TRAFFIC CONTROL DEVICE MANUAL FOR WORK ZONES



Saskatchewan

chapter

100

101 RECORD OF AMENDMENTS

Date	No.	Description
Feb. 19, 2020	TCDMWZ 204.4	•Revised Section 204.4, Permittee role, to state it is at the Ministries discretion if a Traffic Accommodation Supervisor (TAS) is required .
Feb. 19, 2020	TCDMWZ 204.5	•Revised Section 204.5 to allow the TAS to designate another qualified person to be the TAS in their absence.
Feb. 19, 2020	TCDMWZ Typical Plan L.11 EVMB, Rumble Strips & Radar Feedback Sign Setup	• Added the word" optional" to RB-1 & RB-5, (Transitional Speed Zone) • Removed WD-A28S (Next_Km_) Tab from Gateway • Added ID-33 & ID-33T to sign plan (Photo enforced signs) • Added Column B* to table for delineator spacing when workers are not present • Added Note 2. (related to column B*above) • Changed spacing between the CS-100 or CS-101 sign from the WD-A41 sign to the construction limits. (A previous drawing error) • Added construction limits to the plan. • Added Sign CS-101 (Courtesy Sign for Smaller Projects)
August 31, 2020		• Added Signs WD-A22 (Bump) and CS-59 (Rumble Strip Ahead) to plan
Feb. 19, 2020	TCDMWZ B.2 Gateway Assembly	•Removed the next _km Tabs and its sign code, WD-A28S. Revised CS 12DR/L on the gateway assembly so that black & white are shown when leaving the work zone and orange and black are shown when entering the work zone.
Feb. 19, 2020	TCDMWZ B.3 (Gateway Assembly – Dimensions)	•Removed the next _km Tabs and sign code, WD-A28S.
Feb. 19, 2020	TCDMWZ Section 502 Page No. 500-22 & 23	• Removed the Next_ Km Tab On Gateway Assembles • Added sign codes CS-33, CS-12D R/L • Added sign codes CS-14, CS-12D R/L
Feb. 19, 2020	TCDMWZ Section 502, WD-A41 Page No. 500-11	• Corrected an error in the sign spec. for WD-A41 (Workers Present) Sign.
Feb. 19, 2020	TCDMWZ Section 502, CS-81 Page No. 500-21	•Corrected an error in the sign size for CS-81 (Flagger Signal ahead) Sign.
Feb.19, 2020	TCDMWZ Section 306 & Typical Plan L.4	•Revised notes in Typical Plan L.4 and Section 306 (Work Zone Lengths & Limits) to clarify when signs shall be repeated if a work zone extends greater than 3 km.
Feb. 19, 2020	TCDMWZ Added New Typical Plan F.6	•Added new Typical Plan F.6, Graveling in Progress. •Added F.6 to matrix under activity 3170, Spot Graveling, page A-15
April 24, 2020	TCDMWZ Section 804 Unstaffed Temporary Traffic Signals	•Revised section 804 to provide details on using Unstaffed Temporary Traffic Signals

April 24, 2020	TCDMWZ Typical Plan I.4 Bridge Culvert Diversion with Traffic Signals	• Moved CS 82 out of construction area. •Rotated angle of CS-23's to be Perpendicular with the detour centre line •Changed sign code RC-4L to RC-4R •Added Column B* •Added Note 2
May 26, 2020	TCDMWZ Section 804 Unstaffed Temporary Traffic Signals	Removed Typical Plan I.4 from page 21 of section 804, Unstaffed Temporary Traffic Signals
May 26, 2020	TCDMWZ Section 502 Sign Descriptions	ID-33, page 500-22, Automated Speed Enforcement ,corrected sign size
May 26, 2020	TCDMWZ Section 404, Portable Rumble Strips	Revised Section 404, Portable Rumble Strips, to allow other materials, beside rubber, to be used in the manufacturing of the portable rumble strips. Changed the Title of Section 404.1 to Dimensions of Rumble Strips Changed Section 404.4, Exemption, to include an exception for the use of rumble strips if in the opinion of the engineer: • the rumble strips create a hazard due to weather conditions (i.e.: snow, ice, etc.), • surface condition of the roadway makes the use of rumble stripes redundant (ie. rough road, gravel surface or grading projects), or • the rumble strips are in an area where they would create an unreasonable noise annoyance for local residents.
May 26, 2020	TCDMWZ Typical Plans, Section E.1 Lane Encroachment	• Added Column B* • Changed Column B to Black • Added Note 1.
May 26, 2020	TCDMWZ Typical Plans, Section E.2, Pavement Edge Drop-Off- Traveled Way	• Changed maximum distance between WD-A49 signs to 3.0 km • Added Column B* • Changed Column B to Black • Added Note 1 & 2 • Added B & B* to Plan
May 26, 2020	TCDMWZ Typical Plans, Section E.3 Pavement Edge Drop-Off- Centre line	• Added Column B* • Changed Column B to Black • Changed Notes 1 & 2 • Added B & B* to Plan
August 31, 2020	TCDMWZ Typical Plans, Section B.1 Major and Minor Courtesy Signs	• Added Column B* •
August, 31 2020	TCDMWZ Typical Plans, Section I.1 Road Closure- Short and Brief Duration	• Replaced TCDM 701 with Section 801 in Note 5 • Added Column B*

August 31, 2020	TCDMWZ Typical Plans, Section I.2 Two Lane Bridge – Traffic Signal Short Duration	• Added Column B* • Added and Greyed Note 6
August 31, 2020	TCDMWZ Typical Plans, Section I.3 Roadside Diversion –2 Lane	• Moved CS-82 out of construction area. • Corrected Sign code for Roadside Diversion from WD-A23L to WD-A43 • Added Column B* • Added Notes 2 & 3 • Rotated angle of CS-23's to be Perpendicular with the detour centre line
August 31, 2020	TCDMWZ Typical Plans, Section I.5 Ramp Closure	• Added Column B* • Added Note 1 • Added B* to the plan
August 31, 2020	TCDMWZ Typical Plans, Section I.7 Extensive Detour	• Added Column B* to table
August 31, 2020	TCDMWZ Section 602.3, Spacing of Delineators, Page 600-7	• Revised table 600-2 to show the approved spacing when workers are not present.
August 31, 2020	TCDMWZ Typical plans, Section C.1, (Work Adjacent to roadway – Without Hazard)	• The word 'optional' was added next to the Next__km Tab (WD-A28S).
August 31, 2020	TCDMWZ Typical Plans, Section C.2, Work Adjacent to Roadway- With hazard	• Added Column B* • Added Note 6 • Added B & B* to Plan • Changed Column B to Black
August 31, 2020	TCDMWZ Typical Plans, Section C.3 Work within Median with Concrete Barriers	• Extended Concrete Barriers past the work area • Added Column B* • Added Note 8 • Added B* to Plan
August 31, 2020	TCDMWZ Typical Plans, Section D.1,Sign Installation-Shoulder	• Added Column B*
August 31, 2020	TCDMWZ Typical Plans, Section D.2, Sign Installation-Shoulder Short Duration	• Added Column B* • Added Note 3 • Added B & B* to Plan • Changed Column B to Black
August 31, 2020	TCDMWZ Typical Plans, Section D.3, Work on Shoulder	• Added Column B* • Added Note 1 • Added B* to Plan

August 31, 2020	TCDMWZ Typical Plans, Section F.1 Workers Present – No Flagging	• Added Column B*
August 31, 2020	TCDMWZ Typical Plans, Section F.2 Workers Present- Flagging	• Changed TCDM 701 to Section 801 in note 2 • Added Column B*
August 31, 2020	TCDMWZ Typical Plans, Section F.3 Pilot Vehicle Operation	• Changed TCDM 701 to Section 801 in note 5 • Added Column B*
August 31, 2020	TCDMWZ Typical Plans, Section F.4 No Workers Present	• Added Column B*
August 31, 2020	TCDMWZ Typical Plans, Section F. 5, Centreline Surface Affected	• Added Column B* • Added Note 4
August 31, 2020	TCDMWZ Typical Plans, Section G. 1, Sign Installation – 2 Lane- less then 15 minutes	• Added Column B*
August 31, 2020	TCDMWZ Typical Plans, Section G.2, Sign Installation – 2 Lane- More then 15 minutes	• Added Column B* • Added Note 3. • Added B & B* to plan
August 31, 2020	TCDMWZ Typical Plans, Section G.3, Two Lane	• Changed TCDM 701 to Section 801 in Note 2 • Added Column B* • Added Note 5 • Added B* to Plan
August 31, 2020	TCDMWZ Typical Plans, Section G.4 Automated Flagger Assistance Device (AFAD)	• Changed TCDM 701 to Section 801 in Note 2. • Added Column B* • Added Note 5 • Added B* to Plan • Added Stop Bar is Optional to Plan
August 31, 2020	TCDMWZ Typical Plans, Section G.5, Two Lane Bridge – Traffic Signal Short Duration	• Added Column B* • Added Note 2 • Added B* to Plan • Added Stop Bar is Optional to Plan
August 31, 2020	TCDMWZ Typical Plans, Section G.6, Two Lane Bridge – Traffic Signal Long Duration	• Added Column B* • Added Note 5

August 31, 2020	TCDMWZ Typical Plans, Section G.7, Sign Installation- 4 Lane	• Added Column B* • Added Note 3 • Added B & B* to plan
August 31, 2020	TCDMWZ Typical Plans, Section G.8, Four Lane – No Flagging	• Moved Note 1 from the Plan to the Notes • Added Column B* • Added Notes 1 & 2 • Added B* to Plan
August 31, 2020	TCDMWZ Typical Plans, Section G.9, Four Lane- Flagging	• Removed WD-33R/L from Plan • Added Column B* • Added Note 2 • Added B* to Plan
August 31, 2020	TCDMWZ Typical Plans, Section J.1, Premarking, TRPM, Brightening & Splitting – 2 Lane	• Added Column B* • Added Note 2.
August 31, 2020	TCDMWZ Typical Plans, Section J.2, Premarking, TRPM, Brightening & Splitting – 4 Lane	• Correcting sign code from CS-61 to CS-82 on Plan • Added Column B* • Added Note 1.
August 31, 2020	TCDMWZ Typical Plans, Section J.3, Premarking at Intersections	• Added dash line to the turning lane • Added Column B* • Added Note 1
August 31, 2020	TCDMWZ Typical Plans, Section J.4, Automated Premarking	• Added Column B* • Added Note 2
August 31, 2020	TCDMWZ Typical Plans, Section J.5, Pavement Signs at Intersection – 2 Lane	• Added Column B* • Added Note 2
August 31, 2020	TCDMWZ Typical Plans, Section J.6, Pavement Signs at Intersection – 4 Lane	• Added Column B* • Added Note 2
August 31, 2020	TCDMWZ Typical Plans, Section J.7, Pavement Signs – Stop Bars	• Added Table • Added Note 3.
August 31, 2020	TCDMWZ Typical Plans, Section J.8, Pavement Signs – Rail Xing Bars & Crosswalks	• Changed TCDM 701 to Section 801 in Note 1 • Added Column B* • Added Notes 2

August 31, 2020	TCDMWZ Typical Plans, Section J.9, Four Lane Roadway -1 Lane Closed	• Removed Sign WD-33R/L from Plan • Added Column B* • Added Note 2
August 31, 2020	TCDMWZ Typical Plans, Section J.10, Striping 2 Lane	• Added Column B* • Added Note 2
August 31, 2020	TCDMWZ Typical Plans, Section J.11, Striping 4 Lane	• Added Column B* • Added Note 2.
August 31, 2020	TCDMWZ Typical Plans, Section J.12, Establish no Passing Zones with Pilot Vehicles	• Added Column B* • Added Note 2.
August 31, 2020	TCDMWZ Typical Plans, Section J.13, Pavement Signs - Bridge Markings	• Added Column B* • Added Note 1.
August 31, 2020	TCDMWZ Typical Plans, Section J.14, Pavement Signs - Curbing	• Added Column B* • Added Note 1.
August 31, 2020	TCDMWZ Typical Plans, Section J.15, Wrap – 2 Lane	• Added Column B* • Added Note 2.
August 31, 2020	TCDMWZ Typical Plans, Section J.17, Pavement Signs – Painted Medians	• Added Column B* • Added Note 2. • Added B & B* to Plan
August 31, 2020	TCDMWZ Typical Plans, Section K.1, Automated Speed Enforcement – 2 Lane	• Replaced TCDM 701 with Section 801 in Note 2 • Added Column B* • Added Note 5 • Added B*to Plan
August 31, 2020	TCDMWZ Typical Plans, Section K.2, Automated Speed Enforcement – 2 Lane W/Dual	• Replaced TCDM 701 with Section 801 in Note 1 • Added Column B* • Added Note 4 • Added B*to Plan
August 31, 2020	TCDMWZ Typical Plans, Section K.3, Automated Speed Enforcement – 4 Lane	• Removed WD-A33R/L sign from plan • Replaced TCDM 701 with Section 801 in Note 1 • Added Column B* • Added Note 2 • Added B*to Plan
August 31, 2020	TCDMWZ Typical Plans, Section K.6, Speed Zones – Workers not Present Overnight	• Added Column B* • Added and Greyed Note 2.

August 31, 2020	TCDMWZ Section 502, Sign Description, CS-100, Construction Courtesy	• Revised to allow the sign to be erected prior to the contract being • awarded, if the project has already been publicly announced
August 31, 2020	TCDMWZ Section 502, Sign Description, CS-101, Construction Courtesy Sign for Minor Projects	• Revised to allow the sign to be erected prior to the contract being • awarded, if the project has already been publicly announced
January, 12 2021	TCDMWZ Section 801 - Flagging,	• Section 801 was revised to clarify when flaggers should be used. • Section 801.6 & 801.7 were updated to clarify the number of flaggers that are to be used. • Section 801.8 was modified to remove redundant information.
October 18, 2021	TCDMWZ Section 502 Sign Description, CS-100 Construction Courtesy for Major Projects	• Updated sign image • Removed description and added link to policy in STCDM
October 18, 2021	TCDMWZ Section 502 Sign Description, CS-101 Construction Courtesy for Minor Projects	• Removed description and added link to policy in STCDM
December, 2021	TCDMWZ Typical Plans G.3, G. 4, D.4b, G.8 & G.9	• Revised typical plans to included information for projects that utilize open cut when replacing a culvert or other type of work that requires an open cut but doesn't provide a detour (one lane closed). • Added Typical Plan G.4b is a new plan that was required to help when the project doesn't have a detour in place and uses temporary traffic signals.
December, 2021	TCDMWZ Section 403 Radar Speed Feedback, Section 502, Sign Description, Gateway Assemblies & WSD-21 Warning Flags, Section 505.2 placement of Duplication of Key signs, Section 702.3 EVMB	• Clarified statement regarding when these devices need to be used along a High Priority Traffic Accommodation Corridors (HPTAC). New statement reads: _____-signs must be used on all construction and maintenance projects that are on High Priority Traffic Accommodation Corridors (HPTAC) which last five days or longer, or as specified in the contract. The contractor may wish to consider _____- signs on other projects to supplement their traffic accommodation plan
February 2022	Section 502 sign descriptions	• Changed sign code RB-151 & RB-155 to RS-151 & RS-155 • Added new sign CS-102, Federal Construction Courtesy Sign

February, 2022	Typical plan B.1	• Revised plan to include CS-102, Federal Construction Courtesy sign
March 2022	Section 502 sign descriptions, CS-82, Maximum Speed/End of Work Area	• Revised Sign CS-82 to show a 60 X 45 cm "Work Area Ends" Tab can be added below an existing maximum speed sign if one is present at the appropriate location in the work zone.
March 2022	Typical Plan L.9	• Revised plan to provide a more detailed explanation of the type of work zone signs needed along the crossroads when entering a work zone
April, 2022	Typical plans G4B. G.5 & G.6	• Corrected sign code error for Signals Ahead sign, changed from WD-84 to WD-B4
April 2022	Section 803, Automated Flagging Assistance Device, (AFAD).	Updated image of AFAD to include: • Signal back plate, typically flat black finish with a border width of 127mm. • at least 300 mm diameter lenses and • signal visors / hoods (typically flat black finish, and 280 mm deep). Added: • The operator of the AFAD must be trained in equipment failure procedures. • Gate arms must have a detachable gate arm. • Section on AFAD's Without Flagger Immediately Present.
October 14, 2022	Section A.2 General Sequence of WZ Setup & Takedown	Removed reference to signs being allowed to be turned when not required. Changed to match what is in Specification 8400.
October 17, 2022	Typical Plan B.1 Construction Courtesy signs	Updated plan with new CS-100 sign images
October 17, 2022	Section 502, Sign Descriptions, CS-100, CS-101	Added new sign images for CS-100, removed CS-101 as it is no longer required
July 14, 2023	Section 502, Sign Description, CS-6	Renamed Yield sign code from CS-6 to RA-2 and Yield to oncoming traffic to TC-17S to match TAC sign codes.
July 14, 2023	Section 602.3, Table 600-2	Corrected delineator spacing where workers are present.

TABLE 100-1-1: RECORD OF CHAPTER AND SECTION AMENDMENTS (2019-02)

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104	NEW	TABLE OF TABLES
105	1-3, 103, 910, 1-02	DEFINITIONS
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202	202	NEED FOR GUIDELINES
203	203	APPLICATION OF GUIDELINES
204	NEW	ROLES AND PROCEDURES FOR MINISTRY, CONSULTANT, CONTRACTOR AND PERMITEE
205	102	MANAGEMENT OF MANUAL
		FUNDAMENTALS OF WORK ZONE TRAFFIC CONTROL
301	204	PRINCIPLES
302	201	REQUIREMENTS OF TRAFFIC CONTROL DEVICES
303	304	STATUTES AND REGULATIONS
304	301	ADVANCE SIGNING AND WORK ZONE COMPONENTS
305	1-02	DURATION OF WORK
306	NEW	WORK ZONE LENGTHS AND LIMITS
307	9-01	TEMPORARY HIGHWAY CLOSURE
308	303	TRAFFIC MANAGEMENT PLANS
309	302	TRAFFIC ACCOMMODATION PLANS
		SPEED CONTROL
401	305, 306	TEMPORARY REGULATORY SPEED SETTING
402	906	AUTOMATED SPEED ENFORCEMENT
403	908	RADAR SPEED FEEDBACK SIGNS
404	903	PORTABLE RUMBLE STRIPS
		SIGNS
501	401	CLASSIFICATION OF SIGNS
502	404	SIGN DESCRIPTION
503	405	MANUFACTURING SPECIFICATIONS

Section Reference Num.		Section Title
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504	403	SIGN INSTALLATION & PLACEMENT LATERAL AND VERTICAL POSITION
505	904	DUPLICATION OF KEY SIGNS
		CHANNELIZATION DEVICES
601	501	BARRICADES
602	502, 905	DELINEATORS
603	503	BARRIERS
604	601	PAVEMENT MARKINGS
		DEVICES TO WARN, GUIDE AND INFORM
701	801	FLASHING LIGHT BOARDS
702	902	ELECTRONIC VARIABLE MESSAGE BOARDS (EVMB)
703	801	LIGHTING DEVICES
		PEOPLE AND DEVICES TO CONTROL TRAFFIC FLOW
801	701	FLAGGING
802	702	TRAFFIC OBSERVER
803	703	AFADS
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A.2	NEW	GENERAL SEQUENCE OF WORK ZONE SETUP AND TAKEDOWN
A.3	NEW	PLAN SELECTION MATRICIES (by work zone features and by activity)
A.4	NEW	QUESTIONS & ANSWER CHECKLIST FOR SUPPLEMENTARY CONSIDERATIONS AND MODIFYING PLANS
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B.2	907	GATEWAY ASSEMBLY - POSITIONING
B.3	907	GATEWAY ASSEMBLY - DIMENSIONS
		TYPICAL PLANS – ROADSIDE PLANS
C.1	9-02A	WORK ADJACENT TO ROADWAY - WITHOUT A HAZARD
C.2	9-02B, 10-15	WORK ADJACENT TO ROADWAY - WITH HAZARD
C.3	10-14	WORK WITHIN MEDIAN WITH CONCRETE BARRIERS
		TYPICAL PLANS – SHOULDER PLANS
D.1	16-04	SIGN INSTALLATION - SHOULDER
D.2	16-06	SIGN INSTALLATION – SHOULDER SHORT DURATION
D.3	9-03	WORK ON SHOULDER OF ROADWAY

Section Reference Num.		Section Title
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E.1	NEW	TYPICAL PLANS – LANE ENCROACHMENT
E.2	10-13-01	LANE ENCROACHMENT
E.3	10-13-02	PAVEMENT EDGE DROP-OFF – TRAVELED WAY
		PAVEMENT EDGE DROP-OFF – CENTRELINE
		TYPICAL PLANS – OPEN ROAD UNDER REPAIR
F.1	9-04-02, 10-03-01, 13-03, 13-06	WORKERS PRESENT – NO FLAGGING
F.2	9-05-02, 10-03-02, 13-04, 13-05, 10-07, 14-05	WORKERS PRESENT – FLAGGING
F.3	701	PILOT VEHICLE OPERATION
F.4	9-10	NO WORKERS PRESENT
F.5	10-08	CENTRELINE SURFACE AFFECTED
F.6	New	GRAVELING IN PROGRESS
		TYPICAL PLANS – SINGLE LANE CLOSED
G.1	16-05	SIGN INSTALLATION – 2 LANE - LESS THAN 15 MINUTES
G.2	16-08	SIGN INSTALLATION – 2 LANE - MORE THAN 15 MINUTES
G.3	9-04-01, 12-03 9-05-01, 10-04-02, 14-03-01, 12-04, 10-04-01	TWO LANE
G.4	703-01	AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)
G.5	15-03-03	TWO LANE BRIDGE - TRAFFIC SIGNAL SHORT DURATION
G.6	15-03-01	TWO LANE BRIDGE - TRAFFIC SIGNAL LONG DURATION
G.7	16-07	SIGN INSTALLATION – 4 LANE
G.8	10-05-02, 10-05-01, 14-04, 15-03-02, 15-03-04	FOUR LANE -NO FLAGGING
G.9	9-06-01, 12-05, 14-03-02	FOUR LANE – FLAGGING
		TYPICAL PLANS – MEDIAN CROSSOVER
H.1	10-06-01	FOUR TO TWO LANE - RIGHT CROSSOVER
H.2	10-06-02	FOUR TO TWO LANE - LEFT CROSSOVER
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I.2	10-11-03	ROADWAY CLOSURE – LONG DURATION

Section Reference Num.		Section Title
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I.5	NEW	RAMP CLOSURES
I.6	10-10	ADVISORY ALTERNATE ROUTE SIGNS
I.7	10-11-02	EXTENSIVE DETOUR
I.8	18-06 (2)	4 LANE TO 2 LANE EMERGENCY DETOUR
I.9	18-06 (1)	4 LANE TO 2 LANE EMERGENCY RM DETOURS
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J.2	11-03-02	MANUAL PREMARKING, TRPM'S, BRIGHTENING & SPLITTING – 4 LANE
J.3	11-04	PREMARKING AT INTERSECTIONS
J.4	11-06	AUTOMATED PREMARKING
J.5	11-08-01	PAVEMENT SIGNS AT INTERSECTIONS - 2 LANE
J.6	11-08-02	PAVEMENT SIGNS AT INTERSECTIONS - 4 LANE
J.7	11-09	PAVEMENT SIGNS - STOP BARS
J.8	11-10-01	PAVEMENT SIGNS - RAIL XING BARS & CROSSWALKS
J.9	11-10-02	FOUR LANE HIGHWAY - 1 LANE CLOSED
J.10	11-11-01	STRIPING 2 LANE
J.11	11-11-02	STRIPING 4 LANE
J.12	11-11-03	ESTABLISH NO PASSING ZONES WITH PILOT VEHICLES
J.13	11-12	PAVEMENT SIGNS - BRIDGE MARKINGS
J.14	11-13	PAVEMENT SIGNS - CURBING
J.15	11-14-01	WRAP - 2 LANE
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K.3	906 (3)	AUTOMATED SPEED ENFORCEMENT – 4 LANE
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K.5	903	PORTABLE RUMBLE STRIPS – 4 LANE
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		TYPICAL PLANS – MODIFYING AND SUPPLEMENTARY PLANS
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L.2	18-07 (1)	MAXIMUM SINGLE WORK AREA WORK ZONE

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L.4	18-07 (3), 9-11	EXTENDED SINGLE WORK AREA IN WORK ZONE
L.5	18-07 (4)	SEPARATE WORK ZONES
L.6	10-09	TRUCK ENTERING ROADWAY
L.7	18-04	MODIFICATION - SIGHT DISTANCE LIMITATION
L.8	18-05	MODIFICATION - INSUFFICIENT QUEUEING AREA
L.9	NEW	MODIFICATIONS – CROSS ROAD INTERSECTION
L.10	NEW	MODIFICATIONS - RAILWAY CROSSINGS
L.11	18-02	EVMB, RUMBLE STRIPS & RADAR FEEDBACK SIGN SETUP

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- G.2 Sign Installation - 2 Lane - More Than 15 Minutes
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- G.4 Automated Flagger Assistance Device (AFAD)/open cut
- G.4B Temporay Traffic Signals (INCLUDING Open Cut)
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- G.7 Sign Installation - 4 Lane
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105 DEFINITIONS

Words or phrases used in this Manual, are:

board	the Highway Traffic Board (HTB)
brief duration work	is a one time stop of 15 minutes or less. All brief duration work is carried out in conjunction with a vehicle equipped with a rotating/flashing amber light or flashing light board as a replacement for normal signing due to the work location changing on a continual basis. Two or more planned stops of 15 minutes or less within a 3 km section require short duration traffic accommodation as a minimum. For more information reference Section 305.
Deputy Minister	Deputy Minister of Saskatchewan Ministry of Highways and Infrastructure
fast-moving work	moving operations undertaken at greater than 20 km/h which may require random, brief stops by the work vehicle. This does not include slow moving operations. For more information reference Section 305.
hazard	circumstances, substances, materials, floods and objects that are foreign to the normal roadway environment.

