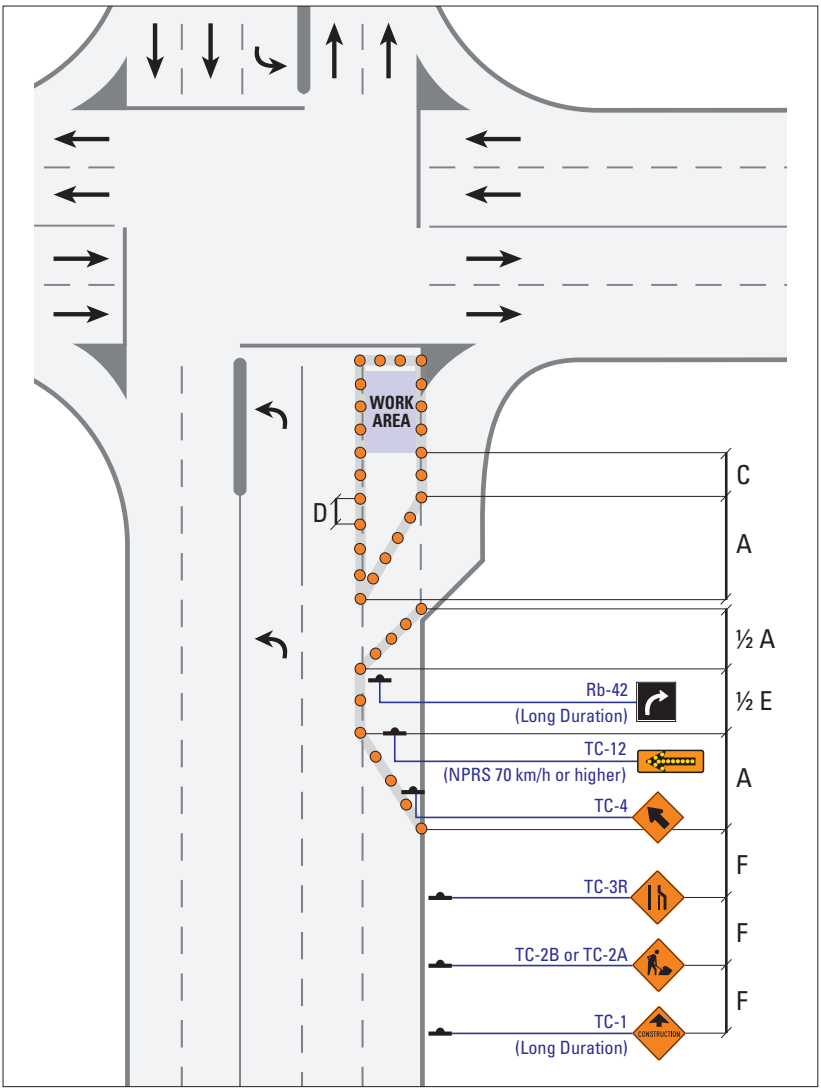
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	30	90	120	140	150

NOTES

i) Right Lane Closed: mirror image (Advance signs (TC-1 & TC-2) not required in opposing direction).
ii) Measures should be taken to make sure on-street parking is not allowed next to the Work Area or Taper.
iii) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-14 Intersection: Far-Side Lane Closed



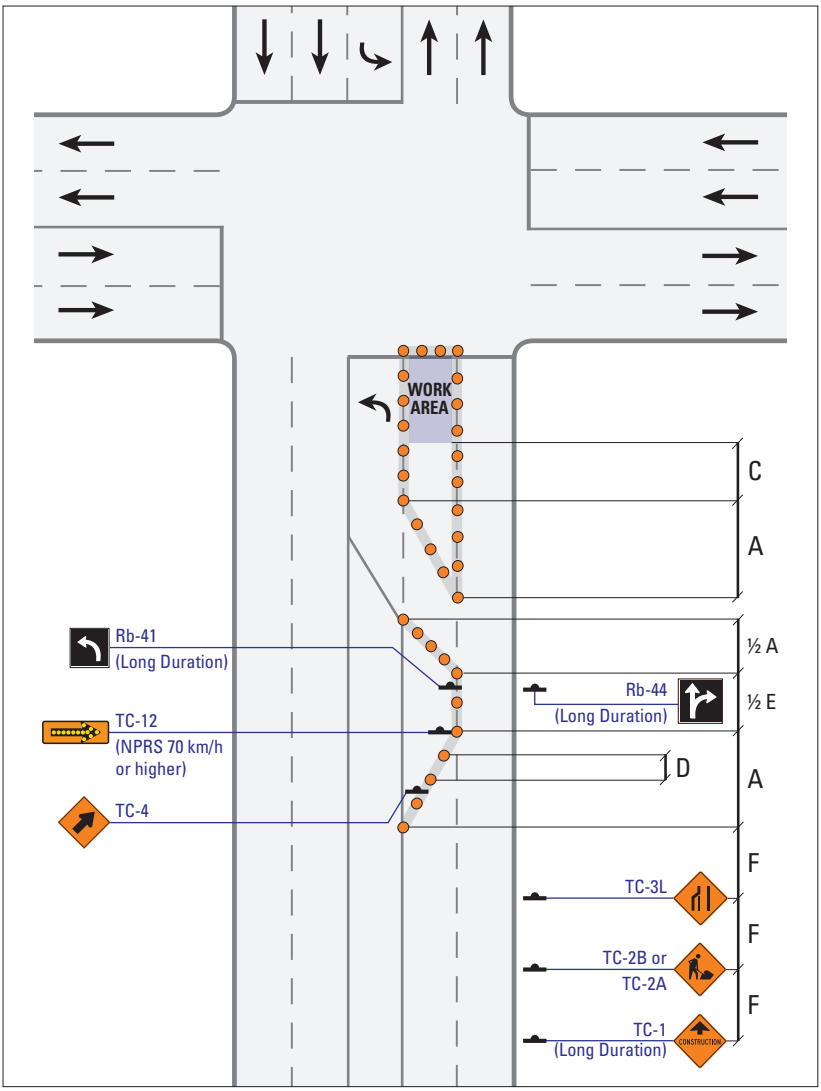
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-15 **Intersection: Lane Adjacent to Right Turn Lane Closed**



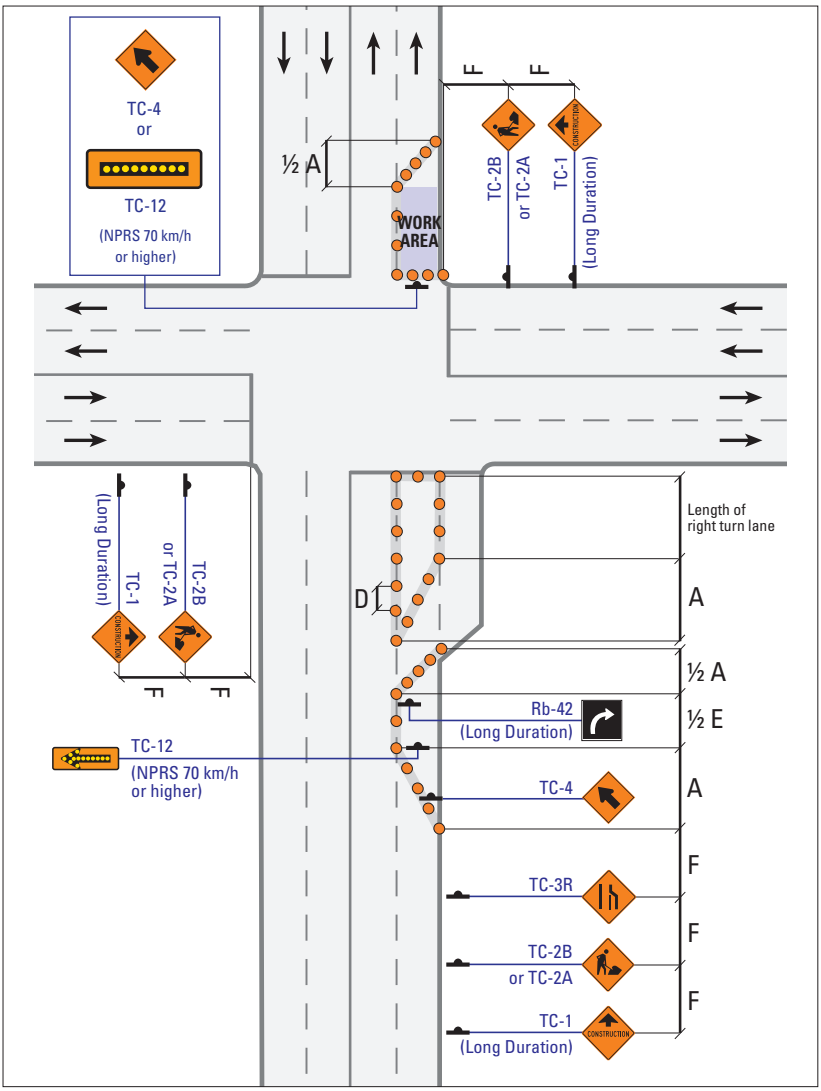
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-16 Intersection: Lane Adjacent to Left Turn Lane Closed



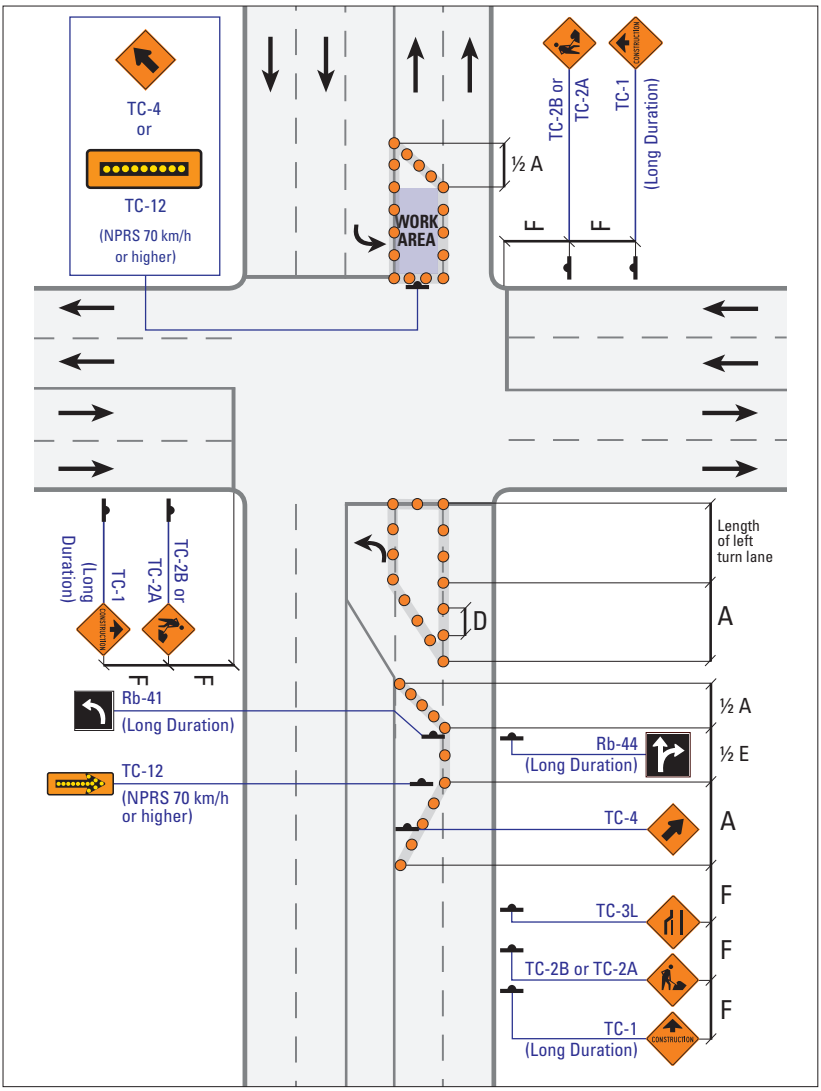
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit certain turning movements.
iii) It may be necessary to prohibit right turn truck movements.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-17 Intersection: Right Turn Lane (Far-Side Right Lane Closed)



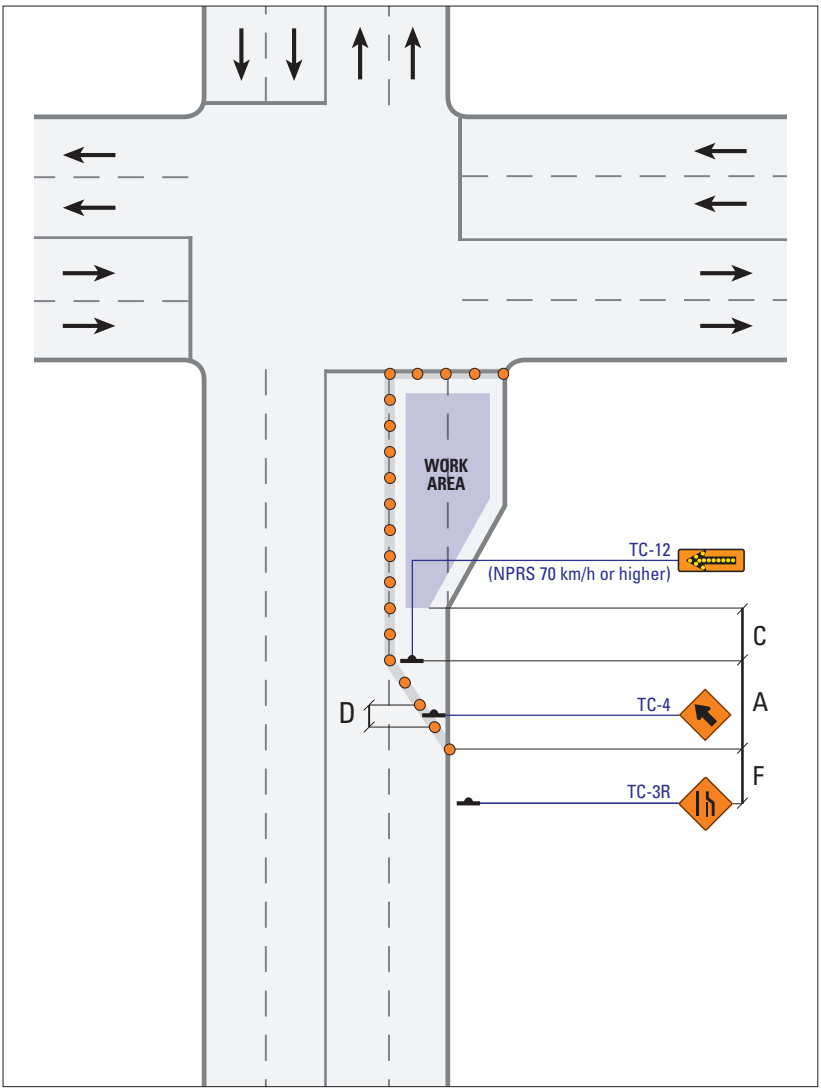
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit right turn truck movements.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-18 Intersection: (Left Turn Lane Open) Far-Side Left Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

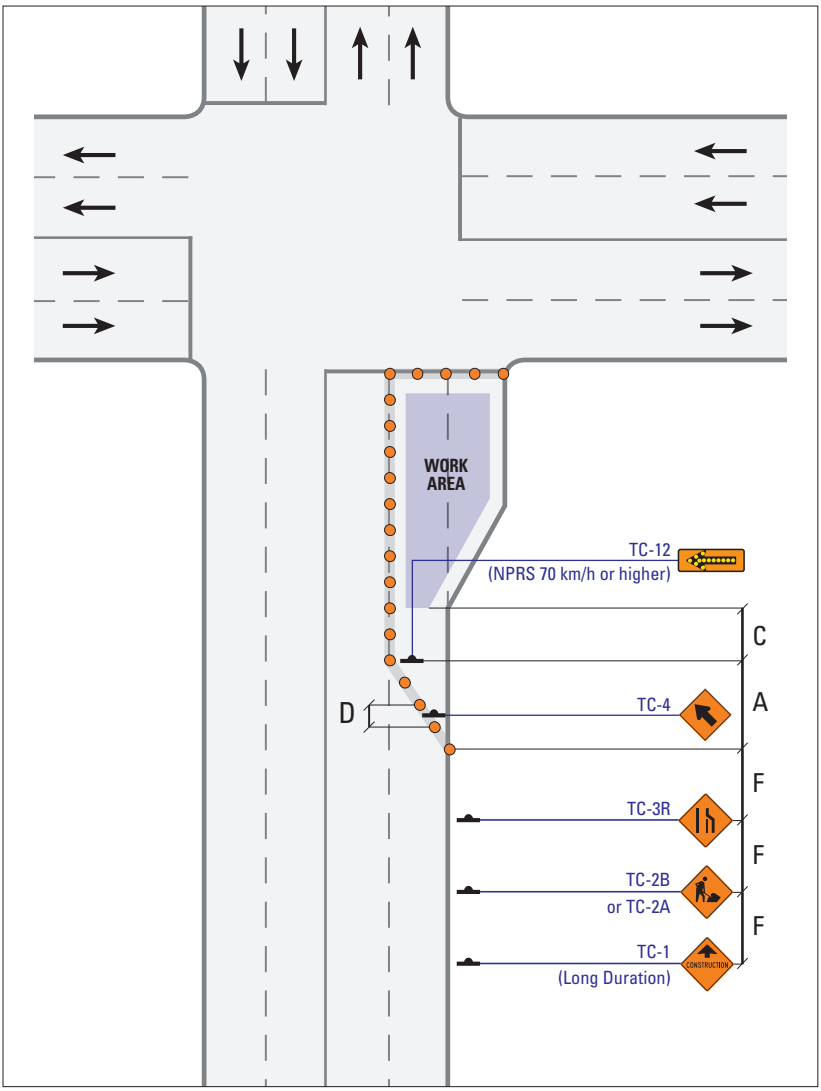
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-19

Intersection: Right Turn Lane and Adjacent Through Lanes Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

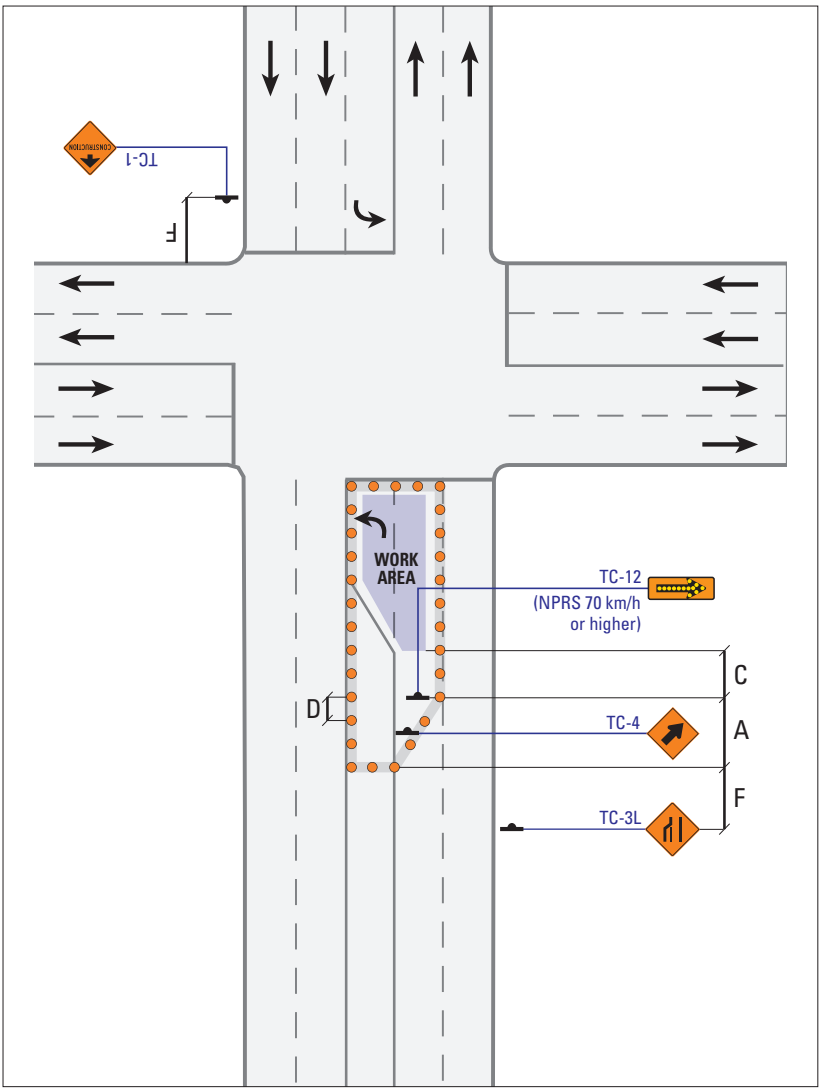
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-20

Intersection: Right Turn Lane and Adjacent Through Lanes Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

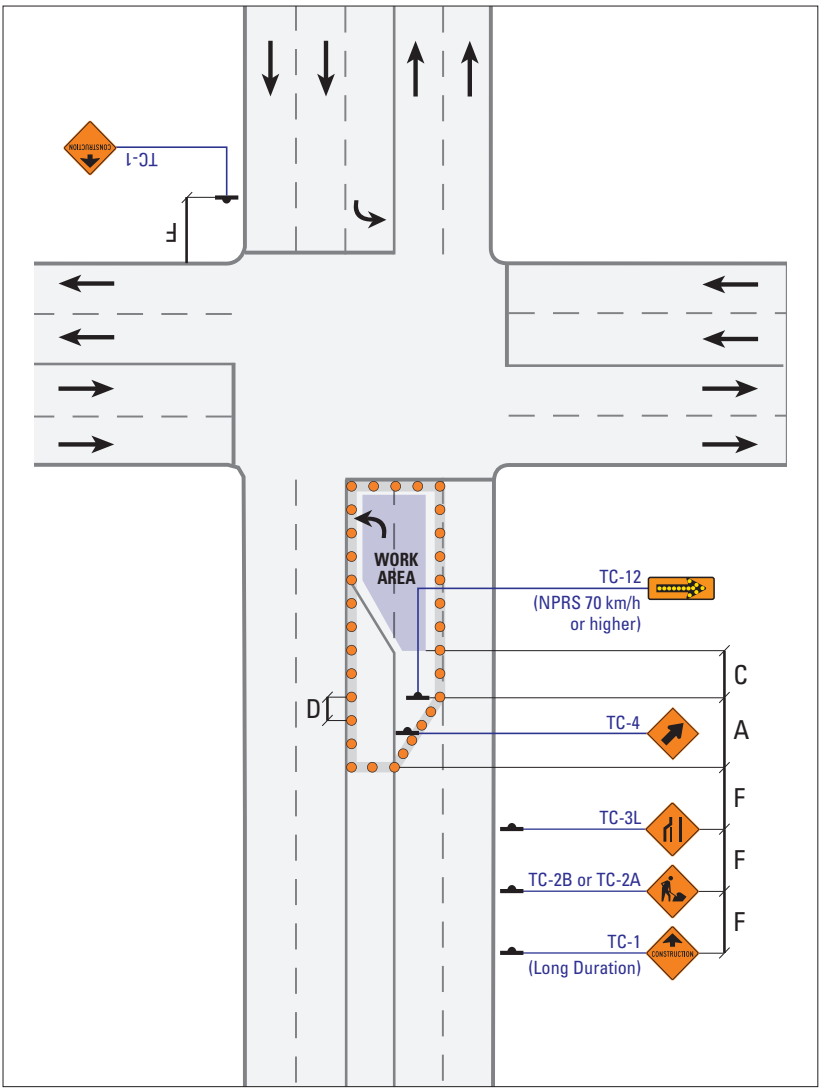
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit left turns in the direction reduced to one lane.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UI-21

Intersection: Left Turn Lane and Adjacent Through Lanes Closed



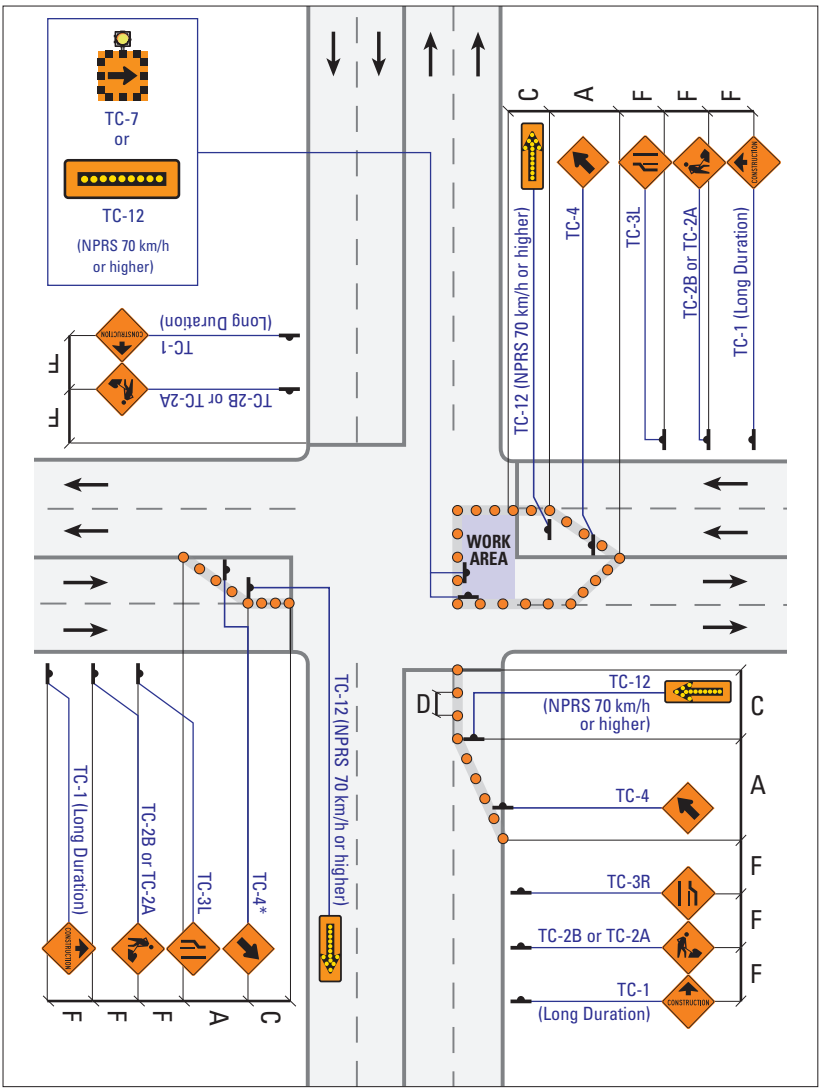
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit left turns in the direction reduced to one lane.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-22 **Intersection: Left Turn Lane and Adjacent Through Lanes Closed**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

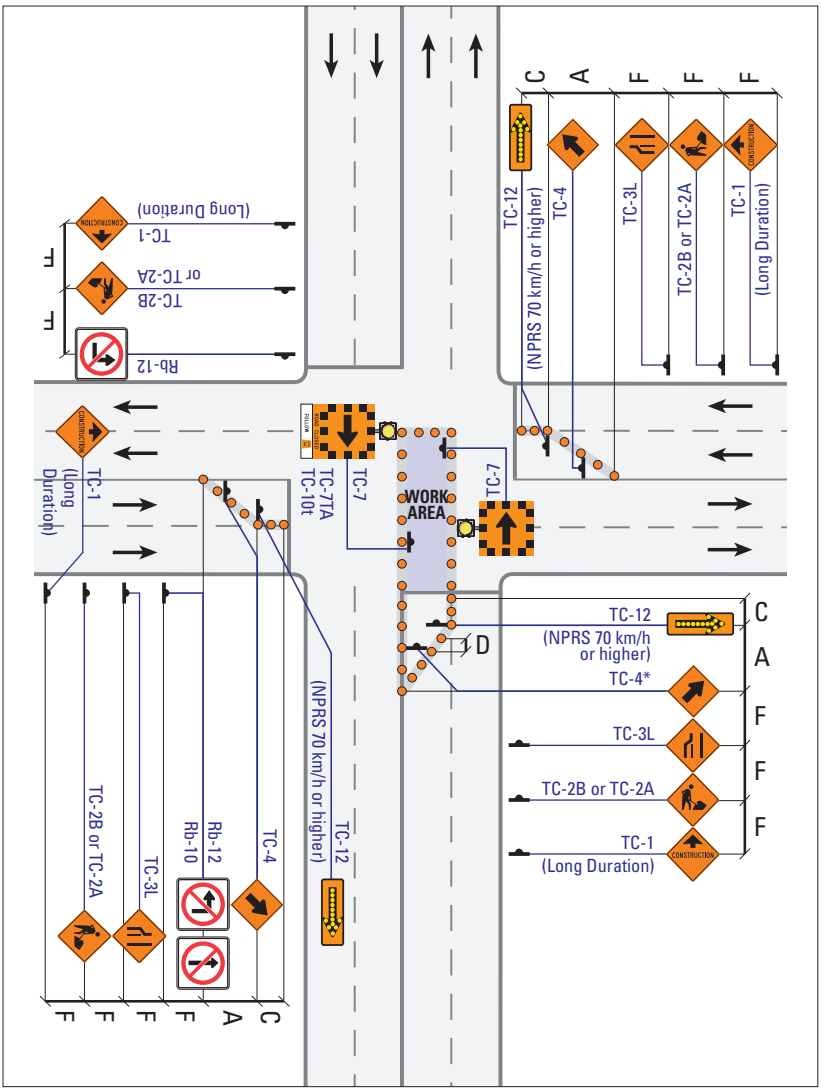
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit certain turning movements.
iii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-23 **Work in Intersection: Right Lane Closed**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

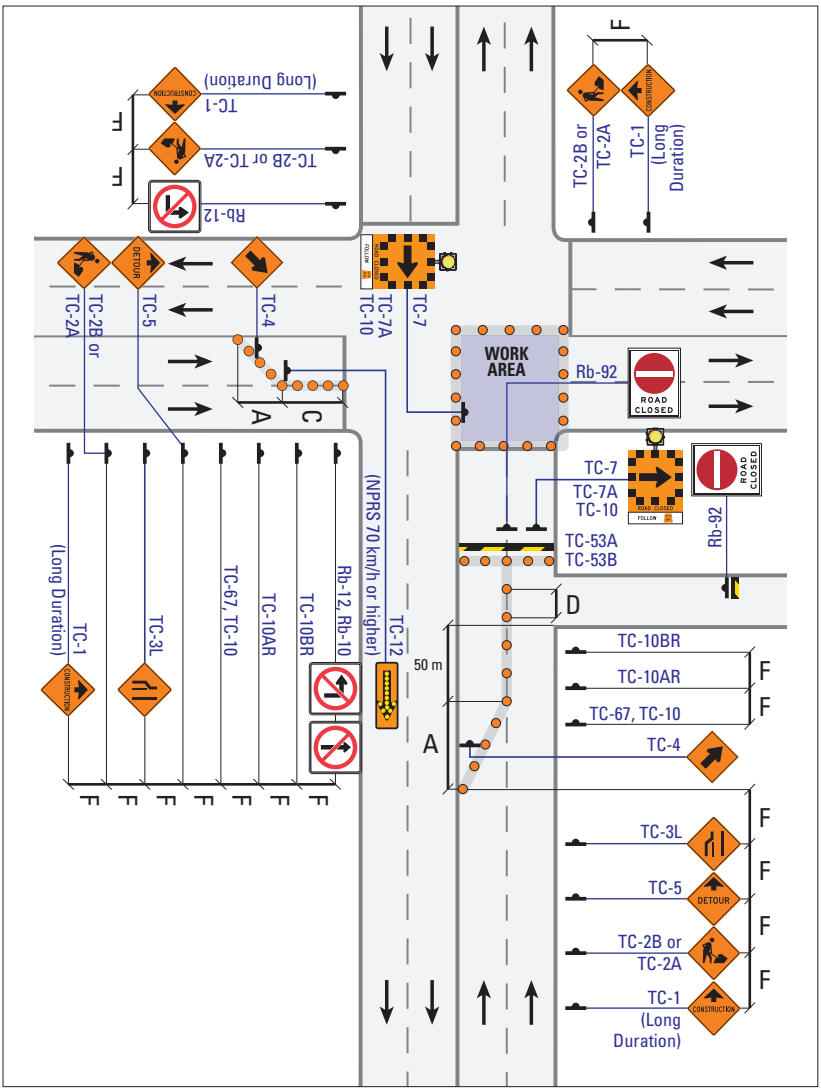
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit additional turning movements.
iii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.
iv) See US-25 "Route Detour", for applicable layout.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-24 Work in Intersection: Left Lane Closed



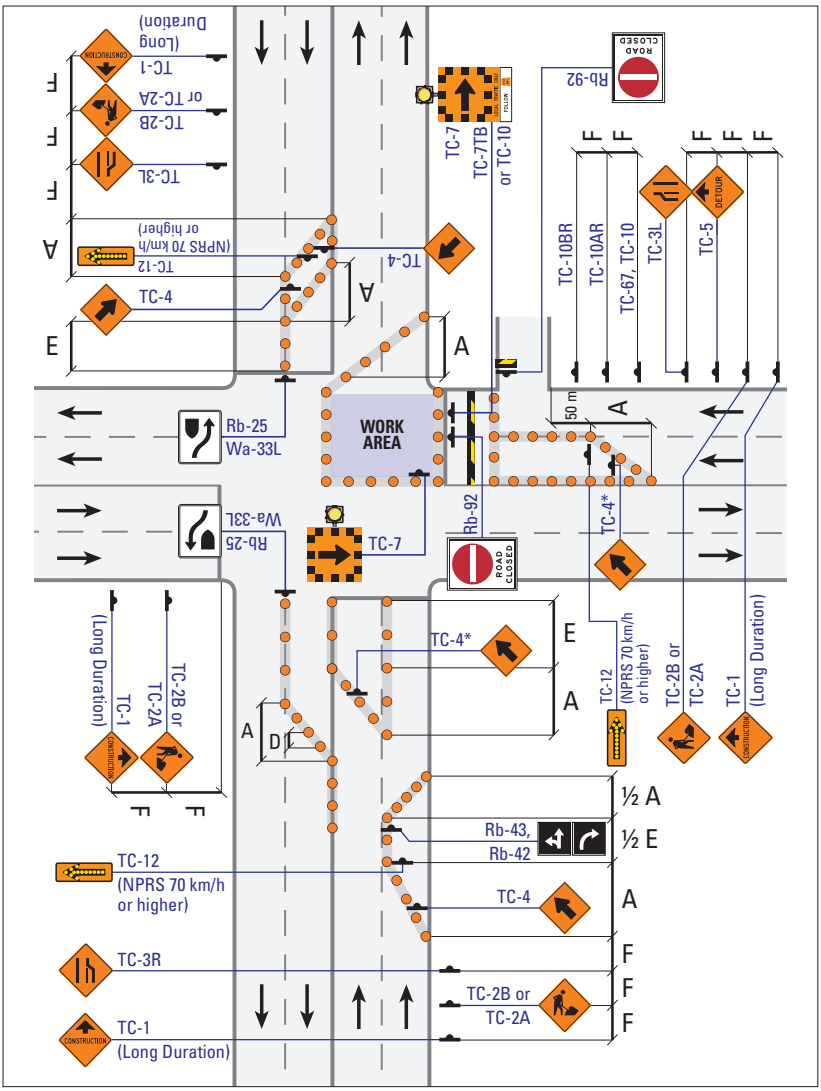
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.
iii) See US-25 "Route Detour", for applicable layout.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-25 Work in Intersection: Road Closed (Detour) – Option 1



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

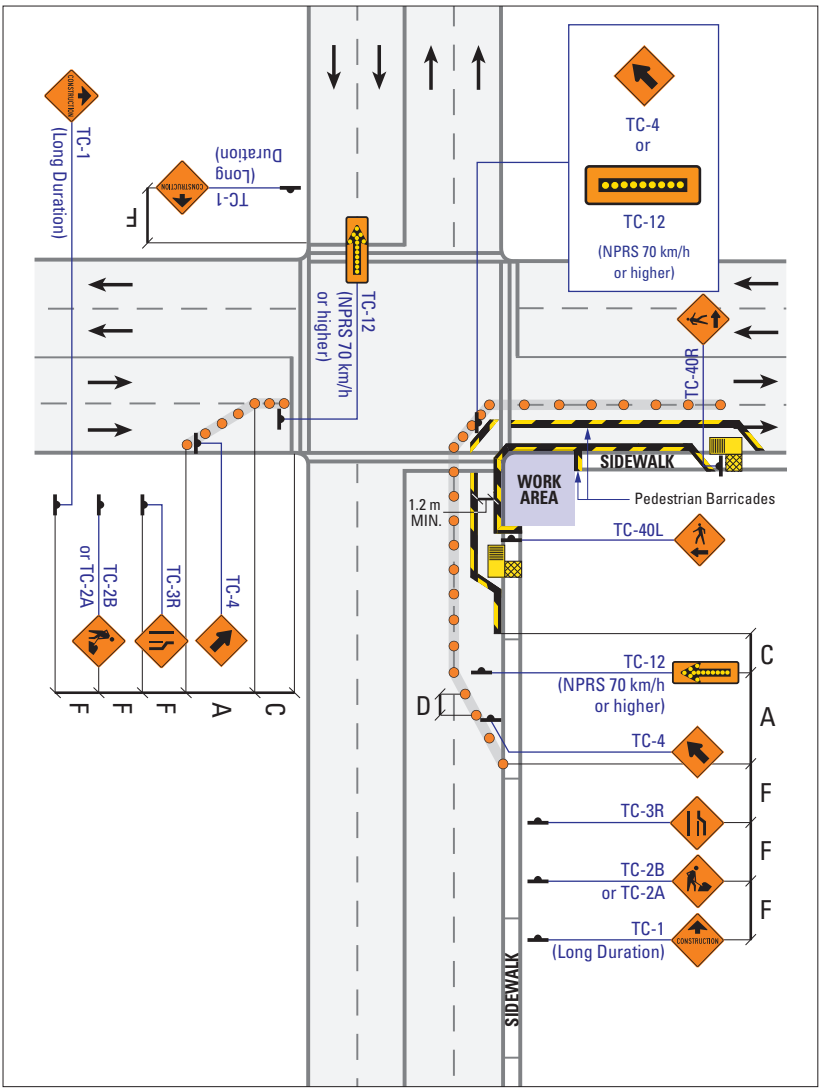
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit certain turning movements.
iii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.
iv) See US-25 "Route Detour", for applicable layout.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-26 **Work in Intersection: Two Lanes Closed – Option 2**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

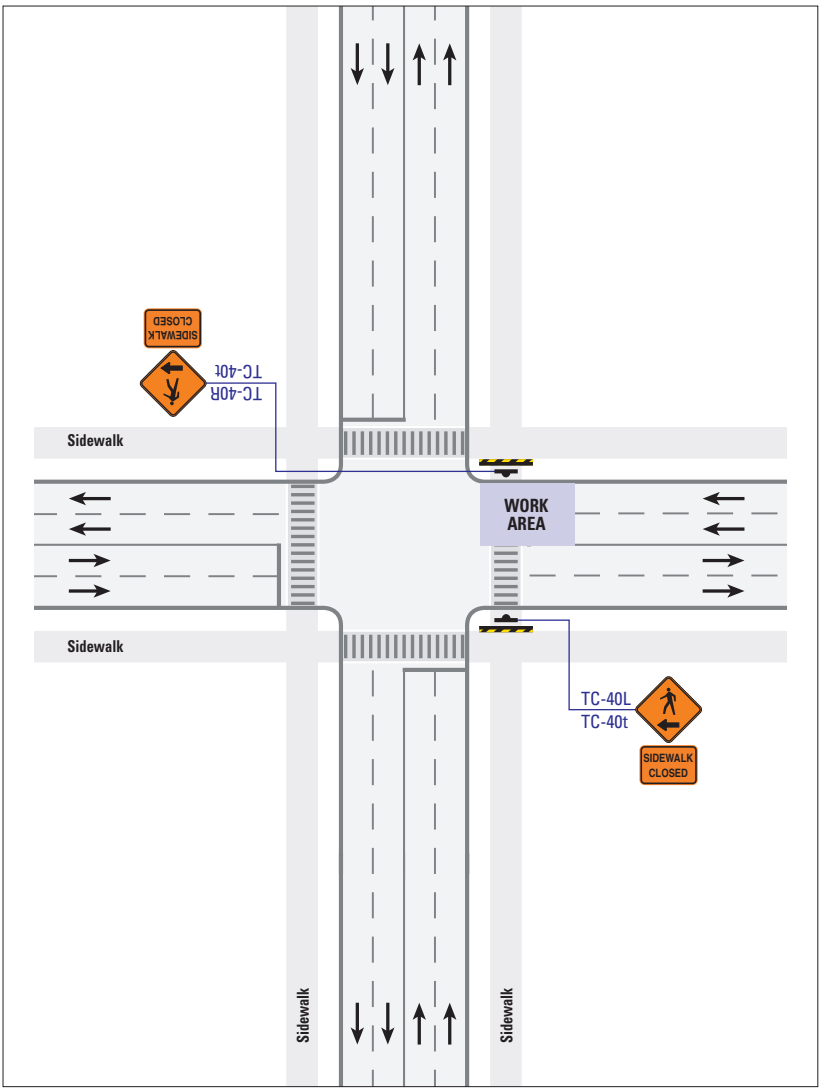
NOTES

i) For Sidewalk Closures of Long Duration, a boardwalk and railing should be provided instead of Pedestrian Barricades.
ii) Minimum width of the temporary walkway is 1.2 m.
iii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-27

Pedestrian Accommodation: Intersection Sidewalk Detour onto Roadway

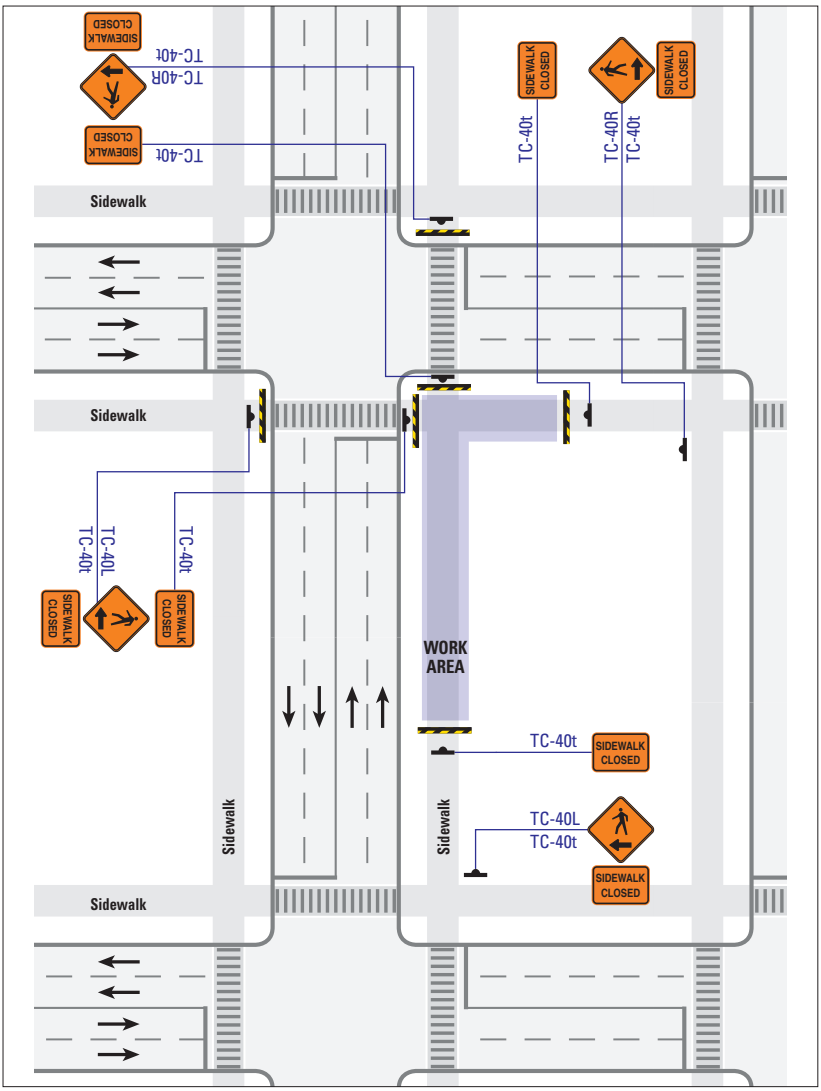


NOTES

i) Supplementary layout. This layout shows pedestrian signage only and shall be used in conjunction with other appropriate layouts.
ii) See US-25 & US-26 for required signage for vehicle Detour.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-28 **Pedestrian Detour: Crosswalk Closure**

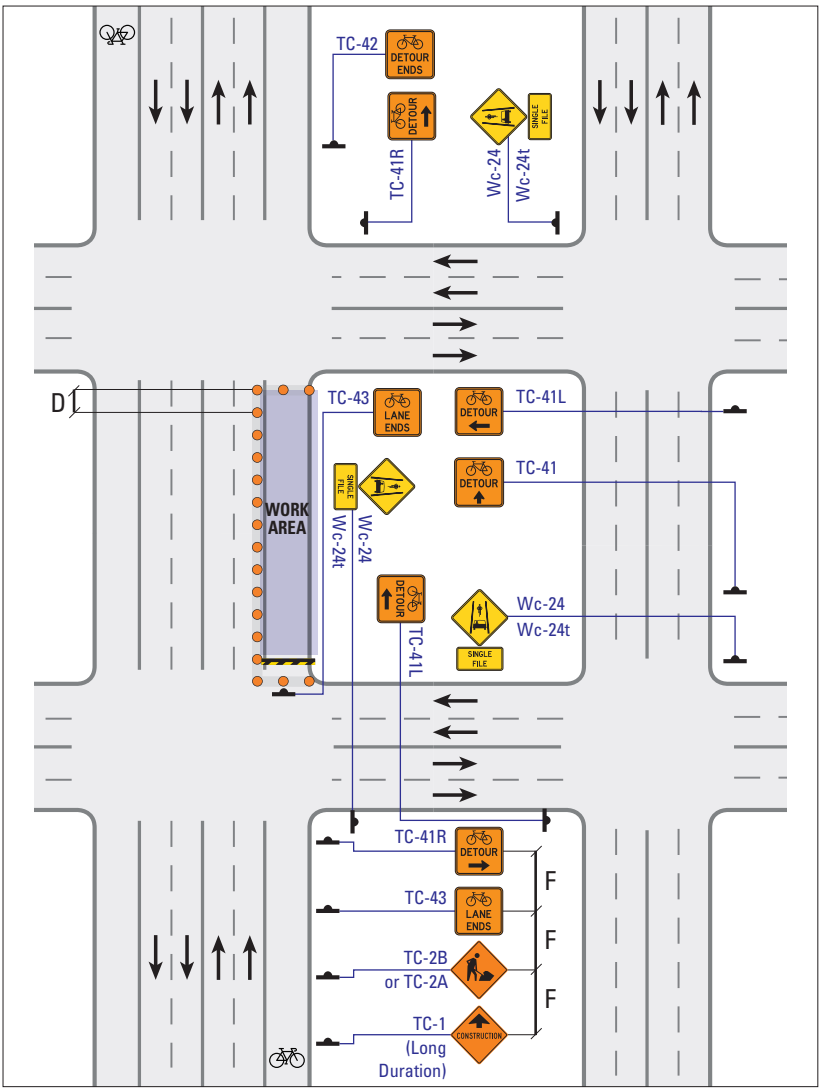


NOTES

i) TC-40L/R Pedestrian Direction sign must be placed at the nearest upstream controlled pedestrian crossing (traffic signal of Pedestrian Crossover) in each direction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-29 **Pedestrian Detour: Crosswalk and Sidewalk Closure**



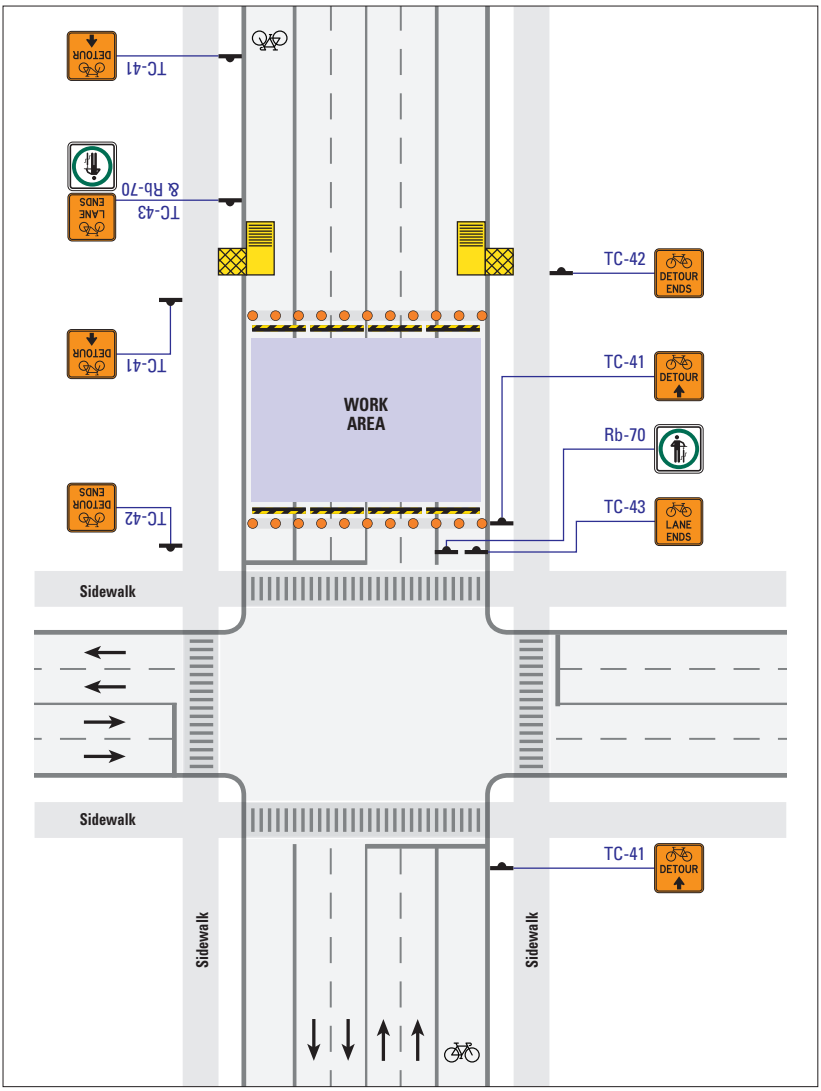
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