High Priority Traffic Accommodation Corridors (HPTAC)

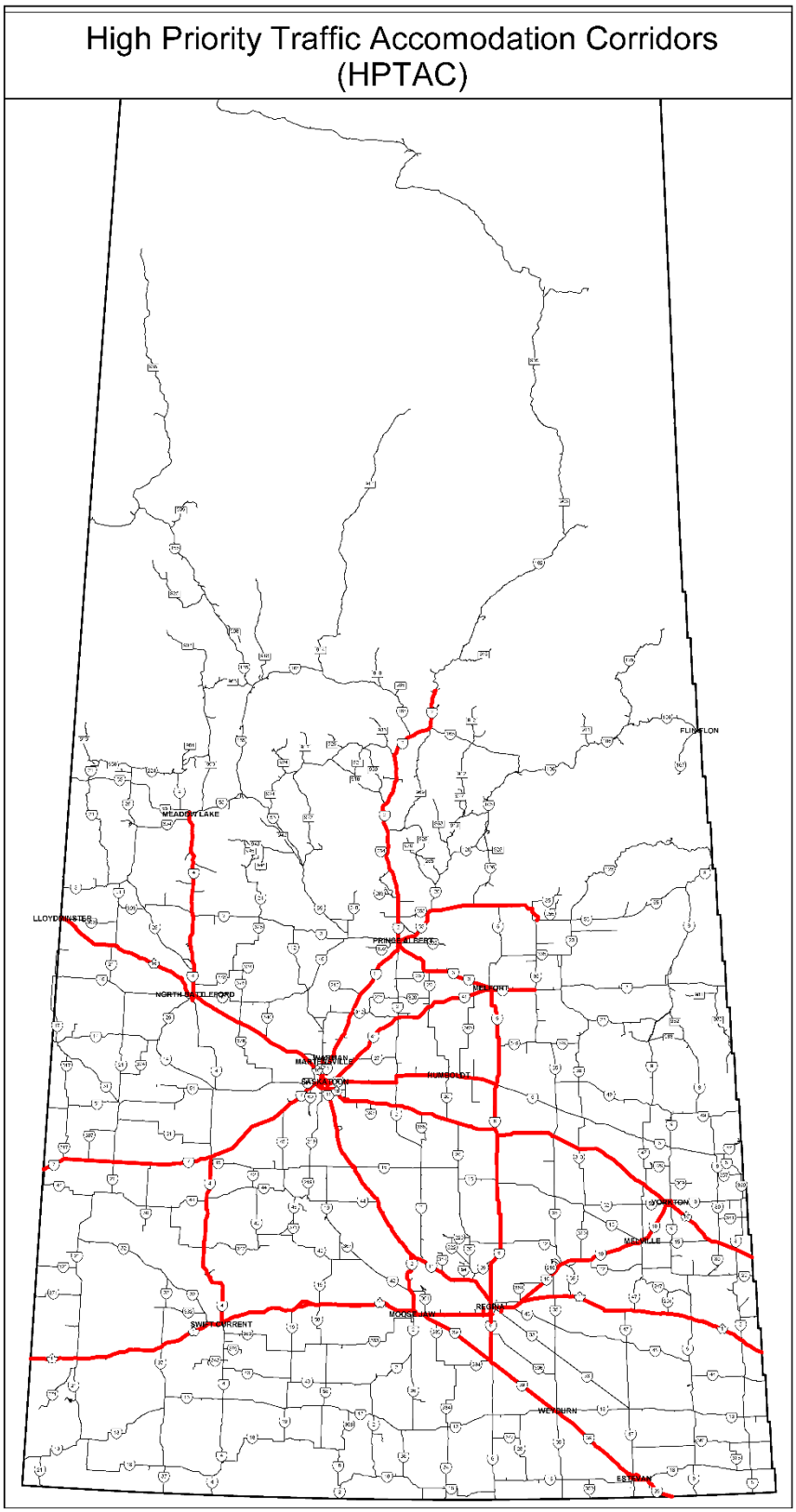


FIGURE 100-1: HIGH PRIORITY TRAFFIC ACCOMMODATION CORRIDORS

highways	provincial highways and public highways maintained by the Ministry.
long duration work	includes all construction, maintenance and utility activities requiring a work area for a period of time greater than one day. For more information reference Section 305.
manual	“Traffic Control Devices Manual for Work Zones” except when used to specifically describe another manual.
MHI	Saskatchewan Ministry of Highways and Infrastructure.
Ministry	Saskatchewan Ministry of Highways and Infrastructure.
moving operations	is a moving operation undertaken at speed up to 20 km/h. The work area is affected for a short duration of time and then returned to its original state. For more information reference Section 305.
must/should/may	the Traffic Control Devices Manual uses the words "must", "should", and "may” to describe various traffic operation conditions. MUST – a mandatory condition. Where certain requirements are described with the "must" stipulation, it is mandatory that these requirements be met. SHOULD – an advisory condition. Where the word "should" is used, it is considered to be an advisable or recommended procedure, but not mandatory. MAY – a permissive condition. No requirement for design or application is intended. Manual users must be guided by these definitions. In the event of liability, the courts could place an emphasis on these definitions, which also reflect common English usage of the words.
provincial highway	means a public highway, designated as a provincial highway by *The Provincial Highway Designation Regulations, 1990*.
public highway	means a right-of-way or roadway and includes a bridge, culvert, drain, or other public improvement erected upon or in connection with such public highway.
short duration work	includes any daytime maintenance activity, construction project, utility work, preliminary survey work, pavement marking, or other miscellaneous highway activity planned for one day or less. When road work spans several days and normal traffic is restored at the end of each day, short duration work signing is installed each day. Short duration work may also be applicable to emergency situations at night. For more information reference Section 305.
slow moving equipment	a vehicle performing roadwork moving at speeds up to 20 km/h for slow moving operations. For more information reference Section 305.

stationary operation	includes any operation on the roadway where the surface is affected for several hours and the work is completed on a section basis rather than a continuous basis. For more information reference Section 305.
traffic observers	warn workers of impending risk from oncoming traffic.
work adjacent to roadway	any work that does not encroach onto the highway surface, driving lane or shoulder. No encroachment may occur that exceeds 15 minutes on more then one occasion per hour in a 3 km distance. Signing is not required for work > 10 metres from the shoulder edge.
work area	portion of the roadway where work is being undertaken.
work site	includes the transition area which moves traffic out of its normal path, the buffer space which provides protection for road users and workers, the work area defined above, and the termination area which lets traffic resume its normal path.
work zone	means an area of roadway where highway construction, maintenance, or utility work activities are taking place. A work zone is typically marked by signs, channeling devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign (WD-A41) or flashing lights on a vehicle to where traffic is no longer being affected. A work zone may be for short or long durations and may include stationary or moving activities. These include: • Long-term stationary highway construction such as building a new bridge, adding travel lanes to the roadway, and extending an existing roadway. • Mobile highway maintenance such as striping the roadway and pothole repair. • Short-term stationary utility work such as repairing electric, gas, water lines within the roadway. Most work zones can be divided into five area: Advance Warning Area, Transition Area, Buffer Space, Work Area, and Termination Area. For more information reference Section 305.

chapter

200

201 NOTICE TO MANUAL USERS

The Traffic Control Devices Manual for Work Zones is published and issued by the Ministry to provide guidance on the safe and uniform use of devices for traffic control at all work zones on or adjacent to all road facilities under provincial jurisdiction.

Work zone situations may arise which require further or other measures than those described in this Manual to ensure the safe and expedient passage of traffic and safety of workers. In each work zone situation, the Manual user should assess the traffic accommodation needs and ensure that all reasonable measures are taken to provide this.

This Manual does not contain a set of absolute rules which must be obeyed without question and without regard to the topography of the work zone, the design of the roadway, the traffic conditions or other factors affecting the work zone. The paramount principle which must be followed always is this: The maximum level of safety which is practical in the work zone must be achieved. Safety must consider the needs of both road users and workers in the work zone.

There are several measures which apply in every work zone situation, such as the need to erect signs warning of the work zone. However, an understanding of road user needs and reactions is necessary to ensure that the signs are located appropriately. Uniform signing methods aid road user recognition and appropriate reaction. The guidance in this Manual must be followed for the sake of uniformity in the accommodation of traffic in work zones. However, there may be situations where judgement will need to be exercised to accommodate road users more safely.

Compliance with the guidelines in this Manual may not protect the Manual user from third party liability.

201.1 CONTENT AND SCOPE

The Manual sets forth guidelines for the arrangement of traffic control devices required to guide traffic during road construction, maintenance and other work activities on or adjacent to highways.

The guidelines are intended for typical situations. Several typical situations are illustrated showing the appropriate application of standard traffic control devices.

Text and schematic drawings in this Manual are not legal standards except where Statutes or Regulations pursuant thereto are precisely quoted. Criteria for position, location and use of traffic control devices are provided solely for the purpose of guidance and information, and are not a legal standard.

This Manual is referenced under work zone signs in the Ministry's "Traffic Control Devices Manual". The Manual contains information specific to regulatory, warning, guide and information signs as well as delineation, and warning lights.

201.2 PURPOSE OF TRAFFIC CONTROL

The fundamental purpose for controlling traffic at work zones is to provide safe and expedient passage for road users through the work zone and safeguard the workers. All organizations performing work on highways have a responsibility to install and maintain such traffic control devices as are necessary to achieve a reasonable level of safety for all concerned.

201.3 USAGE OF THIS MANUAL OUTSIDE OF THE MINISTRY

The Ministry recognizes that this Manual may be used by persons other than those employed by the Ministry. The Manual incorporates Ministry policies, guidelines and recommended practices for common work zone situations on provincial highways which may render it unsuitable for use by others. The content in this Manual is intended as a set of minimum specifications which, if met, would adequately protect the public and the workers on other road systems similar to those under provincial jurisdiction. Other road authorities should consider the characteristics of the roadways for which they are responsible and the traffic to be accommodated in developing appropriate policies, guidelines and practices for accommodating traffic.

Professional judgement, experience and an understanding of road user behaviour must be used in the application of these guidelines. All other users of the Manual are responsible for any traffic control design which the user may produce, as well as all risk of liability associated with any use of this Manual.

201.4 USAGE OF THIS MANUAL BY THE MINISTRY

Ministry employees must use the guidelines, principles and Typical Plan layouts contained in this Manual when planning traffic control measures for typical work zones. The employee must exercise professional judgement in the application of these guidelines to non-typical work zones.

201.5 OTHER SOURCES OF INFORMATION

For further guidance in traffic accommodation, users of this Manual may refer to the Transportation Association of Canada's *Manual of Uniform Traffic Control Devices for Canada*, which is available for purchase from the Transportation Association of Canada's website.

202 NEED FOR GUIDELINES

This Manual is intended as a guide for Ministry employees, contractors and others engaged in temporary work on or adjacent to roadway facilities under provincial jurisdiction. The guidelines presented in this Manual should be followed at all times, except in situations where professional judgement determines that minor variations from the guidelines would result in improved consistency and uniformity in a work zone.

Traffic control is necessary to route traffic through and around highway work activities. Due to the variety of work activities and topographical features encountered in work zones, no one sequence of traffic control devices is universally applicable. The guidelines in this Manual may be used to achieve appropriate traffic control in the situations described in this Manual and should be adapted to achieve appropriate traffic control to suit the particular circumstances of other situations.

202.1 LAW PREVAILS

Traffic control must not contravene the law.

203 APPLICATION OF GUIDELINES

It is not practical to prescribe detailed standards of application for all situations that may conceivably arise. Consequently, guidelines are presented for typical situations in this Manual. It is emphasized that these are guidelines for typical situations and that additional or other protection must be provided when unusual complexities and hazards prevail.

203.1 EXTENT OF PROTECTION

The speed and volume of traffic, sight distance, visual clutter, duration of operation and exposure to hazards are among the considerations which must be considered in providing protection for a particular work zone. In all situations, the particular circumstances of the work zone must be considered together with the guidelines in this Manual, to achieve traffic accommodation which provides increased safety for road users and workers.

203.2 APPLICATION OF THE GUIDELINES

Guidelines for the use of traffic control devices are illustrated for typical applications. Physical features or other factors may require additional protection when unusual complexities and hazards occur (e.g., a severe drop-off close to a travel lane). In these instances, experience and professional judgement must be used, together with the guidelines in this Manual, to select and place the most appropriate devices.

203.3 UNIFORMITY OF APPLICATION

Uniformity of application of traffic control devices is equally as important as standardization of design and placement of devices. Road users' recognition and understanding is facilitated by marking similar conditions consistently. The application and use of traffic control devices must consider the particular features of a work zone which differ from the typical situations illustrated in the Typical Plans in this Manual. To the extent that it is necessary to draw a road users' attention to these features, it must be done in a manner as consistent with these guidelines as the circumstances allow.

203.4 CONTRACTS

This Manual must be referenced in all contracts for construction or maintenance activities which require traffic accommodation.

203.5 MANAGEMENT RESPONSIBILITY AND TRAINING

Responsibility for traffic accommodation must be clearly assigned within an organization, and personnel must be appropriately trained to ensure that professional judgement and experience are used, together with knowledge of the guidelines in this Manual.

204 MINISTRY HIGHWAY WORK ZONE ROLES

The information in this Manual represents recommended guidelines for application of traffic control in common work zone situations on provincial highways. The Ministry of Highways & Infrastructure is the authority for work zones on Ministry Highways and portions of this authority may be delegated through a permit or contract. This section provides an overview of work zone roles and procedures for Ministry, Consultant, Contractor and Permittee representatives.

204.1 MINISTRY ROLE

The Ministry or its representative establishes standards for work zone traffic control specifications and drawings and ensures that worker and public safety is a high priority on Ministry construction and maintenance contracts and permit work.

Ministry In-House Operation and Maintenance Work

On projects where Ministry crews are responsible for completing the work, the Ministry's role relative to establishing and maintaining the work zone includes:

- Notifying the Ministry District Operations Manager within 48 hours prior to the work commencing.
- Contacting the Saskatchewan Highways Hotline 24 hours prior to the work commencing and providing timely updates as road conditions change during construction. Specific requirements for the Highway Hotline are provided in the Ministry's *Project Administration Manual*.
- Being responsible for the work zone setup, adjustments, maintenance and take down. Diarizing field checks of work zone traffic control and noting deficiencies at regular intervals. Taking appropriate and timely action to correct any deficiencies identified. In cases of imminent danger, corrective action must be immediate. Ministry Safety Branch undertakes internal Ministry Audits.
- In the event of an incident in the work zone, complying with OH&S Regulations and undertaking the steps summarized in the Contractor Incident Reporting Standard Practice Bulletin.
- Contacting the Ministry District Operations Manager when work is complete.

Ministry Tendered Work

For tendered works, the Ministry notifies the Highways Hotline, communicates with SGI with respect to move permits, provides known information to the Prime Contractor, issues authorization to commence work, initiates work zone safety audits, and monitors traffic issues.

204.2 CONTRACTOR ROLE

The list below outlines the Contractor's role relative to work zones when administering a Ministry highway or bridge construction contract. Specific responsibilities will be outlined in the project contract.

On projects where the Contractor is responsible for completing the work the Contractor's role relative to work zones includes:

- Providing a Traffic Accommodation Plan if required by an auditor and ensuring that it is properly implemented and updated.
- Developing a Traffic Management Plan if specified in the contract and ensuring that it is properly implemented and updated.
- Contacting the Ministry District Operations Manager 24 to 48 hours prior to the work commencing.
- Being responsible for the work zone setup, adjustments, maintenance and take down. This requirement is applicable during hours of daylight and darkness and regardless of whether or not work is being performed or the project is shut down.
- Taking appropriate and timely action to correct any deficiencies identified. In cases of imminent danger, corrective action must be immediate.
- Completing and signing the work zone traffic control checklist and noting deficiencies at regular intervals.
- Ensuring that all sub-contractors comply with the Traffic Accommodation Plan and Traffic Management Plan as applicable.
- Ensuring that someone with Traffic Accommodation Supervisor (TAS) training is at the worksite when it is active, and workers are present (but TAS can be doing other duties while on site). The Contractor must identify this individual at the preconstruction meeting.
- In the event of an incident in the work zone, complying with OH&S Regulations and undertaking the steps summarized in the Contractor Incident Reporting Standard Practice Bulletin.
- Contacting the Ministry District Operations Manager when work is complete.

204.3 CONSULTANT ROLE

The list below outlines the Consultant's role relative to work zones when administering a Ministry highway or bridge construction contract. Note that when a Consultant performs work such as survey and materials testing within the highway right-of-way which does not coincide with the Contractor's activities, the primary responsibilities of the Contractor shall also apply to the Consultant.

- Identify in the special provisions of a construction contract, any unique situations that will require special traffic accommodation measures. Ensure the Contractor addresses these situations in the Traffic Accommodation Plan and/or Traffic Management Plan (ex: limiting the length of the Work Zone).

- Provide suitable traffic accommodation for the Consultant's activities and coordinate the positioning of the Consultant's Traffic Control Devices with the Contractor and/or Utility Company when necessary.
- Review the Contractor's Traffic Accommodation Plan and/or Traffic Management Plan prior to commencement of the work to determine if it is appropriate for the site conditions anticipated.
- Liaise with the Contractor to address any concerns with the proposed Traffic Accommodation Plan and/or Traffic Management Plan.
- Arrange for erection of courtesy signs if necessary.
- Perform the traffic accommodation inspections and complete the traffic accommodation checklist at least twice per day (daily at start-up and shutdown or when traffic accommodation requirements change) and issue penalties as they occur.
- Advise the Contractor of any deficiencies ensure that the Contractor takes appropriate and timely corrective action.
- Order the Contractor to suspend work in cases of recognized imminent danger or where the Contractor fails to undertake appropriate and timely measures to accommodate traffic or fails to correct deficiencies. Immediately notify the Ministry Representative in cases where such orders are issued.
- In the event of an incident in the work zone, comply with OH&S Regulations and undertake the steps summarized in the Contractor Incident Reporting Standard Practice Bulletin.
- Review all daily traffic reports received from the Contractor.
- Any other duties as assigned in the Professional Services Agreement.

204.4 PERMITTEE ROLE

A Permittee is authorized to do work on Ministry Highways through the permit document. Permit requirements and forms are provided at the following website: https://www.saskatchewan.ca/business/transportation-and-road-construction/apply-for-a-roadside-development-permit

The list below outlines the Permittee's role relative to work zones when administering a Ministry highway or bridge construction contract.

- Apply for a permit more than two weeks prior to work commencing. Contact the Ministry District Operations Manager within 48 hours prior to the work commencing.
- Be responsible for the work zone setup, adjustments, maintenance and take down. This requirement is applicable during hours of daylight and darkness and regardless of whether or not work is being performed or the project is shut down. Take appropriate and timely action to

correct any deficiencies identified. In cases of imminent danger, corrective action must be immediate.

- At the Ministries discretion, ensures that someone with TAS training is at the worksite when it is active, and workers are present (but TAS can be doing other duties while on site).
- In the event of an incident in the work zone, complying with OH&S Regulations and undertaking the steps summarized in the Contractor Incident Reporting Standard Practice Bulletin.
- Contacts the Ministry District Operations Manager when work is complete.

204.5 INDIVIDUAL RESPONSIBILITIES

District Operations Manager and Project Manager

Same as Ministry or Representative.

Traffic Accommodation Supervisor

The Traffic Accommodation Supervisor (TAS) is appointed by the Contractor, and is responsible for preparing, implementing, and managing the Contractor's traffic control plans. The TAS must be certified. These are the typical duties and responsibilities of the TAS:

- must be on site when site is active, or designate another TAS certified person to act as the TAS designate in their absence
- fully implements the traffic control plan
- monitors traffic operations to determine the effectiveness of the traffic control plan
- ensures that the Traffic Accommodation Plan and/or Traffic Management Plan remains current
- oversees modifications to the Traffic Accommodation Plan and/or Traffic Management Plan as required by changes to the construction schedule, accommodation of special events, and changes to sub-plans
- ensures that daily traffic control logs are maintained
- exercises full line authority over all Traffic Control Persons on the work site
- sets up and implements a monitoring schedule for both active and inactive work periods throughout the course of the project
- directs the Contractor's Incident Management Plan
- attends regular meetings with the Ministry on behalf of the Contractor to discuss project performance, issues, and plans
- Decides if flagging control or AFAD is required.
- Sets speed limits in work zones as per Section 401.

- Determines appropriate type of delineation and patrols delineation at frequent intervals.
- Communicates with law enforcement as to a safe and visible location for law equipment to be placed.
- Approves use of warning lights and beacons.
- Determines if passing permitted signs are required in the work zone.

The role of the TAS should be assigned only to a qualified person who is knowledgeable about traffic management principles and requirements, and who has suitable traffic management work experience or training. The TAS may be an employee of the Contractor or a sub-contractor.

205 MANAGEMENT OF MANUAL

205.1 ASSIGNED MANAGEMENT RESPONSIBILITY

Development of the Ministry guidelines pertaining to the physical features and use of traffic control devices is the responsibility of the Operations Standards Branch, Operation and Maintenance Division. Accordingly, the Operations Standards Branch is responsible for managing all aspects of this Manual (e.g. distribution, records, maintaining the associated file, 3-year reviews, updating, etc.).

205.2 APPROVAL

In accordance with Ministry policy, all documentation in this Manual, including Bulletins, must be approved in accordance with Ministry policy. The record of approval of individual Manual documents is maintained in the working file.

205.3 BULLETIN

Any new or revised information that needs to be circulated to Manual holders on an urgent basis, and time does not permit preparation of the material in final form, should be transmitted as a "BULLETIN".

Format

Bulletins must be prepared in memorandum form. The following information must be displayed on each Bulletin page transmitted to Manual holders:

1. the word "BULLETIN";
2. Manual document number represented by the Bulletin; and
3. issue date.

Procedure

The Bulletin must be approved in accordance with Ministry policy. Distribution of Bulletins must be the responsibility of the Operations Standards Branch. Any Bulletin that is distributed must be rewritten in proper Manual form within one year of the date it is issued.

205.4 MANUAL MAINTENANCE

Manual holders are responsible for keeping their Manual up to date by:

1. making the necessary entry in the Record of Amendments form in the Manual;
2. placing new or revised documents in the Manual as they are received;
3. placing Bulletins at the beginning of the related chapter; and
4. removing all superseded material and obsolete Bulletins upon receipt of revisions.

chapter

300

301 PRINCIPLES

This Manual provides guidelines for the design, installation and maintenance of traffic control devices. These guidelines are directed to the safety of individuals performing the work and the safe and expeditious movement of traffic through work zones.

301.1 GUIDING PRINCIPLES FOR WORK ZONE TRAFFIC MANAGEMENT

Work zones may present the road user with unexpected or unusual situations. Consequently, special care must be taken when providing for the temporary accommodation of road users through these work zones. The following guiding principles can help guide the users of this Manual through the process of temporary traffic control provision.

Traffic Movement

Work zones should not confuse the road user. Hence, abrupt changes in speed or path should be avoided. Well delineated transitions should be provided, whenever possible, especially where lanes are closed, roadway widths are reduced and where detours are required. Traffic movement through the work zone should be inhibited as little as possible. The objective should be to route traffic through zones with geometry and traffic control devices as nearly as possible to those encountered for normal highway situations.

Positive Guidance

Road users should be guided in a clear and positive manner while approaching and traversing work zones. Adequate warning, delineation and channelization by use of appropriate traffic control devices for varying conditions of light and weather must be provided to ensure positive guidance in advance of and through the work zone, and hence, minimize unexpected situations that may result in increased collision risk.

For long duration work areas, inappropriate pavement markings should be removed to eliminate any misleading cues to road users. On short duration projects, existing markings may be left in place if the intended vehicle paths can be appropriately delineated using other traffic control devices.

Operation

It is important to ensure that all elements of the traffic accommodation plan are implemented in a manner which is consistent and effective in providing safe conditions for road users and workers. Work zones should be regularly monitored under varying conditions of traffic volumes, light, and weather to ensure that traffic control measures are operating effectively and that all devices used are clearly visible, clean and in good repair.

The circumstances of each collision in a work zone should be examined to determine the adequacy of traffic accommodation measures. Measures to correct any deficiencies must be implemented as soon as it is practical. In addition, collision records should be maintained and analyzed periodically to guide officials in improving the work zone operation. Modification in traffic controls or working procedures may be required in order to expedite safe traffic movement and promote worker safety.

When the work zone is inactive, including nights, weekends and holidays, signs not required for traffic accommodation must be removed or covered. All traffic control devices must be removed or covered immediately after they are no longer applicable.

Roadside Safety

The maintenance of roadside safety requires constant attention. To accommodate run-off-the-road incidents, disabled vehicles or other emergency situations, it is desirable to provide an unencumbered roadside recovery area that is as wide as practical.

Traffic must be channelized using pavement markings, signing, flexible posts and other lightweight devices which yield when hit by errant vehicles. In addition, barriers may be used to provide protection to workers, particularly in longer term or labour intensive activities such as bridge deck repairs. Barriers should be placed to minimize the risk of right-angle impact or other risk to road users.

Equipment, materials and debris should be stored in such a manner as not to be vulnerable to run-off-the-road vehicle impact.

302 REQUIREMENTS OF TRAFFIC CONTROL DEVICES

This Manual provides the characteristics of effective traffic control devices. These characteristics must be considered in the application of traffic control devices and the use of these devices in work zones.

While this Manual provides guidelines for design and application of traffic control devices, it is not a substitute for good judgement. Placement, maintenance and uniformity must be considered in each situation to ensure effectiveness.

302.1 CHARACTERISTICS OF EFFECTIVE TRAFFIC CONTROL DEVICES

Effective traffic control devices:

1. Fulfill a need;
2. Command attention;
3. Convey a clear, simple meaning;
4. Command respect of road users;
5. Give adequate time for proper response; and
6. Are legible at a glance; and,
7. Be uniform in design as other similar devices in the system.

302.2 CONSIDERATIONS

The following must be taken into consideration in design and application of traffic control devices:

Design

The design of the device should have the following attributes:

1. Ensure such features as size, contrast, colours, shape, composition and lighting or reflectorization are combined to draw attention to the device;
2. Produce a clear meaning when shape, size, colours and simplicity of message are combined to promote easy understanding; and,
3. Ensure that legibility and size combine with placement to allow for adequate time for the road user to recognize and respond to the device and that uniformity, size and legibility combine to command respect.

Application

The application of traffic control devices involves the following:

1. Ensuring uniform application
2. Proper placement
3. Proper traffic operation
4. Adequate maintenance

Uniformity

Uniform traffic control devices simplify the task of the road users by aiding in recognition, understanding and interpretation. In economic terms, uniformity reduces costs associated with manufacture, installation, maintenance and administration. Uniformity means treating similar situations in the same way, regardless of who performs the work or the area of the province in which it is located.

Placement

Devices should be placed:

1. within the cone of vision of the viewer so that it will command attention;
2. to convey the proper meaning; and
3. where road users travelling at the speed limit have adequate time to make a proper response.

Operation

Appropriate devices and related equipment must be used to meet the specific traffic requirements at a given location. To the extent possible, the device must be placed and operated in a uniform and consistent manner to assure that road users can be expected to respond properly to the device, based on their previous exposure to similar traffic control situations. The use of standard flags or flashing amber lights in conjunction with signs is allowed, provided these devices do not interfere with the road users' view of the sign face.

Maintenance

Devices must be maintained to ensure that they are legible and visible. Clean, legible, properly installed devices in good working condition command the respect of road users. In addition to physical maintenance, functional maintenance is required to adjust traffic control devices to current conditions and to remove or cover unnecessary traffic control devices.

303 STATUTES AND REGULATIONS

Regulations made pursuant to the Statutes of Saskatchewan pertain to work zone locations as they would to any other provincial highway locations. Some legislation and regulatory provisions, as amended from time to time, apply specifically to work zone activity. Several of these provisions, as well as provisions related to "speeds" generally, are listed below for ready reference.

- *The Highways and Transportation Act, 1997* – Sections 20, 20.1, and 27
- *The Traffic Safety Act* - Sections 199, 201, and 203
- *The Highway Worker and Flag Person Identification Regulation, 2014*
- *The Occupational Health and Safety Regulations, 1996* – Sections 132 and 133

Information with respect to Minister's Orders, pursuant to any of the following Legislation, is outlined in the Ministry's *Financial Administration Manual* and the *Non-Financial Signing Authority Delegation Document*.

304 ADVANCE SIGNING AND WORK ZONE COMPONENTS

Traffic controls and the work activity must be coordinated to provide safe and expeditious movement of traffic along with efficient work progress. Traffic controls in work zones warn road users of potential hazards, separate road users from the work force and delineate a path for traffic to follow. Work zone traffic control devices are usually not used singularly but are deployed as a system of devices. The correct deployment of the devices is an important element in achieving safe performance of highway work.

This section outlines the general principles for preparation of traffic accommodation plans which describe how the system of devices is employed. Examples of typical plans for common situations are included in this Manual beginning in Section A.1.

304.1 ADVANCE SIGNING ZONE

The advance signing is placed in the section of roadway two to three kilometres prior to the work zone in both directions. The advance signing can be divided into two sections which are described below and illustrated in Figure 300-1.

Project Information Area

The project information area is used to provide the road user with specific details of the project. This area is two to three kilometres from the project limit and may include signs that define what type of construction is occurring, the cost of the project and total length of the project these signs would be installed by the Ministry.

Speed Transition Area

The speed transition area is used to inform road users that they need to start reducing their speeds. The transition area allows road users to slow down to a safe speed.

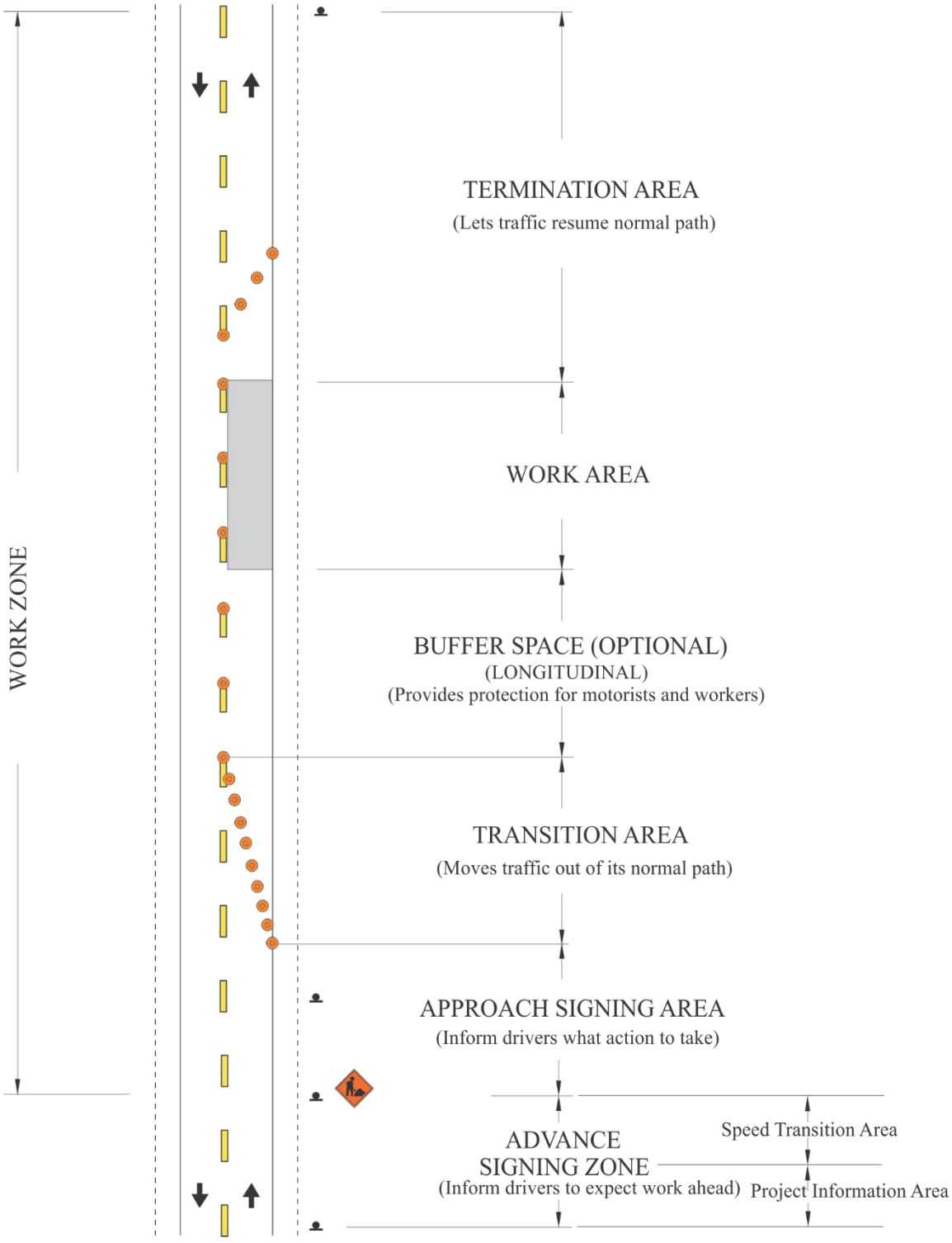


FIGURE 300-1: AREAS IN THE WORK ZONE

304.2 WORK ZONE

A work zone is an area of a roadway or shoulder where highway construction, maintenance, or utility-work activities are taking place.

A work zone is typically marked by signs, channeling devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign (WD-A41) or flashing lights on a vehicle to where traffic is no longer being affected.

A work zone may be for short or long durations and may include stationary or moving activities. These include:

- Long-term stationary highway construction such as building a new bridge, adding travel lanes to the roadway, and extending an existing roadway.
- Mobile highway maintenance such as striping the roadway, median, and roadside grass mowing/landscaping, and pothole repair.
- Short-term stationary utility work such as repairing electric, gas, or water lines within the roadway.

Most work zones can be divided into five areas: Advance Warning Area, Transition Area, Buffer Space, Work Area, and Termination Area.

Advance Signing Area

The advance warning area is used to inform road users to expect roadwork ahead. Road users require sufficient time and distance to adjust to the altered situation before reaching it. The warning area traffic control devices may vary from a single sign or flashing lights to a series of signs in advance of the work area.

Transition Area

When work is being performed on one or more of the lanes, lane closure is required. In the transition area, traffic is channeled from the normal alignment to the path required to move traffic past the work area. It is imperative that no work material, vehicles or equipment be stored or parked in the transition area.

The transition area should be delineated by channelizing devices, unless otherwise indicated in the typical layout. The length and condition of the taper for the specific situation is extremely important and depends on operating speed. An inadequate taper will likely produce undesirable traffic movements and increase the possibility of collisions.

The transition area must be obvious to road users. The intended path must be clearly delineated so that road users will not mistakenly follow the wrong path. For long duration operations, there may be a requirement to remove existing pavement markings and possibly to enhance the transition area with temporary pavement markings to identify a clear route where there could be confusion regarding the proper path.

With moving operations, the transition area moves with the work area. A vehicle with a flashing arrow sign may be used to warn and guide traffic into the proper lane.

Buffer Space

The buffer space is the open and unoccupied area between the transition and work areas. This space provides a margin of safety for both road users and workers. It must be free of equipment, workers, materials, and parked vehicles.

Work Area

The work area is that portion of the roadway where the work is being undertaken. Work areas may be in a fixed location or may move as work progresses. The work area is set aside for workers, equipment and material storage.

Channelizing devices may delineate the work area. As an additional safety feature, barriers may shield the work area in a confined location. Every practical effort must be made to minimize hazards to road users and workers.

Termination Area

The termination area provides the necessary distance for the traffic to clear the work area and return to the normal traffic lanes. A downstream taper at the end of the work zone shows road users that they can move back into the lane that was closed. The taper is placed in the termination area to smooth the traffic flow.

304.3 REMOVING/COVERING SIGNS OR DEVICES

The WD-A41 (Workers Present) sign must be removed or covered when workers are no longer present in the work zone. If devices or hazards are present beyond the WD-A41 sign, there must still be a warning to road users that there is a work zone ahead.

The CS-46C (Maximum 60 Fines Triple) sign and automated speed enforcement signs must be removed or covered when workers are no longer present. In situations where a hazard remains on the road surface when the workers or equipment are no longer present, the 60 km/h sign should remain; however, the “Fines Triple” portion of the sign must be covered.

All traffic control devices must be removed or covered immediately after they are no longer applicable.

305 DURATION OF WORK

In the Typical Plans, the duration of work has been divided into four categories: moving, brief, short and long. The following section expands upon the duration definitions provided in Section 105.

Moving Work – Fast Moving Work

Crews often carry out certain fast-moving operations greater than 20 km/h which require random, brief stops. This does not include slow moving mobile operations. The work vehicle stops on an intermittent basis to carry out these activities. Examples of fast-moving work activities are the Friday field inspection of all highways performed by maintenance crews in their respective sections.

Moving Work – Slow Moving Equipment

Road work performed using a vehicle moving up to 20 km/h for slow moving operations. The work area is affected for a short duration of time and is then returned to its original state. An example of a moving operation is paving.

Brief Duration Work

Brief duration work is a one time stop of 15 minutes or less. All brief duration work must be carried out in conjunction with a vehicle equipped with a rotating/flashing amber light or flashing light board. The work vehicle equipped with a flashing light board operating in the flashing bar mode, or a rotating/flashing amber light is a replacement for normal signing due to the work location changing on a continual basis.

If the work can be done within 15 minutes, an assessment of the work must be done. This would include assessing driving conditions, visibility, traffic volumes, the highway terrain i.e.: no hills or curves. If a road user can see the workers far enough ahead to be aware of their presence, then an activity of less than 15 minutes may be done with adequate safety during breaks in the traffic.

If the work is over the crest of a hill, or on a curve, bad weather/visibility, high volume traffic, etc., then signs are necessary. If the traffic needs to be directed around the work i.e.: slow down or stop, change lanes etc., then signs are necessary. Signs communicate the actions road users need to take.

Two or more planned stops of 15 minutes or less within a 3 km section require short duration traffic accommodation as a minimum.

Short Duration Work

Short duration work includes any daytime maintenance activity, construction project, utility work, preliminary survey work, pavement marking, or other miscellaneous highway activity planned for one day or less. Short duration work may also be applicable to emergency situations at night.

When road work spans several days and normal traffic is restored at the end of each day, short duration work signing is installed each day.

Short Duration Work – Stationary Operations

Any operation on the roadway where the surface is affected for several hours and the work is completed on a section basis rather than a continuous basis. Examples of this type of operation would be base surfacing where windrows are present on the road surface or the laying of the material is occurring.

Long Duration Work

Long duration work includes all construction, maintenance and utility activities which require a work area for a period of time greater than one day.

306 WORK ZONE LENGTHS AND LIMITS

The Ministry has not set out predetermined work zone length limits; however, in the absence of set limits, it is important to apply judgment in longer work zones to ensure that road users do not experience excessive delays that may lead to compliance or inappropriate road user behaviour. When work zones exceed 3 to 5 km in length, monitoring of traffic movement, queuing and delay becomes more critical and limitations may need to be applied on a case-by-case basis considering the volume and composition of traffic.

The actual length of lane closures should be restricted to the minimum necessary to accomplish the work efficiently and safely. Long lane closures without work activity present may compromise safety by encouraging deliberate encroachment by impatient road users. In addition, long closures are counter to good public relations and add to traffic delays and congestion. However, a single long closure is preferred over several short closures located close to each other. The objective is to keep the closure (1) as short as possible, (2) commensurate with a reasonably efficient construction operation, and (3) consistent in traffic pattern through the project. (NCHRP, 2002)

Consideration of work zone and work area length and its effect on traffic should occur at the planning stage. Decisions to limit lengths should be based on the nature of the project and the characteristics of the highway and the surrounding road network. Work zones separated by less than 1 km should be managed as a continuous work zone from the road user's perspective. Once established, work zones should be monitored with respect to vehicle queuing and delay and the length of the work zone adjusted in the event of excessive delay. Active work zones greater than 3 km in length and work zones with two-way traffic operation in a single lane should have additional attention paid to vehicle queuing and delay.

For work zones greater than 3 km in length, signs shall be repeated as noted on Typical Plan L.4.

307 TEMPORARY HIGHWAY CLOSURE

Closure of a highway may become necessary due to a sudden hazardous or abnormal condition. Conditions which could result in a temporary highway closure include, but are not limited to, the following:

1. Limited Visibility: Closure due to limited visibility as a result of weather conditions such as winter blizzards, dust storms or fog. Smoke from forest fires or other burning may also cause limited visibility, necessitating temporary closure of the highway.
2. Obstructions: Closure due to obstructions when any lane of the roadway are blocked because of a traffic collision, snowdrifts, bridge or culvert washout.
3. Surface Conditions: Closure due to surface conditions made in the extreme case where safety of the road user would be endangered. Hazardous surface conditions may be extremely slippery surface conditions caused by ice, excessive asphalt or by a dangerous goods spill.
4. Combinations of the above.

A typical Traffic Accommodation Plan for temporary highway closure is shown in Typical Plan I.1. A temporary highway closure may require a detour or an alternate highway route around the affected area. Refer to Typical Plans Section I for more information.

308 TRAFFIC MANAGEMENT PLANS

If required by the Ministry, a Traffic Management Plan (TMP), in detail appropriate to the complexity of work must be prepared by the contractor and completed prior to occupying the construction site.

308.1 BACKGROUND

A TMP is a set of coordinated traffic management strategies that describes how a contractor will manage work zone impacts of a highway construction project. Traffic management strategies are comprised of an operational plan, communication plan and incident management strategies. The need for a TMP is determined in the design phase of construction. Typically, they are produced whenever there is increased exposure to road users and workers as a result of a larger percentage of truck traffic, where traffic delays are significant, there are environmental impacts etc.

Guidance on the information required in the TMP must be provided in the Special Provisions section of the contract.

308.2 OPERATIONAL PLAN

An operational plan includes strategies used to mitigate work zone impacts using improved traffic operations and management techniques. An operational plan may include travel demand management strategies, ITS strategies, signals, safety strategies, enforcement strategies, etc.

308.3 COMMUNICATION PLAN

A communication plan provides processes to inform the travelling public, stakeholders and MHI of traffic operations and planned and unplanned changes to traffic operations. A communication plan is intended to be adjusted as required throughout the project as issues arise. A communication plan must:

- Define a process to routinely notify MHI of scheduled work;
- Define a process to notify the travelling public of scheduled or unscheduled traffic delays;
- Ensure the local Rural Municipality, local businesses and affected residents are made aware of the schedule including expected road closures, extended delays and detour routes in advance of the commencement of work.

308.4 INCIDENT MANAGEMENT PLANS

Incident management plans identify the processes and procedures for detecting and responding to unplanned events or incidents. The intent is to ensure the safety of road users and workers while minimizing the effects on traffic flow and construction works. An incident response plan must:

- Identify the type of traffic incidents that could occur in the work zone
- Identify the Traffic Accommodation Supervisor
- Contain a contact list of emergency response agencies
- Identify procedures to respond to a traffic incident that occurs within a work zone including:

  - Emergency detour routes
  - Procedure to allow emergency vehicles access to site
- Identify a procedure to inform MHI of the following:
  - Incident occurrence
  - Response measures taken
  - Clearance measures taken
- Identify the procedure to restore traffic flow around an incident site as quickly as possible.

309 TRAFFIC ACCOMMODATION PLANS

A Traffic Accommodation Plan, in detail appropriate to the complexity of the work, must be available and put into operation before the site is occupied. Typical Traffic Accommodation Plans are to be adopted to adequately address issues specific to individual projects. All Traffic Accommodation Plans must be kept on site and available upon request.

309.1 RANGE AND DETAIL OF TRAFFIC ACCOMMODATION PLANS

Traffic Accommodation Plans may range in scope from a reference to a Typical Plan in this Manual to a very detailed Traffic Accommodation Plan designed solely for a specific project. The needed detail in the plan depends on the complexity of the work and on the potential conflicts between traffic and the work.

The Traffic Accommodation Plan includes, but is not limited to, such items as signing, application and removal of pavement markings, placement of devices for delineation, channelization and detours.

309.2 TYPICAL TRAFFIC ACCOMMODATION PLANS

Each project needs to be assessed to determine the adequacy of the typical Traffic Accommodation Plan in achieving worker safety and the required level of traffic control. The Manual contains Typical Plans which portray typical applications of traffic control devices for a variety of work zone activities and situations. For a normal and repetitive situation, for which the Typical Plan adequately fulfils the need, no separate plan needs to be developed.

309.3 TRAFFIC ACCOMMODATION PLANS FOR SPECIFIC PROJECTS

A detailed Traffic Accommodation Plan must be prepared for projects where the typical Traffic Accommodation Plan is determined to be inadequate to achieve the required level of traffic control and worker safety.

An example of a situation where a detailed Traffic Accommodation Plan may be required is where several workers are confined to a restricted work area such as a bridge deck repair project. Another example of where a detailed plan may be required is on projects with high traffic volumes in close proximity to a larger city.

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401 TEMPORARY REGULATORY SPEED SETTING

Special care must be taken when designing sign placement so that vehicle speed is safely reduced from normal highway speed to the restricted speed levels required in work zones. Speed control misuse at a work zone can damage the credibility of work zone speed reduction efforts. Misuse practices include such things as unreasonably low speed limits and leaving reduced speed limits in place after the work activity has been completed.

Temporary regulatory speed zones must be implemented in all work zones. Authority to set temporary speed limits in a work zone is delegated to the Traffic Accommodation Supervisor (TAS). Speed zones are to be removed when the work area is inactive, except where a detour or lane drop may require a speed reduction. Temporary regulatory speed zones can be supplemented by automated speed enforcement (Section 402) and can, or may be required to, be supplemented by radar speed feedback signs (Section 403) and portable rumble strips (Section 404).

401.1 STATUTORY PROVISIONS

Statutory provisions and authorities for establishing maximum speed limits on provincial highways or any portion thereof are referenced in Section 303

401.2 AUTHORITY

Delegated authority of work zone speed control can be found in the Ministry's *Non-Financial Signing Authority Delegation Document*. Table 400-4-1 shows the minimum level of authority that an approver has based on a specific activity:

TABLE 400-4-1: NON-FINANCIAL SIGNING AUTHORITY DELEGATION FOR WORK AREA SPEED CONTROL

ACTIVITY	DELEGATED AUTHORITY TO IMPLEMENT
Work Zone Speed Control – Temporary 60km/h Regulatory Signs (RB-1)	
Construction & Design Activities without an on-site Contractor	
MHI	Traffic Accommodation Supervisor
Consultant	Traffic Accommodation Supervisor
Activities with a Contractor on-site	
Where a Minor Contract form was used (Plan prepared by MHI)	Signatory
All other Contracts	Traffic Accommodation Supervisor
Ministry Staff	Traffic Accommodation Supervisor
Permits (Plan prepared by MHI)	Permittee

Position delegated to implement must hold a current certificate as a TAS except where the sign plan is prepared by MHI.

401.3 ENFORCEMENT

The Temporary Regulatory Speed Limit Sign-off sheets must be used when installing a temporary regulatory speed sign to ensure that it is properly enforced. The sign must be removed if a temporary speed sign is installed without proper documentation or by a non-approved authority.

401.4 DOCUMENTATION

All documentation of the Work Area Speed Control – Temporary Regulatory Speed Signs Approval Sheet must be submitted to the project manager upon request and at the end of the project copies of these documents must be submitted in the final report.

401.5 MAXIMUM SPEEDS IN WORK ZONES

Each project needs to be assessed to determine if a speed restriction other than the maximums stipulated in current statutory provisions is required.

Some of the factors to be considered in determining appropriate maximum speeds include traffic volumes, the normal highway speeds in the vicinity of the work zone, the distance affected by the work zone, the time required to complete the work, the nature and complexity of the work and the highway alignment in the work zone.

Transitional Speed Areas

Transitional speed areas are used to reduce travelers' speed gradually and prepare them to make proper decisions when approaching the work zone. Transitional speed areas must be used on construction or maintenance projects after an assessment of the road and traffic composition has been completed.

401.6 PROCEDURE

The CS-46C sign must be removed or covered if workers or equipment are not present. In situations where a hazard remains on the road surface when workers or equipment are not present the 60 km/h sign can remain. The 'FINES TRIPLE' portion of the sign must be covered. Existing permanent regulatory speed signs that are in the Work zone must be covered so that the temporary regulatory Speed sign does not conflict with it.

A higher temporary work zone speed limit must not be installed where a lower permanent speed limit exists:

> Example: Do not install a temporary 60 km/h speed sign where a permanent speed limit of 40 km/h already exists.

CS-46C may be produced in speed increments of 10 km/h: 60 km/h, 50 km/h, 40 km/h, 30 km/h, etc. Refer to Table 400-4-2 for guidance in identifying appropriate temporary speed limits for different work zone circumstances.

TABLE 400-4-2: SPEED LIMIT MANAGEMENT GUIDANCE FOR WORK ZONES

SPEED LIMIT (KM/H)					
<60	60	80	100	110	DESCRIPTION
X					• When hazards are present that require vehicles to travel slower than the recommended work zone speed limit of 60 km/h. • The speed limit selected must be based on professional judgment. • Proper approval must be given by the project manager before the speed limit is implemented.
	X				• Regular Work Zones with a reduced speed regulatory sign. • When passing equipment that has its Ministry issued warning lights in operation, whether it is in motion or not. • When passing a highway worker or flagger. • The presence of workers/equipment is within 10 m of the edge of shoulder. • In a work zone where there is less than 3.0 km between work areas and conditions do not allow for an increased speed. • When passing a highway vehicle with emergency flashing lights on a two-lane highway.
		X			• When the reduction in speed results in a difference of 20 km/h or greater from the preceding zone or when professional judgment is deemed necessary. • Transition speed when approaching work zones on 2/4 lane 'high exposure' construction projects on the National Highway System. • When travelling between work areas within a work zone and there is greater than 3.0 km between the work areas and conditions are allowable for an increased speed.
			X		• All work is outside10 m of the shoulder of the roadway for a two-lane highway that is posted at 100 km/h. • When travelling between work areas on a two-lane highway within a work zone and there is greater than 3.0 km between the work areas and conditions are allowable for an increased speed. • Regular two-lane highway conditions are present with no adverse geometric or road conditions identified.
				X	• All work is 10 m off the shoulder of pavement for a multi-lane highway. • When travelling between work areas on a multi-lane highway within a work zone and there is greater than 3.0 km between the work areas and conditions are allowable for an increased speed. • Regular multi-lane highway conditions are present with no adverse geometric or road conditions identified.

Work Area Speed Control – Temporary Regulatory Speed Limit Sign-off Sheet

PROCEDURE: SHALL BE FILLED OUT WHEN CS-46C IS USED INCONJUNCTION WITH IS-82 'PHOTO ENFORCED' SIGN. REFER TO TCDMWZ 906.

CONTRACT NO: _____ **DATE:** _____ (MM/DD/YYYY)

TIME OF INSTALLATION	TIME OF SIGN REMOVAL	LOCATION*	INSTALLED SIGN CODE AND SPEED**	DIRECTION OF TRAVEL	SIGN-OFF INITIALS
☐ A.M. ☐ P.M.	☐ A.M. ☐ P.M.	☐ i) ☐ ii)	☐ RB-1 & _____ KM/H ☐ CS-46C	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	
☐ A.M. ☐ P.M.	☐ A.M. ☐ P.M.	☐ i) ☐ ii)	☐ RB-1 & _____ KM/H ☐ CS-46C	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	
☐ A.M. ☐ P.M.	☐ A.M. ☐ P.M.	☐ i) ☐ ii)	☐ RB-1 & _____ KM/H ☐ CS-46C	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	
☐ A.M. ☐ P.M.	☐ A.M. ☐ P.M.	☐ i) ☐ ii)	☐ RB-1 & _____ KM/H ☐ CS-46C	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	
☐ A.M. ☐ P.M.	☐ A.M. ☐ P.M.	☐ i) ☐ ii)	☐ RB-1 & _____ KM/H ☐ CS-46C	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	

ADDITIONAL COMMENTS: _____

_____

SIGNED BY (CHECK SIGNING AUTHORITY): _____

*LOCATION SHALL BE RECORDED IN ONE OF TWO WAYS:

i) BY LATITUDE AND LONGITUDE GPS COORDINATES OR
ii) BY CONTROL SECTION AND STATION/KM

**RB-1 (SPEEDS MAY VARY) - 

**CS-46C - 

Work Area Speed Control – Temporary Regulatory Speed Limit Sign-off Sheet

PROCEDURE: SHALL BE USED WHEN RB-1 (SPEEDS MAY VARY) IS POSTED WHEN WORKERS ARE NOT PRESENT AND A HAZARD EXISTS ON THE ROADWAY.

CONTRACT NO: _____ **DATE:** _____ **(MM/DD/YYYY)**

TIME OF INSTALLATION	TIME OF SIGN REMOVAL	LOCATION*	INSTALLED SIGN CODE AND SPEED**	DIRECTION OF TRAVEL	SIGN-OFF INITIALS
_____ ☐ A.M. ☐ P.M.	_____ ☐ A.M. ☐ P.M.	☐ i) ☐ ii) _____ _____	RB-1 & _____ KM/H	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	
_____ ☐ A.M. ☐ P.M.	_____ ☐ A.M. ☐ P.M.	☐ i) ☐ ii) _____ _____	RB-1 & _____ KM/H	☐ NORTH ☐ SOUTH ☐ EAST ☐ WEST	

ADDITIONAL COMMENTS: _____

_____

_____

SIGNED BY (CHECK SIGNING AUTHORITY): _____

*LOCATION SHALL BE RECORDED IN ONE OF TWO WAYS:

i) BY LATITUDE AND LONGITUDE GPS COORDINATES OR
ii) BY CONTROL SECTION AND STATION/KM

**RB-1 (SPEEDS MAY VARY) -



402 AUTOMATED SPEED ENFORCEMENT

Automated speed enforcement is intended to increase compliance in areas where road users are violating the speed limit.

402.1 PLACEMENT OF AUTOMATED SPEED ENFORCEMENT

Automated speed enforcement should be located as close as practical to the work area. The Traffic Accommodation Supervisor should communicate with the automated speed enforcement officer to agree on a safe and visible location for the speed detection equipment to be placed.

Automated Speed Enforcement signs (ID-33 and ID-33T) must be used on all projects where automated speed enforcement is being used and on construction and maintenance projects, lasting five days or longer. ID-333T must be installed on all divided highway construction and maintenance projects lasting five days or longer where automated speed enforcement is being used to identify the end of the photo enforcement.

The contractor may wish to consider the application of the signs on other project locations to supplement their traffic accommodation plan. Automated Speed Enforcement signs (ID-33 ID-33T, and ID-333T) must be covered or removed when no workers are present.

The assembly must be positioned as shown in K.1, K.2, and K.3.

402.2 REQUESTING AUTOMATED SPEED ENFORCEMENT

For automated speed enforcement, contact the Southern Region Office Coordinator.

For periodic or one-time traditional law enforcement in the work zones, contact:

- The Royal Canadian Mounted Police (RCMP) detachment in the work zone area, or
- The Regional Enforcement Manager to arrange for Traffic Compliance Officers, to administer speed enforcement.

403 RADAR SPEED FEEDBACK SIGNS

Radar speed feedback signs are signs that relay vehicle speeds back to the road user. The most common type of device is one that utilizes radar or other device to detect speeds then relays that information back to road users via a changeable message display.

Although there are a wide variety of radar speed feedback signs, they typically consist of a radar assembly with an electronic board which displays the road users' speed. Alternatively, the signs may be accompanied with warning devices such as flashing lights to alert road users that they are travelling in excess of the posted speed limit.

Radar speed feedback signs are practical for all work zone situations. Radar speed feedback signs must be used on all construction and maintenance projects that are on High Priority Traffic Accommodation Corridors (HPTAC) which last five days or longer, or as specified in the contract. The contractor may wish to consider radar feedback signs on other projects to supplement their traffic accommodation plan.

Operational Characteristics

Radar speed feedback signs must meet the following criteria to be considered acceptable for use on construction projects:

- Must show a blank display, be removed or be turned away from the direction of traffic when workers are not present.
- The static background portion of the sign must meet Ministry standards for retroreflectivity and colour.
- Must be programmable to not display speeds that are in excess of 20 km/h above posted speeds to discourage "racing".
- Must capture and display vehicle speeds in km/h.
- Trailer mounted, and pole mounted devices are acceptable however signs must adhere to MHI specifications for lateral and vertical position (Section 504).
- Character height must be at a minimum of 375 mm.
- The installation of radar speed feedback signs must not interfere with visibility or general effectiveness of any other signs or devices.

Location

Installation must be the next sign after the regulatory speed sign with tab "FINES TRIPLE".

404 PORTABLE RUMBLE STRIPS

Portable rumble strips are made of durable material placed perpendicular to the path of travel and across the full width of the travelled lane. They are used to alert inattentive road users of hazards that may not be readily apparent, but which require substantial speed reduction or other cautionary maneuvers. Portable rumble strips have the same effect as the rumble strips made with pavement, with the benefit of being less expensive and easier to place and relocate.

Rumble strips are practical for short duration stationary and slow-moving work zones and for long duration projects lasting five days or longer. Rumble strips must be used on all construction and maintenance projects, lasting five days or longer, on High Priority Traffic Accommodation Corridors or as specified in the contract. The contractors may wish to consider the application of the device on other project locations to supplement their traffic accommodation plan (e.g. – near and in advance of the hazard and/or flagger). If the work zone is moving quickly, the installation and removal of the rumble strips may become impractical.

404.1 DIMENSIONS OF RUMBLE STRIPS

Rumble strips are devices approximately 325 mm wide x 18 mm high extending across the travelled lane of the highway.

404.2 SPECIFICATIONS

Rumble strips must:

- Generate enough audible noise when traversed by the wheels of a vehicle so as to alert the road user.
- Generate a distinct vibration when traversed.
- Be designed so as not to compromise the safety of the roadway for traffic.
- Be selectively located with respect to the potential hazard to maximize their effectiveness (e.g. – near and in advance of the hazard and/or flagger).
- The device's length should be adjustable in order to span the entire width of the travelled lane.
- Be well suited for quick and efficient deployment and removal and can be lifted by a maximum of two people to provide maximum mobility.
- The materials used should be sufficiently strong to prevent unexpected failure, as well as sufficiently durable to withstand the wear caused by traffic.

It is encouraged, but not mandatory, that hinged rumble strips be used instead of modular installations.

404.3 PLACEMENT OF RUMBLE STRIPS

A minimum of two sets of two rumble strips should be placed 15 m apart, a minimum of 100 metres prior to the regulatory speed sign. The spacing between individual strips in each set is 3 metres. Refer to the Typical Plans K.4 and K.5 for an illustration. Additional sets of rumble strips may be used as required.

The rumble strips must be removed when no workers are present unless there are hazards that remain that merit alerting road users.

404.4 EXEMPTION

Rumble strip installations may be exempt if in the opinion of the engineer:

- the rumble strips create a hazard due to weather conditions (i.e.: snow, ice, etc.),
- surface condition of the roadway makes the use of rumble stripes redundant (ie. rough road, gravel surface or grading projects) or
- the rumble strips are in an area where the rumble strips create an unreasonable noise annoyance for local residents.

chapter

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501 CLASSIFICATION OF SIGNS

501.1 CLASSIFICATIONS

Work zone signs fall into three major classifications:

1. Temporary Warning Signs
2. Regulatory Signs
3. Information and Guide Signs

501.2 TEMPORARY WARNING SIGNS

Function

Temporary warning signs for work zone projects are the most important signs used to notify road users of specific hazards which may be encountered when those operations are underway.

Design

Warning signs for work zones are generally diamond shaped and have an orange reflective background with a black symbol and/or legend message and black sign border.

Dimensions

The minimum dimensions of temporary warning signs are 90 cm x 90 cm. Larger signs may be considered for long term or complex work zones. When the sign interferes with the operation of the vehicle, other sizes may be considered when used in conjunction with other devices.