Shared lane only to be used if considered by OTM Book 18 or MTO Bikeways Design Manual, Desirable Cycling Facility Nomograph. Otherwise, cycling Detour should be provided.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-30 Cyclist: Detour

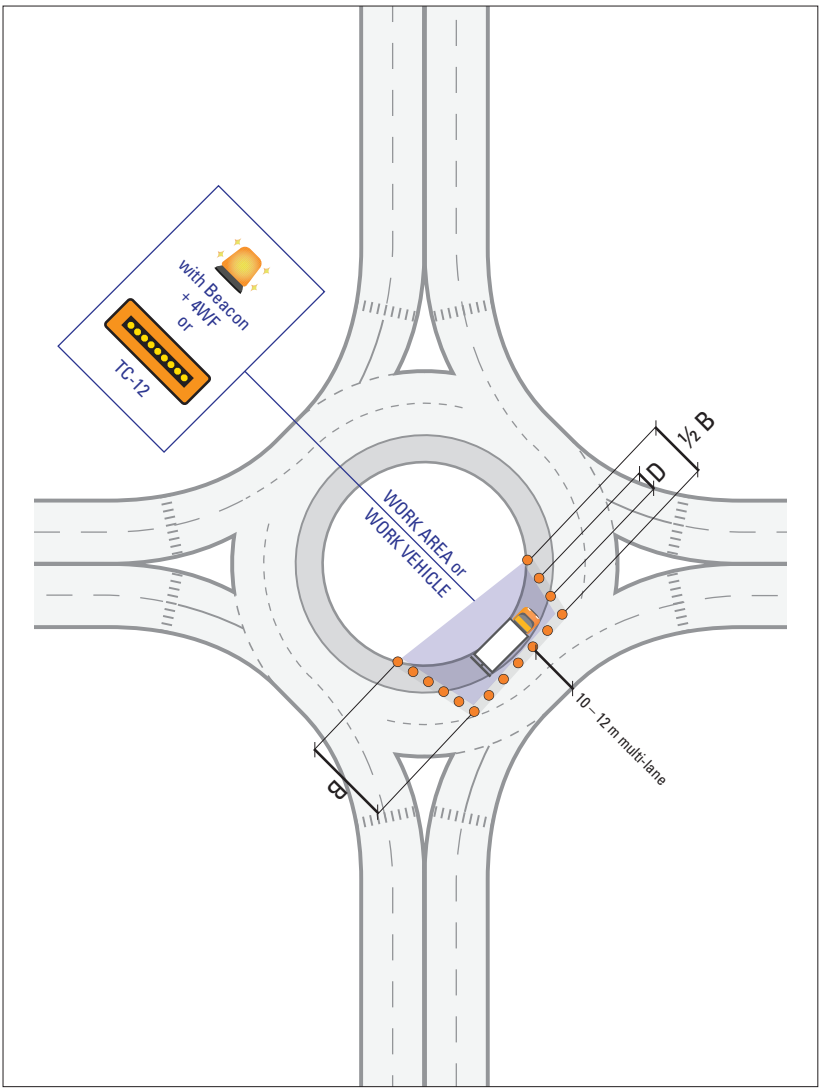


NOTES

i) Supplementary layout. This layout shows cyclist signage only and shall be used in conjunction with other appropriate layouts.
ii) See US-25 & US-26 for required signage for vehicle Detour.
iii) Ramps must be AODA-compliant.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UI-31 Bicycle Lane Closed: Dismount and Walk



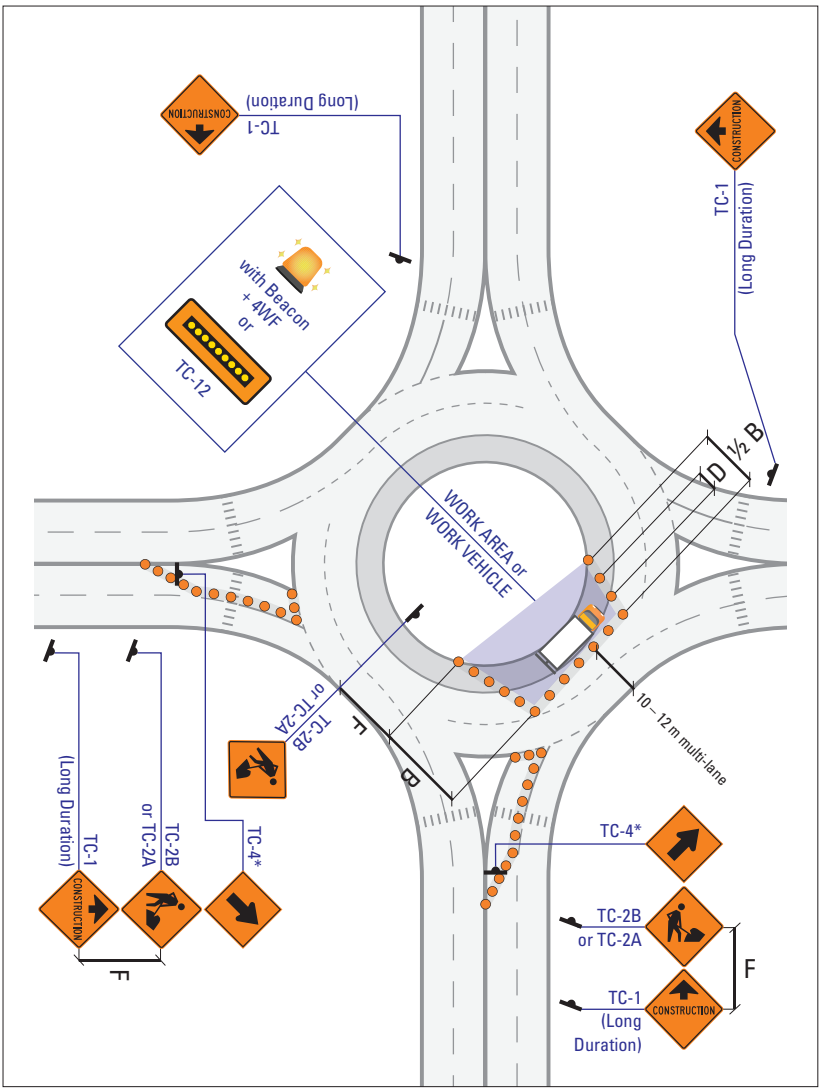
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Total lane width of 10 m must be maintained. If minimum lane widths cannot be maintained then see Lane Closure layouts.
iii) Markers are not required if a Work Vehicle with Beacon + 4WF or TC-12 is present.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UO-1 Roundabout: Encroachment



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

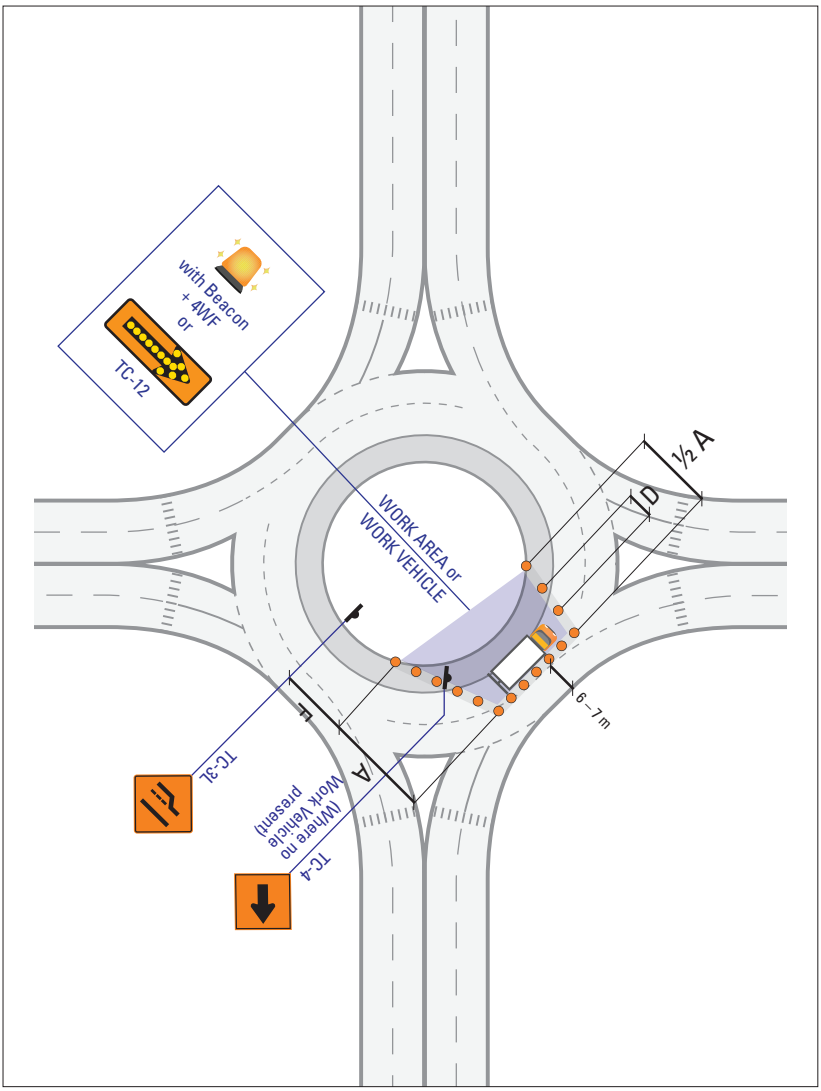
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Total lane width of 10 m must be maintained. If minimum lane widths cannot be maintained then see Lane Closure layouts.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UO-2 Roundabout: Encroachment



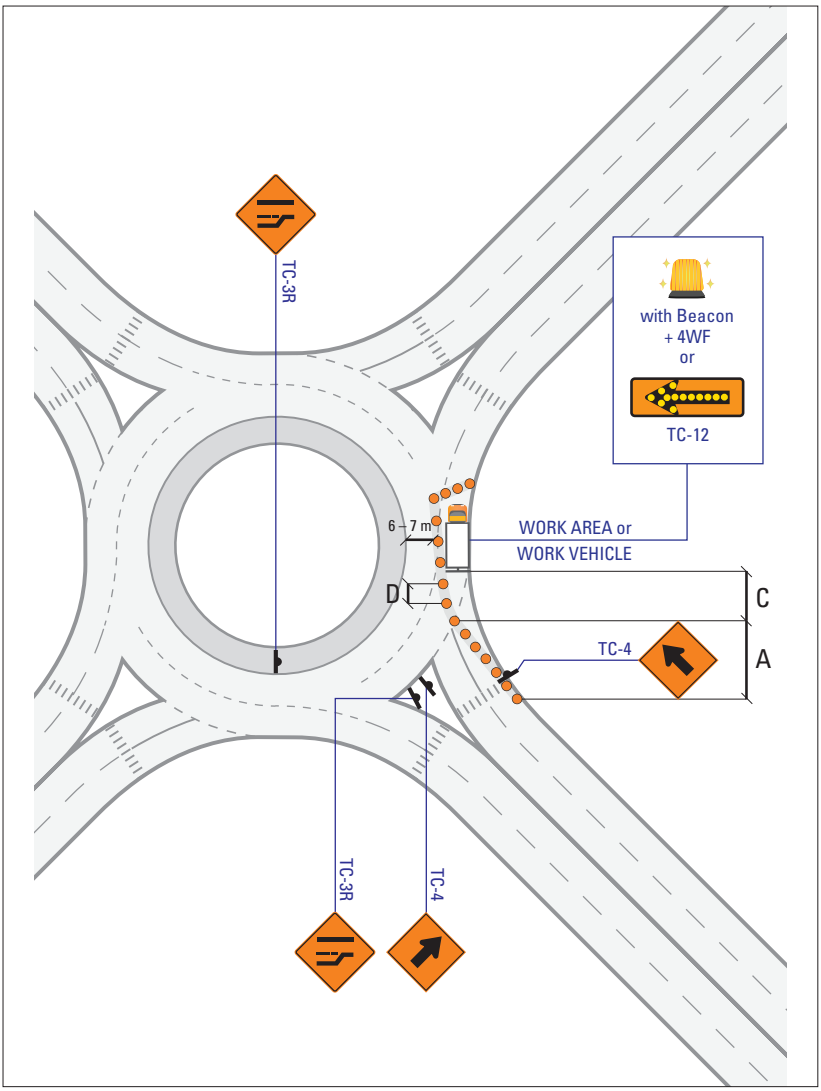
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UO-3 Roundabout: Inside Lane Partially Closed



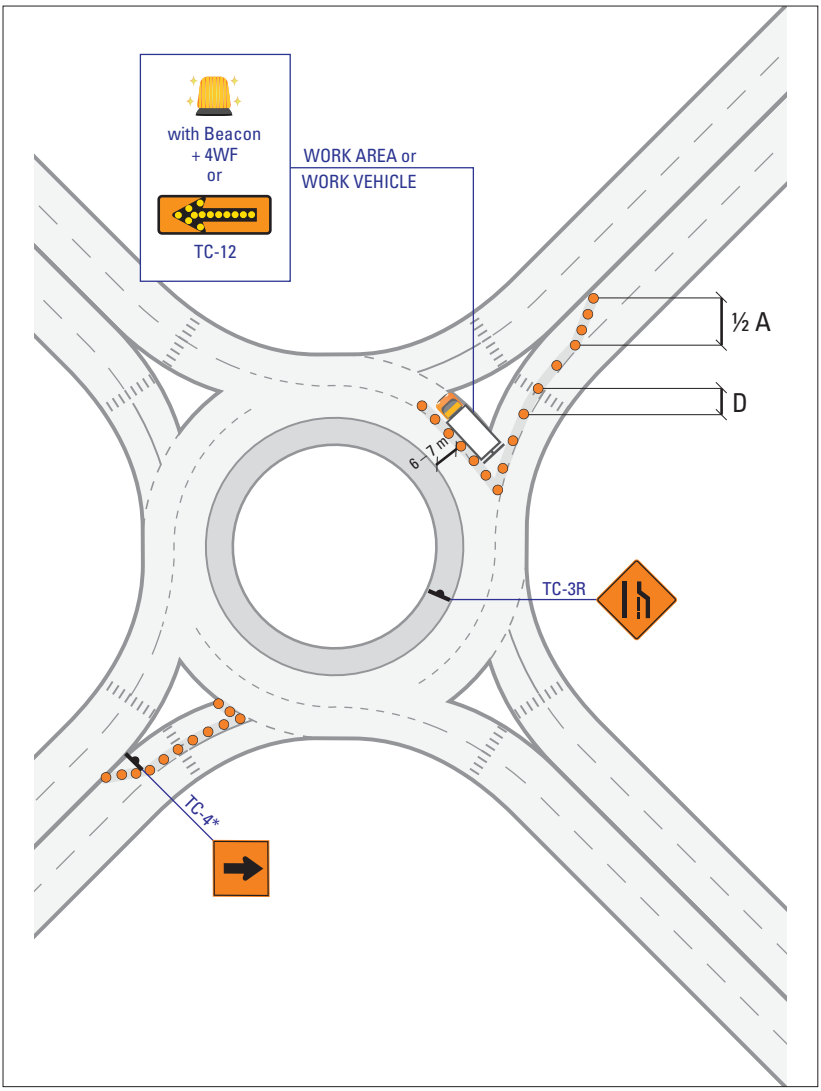
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UO-4 Roundabout: Outside Lane Partially Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	12	12
	Minimum Number of Markers for Taper	4	5	5	7	8

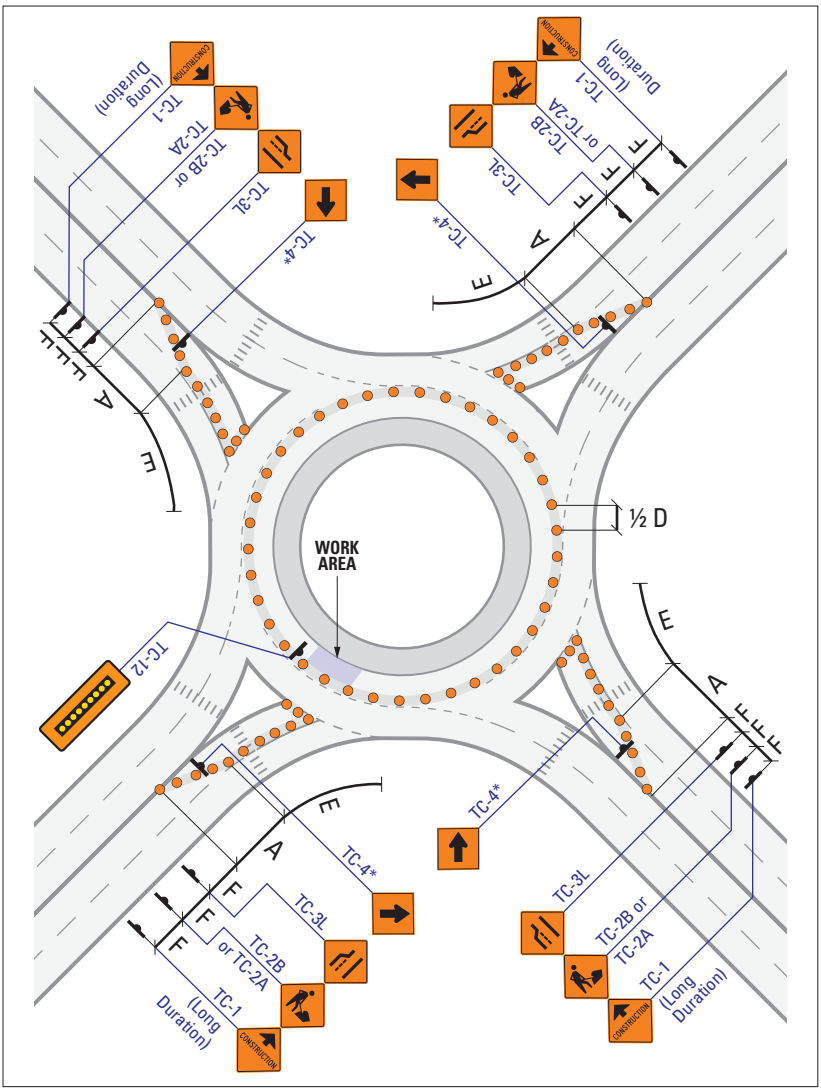
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

UO-5 Roundabout: Left Exit or Partial Outside Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

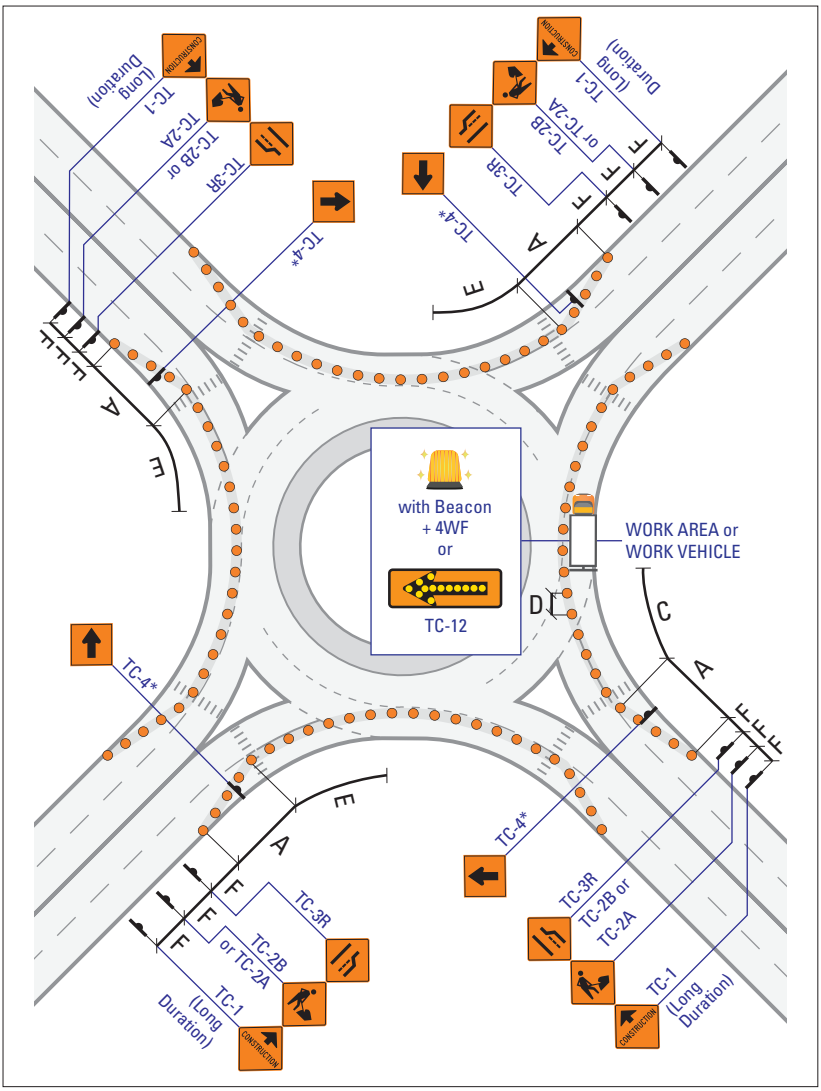
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Work Area may be anywhere in the inside lane. All entrances must be reduced to one lane.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UO-6 Roundabout: Inside Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

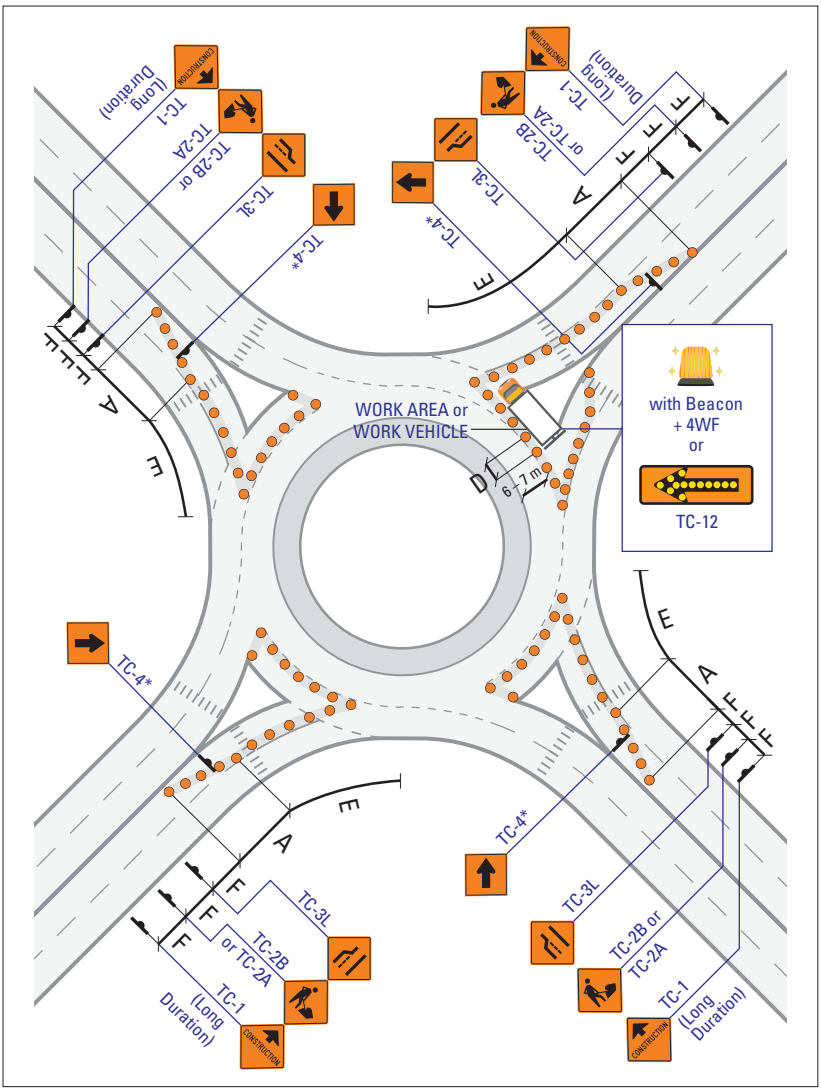
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Work Area may be in any of the closed quadrants. All entrances and exits must be reduced to one lane.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UO-7 Roundabout: Outside Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

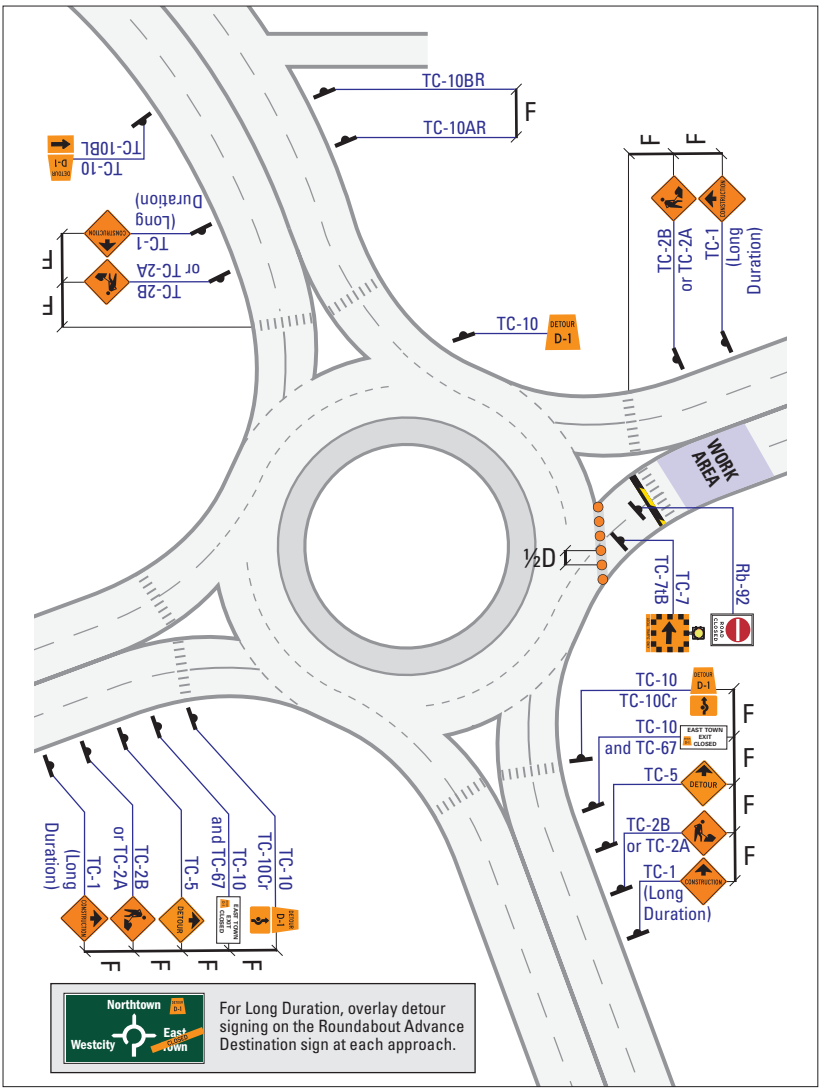
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) All entrances must be reduced to one lane.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UO-8 Roundabout: Left Exit or Partial Outside Lane Closed



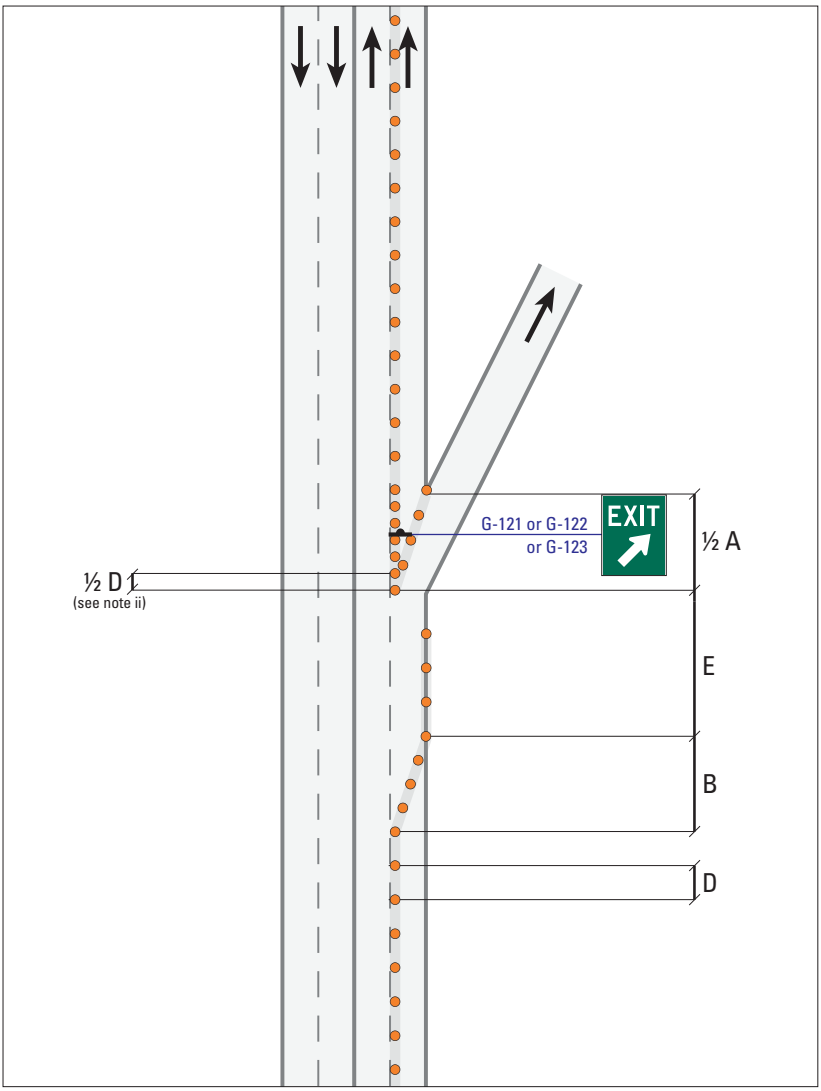
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) See US-25 and US-26 for Detour signing in advance and beyond the Roundabout.
ii) Any existing signs that contradict or that are duplicated should be covered.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UO-9 **Roundabout: One Exit Closed (Detour)**



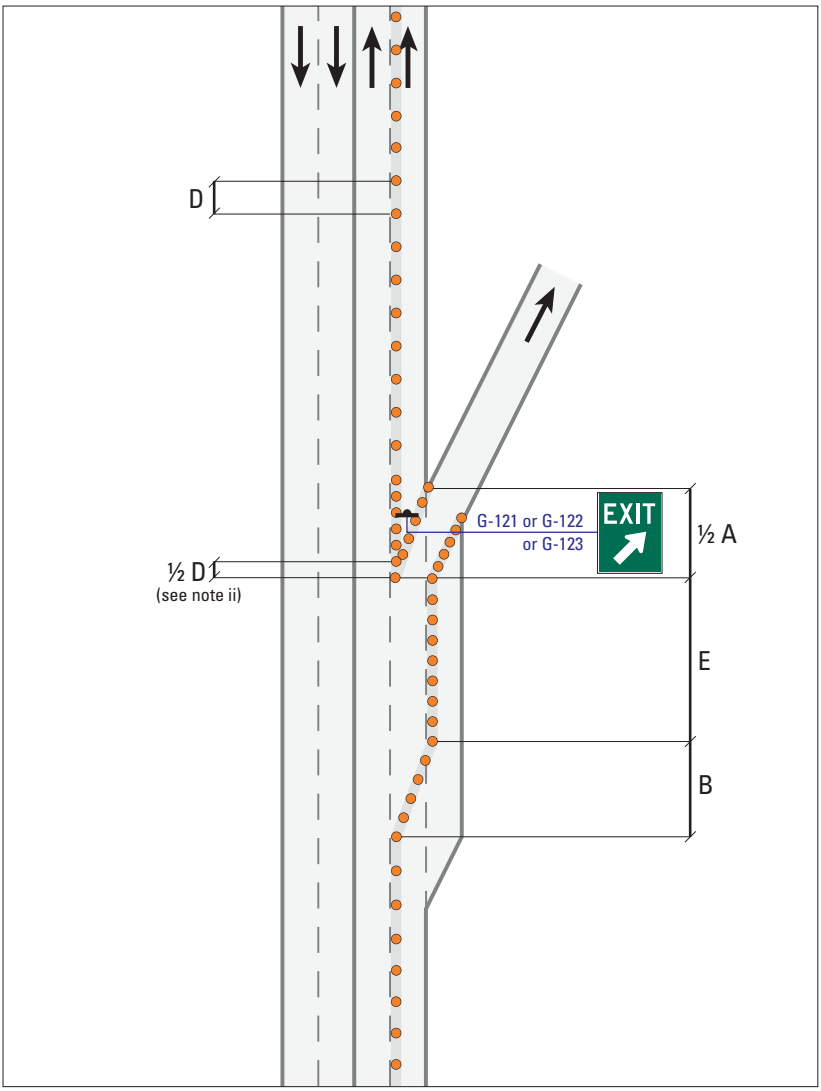
Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200

NOTES

i) For Right Lane Closed, see US-17.
ii) In the immediate area of the exit, Marker spacings of half of those shown on Table B should be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UR-1 Lane Closed at Exit Ramp



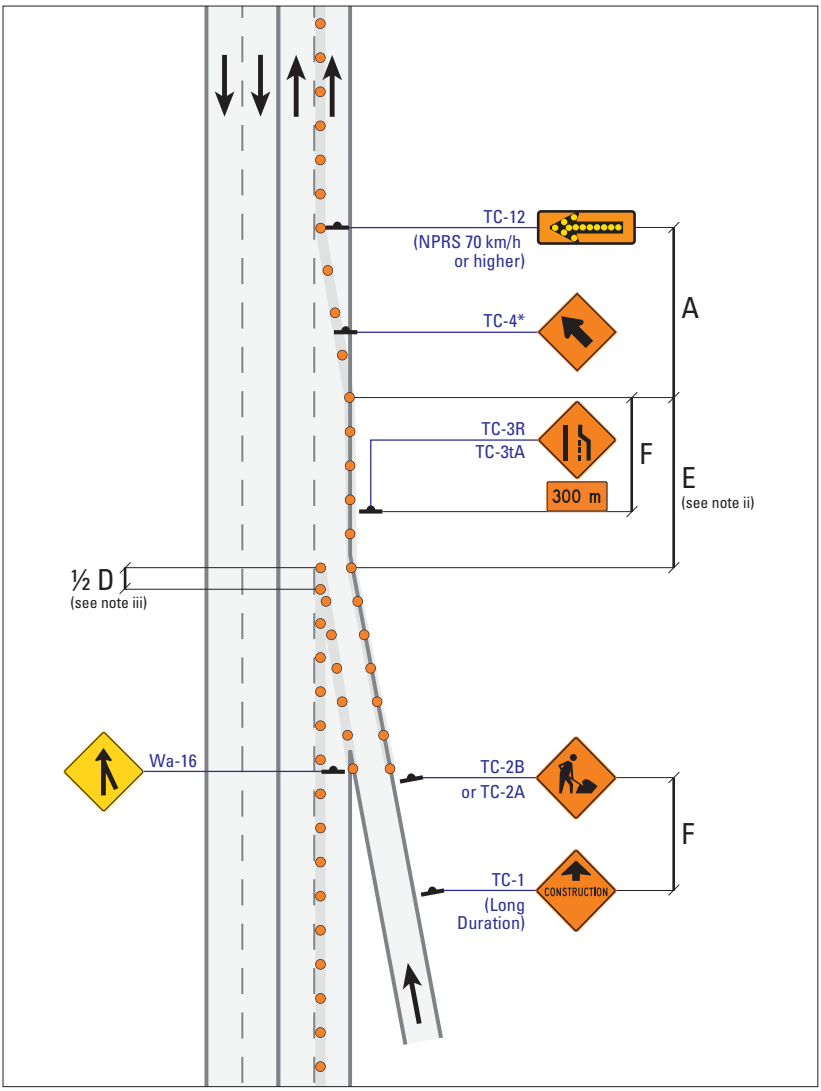
Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200

NOTES

i) For Right Lane Closed, see US-17.
ii) In the immediate area of the exit, Marker spacings of half of those shown on Table B should be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UR-2 Lane Closed at Exit Ramp with a Deceleration Lane



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

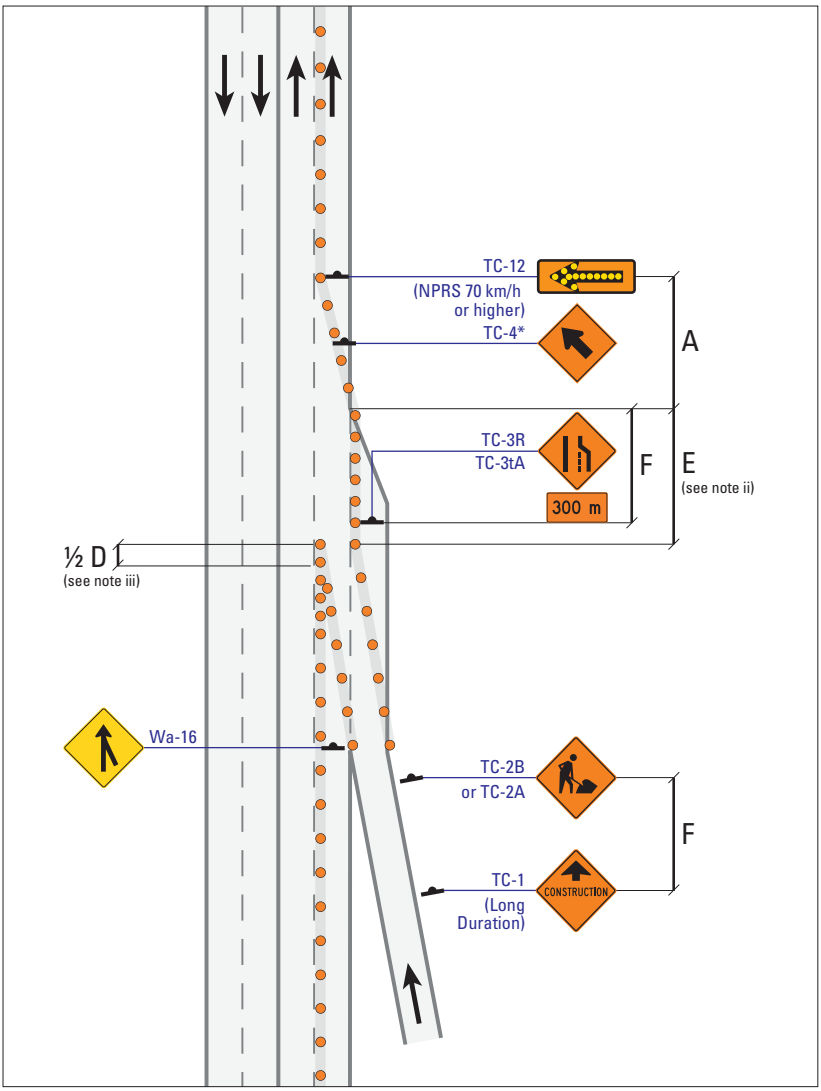
NOTES

i) For Right Lane Closed, see US-17.
ii) Where space and work activities permit, the acceleration lane should be made as long as possible.
iii) In the immediate area of the entrance, Marker spacings of half of those shown on Table B should be used.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UR-3 Lane Closed at Entrance Ramp



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

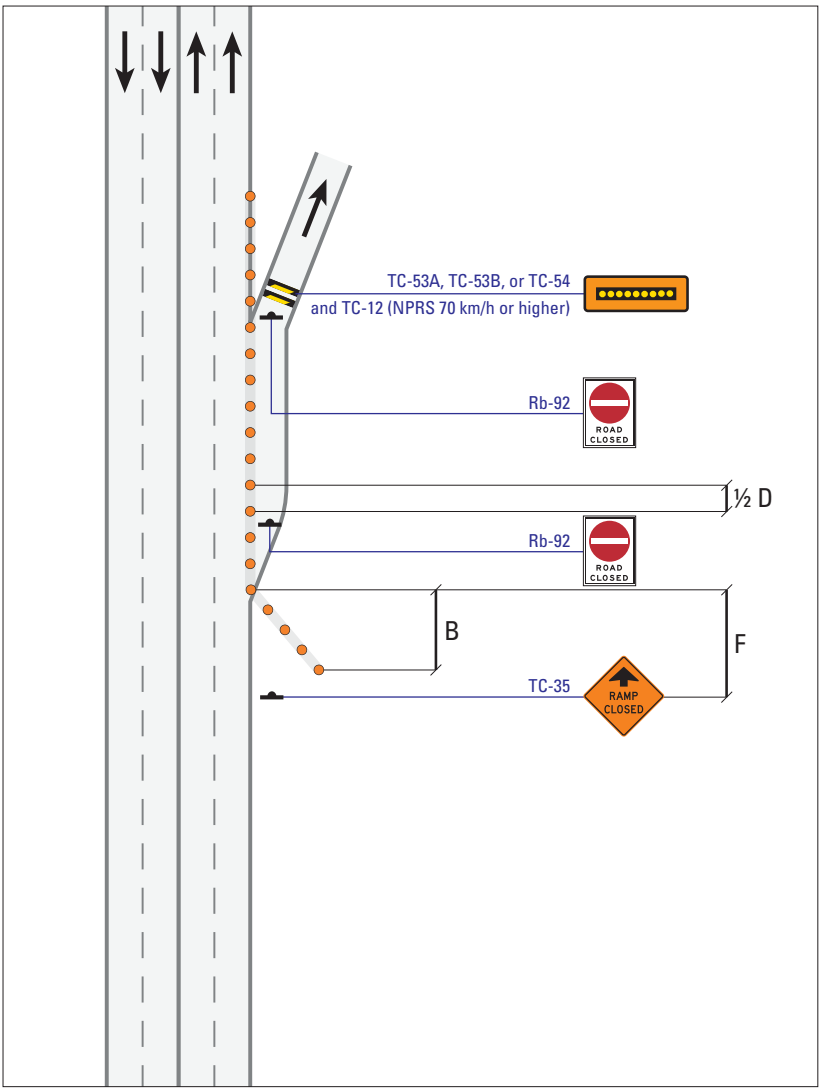
NOTES

i) For Right Lane Closed, see US-17.
ii) Where space and work activities permit, the acceleration lane should be made as long as possible.
iii) In the immediate area of the entrance, Marker spacings of half of those shown on Table B should be used.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UR-4 Lane Closed at Exit Ramp with an Acceleration Lane



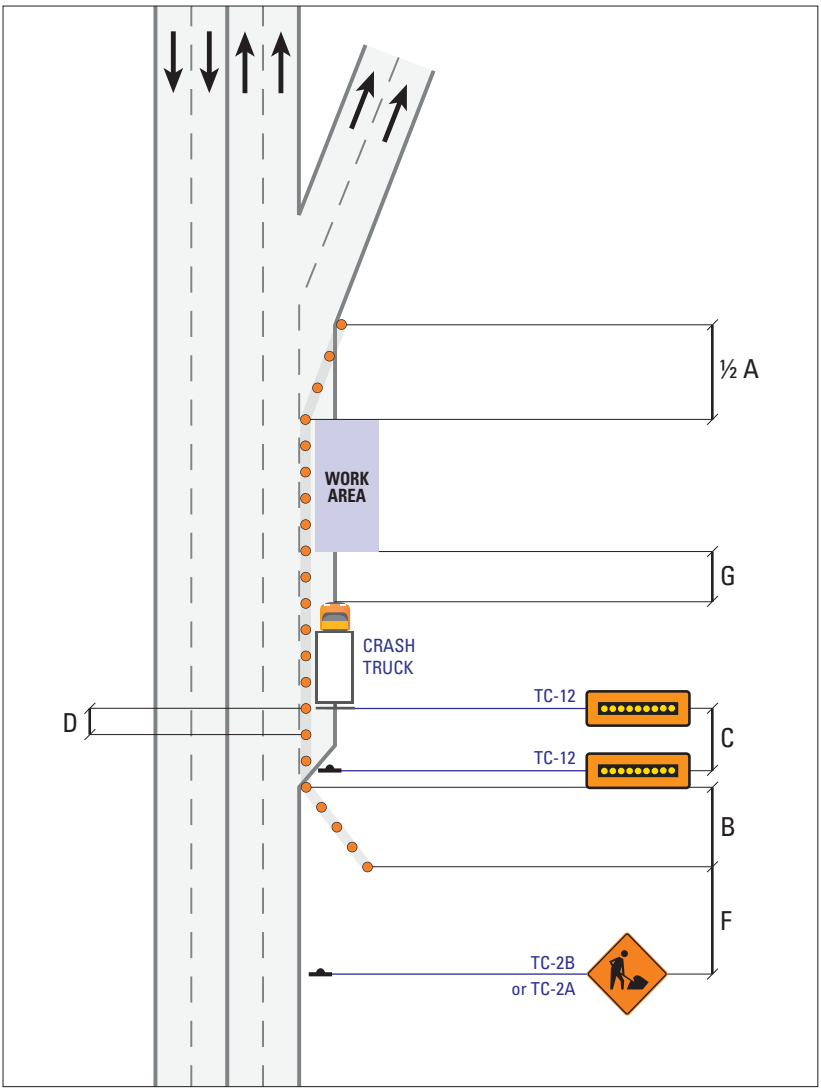
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Closed sign on Directional Guide Signs to be used for Long Duration only. For details, see OTM Book 8.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UR-5 **Ramp Closed**



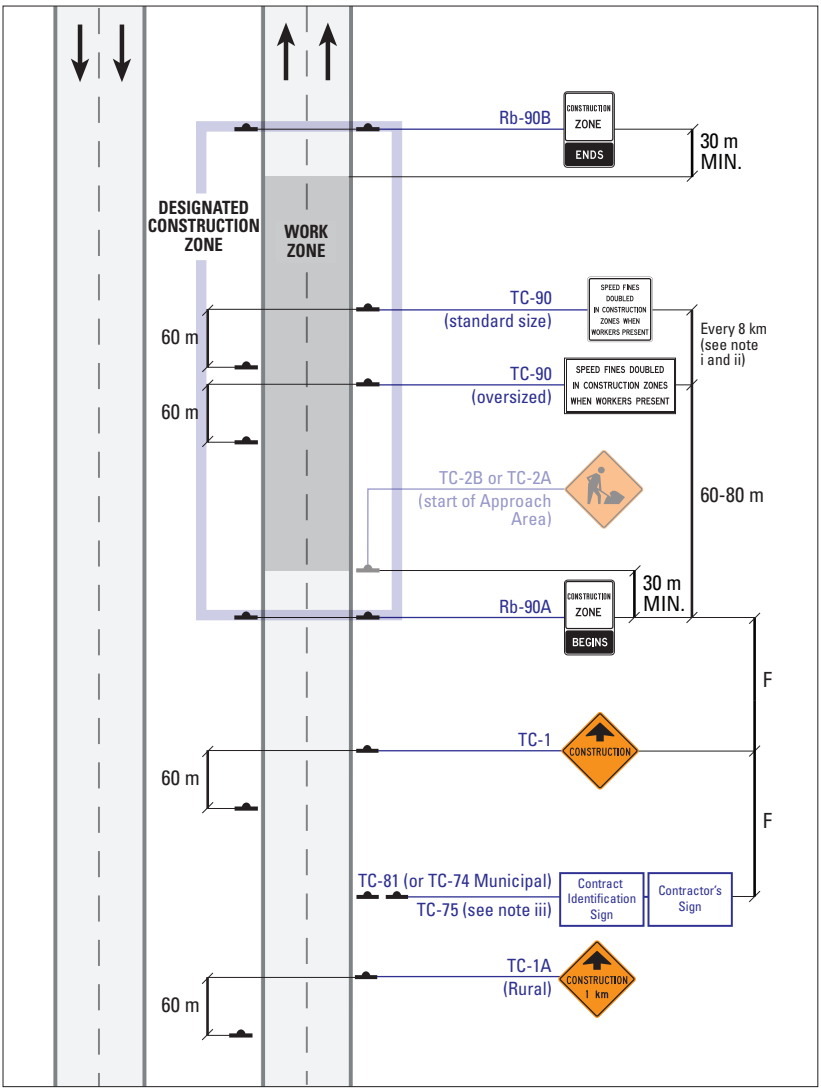
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65

NOTES

i) Left Developed Lane Closed: mirror image of Right Developed Lane Closed.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

UR-6 **Right Developed Lane Closed**



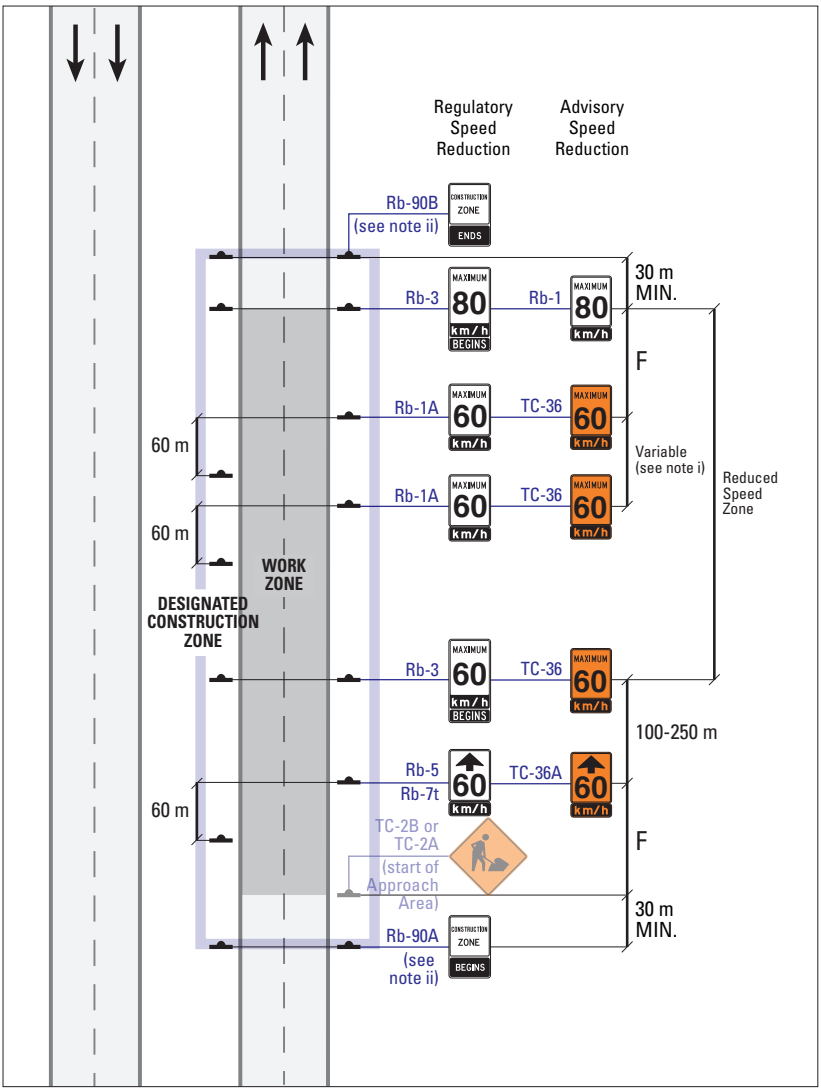
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Where signs cannot be accommodated in the median, provide additional signs on the right shoulder or oversize as practicable.
ii) Recommended, but not required.
iii) Where required by contract.
iv) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts. Locations of TC-1, TC-1A, TC-1B shown in DG-1 overrides the locations shown in other layouts when used in conjunction with DG-1.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DG-1 **Designated Construction Zone Signing**