501.3 REGULATORY SIGNS

Function

Regulatory signs impose legal obligations and/or restrictions on all traffic. While provisional control of traffic will generally be accomplished through warning signs, there are temporary conditions of traffic situations in work zones where the use of regulatory signs becomes necessary.

Design

Regulatory signs, with some exceptions, such as the Stop sign, Yield sign and Do Not Enter sign are rectangular and fully reflective.

Dimensions

Regulatory signs must be of the same minimum dimensions as described in Section 502.

501.4 INFORMATION AND GUIDE SIGNS

Function

Reference to information signs in this document is limited to their application for guiding traffic through portions of roadway where work zone activities may otherwise create confusion, as determined by professional judgement.

Design

Information and guide signs with few exceptions have a rectangular shape with the longer dimension being horizontal. They show a white legend on a green background.

Dimensions

The size and dimensions of information signs must be as described in Section 502.

502 SIGN DESCRIPTION

This section provides a description and use for the signs most commonly used in roadway work operations.

Work zone signs fall into the same major categories, as do other traffic signs: regulatory, warning and guide/information. Many traffic signs normally used elsewhere will also find application for signing in work zones. Temporary warning signs in work zones have a black legend and an orange background colour. Other signs follow the normal standards.

The use of standard flags or flashing amber lights in conjunction with signs is permitted provided these devices do not interfere with the road user's view of the sign face.

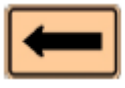
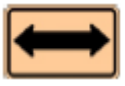
TABLE 500-5-1: REGULATORY SIGN DESCRIPTIONS

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
RA-1		75x75	White	Red	Stop Indicates to stop completely and not to proceed until it is safe to do so.	245S
RA-2		75x75x75	Red	White	Yield Indicates to yield the right of way, stopping if necessary before entering the intersection area, and not proceed until it is safe to do so.	245S
RB-1		60x75	Black	White	Maximum Speed Indicates the maximum legal vehicle speed which is permitted on the roadway section indicated by the presence of the signs. The maximum speed in kilometers per hour, as established by law, and shown in multiples of 10 km/h.	245s
RB-5		60x75	Black	White	Maximum Speed Ahead Indicates that road users are approaching a section of roadway upon which the statutory speed limit is reduced. Is always followed by the Maximum Speed sign (RB-1) at a distance of not less than 90 nor more than 150 m.	245S
RB-11R/L		60x60	Black	White	No Right Turn (Left) Indicates that a right (or left) turn is not permitted.	240
RB-16		60x60	Black	White	No U Turns Indicates that a u-turn is not permitted.	240

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
RB-23		75x75	Red	White	Do Not Enter Indicates that entry is prohibited.	245S
RB-24		60x75	Black	White	Two-Way Traffic Indicates that road users are traveling on a two-way road, and that the normal rules of the road for two-way operation apply. Placed on each side of the roadway at the beginning of the section where two-way traffic is permitted.	245S
RB-25		60x75	Black	White	Keep Right Indicates to road users that they are required to pass to the right of an obstruction. Installed in the gore point at the transition from two lane to four lane highway and face the road user travelling along the two lanes highway towards the four-lane highway.	245S
RB-31		75x75	Black	White	Do Not Pass Indicates to road users that passing manoeuvres are restricted due to hazards such as lane closures or windrowed material.	245S
RB-32		75x75	Black	White	Passing Permitted Indicates to road users that passing is permitted. May be installed at the end of a no passing zone where a Do Not Pass sign has been installed at the beginning.	240
RB-61		75x75	Black	White	Truck Route Indicates that trucks, as prescribed by legislation, are permitted to travel on a road through a work zone.	245S
RB-62		75x75	Black	White	Truck Prohibition Indicates that trucks, as prescribed by legislation, are prohibited from travelling on a road through a work zone.	245S
RB-63		60x60	Black	White	Weight Limit Control Indicates that the gross vehicle weight of vehicles using the facility must not exceed the value indicated in tonnes.	245S
RS-151		60x60	Black	White	Rural Parking Control Indicates that parking is prohibited in the area identified by the sign.	240
RS-155		60x60	Black	White	Rural Stopping Control Indicates that stopping is prohibited in the area identified by the sign.	240

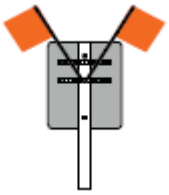
CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
RC-4R/L		60x75	Black	White	Stop Line Right (Left) Indicates the point at which road users approaching a traffic control device must stop.	240
RS-25		240x120	Black	White	Highway Closed Ahead Indicates that the road is closed ahead due to a hazardous condition.	245S
RS-26		120x75	Black	White	Road Closed Installed on a barricade where a road is closed entirely to public traffic.	245S
RS-28		240x120	Black	White	Highway __ Closed __ km Ahead Should be installed to advise road users that a specific numbered highway is closed to traffic beyond a certain point. The route numbers and kilometres can be ordered separately in the form of E Series decals so that the signs can be used at various locations.	

TABLE 500-5-2: WORK ZONE SIGN DESCRIPTIONS

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
ID-B5L/R		45x30	Black	Orange	Detour Arrow – 90 Degrees Left (Right) Installed in conjunction with a Route Marker to form an assembly to give advance information on a turn or change in direction on a route.	240
ID-B7		45x30	Black	Orange	Detour Arrow – Vertical Installed in conjunction with a Route Marker to form an assembly to indicate a turn or change in direction to the road user on a route.	240
ID-B8		45x30	Black	Orange	Detour Arrow – Horizontal See ID – B7	240
ID-B9R/L		45x30	Black	Orange	Detour Arrow – 45 Degrees Right (Left) See ID – B7	240
GSD-1		45x30	Black	Orange	Detour Arrow – Doubleheaded	240

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
					Installed in conjunction with a Route Marker to form an assembly to indicate a choice of turn or change in direction to the road user on a route.	
GSD-2R/L		45x30	Black	Orange	Detour Arrow – Doubleheaded Right Angle (Left) Installed in conjunction with a Route Marker to form an assembly to indicate a choice of turn or change in direction to the road user on a route.	240
WD-A1R/L		90x90	Black	Orange	Right (Left) Turn (90 Degrees) Warns road users of a sharp 90 degree turn ahead that requires a reduced speed.	240
WD-A2R/L		90x90	Black	Orange	Right (Left) Curve (90 Degrees) Warns road users of a 90 degree turn ahead that requires a reduced speed.	240
WD-A3L		90x90	Black	Orange	Left (Right) Curve Warns road users of a curve in the road that has a safe speed that is less than the speed limit.	240
WD-A4R/L		90x90	Black	Orange	Right (Left) Reverse Turn Warns road users that there are two turns in opposite directions (consistent with a WD-A2 sign) which are separated by a tangent of less than 120 m.	240
WD-A5R/L		90x90	Black	Orange	Right (Left) Reverse Curve Warns road users that there are two turns in opposite directions (consistent with a WD-A3 sign) which are separated by a tangent of less than 120 m.	240
WD-A6R/L		90x90	Black	Orange	Right (Left) Winding Road Warns road users that there is a series of five or more turns or curves separated by tangent distances of less than 120 m.	240
WD-A7		60x60	Black	Orange	Advisory Speed Tab Advises road users of the speed to travel to negotiate the hazard indicated by the warning sign above. Must be installed in conjunction with standard warning signs.	240

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
WD-A8		90x90 120x120	Black	Orange	Checkerboard (dead-end) Indicates the termination of a road.	240
WD-A8B		90x90 120x120	Black	Orange	Checkerboard (Doubleheaded Horizontal Arrow) Indicates the termination of a road at a T-intersection.	240
WD-A8L/R		90x90 120x120	Black	Orange	Checkerboard (turn left or right) Indicates an abrupt change in alignment at a turn or curve.	240
WD-A9		45x60 60x75	Black	Orange	Chevron Alignment Provides additional guidance for road users as to changes in the horizontal alignment due to highway diversions. Installed on the outside of a curve or sharp turn at right angles to oncoming traffic. Signs are spaced such that the road user always has two in view until the change in alignment eliminates the need for the signs. Installed at a height of 1.2 m above the near edge of the nearest traffic lane to the bottom of the sign.	240
WD-A14		90x90	Black	Orange	T Intersection Warns road users approaching a T-intersection that they are on the road that ends at the intersection.	240
WD-A18		90x90	Black	Orange	Railway Advance Warning Warns road users that there is an at-grade rail crossing ahead.	240
WD-A18R/L		90x90	Black	Orange	Railway Advance Warning (45 degrees Right/Left) Warns road users that there is a skewed at-grade rail crossing ahead.	240

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
WSD-A21		45x45	Bright Red or Fluorescent Orange		Sign Mounted Warning Flags Used to call attention to key signs. Sign mounted warning flags must be either soft type or rigid metal and must meet the following criteria to be considered acceptable for use on construction projects: • Must not block the sign face. • Must be either soft type or rigid metal style and must be bright red or fluorescent orange in colour. • Must not interfere with visibility or general effectiveness of any other signs or other devices. Sign mounted warning flags must be used on CS - 46C - "REGULATORY SPEED" signs with "FINES TRIPLE" for all construction and maintenance projects that are on High Priority Traffic Accommodation Corridors (HPTAC) which last five days or longer, or as specified in the contract.	273
WD-A22		90x90	Black	Orange	Bump Warns road users of a sharp change in the profile of the road that is sufficiently abrupt to create a hazardous condition, to cause considerable discomfort to vehicle occupants, to cause a shifting of cargo, or to deflect a vehicle from its true course when the bump is crossed at speeds 25% greater than normal driving speed for that section of the road.	240
WD-A23		90x90	Black	Orange	Road Narrows Warns road users of a reduction in the width of the roadway ahead but only in cases where no reduction occurs in the number of traffic lanes.	240
WD-A23L/R		90x90	Black	Orange	Road Narrows Left (Right) Warns road users of a reduction in the width of the roadway ahead (one side) but only in cases where no reduction occurs in the number of traffic lanes.	240
WD-A24		90x90	Black	Orange	Narrow Structure Warns road users in advance of a structure (bridge, culvert, subway, overpass and similar structures) having a clear roadway width of 5 to 6 m inclusive, or any structure with a roadway clearance less than the width of the approach pavement. Where the structure has a clear roadway width of less than 5 m thereby permitting only a single lane of	240

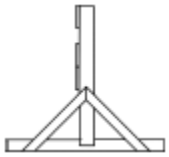
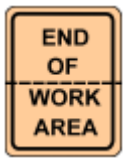
CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
					traffic, a One Lane tab sign is placed below the narrow structure sign.	
WD-A24T		75x45	Black	Orange	One Lane See WD-A24.	240
WD-A25		90x90	Black	Orange	Pavement Ends Warns that an asphalt or concrete roadway is about to end and that its continuation has a gravel surface.	240
WD-A28S		60x45	Black	Orange	Next ___ km Indicate how many kilometres a road user should expect work zone activity on the highway. The Numbers 0 to 9 sign tab (WD-A28T) should be used in conjunction with the Next ___ km sign to indicate the length of the temporary condition.	240
WD-A28T		10x15	Black	Orange	Numbers 0 to 9 for WD-A28S	240
WD-A31		90x90	Black	Orange	Divided Highway Begins Installed on the approaches to a section of a highway where the opposing flows of traffic are separated by a median to warn road users of the transition from a non- divided to divided highway cross-section ahead.	240
WD-A32		90x90	Black	Orange	Divided Highway Ends Installed on both sides of the roadway at the end of a section of divided highway as a warning of two-way traffic ahead. Indicates the transition from divided to non-divided highway cross-section ahead.	240
WD-A33R/L		90x90	Black	Orange	Right (Left) Lane Ends Warns road users on the approaches to work sites, that there is a temporary reduction in the number of traffic lanes either from the right or the left.	240

WD-A41		90x90 Black Orange	Workers Present Warns road users that construction or maintenance activities are in progress on or adjacent to the roadway and that workers or equipment may be on the road. Establishes the maximum speed of 60 km/h when passing highway workers or equipment engaged in roadwork per Section 203 (1) of The Traffic Safety Act. Refer to TCDM 303. The Workers Present sign must be removed or covered if workers or equipment are not present.	246S
WD-A41H		60x60 Black Orange	Roadwork-Hinged This sign is hinged so that it can be hinged closed when no work is ongoing.	240
WD-A43R/L		90x90 Black Orange	Roadside Diversion Right (Left) Indicate a minor deviation of the normal roadway which is 200 metres or less.	240
WD-A44		45x30 Black Orange 75x30	Detour Warns road users that they will be required to depart completely from their normal route to follow an alternate routing. Repeated in any subsequent series of guide signs along the detour as necessary to properly advise the road user of the temporary routing. When used with a route marker, the size is 45 x 30 cm. When used with a warning sign, the size is 75 x 30 cm.	240
WD-A45		90x90 Black Orange	Flagger Ahead Warns road users that they are approaching a work area where a flagger is on duty. The flagger sign must be removed or covered if the flagger is not present.	246S
WD-A46		90x90 Black Orange	Survey Crew Warns road users that surveying activities are in progress upon or adjacent to the highway and that workers or survey equipment may be exposed to the road user. The survey crew sign must be removed or covered if workers or equipment are not present.	246S
WD-A48 R/L		90x90 Black Orange	Truck Entrance Right (Left) Warns road users that they are approaching a location where trucks are entering or crossing the main roadway.	240

WD-A49		90x90	Black	Orange	Pavement Drop-Off Warns road users that they are on or approaching a section of roadway where either or both the adjacent lane or shoulder are lower or higher than the road users' travel lane. Sign is used when the difference in pavement elevation exceeds 60mm.	240
WD-A50		90x90	Black	Orange	Grooved Pavement Warns road users of a surface condition which may affect the control and stability of vehicles. The Next___ km sign tab (WD-A28S) is used in conjunction with the Grooved Pavement sign tab to indicate the length of this temporary condition.	240
WD-A50T		75x45	Black	Orange	Grooved Pavement Tab See WD-A50.	240
WD-B1		90x90	Black	Orange	Stop Ahead Warns road users of the presence of a stop sign ahead.	240
WD-B3		90x90	Black	Orange	Two-Way Traffic Ahead Warns road users driving on a one-way street or highway that they are approaching a section where two-way traffic is in operation and that the normal rules of the road for the two-way operation apply.	240
WD-B4		90x90	Black	Orange	Signals Ahead Warns road users of traffic control signals ahead and may generally be employed where the signals are not visible for a distance of 120 m, or in such other cases where the prevailing approach speed or conditions of visibility are such as to justify its use. A distance sign tab (WD-B4T) may be used to indicate the distance to the traffic signal rounded to the nearest 50 m.	240

WD-C5		90x90	Black	Orange	Slippery When Wet Warns road users that a slippery road surface condition exists when the pavement is wet. The use of this sign must be kept to a minimum and upon the correction of the slippery condition, the sign must be removed or covered. On rural highways, the sign is installed at not greater than 3 km intervals on long sections of slippery road surface.	240
WD-S9		90x90	Black	Orange	Watch For Rocks Installed to warn construction crews when earth excavation containing rocks is placed on the subgrade.	240
WD-S28		90x90	Black	Orange	Soft Shoulder Warns road user that the shoulder is soft and presents a hazard to vehicles that leave the pavement. Should be installed at regular intervals, about 300 m apart over short stretches and 900 m on long sections.	240
WD-S90		90x90	Black		Vinyl Sign Cover Used to cover signs that no longer apply.	
CS-1		90x90	Black	Orange	Begin Detour Warns road users that there is a detour ahead that directs traffic onto an alternate route in order to bypass the work zone.	240
CS-2		90x90	Black	Orange	Barricade Ahead Warns road users that there is a barricade ahead for a road closure.	240
CS-3		90x90	Black	Orange	End Detour 125 m Warns road users that they are approaching the end of a detour.	240
CS-5		90x90	Black	Orange	Be Prepared To Stop May be used to warn road users to be prepared to stop due to obstructions in the road.	240

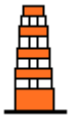
RA-2 /TC-17S		30x60	Red	White	Yield To Oncoming Traffic Indicates which direction of travel has the right of way where only one lane is available for two-way traffic. May be used if the location has adequate sight distance, low traffic volumes and low speeds.	
CS-7		90x90	Black	Orange	Fresh Oil Warns road users of uncovered road oil on the highway surface, which could splash onto vehicles. The Fresh Oil sign is removed once the surface can be travelled at posted speed without splashing occurring. The Next ___ km sign tab (WD-A28S) is used in conjunction with the Fresh Oil sign to indicate the length of this temporary condition.	240
CS-8		90x90	Black	Orange	Rough Road Warns road users of a rough section of road through a work zone. The Next ___ km sign tab (WD-A28S) is used in conjunction with the Rough Road sign to indicate the length of this temporary condition.	240
CS-9		90x90	Black	Orange	Loose Gravel Warns road users that there is loose gravel on the highway. The Next __ km sign tab (WD-A28S) is used in conjunction with the Loose Gravel sign to indicate the length of this temporary condition.	240
CS-10		120x60	Black	Orange	Detour Next ___ km Warns road users of the length of an upcoming detour. The Numbers 0 to 9 sign tab (WD-A28T) is used in conjunction with the Detour Next __ km sign to indicate the length of the detour.	240
CS-11L/R		120x75	Black	Orange	Road Closed Detour Left (Right) Indicates the direction of an alternate route for through traffic around a closed section of highway.	240
CS-12DR		360x24	Black	Orange (Front) White (Back)	Double Sided Barricade Board Right Forms part of a Gateway Assembly (see Typical Plan B.3). Stripes are placed at 45 degrees on the boards with an orange background on the front and white background on the back.	Type 4
CD-12DL		360x24	Black	Orange (Front) White	Double Sided Barricade Board Right See CS-12DR	Type 4

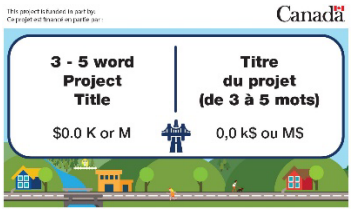
				(Back)		
CS-12R		240x24	Black	Orange	Barricade Board Right Used with the Barricade Stands to form a Standard Barricade. The stripes are placed at 45 degrees on the boards. Two boards can be placed together to form an arrow head to indicate direction.	156
CS-12L		240x24	Black	Orange	Barricade Board Left See CS-12R	156
CS-13			White		Barricade Stand (pair) Used in conjunction with the Barricade Boards to form a Standard Barricade.	
CS-14		90x90 120x120	Black	Orange	Construction Ends Installed at the end of a Long Duration work zone to indicate the road user end of the construction zone.	240
CS-16		60x75	Black	Orange	End Of Work Area Installed beyond the end of a work area where the work is being undertaken.	240
CS-16H		60x75	Black	Orange	End Of Work Area – Hinged This sign is hinged so that it can be hinged closed when no work is ongoing.	240
CS-17		90x90	Black	Orange	Overhead Lines Installed up to 10m in advance of the overhead line to give warning to truckers that their raised boxes might come in contact with overhead lines.	240
CS-18A & CS-18B		120x120 120x120	White White	Green Green	Alternate Route Map (message) Alternate Route Map (map) Installed when travel through the work zone cannot be ensured at the designated class of traffic accommodation.	210 210
CS-19		240x120	White	Green	Alternate Route Map 150m Ahead Installed as advance notification to road users in conjunction with an Alternate Route Map sign (CS-18)	220

CS-23		15x60 30x90	Black	Orange	Work Zone Delineator Used to delineate detours.	146
CS-26N		45x45			Hand Paddle with no Handle Used by flagger to indicate the appropriate instruction to road users approaching a work site.	335
CS-26S CS-26L		45x45 45x45			CS-26N Hand Paddle with 30cm handle CS-26N Hand Paddle with 150 cm handle	335 335
CS-27R		240x24	Black	Orange	Keep Right The top board used in conjunction with the Barricade Stand to form a Standard Barricade to signify keep right.	156
CS-27L		240x24	Black	Orange	Keep Left See CS-27R.	156
CS-28		90x90	Black	Orange	Loose Stones Installed on seal coat projects or other areas to warn road users that there are loose stones on the highway surface. The Next ___ km sign tab (WD-A28S) is used in conjunction with the Loose Stones sign to indicate the length of this temporary condition.	240
CS-29		90x90	Black	Orange	Blasting Area Ahead Warns road users that they are approaching an area where blasting activities are taking place.	240
CS-30		90x90	Black	Orange	Bridge Repair Ahead Warns road users that the bridge they are approaching is under repair.	240
CS-32		164x50	Black	Orange	Pilot Vehicle – Follow Me Mounted on a pilot vehicle when it leads road users through a work area.	246A
CS-33		90x90 120x120	Black	Orange	Construction Ahead Installed to provide advance warning of a Long Duration work zone.	246S

CS-34B		90x90	Black	Orange	Work Adjacent To Roadway Warns road users of work adjacent to the roadway, within 10 m of shoulder edge. The Next ___ km sign tab (WD-A28S) is used in conjunction with the Work Adjacent To Roadway sign to indicate the length of this temporary condition	246S
CS-36		90X90	Black	Orange	Blowing Dust Warns road users of blowing dust conditions in or adjacent to the work area. The Next ___ km sign tab (WD-A28S) is used in conjunction with the Blowing Dust sign to indicate the length of this temporary condition.	240
CS-38		245x30	White	Red	Wide Load “D” Placed on vehicles to indicate that they are excessively wide.	240
CS-40		360x120	White	Blue	Orange Zone Awareness (Requires WD-A41) Ministry installed sign to raise public awareness of work zones. Not installed within the work zone.	240
CS-40B		360x120	White	Blue	Snow Zone Awareness (Requires CS-40BT) Ministry installed sign to raise public awareness of work zones. Not installed within the work zone.	240
CS-40BT		90x90	Black	Yellow	Snow Zone Tab (Part of CS-40B)	240
CS-41		120x60	Black	Orange	Slow Down And Save Your Windshield Warns road users of danger to their windshield due to loose stones on the highway. Installation of this sign is optional.	240
CS-42		90x90	Black	Orange	Road Sweeper Ahead Warns road users of a road sweeping operation. May be installed as part of the sign assembly on a stripping unit.	240
CS-43		150x45	Black	Orange	Pass When Safe Used in conjunction with flashing light boards in moving pavement marking operations without a lane closure.	246A

CS-46C		60x120	Black	White	60 km/h Fines Triple Indicates the maximum legal speed in the work zone. Must be removed or covered when workers are no longer present. In situations where a hazard remains when the workers are no longer present, the 60 km/h sign remains; however, the “Fines Triple” portion of the sign must be covered.	245S
CS-47T		330x45	Black	Orange	Minimum Width ____ m The Numbers 0 to 9 sign tab (WD-A28T) should be used in conjunction with the Maximum Width ___ m sign to indicate the width of the temporary condition.	240
CS-48		240x120	Black		Flashing STOP Board Requires road users facing the sign to stop their vehicles completely and not to proceed until it is safe to do so. The Flashing STOP Board consists of a 120x 120 cm STOP sign mounted on a 120 x 240 cm sheet of plywood painted black. Alternating flashing lights on each side of the STOP sign.	
CS-49T		60x45 75x45	Black	Orange	Advisory Distance Installed with construction warning signs to indicate the distance, in kilometres or metres, over which the warning applies.	240
CS-50		150x45	Black	Orange	Wet Paint Installed as part of the sign assembly on a stripping unit.	230
CS-56		3.8 cm	Black		Numbers (equipment identification) Decal	580
CS-59		90x90	Black	Orange	Rumble Strips Ahead Provide advanced warning for portable rumble strips that remain stationary or do not move with the work zone.	246S
CS-60		240x150	Black	Orange	Road Work – Expect Delays If required in project contract, this sign is installed a minimum of 7 days prior to commencement at a location 2 to 3 km in advance of the work zone. Date format is MMM DD.	Type 4
CS-61		90x90	Black	Orange	Graveling in Progress Eligible to be used to warn road users that graveling is in progress when all of the following criteria are satisfied:	240

				• utilizing bottom/belly dump gravel trailers, where the gravel is spread evenly across the road surface minimizing the hazard to the public; • on a highway located in the Northern Region; • on a highway with an AADT ≤ 200; • in daylight hours only; and • with no other equipment or workers on the road surface.
CS-75		45 cm	Orange	Traffic Cone – 50 km/h or less Used as the minimum delineation required in daytime short duration or shorter work zones to delineate detours, windrows, shoulder widening, sharp drop-off pavement edge and to channelize traffic along a specified route. They may also be used to mark tapers in advance of closed lanes and to provide separation between work zones and the flow of traffic.
CS-76		70 cm	Orange	Traffic Cone – More than 50 km/h See CS-75. Used as the minimum delineation required for nighttime short duration or shorter work zones.
CS-77		100 cm	Orange	Traffic Delineator – More than 50 km/h (weighted base) Used to delineate traffic lanes and separating two-way traffic when space restrictions do not allow for the use of more visible delineators.
CS-78		100 cm x Var.	Orange	Flexible Delineator May be used to delineate detours, windrows, shoulder widening, sharp drop-off pavement edge and to channelize traffic along a specified route. They may also be used to provide separation between work zones and the flow of traffic.
CS-79		Variable	Orange	Flexible Drum Where space allows, flexible drums are the preferred device for high speed, high volume, long duration and nighttime delineation of tapers, detours, windrows, shoulder widening, sharp drop-off pavement edge and to channelize traffic along a specific route. May also be used to provide separation between work zones and the flow of traffic.
CS-80		90x90		Raised Delineator Installed temporarily to mark directional dividing lines and lane lines.

CS-81		90X90	Black	Orange	Flagger Signal Ahead Warns road users of the existence of an Automated Flagger Assisted Device (AFAD) Red/Amber Signal ahead. The flagger signal ahead sign must be removed or covered if the AFAD is not present.	240
CS-82 CS-82T		60x120 60 X 45	Black	White/ Orange	Maximum Speed/End of Work Area Combines the Maximum Speed (RB-1) sign with the End of Work Area (CS-16) sign for efficiency. If an existing maximum speed sign is present at the appropriate location in the work zone, a 60 X 45 cm "Work Area Ends" Tab (CS-82T) can be added below it.	245S
CS-100		330x180	Black/ Green	White/ Green	Construction Courtesy for Major Projects Installed in advance of the work zone (see Typical Plan B.1), For more information, refer to https://publications.saskatchewan.ca/#/products/108512	Type IV
CS-100		90x60	Black/ Green	White/ Green	Construction Courtesy Sign for Minor Projects Installed in advance of the work zone (see Typical Plan B.1), For more information, refer to: https://publications.saskatchewan.ca/#/products/108513	Type IV
CS-102		3660 X 2286 mm	Black	various	Federal Construction Courtesy Sign Installed in advance of the work zone (see Typical Plan B.1), For more information, refer to https://publications.saskatchewan.ca/#/products/116311	
TC-17			Red	White	"TO ONCOMING TRAFFIC" Tab Used with a Yield sign in low volume situations where continuous use of flaggers or temporary traffic signals is not warranted to indicate which direction has the right-of-way where only one lane is available for two-way traffic. Used only in locations with short one lane operation, adequate sight lines, low traffic volumes and low speeds.	245S
ID-33 & ID-33T		60x75 60x45	Black	White	Automated Speed Enforcement Used on all projects where automated speed enforcement is being used and on construction and maintenance projects, lasting five days or longer. Automated Speed Enforcement signs must be covered or removed when no workers are present.	245

ID-333T		60x30	Black	White	Automated Speed Enforcement Ends Installed on all divided highway construction and maintenance projects, lasting five days or longer where automated speed enforcement is being used to identify the end of the photo enforcement. Automated Speed Enforcement signs must be covered or removed when no workers are present.	245
WB-12T		90x45	Black	Yellow	New Installment Optional sign used only in conjunction with other traffic control signs where necessary to provide added emphasis during an introductory period. The tab sign is installed either above or below the primary traffic control sign, and on the same post. Must be removed after an introductory period not to exceed 12 months.	245S

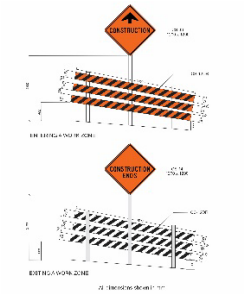
CS-33 CS-12D R/L CS-14 CS-12D R/L		Black	Orange/ White	Gateway Assemblies Denotes the outer limits of a construction project to alert the road user that they are entering a construction area. Effective for long duration work on major construction projects with higher traffic volumes. Also, effective where the construction signs may be inconspicuous due to visual distraction from other signs or roadside development. Gateway Assemblies must be used on all construction and maintenance projects that are on High Priority Traffic Accommodation Corridors (HPTAC) which last five days or longer, or as specified in the contract. Gateway boards (CS-12DR/L) and associated signs (CS-33 and CS-14) should be mounted on 100 mm x 100 mm wooden posts. The gateway assemblies must be supported with sufficient structure to maintain the position of the boards and signs for the duration of the project. See Typical Plans B.2 and B.3 for positioning and dimensions.