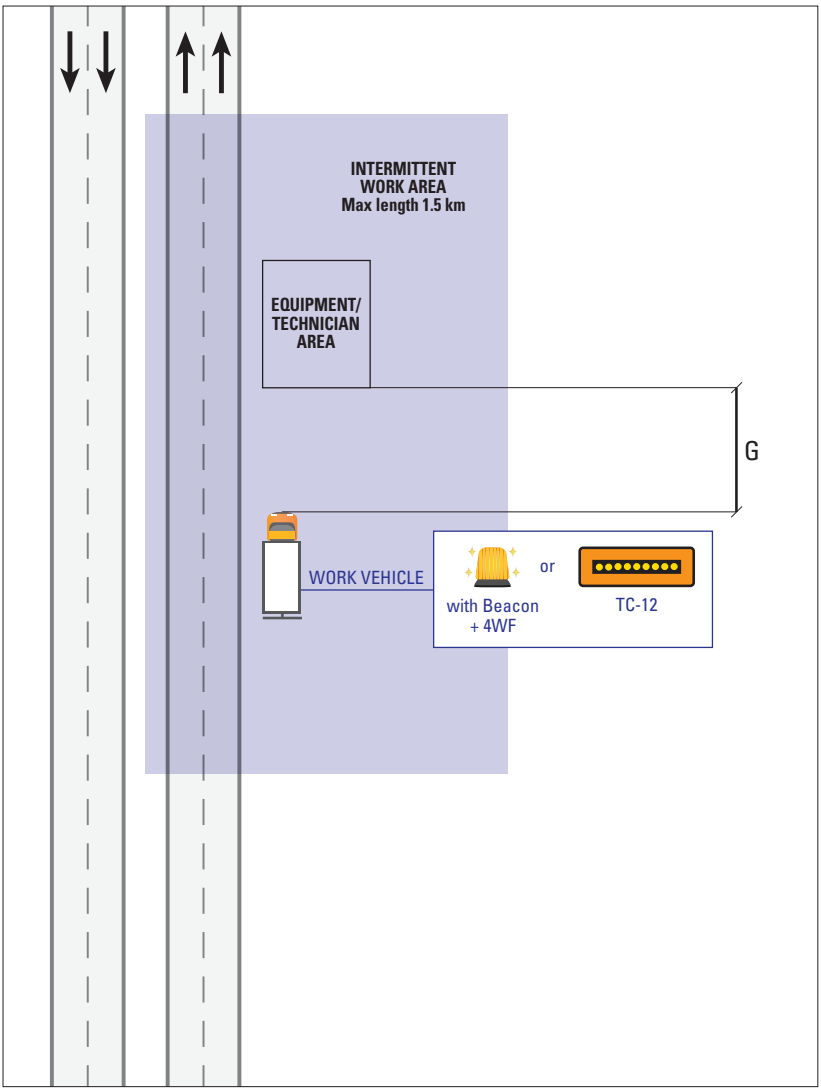


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Refer to Regulation 615 of the Highway Traffic Act and OTM Book 5 for distance between regulatory speed limit signs.
ii) For Regulatory Speed Reduction, a Designated Construction Zone must be established and signed as per DG-1.
iii) Where signs can be accommodated in the median, provide additional signs on the right shoulder or oversize as practicable.
iv) Reduced Speed Zone may include all of or only part(s) of the Designated Construction Zone.
v) Additional signs may be required based on the length of zone.
vi) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H	Sight Distance (m)	150	150	200	250	250

NOTES

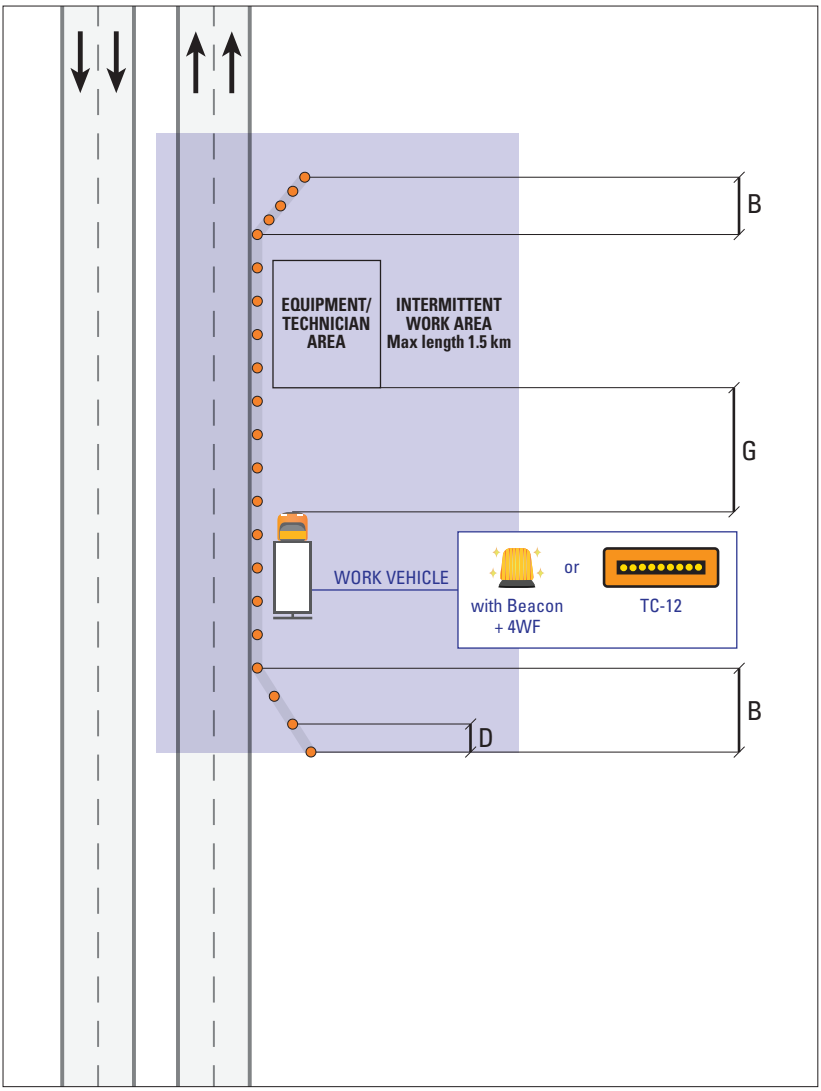
Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, pothole patching:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DS-1 **Intermittent Work**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H	Sight Distance (m)	150	150	200	250	250

NOTES

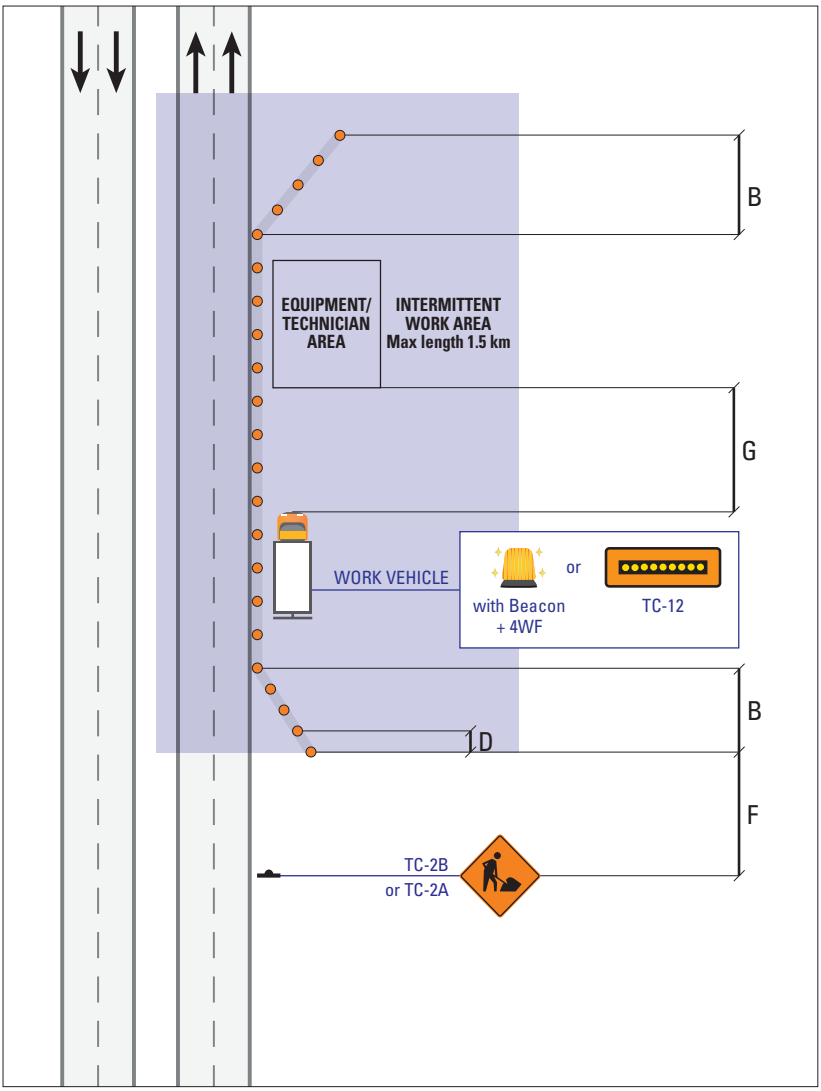
i) A Work Vehicle with a TC-12 may replace Markers.

Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, debris cleanup:

- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65
H	Sight Distance (m)	150	150	200	250	250

NOTES

i) A Work Vehicle with a TC-12 may replace Markers.

Where a worker is moving within the Intermittent Work Area with only brief stationary moments, for example, surveying:

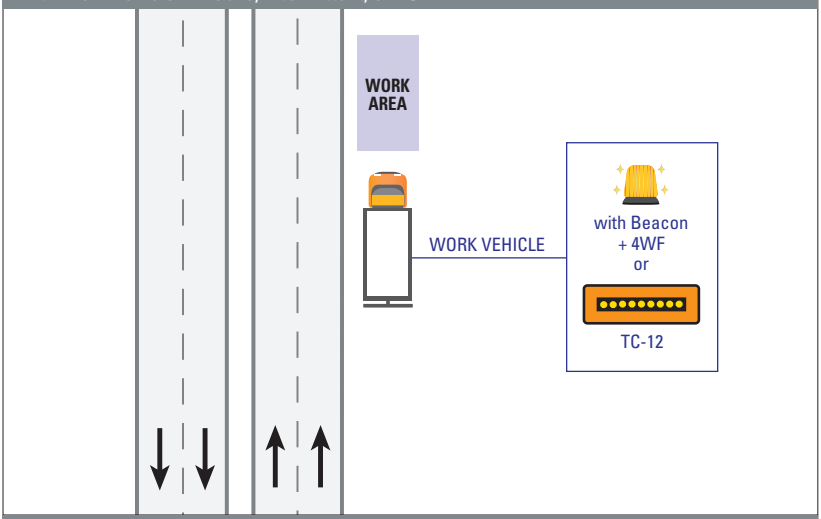
- **Worker requires sight distance**
- **(refer to H in Table).**
- **Spotter(s) required when sight distance is not available.**
- **Where clear and constant verbal communication is not possible (i.e., distance, noise), spotter(s) and worker must use two-way communication devices.**
- **Where required sight distances (refer to H in Table) are present and the worker/technician's activities permit a continuous consciousness of approaching traffic, a spotter may not be required.**
- **Worker must not interfere with traffic.**

Note: this would allow for a single worker operation (i.e., surveyor or possibly one-person pothole repair).

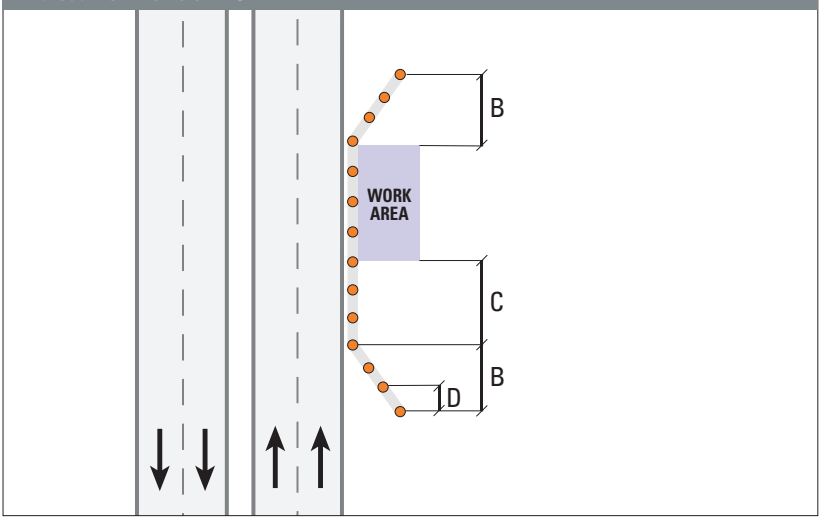
For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-3 Intermittent Work

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD

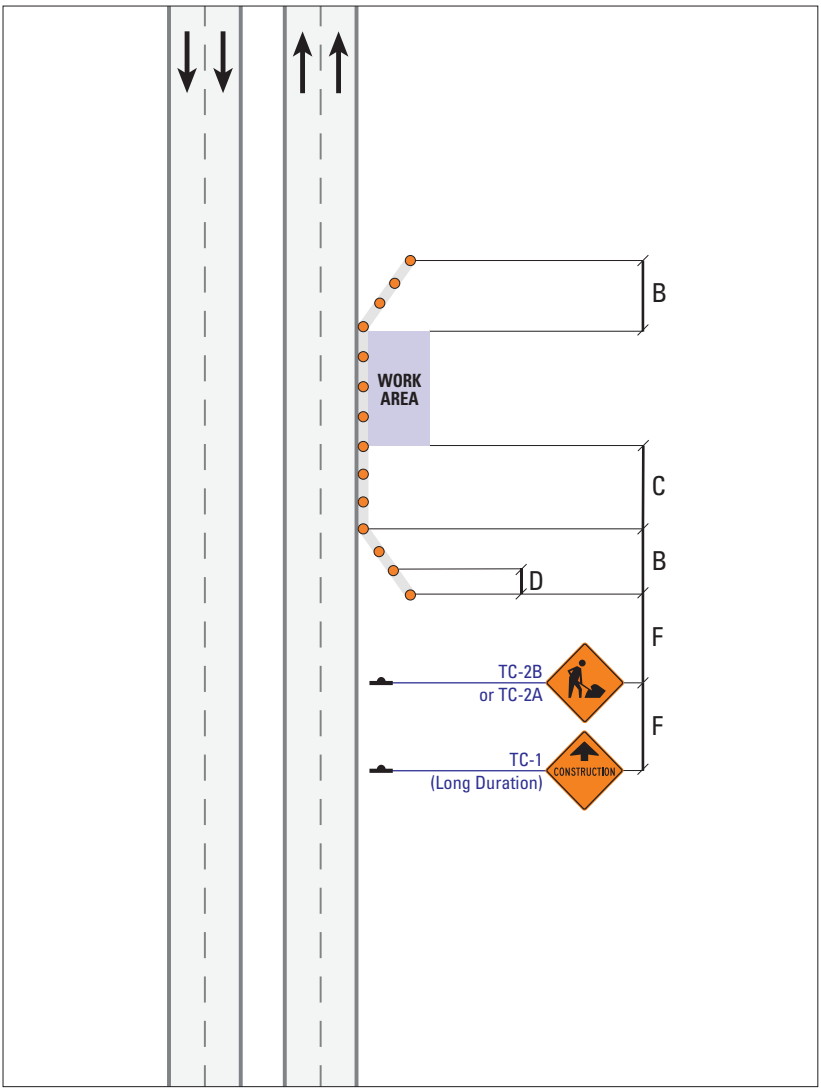


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Mirror image for work on the left shoulder.
ii) Termination Taper optional.
iii) When a vehicle on shoulder with TC-12 enters a live lane, the TC-12 in bar mode must be switched to arrow mode.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

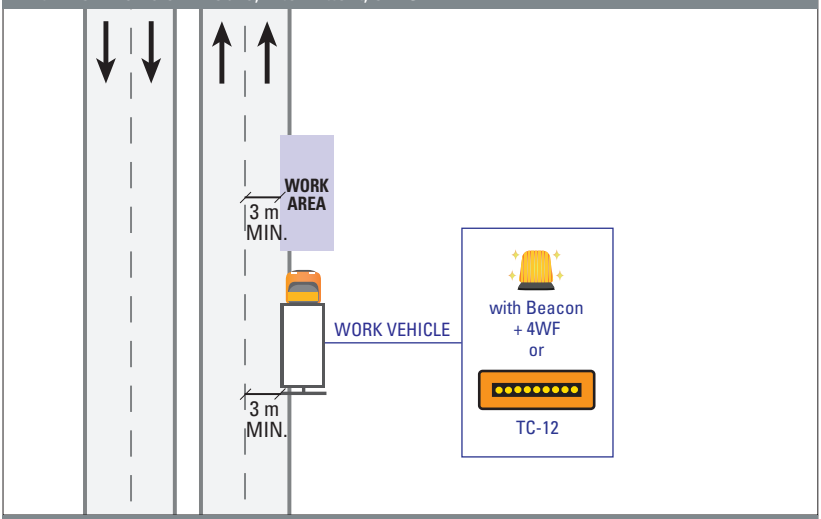
NOTES

i) Mirror image for work on the left shoulder.
ii) Termination Taper optional.
iii) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.
iv) A Work Vehicle with a TC-12 may replace Markers for Short Duration work.

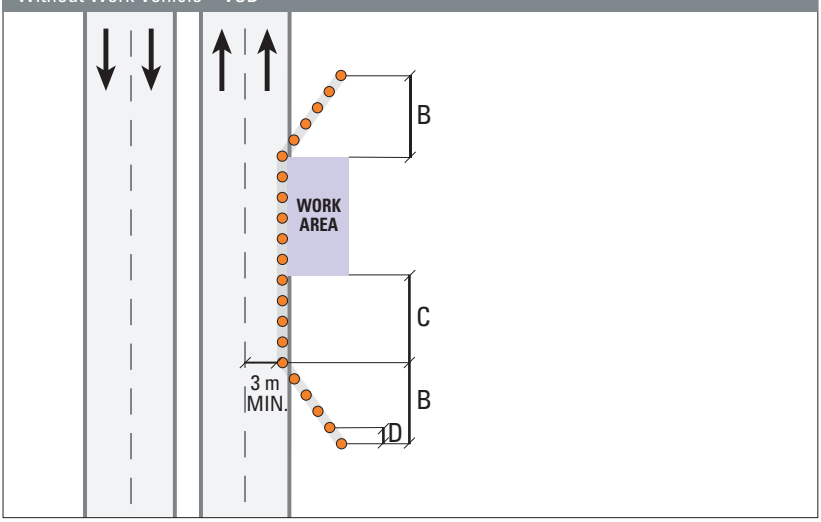
For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-5 **Shoulder Work**

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD



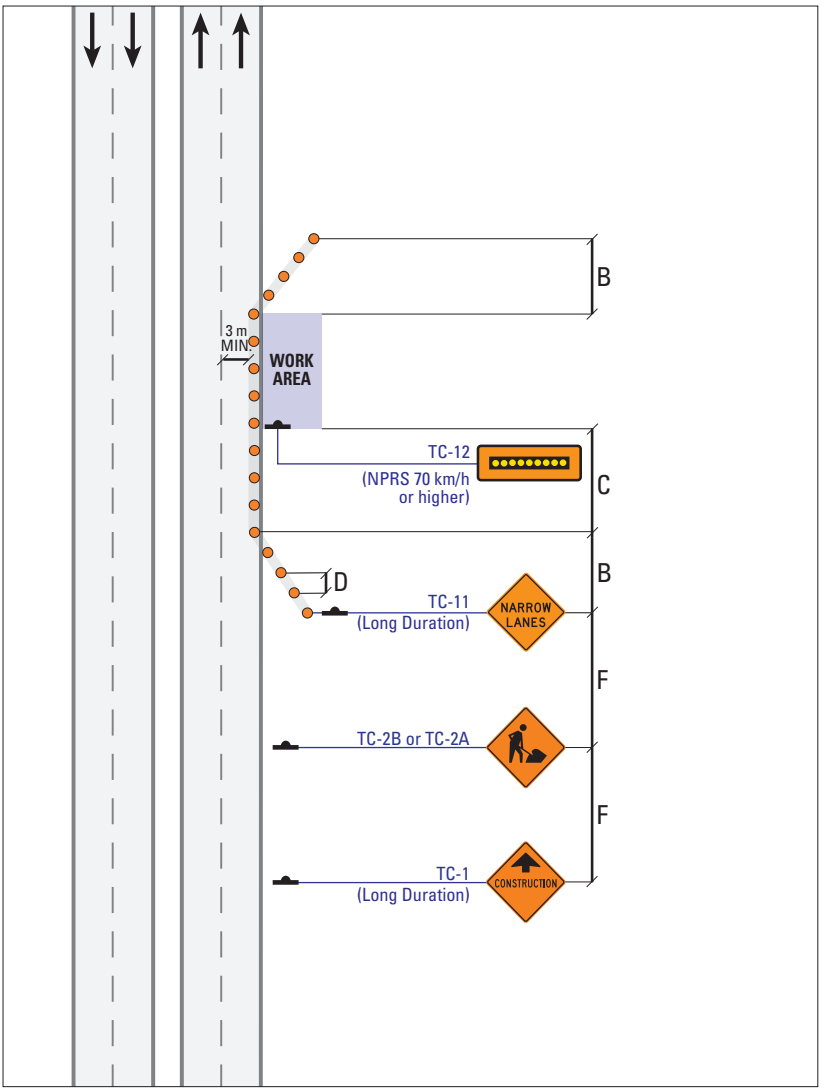
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Termination Taper optional.
ii) Encroachment in the left lane: mirror image of right lane.
iii) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DS-6 **Lane Encroachment**



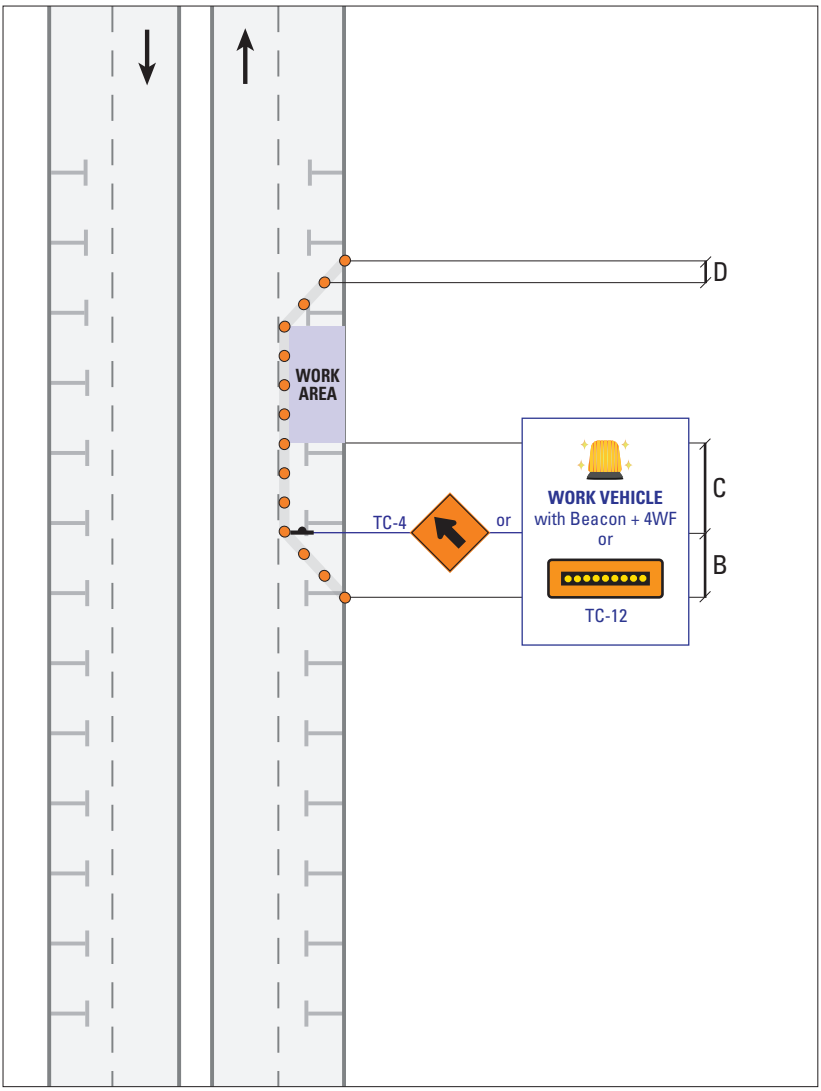
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Encroachment in the left lane: mirror image of right lane.
ii) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4.
iii) A Work Vehicle with a TC-12 may replace Markers for Short Duration work where NPRS is 60 km/h or lower.
iv) In addition to the minimum requirement of 3 m temporary lane width, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-7 **Lane Encroachment**



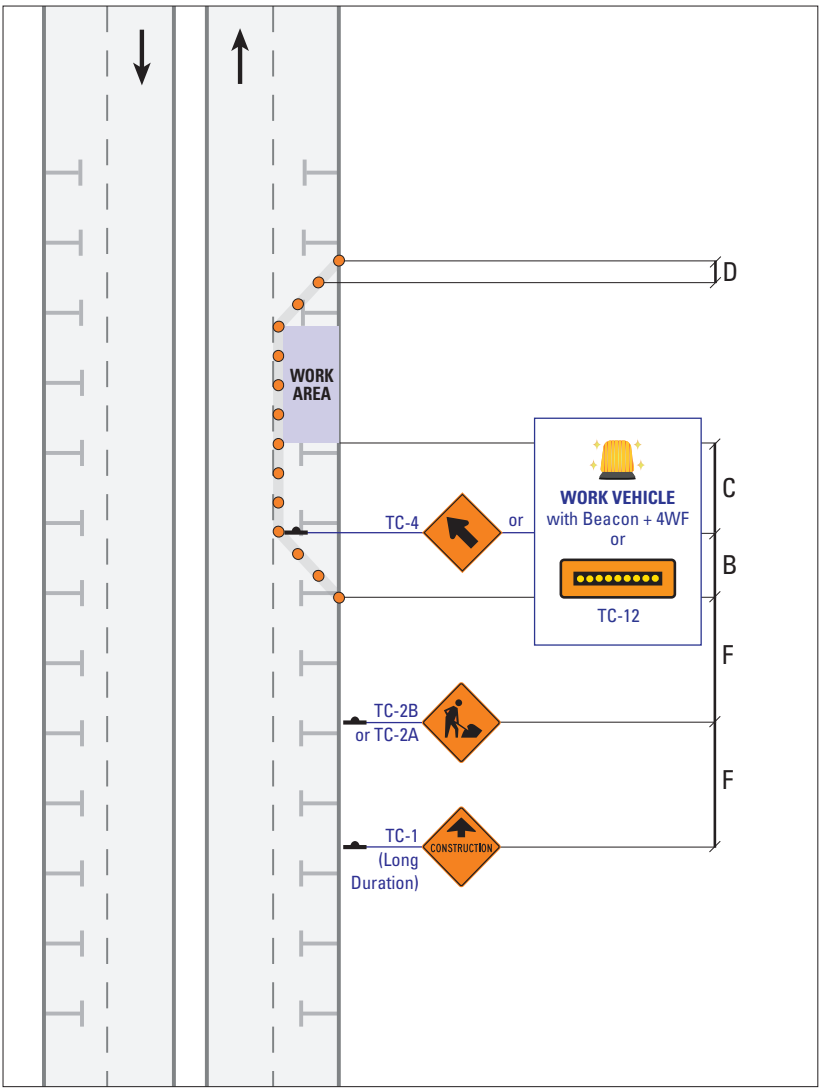
		Normal Posted Regulatory Speed (km/h)			
Label	Description	50	60	70	80
B	Shoulder Taper (m)	20	30	35	35
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60
D	Maximum Distance between Markers (m)	6	6	9	9
	Minimum Number of Markers for Taper	4	5	5	7

NOTES

i) A Work Vehicle with Beacon + 4WF or a TC-12 in bar mode can replace Markers.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DS-8 Parking Lane Closed



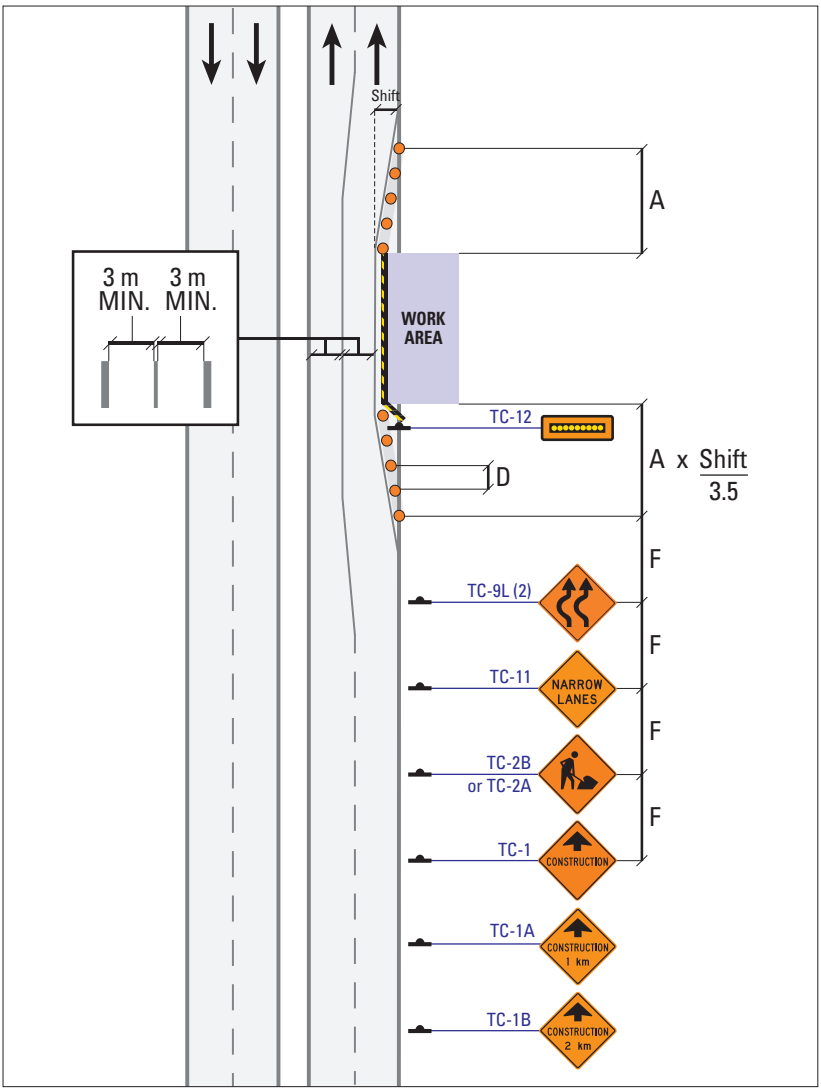
		Normal Posted Regulatory Speed (km/h)			
Label	Description	50	60	70	80
B	Shoulder Taper (m)	20	30	55	60
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60
D	Maximum Distance between Markers (m)	6	9	9	12
	Minimum Number of Markers for Taper	5	7	9	11
F	Distance between Construction Signs (m)	50	90	120	140

NOTES

i) Placement of TC-1 or TC-2 may need to be adjusted if visibility is obstructed due to parked vehicles.
ii) For Short Duration work, a Work Vehicle with Beacon + 4WF or a TC-12 in bar mode can replace Markers.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-9 Parking Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

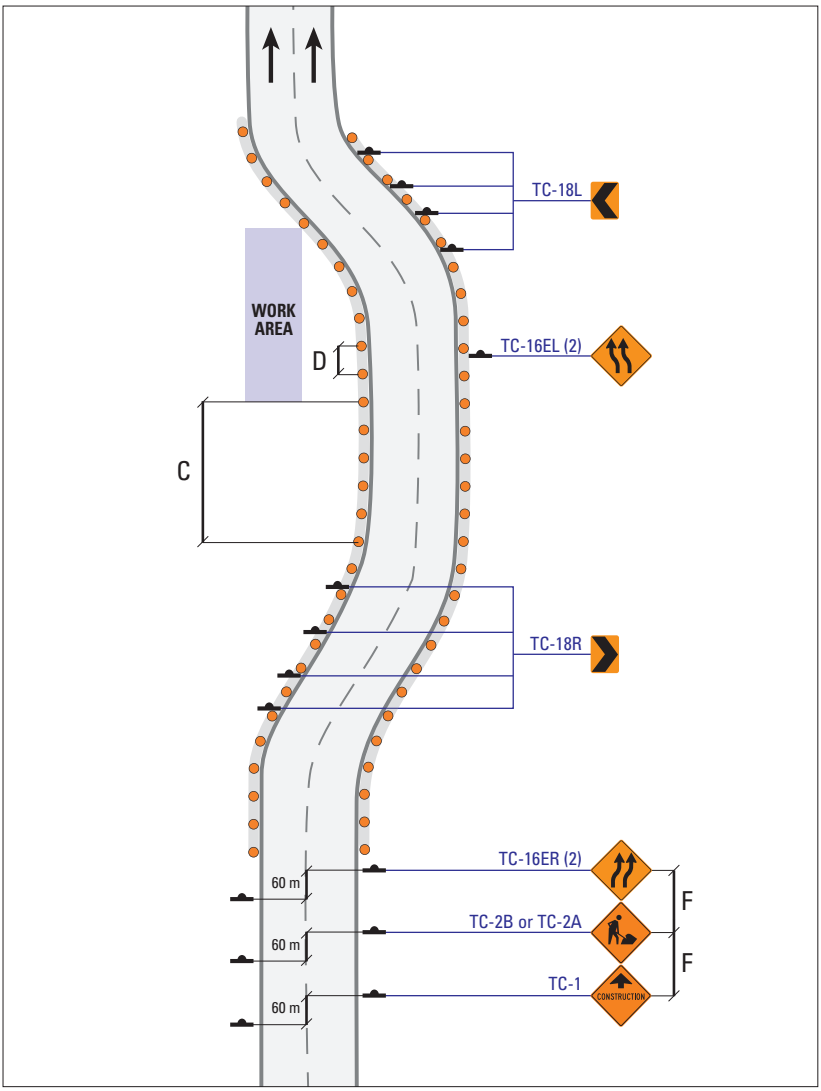
NOTES

i) Minimum lane width is 3 m. Additionally, an offset of 0.3 m to 0.6 m between Markers and the edge of the traveled lane is desirable.

ii) For narrowed lanes exceeding 2 km, use a TC-16 EL (ER) in place of the TC-9L (R). Add an additional TC-16 ER (EL) at the beginning of end Taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-10 **Partial Lane Shift: Narrow Lanes**



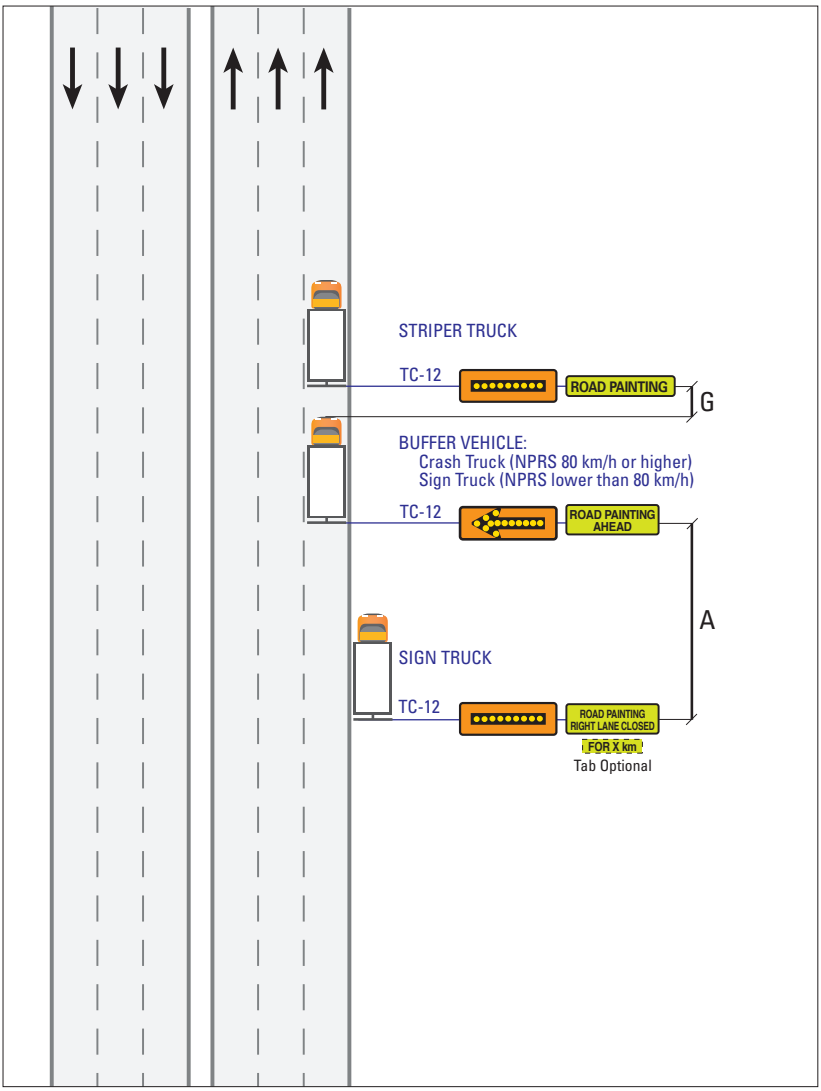
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Refer to OTM Book 6 for the appropriate placement of TC-18L.
ii) Markers used for additional Delineation through Tangent on the far-side of the Work Area are optional.
iii) If the space in median is not sufficient, then US-11 should be used.
iv) Work on the right shoulder: mirror image.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-11 Lane Realignment



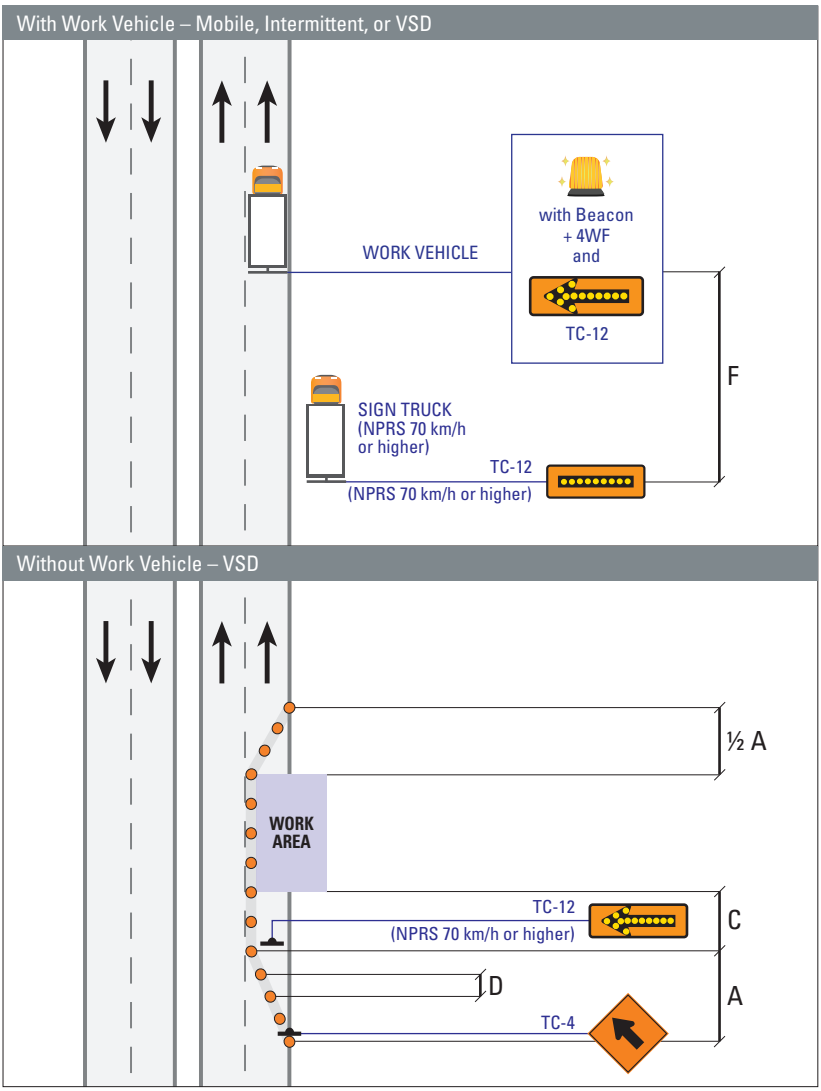
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	–	–	35	45	50

NOTES

i) MTO requirements illustrated. Other Road Authorities may not require a "ROAD PAINTING" information sign.
ii) Sign Truck may be replaced by an approved equivalent VMS.
iii) Where shoulder is intermittent, Sign Truck should drive with traffic flow in arrow mode until shoulder becomes available.
iv) Left Lane Closed mirror image where the Sign Truck should follow on the same side shoulder as the closure.
v) The distance between Sign Truck and Buffer Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other specific conditions.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DS-12 Zone Painting: Right or Left Lane Closed

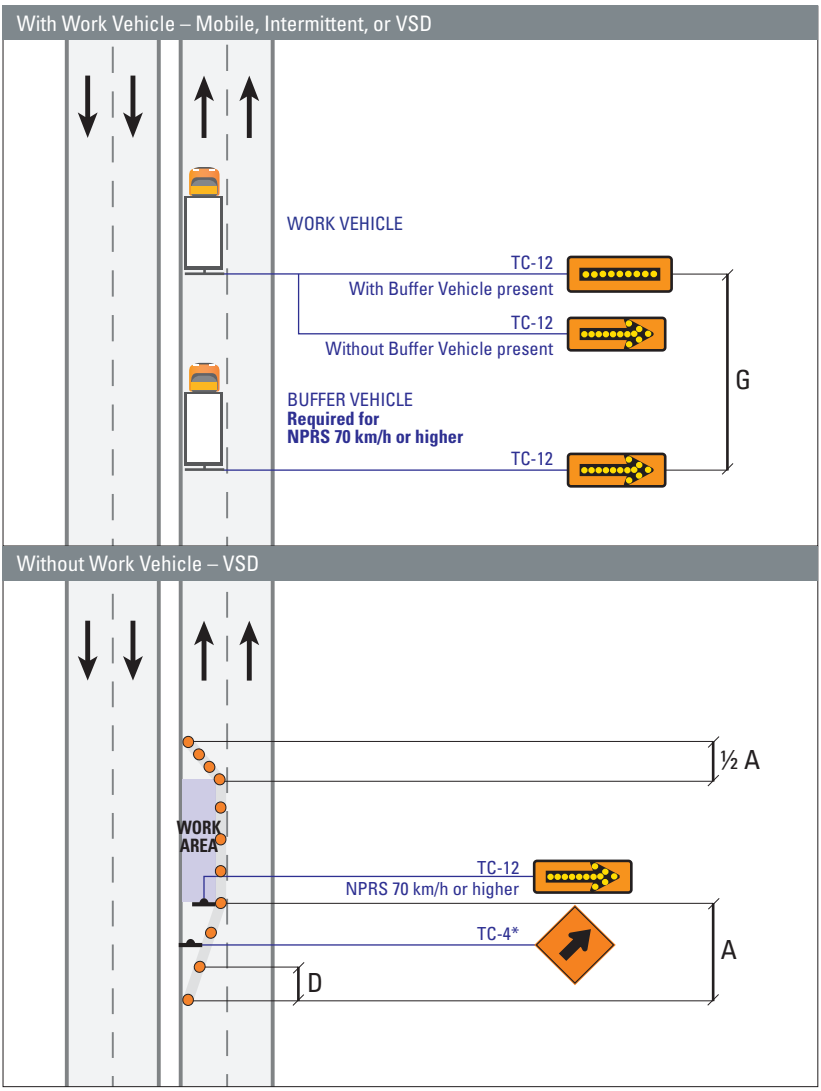


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) Distance between Sign Truck and Work Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other site specific conditions.
ii) Where shoulder is intermittent, Sign Truck should drive with traffic flow until shoulder becomes available.
iii) Left Lane Closed: mirror image.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



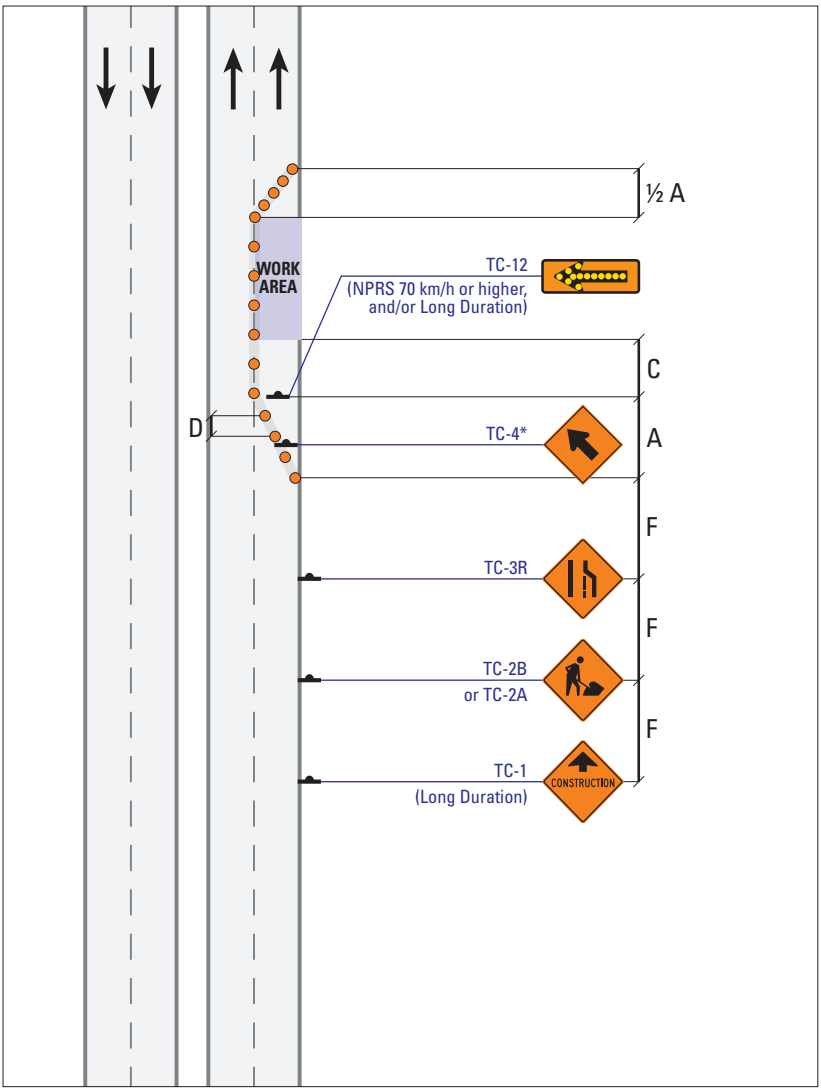
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	–	–	9	9	50

NOTES

i) Distance between Sign Truck and Work Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other site specific conditions.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

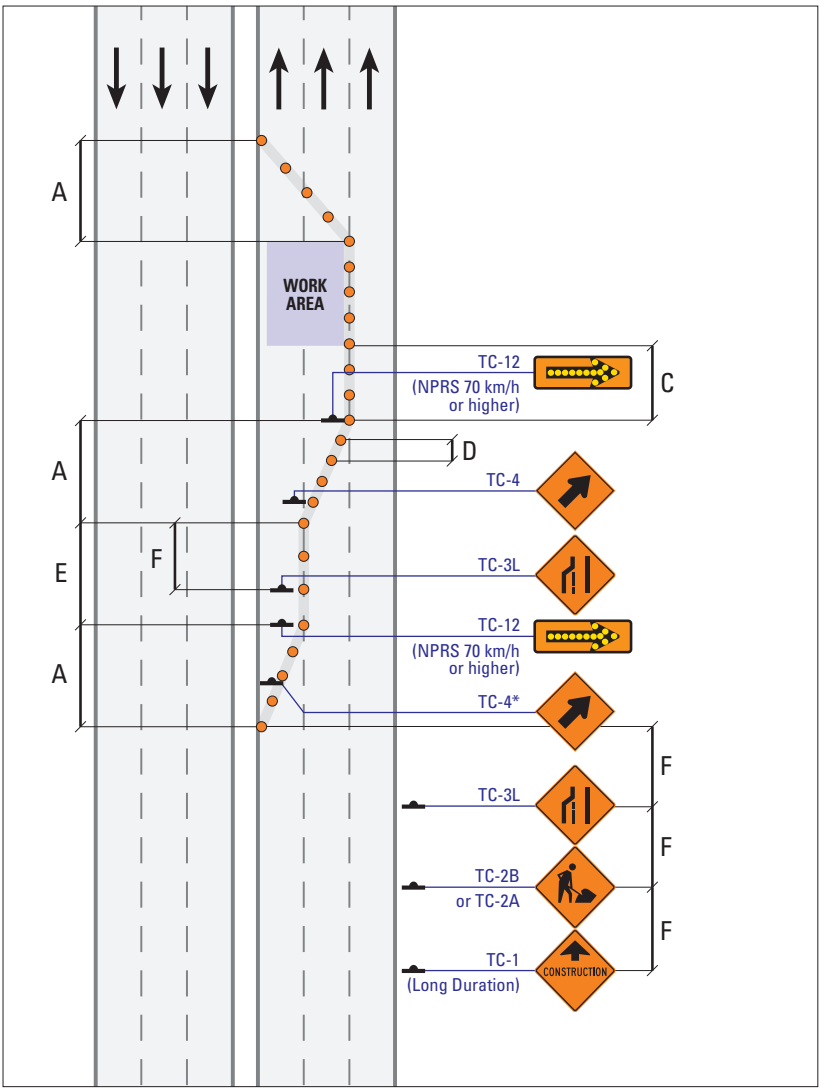
NOTES

i) Mirror image for Left Lane Closed. For Left Lane Closed, TC-3, TC-2B or TC-2A, TC-1 are to be repeated appropriately on opposite shoulder where NPRS is 70 km/h or higher.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-15 **Lane Closed**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

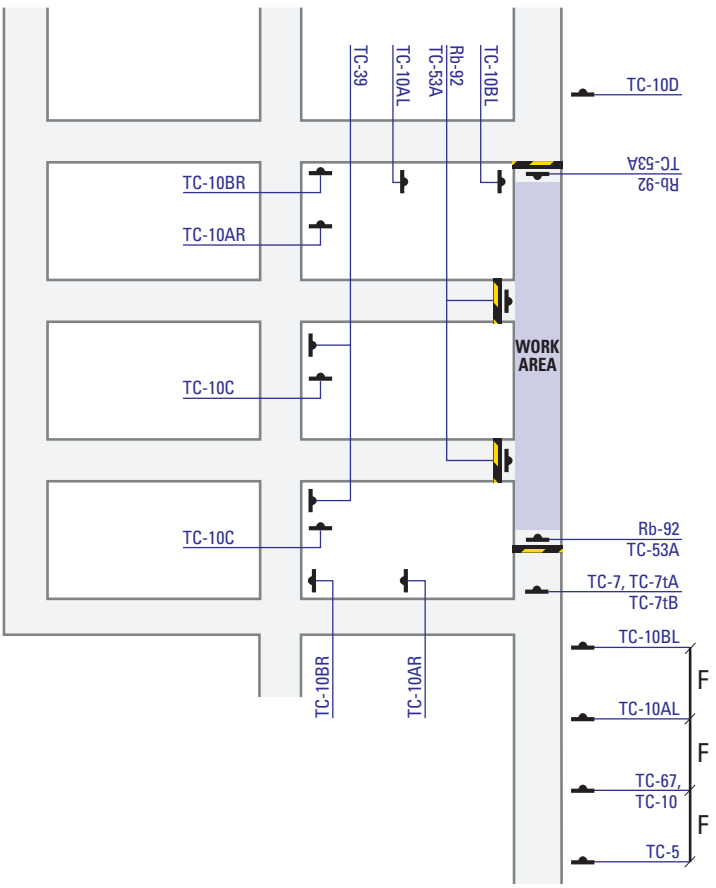
NOTES

i) Where sufficient space permits, TC-3L, TC-2, and TC-1 may be placed in the median.
ii) Right Lanes Closed: mirror image, except for TC-3, TC-2, and TC-1.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-16 Six Lane Road: Left Two Lanes Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) See DS-18 for Sign Details.
ii) The same approach to signing is required in the opposite direction.
iii) TC-54 can be used in place of TC-53A.
iv) If space is insufficient to install a TC-67, it may be replaced with a TC-65.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-17 Route Detour (Alternative Roads)

The following signs are to be used in the layout for Route Detour – see DS-17.

TC-10


TC-10AR

Other tabs may be used with the 

sign as follows:


TC-10BR


TC-10C


TC-10ER


TC-10FR


TC-10AL


TC-10BL

TC-10D


TC-10EL


TC-10FL

Roundabout Fish-hook tabs:


TC-10BRr


TC-10ALr


TC-10Cr

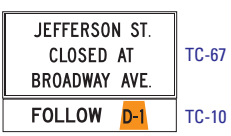
TC-39

TC-5

Rb-92

TC-7
TC-7tA
TC-7tB

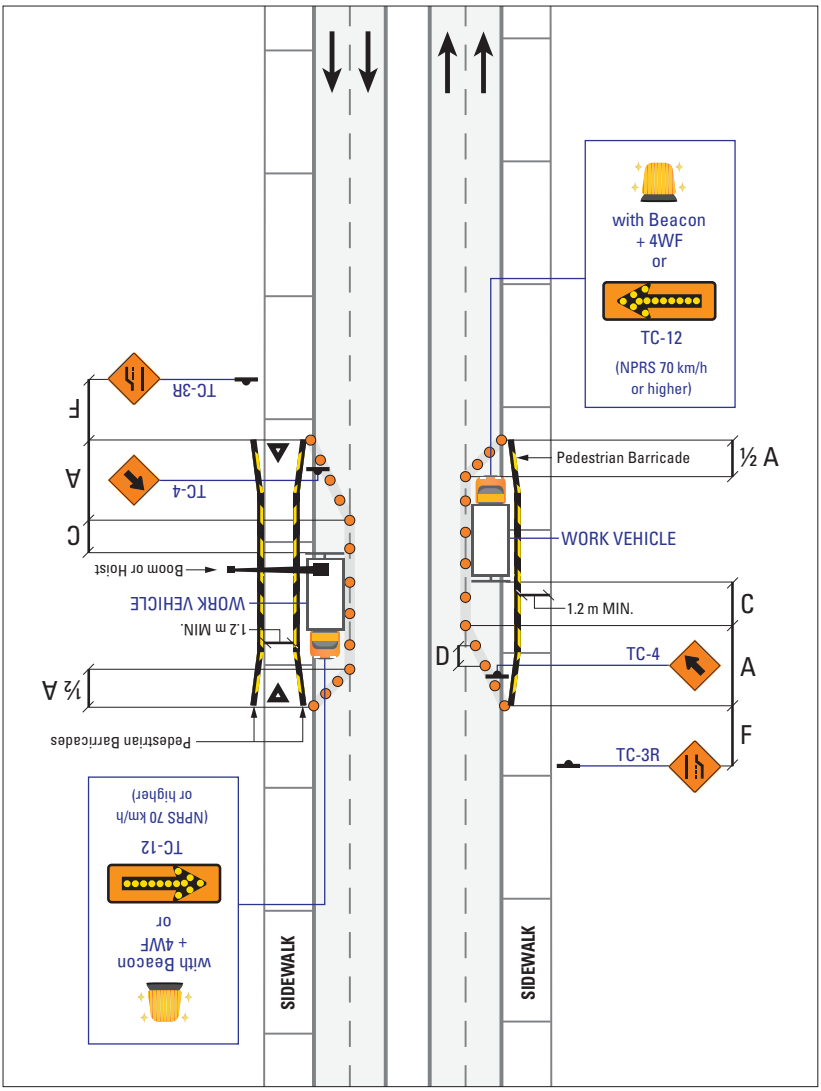

TC-53A



TC-67
TC-10

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).



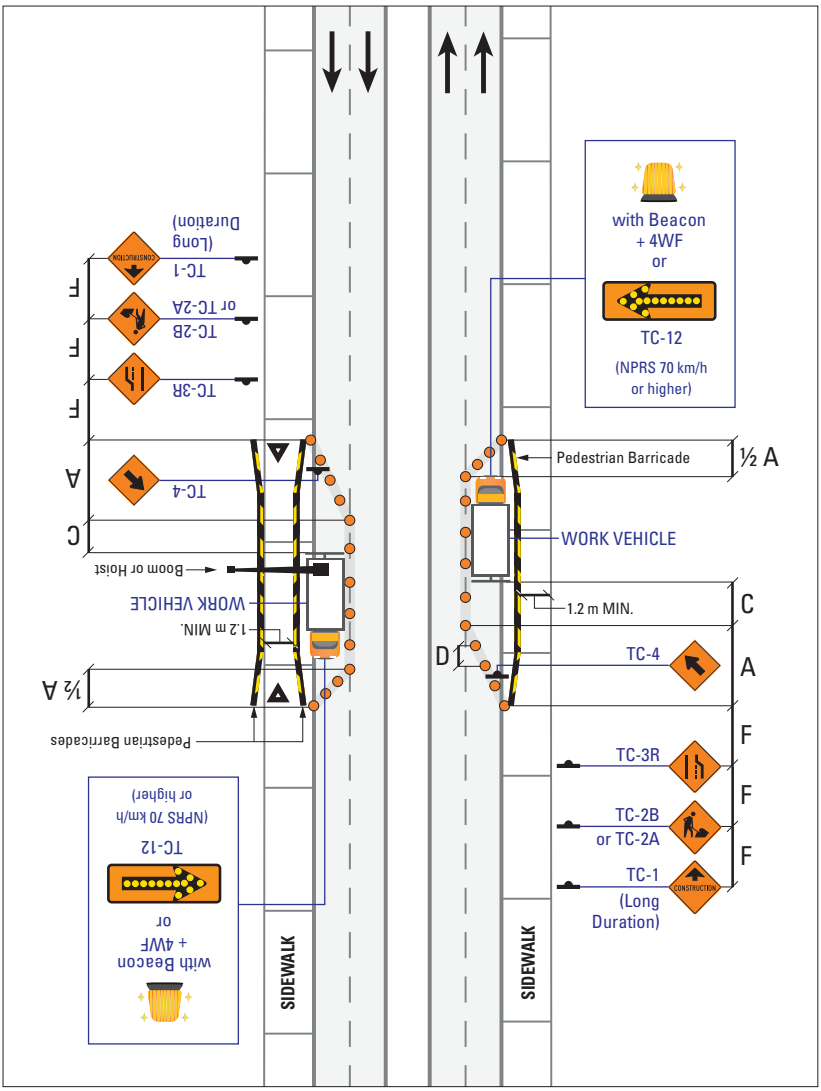
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) ▲ Location of Pedestrian Controllers if required (e.g., use of Booms or Hoists). Pedestrian passage under Boom is acceptable when Boom is not in motion and when Hoisting is not underway. Where activities at a Work Area could endanger the public (e.g., trenches, excavation), Pedestrian Barricades must be used.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DS-19 **Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk**



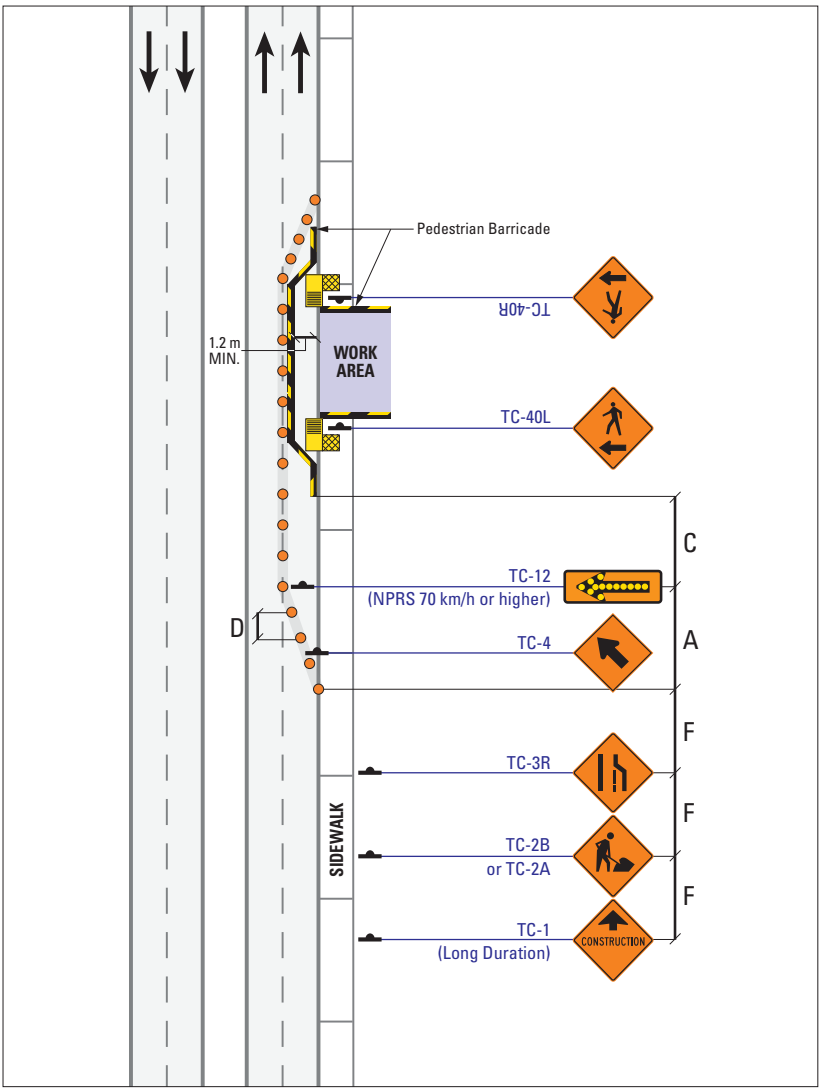
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) ▲ Location of Pedestrian Controllers if required (e.g., use of Booms or Hoists). Pedestrian passage under Boom is acceptable when Boom is not in motion and when Hoisting is not underway. Where activities at a Work Area could endanger the public (e.g., trenches, excavation), Pedestrian Barricades must be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-20 **Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk**



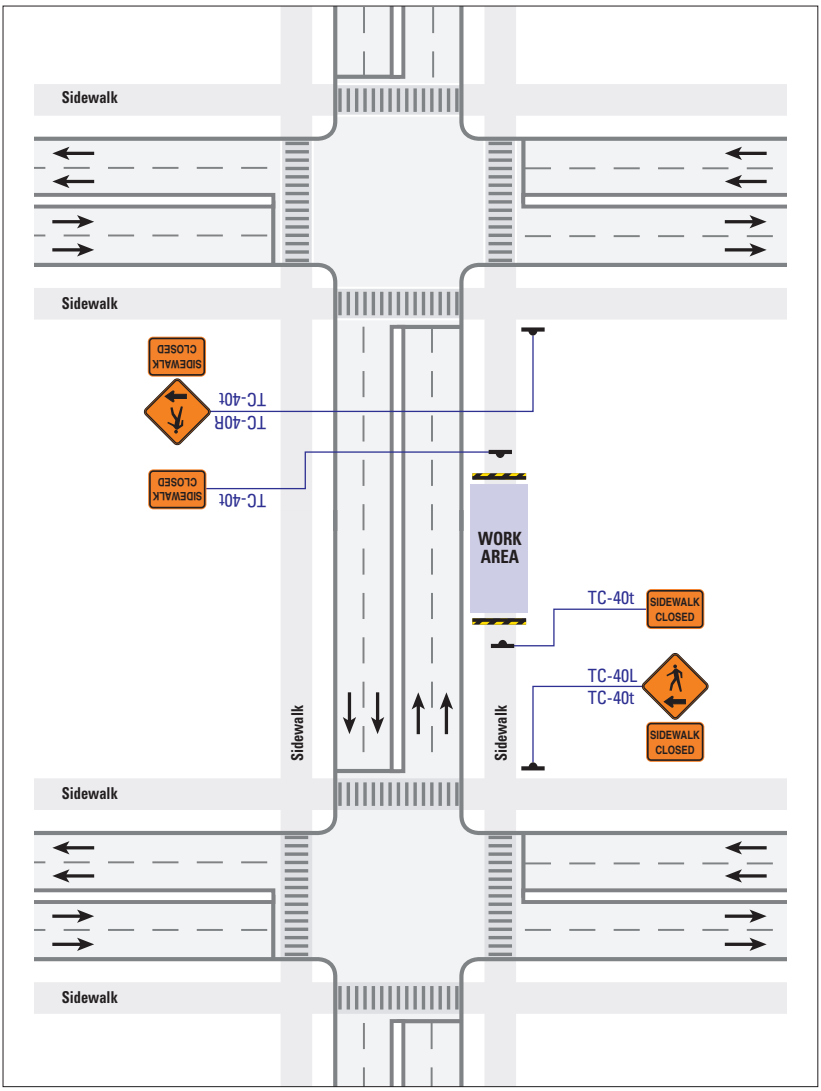
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) For Sidewalk Closures of Long Duration, a boardwalk and railing should be provided instead of Pedestrian Barricades.
ii) If close to a crosswalk, pedestrians can be directed to the opposite side of the street with a TC-40 and TC-40T installed at the crosswalk.
iii) Minimum width of the temporary walkway is 1.2 m.
iv) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-21 **Pedestrian Accommodation: Mid-Block Sidewalk Detour onto Roadway**

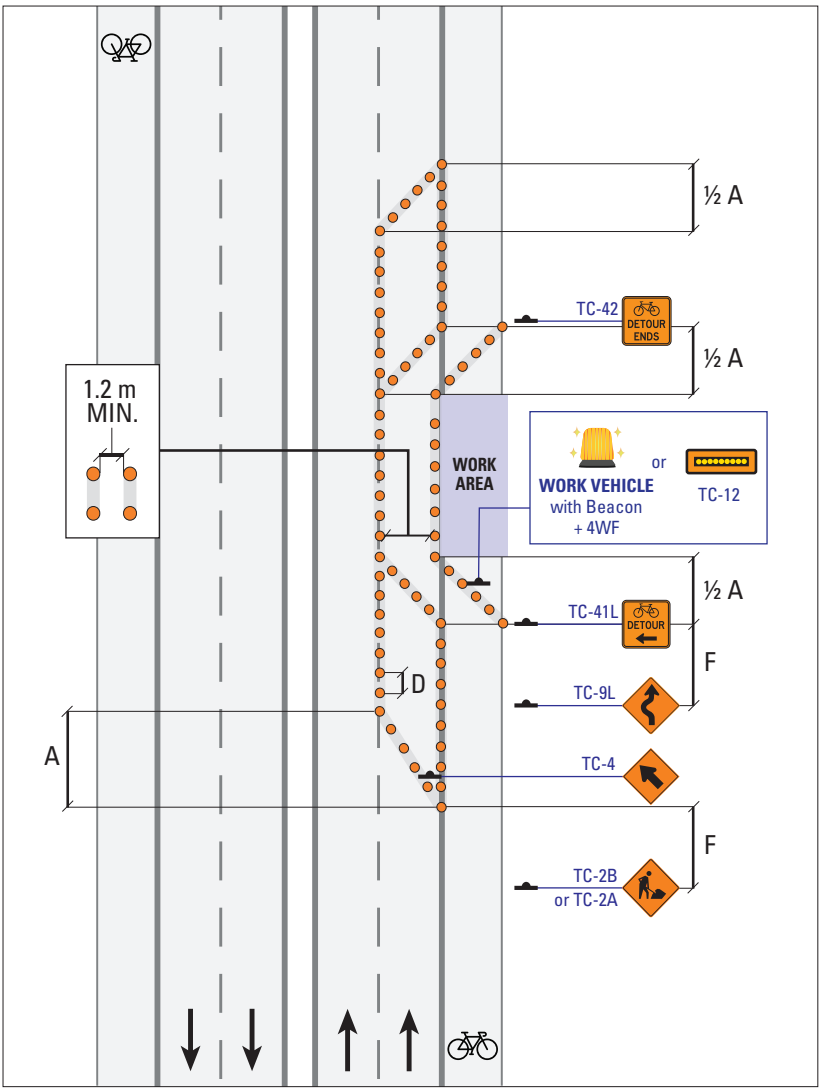


NOTES

i) TC-40L/R Pedestrian Direction sign must be placed at the nearest upstream controlled pedestrian crossing (traffic signal of Pedestrian Crossover) in each direction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-22 **Pedestrian Detour: Sidewalk Closure**



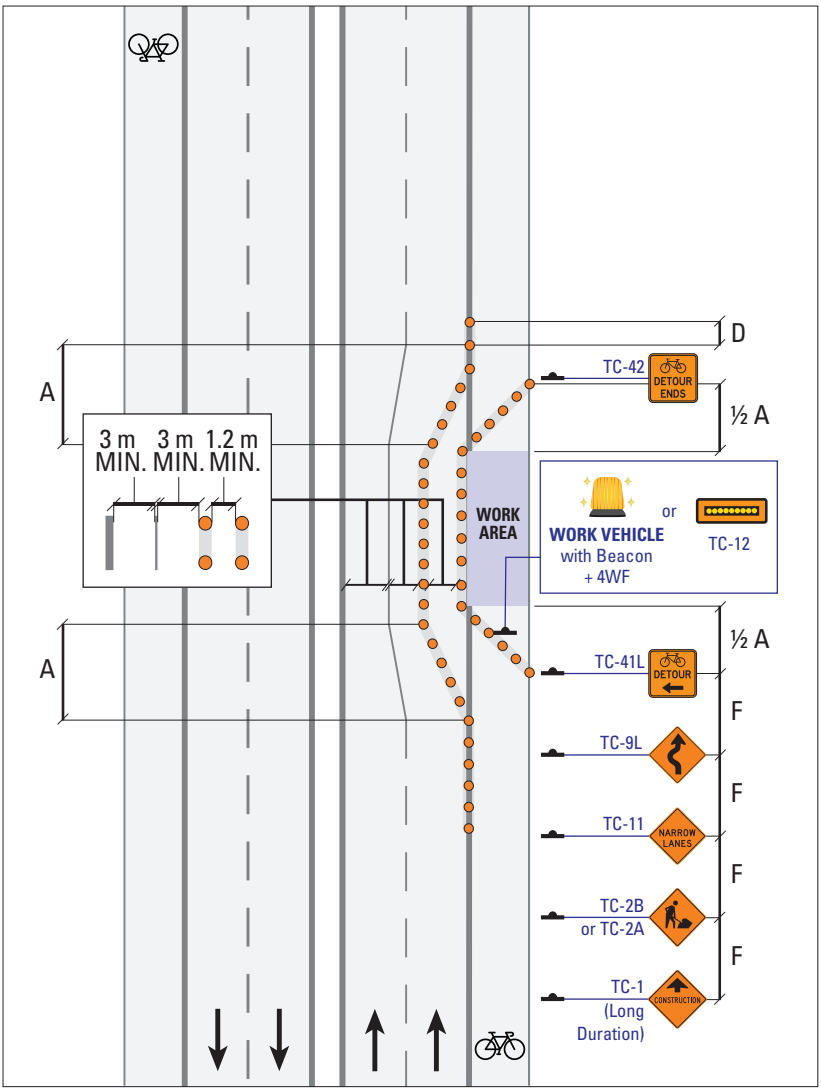
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, TC-54 should be used in place of TC-51.
ii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-23 Bicycle Lane Diversion: Bicycle Lane Shift



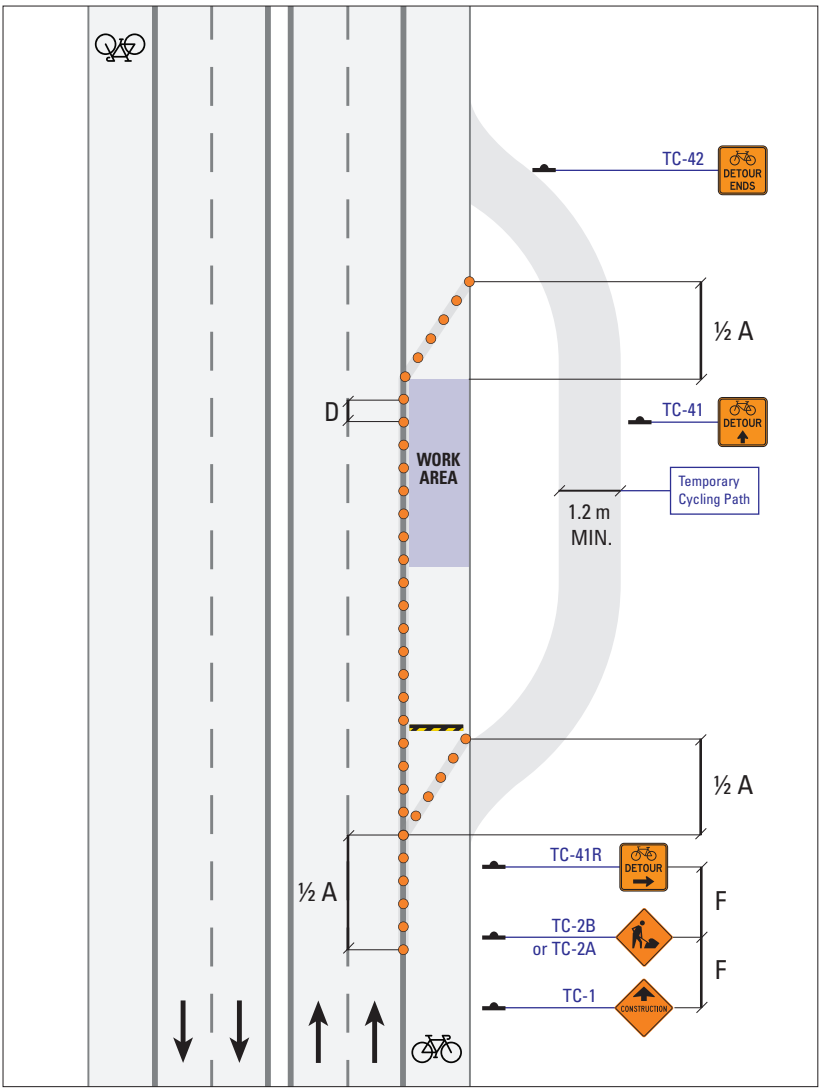
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, TC-54 should be used in place of TC-51.
ii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-24 Bicycle Lane Diversion: Bicycle Lane Shift

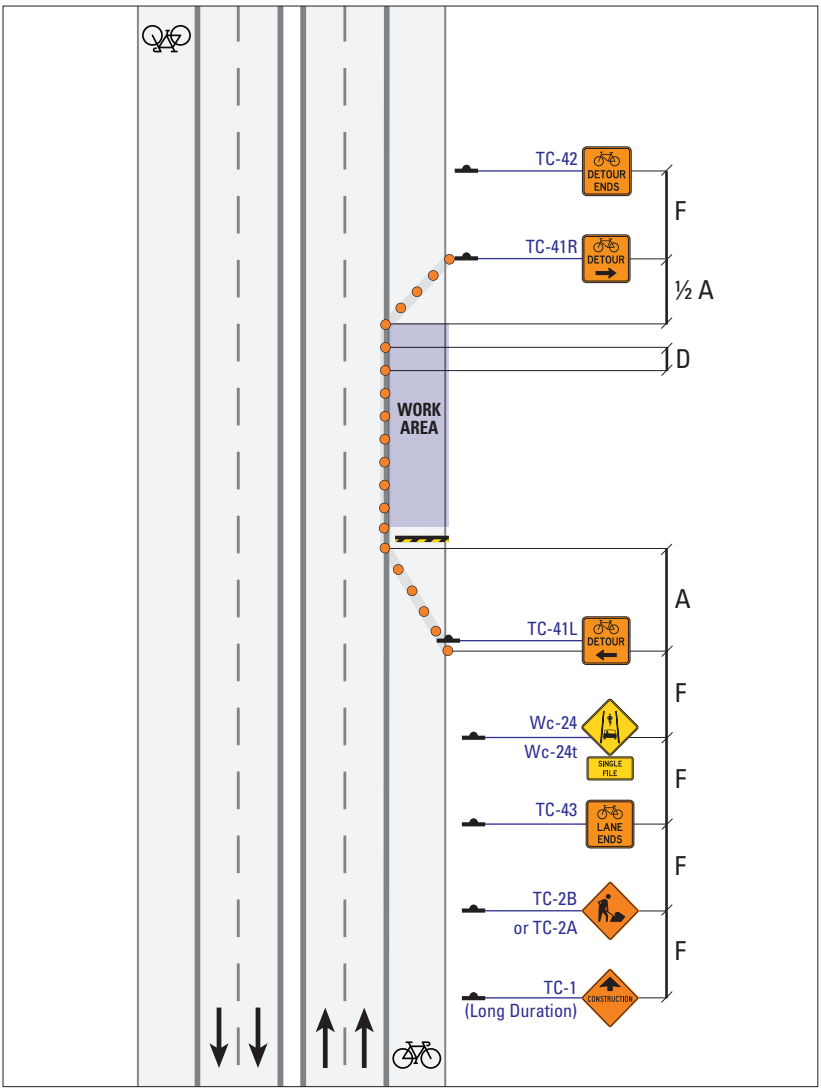


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-25 **Bicycle Lane Diversion: Temporary Path**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

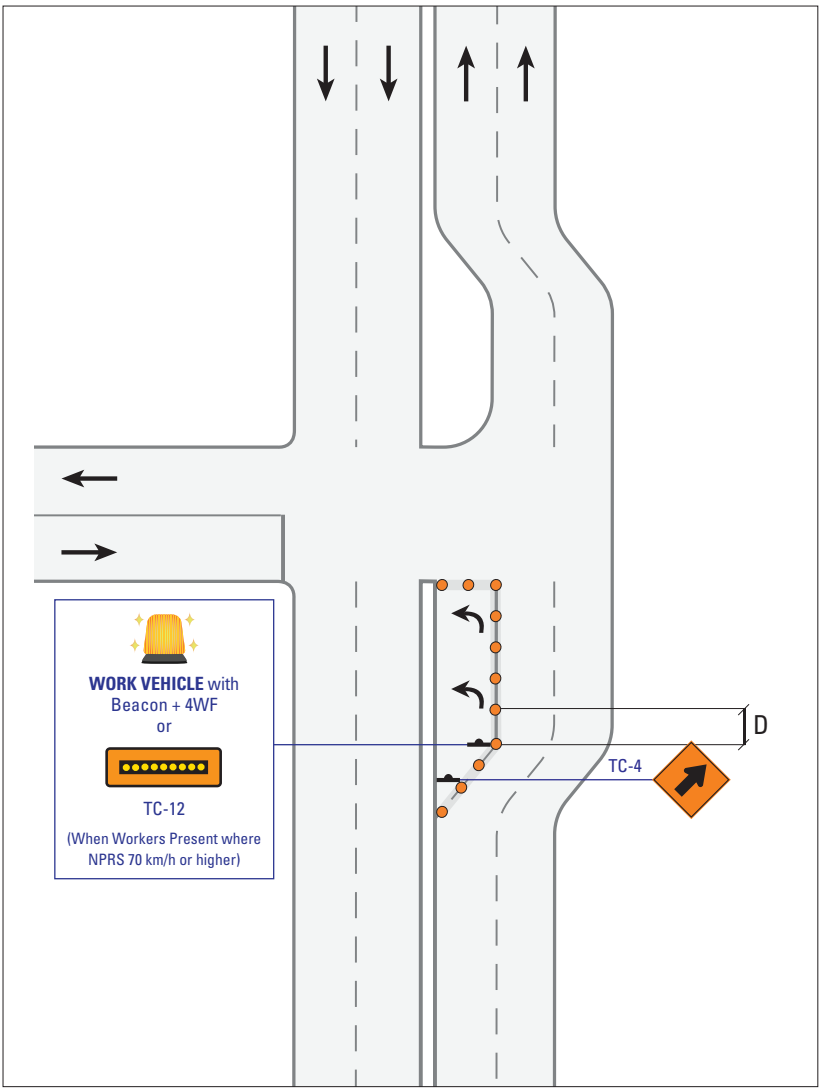
NOTES

i) AODA-compliant ramps are required if the curb is raised.
ii) Ensure signage is visible for drivers to be aware of merging cyclists.

Shared lane only to be used if considered by OTM Book 18 or MTO Bikeways Design Manual, Desirable Cycling Facility Nomograph. Otherwise, cycling Detour should be provided.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DS-26 Bicycle Lane Diversion: Single File

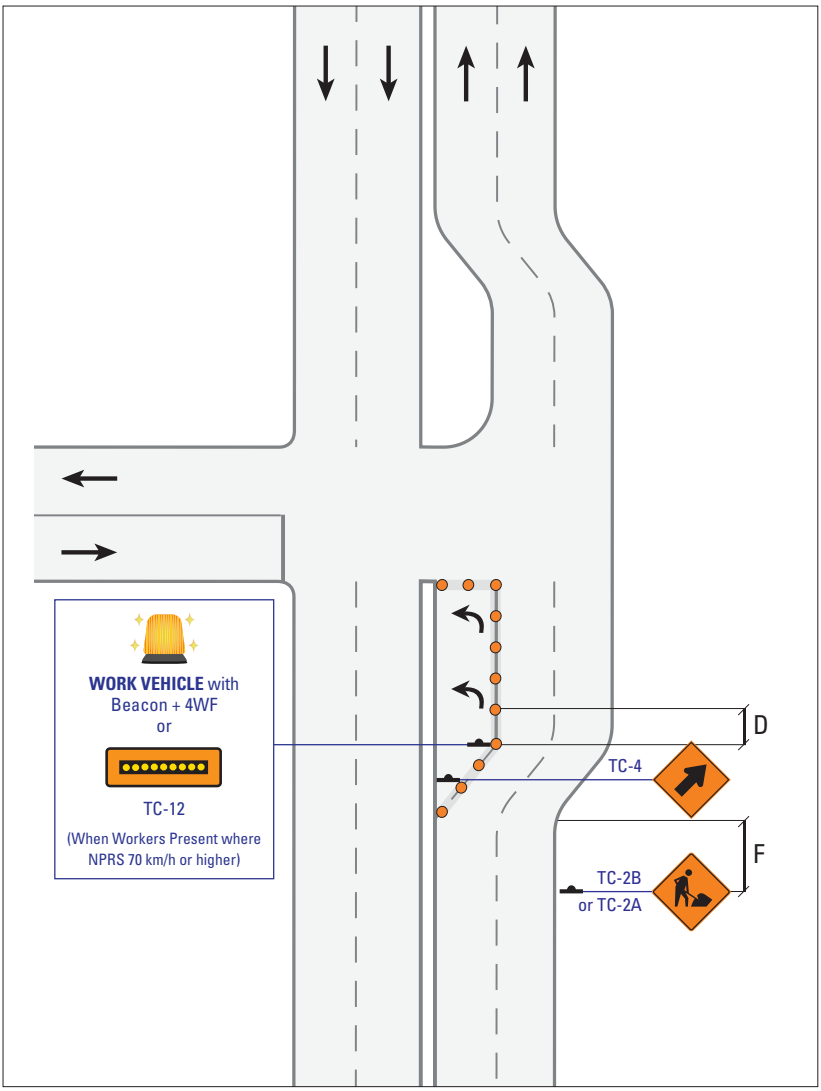


Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).



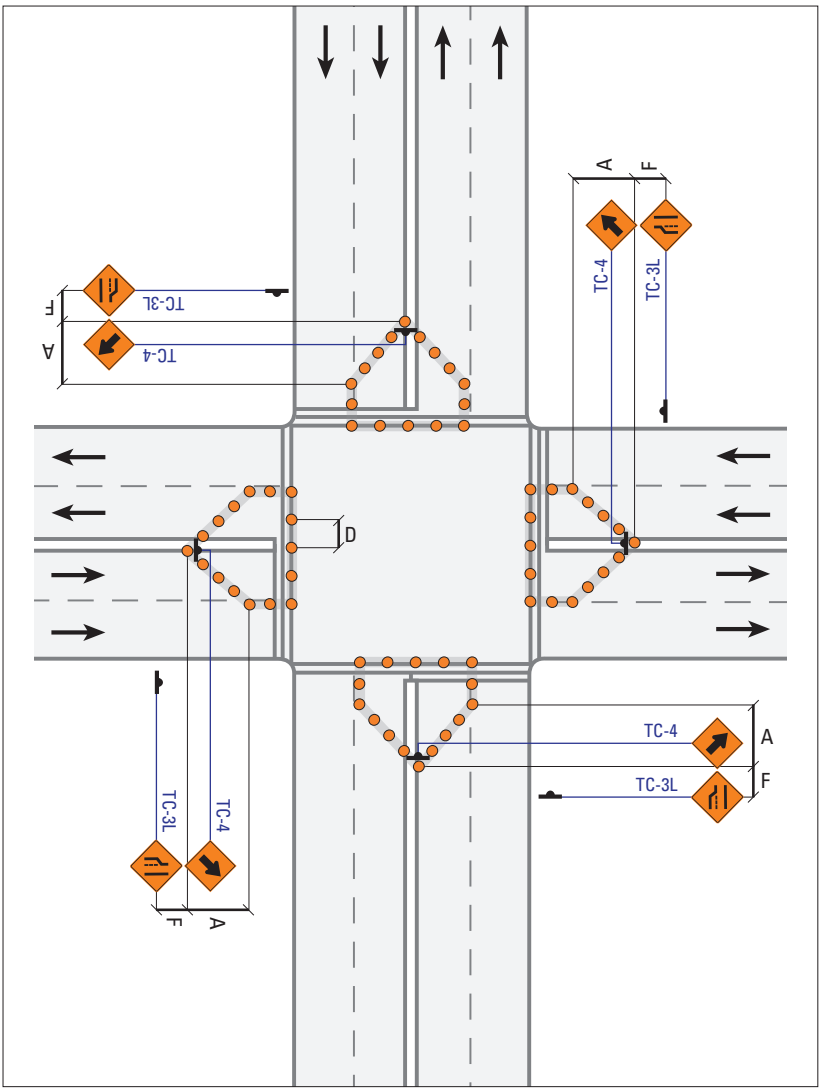
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-2 **Zone Painting: Intersection Turn Arrows**

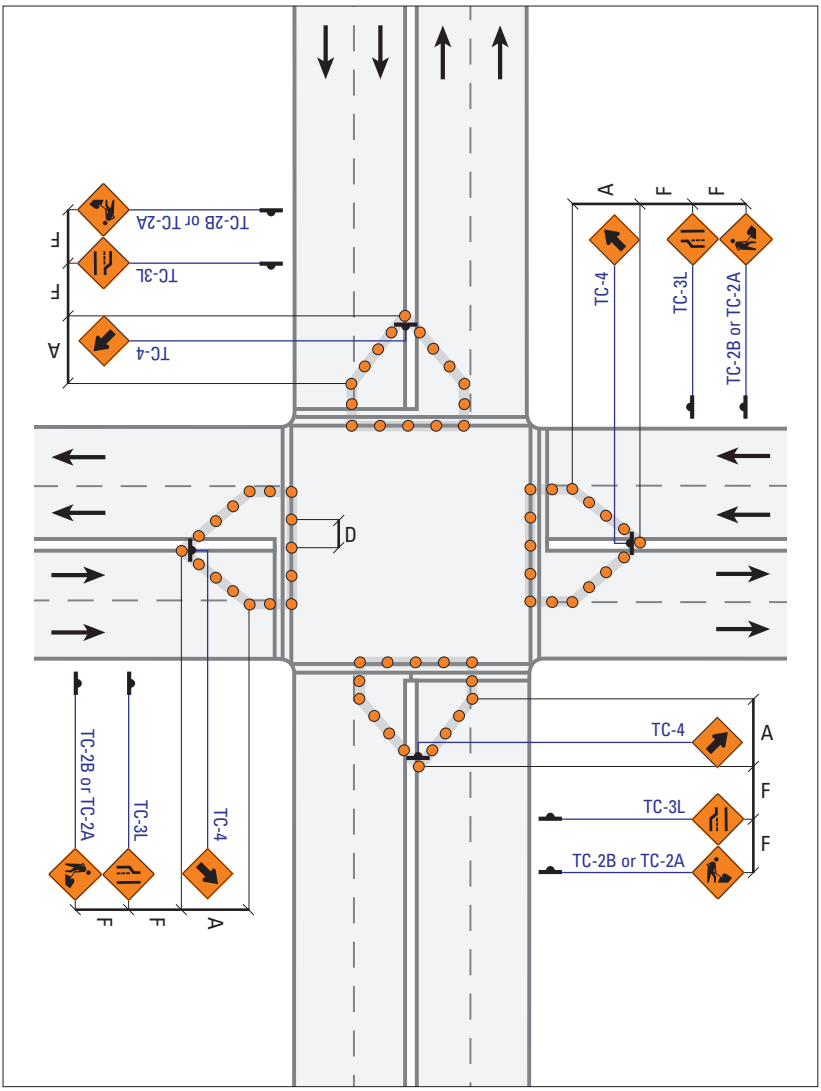


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-3 **Zone Painting: Intersection Left Lane Closed**

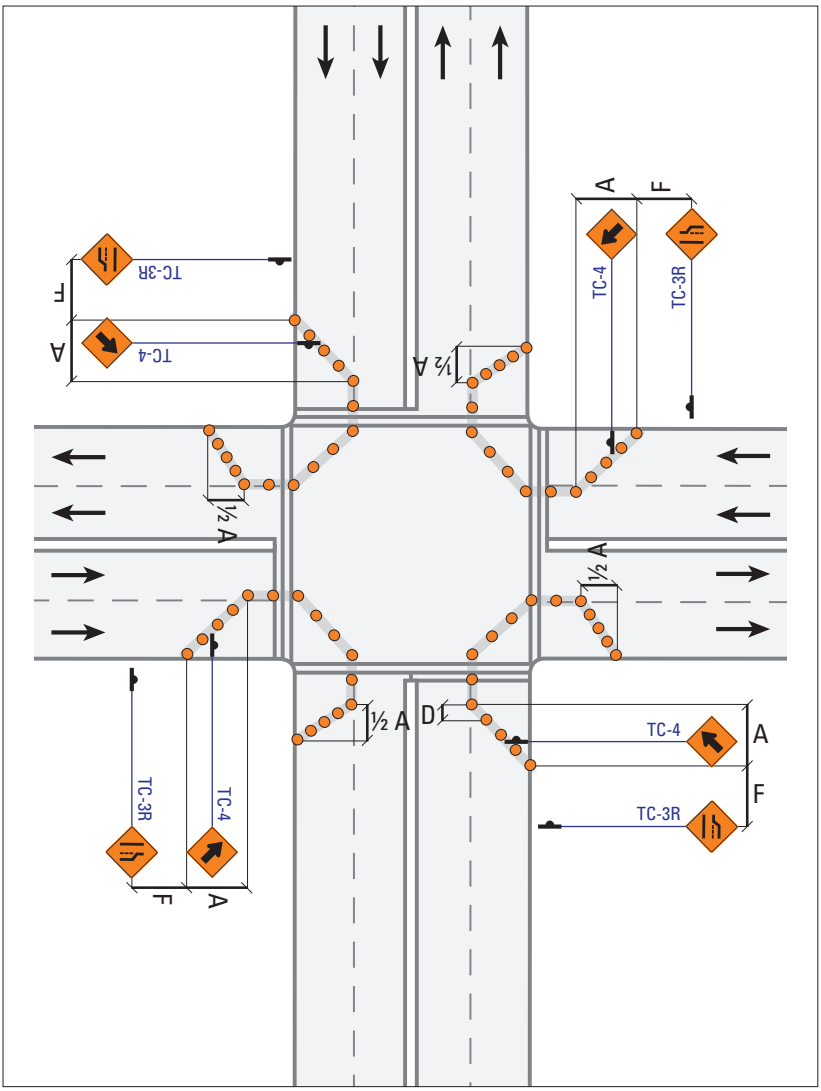


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-4 Zone Painting: Intersection Left Lane Closed

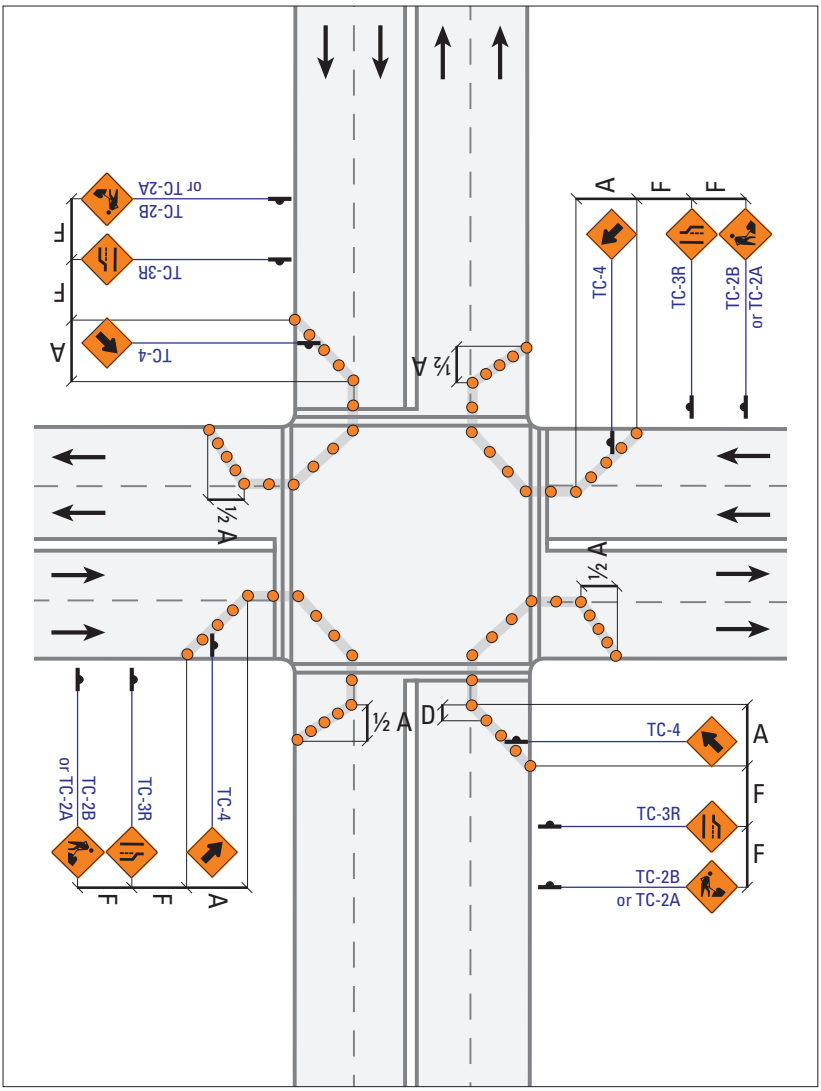


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-5 Zone Painting: Intersection Right Lane Closed

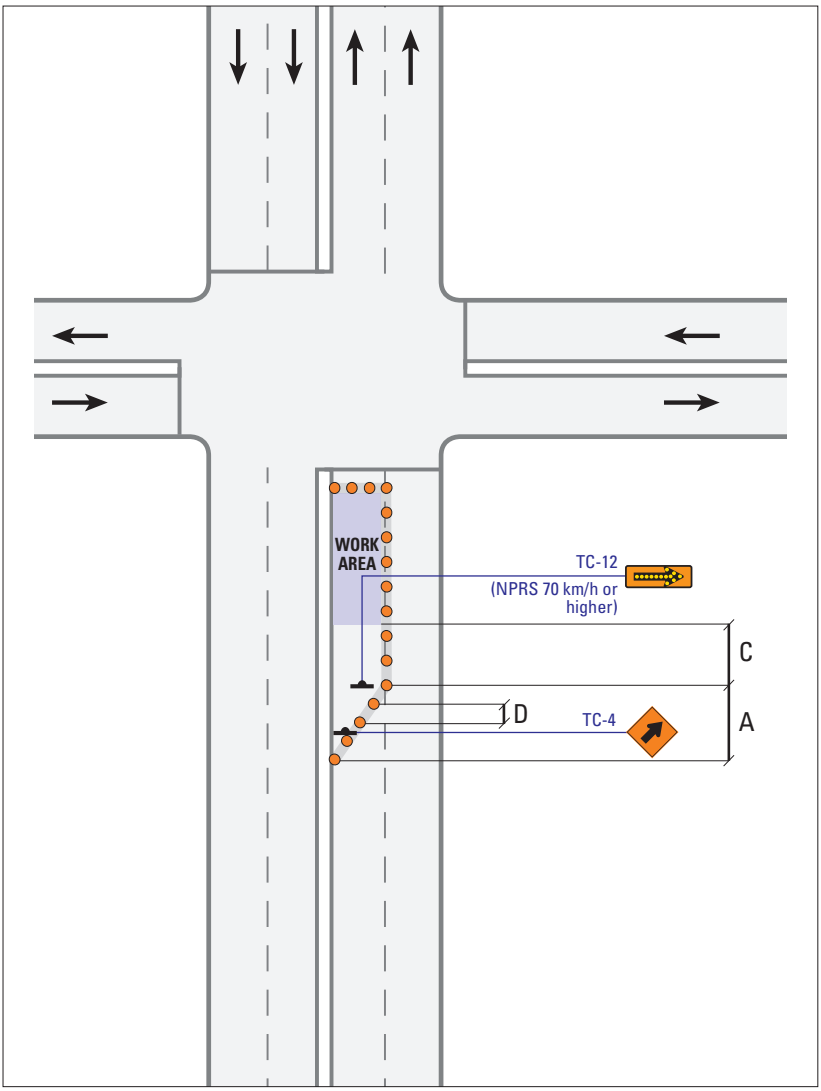


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-6 **Zone Painting: Intersection Right Lane Closed**



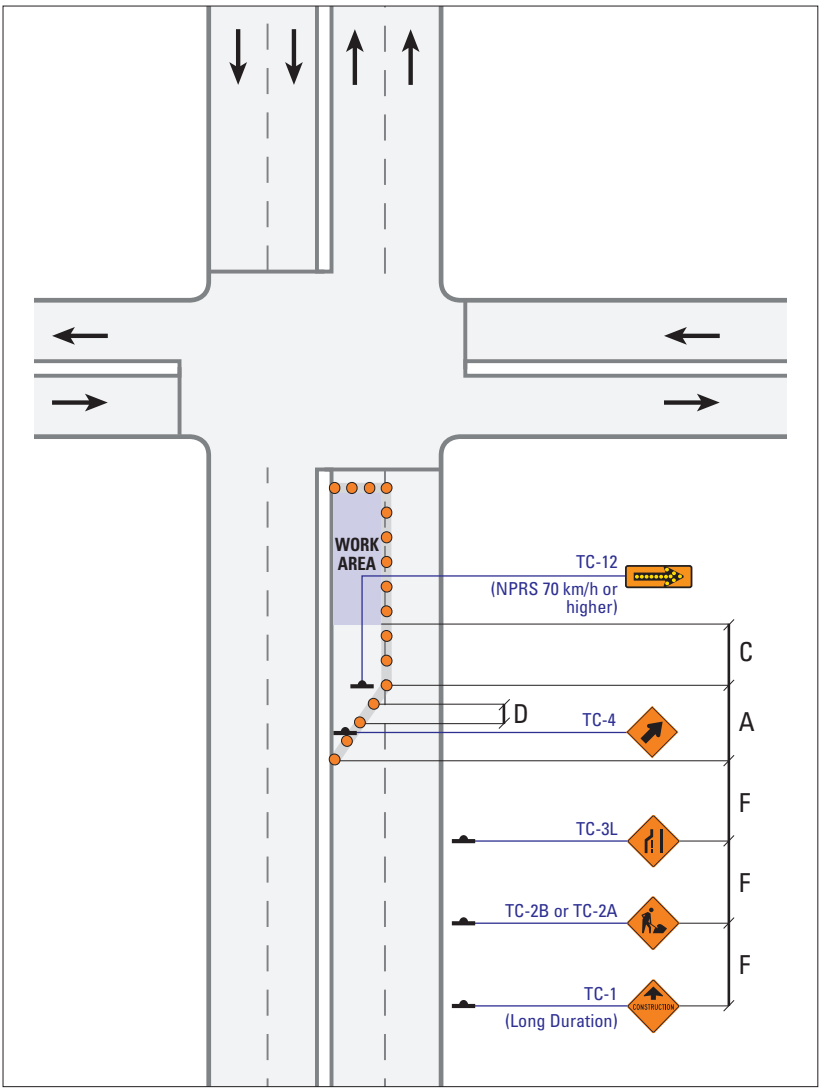
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) Right Through Lane Closed mirror image (for Markers, TC-12, TC-4).