TABLE 500-5-3: WARNING SIGN DESCRIPTION

CODE	SIGN	SIZE (cm)	COLOUR MSG	COLOUR BGRD	DESCRIPTION	SPEC
WS-16A		35x35x35	Red	Orange	Slow Moving Vehicle (small) Indicates that vehicle is only capable of travelling at slower speeds.	310
WS-16B		75x75x75	Red	Orange	Slow Moving Vehicle (large) Indicates that vehicle is only capable of travelling at slower speeds.	310
WS-30		90x90	Black	Yellow	Heavy Truck Haul Indicates that the road is being used as a heavy haul route.	245S
WS-53		240x120	Black	Yellow	Remember Two Way Traffic Installed to advise road users that they are on a two-way roadway and that the normal rules of the road for two-way operation apply. Installed 800 m beyond the RB-24 sign (Two Way Traffic Sign) and placed every 3 km thereafter within the work zone. The sign tab Next ___ km (WD-53T) must indicate the length of two-way traffic to be encountered by the road user within the work zone.	245S
WS-53T		240x45	Black	Yellow	Next ___ km Tab	245S
WS-60		210x120	Black	Yellow	Advanced Runaway Truck Ramp	245S

503 MANUFACTURING SPECIFICATIONS

503.1 SIGN SUBSTRATE

Plywood (1.27 cm)

All 1.27 cm plywood including splicing material must be medium density, overlay plywood (good both sides) and meet plywood manufacturing specifications *CSA 0l5l*.

Plywood (1.9 cm)

All 1.9 cm sign blanks must be 240 cm x 24 cm, good one side fir plywood planks and meet manufacturing specifications *CSA 0121*.

Aluminum (Flat Type)

Aluminium sheet alloy must be Alcan S-67 sign sheet or approved equivalent. Thickness for signs 1.44 m^2 or less must be a minimum of 1.6 mm. Thickness for signs greater than 1.44 m^2 must be a minimum of 2.0 mm. Mechanical properties, minimum ultimate tensile strength of 2672 kg/cm^2, a typical yield strength of 2600 kg/cm^2.

503.2 SIGN FACING

All sign facing materials are to be approved by the Ministry. Colour must be specified and conform to the requirements of the current edition of *ASTM D4956, Tables 11 and 13*.

ASTM Type IV (High Intensity Prismatic)

Type IV sheeting must meet or exceed the brightness requirements of specifications as outlined in the current edition of *ASTM D4956, Type IV*. Type IV sheeting must maintain a minimum of 80% of values cited in the current edition of *ASTM D4956, Tables 4 and 5*, for a period of seven years and a minimum of 70% of values cited to 10 years. Reflective material shall be supplied with a single pressure sensitive adhesive, capable of performing on a variety of commonly used sign substrates.

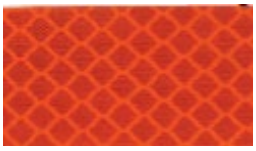
High Intensity



ASTM Type IX

Presently there are no government specifications for this product.

Very High Intensity Reflective Sheeting



ASTM Type XI

Type XI sheeting must meet or exceed the brightness requirements of specifications as outlined in the current edition of *ASTM D4956, Type XI*. Type XI sheeting must maintain a minimum of 80% of retroreflectivity values as cited in the current edition of *ASTM D4956 Table 10*, for up to seven years, and a minimum 70% values for up to 12 years (with the exception of fluorescent colours, for a period of 10 years). Reflective material shall be supplied with a single pressure sensitive adhesive, capable of performing on a variety of commonly used sign substrates.

Very High Intensity Microprismatic Cube Reflective Sheeting



503.3 PLYWOOD SUBSTRATE – FABRICATION

Fabrication of all plywood sign blanks must be accomplished in uniform and workmanlike manner. All possible fabrication, including cutting, drilling of holes and edge routing should be completed prior to application of prime and finishing paint coats, sign facing and/or cut-out letters.

Cleaning

Prior to applying the sign facing or painting, the surface of the sign blank must be buffed lightly and wiped clean with lint free cloth to remove any trace of grease, wax or dirt.

Edge Treatment

The edge of the plywood sign blank must receive a waterproof and weatherproof edge treatment.

Application of Sheeting

Application of sheeting to conform to instructions issued by the sheeting supplier. Sign sheeting 120 cm or less on the longest side must not contain any splicing. Sign sheeting greater than 120 cm must be allowed one vertical lap splice.

Legend Screened

Unless sheeting suppliers' specifications state otherwise, all signs utilizing the reverse screening method must have one coat of clear coat applied to the front side of the finished sign after the reflective sheeting has been placed on the plywood blank

Cut-Out Letters

All cut-out letters, digits and symbols must be in one piece and free of joints, splices and patches.

Clear Coat

Unless sheeting suppliers' specifications state otherwise, clear top coat must be applied as an edge seal on all legends, border and sign edges.

503.4 ALUMINUM SUBSTRATE – FABRICATION

Fabrication of all metal sign blanks must be accomplished in a uniform and workmanlike manner. All fabrication including shearing, cutting and punching of holes must be completed prior to metal degreasing and application of materials. Sign blanks must be cut to size and shape and free of buckles, warps, dents, cockles, burrs and defects. The surface of all sign blanks must be flat. The edges of the sign blank must be smooth and free of sharp projections.

Cleaning

Aluminum blanks must be degreased and etched, including all necessary rinse operations in accordance with the sign facing manufacturer's specifications.

Sign Facing

Application of the sheeting to conform to instructions issued by the supplier. Sign sheeting 120 cm or less on the longest side must not contain any splicing. Sign sheeting greater than 120 cm must be allowed one vertical lap splice.

Legend Screened

Unless sheeting suppliers' specifications state otherwise, all signs utilizing the reverse screening method must have one coat of clear coat applied to the front side of the finished sign after the reflective sheeting has been placed on the metal blank.

Cut-Out Letters

All cut-out letters, digits and symbols must be in one piece and must befree of joints, splices and patches.

Clear Coat

Unless sheeting suppliers' specifications state otherwise, clear topcoat must be applied as an edge seal on all legend, border and sign edges.

503.5 SIGN SPECIFICATIONS

TABLE 500-5-4: SIGN SPECIFICATIONS

SPEC	MATERIALS	BACKGROUND	LEVEL	LEGEND	LEVEL
140	1.27 cm medium plywood	Reflectorized	2	Non-reflective (black)	
145	1.27 cm medium plywood	Reflectorized	2	Screened	
146	1.27 cm medium plywood	Reflectorized	1	Screened	
155	1.90 cm G1S plywood	Reflectorized	2	Reflectorized	
156	1.90 cm G1S plywood	Reflectorized	1	Reflectorized	
185	1.27 cm medium plywood	Reflectorized	DG	Screened	
210	Aluminum flat type	Reflectorized	2	Screened	
240	Aluminum flat type	Reflectorized	1	Screened	
245A	Aluminum flat type	Reflectorized	DG	Reflectorized	DG
245S	Aluminum flat type	Reflectorized	DG	Screened	
246A	Aluminum flat type	Reflectorized	FDG	Reflectorized	FDG
246S	Aluminum flat type	Reflectorized	FDG	Screened	
275	Aluminum flat type	Reflectorized	2	Reflectorized	2
276	Aluminum flat type	Reflectorized	1	Reflectorized	1
280	Aluminum flat type	Reflectorized	2	Screened	
281	Aluminum flat type	Reflectorized	1	Screened	
335	Aluminum flat type	Reflectorized	DG	Reflectorized	
310	Aluminum flat type	Reflectorized outer edge	2	Fluorescent vinyl centre	
340	Aluminum Handle – 30 cm				
345	Aluminum Handle – 150 cm				
580	Decal	Vinyl Film		Screened	
620	Decal	Reflectorized	2	Reflectorized	2
1000	Roll-up flexible signs, impact resistant and UV stabilized	Reflectorized	2	Screened	
1050	Roll-up flexible signs, impact resistant and UV stabilized	Reflectorized	1	Screened	

504 SIGN INSTALLATION AND PLACEMENT LATERAL AND VERTICAL POSITION

504.1 LATERAL POSITION

Single Post Fixed Signs

Signs must be located on the right-hand side of the roadway with the near edge from 0.3 m to 4.5 m from the edge of the shoulder line. Signs 120 cm or less in width may be erected on single posts.

Double Post Fixed Signs

Signs must be located on the right-hand side of the roadway with the near edge of the sign from 2.0 m to 4.5 m from the edge of the shoulder line. Signs exceeding 120 cm in width and/or exceeding an area of 1.44 square m in area must be erected on two posts.

Portable Signs

Signs must be located on the right-hand side of the roadway with the near edge of the sign from 0.3 m to 4.5 m from the edge of the shoulder line.

General Requirements

Single and double post mounted signs should be used for long duration work. The lateral position of fixed signs and portable signs is shown in Figure 500-1, Figure 500-2 and Figure 500-3.

504.2 VERTICAL POSITION

Single and Double Fixed Signs

The signs must be erected to a height of between 0.45 m and 2.5 m above the travelled portion of the roadway and the bottom edge of the lowest sign.

Portable Signs

The signs must be erected to a height of between 0.45 m and 2.5 m above the travelled portion of the roadway and the bottom edge of the lowest sign. The vertical position of fixed signs and portable signs is shown in Figure 500-1, Figure 500-2 and Figure 500-3.

504.3 PORTABLE STANDS

Signs mounted on portable stands or barricades are suitable for temporary conditions. Positioning of the portable stand is illustrated in Figure 500-3. All signs must be mounted such that the sign face is positioned and oriented towards traffic. The stand should yield upon impact to minimize hazards to road users.

504.4 SIGN MOUNTED ON VEHICLE

For certain operations, a large sign may be effectively mounted on a vehicle stationed in advance of the work or moving along with the work. This may be the working vehicle itself or a vehicle provided expressly for this purpose.

504.5 SIGN MOUNTED ON BARRICADE

Detour signs, although typically erected on separate posts, may also be mounted on or above barricades, but should not be permitted to interfere with the effectiveness of necessary regulatory and warning signs.

504.6 ROLL UP SIGNS

Roll up signs on portable stands are suitable for temporary conditions, providing the sign meets the size, shape, colour, and reflectivity as described in Section 502.

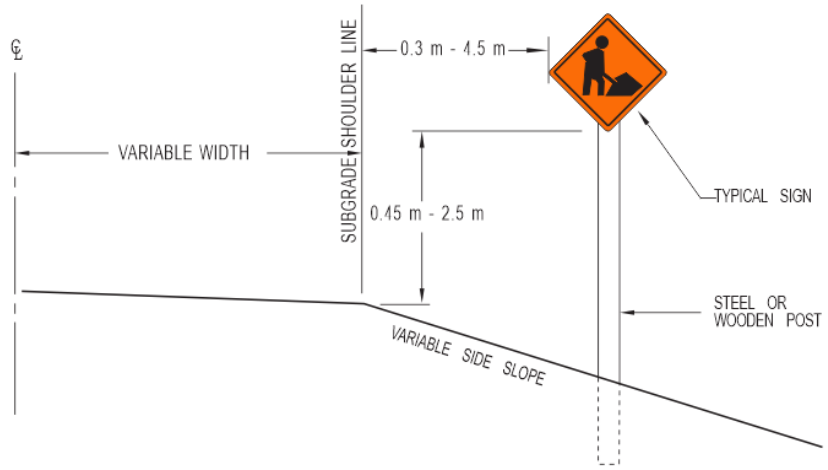


FIGURE 500-1: LATERAL AND VERTICAL POSITION OF SINGLE POST SIGNS

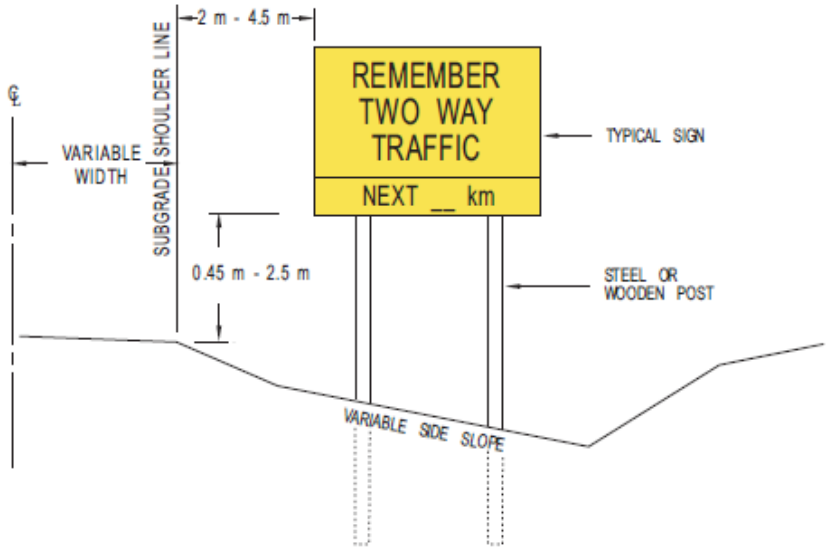


FIGURE 500-2: LATERAL AND VERTICAL POSITION OF TWO POST SIGNS

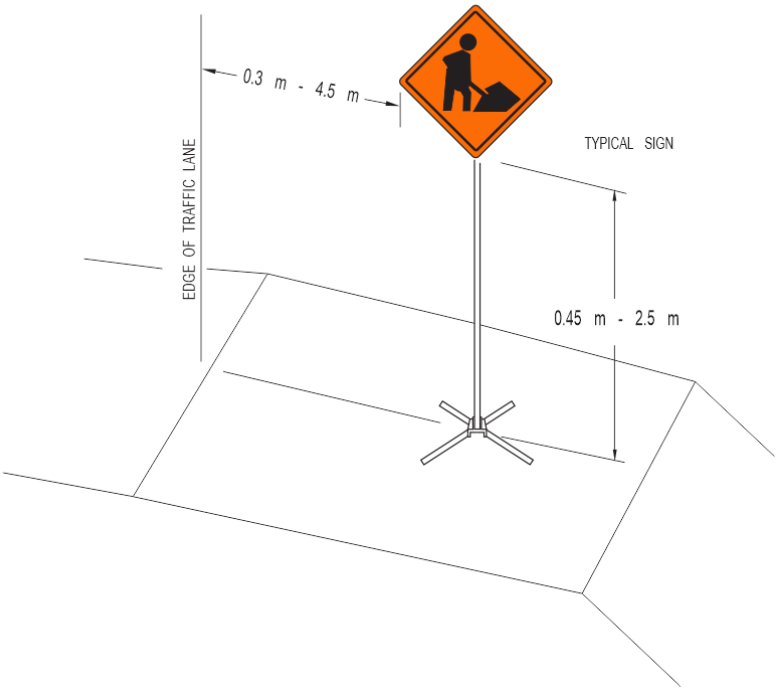


FIGURE 500-3: LATERAL AND VERTICAL POSITION OF PORTABLE SIGNS

505 DUPLICATION OF KEY SIGNS

Duplication of key signs is used to supplement work zone signing on two-lane highways. The duplication of key signs gives the road user heightened visual awareness of what driving behaviour to adhere to. Duplication of key signs is practical for long duration work on major construction projects with higher traffic volumes, on two-lane highways.

505.1 SPECIFICATIONS

The key signs to be duplicated are the WD-A41 (Workers Present), WD-A45 (Flagger) and Regulatory signs, which include the CS-46C (Max 60 with Fines Triple), RB-32 (Do Not Pass) sign.

Signs must be duplicated every time they appear throughout the work zone.

505.2 PLACEMENT OF DUPLICATION OF KEY SIGNS

Duplication of key signs must be used on all construction and maintenance projects, that are on High Priority Traffic Accommodation Corridors (HPTAC) which last five days or longer, or as specified in the contract. The contractor may wish to consider duplicating signs on other project locations to supplement their traffic accommodation plan.

The assembly must be positioned as shown in Typical Plan L.1.

chapter

600

601 BARRICADES

Barricades are primarily used to delineate a work area in or near the travelled portion of a roadway and to block off a portion or all of a lane or roadway where closures become a necessity. Barricades must not be used to channelize traffic.

601.1 STANDARD BARRICADE

The Standard Barricade is a portable device having three panels with reflective orange and black stripes. Each barricade panel must be 24 cm wide and 240 cm long. The orange and black stripes must be at least 15 cm wide. Barricades with stripes that begin at the upper right side and slope downward to the lower left side are to be designated as ""right"" barricades (CS-12R).



Barricades with stripes that begin at the upper left side and slope downward to the lower right side are to be designated as ""left"" barricades (CS-12L).



Markings for the top barricade panels must slope downward at an angle of 45 degrees in the direction traffic is to take.

The top rail of the barricade may be replaced with a CS-27 rail signifying to keep left or right.



Regulatory or warning traffic signs may be affixed to barricades to provide additional information to the road user regarding the road closure.

A Typical Plan of the Standard Barricade is shown on in Figure 600-1.

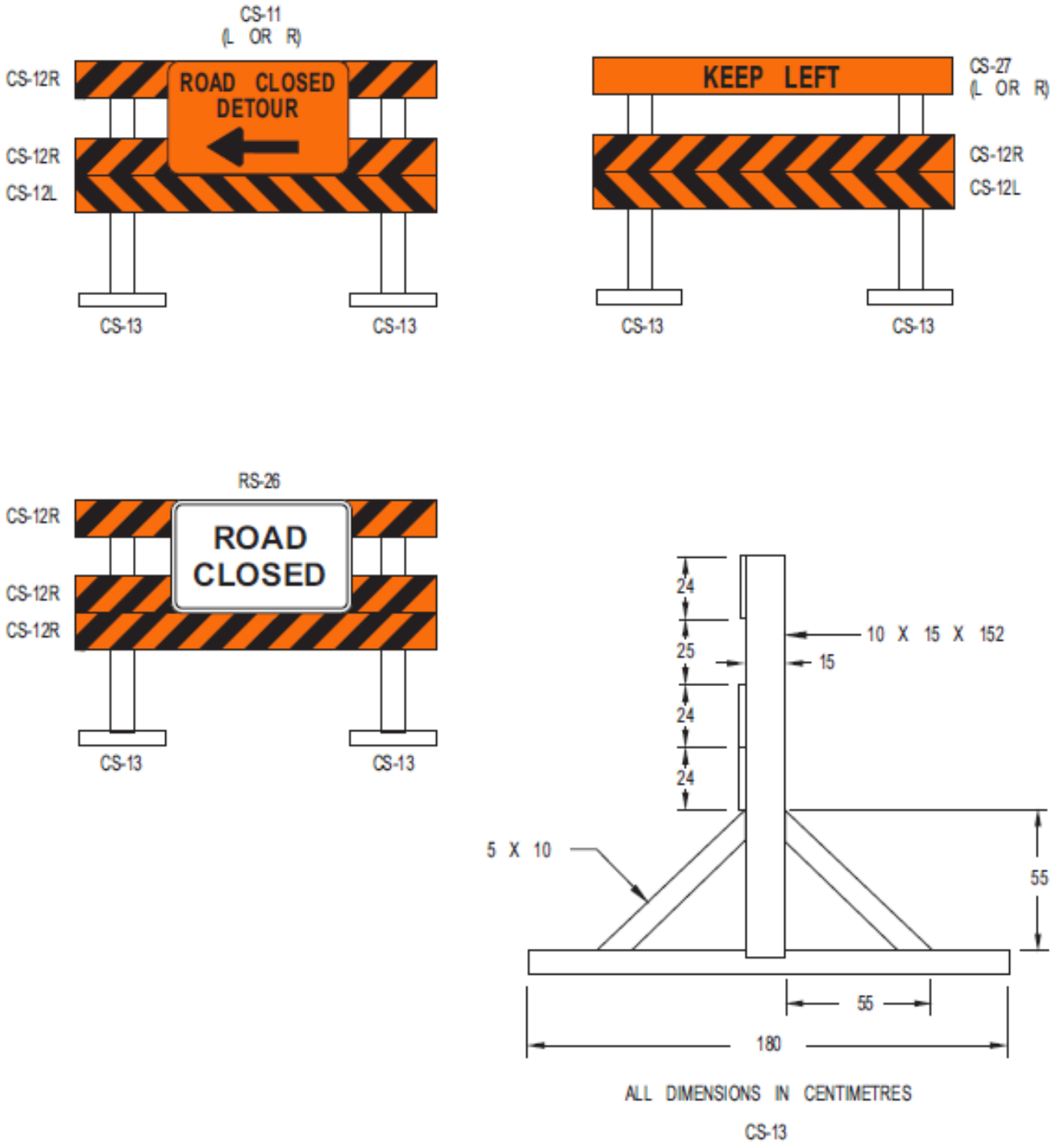


FIGURE 600-1: STANDARD BARRICADES

601.2 PORTABLE BARRICADE

The Portable Barricade is light and easy to handle, store and transport. The intent is to use this type of barricade for short term road closures such as a washout. The barricade consists of one rail with reflective orange and black stripes and is illustrated in Figure 600-1.

The stability of portable barricades may be enhanced with the use of sandbags provided they are placed on or close to the barricade base.



FIGURE 600-2: PORTABLE BARRICADE

602 DELINEATORS

Delineation devices are used to warn and alert road users of hazards created by work activities in or near the travelled way and to guide and direct road users safely past the hazards.

Devices used for delineation (or channelization) should provide a smooth and gradual transition in moving traffic from one lane to another, onto a bypass or detour, or reduce the width of travelled way. They may also be used to separate traffic from the work area, pavement drop-offs, or storage areas.

Delineating cones, markers or flexible drums used for transition taper alignments may get out of their normal alignment and spacing due to being struck by vehicles or moved by the wind and suction created by fast-moving trucks, construction, maintenance, or utility activities. It is therefore necessary for the Traffic Accommodation Supervisor to patrol the delineation at frequent intervals to ensure it is functioning properly.

Since the delineators can be easily knocked down, displaced or blown over, some devices need extra weight to keep them in place. Sand bags or plastic collars may be used but solid materials such as rock, concrete, etc., are not acceptable for this purpose. Extra weights should be placed at the base of devices to provide maximum stability and to avoid the weights becoming projectiles in the event of a collision.

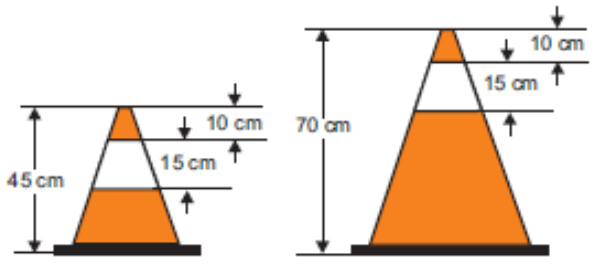
602.1 TYPES OF DELINEATORS

Delineation is achieved by proper placement of traffic cones, tubular markers, flexible drums, or other similar devices. Delineation devices used during the hours of darkness must be reflectorized or illuminated to show the same colour and shape by night as by day.

Traffic Cones

Traffic cones are lightweight, flexible delineation devices. Traffic cones are used primarily for daylight operations for short duration or shorter work zones; however, 70 cm cones may be used at night if equipped with white reflectorized bands (flexible drums preferred). Required sizes:

- > 50 km/h = minimum height of 70 cm
- < 50 km/h = minimum height of 45 cm
- Night time = minimum height of 70 cm

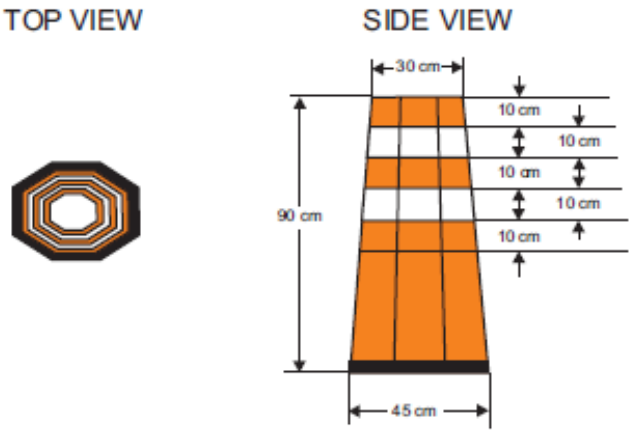


TRAFFIC CONES

Flexible Drums

Flexible drums are generally used in long duration work zones and, where space permits, are preferred for high-speed, high-volume and night-time work zones.

For night time use, flexible drums are reflectorized by application of alternating horizontal bands of orange and white reflectorized sheeting. There must be a minimum of two white bands and three orange bands, being 10 cm deep.

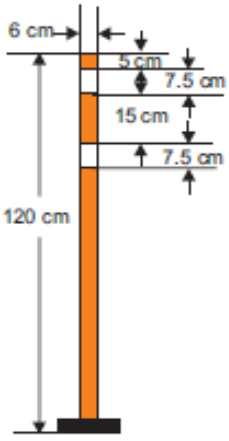


FLEXIBLE DRUMS

Tubular Markers (Delineation Post)

Tubular markers are similar to traffic cones in that they are lightweight and easy to install and remove. They are particularly suited to delineating traffic lanes or separating two-way traffic for short duration work where space is limited. As tubular markers have less visible area than other devices, other more visible devices should be used where space is available.

These orange tubular markers must have at least two circular bands of white retroreflective sheeting.



TUBULAR MARKERS

602.2 TAPERS

The single most important element within the system of traffic control devices commonly used in work zones is the transition taper for full lane closure or for other reductions in the pavement width. An inadequate taper will almost always produce undesirable traffic operations with resulting congestion and possible collisions through the area.

The taper length must comply with the following minimum requirements:

TABLE 600-1: TAPER LENGTH MINIMUM REQUIREMENTS

SPEED LIMIT (km/h)	TAPER LENGTH (m)
50	40
60	40
70	60
80	80
90	105
100	125
110	140

602.3 SPACING OF DELINEATORS

The centre to centre distance between delineators is different in tapers than it is longitudinally along a work area. In a taper, delineators are more closely spaced with a minimum of nine delineators in a taper approaching the work area and four delineators in tapers leaving the work area. The centre to centre distance between delineators adjacent to the direction of travel must be as follows:

TABLE 600-2: SPACING OF DELINEATORS ADJACENT TO DIRECTION OF TRAVEL

SPEED LIMIT (km/h)	MAXIMUM CENTRE TO CENTRE SPACING (m)	MAXIMUM CENTRE TO CENTRE SPACING (m)
	Where Workers are not Present	Where Workers are Present
50	100 m	10 m
60	100 m	10 m
70	100 m	15 m
80	100 m	15 m
90	100 m	20 m
100	100 m	20 m
110	100 m	20 m

602.4 PAVEMENT EDGE DROP-OFF

At certain speeds, particularly during periods of darkness, a pavement edge drop-off becomes a potential hazard to the road user. Every reasonable effort must be made to minimize the amount of pavement edge drop-off that is present when the travelled way is open to traffic. The length of pavement edge drop-off should be minimized by:

- scheduling the paving of adjacent lanes so that there is no pavement drop-off along the centre line of a road at the end of the day's operation; and
- scheduling the construction of shoulder base or shoulder fillets, concurrently with the paving operations.

However, where a pavement edge drop-off is present and the travelled way is open to traffic, the following devices and practices must be utilized:

- pavement drop-off signs must be installed at not more than 1.5 km intervals;
- any pavement drop-off at the edge of the travelled way must be delineated when the drop-off exceeds 60 mm; and
- any pavement drop-off at centre line must be delineated when the drop-off exceeds 60 mm.
- delineators must be weighed down or securely fastened to the pavement so they will not be blown over by the wind or passing vehicles.

602.5 LANE WIDTH REDUCTION

Lane width reduction uses traffic cones or similar delineation devices to effectively narrow the driving lanes. Narrower lanes are a visual queue that causes the road user to slow down.

Lane width reduction is effective for most static work zone situations. It may not be practical for fast moving work zones. In some situations, such as pavement drop-offs, where delineators are already required, lane width reduction would be a very simple method to implement. For projects such as long-term bridge construction or maintenance, it may be more feasible to use barriers, whereas for most highway projects, other delineators would likely be the best option.

Delineation devices for lane width reductions can include cones, tubular delineators, drums, striping, barriers, barricades, etc. The cost, maintainability, effectiveness and safety of the devices varies, and the supervisor of operations or the Traffic Accommodation Supervisor must decide which type is most appropriate to use.

Lane widths of 3.0 m to 3.5 m are recommended for lane width reductions as a speed control technique. Generally, the narrower the lane, the slower the traffic. Lanes that are too narrow can lead to erratic maneuvers and speed differentials.

603 BARRIERS

Barriers protect work areas and road users by preventing or reducing vehicle penetration into the work areas and by redirecting errant vehicles in a controlled manner. The effectiveness of the barrier system depends on its correct placement and on the size, speed, and angle of approach of the errant vehicle.