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-7 **Intersection: Near-Side Right or Left Through Lane Closed**



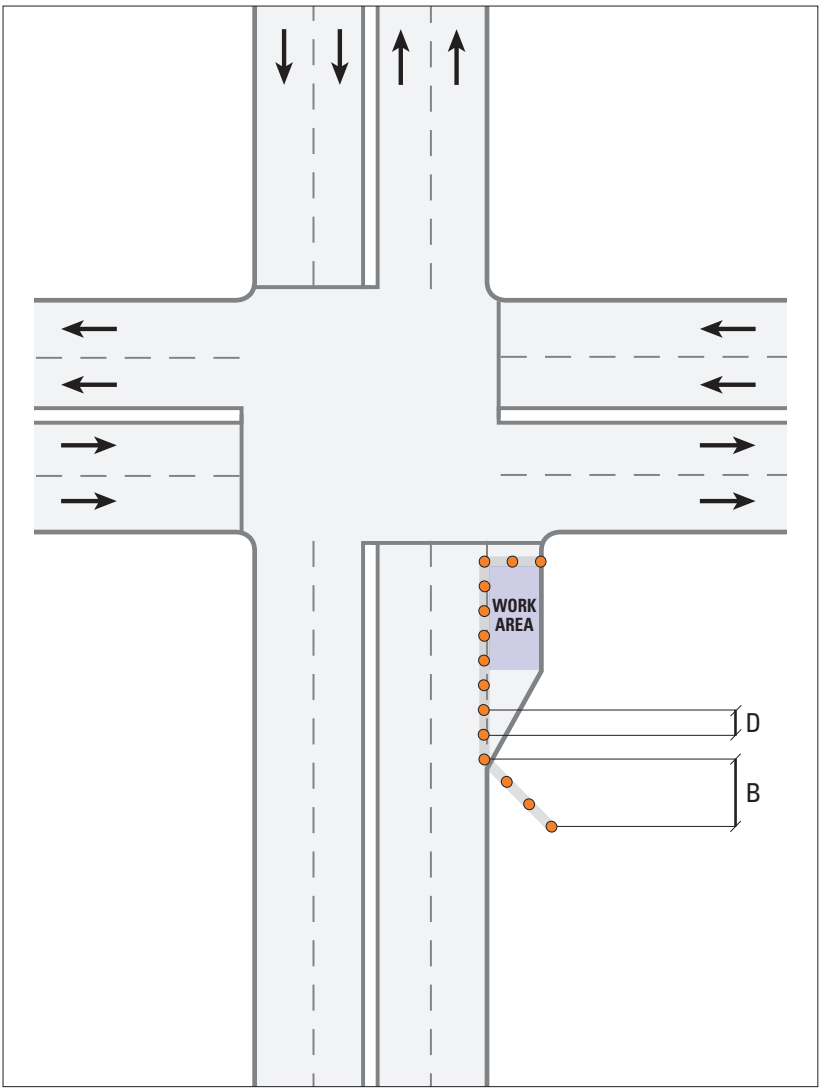
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Right Through Lane Closed mirror image (for Markers, TC-12, TC-4).

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-8 **Intersection: Near-Side Right or Left Through Lane Closed**

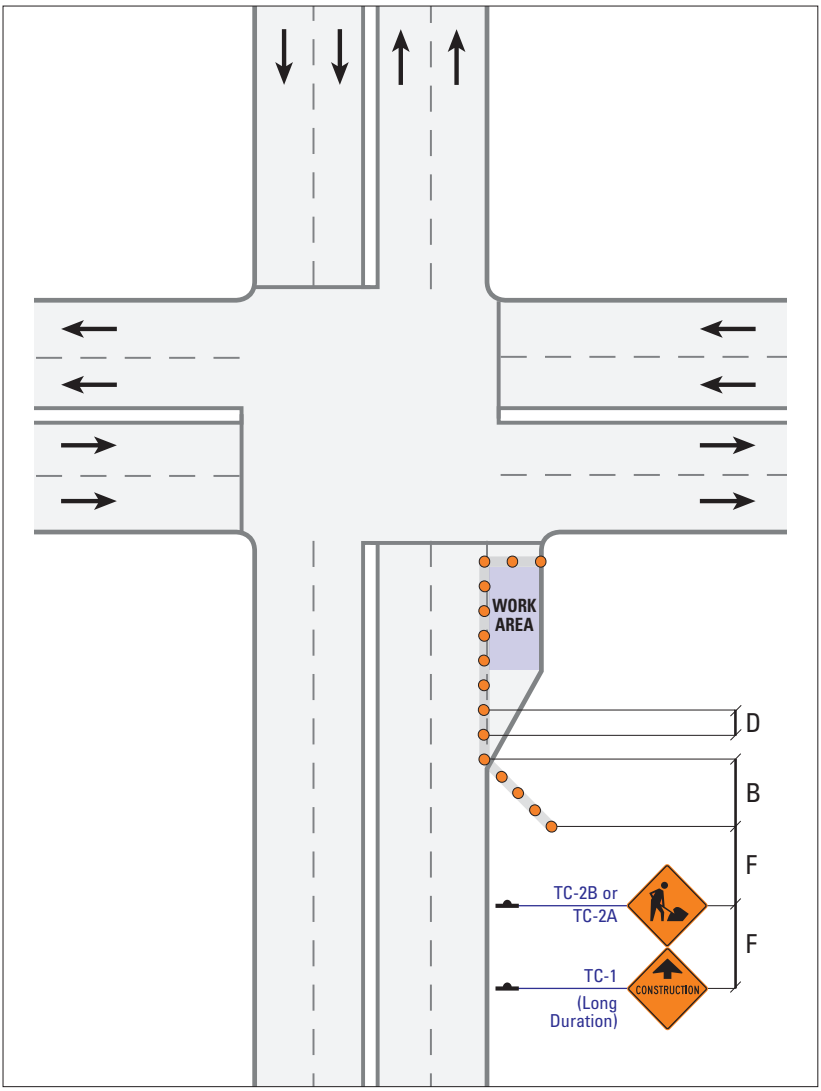


Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-9 **Intersection: Right Turn Lane Closed**

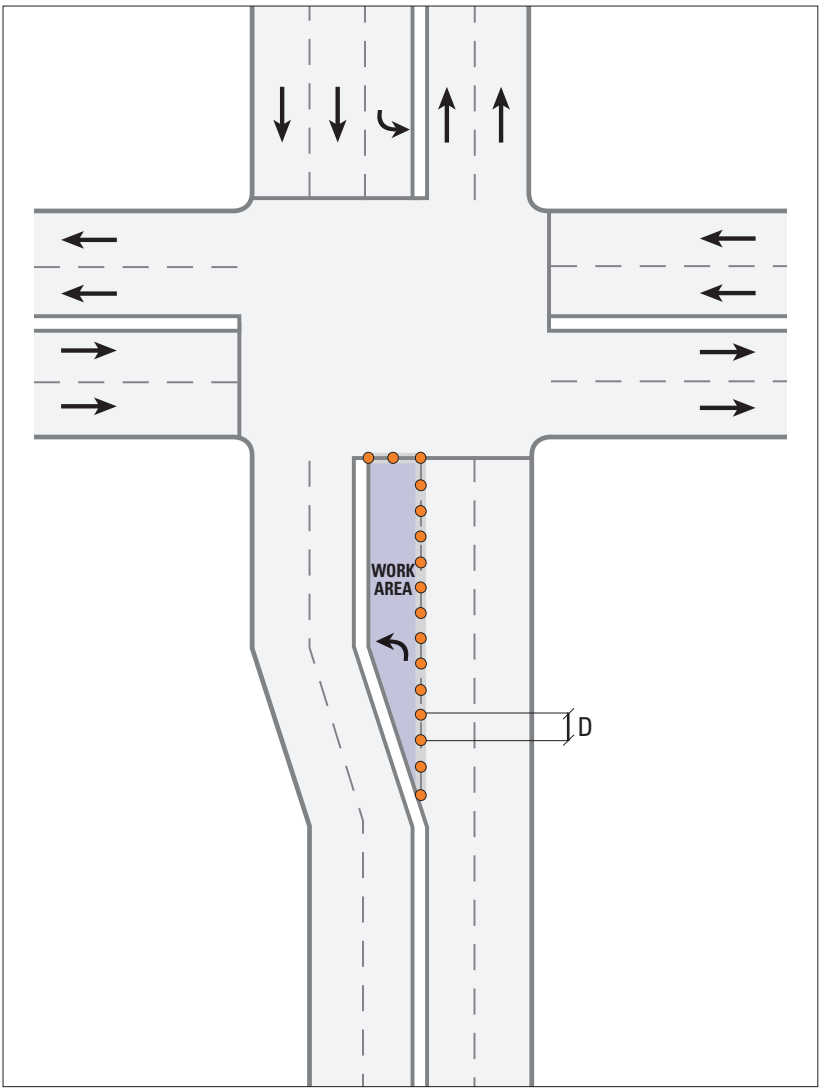


		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-10 **Intersection: Right Turn Lane Closed**



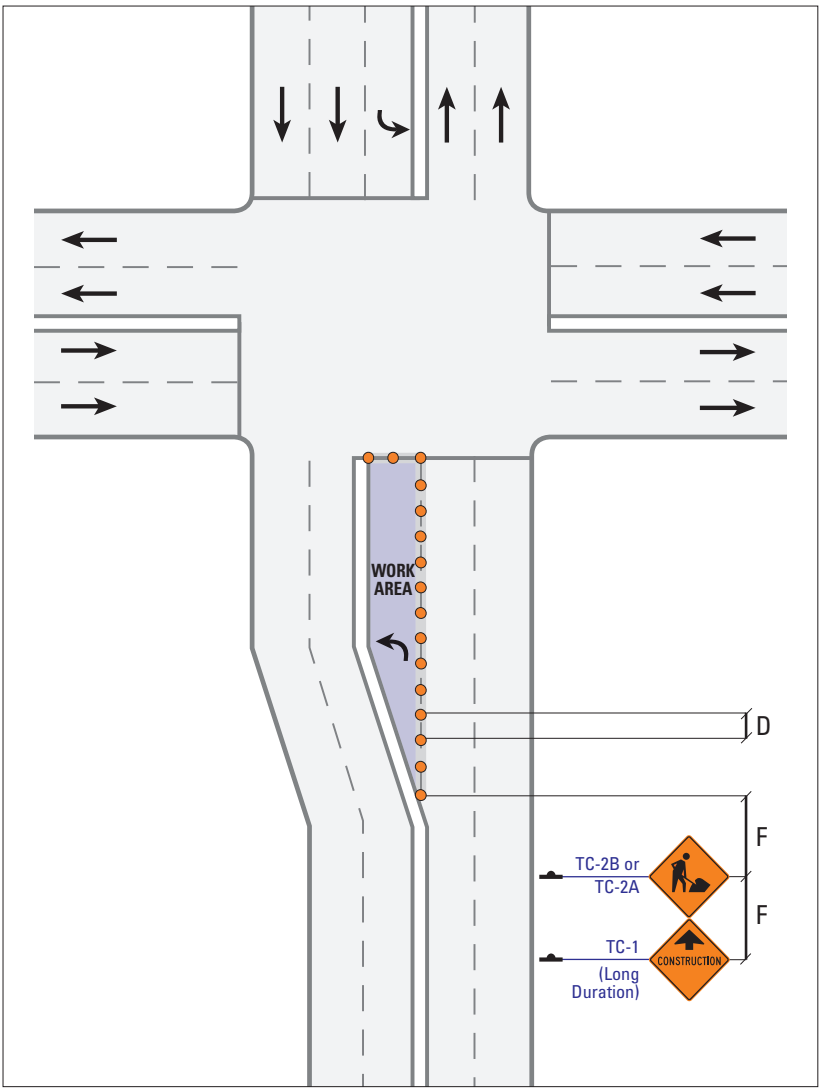
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-11 **Intersection: Left Turn Lane Closed**



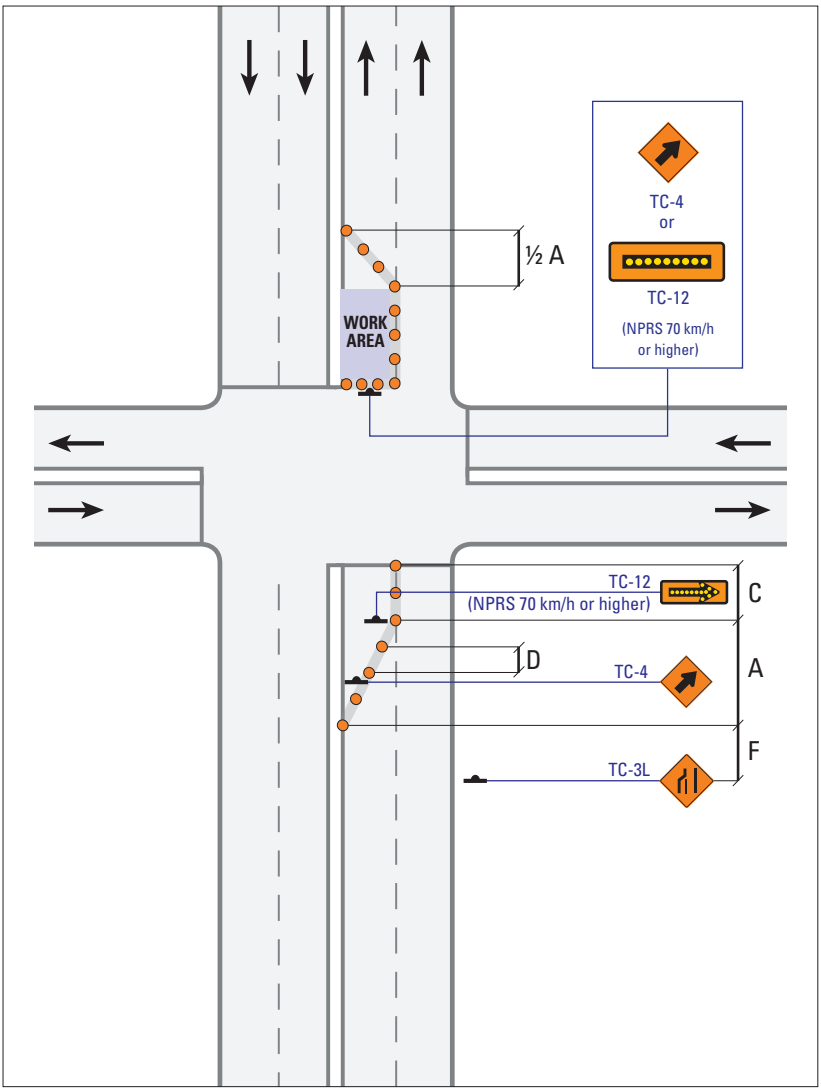
Label	Description	Normal Posted Regulatory Speed (km/h)				
		50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-12 **Intersection: Left Turn Lane Closed**



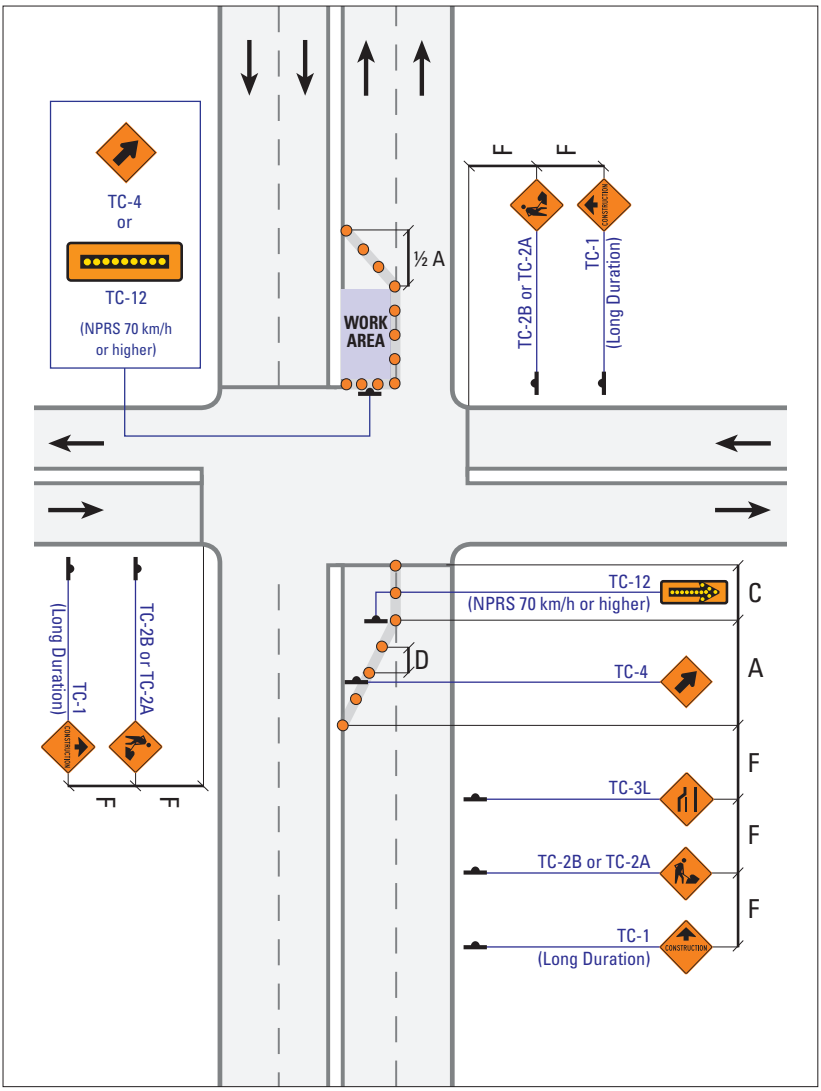
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) Right Lane Closed: mirror image.
ii) Measures should be taken to make sure on-street parking is not allowed next to the Work Area or Taper.
iii) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-13 **Intersection: Far-Side Lane Closed**



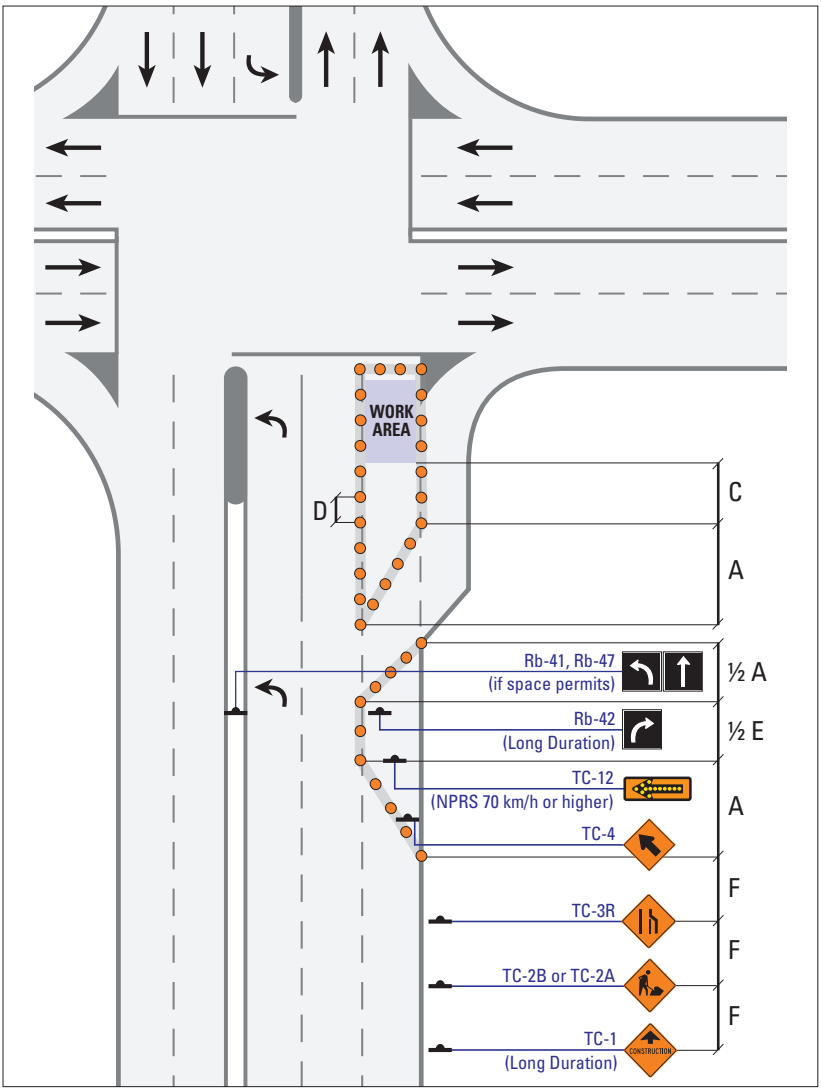
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Right Lane Closed: mirror image.
ii) Measures should be taken to make sure on-street parking is not allowed next to the Work Area or Taper.
iii) It may be necessary to prohibit left turns.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-14 **Intersection: Far-Side Lane Closed**



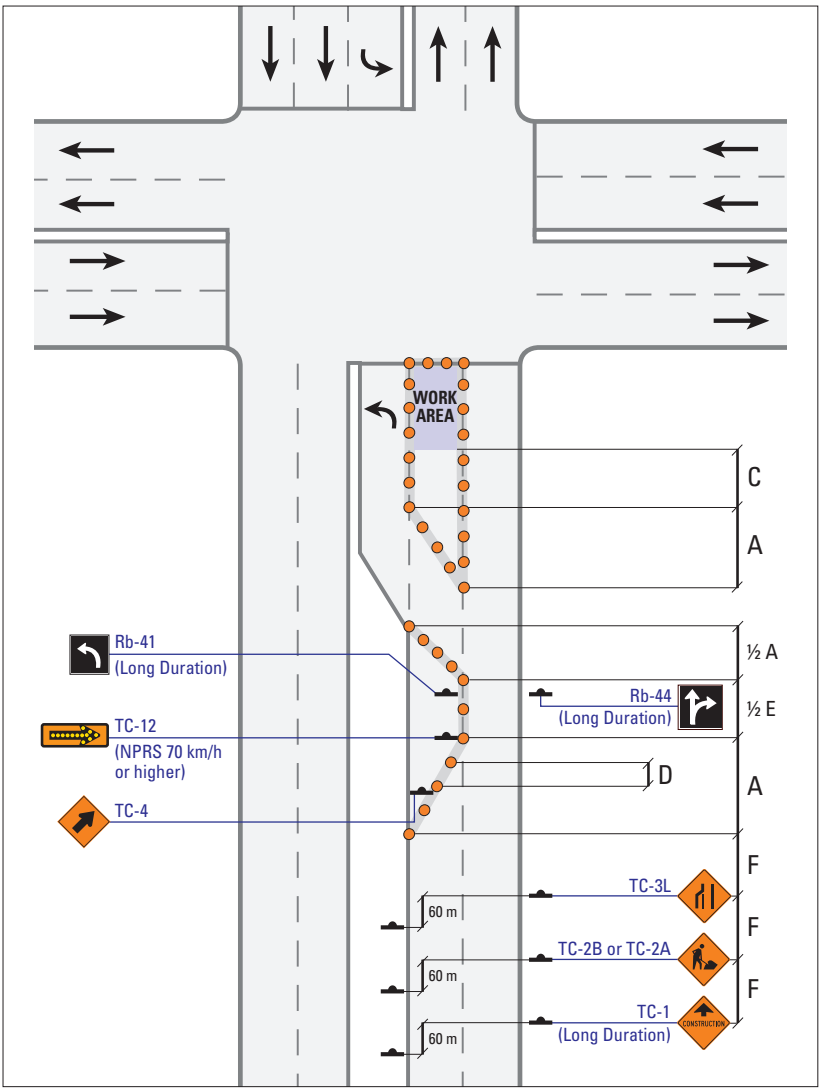
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-15 **Intersection: Lane Adjacent to Right Turn Lane Closed**



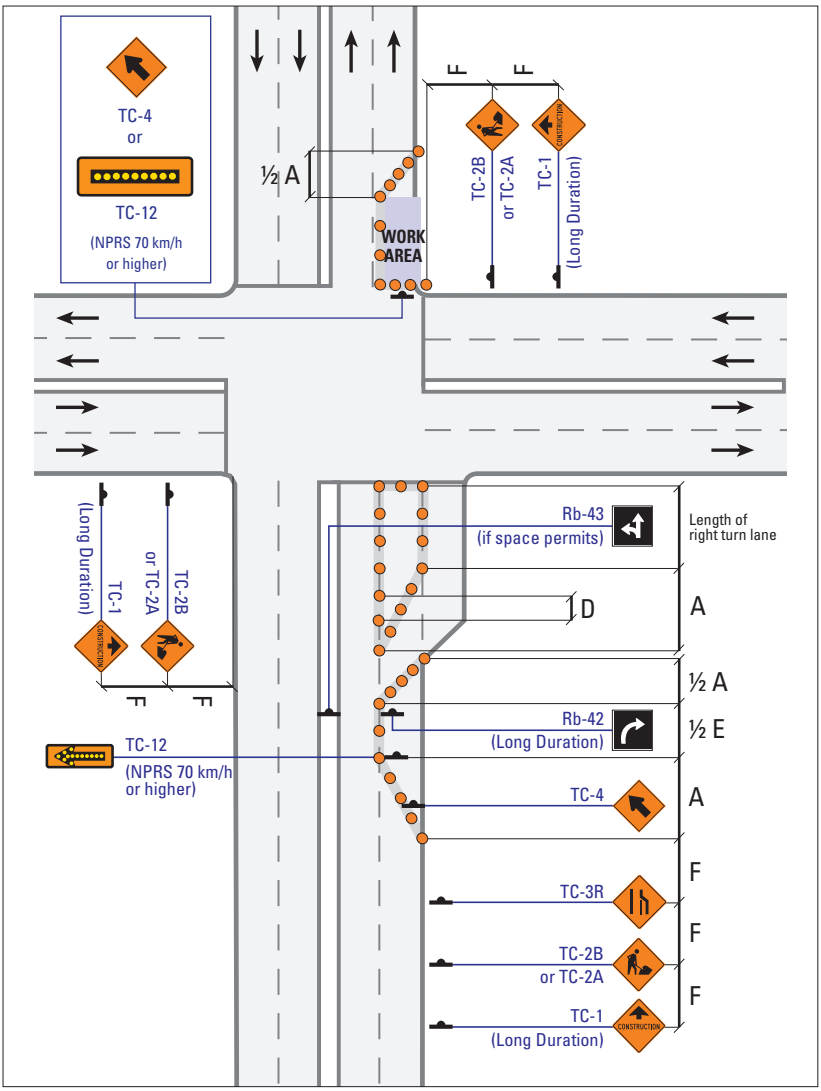
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Repeated median signing required for Long Duration only.
ii) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-16 Intersection: Lane Adjacent to Left Turn Lane Closed



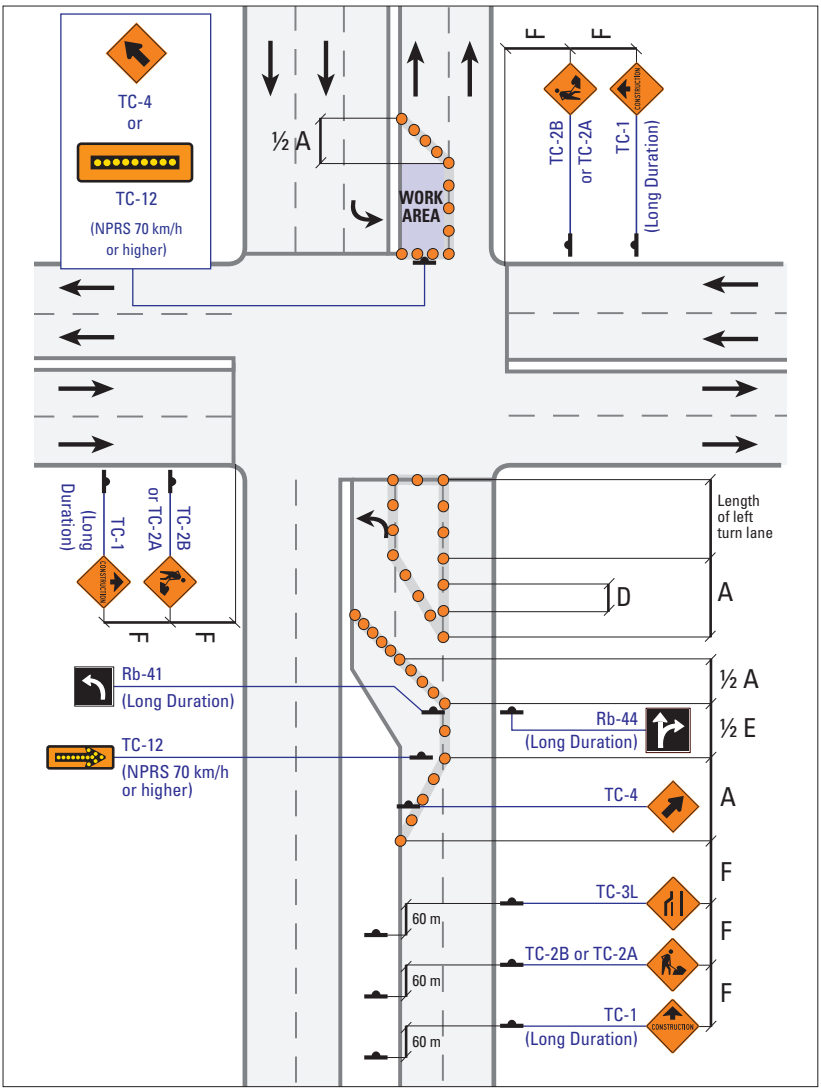
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit certain turning movements.
iii) It may be necessary to prohibit right turn truck movements.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-17 Intersection: Right Turn Lane (Far-Side Right Lane Closed)



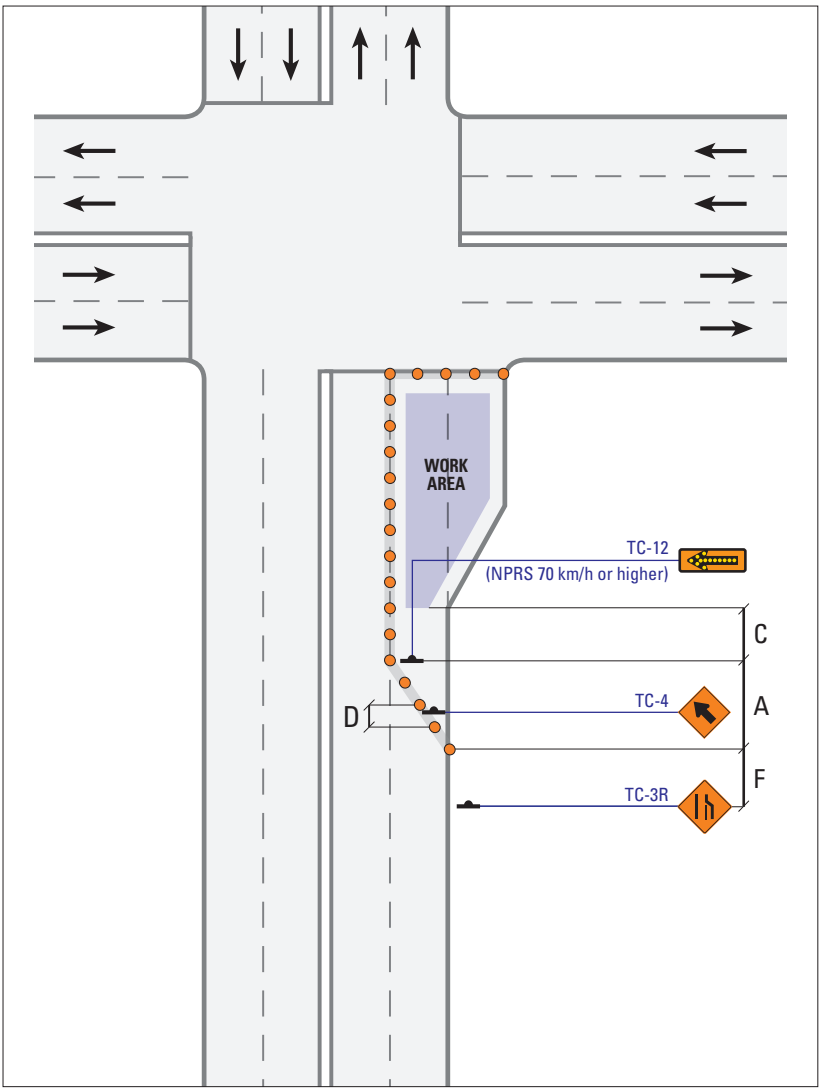
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) Repeated median signing required for Long Duration only.
iii) It may be necessary to prohibit right turn truck movements.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-18 Intersection: (Left Turn Lane Open) Far-Side Left Lane Closed



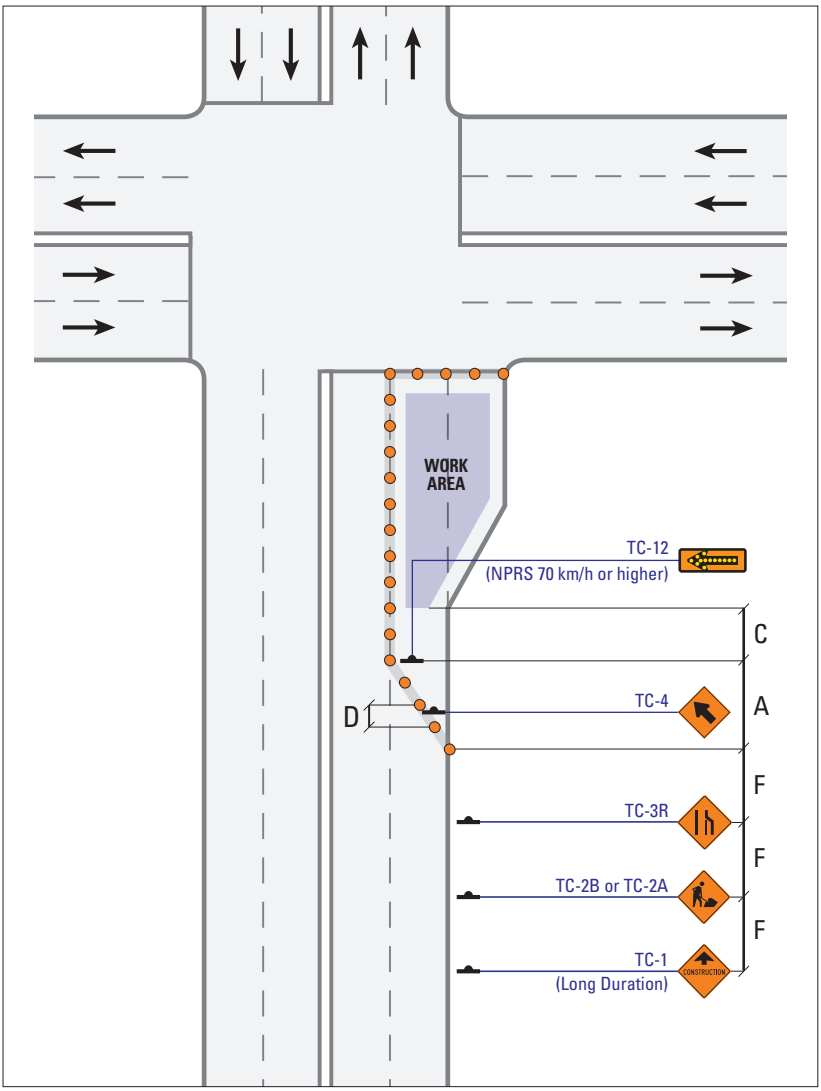
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-19 **Intersection: Right Turn Lane and Adjacent Through Lanes Closed**



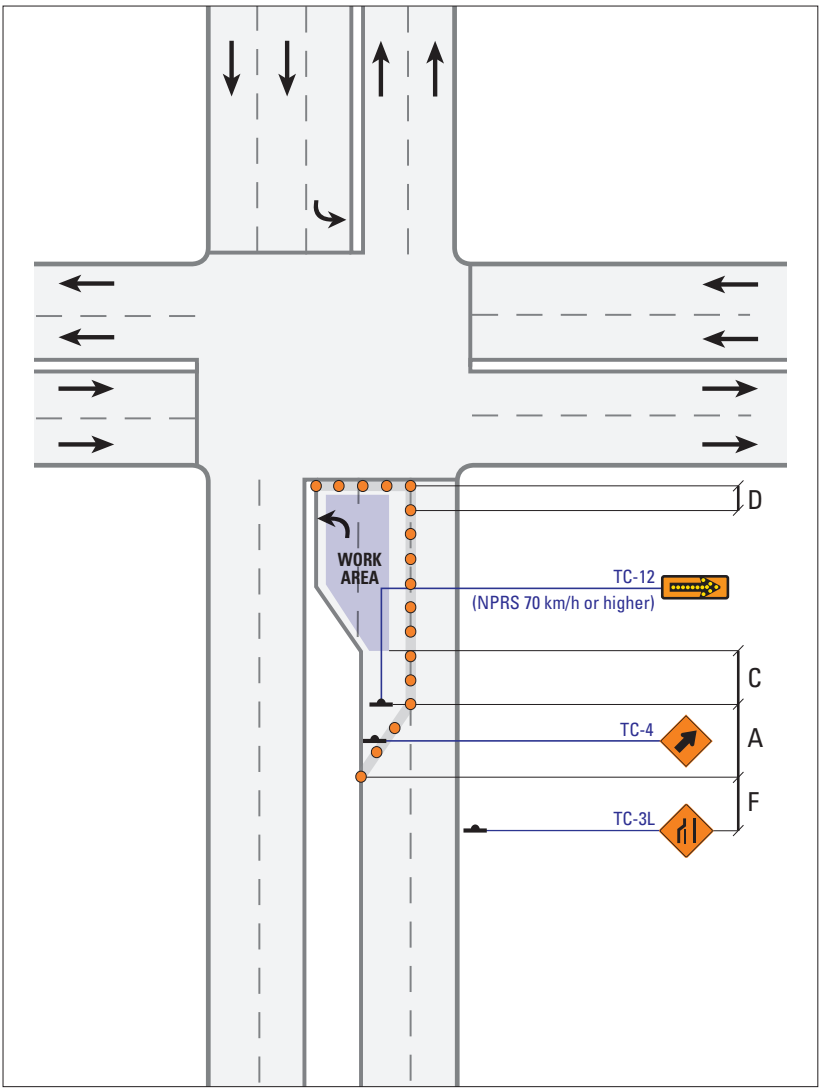
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-20 **Intersection: Right Turn Lane and Adjacent Through Lanes Closed**



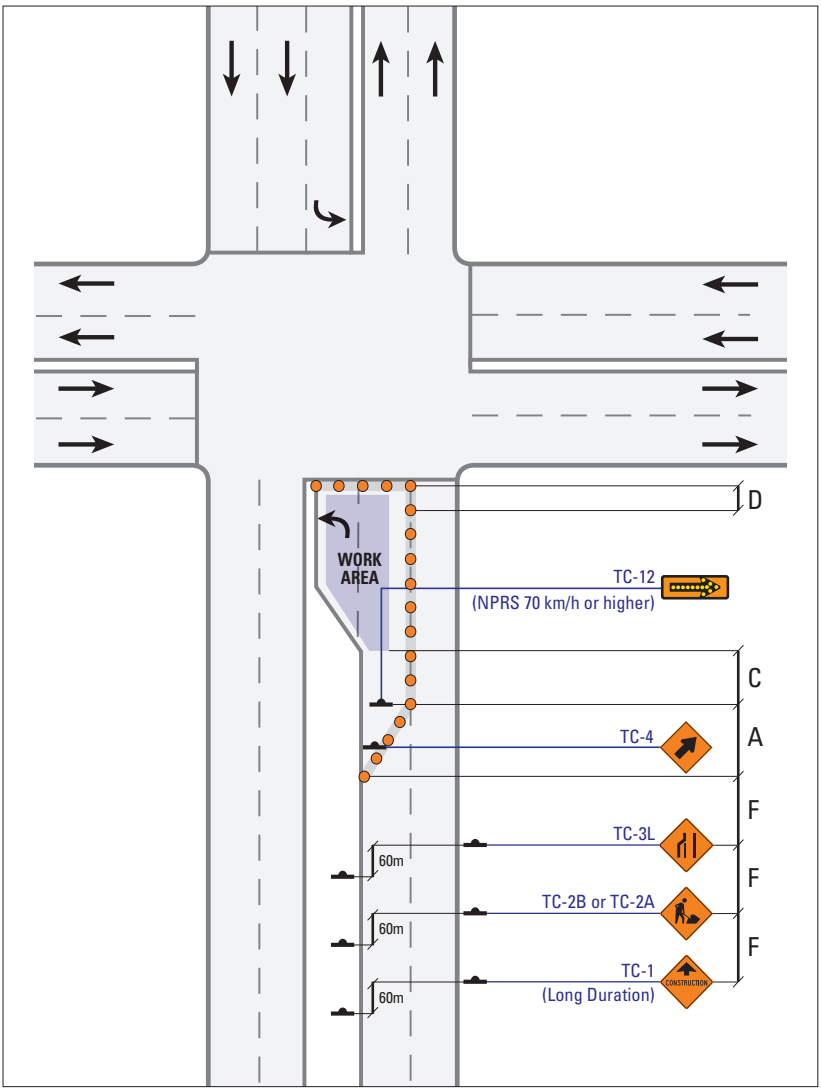
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit left turns in the direction reduced to one lane.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DI-21 Intersection: Left Turn Adjacent Through Lanes Closed



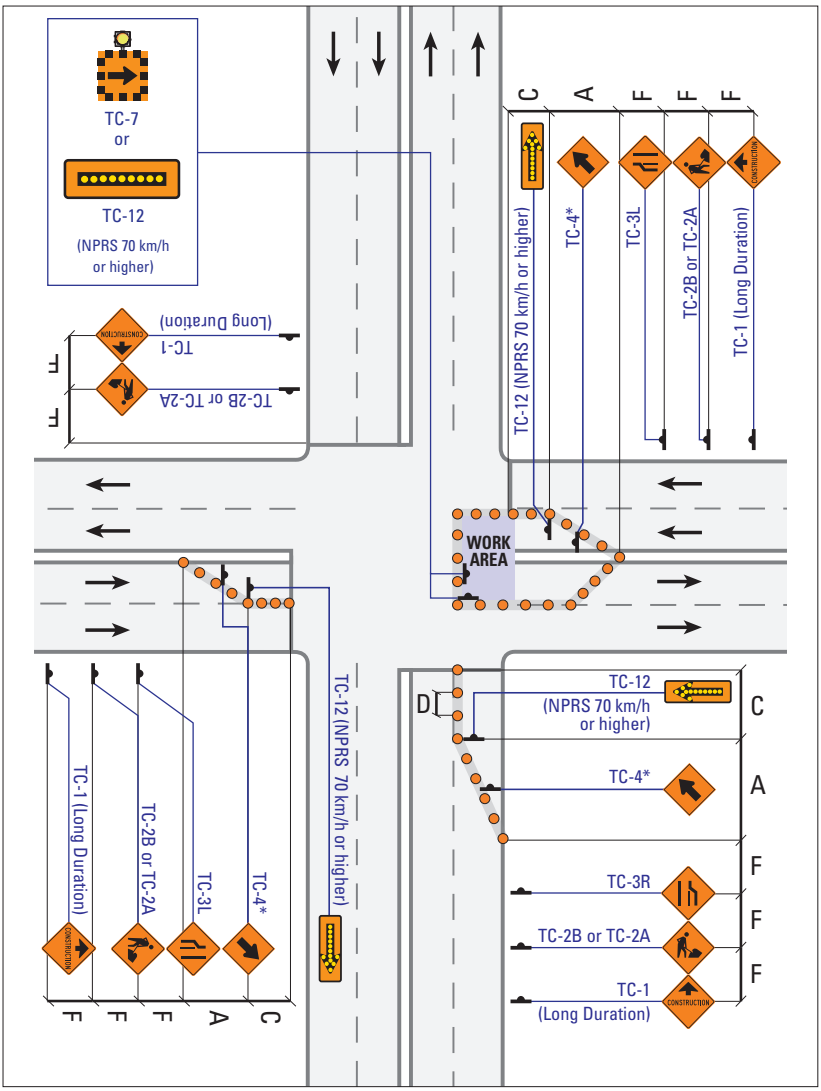
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Repeated median signing required for Long Duration only.
ii) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
iii) It may be necessary to prohibit left turns in the direction reduced to one lane.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-22 Intersection: Left Turn Adjacent Through Lanes Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

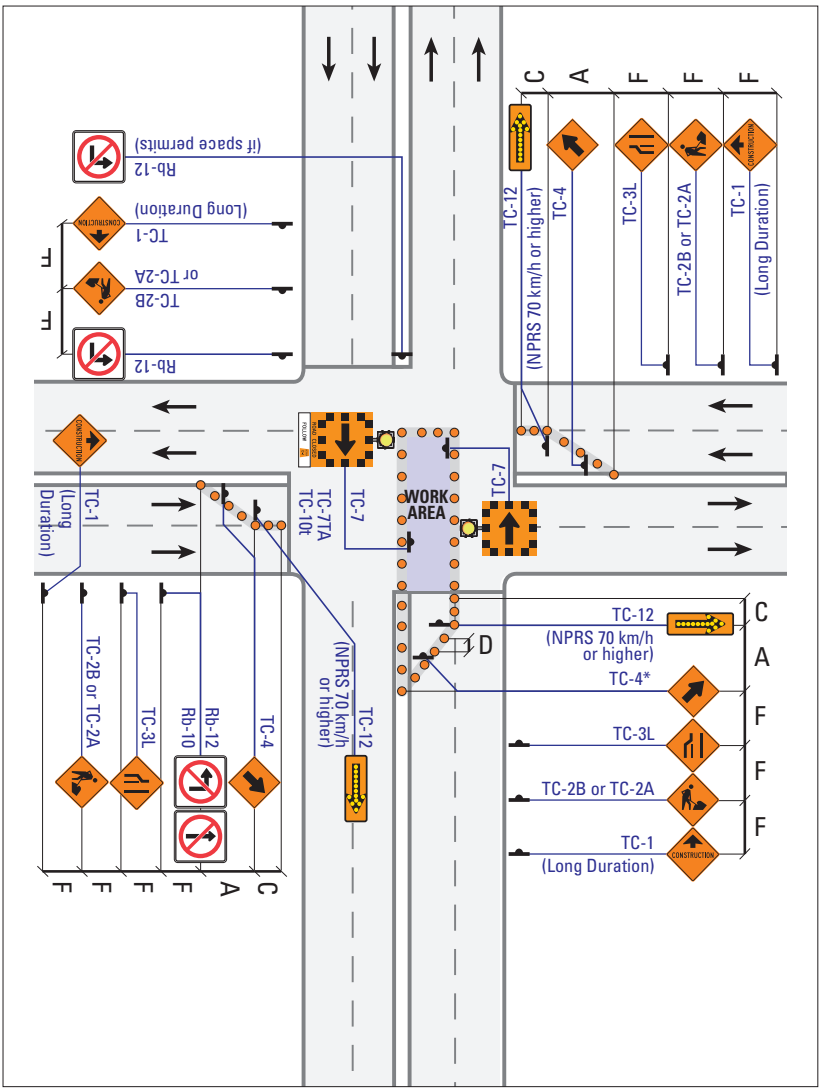
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit certain turning movements.
iii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-23 **Work in Intersection: Right Lane Closed**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

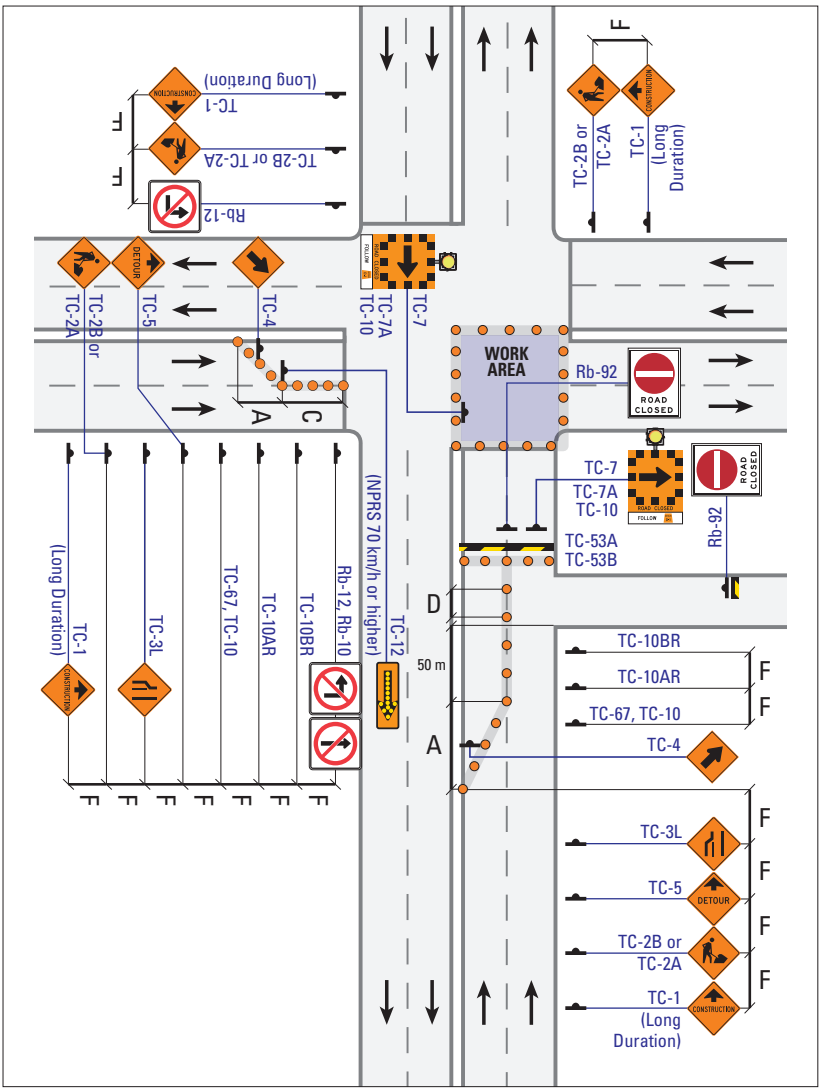
NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit additional turning movements.
iii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.
iv) See DS-17 "Route Detour", for applicable layout.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-24 Work in Intersection: Left Lane Closed



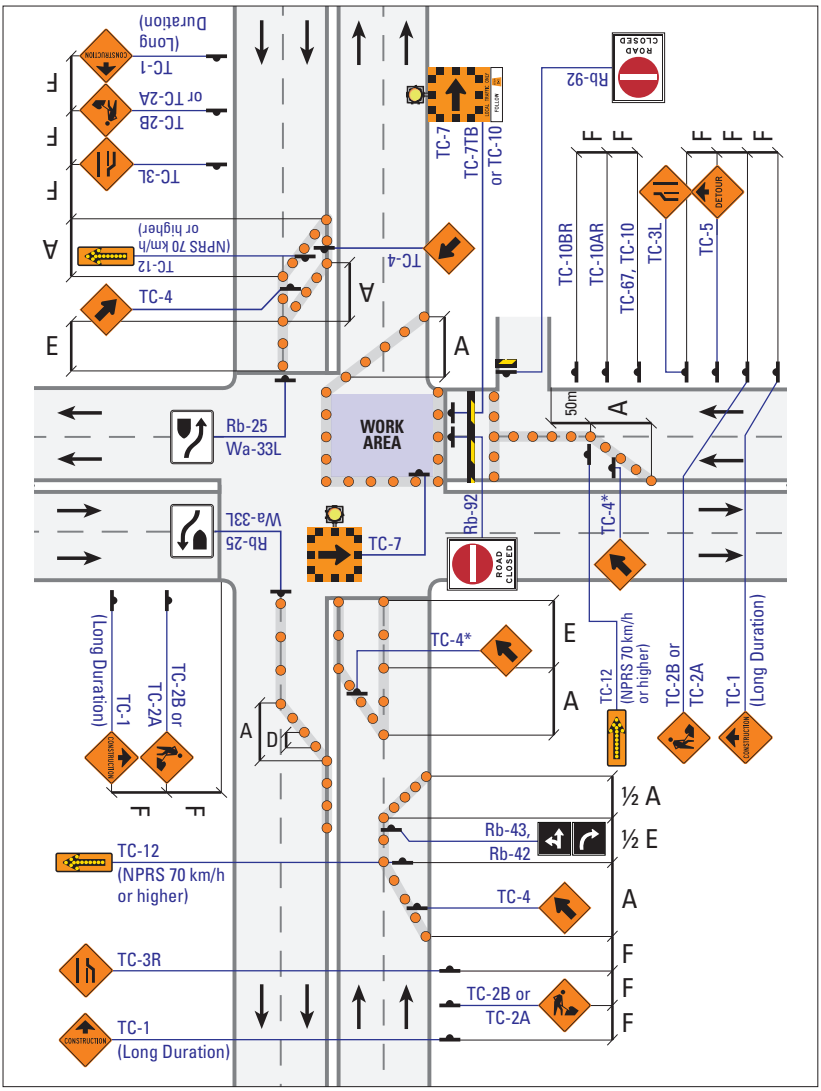
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.
iii) See DS-17 "Route Detour", for applicable layout.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-25 **Work in Intersection: Road Closed (Detour) - Option 1**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) If space permits, use TC-53A or TC-53B to surround the Work Area, otherwise reduce spacing between TC-54.
ii) It may be necessary to prohibit certain turning movements.
iii) Flashing Amber Light above TC-7 must not be used at intersections with active signals.
iv) See DS-17 "Route Detour", for applicable layout.

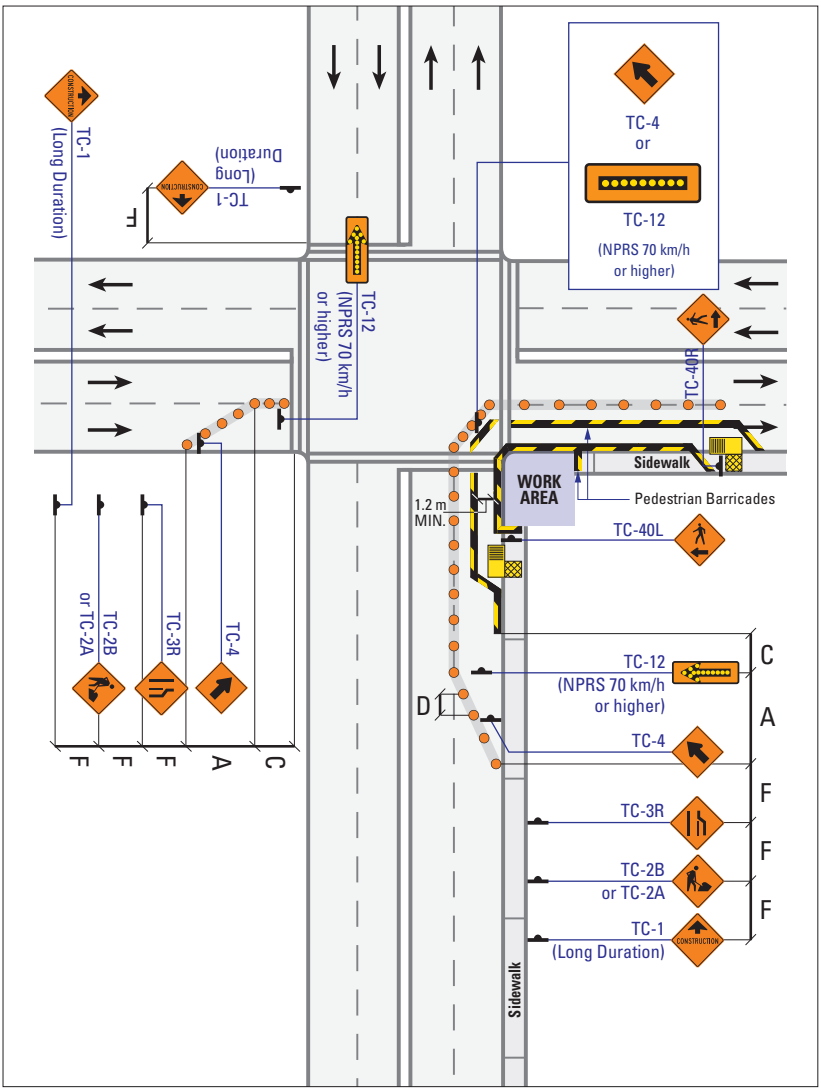
The median elevation must match the highway elevation.

Remove necessary portion of the raised median. If a traffic signal pole is present, it must be relocated with a temporary traffic signal.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-26 Work in Intersection: Two Lanes Closed - Option 2



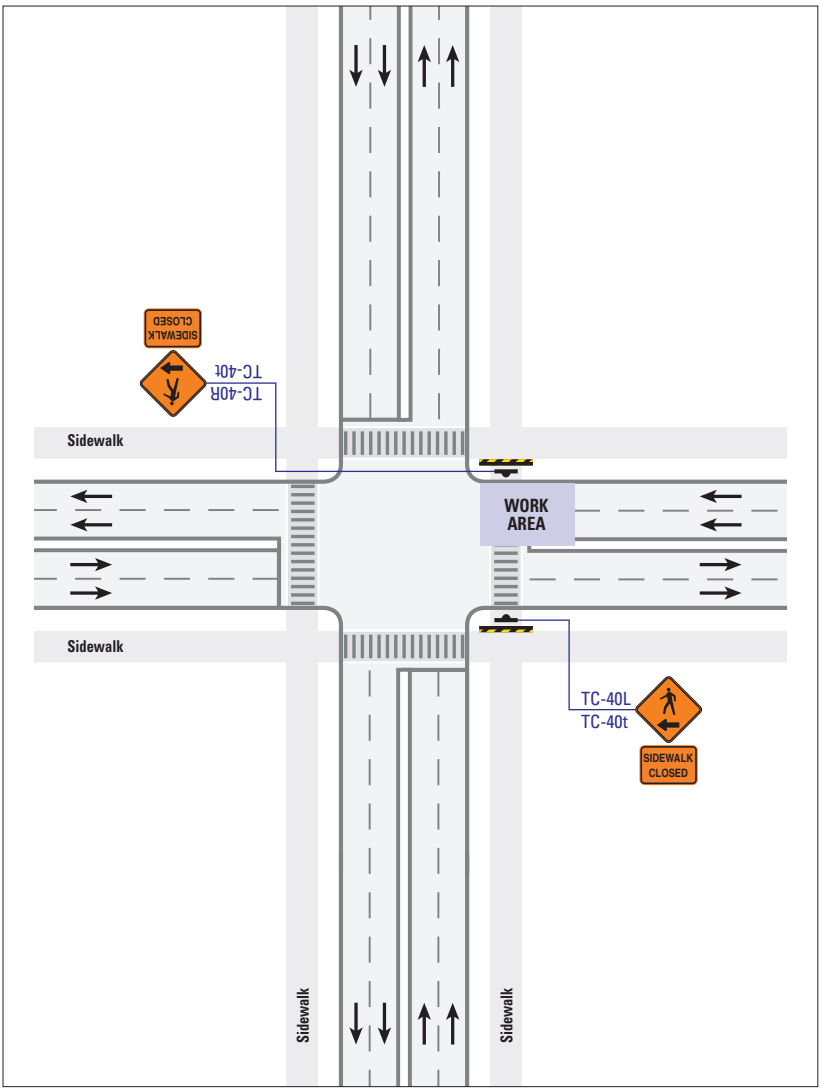
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) For Sidewalk Closures of Long Duration, a boardwalk and railing should be provided instead of Pedestrian Barricades.
ii) Minimum width of the temporary walkway is 1.2 m.
iii) AODA-compliant ramps are required if the curb is raised.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-27 **Pedestrian Accommodation: Intersection Sidewalk Detour Onto Roadway**

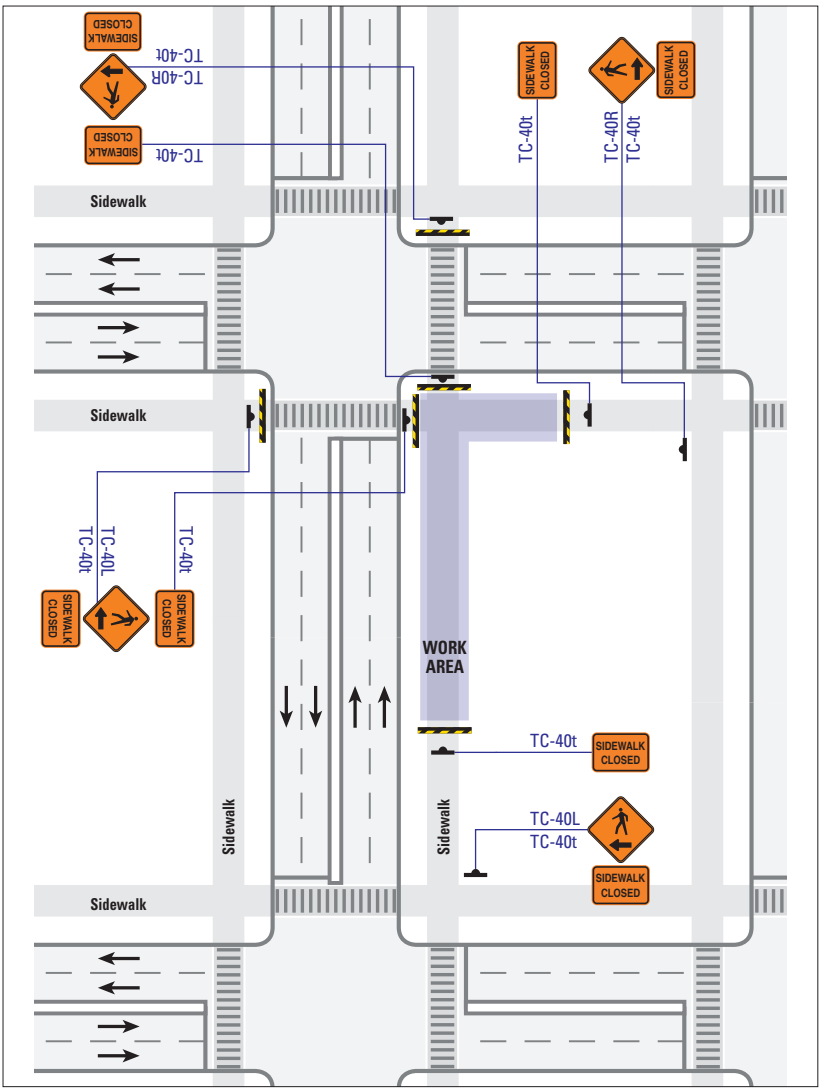


NOTES

i) Supplementary layout. This layout shows pedestrian signage only and shall be used in conjunction with other appropriate layouts.
ii) See DS-17 & DS-18 for required signage for vehicle Detour.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-28 **Pedestrian Detour: Crosswalk Closure**

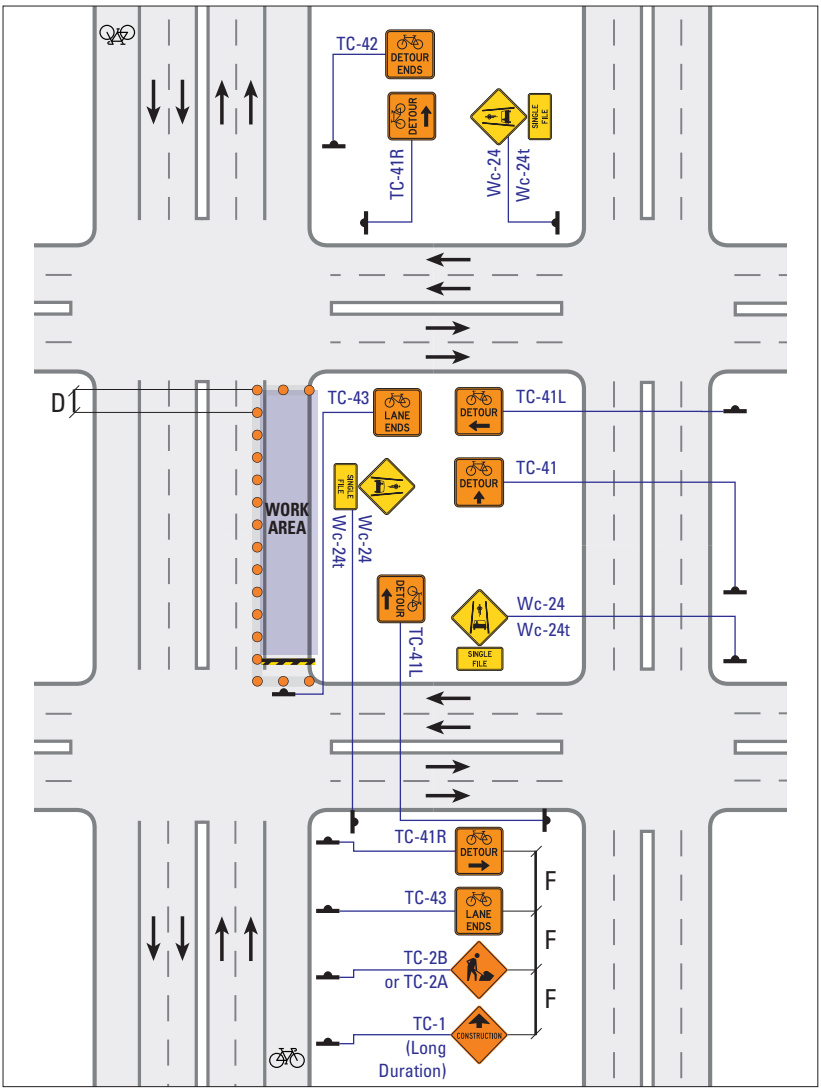


NOTES

i) TC-40L/R Pedestrian Direction sign must be placed at the nearest upstream controlled pedestrian crossing (traffic signal of Pedestrian Crossover) in each direction.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-29 **Pedestrian Detour: Crosswalk and Sidewalk Closure**



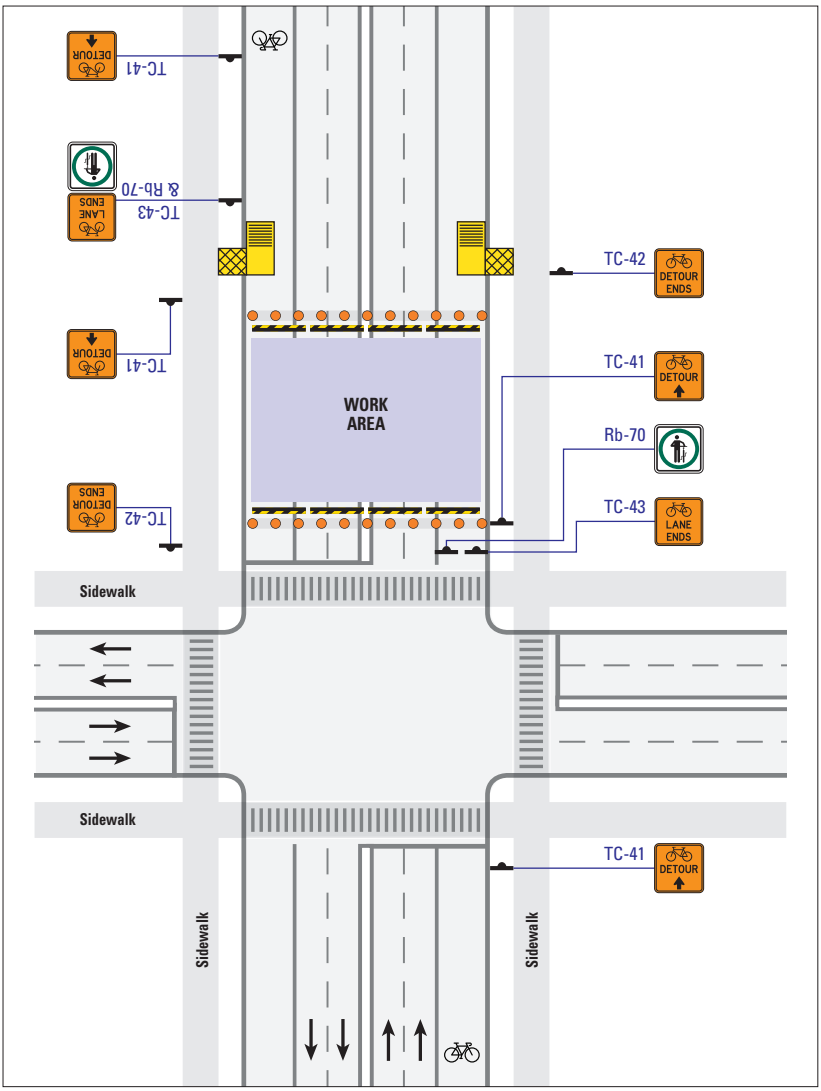
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

Shared lane only to be used if considered by OTM Book 18 or MTO Bikeways Design Manual, Desirable Cycling Facility Nomograph. Otherwise, cycling Detour should be provided.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-30 Cyclist: Detour

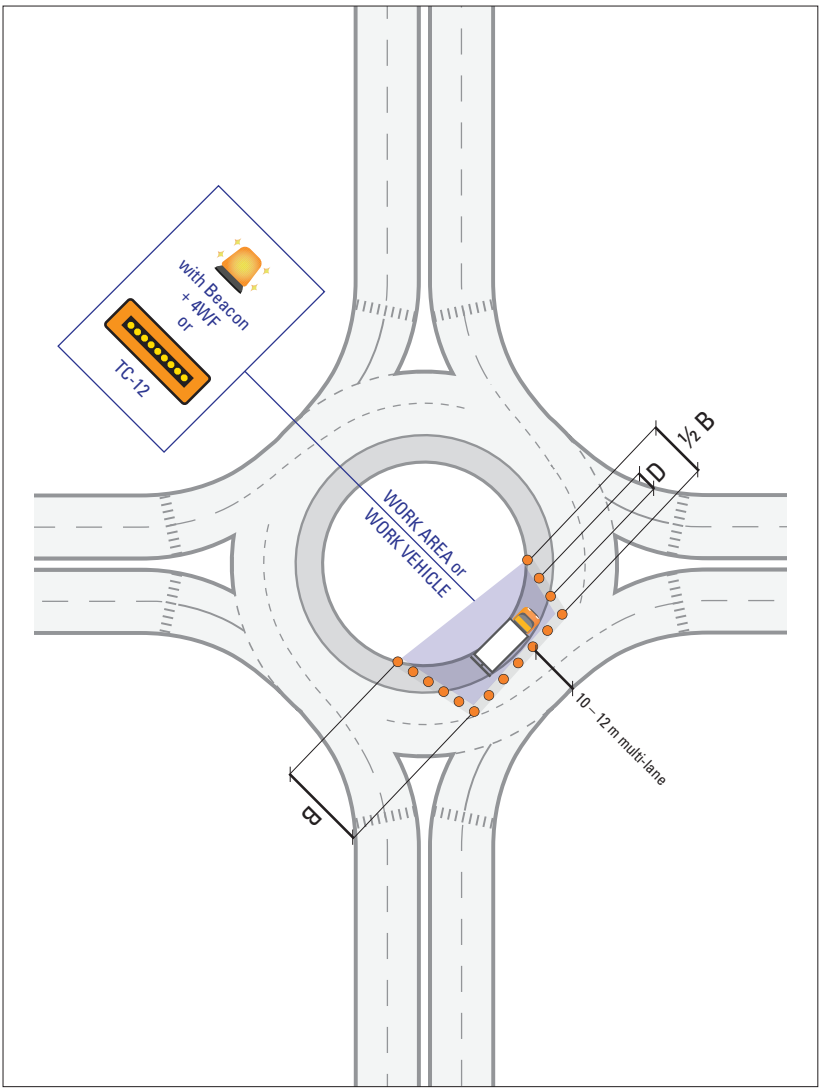


NOTES

i) Supplementary layout. This layout shows cyclist signage only and shall be used in conjunction with other appropriate layouts.
ii) See DS-17 & DS-18 for required signage for vehicle Detour.
iii) Ramps must be AODA-compliant.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DI-31 **Bicycle Lane Closed: Dismount and Walk**



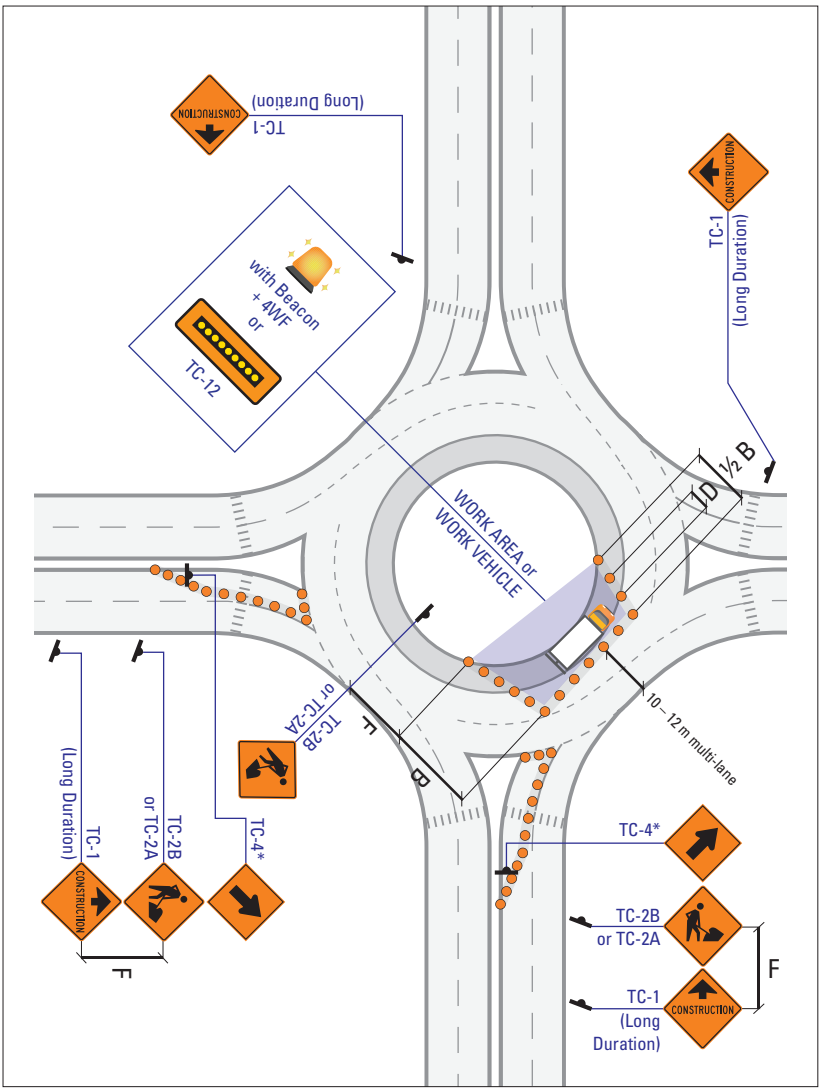
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	35	35	40
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Total lane width of 10 m must be maintained. If minimum lane widths cannot be maintained then see Lane Closure layouts.
iii) Markers are not required if a Work Vehicle with Beacon + 4WF or TC-12 is present.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DO-1 **Roundabout: Encroachment**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

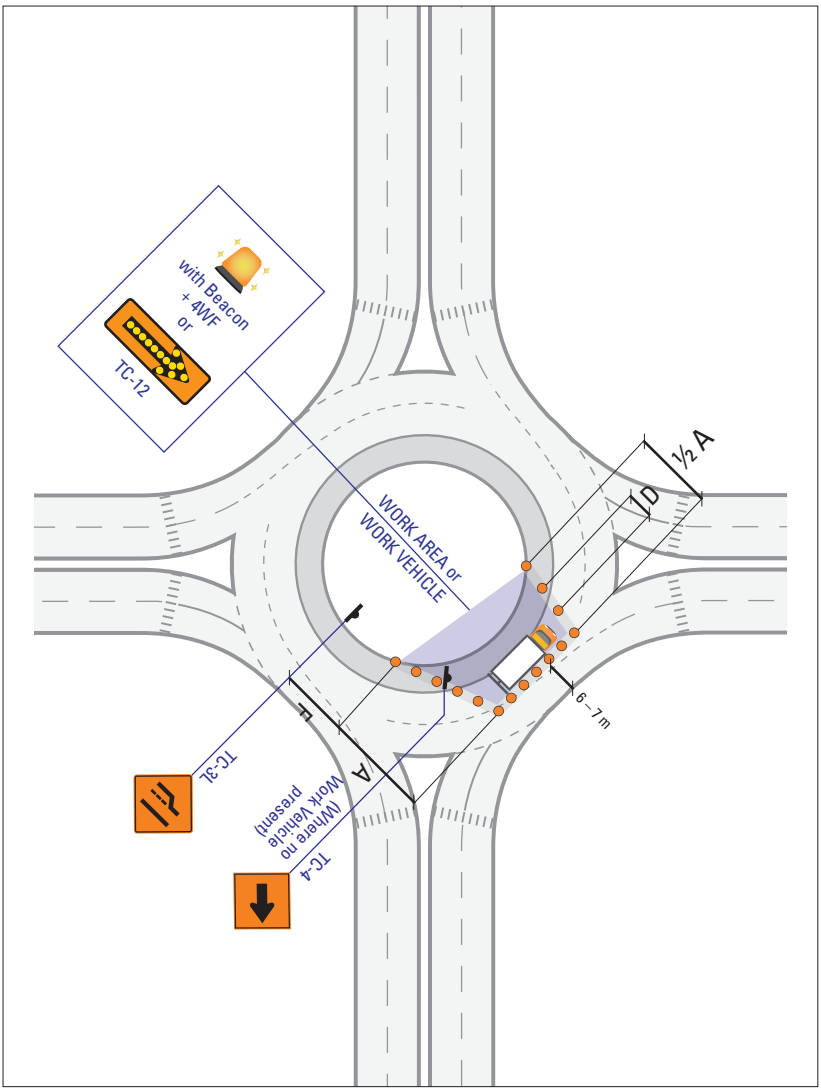
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Total lane width of 10 m must be maintained. If minimum lane widths cannot be maintained then see Lane Closure layouts.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DO-2 Roundabout: Encroachment



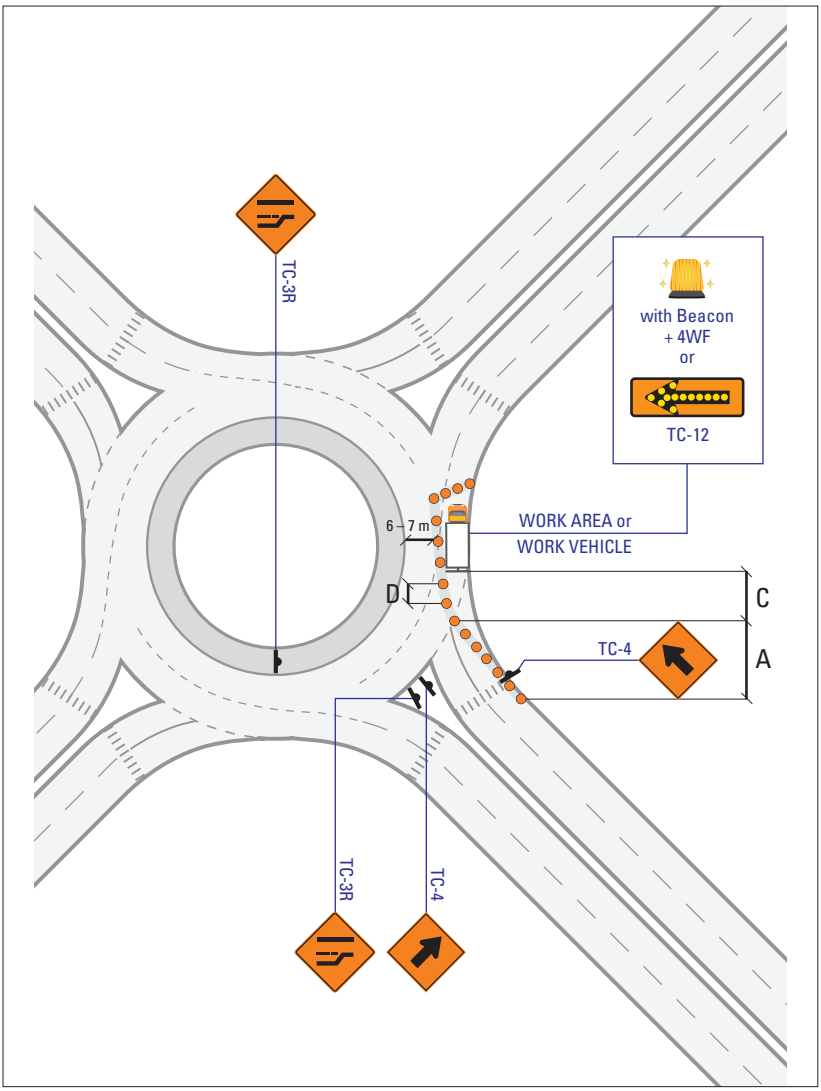
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8
F	Distance between Construction Signs (m)	30	30	60	60	80

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DO-3 Roundabout: Inside Lane Partially Closed



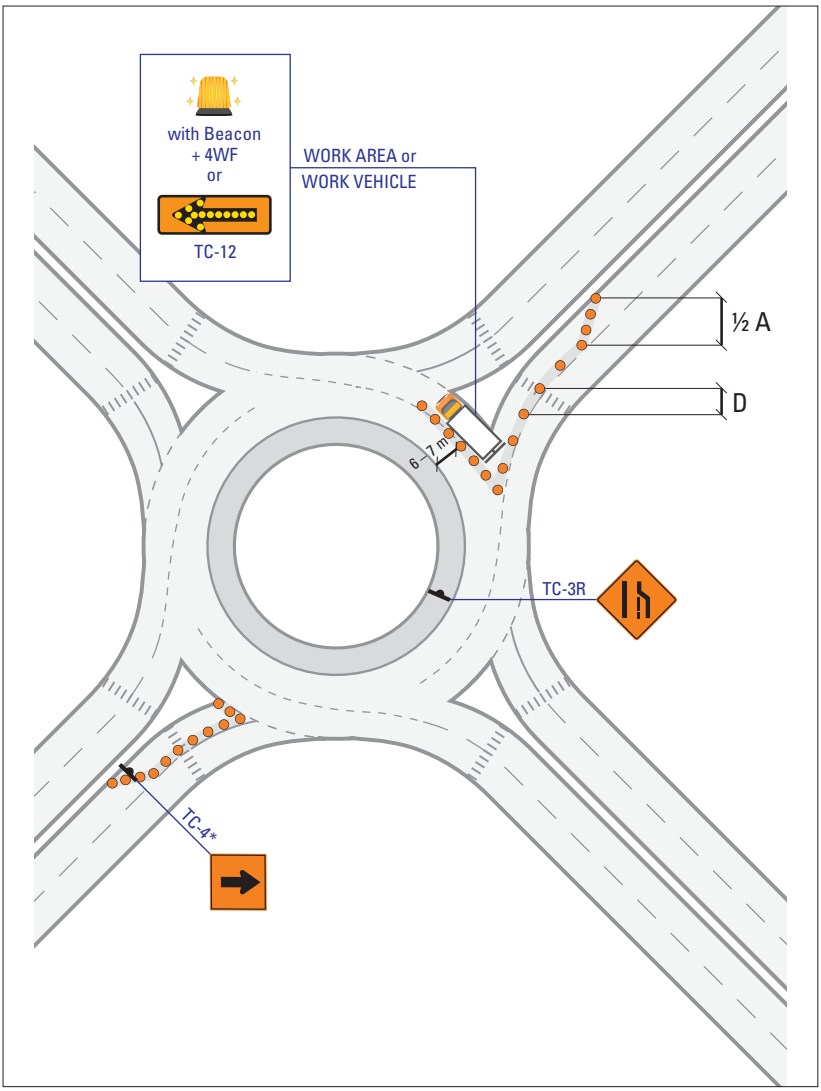
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	110
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DO-4 Roundabout: Outside Lane Partially Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	100	100	100
D	Maximum Distance between Markers (m)	6	6	9	9	12
	Minimum Number of Markers for Taper	4	5	5	7	8

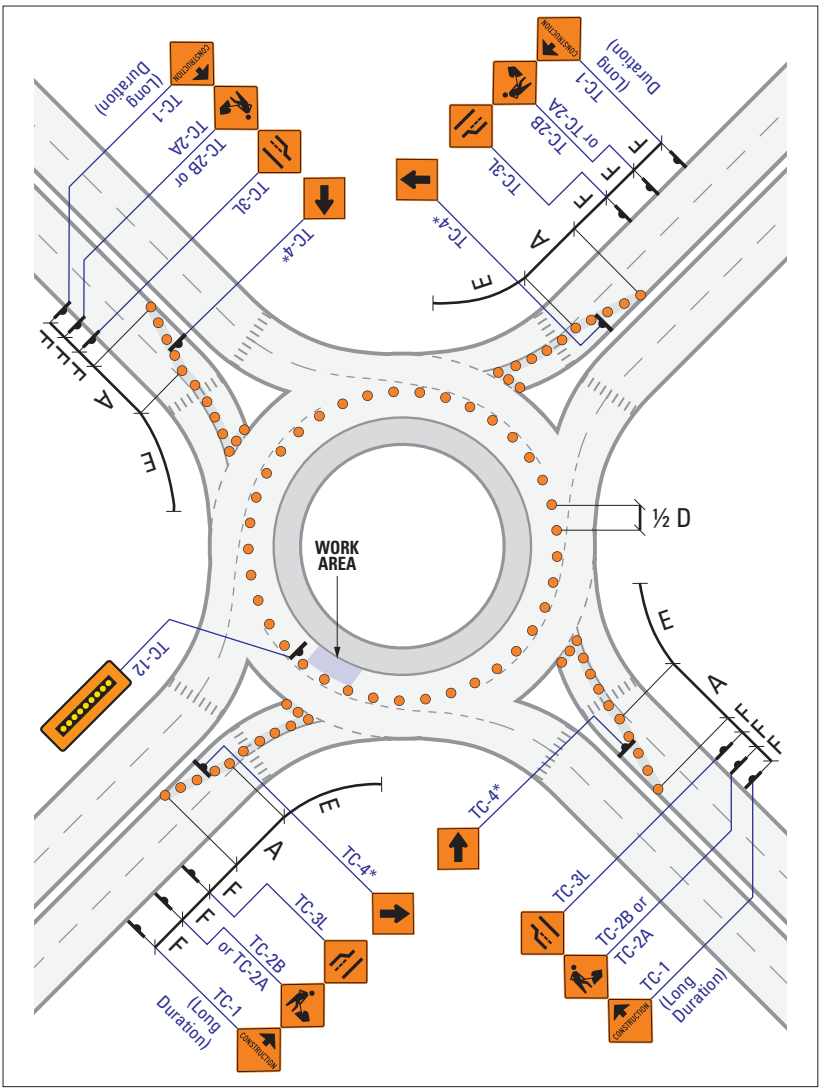
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table A (Mobile/Intermittent/Very Short, pg. 4).

DO-5 Roundabout: Left Exit or Partial Outside Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

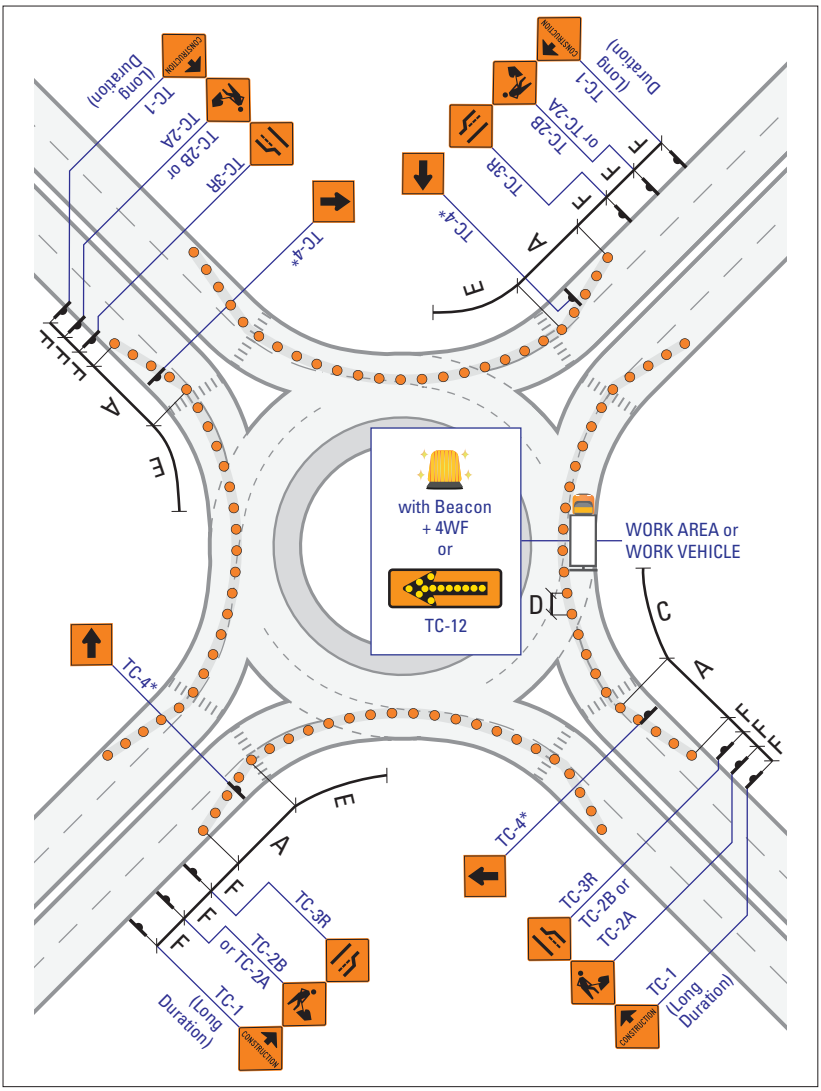
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Work Area may be anywhere in the inside lane. All entrances must be reduced to one lane.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DO-6 Roundabout: Inside Lane Closed



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

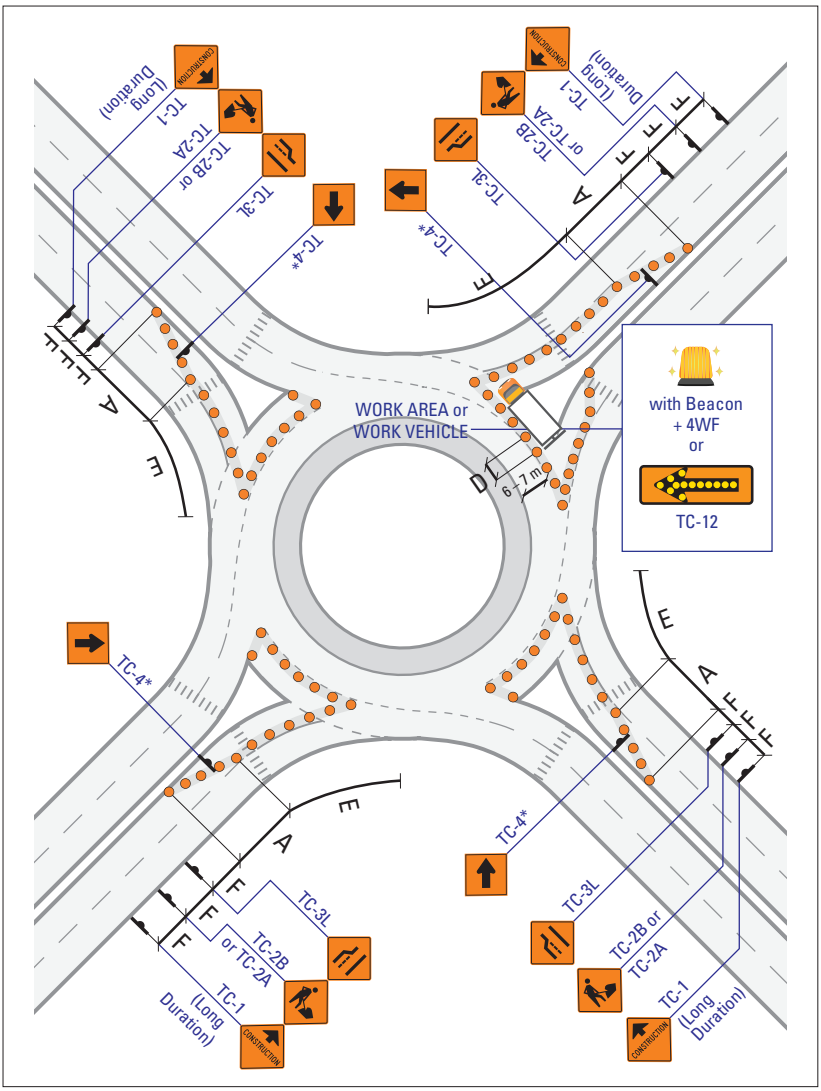
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) Work Area may be in any of the closed quadrants. All entrances and exits must be reduced to one lane.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DO-7 **Roundabout: Outside Lane Closed**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

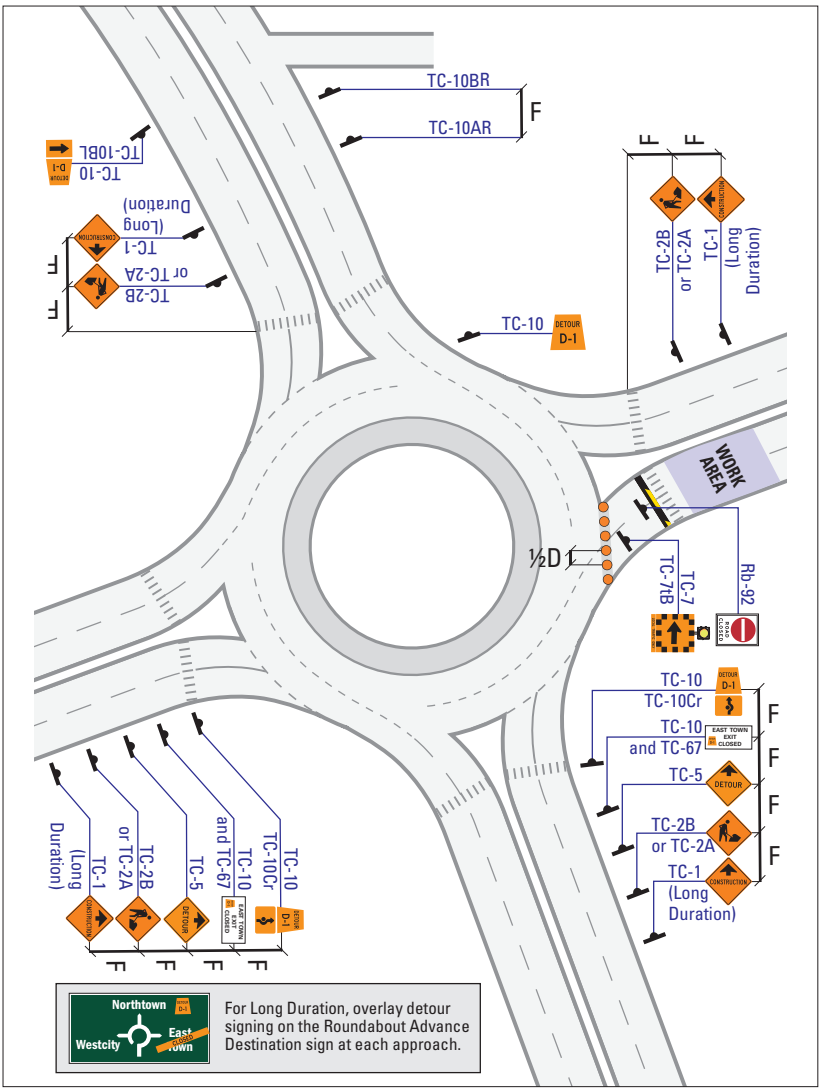
NOTES

i) It may be necessary to leave a wider lane width if there is a high truck percentage.
ii) All entrances must be reduced to one lane.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DO-8 Roundabout: Left Exit or Partial Outside Lane Closed



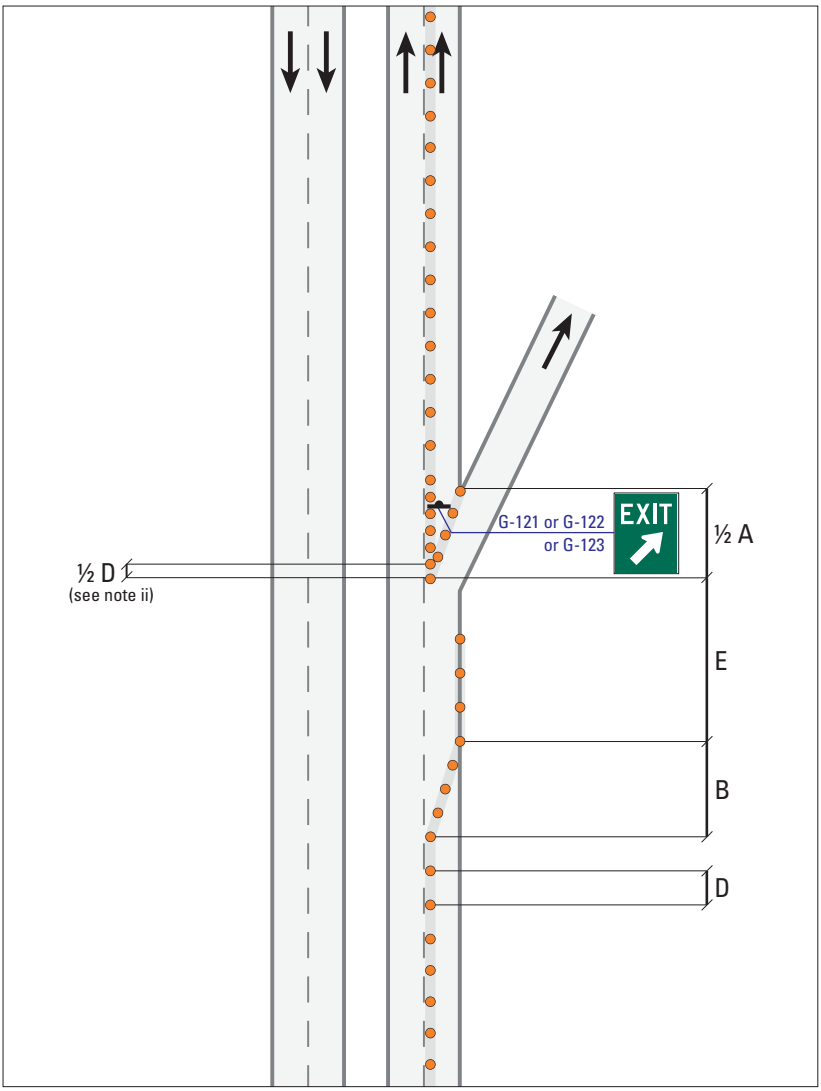
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) See DS-17 and DS-18 for Detour signing in advance and beyond the Roundabout.
ii) Any existing signs that contradict or that are duplicated should be covered.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DO-9 **Roundabout: One Exit Closed (Detour)**