Unless otherwise specified, barriers are normally placed parallel or near parallel to approaching traffic. They are solid in design and are installed in a continuous manner.

Where required, concrete barriers are most commonly used in long duration work zones to:

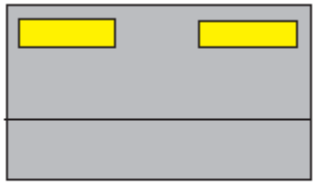
- Protect workers
- Separate road users from potentially hazardous objects and areas in work zones
- Separate opposing lanes of traffic where barricades or other delineation devices are not considered adequate
- Reinforce other channelizing devices in lane closure tapers or other areas where traffic cannot be allowed to enter

603.1 PRE-CAST CONCRETE BARRIERS

Two typical pre-cast concrete barriers are shown in Figure 600-3: Pre-Cast Concrete Barriers.

603.2 REFLECTORIZATION

Reflective material arranged at the top of the barrier can be very effective in increasing the visibility of barriers in work zones. Reflectorized material should be placed as close to the top of the barriers as possible to ensure that road users can see it. Reflectors that are fastened to the top of barriers are available. The lines of sight should not be obstructed by any object between the reflectorization and road users.



(optional)

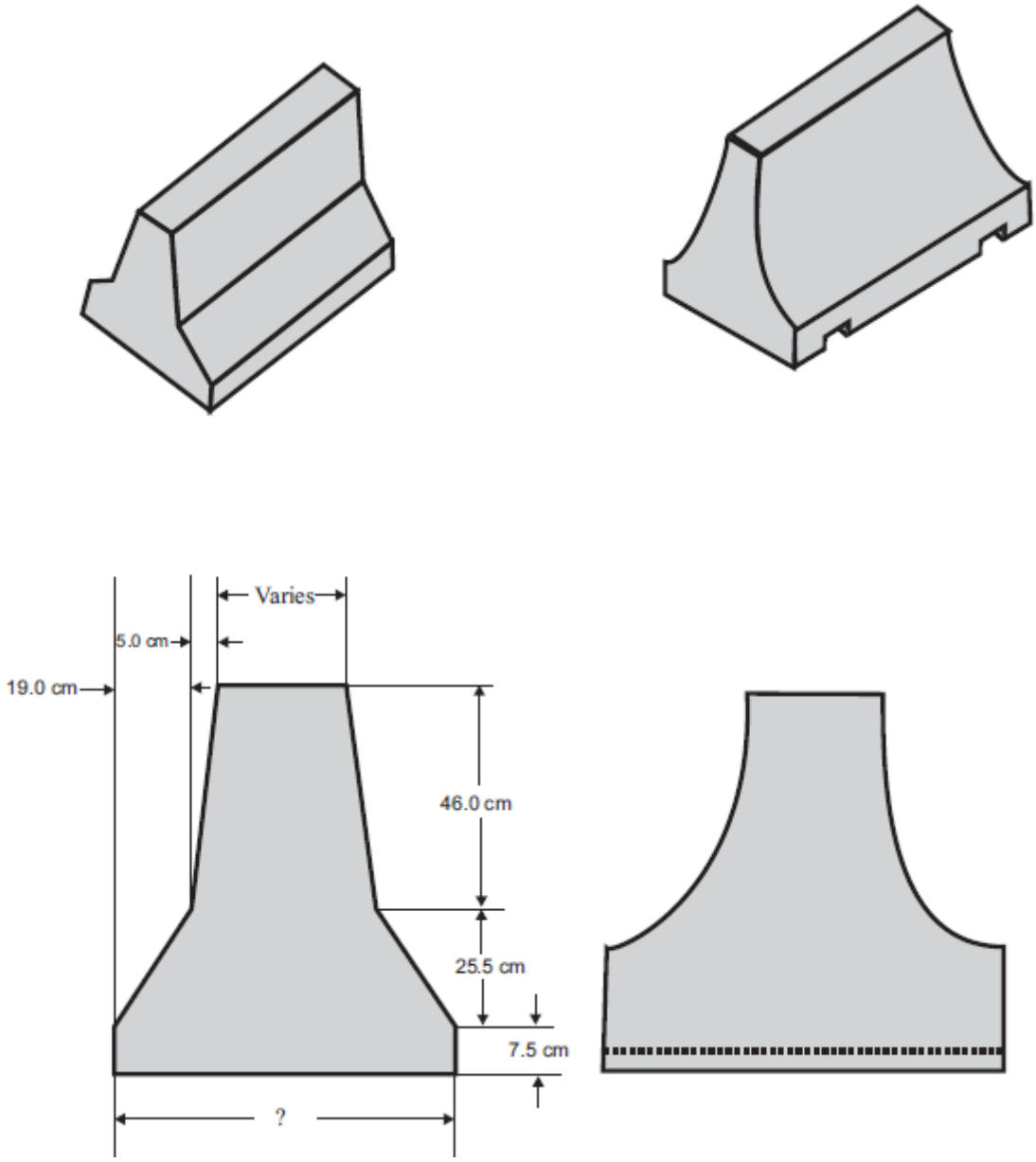


FIGURE 600-3: PRE-CAST CONCRETE BARRIERS

604 PAVEMENT MARKINGS

Pavement markings consist of centrelines, shoulder lines, lane lines, intersection layouts and pavement signs. Temporary pavement markings should be used in combination with appropriate warning signs, delineators or other channelizing devices to clearly indicate the required vehicle path.

Pavement markings should be used where traffic is diverted from normal paths and where guidance by warning signs or delineation does not clearly indicate the required path.

When a surface detour or temporary roadway is constructed, all necessary pavement markings and other channelizing devices must be in place along its approaches to and throughout its length before being opened to traffic.

Pressure sensitive temporary marking tape should be applied on surfacing projects to delineate the centreline on each lift of a newly constructed pavement until the permanent markings can be applied. The temporary marking tape should be applied before the end of each work shift. Pavement markings and channelization devices should be supplemented by raised reflective markers on a temporary roadway such as on a transition from a four lane to a two-lane facility.

Pavement markings are often obliterated due to work zone activities. Whenever this occurs, temporary pavement markings should be applied until the permanent markings can be replaced. Conflicting pavement markings, which might inadvertently lead road users from the intended path, must be obliterated immediately to prevent road user confusion.

Typical traffic accommodation plans for the various pavement marking activities are included in Typical Plans Section J.

All painting material must comply with Ministry specifications.

chapter

700

701 FLASHING LIGHT BOARDS

Flashing light boards are internally illuminated sign panels or a matrix of lights capable of either flashing or sequential display. Flashing light boards are very effective in:

1. providing additional advance warning;
2. providing directional information; and
3. encouraging road users to leave the closed lane.

701.1 USE OF FLASHING LIGHT BOARDS

Flashing light boards must be used in the following manner on:

Two Lane Highway.

- Right Flashing Arrow or Right Sequential Chevron
  - for passing to the right of the work area where sufficient shoulder width is available; and
  - for local roadside (i.e., low vehicle volumes) detours to the right.
- Left Flashing Arrow or Left Sequential Chevron
  - for local roadside detours to the left.
- Caution Mode
  - shoulder closure;
  - lane closure;
  - stop condition; and
  - caution condition (e.g., workers on or near the road).
- For moving pavement marking operations, the left or right flashing arrow mode may be used, but only in conjunction with the When Safe Pass As Shown sign (CS-44).

Four Lane Highway

- Right Flashing Arrow or Right Sequential Chevron
  - for passing to the right of the work area; and
  - for local roadside (i.e., low vehicle volumes) detours to the right.
- Left Flashing Arrow or Left Sequential Chevron
  - for passing to the left of the work area; and
  - for local roadside detours to the left.
- Caution Mode
  - for stop condition; and
  - caution condition (e.g., workers on or near the road).

701.2 PLACEMENT OF FLASHING LIGHT BOARDS

Placement of flashing light boards should be varied as needed to achieve the desired recognition distances. Also, care must be taken in the placement to avoid causing road user confusion in the vicinity of ramps, median crossovers and side road intersections.

For lane closures, the flashing light boards should be placed within the taper towards the end of the taper as illustrated in the Typical Plans.

In diversions where flashing light board need has been determined, the board should be placed behind the barricades closing the roadway.

For moving operations where a lane is closed, the flashing light board should be placed at the rear of the activity in the closed lane on a vehicle separate from the work activity itself. The flashing light board should always remain upstream of the work activity where adequate recognition distance is available. The vehicle carrying the flashing light board should also be equipped with appropriate signing and/or lighting.

Flashing light boards may be used for moving pavement marking operations without a lane closure but only in conjunction with the Pass When Safe sign (CS-43).

Flashing light boards in arrow mode should not be used for shoulder or roadside work activities nor should they be used on two lane highways because the panels can cause unnecessary lane changing.

701.3 SPECIFICATIONS FOR FLASHING LIGHT BOARDS

Flashing light boards must meet the specifications in the table below. Minimum legibility distances for various traffic conditions are based on the decision-sight distance concept. Minimum legibility distances are those at which the light board message is legible to a road user on a sunny day or clear night.

TABLE 700-7-1: FLASHING LIGHT BOARD SPECIFICATIONS

TYPE	MINIMUM SIZE (cm)	MINIMUM NUMBER OF LAMPS	MINIMUM LEGIBILITY DISTANCE (m)
A	60 x 120	12	800
B	75 x 150	13	1200
C	120 x 240	15	1600

Type A light boards are appropriate for use on low speed urban streets. Type B and C light boards are appropriate for work zone activities on higher speed two lane and four lane highways.

Light boards must be rectangular, of solid construction and finished with non-reflective flat black. Boards must be mounted on a vehicle, trailer or other suitable support. Vehicle mounted boards must be provided with remote controls. Minimum mounting height should be two metres above roadway to the bottom of the board, except on vehicle mounted boards which should be as high as practicable.

Light boards should have the capability of the following mode selections (see Figure 700-1):

1. left or right flashing or sequential arrows;
2. left or right sequential chevrons;
3. double flashing arrows; and
4. caution.

The caution mode consists of four or more lamps, arranged in a pattern which must not indicate a direction.

Light boards must be capable of a minimum of 50 percent dimming from the rated lamp voltage. Light board lamps must be operated in high intensity mode during daylight hours and in low intensity mode during night-time hours. Lamp flashing rate must not be less than 25 nor more than 40 flashes per minute. Minimum lamp ""on time"" must be 50 percent for the flashing arrow and 25 percent for the sequential chevron. Light board lamps or lenses must be recess mounted or, alternately equipped with an upper hood of not less than 180°, and the colour of light emitted must be yellow.

Flashing Arrow



Sequential Flashing Arrow



Sequential Flashing Chevron



Caution

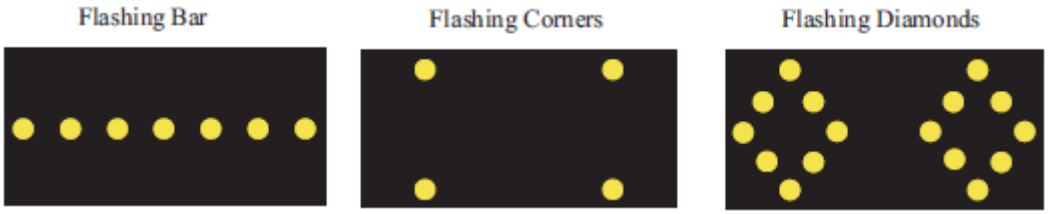


FIGURE 700-1: FLASHING LIGHT BOARD OPERATING MODES

702 ELECTRONIC VARIABLE MESSAGE BOARDS (EVMB)

EVMB are message boards that can be used to provide essential information for road users. EVMB are used in work zones predominantly to display a brief statement that informs road users of road work or road obstruction, the location of the obstruction, and the action that road users are expected to take.

EVMB are practical for a wide range of work zone situations because they are easy to implement and move. They can also be very effective at night and in inclement weather. EVMBs are an effective addition to work zones when the message is simple and concise, kept current and only displays verified information.

EVMB can be used in conjunction with a radar unit. The radar sends signals directed at the oncoming traffic. The frequencies of the rebounding signals give the unit controller information about how fast vehicles are travelling. The EVMB must display the speed that a vehicle is travelling as it approaches the sign. The unit controller can be programmed to display a message (e.g., “YOU ARE SPEEDING/SLOW DOWN”) when vehicles are travelling above a threshold speed. Information on Radar Feedback signs can be found in Section 403.

702.1 TYPES OF EVMB

The most common type of EVMB is light-emitting, which usually have light emitting diode bulbs attached in a matrix on the viewing surface. Typically, EVMB have a “full matrix” display, which allows them to form graphics as well as alphanumeric characters. Though EVMB are able to form required signs for work zones, they are not to be used in the place of required signs. “Full matrix” displays are not an essential feature of EVMB, but they are recommended because they allow greater variance in the types of display and size of font.

702.2 PORTABILITY

EVMB can be mounted on a truck or trailer.

702.3 PLACEMENT OF EVMB

Placement should take into account the following factors:

- The lettering must be legible from a distance of 300 m under ideal conditions.
- The EVMB located where a real need is perceived, so road users will be more apt to respond.
- The EVMB operation must not interfere with the visibility or general effectiveness of any other signs or devices.
- Visual clutter should be avoided when placing EVMB so that the road user is not distracted.
- Do not place near exits, merges, intersections, etc.
- Place EVMBs in advance of predicted queues.

- EVMB are normally placed on the right shoulder of the roadway.
- EVMB that are not used in conjunction with a radar unit may be placed on both sides of a double-lane highway work zone provided that the messages are synchronized.
- The boards should be turned three degrees away from perpendicular to the direction of travel to reduce glare.
- The board must be installed such that it has two metres minimum vertical clearance to reduce glare, enhance sight distance and increase visibility.
- The board should be level.
- EVMB must be used on all construction and maintenance projects that are on High Priority Traffic Accommodation Corridors (HPTAC) which last five days or longer, or as specified in the contract. The contractor may wish to consider the application of the device on other projects to supplement their traffic accommodation plan.

702.4 EVMB MESSAGES

Messages should be designed to take into account the following factors:

- No more than two displays within a message cycle.
- Each display should be a single one to three-word statement.
- Messages as brief as possible.
- Abbreviations avoided if possible. When they are used, they should be standardized by the Ministry.
- The entire message cycle must be able to be read at least twice when driven at the posted speed or the anticipated operating speed.
- Messages not to scroll horizontally or vertically across the face of the sign.
- Avoid general messages such as “DRIVE SAFELY” or “HAVE A NICE DAY.”
- Only use verified information to ensure credibility. The message displayed must not contradict with other signs and devices being used.
- Should be updated immediately as work zone circumstances change to maintain a high standard of validity to road users.
- It is encouraged to display the length of the currently active work zone.

703 LIGHTING DEVICES

Work zone activities often create conditions on the travelled way that are hazardous particularly at night when the ability of road users to see is sharply reduced from daytime conditions. It is often desirable and necessary to supplement the reflectorized signs, barriers and delineating devices with lighting devices that are described below. Warning lights and beacons may be used in place of warning flags as long as they meet Ministry specifications and are approved for use by the Traffic Accommodation Supervisor.

703.1 WARNING LIGHTS

Warning lights are portable, lens directed, enclosed lights. The colour of light emitted must be amber. They may be used in either a steady burn or flashing mode. Warning lights must be in accordance with current Institute of Transportation Engineers Purchase Specifications for Flashing and Steady Burn Warning Lights, with regard to colour, lens size, flash rate, and minimum on time.

Mounting Height

Warning lights must have a minimum mounting height of 1.0 m to the bottom of the lens.

Low Intensity

Low Intensity Flashing Warning lights are most commonly mounted on barricades, drums, or advance warning signs, and are intended to continually warn road users that they are approaching an obstacle, hazards, condition or other potential conflict.

High Intensity

High Intensity Flashing Warning lights are normally mounted on advance warning signs or on independent supports. High Intensity Warning lights should be used to warn road users of an extremely hazardous site condition within the work area. As these lights are effective in daylight as well as dark, they are designed to operate 24 hours per day.

Steady Burn

Steady Burn lights may be used to delineate the edge of the travelled way on detour curves, lane changes, lane closures and other similar conditions.

703.2 SELF-PROPELLED EQUIPMENT

All self-propelled non-steel tracked equipment, including pickup trucks and larger, engaged in the maintenance or construction of highways must be equipped with a rotating or flashing amber light. The rotating or flashing amber light must be mounted such that it is clearly visible in all directions to the highway user.

703.3 MISCELLANEOUS DEVICES

Other miscellaneous lighting devices such as flares, floodlights, flashlights, lanterns, etc., may be used as required to supplement the signs and other devices in this Manual.

chapter

800

801 FLAGGING

Flaggers play an important role in the high level of traffic safety expected through work zones on Saskatchewan highway projects. Flaggers are responsible for directing traffic through work zones, protecting the workers and road users from traffic dangers by communicating what action road users are required to take.

Flaggers are provided at work areas to stop traffic intermittently as necessitated by work progress or to maintain continuous traffic flow past a work area at reduced speeds to help protect the workers. For both of these functions, flaggers must be clearly visible to approaching road users for a distance sufficient to permit proper response by the road user to the flagging instructions.

A critical examination should be made of each project to determine if flagging is necessary, because of their extremely exposed position with a high collision potential, alternate effective means of control should be used wherever possible.

Section 133(4) of the Occupational Health and Safety Regulations states: “An employer shall use designated signallers to control traffic on a public highway only where other methods of traffic control are not adequate or suitable".

If flagging is required, the Traffic Accommodation Supervisor will need to determine what is the minimum level that can be used to coincide with job and safety needs.

801.1 RESPONSIBILITIES

The responsibilities of the flagger are:

- To direct traffic safely through the work zone.
- To protect the road user from work zone dangers.
- To protect the workers, including themselves, from traffic dangers.
- To communicate what action road users are required to make.

801.2 QUALIFICATIONS FOR FLAGGERS

It is important that qualified personnel be selected and trained in the fundamentals of flagging before being assigned to a flagging task. Flaggers must be certified as a flagger by the Ministry or by the Heavy Construction Safety Association of Saskatchewan.

Flaggers must have the required copy of the flagger’s “Certificate of Training in Workzone Flagging” with them at the worksite and be able to readily produce it upon request.

Flaggers should possess the following minimum qualifications:

- Average intelligence and mentally alert.
- Good physical condition, including sight and hearing.
- Courteous but firm manner.
- Neat appearance.
- Sense of responsibility for safety of public and workers.
- Ability to communicate effectively in a positive manner.

801.3 FLAGGER'S APPAREL

For daylight flagging operations, the flagger's apparel must include:

- Approved footwear.
- Fluorescent orange or other high visibility colour hard hat.
- One of the following three clothing options:
    - All high-visibility coveralls must meet CSA Z96-09, Class 3, Level 2, minimum Table 2B for background material.
    - All high-visibility safety vests must meet CSA Z96-09, Class 2, Level 2, minimum Table 2A for background material or ANSI/ISEA 107-1999, Class 2, Level 2. High visibility clothing must also be worn with vests. (The colour should achieve the maximum contrast between the flagger, the roadway and the work environment.) Acceptable colours must include white, orange or fluorescent yellow/green.
    - All high-visibility safety bib style overalls must meet CSA Z96-09, Class 2, Level 2, minimum Table 2A for background material. A high-visibility safety vest meeting the above standards must also be worn with the bib style overalls.
- Ministry staff and consultants refer to the Ministry of Highways and Infrastructure Safety Manual, SM 1200-400.

For night flagging operations, in addition to the daylight requirements, the flagger's apparel must include:

- Reflective strips or bands on the headgear and reflective armlets.

801.4 FLAGGER'S TOOLS

Flagger's tools must include:

- STOP/SLOW paddle.
- Flashlight with semi-transparent red/orange cone for flagging for night time.

Flagger's tools should also include:

- Two-way radio when visibility is restricted between flaggers.
- Horn or whistle (optional item).
- Log book and pencil for recording traffic violations.

- Eye protection.
- Suitable outerwear for prevailing conditions (rainwear).

The signs and paddles must be:

- Ministry approved.
- Reflective.
- Kept clean at all times.
- Replaced if face or legend is damaged.

801.5 FLAGGING STATION

- Flagging stations must be adequately protected and preceded by proper advance warning signs.
- Flaggers should stay 70 to 150 m from the work area or crew.
- Flaggers must be visible for a minimum distance for 125 m by the road user. Flaggers must take a position so that the road user's vision of the flagger is not impaired by curves, hills, parked vehicles, traffic control signs or delineators (Figure 800-1).
- Flaggers must stand alone and must not mix with other workers.
- Flaggers must always be ready to get out of the way of an approaching vehicle in case it does not stop. Always plan an escape route and avoid stations adjacent to guard rails or bridge structures.
- Vehicles used by the flagger must be parked a minimum of 15 meters from the flagger station. The vehicle must be positioned between the flagger and work crew, as far right as possible on the shoulder.
- During periods of darkness, the flagging station must be illuminated by lights where reasonably practical.

801.6 NUMBER OF FLAGGERS

4-Lane Highway

One flagger may be utilized if traffic approaches from one direction only. The use of flaggers on 4 lane highways should be used cautiously because of their extremely exposed position with a high collision potential, alternate effective means of control should be used wherever possible. See Typical Plan G.9 Four Lane Flagging and/or Typical Plan G.8 Four Lane No Flagging.

2-Lane Highway

At least two flaggers must be utilized if traffic approaches from both directions and the flaggers and the operator of any approaching vehicle would not be clearly visible to one another.

On sections where the two flaggers are not visible to one another, a third flagger, or some other means of communication, such as two-way radios, is required to relay instructions to the flagger at either end.

Where a one-lane two-way temporary traffic control zone is short enough to allow visibility from one end to the other, traffic may be controlled by either a single flagger or by a flagger at each end of the section.

801.7 ONE WAY TRAFFIC CONTROL

Where traffic in both directions must use a single lane, provision should be made for alternate one-way movement to pass through the restricted section.

Some means of coordinating movements at each end of the section must be incorporated so that delays are not excessive at either end. Control points at each end of the restricted section should be chosen to permit easy passing of opposing line of vehicles.

Alternate one-way traffic movement may be affected by the following means:

- Flagger control.
- Pilot vehicle.

If a single flagger is used, the flagger should be stationed on the shoulder opposite the obstruction or work space, or in a position where good visibility and traffic control can always be maintained. When good visibility and traffic control cannot be maintained by one flagger station, traffic should be controlled by a flagger at each end of the section.

See Typical Plan G.3 Single Lane Closed - Two Lane.

801.8 FLAGGER CONTROL

One flagger must be designated as the Chief flagger for purposes of coordinating traffic movement. They should be able to communicate with signals or by two-way radio.

801.9 PILOT VEHICLE

The use of a pilot vehicle for traffic control can be most effective where work is being performed over a long section of highway. The pilot vehicle is used to guide a train of vehicles through the restricted section or detour. A pilot vehicle must be employed if drivers are required to depart from their travel path without direction to safely travel through the work area. Its operation must be coordinated with flagging operations at each end of the one lane section.

Sufficient turnaround room should be provided at these points. Provision should be made for identification of the last vehicle in the train.

The pilot vehicle must:

- Co-ordinate the activities with flagging operations at each end of the one lane section.
- Escort the line of traffic through work area.
- Move over to the right/left shoulder of the road, depending on the direction of work, to a minimum of 35 m in advance of the flagger station on the opposing lane and stop.

- Not travel faster than 60 km per hour.

The desirable maximum waiting time when stopping and holding road users in a line at a work area is no more than ten minutes.

Pilot vehicles should be vehicles which are easily maneuvered and must be equipped with the following items:

- A CS-32 sign prominently displayed at the rear (PILOT VEHICLE FOLLOW ME).
- A rotating or flashing amber light mounted on the roof.

See Typical Plan F.3 for an illustration of a pilot vehicle setup.

801.10 FLAGGING PROCEDURE

Careless Road Users

Flaggers must bear in mind that when handling many vehicles and road users there always exists the chance that erratic, unpredictable, inattentive or careless road users will appear and become a hazard. In these cases, the flagger must be alert and give warning of impending danger (e.g., via two-way radio) to the workers and manage traffic accordingly. Flaggers must determine an escape route prior to the commencement of flagging.

Uniform Flagging

Uniform flagging procedures are an important part of traffic operations. With uniform and consistent procedures and signals, the road user will more readily comply and proceed through the work zone in a safe manner.

Face Traffic

The flagger must face traffic when signaling road users to stop, slow down or proceed.

Position of Flagger

The flagger must be positioned as described in Section 801.5.

Position of Vehicle Used by the Flagger

The vehicle used by the flagger must be positioned as described in Section 801.5.

To Stop Traffic

The flagger must stand on the shoulder of the road in a stationary position facing traffic. The STOP paddle must be extended over the traffic lane and be held in a vertical position at arm's length. The free arm must be raised with the palm of the hand towards approaching traffic. The flagger must direct the first vehicle to the shoulder of the road with the free hand, to a point a minimum of 15 m in front of the flagger position. Once the vehicle has come to a full stop and when safe, the flagger must move into the traffic lane, as far as necessary without crossing centre line. This position must ensure that the flagger can see and be seen by the next approaching vehicle. The flagger must ensure the STOP paddle is held so it is visible to the stopped traffic, as well as approaching traffic.

The flaggers should occasionally glance over their shoulder to ensure that traffic from the opposing lane is not entering their lane. As more vehicles approach, the flaggers would hold their free arm up and with the palm of the hand showing, direct the vehicles in behind the line of traffic already stopped.

Traffic to Proceed

When releasing traffic, the flagger returns to the shoulder position and turns the STOP/SLOW paddle to the Slow position. The flagger must face the traffic, and with the SLOW paddle held in a vertical position, motion traffic ahead with the free arm.

To Slow Traffic

The flaggers must face traffic and hold the SLOW sign in a vertical position at arm's length. For added emphasis, the flagger may slowly raise and lower the free hand with the palm down.

Relief Flagger

Flaggers should be relieved periodically, where possible every two hours, during the course of work; rest breaks are important to maintain effective flagging operations. A person relieving a flagger must wear the proper apparel required for flagging operations.

Emergency Vehicles & Crews

Flaggers must make every effort to accommodate travel of emergency vehicles and workers through the work zone.

Flaggers Must Not

- Wave the paddle to stop or move traffic.
- Leave the flagging station unattended or mix with the crew. The crew safety and that of the road user depends on being easily seen at a safe distance from other workers.
- Leave the STOP/SLOW paddle standing on a post, acting as a STOP or SLOW sign.
- Leave a vehicle or other obstruction near the flagging station as this may cause a distraction and prevent a quick exit in an emergency.
- Wear headphones while on duty.
- Sit down at the flagging station.

Flagger Signs

All signs indicating that a flagger is on duty must be removed or covered when there is no flagger on duty.

Night Flagging

When flagging at night the flagger must slowly wave, above the head, in a semicircular arc, a flashlight with a red/orange wand to attract the road user's attention.

Flagger Signals



To Stop Traffic - The flagger must stand outside the traffic lanes, and in a stationary position, facing traffic, extend the STOP sign over the traffic lane. Hold the STOP sign in a vertical position at arm's length. For greater emphasis, the free arm may be raised with the palm toward approaching traffic.



When it is Safe for Traffic to Proceed - The flagger must face the traffic, and with the SLOW sign held in a vertical position, motion traffic ahead with the free arm.



Where it is Desired to Alert or Slow Traffic - The flagger must face traffic and hold the SLOW sign in a vertical position at arm's length. For added emphasis, the flagger may slowly raise and lower the free hand with the palm down.