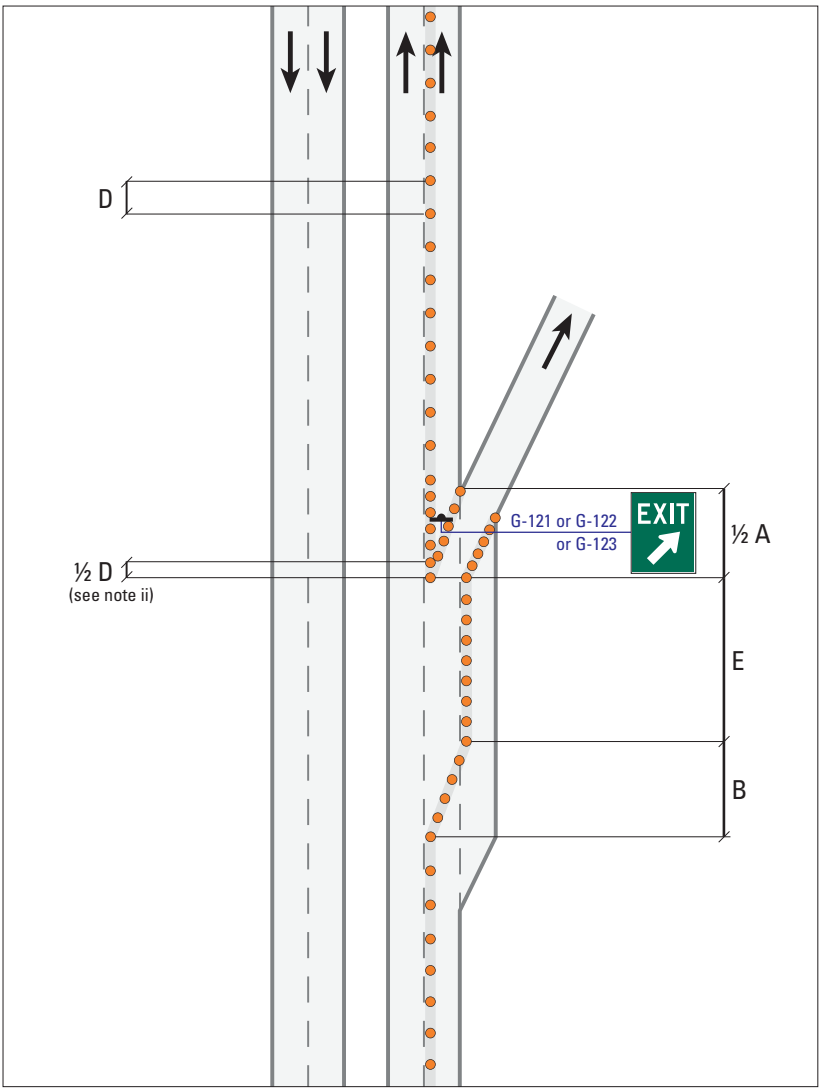
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200

NOTES

i) For Right Lane Closed, see DS-15.
ii) In the immediate area of the exit, Marker spacings of half of those shown on Table B should be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DR-1 Lane Closed at Exit Ramp



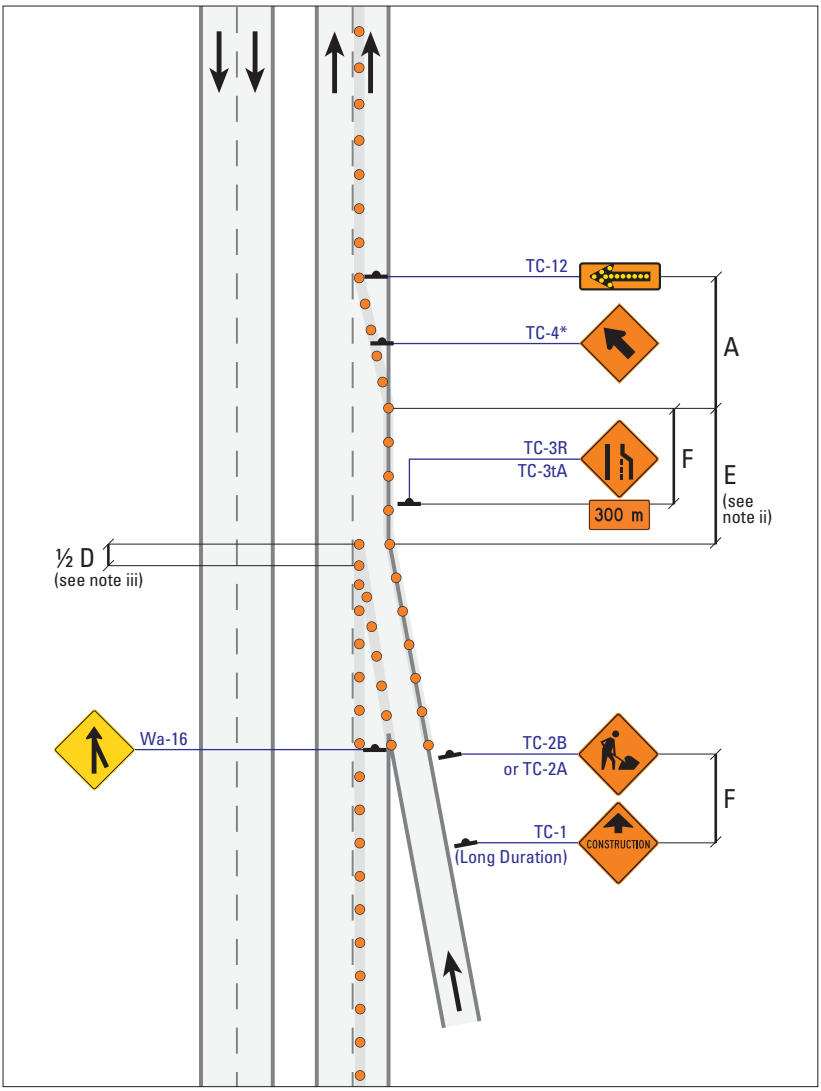
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200

NOTES

i) For Right Lane Closed, see DS-15.
ii) In the immediate area of the exit, Marker spacings of half of those shown on Table B should be used.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DR-2 Lane Closed at Exit Ramp with a Deceleration Lane



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

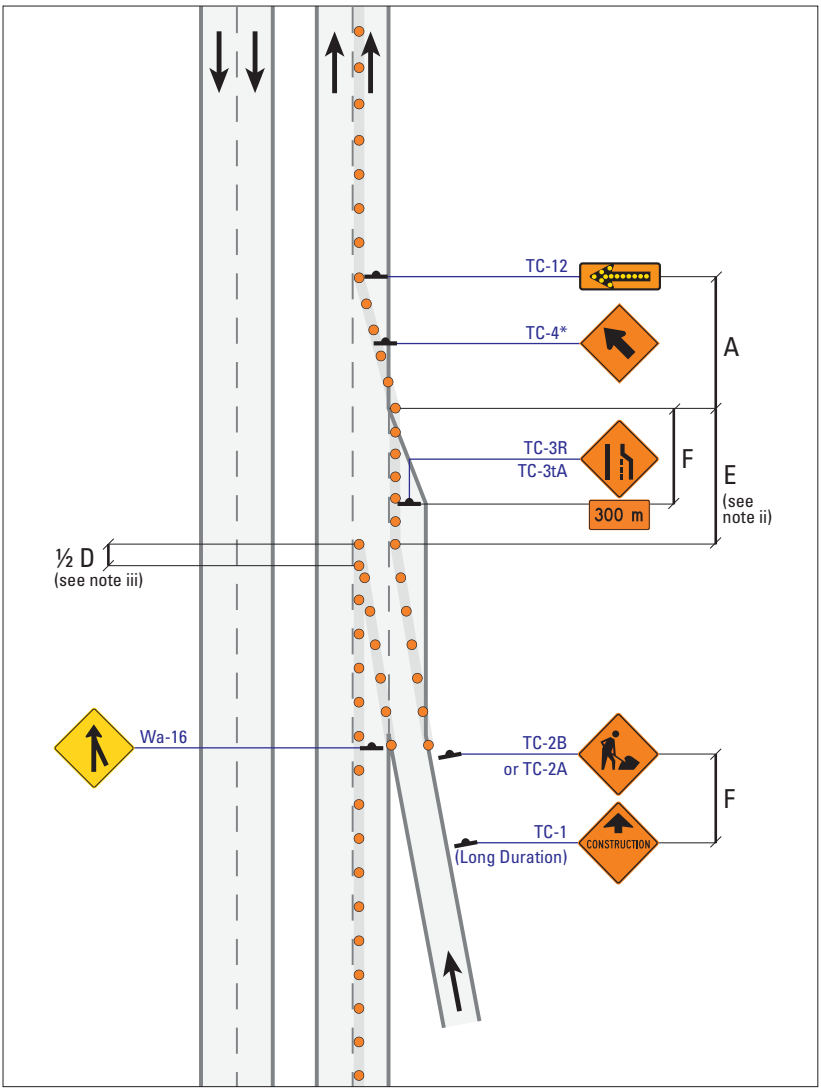
NOTES

i) For Right Lane Closed, see DS-15.
ii) Where space and work activities permit, the acceleration lane should be made as long as possible.
iii) In the immediate area of the entrance, Marker spacings of half of those shown on Table B should be used.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DR-3 **Lane Closed at Entrance Ramp**



		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
E	Minimum Tangent between Tapers (m)	60	85	155	180	200
F	Distance between Construction Signs (m)	50	90	120	140	150

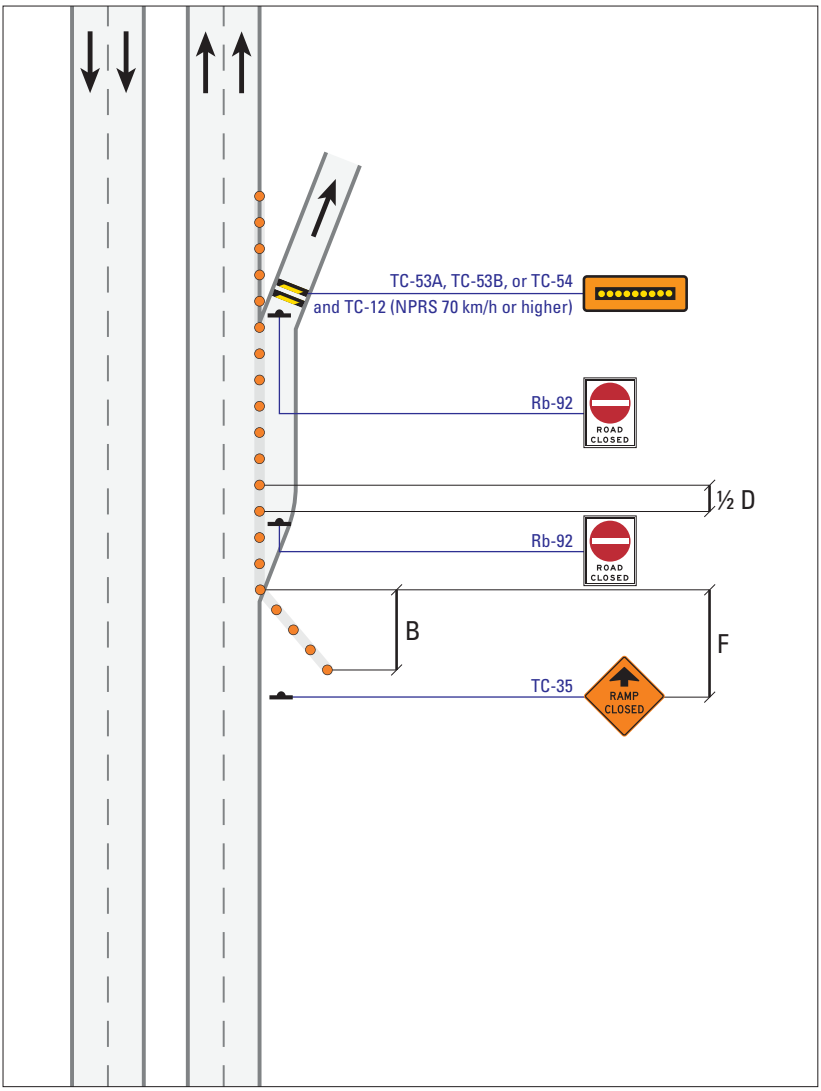
NOTES

i) For Right Lane Closed, see DS-15.
ii) Where space and work activities permit, the acceleration lane should be made as long as possible.
iii) In the immediate area of the entrance, Marker spacings of half of those shown on Table B should be used.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DR-4 **Lane Closed at Entrance Ramp with an Acceleration Lane**



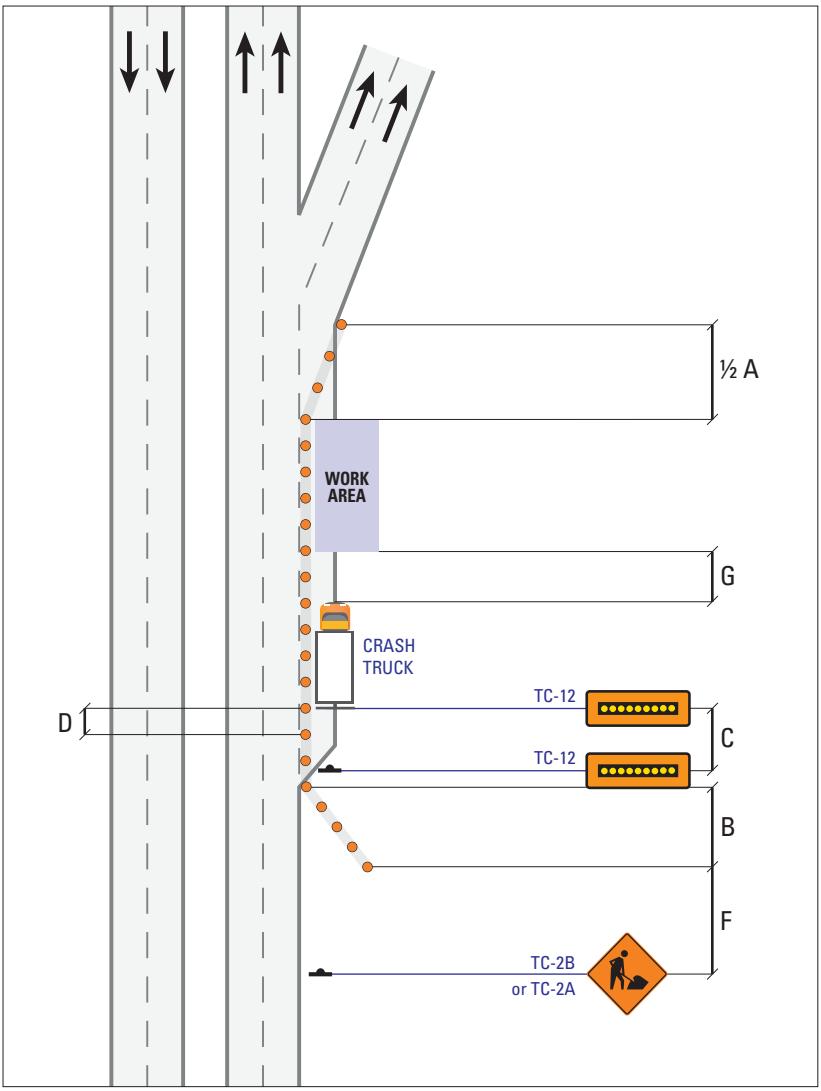
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
B	Shoulder Taper (m)	20	30	55	60	70
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

NOTES

i) Closed sign on Directional Guide Signs to be used for Long Duration only. For details, see OTM Book 8.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DR-5 **Ramp Closed**



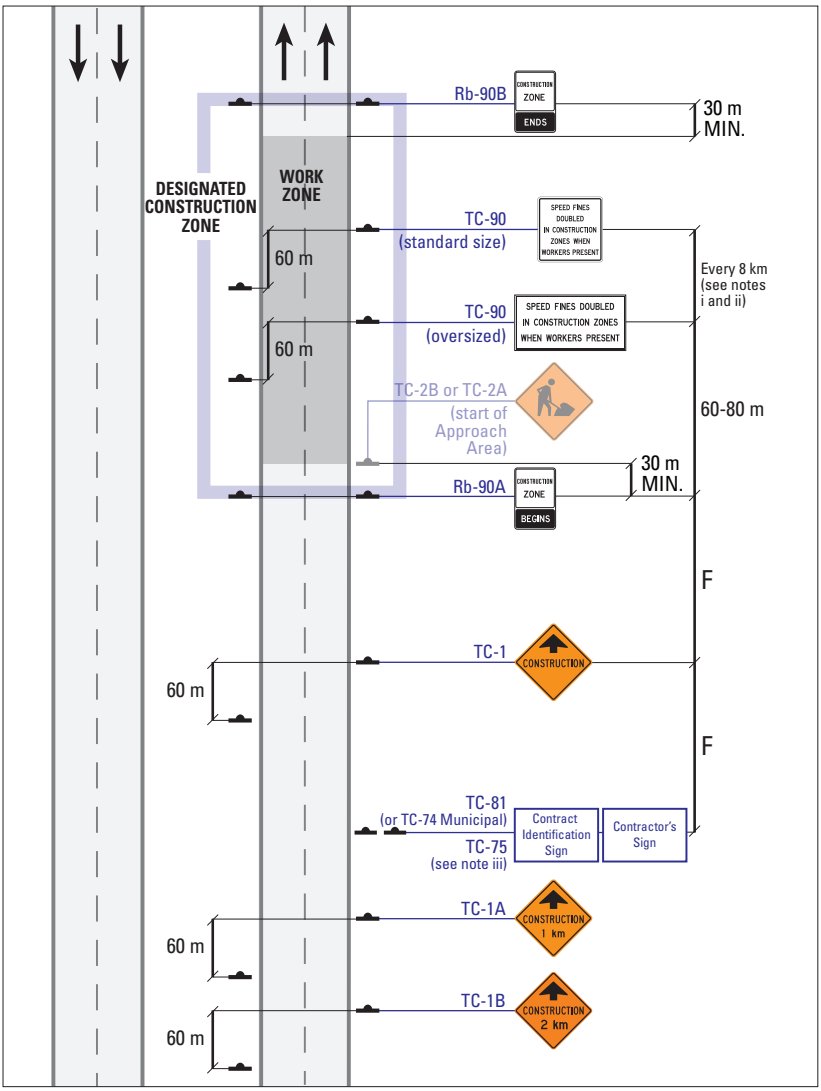
		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
B	Shoulder Taper (m)	20	30	55	60	70
C	Longitudinal Buffer Area (LBA) (m)	(30)	(40)	50	60	75
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	(35)	(40)	50	60	65

NOTES

i) Left Developed Lane Closed: mirror image of Right Developed Lane Closed.

For further detail on Work Zone components, see Table B (Short/Long, pg. 6).

DR-6 **Right Developed Lane Closed**



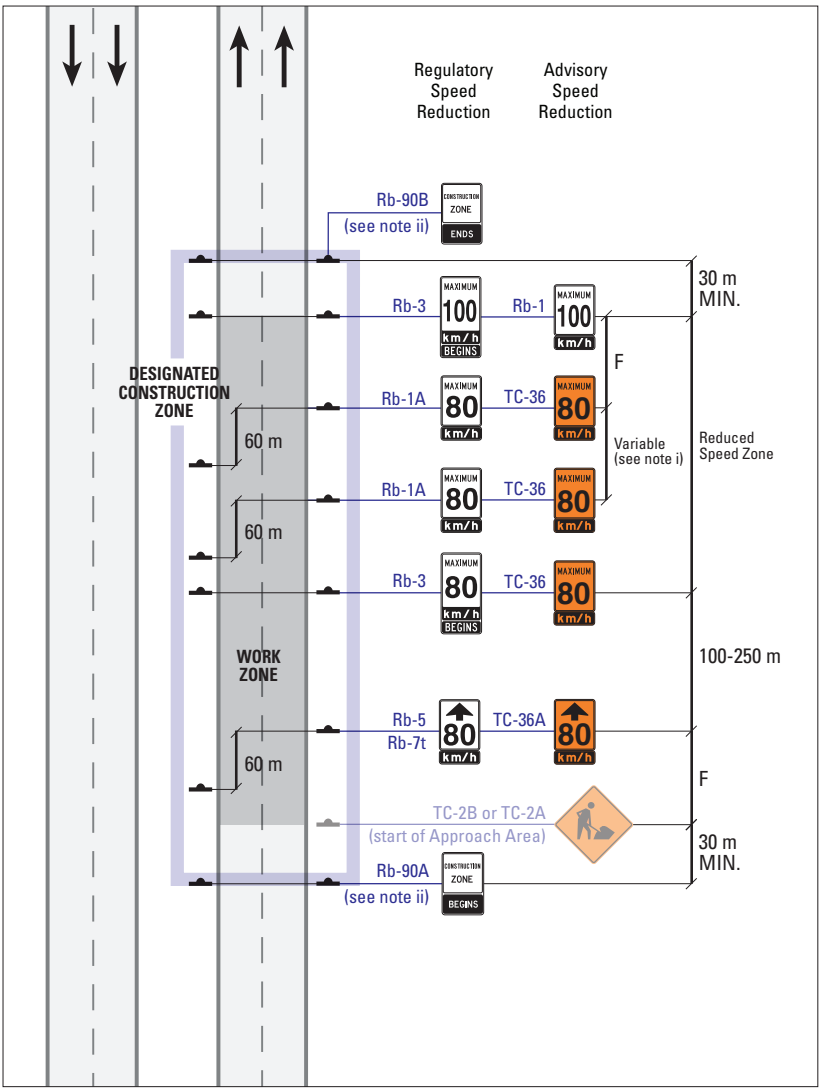
		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
F	Distance between Construction Signs (m)	160	180	200	200

NOTES

i) Where signs cannot be accommodated in the median, provide additional oversize signs on the right shoulder as practicable.
ii) Recommended, but not required.
iii) Where required by contract.
iv) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts. Locations of TC-1, TC-1A, TC-1B shown in FG-1 overrides the locations shown in other layouts when used in conjunction with FG-1.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FG-1 **Designated Construction Zone Signing**



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
F	Distance between Construction Signs (m)	160	180	200	200

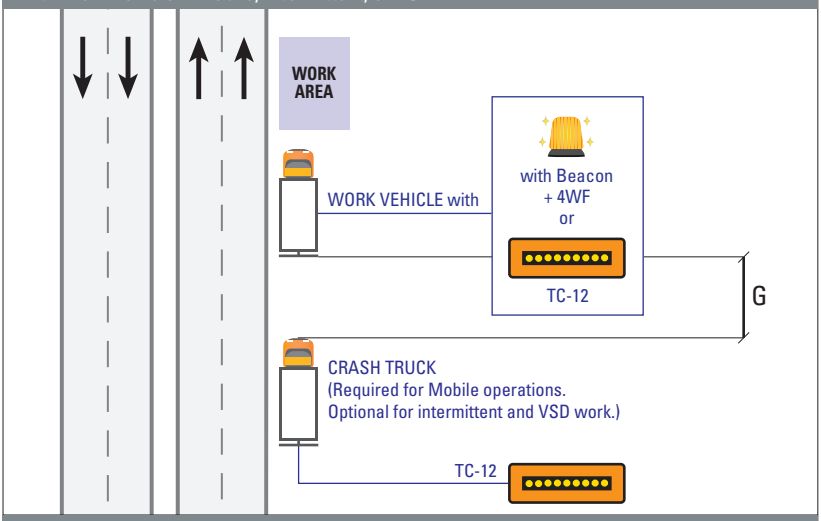
NOTES

i) Refer to Regulation 615 of the Highway Traffic Act and OTM Book 5 for distance between regulatory speed limit signs.
ii) For Regulatory Speed Reduction, a Designated Construction Zone must be established and signed as per FG-1.
iii) Where signs cannot be accommodated in the median, provide additional signs on the right shoulder or oversize as practicable.
iv) Reduced Speed Zone may include all of or only part(s) of the Designated Construction Zone.
v) Additional signs may be required based on the length of zone.
vi) Supplementary layout. This layout shall be used in conjunction with other appropriate layouts.

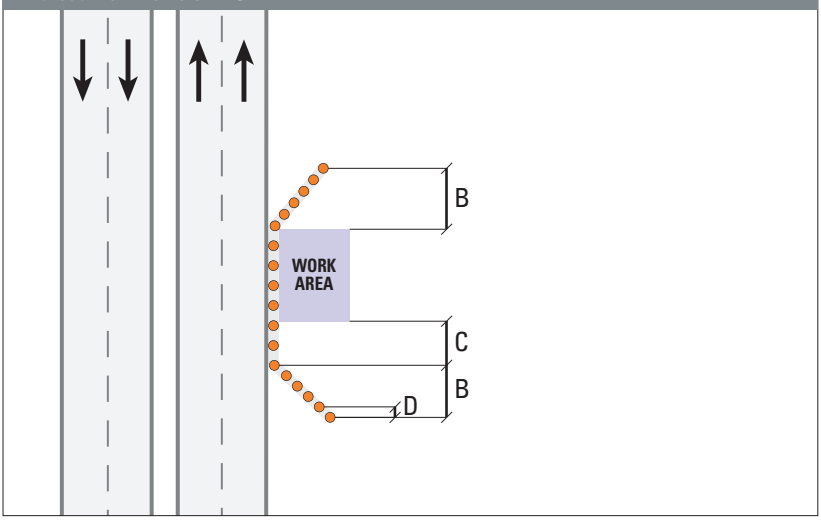
For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FG-2 Reduced Speed Zone Signing

With Work Vehicle – Mobile, Intermittent, or VSD



Without Work Vehicle – VSD



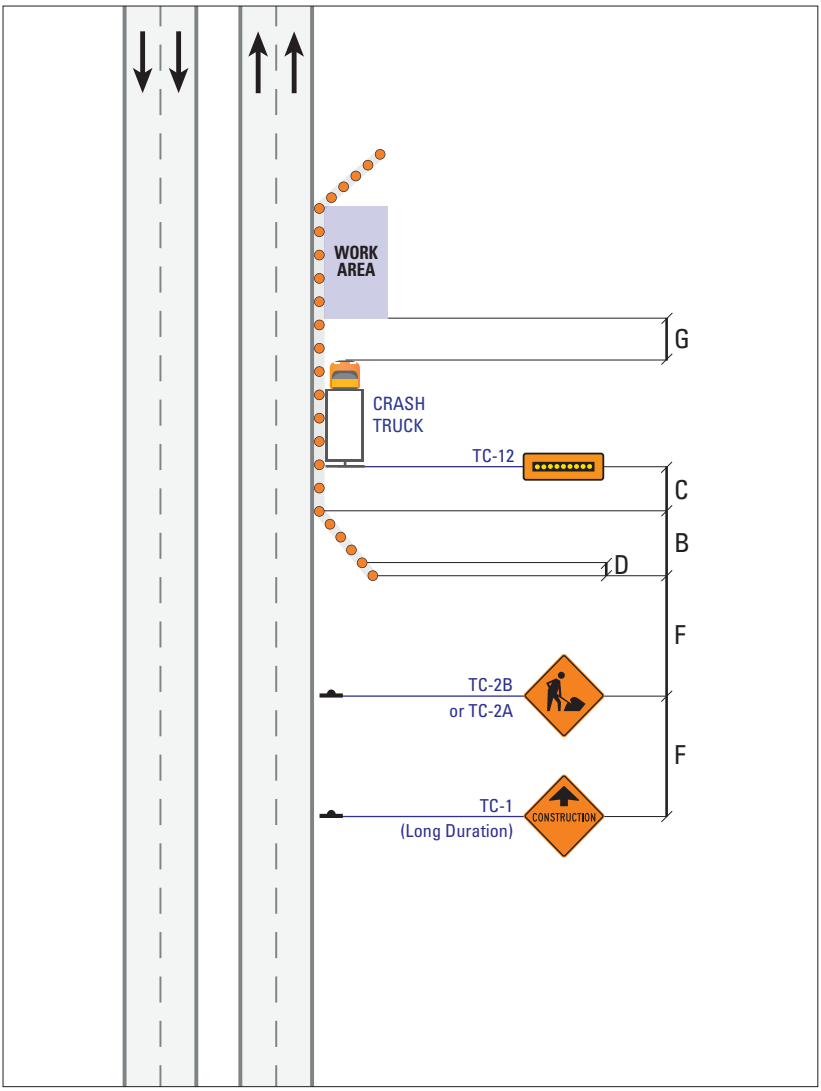
		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
B	Shoulder Taper (m)	75	85	100	100
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
G	Mobile Work: Lateral Intrusion Deterrence Gap (LIDG) (m)	45	50	55	60
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

NOTES

i) Work on the left shoulder mirror image.
ii) Termination Taper optional.
iii) Preferred option for VSD work is to have a Work Vehicle present.
iv) When a vehicle on shoulder with TC-12 enters a live lane, the TC-12 in bar mode must be switched to arrow mode.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-1 **Shoulder Work**



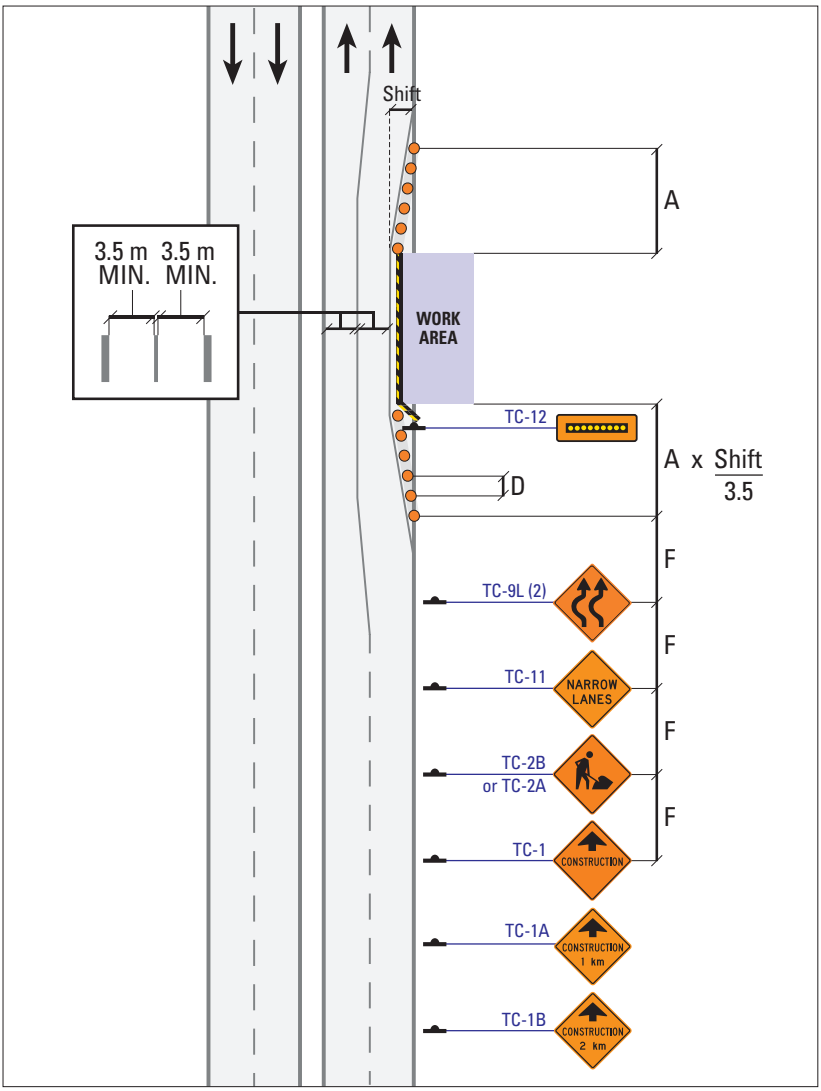
		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
B	Shoulder Taper (m)	75	85	100	100
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
F	Distance between Construction Signs (m)	160	180	200	200
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

NOTES

i) Work on the left shoulder mirror image.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
D	Maximum Distance between Markers (m)	12	24	24	24
F	Distance between Construction Signs (m)	160	180	200	200

NOTES

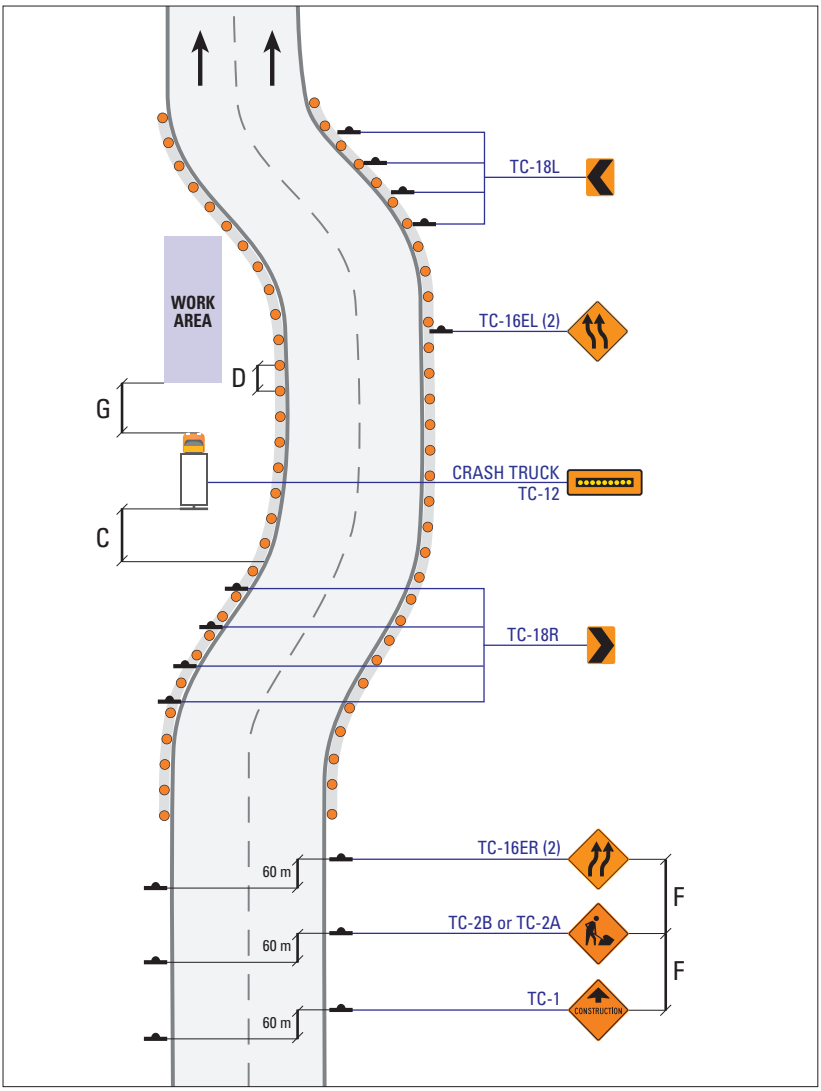
i) Minimum lane width is 3.5 m. Additionally, an offset of 0.3 m to 0.6 m between Markers and the edge of the travelled lane is desirable.

ii) For narrowed lanes exceeding 1 km, use a TC-16EL (ER) in place of the TC-9L (R). Add an additional TC16ER (EL) at the beginning of end Taper.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-3 **Partial Lane Shift: Narrow Lanes**



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
F	Distance between Construction Signs (m)	160	180	200	200
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

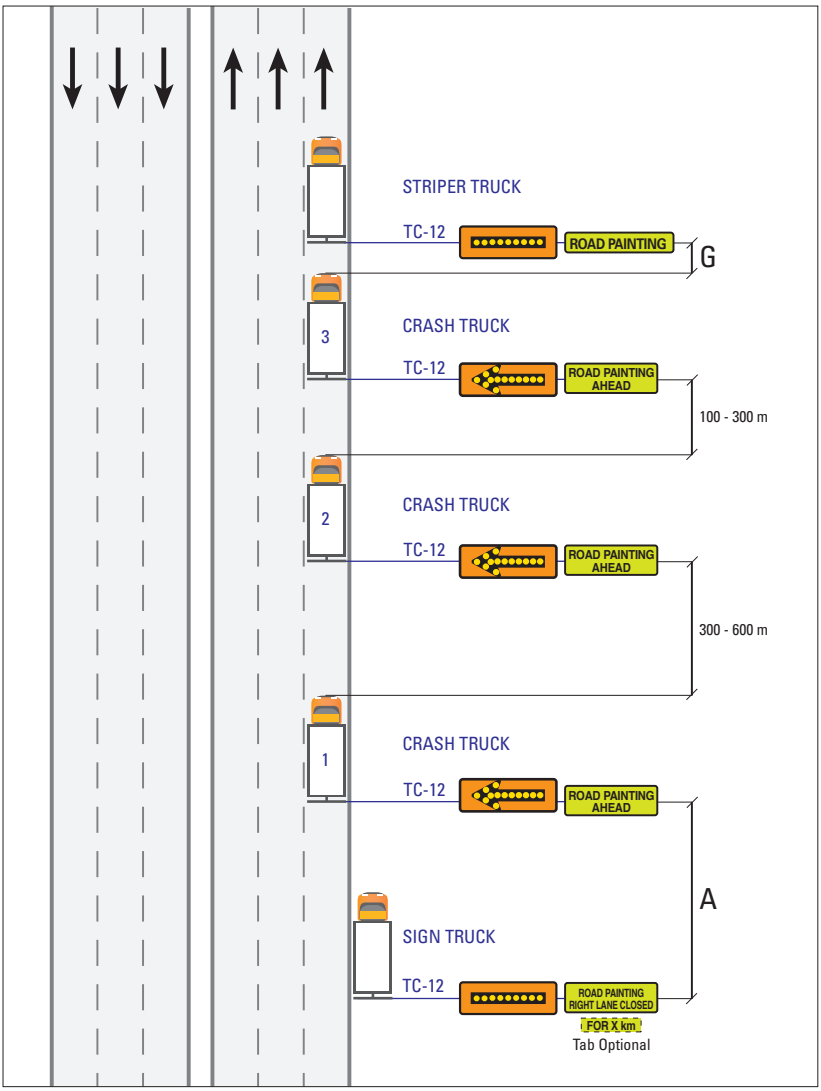
NOTES

i) Refer to OTM Book 6 for the appropriate placement of TC-18L.
ii) Markers used for additional Delineation through Tangent on the far-side of the Work Area are optional.
iii) If Temporary Concrete Barriers are used, the Crash Truck is not required.
iv) TC-1A and TC-1B Advance Warning are required for freeways (not shown).
v) Work on the right shoulder: mirror image.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-4 Lane Realignment



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	45	50	55	60

NOTES

i) MTO requirements illustrated. Other Road Authorities may not require a "ROAD PAINTING" information sign or additional Crash Truck #1.

ii) Sign Truck may be replaced by an approved equivalent VMS.

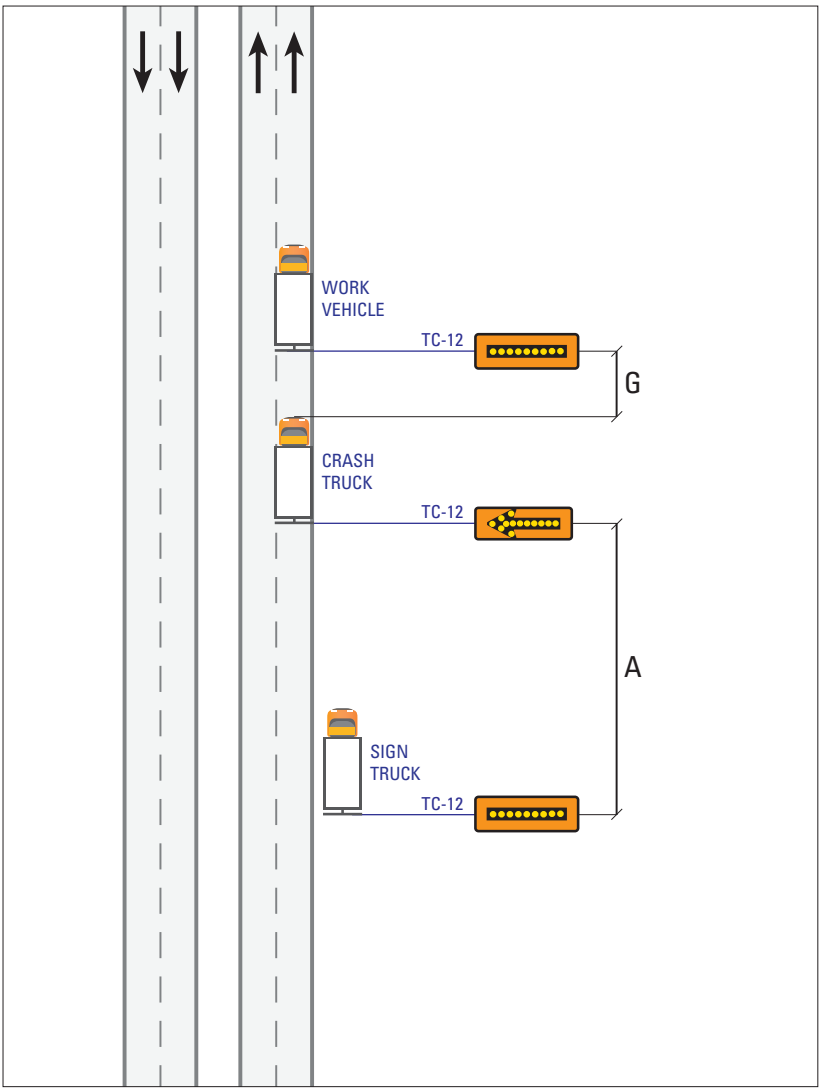
iii) Left Lane Closed: mirror image of Right Lane Closed, where shoulder exists. Where no shoulder or narrow shoulder exists, the Sign Truck must follow on the right shoulder with TC-12 in bar mode with "ROAD PAINTING LEFT LANE CLOSED" sign.

iv) The distance between Sign Truck and Buffer Vehicle may be adjusted to accommodate hills, curves, restricted visibility, or other specific conditions.

v) When a vehicle on shoulder with TC-12 enters a live lane, the TC-12 in bar mode must be switched to arrow mode.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-5 Zone Painting: Right or Left Lane Closed



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	45	50	55	60

NOTES

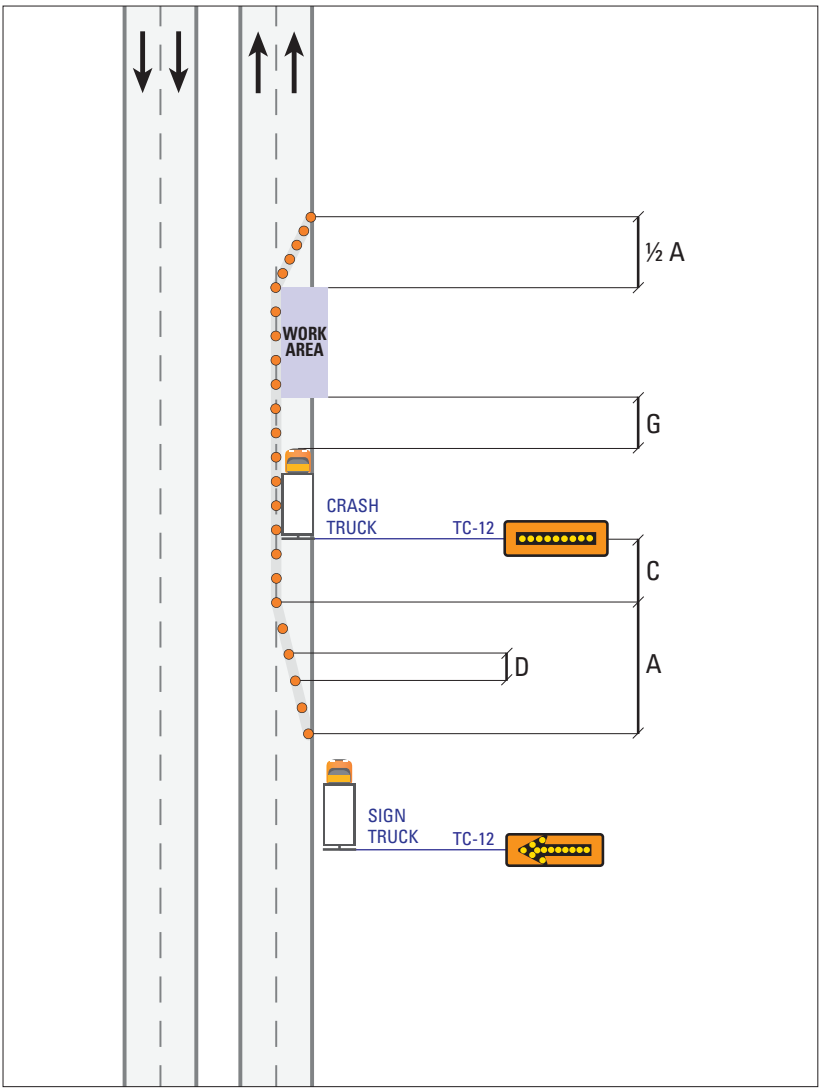
i) Distance between Sign Truck and Crash Truck may be adjusted to accommodate hills, curves, restricted visibility, or other site specific conditions.

ii) Left Lane Closed: mirror image of Right Lane Closed, where shoulder exists. Where no shoulder or narrow shoulder exists, Sign Truck may be eliminated. Optionally, modify by replacing the Sign Truck with a Crash Truck with a TC-12 in arrow mode moving behind, in the same lane as the first Crash Truck in bar mode.

iii) When a vehicle on shoulder with TC-12 enters a live lane, the TC-12 in bar mode must be switched to arrow mode.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-6 **Right or Left Lane Closed or Occupied**



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

NOTES

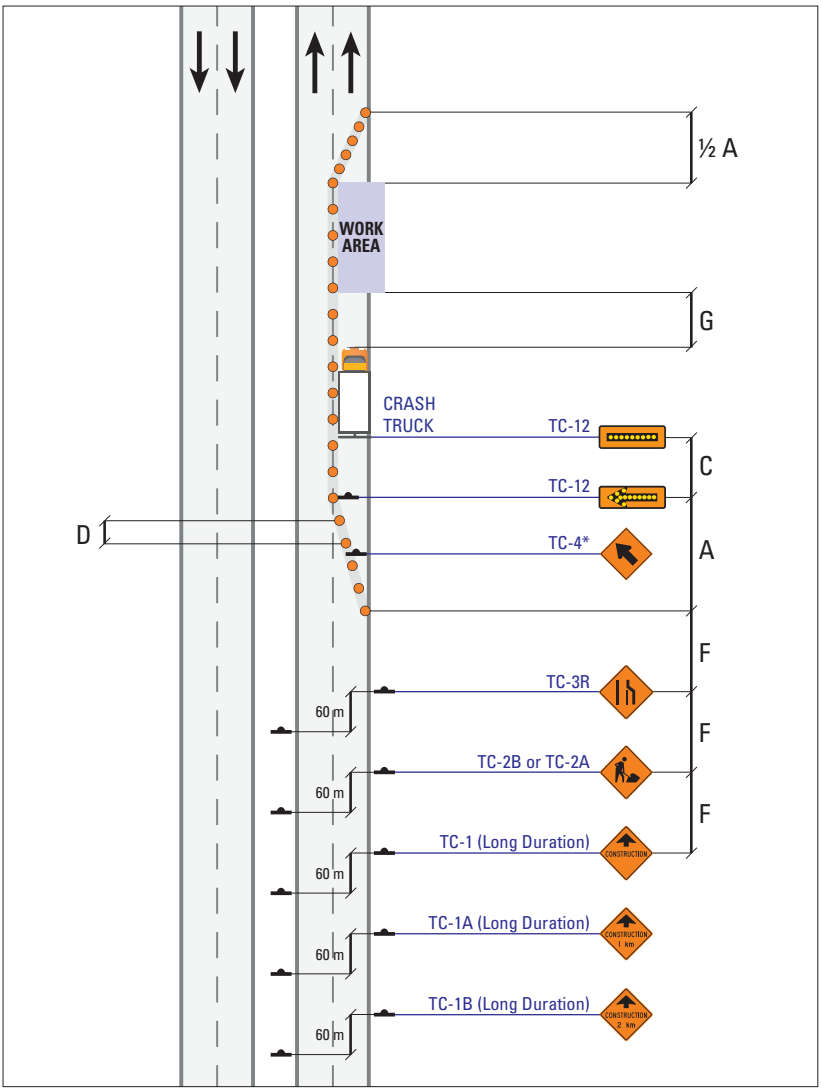
i) The Work Area may include Work Vehicles. All Work Vehicles in the Work Area (downstream of the Crash Truck) with an activated TC-12 must have the TC-12 in bar mode.

ii) Left Lane Closed: mirror image of Right Lane Closed.

iii) For HOV Lane Closure (or other legally limited lane use): lengthen C such that the transition Taper is within the legal access/egress zone, and lengthen Work Area such that exit Taper is within legal access/egress zone. Where not practicable, notify and/or have police present.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-7 **Right or Left Lane Closed**



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
F	Distance between Construction Signs (m)	160	180	200	200
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