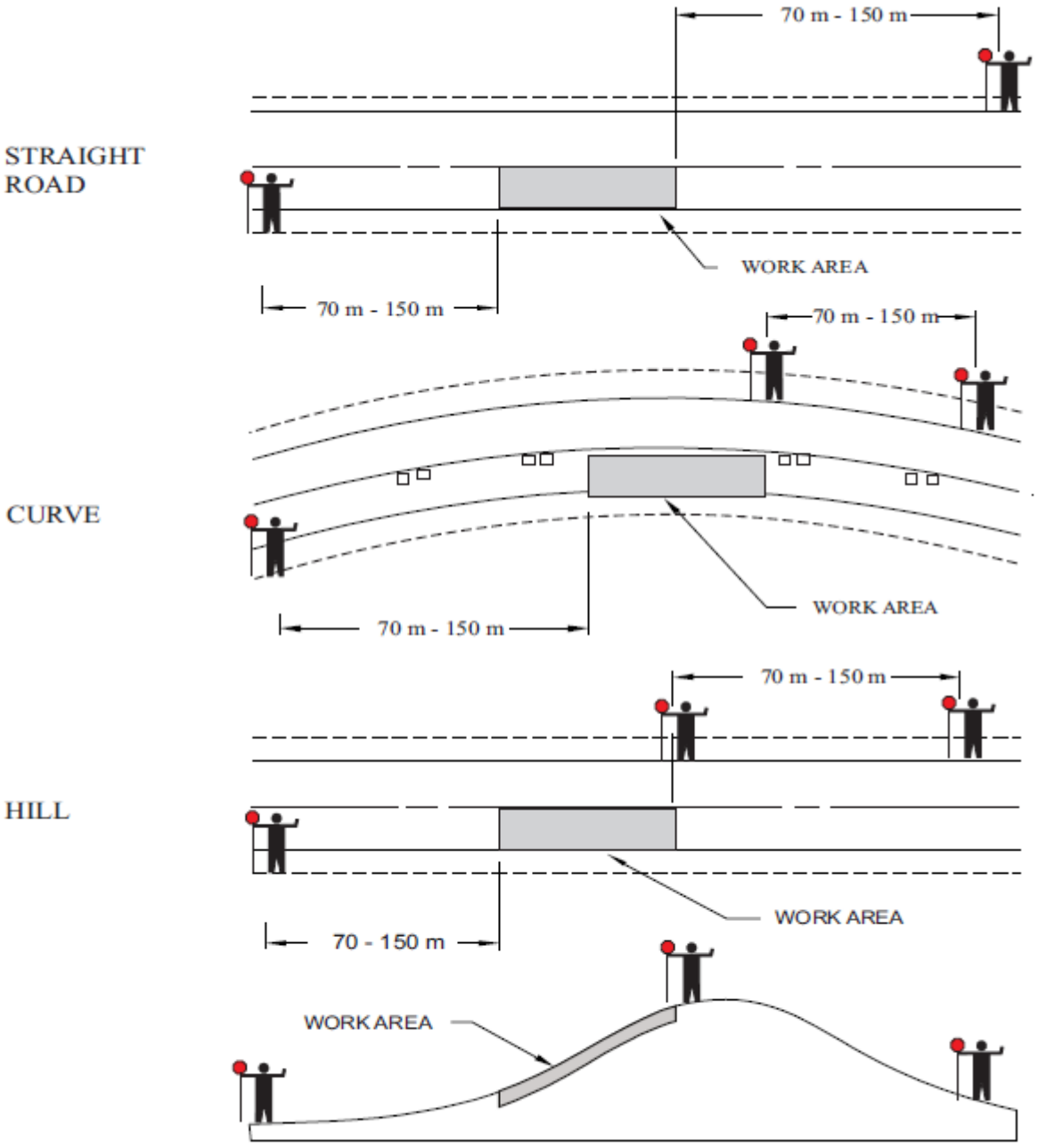


FIGURE 800-1: FLAGGER POSITIONING RELATIVE TO WORK AREA

802 TRAFFIC OBSERVER

Traffic observers play an important role in maintaining employee safety in highway work zones. Traffic observers are responsible for protecting the workers from traffic dangers. Traffic observers are essentially used on fast moving projects where a flagger isn't required but worker safety may be compromised by not being able to observe oncoming traffic. Traffic observers are not flaggers; their sole responsibility is the safety of other workers at the job site.

802.1 QUALIFICATIONS

Traffic observers must have a valid flagger certification.

802.2 RESPONSIBILITIES

The responsibilities of the traffic observer are to:

- Protect the workers, including themselves, from traffic dangers.
- Observe oncoming traffic and to warn the other workers if oncoming traffic appears to be a threat.

802.3 PROCEDURES

- The work crew must clearly determine who is the traffic observer before work begins.
- The work crew must determine the means by which the traffic observer must warn the work crew of pending danger and the means of escape. If an adequate means of escape cannot be achieved, then flagging should be considered. The decision to flag should be made prior to commencement of work and not after a situation has developed.
- The traffic observer must be in a position that has a clear view of oncoming traffic.
- The sole responsibility of the traffic observer is to watch the traffic and warn the highway workers if oncoming traffic appears to be a threat.
- Work must not start until the traffic observer gives the “All Clear”.
- If the work crew is moved off the road surface because of oncoming traffic, work must not resume until directed to do so by the traffic observer.

803 AUTOMATED FLAGGING ASSISTANCE DEVICE (AFAD)

A certified Traffic Accommodation Supervisor may elect to supplement a flagger-controlled work zone with a standard AFAD. AFADs are designed to be remotely operated by a flagger positioned outside of the travel lane, thereby lowering their exposure to traffic.

The flagger is still responsible to:

- direct traffic safely through the work zone;
- protect the road user from work zone dangers;
- protect the workers, including themselves, from traffic dangers; and
- address road users' work zone concerns.

TCDMWZ 309 Traffic Accommodation Plans and TCDMWZ 801 Flagging still apply when an AFAD is utilized. Refer to Typical Plan G.4 for an illustration of an AFAD installation.

Types of AFADs

There are 2 types of standard AFAD:

- Stop/Slow Sign - alternately displays a stop and slow sign.
- Red/Amber Signal - alternately displays a red and amber signal.

803.1 SPECIFICATIONS

AFADs Must:

- only be used when a flagger is required as per TCDMWZ 801;
- be removed when not in use, including also removing or covering associated signs such as: Flagger Ahead Sign (WD-A45) or Flagger Signal Ahead Sign (CS-81), Stop Line Sign (RC-4R), and the Temporary Stop Line;
- be operated only by a flagger who has been trained on the operation of the AFAD, and possess a valid “Certificate of Training in Work Zone Flagging”;
- be operated by a flagger equipped with a supplemental stop/slow paddle(s) that can be used in the case of equipment malfunction;
- be shielded where possible to minimize injury in the event of a collision;
- only be used in situations where there is only one lane of approaching traffic in the direction being controlled;
- be operated with a means of coordination between each end of the work zone as per TCDMWZ 801 Flagging; and
- not contradict TCDMWZ 309 or TCDMWZ 801.

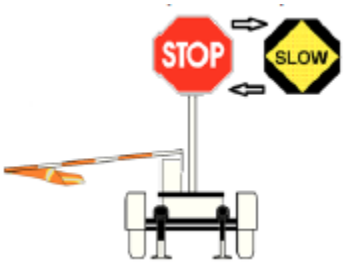
Red/Amber AFADs Must:



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- have the lens at least 2.1 m above the pavement; and any supplementary lenses over any portion of the travel way must have the bottom of the signal housing (including brackets) at least 4.6 m above the pavement;
- have lenses at least 300 mm in diameter; and
- have industry standard:
    - signal back plate (typically flat black finish with a border width of 127 mm), and
    - signal visors / hoods (typically flat black finish, and 280 mm deep);
- have a steady amber transition of at least 5 seconds between the flashing amber and the steady red, unless engineering judgement justifies a different duration; but must not have a transition interval between the steady red and the flashing amber;
- have a flashing Amber flash rate of 50 to 60 flashes/min;
- satisfy the ITE LED Circular Signal Supplement Purchase Specification, or equivalent; and
- have a Flagger Signal Ahead Sign (CS-81) 90 - 150 m before the AFAD, or 90 - 150 m before the Stop Line Sign (RC-4L) if used.

Stop/Slow Sign AFADs Must:



- have the bottom of the CS-26N sign a minimum of 1.80 m above the pavement on an appropriate support;
- have a means to positively lock, engage, or otherwise maintain the sign assembly in a stable condition when set in the Stop or Slow position; and

- have Flagger Ahead Sign (WD-A45) 90 - 150 m before the AFAD, or 90 - 150 m before the Stop Line Sign (RC-4L) if used.

Gate Arm Must:

- have a detachable gate arm;
- descend to a down position across the approach lane of traffic when the Stop face or Red signal is displayed, and then ascends to an upright position when the Slow face or flashing Amber signal is displayed and remain in the upright position during the steady Amber transition.
- be fully retro reflectorized on both sides, and must have vertical alternating red or orange and white stripes;
- reach at least to the centre of the lane being controlled; and
- have a minimum 60 cm square bright red or florescent orange flag fastened to the end of the gate arm.

Temporary Stop Line May:

- be utilized to give road users a clear indication of where to stop in order to have sufficient room to maneuver around the AFAD when given the indication to proceed.
- If a Temporary Stop Line is used, it must:
  - be located 10 - 15 m in front of the AFAD;
  - be temporarily installed (e.g. - portable rumble strip painted white, temporary road marking tape, etc.);
  - be a transverse line at a right angle to the travelled way;
  - be highly visible to the road users;
  - be supplemented by an adjacent Stop Line Sign (RC-4R); and
  - be removed when the AFAD is not in use.

AFADs Without Flagger Immediately Present:

If there is not going to be a trained flagger directly beside the AFAD, the following is required:

- a pilot vehicle guiding traffic through the work zone if the work zone is longer than 800 metres, with the driver monitoring the equipment on each pass. For more information on the use of a pilot vehicles, see TCDMWZ 801.9.
- the flag person can still pair remotely to the other AFAD, and still maintain full vision of traffic through the cameras, if a central controller base station or range extender fails.

- the amber and red light still function to manage traffic until an additional AFAD or flagger can be brought to the site, if a gate arm fails and is removed.
- the flag person can flag one side of the site and remotely operate the opposite side, including being able to remotely see the AFAD and traffic, if a light fails or there is an internal electrical failure.
- the AFADs will go into failsafe mode, where both go red and gate arms close, if both AFADs fail. The flag person shall also be trained to:
  - Manually operate the AFADs.
  - Remove the AFAD, as well as the workers, from the road until an additional AFAD or flag person is available to complete the set.
- have intrusion alarms.
- have high-definition camera.

804 UNSTAFFED TEMPORARY SIGNALS

A traffic signal is a device used to direct alternate traffic between stop and go.

804.1 APPLICATION

A certified Traffic Accommodation Supervisor (TAS) may elect to use Unstaffed Temporary Signals to control a single lane operating with two-way traffic, subject to this policy and approval by the Ministry for each stage of construction.

804.2 TYPES

Traffic Control Signal

An unstaffed portable, temporary signal that has 2 or more signal head per direction.



(Google Image Search)

Lane Control Signal

An unstaffed portable, temporary signal that has only 1 signal head per direction.



(Google Image Search)

804.3 ALTERNATIVE CONTROLS

Consideration must be given to traffic volume, sight distance, duration of work, night time conditions, and other factors, to ensure that the traffic control selected is adequate for the situation. Potential alternative traffic control might include: flag person, AFAD, “Yield to Oncoming Traffic” sign (TC-17), etc.

804.4 CONDITIONS

To use an Unstaffed Temporary Signal, the site must:

General Conditions

- Be a stationary work area, that is:
  - Between April 1st and October 31st or as approved by the Ministry's local District Operations Manager,
  - With no adverse driving conditions,
  - With minimum lane width of 3.5 m, and
  - With a worker area between 150 metres and 800 metres long;
- No significant time of day variances in traffic patterns;
- No intersection or pedestrian crosswalk;
- No conflict with existing signals or other traffic control systems;
- Operated in accordance with the manufacture's recommendations; and
- Have clear visibility of the device by approaching motorists, as follows:

Posted Speed Limit (km/h)	Minimum Distance from Which Signal Must Be Clearly Visible (m)
< 60	100
60	110
70	140
80	170
90	200
100	230
110	260

Interpreted from Ontario Traffic Manual Book 7 (Jan 2014), Table 3

Lane Control Signal (1 Signal Head) Conditions

If it is not practical to use a Traffic Control Signal (multiple signal heads), then a Lane Control Signal (1 signal head) may be used. However, due to only 1 signal head per direction, it is concern if the only lamp burns out. Therefore, the site must also:

- Satisfy all the General Conditions listed above;
- Be a short duration, daytime project;
- Have a pre-construction speed limit of ≤ 60 km/h; and
- Have a certified Traffic Accommodation Supervisor present and monitoring the devices. When the Lane Control Signal is not being monitored by a certified TAS, the device must be removed and normal traffic operations resumed, or an acceptable alternate traffic control device be implemented.

804.5 HARDWARE

To use an Unstaffed Temporary Signal, the device must:

General

- Be resistant to displacement or damage by moderate to severe weather, vehicle impact, vandalism, etc.

Signal Head

- Have three (red, amber and green) 300 mm lenses;
- Have a signal head backboard (preferably yellow), resulting in a minimum of 500 mm wide by 1,000 mm tall total signal head face; and
- Comply with the Institute of Transportation Engineers (ITE) specifications for incandescent or light emitting diode (LED) lamps for chromaticity and luminous intensity (or equivalent).

Controller

- Have security features to prevent tampering;
- Provide a red flash cycle that continuously flashes at a rate of 50 - 60 times per minute;
- Monitors:
  - Master and local absence of display,
  - Master and local conflicting display on the same signal head(s),
  - Master and local conflicting displays on opposing heads,
  - Low voltage; and
- Prevent unsafe signal indications;
- Send a message to the TAS if a conflict is identified, or communication interference or failure occurs, and if sending a message is not practical (e.g. – not sufficient cellular coverage) written approval from the Ministry is required to exempt this requirement; and
- Record such events in an error log (with the exact date and time of occurrence) retrievable by the Ministry.

Power Supply

- Have a primary and back-up power source; sufficient to operate the system without recharging for a minimum of 14 days; and
- Be inaccessible to unauthorized personnel.

Communications

- Comply with industry standards as required (e.g. – Industry Canada for radio interconnection).

804.6 SIGNAL TIMING

To use an Unstaffed Temporary Signal, the signal timing must:

General

- Be monitored, and adjusted if traffic flow is adversely affected.

Signal Cycle

- Have only two phases (i.e. – one per directions), as per Table 804-1 (next page); based on:
  - Operating speed of 50 km/h,
  - Minimum all red time of 3 seconds,
  - Minimum amber clearance of 3 seconds,
  - Minimum green time of 15 seconds,
  - Lane width 3.5 metres,
  - Assumed 25 % of AADT is trucks,
  - Peak hourly factor of 13%, and
  - Directional traffic flow factor of 60%.

Unsafe Signal Indication

- In the event of low voltage, default to either all red (flashing or solid).
- In the event of conflicting displays, ensure both directions display a solid red.
- In the event actuated time operation system (if used) detects a failure, display the maximum green time on every cycle.

Table 804-1: Total Cycle Length (seconds)

Distance between stop bars (metres)	150	200	250	300	350	400	450	500	550	600	650	700
Amber Clearance (seconds)	3	3	3	3	3	3	3	3	3	3	3	3
All Red Interval (seconds)	11	14	18	22	25	29	32	36	40	43	47	50
Minimum Initial (aka Green Time) (seconds)	15	15	15	15	15	15	15	15	15	15	15	15
Minimum Split (seconds)	29	32	36	40	43	47	50	54	58	61	65	68
Minimum Total Split (seconds)	58	64	72	80	86	94	100	108	116	122	130	136
Daily Traffic Volumes (vpd)	≤100	58 - LOS B	64 - LOS B	72 - LOS C	80 - LOS C	86 - LOS C	94 - LOS C	100 - LOS D	108 - LOS D	116 - LOS D	122 - LOS D	130 - LOS D	136 - LOS E
	200	58 - LOS B	64 - LOS B	72 - LOS C	80 - LOS C	86 - LOS C	94 - LOS C	100 - LOS D	108 - LOS D	116 - LOS D	122 - LOS D	130 - LOS D	136 - LOS E
	300	58 - LOS B	64 - LOS B	72 - LOS C	80 - LOS C	86 - LOS C	94 - LOS C	100 - LOS D	108 - LOS D	116 - LOS D	122 - LOS D	130 - LOS D	136 - LOS E
	400	58 - LOS B	64 - LOS C	72 - LOS C	80 - LOS C	86 - LOS C	94 - LOS D	100 - LOS D	110 - LOS D	118 - LOS D	128 - LOS D	140 - LOS D	146 - LOS E
	500	58 - LOS B	64 - LOS C	72 - LOS C	80 - LOS C	86 - LOS C	94 - LOS D	104 - LOS D	112 - LOS D	124 - LOS D	132 - LOS D	142 - LOS E	148 - LOS E
	600	58 - LOS B	64 - LOS C	72 - LOS C	80 - LOS C	86 - LOS C	96 - LOS D	104 - LOS D	114 - LOS D	126 - LOS D	134 - LOS D	144 - LOS E	154 - LOS E
	700	58 - LOS B	64 - LOS C	72 - LOS C	80 - LOS C	88 - LOS C	96 - LOS D	110 - LOS D	118 - LOS D	128 - LOS D	134 - LOS D	144 - LOS E	160 - LOS E
	800	58 - LOS B	64 - LOS C	72 - LOS C	80 - LOS C	88 - LOS C	98 - LOS D	108 - LOS D	122 - LOS D	134 - LOS D	136 - LOS D	144 - LOS E	160 - LOS E
	900	58 - LOS B	64 - LOS C	72 - LOS C	82 - LOS C	90 - LOS C	102 - LOS D	112 - LOS D	122 - LOS D	136 - LOS D	140 - LOS D	150 - LOS E	162 - LOS E
	1,000	58 - LOS B	64 - LOS C	72 - LOS C	84 - LOS C	90 - LOS C	102 - LOS D	114 - LOS D	126 - LOS D	136 - LOS D	144 - LOS E	154 - LOS E	162 - LOS E
	1,250	58 - LOS B	64 - LOS C	76 - LOS C	90 - LOS C	96 - LOS D	110 - LOS D	122 - LOS D	130 - LOS D	142 - LOS D	150 - LOS E	162 - LOS E	172 - LOS E
	1,500	58 - LOS C	66 - LOS C	78 - LOS C	90 - LOS C	104 - LOS D	118 - LOS D	126 - LOS D	136 - LOS D	146 - LOS E	154 - LOS E	164 - LOS E	178 - LOS E
	1,750	58 - LOS C	68 - LOS C	82 - LOS C	94 - LOS D	108 - LOS D	122 - LOS D	134 - LOS D	142 - LOS D	152 - LOS E	162 - LOS E	172 - LOS E	182 - LOS E
	2,000	62 - LOS C	70 - LOS C	84 - LOS C	98 - LOS D	108 - LOS D	128 - LOS D	140 - LOS D	150 - LOS E	160 - LOS E	166 - LOS E	176 - LOS E	192 - LOS E
	2,250	62 - LOS C	74 - LOS C	88 - LOS C	106 - LOS D	114 - LOS D	128 - LOS D	140 - LOS D	150 - LOS E	164 - LOS E	174 - LOS E	184 - LOS E	198 - LOS E
	2,500	66 - LOS C	78 - LOS C	92 - LOS C	106 - LOS D	118 - LOS D	132 - LOS D	142 - LOS D	158 - LOS E	170 - LOS E	178 - LOS E	194 - LOS E	210 - LOS E
	2,750	68 - LOS C	82 - LOS C	98 - LOS D	112 - LOS D	124 - LOS D	138 - LOS D	148 - LOS E	164 - LOS E	176 - LOS E	192 - LOS E	204 - LOS E	214 - LOS E
	3,000	72 - LOS C	86 - LOS C	102 - LOS D	116 - LOS D	126 - LOS D	144 - LOS D	156 - LOS E	168 - LOS E	184 - LOS E	198 - LOS E	212 - LOS F	222 - LOS F
	3,250	74 - LOS C	88 - LOS C	104 - LOS D	120 - LOS D	136 - LOS D	152 - LOS E	160 - LOS E	178 - LOS E	194 - LOS E	202 - LOS E	220 - LOS F	230 - LOS F
	3,500	80 - LOS C	92 - LOS C	108 - LOS D	126 - LOS D	141 - LOS D	170 - LOS E	186 - LOS E	200 - LOS E	212 - LOS E	236 - LOS F	242 - LOS F	
	3,750	84 - LOS C	96 - LOS D	116 - LOS D	134 - LOS D	148 - LOS D	168 - LOS E	180 - LOS E	212 - LOS E	222 - LOS F	240 - LOS F	256 - LOS F	
	4,000	88 - LOS C	102 - LOS D	120 - LOS D	136 - LOS D	152 - LOS E	182 - LOS E	200 - LOS E	218 - LOS F	234 - LOS F	252 - LOS F	260 - LOS F	
	4,500	100 - LOS D	110 - LOS D	132 - LOS D	150 - LOS E	168 - LOS E	182 - LOS E	194 - LOS E	216 - LOS F	234 - LOS F	242 - LOS F	260 - LOS F	280 - LOS F
	≥5000	110 - LOS D	120 - LOS D	144 - LOS E	170 - LOS E	182 - LOS E	200 - LOS E	218 - LOS E	236 - LOS F	256 - LOS F	268 - LOS F	292 - LOS F	296 - LOS F

804.7 SETUP

To use an Unstaffed Temporary Signal, the device must be setup as per Typical Plan I.4, and:

General

- Be set up in a work zone in accordance with Typical Plan I.4.

Device Location

- Be right of and facing traffic; and
- Be strategically located to protect it from moving traffic, with supports and controller as far as practicable from the edge of the roadway, and no closer than 1.0 m from the edge of the shoulder.

Signal Head Lateral Placement

- Have one signal head adjacent to the roadway; and
- Have the second signal head (if used) above the approach lane, at least 0.5 - 1.75 m into the lane, and at least 3.0 m laterally separated from the other signal head.

Signal Head Vertical Placement

- Have the signal head(s) set above the roadway to achieve optimal visibility and adequate clearance, but within the range of:
  - 2.5 - 4.5 m for the first signal head, and
  - 4.5 - 5.8 m for the second signal head (if used),

  measured from the elevation of the road surface at centreline, to the bottom of the signal face.

Temporary Stop Line:

- May be utilized to give road users a clear indication of where to stop in order to have sufficient room to maneuver around the signal when given the indication to proceed.
- If a Temporary Stop Line is used, it must:
  - be temporarily installed
    (e.g. - portable rumble strip painted white, temporary road marking tape, etc.);
  - be a transversable line at a right angle to the travelled way;
  - be highly visible to the road users;
  - be supplemented by an adjacent Stop Line Sign (RC-4R); and
  - be removed when the signal is not in use.

Intersections Within Controlled Area

- If an intersection is present, it must be controlled by a flag person working in conjunction with the signals.

Night Time Use

- Be illuminated if used at night, at the device's decision points (as a minimum), with the light source:
  - Being a minimum of 9.0 m above the roadway (measured from the elevation of the road surface at centreline),
  - Providing a minimum of 22,000 lumens, and
  - Not producing a glare for oncoming motorists.

When Not in Use

- Be removed when not in use, and normal traffic operations resumed, or an acceptable alternate traffic control device be implemented.

804.8 REFERENCES

- British Columbia Traffic Management Guidelines for Work on Roadways (September 2001)
- Ontario Traffic Manual, Book 7 (January 2014)

TYPICAL PLANS

A. TYPICAL PLANS

A.1 TYPICAL PLAN INTRODUCTION AND INTERPRETATION GUIDE

This section of the manual is intended to assist users in identifying appropriate Typical Plans to implement for different work zone scenarios. Section A.2 provides the general sequence of work zone setup and takedown applicable to all work zones. Section A.3 provides a number of matrix tables that can be used to determine which Typical Plans are appropriate based on where the work is located within the highway right-of-way and based on what type of activities are taking place within the work zone. Section A.4 is a companion to Section A.3 that is intended to help users select Typical Plans that are more supplementary in nature to deal with specific characteristics that might exist in the work zone.

Any of the traffic accommodation plans are to be considered as guidelines and additional signs, devices and/or flaggers may be required to take into consideration such factors as horizontal alignment, vertical alignment, unusual hazards and traffic volumes.

Minimum Requirements

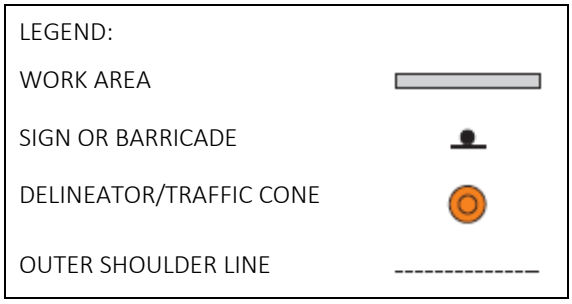
Every employee who may have reason to stop on the shoulder or roadway must have as a minimum a vehicle flashing light.

Operation

All traffic control devices must be removed or covered immediately after they are no longer applicable.

Legend

The following legend pertains to all the Typical Plans.



Speed Limit

Values for Taper Length (A), Distance between Markers (B) and Distance between Signs (C) in the tables on the Typical Plans are selected based on the speed limit. The speed limit should be interpreted as the pre-construction, regulatory speed limit. Site constraints and access points may require adjustment to the distance between signs for some work zones.

A.2 GENERAL SEQUENCE OF WORK ZONE SETUP AND TAKEDOWN

Revised: October, 2022

Until all devices are in place, setup and takedown of work zones creates additional risks for workers and road users. Key concepts to apply for all work zone setups and takedowns include advance planning of the setup and takedown activities, minimizing worker exposure to traffic, making sure that workers are visible and conspicuous to oncoming traffic having a planned escape route in the event of an encroaching vehicle. The following list a general sequence for work zone setup and takedown.

Setup

- Position work vehicles upstream of the work (between workers and approaching traffic) rather than downstream, so that their flashing lights and/or flashing arrows indicate a visual presence and obstacle to drivers.
- Put together traffic control devices away from the roadway. Where possible, deposit signs, delineators and other traffic control devices along the roadside in advance of setting them up.
- Put up the 'Workers Present' sign WD-A41 first before any other traffic control devices.
- Begin setting up the work zone traffic control devices starting at the upstream end of the work zone and proceeding downstream.
- When installing a continuous line of delineators, always place the delineators in sequential order from the upstream end.
- When placing a traffic control device, ensure that it is not obscured by other objects.
- Where there are two 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, and then place the signs on the same shoulder as the closed lane.
- All Ministry and Contractor signs that are not applicable at any given time shall be promptly removed or entirely covered until such time as they are needed again. Remove the cover immediately before work at the work site begins.

Removal

- 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 traffic control.
- Remove traffic control devices in the opposite order from which they were installed, starting with the closed lane(s). In other words, the last delineator installed is the first delineator removed. 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 should not be done until all other traffic control devices are removed. The 'Workers Present' sign WD-A41 must be the last sign removed.
- Turning the signs parallel to the Travelled Way or knocking over within 10 m of the Travelled Way is not allowed.

A.3 PLAN SELECTION MATRICES (BY WORK ZONE FEATURES AND BY ACTIVITY)

This section provides a number of matrix tables to assist users with the selection of appropriate Typical Plans. Table A-8-1 is an overall matrix that can be used to identify appropriate Typical Plans based on the duration of the work, whether the work is taking place on a 2-lane or 4-lane road and where the work is taking place relative to the roadway. The tables that follow provide matrix tables based on specific work activities such as sign installation, bridge work or preservation.