NOTES

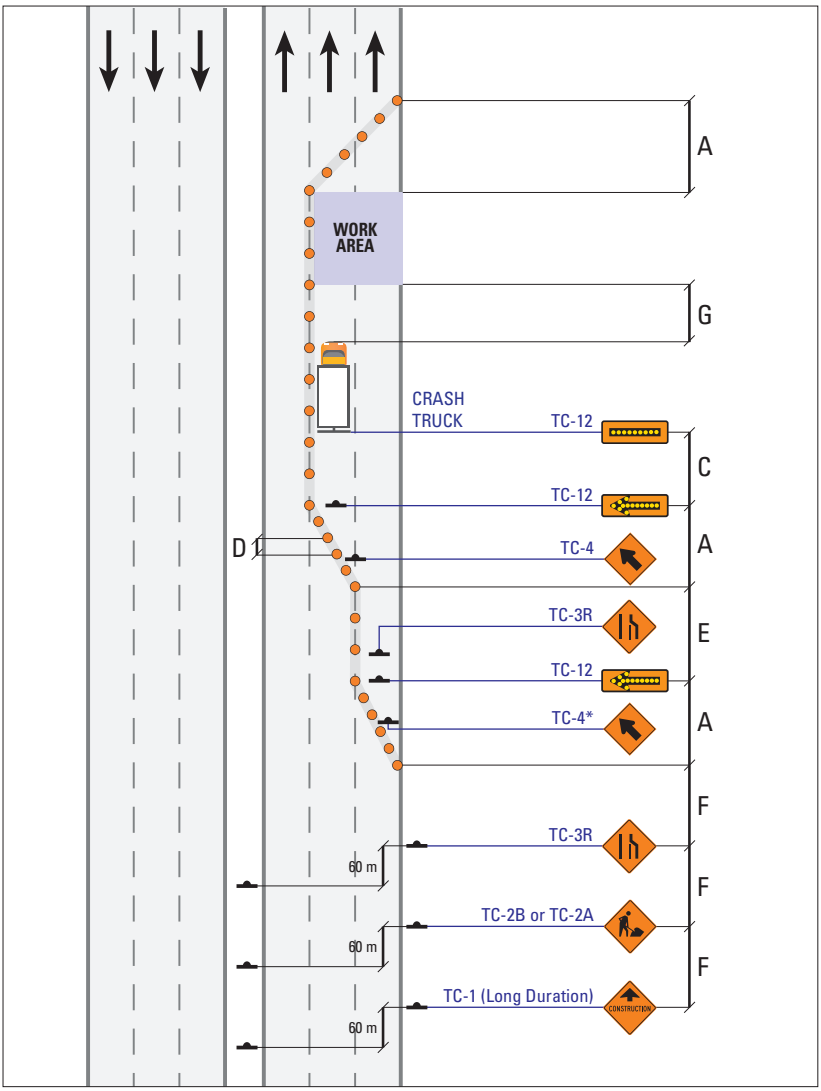
i) Left Lane Closed: mirror image of Right Lane Closed.
ii) Where signs cannot be accommodated in the median, provide additional signs on the right shoulder.
iii) The Work Area may include Work Vehicles. All Work Vehicles in the Work Area (downstream of the Crash Truck) with an activated TC-12 must have the TC-12 in bar mode.
iv) For HOV Lane Closure (or other legally limited lane use): lengthen C such that the transition Taper is within the legal access/egress zone, and lengthen Work Area such that exit Taper is within legal access/egress zone. Where not practicable, notify and/or have police present.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-8 **Right or Left Lane Closed**



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
E	Minimum Tangent between Tapers (m)	220	250	300	300
F	Distance between Construction Signs (m)	160	180	200	200
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

NOTES

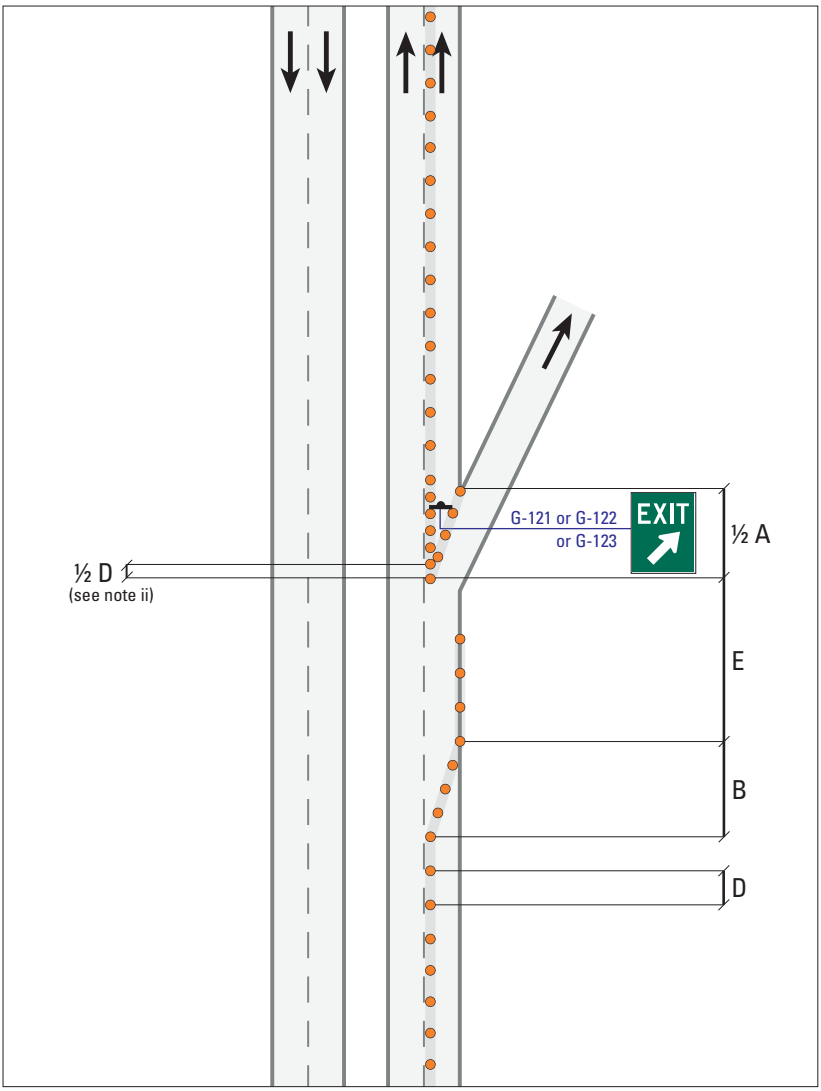
i) Where signs cannot be accommodated in the median, provide additional signs on the right shoulder.
ii) Left Lane Closed: mirror image of Right Lane Closed.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FS-9 Six Lane Road: Centre Lane or Two Lanes Closed



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
B	Shoulder Taper (m)	75	85	100	100
D	Maximum Distance between Markers (m)	12	24	24	24
E	Minimum Tangent between Tapers (m)	220	250	300	300

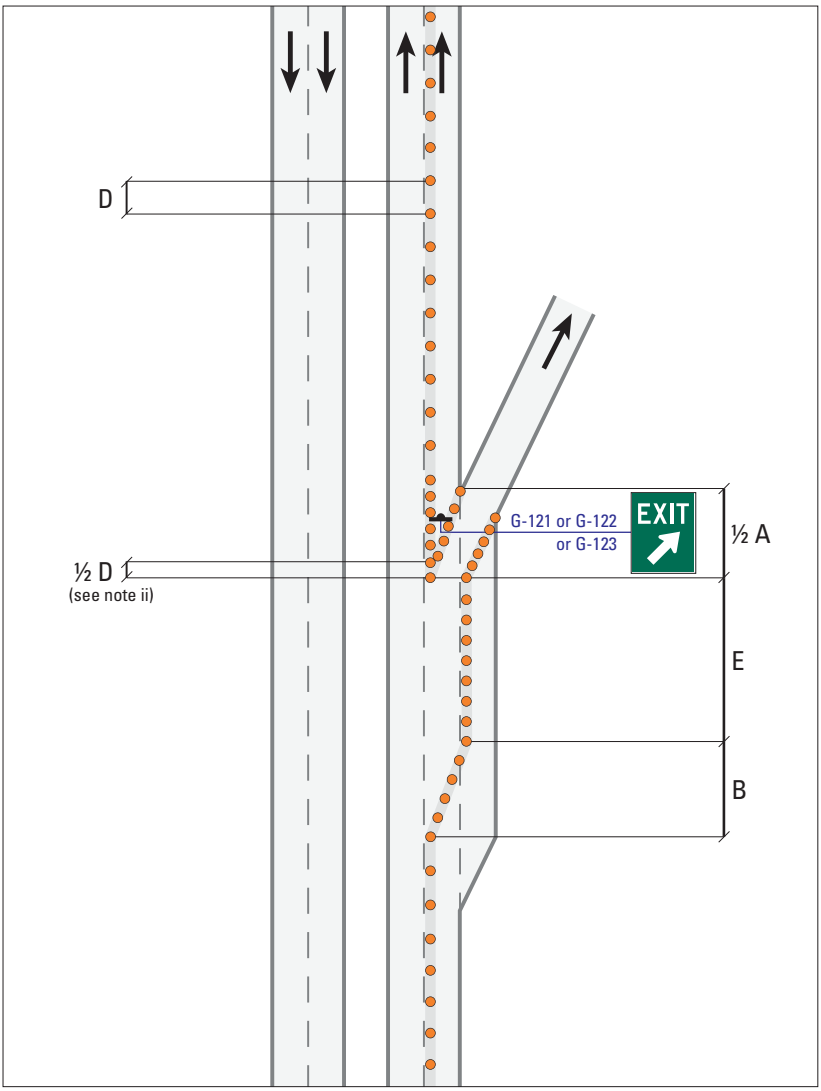
NOTES

i) For Right Lane Closed, see FS-8.
ii) In the immediate area of the exit, Marker spacings of half of those shown on Table C should be used.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FR-1 Lane Closed at Exit Ramp



Label	Description	Normal Posted Regulatory Speed (km/h)			
		80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
B	Shoulder Taper (m)	75	85	100	100
D	Maximum Distance between Markers (m)	12	24	24	24
E	Minimum Tangent between Tapers (m)	220	250	300	300

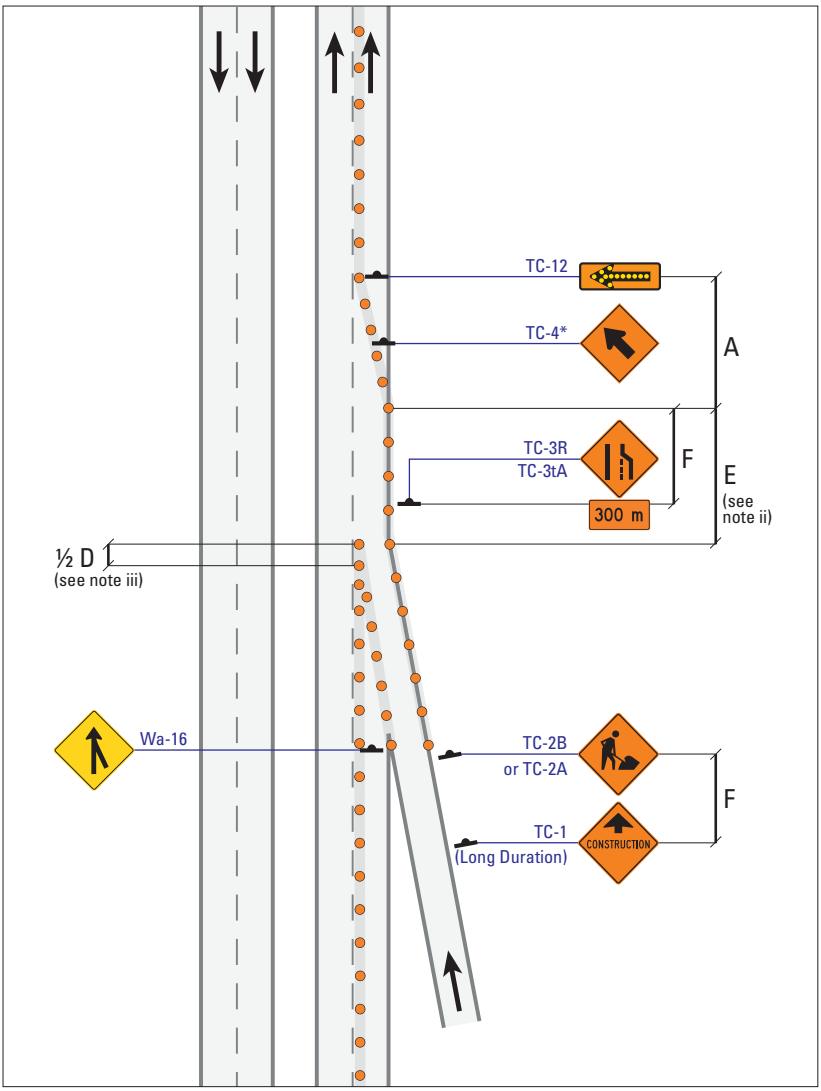
NOTES

i) For Right Lane Closed, see FS-8.
ii) In the immediate area of the exit, Marker spacings of half of those shown on Table C should be used.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FR-2 Lane Closed at Exit Ramp with a Deceleration Lane



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
D	Maximum Distance between Markers (m)	12	24	24	24
E	Minimum Tangent between Tapers (m)	220	250	300	300
F	Distance between Construction Signs (m)	160	180	200	200

NOTES

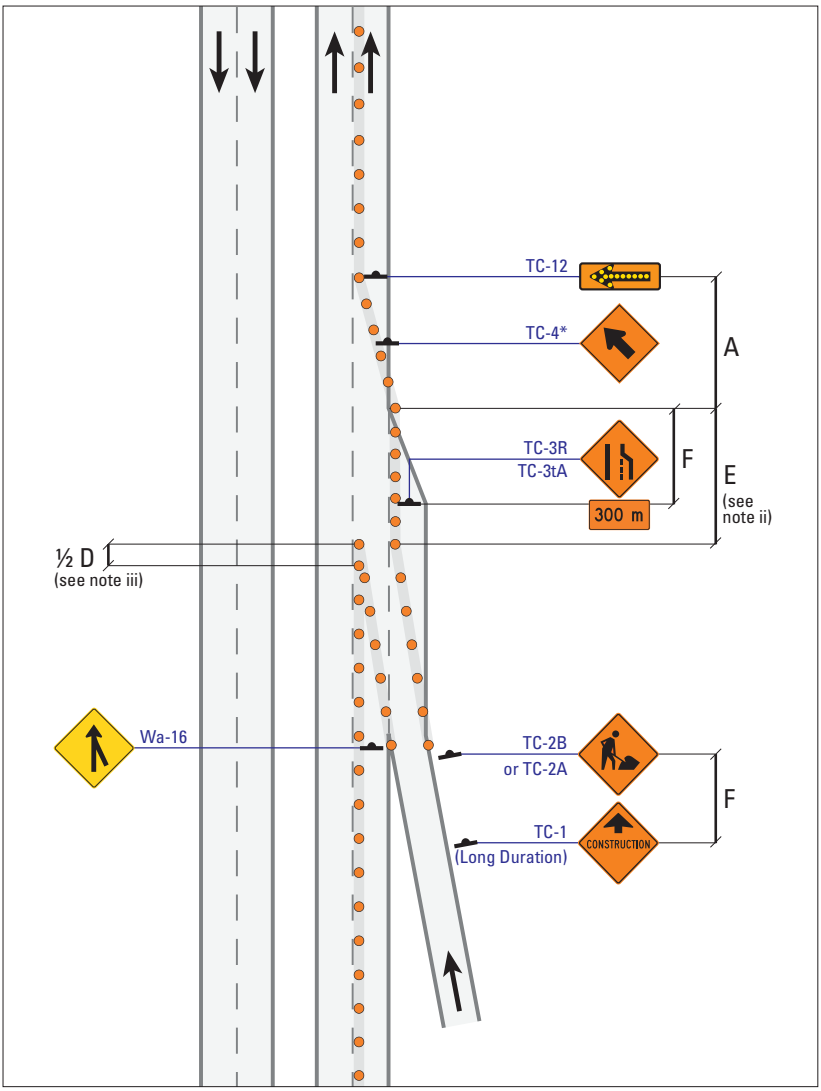
i) For Right Lane Closed, see FS-8.
ii) Where space and work activities permit, the acceleration lane should be made as long as possible.
iii) In the immediate area of the entrance, Marker spacings of half of those shown on Table C should be used.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, and Table C (Freeways, pg. 8).

FR-3 Lane Closed at Entrance Ramp



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
D	Maximum Distance between Markers (m)	12	24	24	24
E	Minimum Tangent between Tapers (m)	220	250	300	300
F	Distance between Construction Signs (m)	160	180	200	200

NOTES

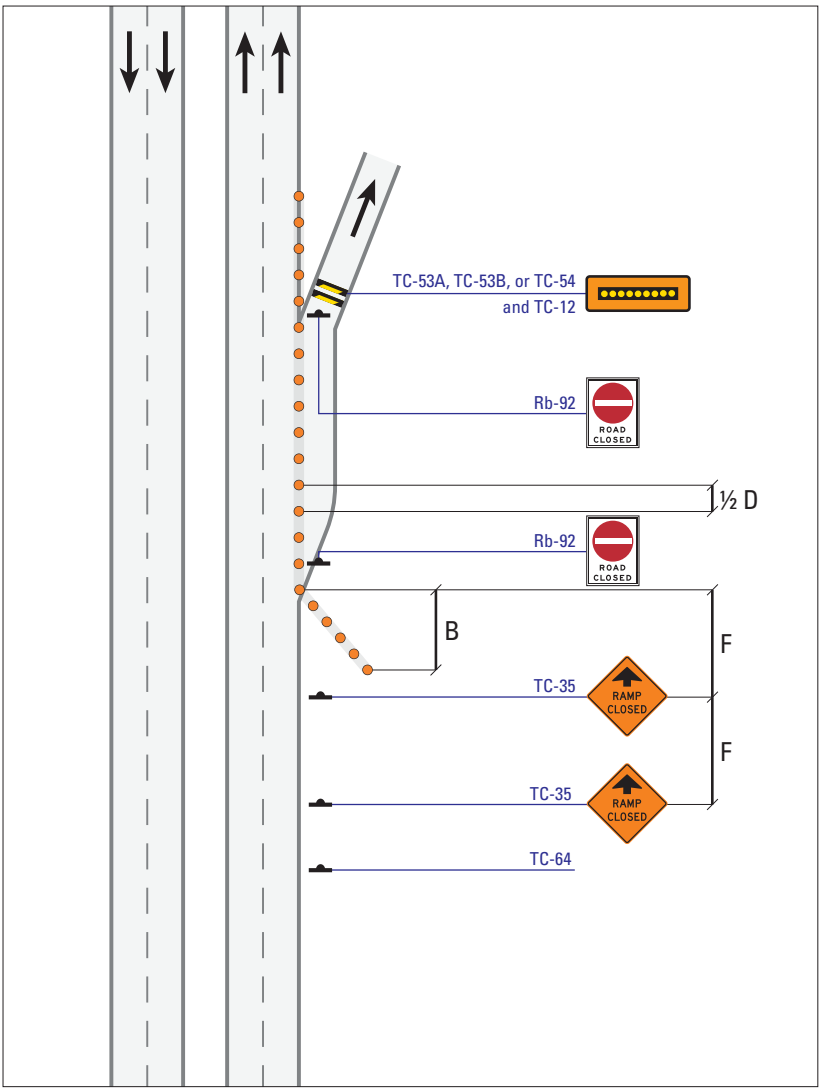
i) For Right Lane Closed, see FS-8.
ii) Where space and work activities permit, the acceleration lane should be made as long as possible.
iii) In the immediate area of the entrance, Marker spacings of half of those shown on Table C should be used.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

*The TC-4 sign must be installed at or just beyond the beginning of a lane closure taper.

For further detail on Work Zone components, and Table C (Freeways, pg. 8).

FR-4 Lane Closed at Entrance Ramp with an Acceleration Lane



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
B	Shoulder Taper (m)	75	85	100	100
D	Maximum Distance between Markers (m)	12	24	24	24
F	Distance between Construction Signs (m)	160	180	200	200

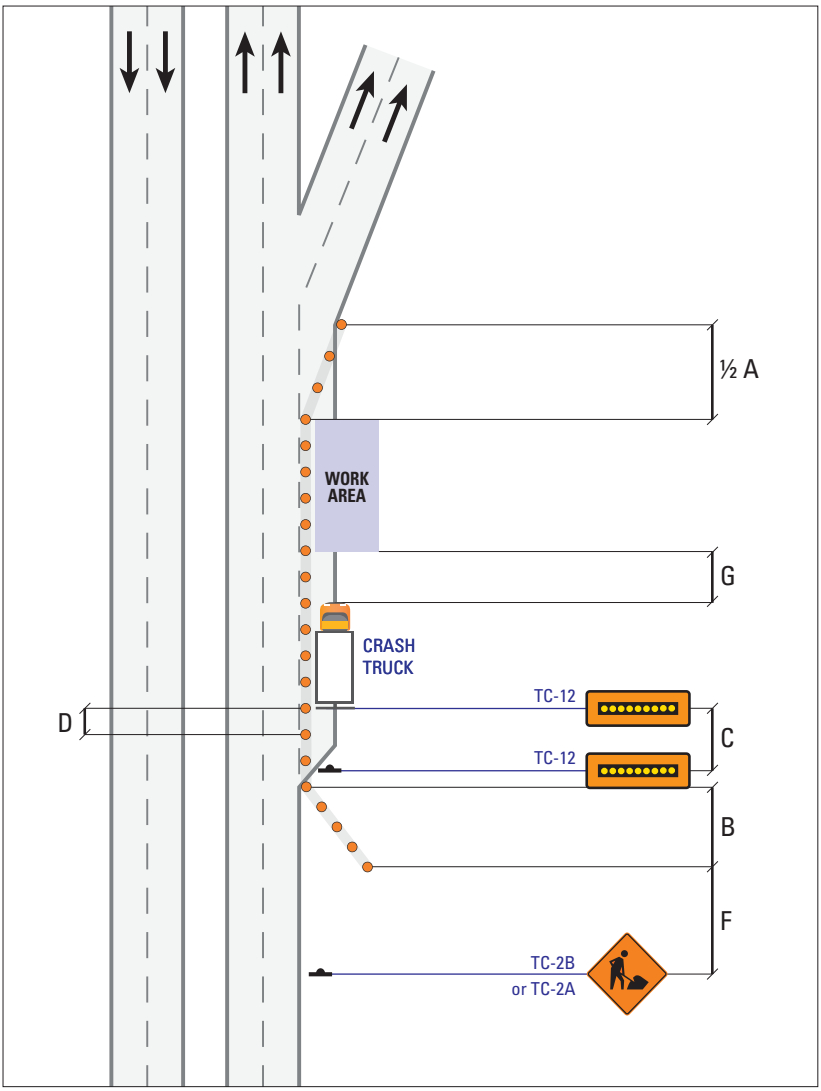
NOTES

i) Closed sign on Directional Guide Signs to be used for Long Duration only. For details, see OTM Book 8.
ii) See Section 4.3 of the Office Edition for location of TC-64.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FR-5 Ramp Closed



		Normal Posted Regulatory Speed (km/h)			
Label	Description	80	90	100	110
A	Taper Length for Full Lane Closure (m)	220	250	300	300
B	Shoulder Taper (m)	75	85	100	100
C	Longitudinal Buffer Area (LBA) (m)	60	75	95	110
D	Maximum Distance between Markers (m)	12	24	24	24
F	Distance between Construction Signs (m)	160	180	200	200
G	Stationary Work (Lateral Intrusion Deterrence Gap (LIDG) (m)	60	65	70	75

NOTES

i) Left Developed Lane Closed: mirror image of Right Developed Lane Closed.

For stationary Long Duration operations (longer than five days), Temporary Concrete Barriers must be used to separate the Work Area from traffic.

For further detail on Work Zone components, see Table C (Freeways, pg. 8).

FR-6 Right Developed Lane Closed

3 General Quality Guidelines for Traffic Control Devices

All traffic control devices used in work zones must conform to the requirements of OTM Book 7 and contract documents with regard to size, shape, colour, placement, and legend message. Compliance to these documents must be maintained for the duration of the project.

Device quality should be evaluated at various stages including:

- While in storage.
- While in preparation for drop off at a work zone.
- During installation.
- Regularly during the course of the work.

Traffic control devices should be routinely inspected. Routine inspection at night ensures that the level of retro reflectivity is adequate, and the devices are clearly visible, legible, and placed appropriately. Signs should be as near vertical as possible.

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

The quality of work zone devices has been divided into three categories:

- Acceptable devices.
- Marginally acceptable devices.
- Unacceptable devices.

Table 1 Quality of Acceptable Work Zone Devices

Acceptable Devices	Marginally Acceptable Devices	Unacceptable Devices
• Meet quality, design, size, and colour requirements. • May be used on highway construction, maintenance, utility, and other projects.	• At or near the lower end of acceptability for quality, design, size, and colour requirements. • May be used until they become unacceptable.	• Should not be delivered to the work zone or used on a work project. • Shall be replaced or repaired within 12 hours of notification, or as contained in the contract specifications or road authority requirements.
• Percentage of acceptable devices shall be at least 50% at any time, or as contained in the contract specifications, or road authority requirements. • The 50% acceptability criterion applies to each traffic control device type taken by itself. (e.g., 50% of barrels, 50% of TC series signs, 50% of delineators etc.)	• Percentage of marginally acceptable devices should not exceed 50% at any time and, if used, shall be interspersed with acceptable devices so that a sizeable length of a work zone does not have all marginally acceptable devices.	• Where 10% or more of the surface of a traffic control device, or 20% of the retro-reflective material on a traffic control device is damaged or missing, the device is considered unacceptable and shall be removed from service. • For key communication items in a work zone, if the message or symbol on a traffic control device becomes unclear, the device is unacceptable.

3.1 Evaluation Guide for Traffic Control Devices

The selected traffic control device figures, together with the accompanying descriptions, should be used as a guideline to determine whether a device is acceptable, marginally acceptable, or unacceptable.

Table 2 Cones Quality Illustration

Acceptable	Marginally Acceptable	Unacceptable
• Clearly identifiable conical shape, free-standing in its original position. • Surface free of punctures, abrasions, splatter residue, and is washable. • Reflective bands have little or no loss of reflectivity, with only minor tears and scratches.	• Some splatter residue, difficult to clean, minor discolouration. • Reflective bands have tears and scratches but free of large areas of residue or missing material.	• Punctures, large areas of splatter residue, large areas of missing or stained reflective material.
		

Table 3 Flexible Drums (TC-54 Barrels) Quality Illustration

Acceptable	Marginally Acceptable	Unacceptable
• Minor tears and scratches on sheeting. • Any dents do not seriously reduce reflectivity. • Intended original shape is maintained.	• Numerous tears and scratches, but free of large areas of residue or missing or damaged reflective material. • Intended original shape and strength are maintained.	• Large areas of missing or damaged reflective material, or significant splatter residue. • If 20% of the retro-reflective material is damaged or missing, the device is unacceptable and shall be removed from service. • Substantial deformation, i.e., dented severely enough to affect overall dimensions or contain fractures that affect stability or ability to retain reflective sheeting, render a drum unacceptable.
		

Table 4 Work Zone Signs Quality Illustration

Acceptable	Marginally Acceptable	Unacceptable
• Minor abrasions, no loss of lettering. The message is legible. • All TC-21 TRAFFIC CONTROL PERSON AHEAD and TC-22 TRAFFIC CONTROL signs (STOP/SLOW paddles) in use must meet the "Acceptable" criteria.	• Many surface abrasions, including individual letters of message. • Sign surface is free of residue. • Background colour and reflectivity are still apparent at night. • The message is legible.	• Many abrasions and/or splatters. • Significant loss of letters or colour fading. • The message is partly missing or illegible.
 	 	 

NOTE

All TC-21 TRAFFIC CONTROL PERSON AHEAD and TC-22 TRAFFIC CONTROL signs (STOP/ SLOW paddles) in use must meet the "Acceptable" criteria.

Table 5 Evaluation Guide for Pavement Tape and Paint

Acceptable	Marginally Acceptable	Unacceptable
• All pavement marking tape or paint required (solid lines and skip lines) is in place and meets all material specifications.	• No more than 10% of all tape, paint, message, or symbol, or no more than two consecutive skip lines, or no more than 15 continuous metres of solid line are missing.	• More than 10% of all tape, paint, message, or symbol, more than two consecutive skip lines, or more than 15 continuous metres of solid line are missing.

Table 6 Evaluation Guide for Temporary Raised Pavement Markers (TRPM)

Acceptable	Marginally Acceptable	Unacceptable
• All TRPM required are in place and meet all material specifications.	• No more than 10% of the total TRPM or no more than three consecutive TRPM are missing.	• More than 10% of the total TRPM or more than three consecutive TRPM are missing.

Table 7 Evaluation Guide for Flashing Arrow Board (TC-12)

Acceptable	Marginally Acceptable	Unacceptable
• No more than one lamp in stem not functioning and all functioning in arrowhead. • Properly dimming.	• Two or fewer lamps in stem not functioning, all functioning in arrowhead. • Properly dimming.	• Three or more lamps in the stem not functioning, or any lamp not functioning in the arrowhead. • Not properly dimming.

NOTE

Any operating lamp which is out of alignment will be considered “not functioning”.

4 Traffic Control Persons (TCP)

Traffic Control Persons (TCP) are workers who manually regulate vehicle traffic using a TC-22 TRAFFIC CONTROL SIGN (STOP/SLOW Paddle), and often arm motions, to prevent conflicts between workers, work zone activities, opposing highway traffic, work vehicles, and pedestrians.

The TCP is responsible for:

- Protecting construction workers and the motoring public by safely regulating traffic flow and directing traffic through a work zone.
- Stopping traffic whenever required by the progress of the work; otherwise, to keep traffic moving at reduced speeds to avoid tie-ups and delays.
- Allowing construction to safely and efficiently proceed.
- Warning workers of impending danger.
- Ensuring that construction equipment does not impact public traffic.
- Focusing on the traffic control task and not performing other work while directing traffic.

Adequate safety precautions, as prescribed in the Occupational Health and Safety Act (OHSA), must be taken to protect TCP from any hazards to which they may be exposed. Safety precautions include:

- Personal protective clothing.
- Equipment and devices.
- Appropriate training.
- Additional protective measures necessary to mitigate risks imposed by vehicular traffic.

The safety of TCP must be addressed during the planning stages of traffic control.

4.1 Specifications for Use of TCP

Table 8 Recommended Use for TCP

Use	Roadway	Speed	Duration
Lane control (two-way traffic in single lane)	Non-freeways	≤ 60 km/h	All work durations
Lane control (two-way traffic in single lane)	Non-freeways	> 60 km/h and ≤ 90 km/h	Intermittent Duration (ID), Very Short Duration (VSD), and Short Duration (SD) for one day only
Within 30 metres of intersection if signals are turned off	Non-freeways	≤ 60 km/h	All work durations
Intermittently stopping traffic	For work progress	≤ 60 km/h	All work durations
Intermittently stopping traffic	To enter or cross non-freeways	≤ 60 km/h	All work durations

NOTE

An additional TCP or two-way communication devices are required on sections where TCP are not in sight of each other.

TCP must not be used on:

- Any highway with a TC-12 FLASHING ARROW BOARD.
- A freeway or staged freeway including ramps.

TCP must never:

- Impact the operation of traffic control signals (temporary or permanent).
- Be positioned or operate within 30 metres of an intersection with operating traffic control signals. (Only Police Officers can control intersections with operating traffic control signals. (Refer to Section 175 (9) of the HTA)).

4.2 TCP Qualifications and Equipment

General qualifications for a TCP include:

- Sound health, good vision and hearing, and mental and physical alertness.
- Mature judgement and pleasant manner.

- Ability to judge speed and distance of oncoming vehicles.
- Compliance with the OHSA requirement of a competent worker.
- Possession of a valid driver's licence (preferably).
- The ability to give motorists simple directions, explain hazards, and answer questions.
- The ability to appreciate, understand, and respect the responsibilities of the job.

TCP must be given written and oral instructions about their duties in a language they can understand.

Clothing

TCP must wear a garment that covers at least his or her upper body and meet the requirements of *O.Reg. 213/91 Section 69.1* under the OHSA.

- The garment shall be fluorescent blaze or international orange in colour.
- On the front and the back, there shall be two yellow stripes that are 5 centimetres wide. The yellow area shall total at least 500 square centimetres on the front and at least 570 square centimetres on the back.
- On the front, the stripes shall be arranged vertically and centred and shall be approximately 225 millimetres apart, measured from the centre of each stripe. On the back, they shall be arranged in a diagonal "X" pattern.
- The stripes shall be retro-reflective and fluorescent.
- If the garment is a vest, it shall have adjustable fit and shall also have a side and front tearaway feature.
- For more detailed information on High Visibility Safety Apparel (HVSA), refer to CSA Z96-15 standard.

TCP also require the following:

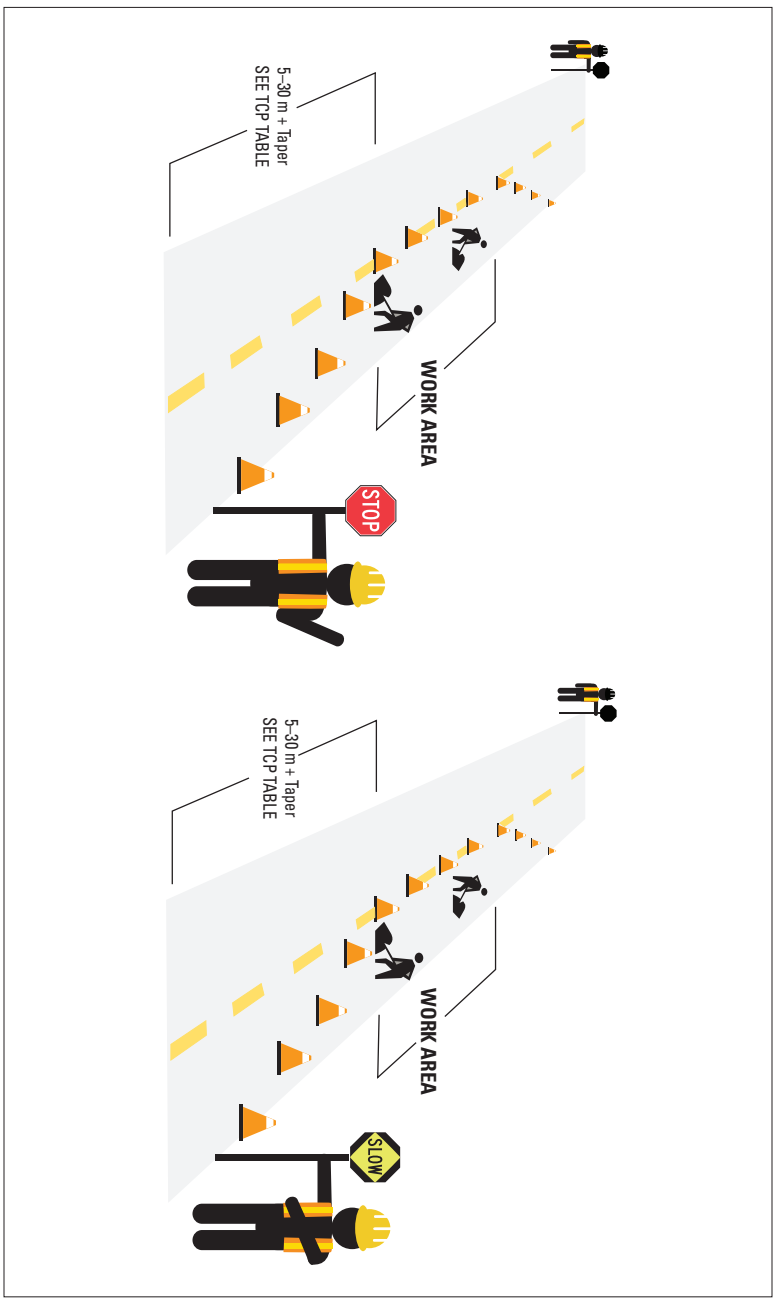
- A hard hat that is *Canadian Standards Association (CSA) certified Class E – Type I or II* hard hat. If used at night, it is recommended the hard hat have reflective tape that does not alter the dielectric properties of the safety hat and is visible from all angles (minimum of 80 cm^2 recommended).
- Safety boots that are *CSA-certified, Grade 1* (green triangular CSA patch on the outside, green rectangular label on the inside).
- Eye protection, e.g., clear safety glasses for night or overcast, tinted safety glasses when sunny, consider goggles for extreme dust and wind.
- Retro-reflective silver stripes encircling each arm and leg or equivalent side visibility-enhancing stripes with a minimum area of 50 cm^2 per side during night-time hours.

Tools

The standard TC-22 TRAFFIC CONTROL SIGN (STOP/SLOW Paddle) with an extension handle must be used by TCP for hand signalling to direct traffic. The use of flags is prohibited.

Figure 1 Traffic Control Person Use of STOP/SLOW Paddle illustrates the TCP use of the STOP/SLOW paddle.

Figure 1 Traffic Control Person Use of STOP/SLOW Paddle



TCP may be used for night-time operations; however, this should be avoided if possible. Traffic Control Plans using TCP for night-time operations require approval from the road authority. For night-time traffic control, TCP require:

- A well-lit TCP station. Appropriate lighting must be provided so that the TCP is clearly visible to traffic in both directions. Illumination from above is generally more effective than from the side.
- A TC-22 TRAFFIC CONTROL SIGN (STOP/SLOW Paddle) and a flashlight with a red or orange cone attachment with spare batteries.
- The STOP side of the paddle may be enhanced with alternating flashing red LED lightbars installed horizontally above and/or below the outer border of the STOP sign, as an option to the standard TC-22.
- The alternating flashing red light(s) are to be briefly activated by the TCP as vehicles approach to enhance conspicuity.
- **A two-way communication device**. Voice activated radios are recommended to free the TCP's hand for using the STOP/SLOW Paddles and flashlight simultaneously.
- Advance warning signs, which may be enhanced with amber beacons when TCP are used at night.
- Automated Flagger Assistance Devices (AFAD) or Portable Temporary Traffic Signal (PTTS) should be considered for high risk situations.

4.3 TCP Position and Location

When a TCP is on duty, the TC-21 TRAFFIC CONTROL PERSON AHEAD sign must always be used. The sign is placed in advance of the TCP at the distance shown in an appropriate layout in Section 2 of the Field Edition. The TC-21 sign must be removed when the TCP is not on duty.

TCP must be positioned and operate in a manner which will not conflict with other traffic control devices such as:

1. STOP signs.
    - STOP signs must be covered on any approach that is controlled by a TCP.
2. Traffic signals.
    - Sufficient vehicle storage should be available between an intersection and the TCP to accommodate expected queues without extending into an intersection with operating signals.
    - Where there are operating traffic signals (permanent or temporary) at an intersection, TCP must not be used within 30 metres of the stop bar on any approach.
3. Railway crossing signals.

Lane closure tapers for one-lane and two-way lane control scenarios (when TCP or other traffic control devices are used) range from 15 metres to 30 metres (based on Normal Posted Regulatory Speed (NPRS)), as shown in Table 9, below.

Table 9 also shows appropriate lengths of longitudinal buffer areas (LBA) at various NPRS.

For one-lane, two-way lane control scenarios, LBA:

- Should be used for all NPRS if space permits.
- Are required for NPRS > 60 km/h.
- Are recommended, if space permits, for NPRS < 60 km/h.

Additionally, TCP must be positioned 10 metres from the first cone of the taper. This distance remains constant at all NPRS.

Table 9 Recommended TCP Positioning Distances

NPRS (km/h)	50	60	70	80	90
Taper (m)	15	20	25	30	30
LBA (m)	(30)*	(40)*	50	60	75
TCP Position from First Cone (m)	10	10	10	10	10

**LBA at speeds of 60 km/h or lower are optional; however, should be used if space permits.*

Contractors are not permitted to turn off traffic signals to allow the use of TCP at an intersection. The turning off of traffic signals must be approved and executed by the road authority.

TCP must be clearly visible to approaching motorists at all times. This can be achieved by

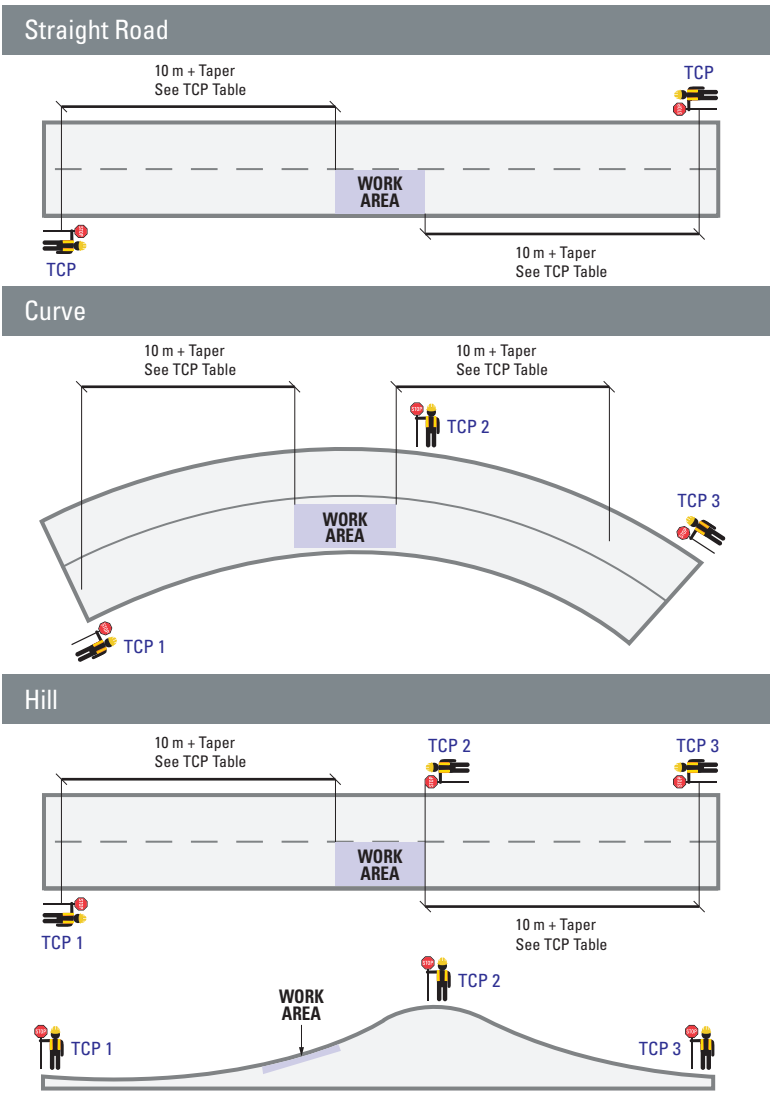
- Locating the TCP for good visibility and contrast.
    - The TCP should not stand in the shadows or where the sun impedes visibility.
    - Colour contrast should be maintained between the TCP and the background, to every extent possible.
- Preventing other illuminated or reflective objects from distracting the visual attention of motorists away from the TCP.

Typical TCP locations are shown in Figure 2 Positioning of Traffic Control Persons for straight highway, hill, and curve situations, and in the layouts in Section 2 of the Field Edition.

When a TCP is on duty, they must also:

- Be alert, standing at all times.
- Be aware of an escape route, which should be planned before going on duty.
- Face oncoming traffic and not turn their back on moving traffic.
- Stand alone and not mingle with workers or the public.
- Stand just outside the lane of traffic.
- Stand where they can be seen to give approaching traffic adequate time to respond, and where they can see for 150 metres.
- Remove or cover all signs that indicate a TCP (TC-21 TRAFFIC CONTROL PERSON AHEAD) when a TCP is not present to control traffic, including lunch and other breaks.
- Not perform any other work while directing traffic.
- Be alert for emergency vehicles, which have "priority rights," and allow them to pass as quickly as possible.
- Conduct their operations so as not to impact nearby traffic control and railway crossing signal systems, and not override or conflict with them.

Figure 2 Positioning of Traffic Control Persons



4.4 TCP Control Procedures

The following procedures are to be used by TCP when controlling traffic.

When stopping traffic, the TCP must:

- Display the TC-22 STOP Paddle sign to the driver, extending the sign into the lane of oncoming traffic, giving the driver enough warning for a safe and comfortable stop.
- Stand off the travelled portion of the highway until the first vehicle has come to a stop.

- Move to a point on the highway where traffic in the queue can see him/her when traffic has stopped.
- Ensure that opposing traffic has stopped and the last opposing vehicle has passed his/her post before moving traffic from a stopped position.

When slowing traffic, the TCP must:

- Display the TC-22 SLOW Paddle sign, slowly moving the sign back and forth, if necessary, using hand signals to wave traffic forward or to command a further reduction in speed.

The most typical TCP situation involves two TCP. When two TCP are required:

- Lines of communication must be established prior to the start of operations.
- The two TCP must be able to see and hear each other or have two-way radios for proper communication.
- One TCP should be the lead TCP and coordinate all activities.

When using visual communications on curves or hills, a third TCP may be required to relay signals between the two TCP at the ends of the work area.

A single TCP may be used to control traffic in work areas where:

- The length of the closed lane is short (up to 50 metres).
- Traffic volumes and speeds are low (NPRS 60 km/h or lower).
- Visibility is good and in daylight hours only.

This may only be done in such a way that it is effectively one-way control, such as where traffic in one direction has an unobstructed lane. In this case:

- The TCP holds traffic in the obstructed lane until the unobstructed lane is clear of traffic.

In this one-way control situation, the TCP serves the same function as the YIELD TO ONCOMING TRAFFIC sign.

5 Set Up and Removal of Temporary Traffic Control

The set up or removal of traffic control (e.g., lane closures) on highways involves an additional element of risk for traffic control workers and highway users until all devices are in place.

The principles and procedures set out below have been developed to minimize risks for all workers and highway users. Where competing risks need to be weighed, the safety of workers who are handling traffic control devices on the highway is considered paramount since these workers are the most vulnerable.

As required by *O.Reg. 213/91* and *O.Reg. 145/00* under the OHSA, all workers, including TCP, responsible for on-site duties such as, installing or removing traffic control devices or measures must be:

1. Competent workers.
2. Aware of the requirements of the OHSA.
3. Trained in the application of OTM Book 7.
4. Capable of receiving written and oral instructions in a language easily understood.
5. Not performing any other work while installing or removing traffic control devices or measures.
6. Not performing any other work while directing vehicular traffic.

Additionally, workers responsible for on-site duties must:

- Not perform other functions while installing or removing traffic control devices.
- Ensure that enough vehicles (including CT), signs, barriers, barricades, and markers are taken to the work site to provide appropriate protection, and that TCP are available and on-site when required. If night-time protection is required, ensure that the appropriate devices are available.
- Ensure that the vehicles, signs, barricades, and markers are in good and clean conditions and meet the applicable specifications, including minimum reflectivity levels.
- Cover or remove any conflicting, existing traffic control devices.
- Record that the traffic control devices were installed according to the traffic control plan (or layout), as well as any modifications or deviations from the traffic control plan.

5.1 General Requirements

Workers who set up, use, or remove (take-down) work zone traffic control should apply the following safety principles. These principles apply to both non-freeways and freeways.

Set-up of work zone traffic control

The following safety principles should be applied when ***setting up traffic control in a work zone***:

1. Position work vehicles upstream of the work area rather than downstream, so that flashing lights and/or flashing arrows indicate a visual presence and obstacle to drivers.
2. Assemble and disassemble traffic control devices away from the highway. Where feasible, drop off traffic barrels in advance, along the shoulders adjacent to the lane closure.
3. AFADs, PLCS and PTTS should as much as possible, be partially or fully setup up and tested with any required settings or timings prior to being moved into position on the highway to minimize disruption to traffic. When moving any of these devices into position on the highway, the signalling displays should be turned off to reduce driver confusion.
4. Set up work zone traffic control devices starting at the upstream end of the work zone and proceeding downstream.
5. When installing a continuous line of channelizing devices, always place the channelizing devices in sequential order from the upstream end.
6. Reduce barrel spacing on the inside of curves, on hills, in the immediate vicinity of ramps and the work area, and in the taper, if considered needed to reinforce the closure.
7. Cones may be used for SD daytime work only (barrels are preferred).
8. Maintain an offset of 0.3 metres to 0.6 metres between the flexible drums (barrels) and the edge of the travelled lane, if possible.
9. When placing a traffic control device, ensure that it is not obscured by other objects.
10. Where there are multiple lanes in one direction, and staggered signage is required on both the left and right shoulders, first place the signs on the opposite shoulder from the lane that is being closed, then place the signs on the same shoulder as the closed lane.
11. Drive through the work zone on all approaches to ensure worker and public safety and to ensure all devices are installed and functioning as intended.
12. Cover, turn, or remove signs and devices at times when they are not required. Remove the cover immediately before work at the work site begins.
13. Ensure the layout is implemented as approved, record this information, and keep a copy available on site as part of the Traffic Control Plan and/or the Traffic Protection Plan.
14. Ensure any operational adjustments to the layout are recorded with reasoning, date, and time.
15. Approval maybe required.

Removal of work zone traffic control

The following safety principles should be applied when ***removing traffic control in a work zone***:

1. Drive through the work zone before removal of traffic control devices to ensure that all workers are off the road, and that there are no gaps in the closure.
2. Remove traffic control devices in the opposite order from which they were installed, starting with the closed lane(s), i.e., the last barrel (or cone) installed is the first barrel removed.
3. Advance signs are an exception. Remove advanced signs on the left and right shoulders in a downstream direction, in the same order they were installed. Removal of advanced signs must not be done until all other traffic control devices are removed.
4. Do not face work vehicles upstream when removing lane closures except in unusual circumstances. Never face work vehicles upstream at night.

5.2 Freeway-Specific Requirements

The following additional safety principles should be applied specifically for traffic control on a freeway:

1. Use a CT to protect workers who are installing or removing lane closures (except when 3.0 metres or more from a live lane or when installing or removing advance signage on shoulders wide enough to park on). Refer to Section 4 of the Office Edition for more information on CT and their implementation.
2. Position and maintain the CT at an LIDG distance (see Table C) upstream of workers when lane closures are being installed or removed.
3. Install and remove freeway lane closures as quickly as possible, particularly the tapers.
4. Back up the CT and work vehicles during removal of lane closures to provide protection for downstream workers. Do not back CT and work vehicles into a live lane of traffic.

The set up and removal of freeway lane closures are operations that require special consideration. The best practices outlined for various types of freeway lane closure, provided in detail in the Office Edition, must be used for provincial freeway lane closure, set ups and removals. The same procedures can be used on non-freeways, with or without a CT.

Road authorities may approve the use of alternative procedures or modifications of the procedures listed below to suit certain situations.

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April 2022