TABLE A-8-1: TYPICAL PLAN SELECTION MATRIX BY WORK ZONE CONTROL REQUIREMENT

	MOVING		BRIEF		SHORT		LONG	
WORK ZONE CONTROL REQUIREMENT	**2-LANE**	**4-LANE**	**2-LANE**	**4-LANE**	**2-LANE**	**4-LANE**	**2-LANE**	**4-LANE**
PROJECT INFORMATION AREA								
Courtesy Signs							B.1	B.1
Gateway Assemblies							B.2, B.3	B.2, B.3
ROADSIDE WORK								
Roadside without Hazard	C.1	C.1	C.1	C.1	C.1	C.1	C.1	C.1
Roadside with Hazard	C.2	C.2	C.2	C.2	C.2	C.2	C.2	C.2
In Median		C.3		C.3		C.3		C.3
SHOULDER WORK								
Sign Installation	D.1	D.1	D.1	D.1	D.2	D.2		
Work on Shoulder	D.3	D.3	D.3	D.3	D.3	D.3	D.3	D.3
LANE ENCROACHMENT								
Lane Encroachment	E.1	E.1	E.1	E.1	E.1	E.1	E.1	E.1
Edge Drop-Off Travelled Way	E.2	E.2	E.2	E.2	E.2	E.2	E.2	E.2
Edge Drop-Off Centreline	E.3		E.3		E.3		E.3	
OPEN ROAD UNDER REPAIR								
Workers Present – No Flagging					F.1	F.1	F.1	F.1
Workers Present – Flagging					F.2	F.2	F.2	F.2
Pilot Vehicle Operation					F.3		F.3	
No Workers Present	F.4	F.4	F.4	F.4	F.4	F.4	F.4	F.4
Centreline Surface Affected					F.5	F.5	F.5	F.5
SINGLE LANE CLOSED								
Sign Installation			G.1	G.7	G.2	G.7		
Automated Flagger Assistance Device	G.4		G.4		G.4		G.4	
Bridge with Traffic Signal					G.5		G.6	
No Flagging	G.3	G.8	G.3	G.8	G.3	G.8	G.3	G.8
With Flagging	G.3	G.9	G.3	G.9	G.3	G.9	G.3	G.9
MEDIAN CROSSOVER								
4-Lane to 2-Lane Right Crossover								H.1
4-Lane to 2-Lane Left Crossover								H.2
ROAD CLOSURE AND DETOUR								
Road Closure					I.1	I.1	I.2	I.2
Roadside Detour							I.3	
Bridge/Culvert Detour w/Traffic Signals							I.4	
Ramp Closure							I.5	I.5
Route Detour							I.6, I.7	I.6, I.7
4-Lane to 2-Lane Emergency Detour								I.8, I.9

TABLE A-8-2: TYPICAL PLAN SELECTION MATRIX FOR PAVEMENT MARKING

PAVEMENT MARKING ACTIVITY	DESCRIPTION	2-LANE	4-LANE
Manual Premarking – 2-lane	• Performed prior to road marking in areas where there is no existing line for the striper to follow. • The road is split to find centre every 200 to 300 metres. • A line is then run in with a transit between the splits. • The crew sets up a maximum 3 km work zone and works on centreline between two units equipped with lightboards, the distance between the units is generally never more than 300 metres. • Traffic is passed to the right, unless there is no shoulder or shoulder is soft, in which case passing would be to the left.	J.1	
Manual Premarking – 4-lane	• Passing lane is closed. • Work is done between two units. • Transit operator always faces traffic.		J.2
Splitting	• Done prior to manual premarking. • The road surface is measured (split) to obtain centre. • A road is generally split every 300 metres. • Two workers measure the road in front of the unit, one marks the centre.	J.1	J.2
Brightening	• Brightening is manual premarking that is done where short sections of existing line are missing due to maintenance patching or where lines are too dim for the striper driver to see clearly. • Generally done with 2-3 workers with one truck. • The truck straddles centreline while the driver guides one or two workers placing marks on the road surface directly in front of the vehicle.	J.1	J.2
Erasing	• Removal of existing pavement markings. • Work zones are identical to manual premarking.	J.1, J.3	J.3, J.17
TRPM Placement	• Temporary raised pavement markers (TRPM's) are placed on existing lines prior to sealing and flushing operations to provide temporary delineation until a road is striped. • Work zones are the same as for manual premarking.	J.1, J.3	J.3, J.17
Premarking Intersections		J.3	J.3
Automated Premarking	• Premarking performed by a unit equipped with a closed-circuit television system. • Truck straddles centreline, traffic is passed to the left on narrow roads, to the right if shoulders allow.	J.4	
Pavement Signs at Intersections	• Involves painting arrows in the driving and turning lanes at flared intersections, bypass lanes, and turning lanes on 2 and 4-lane highways. • Minimum of two people working between two trucks with light boards. • Traffic is passed to the right when arrows are painted in the driving lane.	J.5	J.6

PAVEMENT MARKING ACTIVITY	DESCRIPTION	2-LANE	4-LANE
Pavement Signs – Stop Bars	• Painting of stop bars at locations where Stop signs are located. • As this is a stop condition no extra signing required, lane is closed with truck. A minimum of two people, one person is designated signaler.	J.7	
Pavement Signs – R.W. Crossing Bars & X-Walks	• Uses a minimum of two people. • On a 2-lane highway the lane is closed using a truck with light board and a flagger. • 4-lane highways are painted closing the lane with a truck and traffic cones.	J.8	J.9
Striping 2 - Lane	• Pilot vehicle maintains a distance between the striper that allows the paint to dry to a trackfree state. • Traffic is passed to the right if shoulders allow otherwise to the left when safe.	J.10	
Striping 4 - Lane	• Traffic is directed into free lane.		J.11
Establishing No Passing Zones	• Done prior to striping. • A car equipped with a DMI and a lightbar is used to establish areas where a minimum of 500 m of sight distance is not available and require barrier lines. • The operator ensures that the vehicle when stopped is always visible for a minimum of 300 metres, if not a warning vehicle is used. • Whenever possible this operation must be done in conjunction with premarking.	J.12	
Bridge Markings	• Transverse 60 cm bars marked on the shoulder of the road. • Warn of locations where shoulder width narrows by 0.6 metres and the sight distance in advance of this transition is less than 500 metres.	J.13	
Curb Painting	• Lane adjacent to curb is closed by truck with light board.		J.14
Edge Line Wraps	• Is the continuation of edge line marking from a highway to another highway or intersecting road. • The original marking is done with the striping unit, restriping is done by using a small push type unit or a gun mounted on a 1-ton automated premarking unit. • May require the unit to paint against traffic, in which case the operator does not proceed until traffic conditions allow. • An accompanying unit with an operator is placed on the intersecting roadway to signal traffic. • Yellow 4-lane wraps are always marked in the direction of traffic	J.15	J.16
Premarking Medians			J.17
Pavement Signs – Painted Medians	• Involves the painting of transverse yellow crosshatch bars at 2-lane to 4-lane transitions and channelized intersections. • 3 – 4 workers, one worker is designated signaler.		J.17

TABLE A-8-3: TYPICAL PLAN SELECTION MATRIX FOR TESTING SERVICES

TESTING SERVICES ACTIVITY	DESCRIPTION	2-LANE	4-LANE	SHOULDER
• bridge deck surveys • walking profile measurements • special concentrated coring • deflection bowl Benkelman Beam • special Benkelman Beam • installing traffic counting equipment • installing thermisters • reading slope indicators on bridges • painting special test sections • geotechnical drilling • truck traffic studies	A lane of highway is closed in order to perform the activity. Temporary signs are erected, and the work area may be coned off. On two-lane roads, a safety truck parked in the closed lane, equipped with rotating lights or a light board in caution mode, and a flagger are used to control traffic and protect the workers. Highways with higher traffic volumes or with restricted sight distances use a second flagger to control traffic from the other direction. On four-lane roads, a safety truck parked in the closed lane, equipped with rotating lights or a light board in arrow mode, and an optional flagger are used to control traffic and protect the workers.	G.3	G.9	D.3
• reading slope indicators on shoulders • soil sampling with the auger drill • traffic counter repairs • geotechnical drilling	Activity occurs 2 to 10 m from the edge of the road. Temporary signs are erected. The testing vehicle is either parked on the shoulder or off of the road surface with a rotating light on.	C.1	C.1	C.1
• general coring • soil sampling with the auger drill • subgrade testing • centerline traffic counts	The testing activity moves along quickly over an extended length of highway (up to 20 km). The lane is temporarily closed to perform the task, which usually takes less than 15 minutes to complete. On two-lane roads, a safety truck parked in the shoulder, equipped with rotating lights and the applicable signage, and a flagger are used to control traffic and protect the workers. Highways with higher traffic volumes or with restricted sight distances use a second flagger to control traffic from the other direction. On four-lane roads, a safety truck parked in the shoulder, equipped with rotating lights and the applicable signage, and an optional flagger are used to control traffic and protect the workers.	F.2	F.2	D.3
• skeleton Benkelman Beam • concentrated Benkelman Beam	The testing activity proceeds rapidly over an extended length of highway (up to 40 km). The lane is temporarily blocked by the testing vehicle to perform the task, which usually takes less than 15 seconds to complete. A safety truck, with appropriate lights and signage, follows the testing vehicle on the shoulder watching for traffic and provides an early warning for the public and if required, to the workers.	D.1	D.1	D.1

A. TYPICAL PLANS

TESTING SERVICES ACTIVITY	DESCRIPTION	2-LANE	4-LANE	SHOULDER
• traffic counter servicing • data collection box servicing • manual traffic surveys • reading off-road slope indicators • geotechnical drilling • soil sampling with the auger drill	The testing activity is beyond 10 m from the edge of the road surface. The testing vehicles use rotating lights. This also includes situations where the workers are beyond 10 m, but the testing vehicle may be parked on the shoulder.	None	None	None
• high-speed profiler • skid resistance testing	The testing activity continuously moves along the highway at speeds between 50 and 80 km/h. The testing vehicles use flashing or rotating lights.	None	None	None
• moving equipment on or off the road • placing temporary traffic counters • traffic counter repairs • speed surveys • special section painting • Benkelman Beam pre-marking • road inspections • road-top hazard removal	The activity involves stopping on the shoulder and having a worker or a vehicle briefly enter the driving lanes for usually less than 15 seconds. The action only occurs when it is safe to do so and there is no oncoming traffic. In heavy traffic, the worker simply waits for a break in the traffic to continue the operation. The testing vehicle uses a rotating light.	None	None	None
• using mobile communication • road inspections • reviewing information • writing notes	The activity involves stopping a vehicle on the shoulder for a short period of time to attend to a task within the vehicle. An attempt must be made to use an approach instead of the shoulder whenever possible. The testing vehicle uses four-way flashers as a minimum.	None	None	None

TABLE A-8-4: TYPICAL PLAN SELECTION MATRIX FOR SIGN INSTALLATION

	2-LANE			4-LANE		
SIGN INSTALLATION	DITCH	SHOULDER	ROAD SURFACE	DITCH	SHOULDER	ROAD SURFACE
Standard Sign < 15 minutes	C.1	D.1	G.1	C.1	D.1	G.7
Standard Sign > 15 minutes	C.1	D.2	G.2	C.1	D.2	G.7
Steel (I-Beam)	C.1	G.3	G.3	C.1	G.9	G.9
Overhead Structures	C.1	G.3	G.3	C.1	G.9	G.9
Guardrail	C.1	G.3	G.3	C.1	G.9	G.9

Ditch: Unit is setup entirely off the road surface.

Shoulder: Setup unit must be completely off the driving lane, including the outriggers.

Road Surface: Unit is setup either wholly or partially in driving lane.

Arrowboard and cones can not be used to direct traffic into oncoming traffic.

TABLE A-8-5: TYPICAL PLAN SELECTION MATRIX FOR ENGINEERING SERVICES

ENGINEERING SERVICES ACTIVITY	DESCRIPTION	2-LANE	4-LANE	SHOULDER
• establishing PIs and POTs for preliminary surveys and construction surveys • offsetting POTs for preliminary surveys and construction surveys • determining chainage for POTs for preliminary surveys • preliminary cross sectioning • slope staking and second grading. • plugging culverts • final cross-sections • material sampling on the road surface • provision of width stakes on surfacing projects • checking of cross-slopes on surfacing projects • centreline marking on surfacing projects • coring supervision on surfacing projects • density testing • segregation inspections • road inspections on microsurfacing projects	This activity continuously moves along the highway at less than 10 km/h. Workers will be present on the road surface. Vehicles must use an amber flashing light. No plan required if work is within a Contractor's work zone.	F.1, F.2	F.1, F.2	
• typical cross-sectioning for rehabilitation • assessments • obtaining centreline profiles for rehabilitation • contracts • running fly levels • obtaining transit and drainage notes during • preliminary surveys • running line for surfacing projects • obtaining centreline profiles and typical • cross-sections on haul roads	This activity continuously moves along the highway. Workers will be present on the surface or within 2 m of the road surface. When workers are required to enter the road surface, the workers wait for a break in traffic to carry out the activity. Vehicles must use an amber flashing light.	F.1	F.1	F.1
• running line for preliminary surveys and grading projects • establishing benchmarks	The activity is beyond 10 m from shoulder, including all workers and vehicles. Low risk lane entry procedures are used to exit and enter the highway. Vehicles must use an amber flashing light.	None	None	None
• legal pin location • road inspections • haul road inspections • locating project limits for sealing contracts and microsurfacing contracts • road-top hazard removal	The activity involves stopping on the shoulder and having a worker briefly enter the driving lanes for usually less than one minute. The action only occurs when there is no oncoming traffic. In heavy traffic, the worker waits for a break in the traffic	None	None	None

ENGINEERING SERVICES ACTIVITY	DESCRIPTION	2-LANE	4-LANE	SHOULDER
	to continue the operation. This activity also includes parking on the shoulder to access work beyond 10 m from the road surface. The vehicle must use an amber flashing light.			
• slope staking, plugging culverts and second grades on projects not open to the public • materials sampling and density testing • second grading • on road checking • time keeping • quality control • road testing on sealing contracts • materials sampling on sealing contracts • Contractor communications • communications with the public, landowners and local government officials	This activity takes place within the highway right of way but is entirely within the Contractor's work zone. Vehicles must use an amber flashing light.	None	None	None
• using mobile communication • reviewing information • others	The activity involves stopping a vehicle on the shoulder for a short period of time to attend to a task within the vehicle. An attempt must be made to use an approach instead of the shoulder whenever possible. The vehicle uses four-way flashers as a minimum.	None	None	None

TABLE A-8-6: TYPICAL PLAN SELECTION MATRIX FOR BRIDGE ACTIVITIES

BRIDGE ACTIVITY	2-LANE	4-LANE
• Bridge Inspection (excluding deck inspections)	F.1	F.1
• Deck Inspection Emergency For checking emergency situations (not planned) less than 15 minutes duration. Rotating/Flashing Amber Light on Unit	None	None
• Deck Inspection ADT < 1000	F.1	F.1
• Deck Inspection One Lane ADT ≥ 1000	G.3	
• Deck Inspection Two Lanes ADT ≥ 1000	F.2	F.2
• Patching Holes	F.1, G.3	F.1, G.9
• Driving Piles	F.1, G.3, G.6, I.4	F.1, G.9
• Driving Piles with Detour	G.3, G.6, I.4	G.8
• Driving Piles without Detour	G.6, I.3, I.4, I.7	I.7
• Replace Bridge Rails install with Detour	F.1, G.3, I.3, I.4, I.7	F.1, G.9, I.7
• Replace Guardrails Cable, Box Beam & W-Beam	G.3	G.9
• Install Guardrails	G.3, G.6, I.3, I.7	G.9, I.7
• Cap replacement – timber pier bent	G.3, G.6	G.8, G.9
• Cap installation timber, steel, precast	G.6, I.3, I.4, I.7	G.8, I.7
• Concrete deck repair - all	G.3, G.6, I.4	G.8
• Concrete deck repair surface preparation Option to add lights and rumble strips.	G.3, G.6, I.4	G.8
• Concrete deck repair curbs Option to add lights and rumble strips.	G.3, G.6, I.4	G.8
• Concrete deck repair replacement/precast Options to add lights and rumble strips. A barrier or a guard to the area, option as over and above the minimum standards outlined in the Work Zone manual. New bridge and can only do one lane at a time (hole in the area) or anytime precast units taken off and left open. Concrete barriers limit the work area to daylight hours. If going to be left over night, concrete or standard bridge rail around the work hole.	G.3, G.6, I.4	G.8
• Concrete deck repair replacement/concrete Option to add lights and rumble strips.	G.3, G.6, I.4	G.8
• Precast deck installation	G.6 I.3, I.4, I.7	G.8, I.7
• Concrete pier repair	I.4	G.8
• Concrete pier repair with lane closed	F.1, F.2, G.3, I.4	F.1, F.2, G.8, G.9
• Concrete pier repair no lane closed	G.3, I.4	G.8
• Timber deck repair running planks	F.1, F.2, G.3	F.1, F.2, G.9
• Timber deck repair replacement	F.1, F.2, I.6, I.7	F.1, F.2, I.6, I.7
• Timber deck repair re-nail	F.1, F.2, G.3	F.1, F.2, G.9
• Add stringers (timber)	G.3	G.9
• Place rip-rap	G.5	
• Place rip-rap over wings and carry underneath	G.3, G.5	G.9

BRIDGE ACTIVITY	2-LANE	4-LANE
• Place rip-rap dump through the floor and carry	G.3, G.5	G.9
• Place rip-rap place gabions	G.3, G.5	G.9
• Place rip-rap with construction	G.5, G.6, I.3, I.7	G.8, I.7
• Replace planking	G.5	G.8
• Replace planking replace knee brace	G.3, G.5	G.8, G.9
• Replace planking replace sway brace	G.3, G.5	G.8, G.9
• Replace planking replace backing planks	G.3, G.5	G.8, G.9
• Install planking	G.5, G.6, I.3, I.7	G.8, I.7
• Level bridge	G.5	
• Level bridge raise up	G.3, G.5	G.8, G.9
• Level bridge lowering	G.3, G.5	G.8, G.9
• Place upstream ice protection	G.3	G.9
• Install ice protection	G.6, I.3, I.7	G.8, I.7
• Install struts	G.3, G.5	G.9
• Install sub-piles	G.3, G.5	G.9
• Install pile tiles	G.3, G.6, I.3, I.7	G.9, G.8, I.7
• Install anchor rods	G.3	G.9
• Install anchor rods construction	G.6, I.3, I.7	G.8, I.7
• Install T-sections b/w precast	G.3	G.9
• Replace/repair connectors	G.3, G.6, I.4	G.9
• Install connectors	G.6, I.3, I.4, I.7	G.8, I.7
• Replace expansion joints	G.3, G.6	G.8
• Strip seal replacement	G.3	G.9
• Remove pavement	G.3	G.9
• Waterproofing	G.6, I.3, I.7	G.8, I.7
• Painting structural steel	G.3, G.3, G.6	G.8, G.9
• Painting timber rails	G.3	G.9
• Painting with construction	G.6, I.3, I.7	G.8, I.7
• Washing bridges	G.3	G.9
• Girders	G.3	G.8, G.9
• Ferry Towers		
• Repairing Ferry Towers		
• Constructing Ferry Towers		
• Overhead sign structure repair	F.2, G.3	F.2, G.9
• Overhead sign structure construction	F.2, G.3	F.2, G.9

TABLE A-8-7: TYPICAL PLAN SELECTION MATRIX FOR PRESERVATION ACTIVITIES

#	ACTIVITY	LOCATION	2-LANE	4-LANE	DESCRIPTION/COMMENTS
Emergency Measures Unscheduled Stops					
	Traffic Control Flagging	Road	Rotary Lights	Rotary Lights	As required with the equipment available.
	Road Closure	Road	Rotary Lights	Rotary Lights	As required with the equipment available.
	Removal of Debris/Roadkill	Road	Rotary Lights	Rotary Lights	As required with the equipment available.
	Road Detour	Road	Rotary Lights	Rotary Lights	As required with the equipment available.
	Equipment Breakdown	Road	Safety Reflector	Safety Reflector	As required with the equipment available.
	Use of Handheld Communication Devices	Road			Pull over on shoulder when having to take attention off the road.
Emergency Measures Planned Emergencies					
	Road Closures due to fires	Road	I.1	I.1	Follow Policy and add "Smoke Area" sign.
	Road completely closed due to floods	Road	I.1	I.1	
	Detour due to floods	Road	I.3, I.7	I.3, I.7	
	Road Closures Due to Weather	Road			Media alert, notify RCMP, notify hotline, mechanical sign at major centre to indicate "road closed".
	Temporary Airstrip	Road	F.2	F.2	
Routine Surface Repair Activities (MiPP)					
3120	Spot Seal	Road	F.1, F.2	G.8	The application of liquid asphalt and graded aggregate on surfaced roads to prevent moisture from entering the subgrade and to prevent further deterioration of the asphalt mat.
		Overnight	F.1, F.2	G.8	Leave arrow board and delineators up overnight if seal can't be swept the same day it is applied (4-lane only).
3120	Strip Seal	Road	F.1, F.2	G.8	Application of asphalt and graded aggregate to granular and asphalt concrete surfaced roads in wheel ruts to prevent moisture from accumulating in rutted areas as well as prevent further deterioration. Single or multiple wheel path seals.
		Overnight	F.1, F.2	G.8	Leave arrow board and delineators up overnight if seal can't be swept the same day it is applied (4-lane only).
3130	Deep Patch	Road	F.1, F.2	G.8	Repair of failed areas by excavating into the sub-grade by mechanical means. Use cones to direct traffic around the hole and equipment.
3140	Machine Mix Patching	Road	F.1, F.2	G.8	The process of spreading asphalt mix with a motor grader or other mechanical means to repair failed area, wheel ruts, depressions, bumps, etc.

A. TYPICAL PLANS

#	ACTIVITY	LOCATION	2-LANE	4-LANE	DESCRIPTION/COMMENTS
		Overnight	F.5	F.5	If a windrow is left overnight.
3150	Crack Sealing	Road	F.2	G.8, G.9	The sealing of cracks on a pavement with liquid asphalt or with liquid asphalt and sand.
3160	Spot Gravel Blading	Road	Rotary Lights	Rotary Lights	The reshaping of the road surface and spreading of aggregate on gravel surfaced highways by blading with a motor grader. Includes the pulling of shoulders on gravel roads.
	Single Gravel Blading	Road	Rotary Lights	Rotary Lights	When windrow is > 4 cm in height a cone is placed at the start of the windrow. Maximum length of section is 10 km.
	Tandem Gravel Blading	Road	Rotary Lights	Rotary Lights	
3170	Minor Spot Re-gravel	Road	Rotary Lights		Minor spot re-graveling of gravel surfaces. If load is dumped improperly, take necessary precautions to ensure public safety.
	Spot Gravel	Road	F.1 or F.6		Major spot re-gravel of areas less than a complete segment.
3180	Dust Treatment	Road	Rotary Lights		The application of calcium chloride, lignosulfinate, asphalt to a gravel surface road. Lead truck with rotary lights. Radio communication. Semi and lead vehicles travel in centre of the road. 10 km section. Vehicles travel at 10 km/h.
3190	Hand Patching				Hand repair of small pot holes or depressions using cold mix, hot mix or base and compacting.
	Fast Moving (short duration)	Road	Rotary Lights	Rotary Lights	Hand patching which is expected to take less than 15 minutes in a 3 km section. **Add an extra person to act as traffic observer/spotter.**
	Extensive Patching	Road	G.3	G.8, G.9	Hand patching which is expected to take greater than 15 minutes in a 3 km section.
3200	Minor Sandvik Blading	Road	F.1, F.2	G.8	Minor recycling of bituminous mix generally carried out to improve ride or rutting. This activity is intended for use on short sections where deformed or rutted material exists.
	Pavement Planning	Road	G.3	G.8	Removal or recycle of bituminous surface material, generally carried out to improve ride or rutting. Not associated with Mepp and Hepp projects.
3210	Shoulder Work	Shoulder	**Use the same sign plan as the surface activity uses**	**Use the same sign plan as the surface activity uses**	Any activity outside the shoulder line including sealing, hand patching, deep patching, graveling, flushing, blading composite shoulders, etc. Includes any type of work on approaches.
3220	Thermopatching / Transverse Crack Machine	Road	G.3, L.4	G.9	The leveling of surface depressions with sand sulphur asphalt mix or micro - surfacing materials.
3260	Convert TMS to Gravel	Road	F.1, F.2		The process of converting an asphalt surface to a gravel surface. Includes spot re-gravel and blading or, blading

#	ACTIVITY	LOCATION	2-LANE	4-LANE	DESCRIPTION/COMMENTS
					failures on sections of road awaiting resurfacing, spot overlay, or thick patch. Construction signing for the conversion of TMS to gravel.
		Overnight	F.5		Used when windrow is left overnight.
	Regular	Road	F.1		Routine gravel blading for purposes of maintaining road surface for safe travel. Routine maintenance to maintain gravel surface.
3280	Spot Improvement	Road	F.1, F.2	G.8	Spot overlays using a paver for AC pavements. Larger scale strengthening layers generally covered with a seal coat on granular or TMS surfaces (strengthening).
		Overnight	F.5	F.5	Used when windrow is left overnight.
Light Surface Repair Activities (MaPP)					
3370	Full Seal	Road	F.1, F.2	G.8	Full seal of driving lanes for entire segment with the application of liquid asphalt and aggregate to all surface roads to prevent moisture from entering the subgrade and to prevent deterioration of the asphalt surface.
		Overnight			Leave arrow board and cones up overnight if seal can't be swept the same day it is applied (4-lane only).
Medium Surface Repair Activities (MaPP)					
3530	Micro Surfacing	Road	G.3	G.8	The filling of depressions usually ruts, using contractor and specialized materials.
3540	Re-gravel	Road	F.1		Major re-gravel covering a complete segment of a gravel surface highway. If load is dumped improperly, take necessary precautions to ensure public safety.
3550	Subgrade Stabilization	Road	F.1, F.2		Use of clay, slit or gravel materials to stabilize sandy subgrades or cover rocky road surfaces on gravel highways. Yield to oncoming traffic on windrow side.
		Overnight	F.5		Used when windrow is left overnight.
5360	Sandvic Blading (full segment)	Road	F.2	G.8	Removal or recycle of bituminous surface material, generally carried out to improve ride or rutting. Less than a day.
		Overnight	F.1, F.2	G.8	Greater than a day.
Heavy Surface Repair Activities (HePP)					
3610	Structural Heavy Preservation	Road	F.1, F.2	G.8	AC Major resurfacing (N20 design). Gran Structural / TMS Structural.
		Overnight	F.5	F.5	Used when windrow is left overnight.
	Beginning and end of job site		B.1	B.1	Used if size of job fits criteria set out in the plan.
	Non-Structural Heavy Preservation	Road	F.1, F.2	G.8	Preservation Overlay could be a combination of any strengthening methods that provide a design life less than 15 years. i.e., Cold in place or sub- grade strengthening or spot improvement 100% or TMS gravel reversion on a full segment.
		Overnight	F.5	F.5	Used when windrow is left overnight.
	Beginning and end of job site		B.1	G.8	Used if size of job fits criteria set out in the plan.

A. TYPICAL PLANS

#	ACTIVITY	LOCATION	2-LANE	4-LANE	DESCRIPTION/COMMENTS
Winter Maintenance Activities					
3910	Snow Removal	Road	Rotary Lights	Rotary Lights	The removal of snow, snowpack and slush from the road surface by mechanical means. Includes sanding while plowing.
3920	Ice Control	Road	Rotary Lights	Rotary Lights	Spreading of sand or chemical for the treatment of pavement frost, ice or snowpack on driving lanes.
Mowing Activities					
	Mowing				Cutting vegetation under 25 mm in diameter to a height less than 100 mm.
	Hand Cutting	Shoulder	C.1	C.1	Use rotary lights. WD-A41 and CS-46C may be mounted on back of vehicle.
		Ditch	C.1	C.1	Use rotary lights. WD-A41 and CS-46C may be mounted on back of vehicle.
		ROW	C.1	C.1	Use rotary lights.
	Moving Operation	Shoulder	Rotary Light	Rotary Light	
		Ditch	Rotary Light	Rotary Light	
		ROW	Rotary Light	Rotary Light	
	Mowing Vehicle parked on Road	Shoulder	Rotary Light	Rotary Light	Cones are placed around any piece of equipment left on road surface unattended.
	Mowing Vehicle driving on Road		Rotary Light	Rotary Light	"Slow Moving Vehicle" sign on back of mowing equipment.
4130	Brushing				The control of vegetation greater than 25 mm by mechanical means.
	Mechanical - Hydro-Axing	ROW	C.1	C.1, G.8	
	Mechanical - Robo Cutter	Shoulder	C.1	C.1, G.8	Safety vehicle needed to follow grader travelling on the road.
	Hand Cutting	Ditch	C.1	C.1, G.8	The control of vegetation greater than 25 mm by hand. Use rotary lights.
		Shoulder	D.3	D.3, G.8	Use rotary lights.
		ROW	C.1	C.1, G.8	Use rotary lights.
4140	Chem. Vegetation Control	ROW	C.1	C.1, G.8	The control of brush and noxious weeds using chemical treatment.
Ditch Maintenance Activities					
4220	Litter Pickup		C.1	C.1	Removal of litter from highway rights of way.
	Adopt a Highway		C.1	C.1	
	Volunteer Groups		C.1	C.1	
4230	Beaver Control				Cleaning debris from the culverts used by beavers to plug off the flow of water through the culvert. The activity also includes time spent removing beaver dams and/or time spent eradicating beaver from the site.
	Backhoe Used	Shoulder	F.1	G.8, G.9	
	Explosives Used	Shoulder	F.1	G.8, G.9	Traffic Control signalers mandatory while blasting.

A. TYPICAL PLANS

#	ACTIVITY	LOCATION	2-LANE	4-LANE	DESCRIPTION/COMMENTS
4240	Fence Repair	ROW	C.1	C.1, G.8	Repair or replace fences. Includes all types of fences and security barriers. Only for work in the median.
4250	Culvert Maintenance	Shoulder	C.1	C.1, G.8	Steaming, cleaning, repairing and replacing culverts. Cleaning subdrains.
	Seeding Right of Way	ROW	Rotary Light	Rotary Light	
Sweeping					
	After sealing and other maintenance activities	Road	F.1, F.2	G.8	Add road sweeper ahead.
	Cleanup		Rotary Lights	Rotary Lights	Safety Vehicle must be present for all sweeping, complete with arrow board and "Road Sweeper Ahead" sign.
	Dust Control		Rotary Light	Rotary Light	Water is recommended in addition to a sweeping operation to reduce the dust and increase the visibility.
Bridges					
	Inspections		Rotary Light	Rotary Light	
	Cleaning/Minor Repair		F.2	G.8	Addition of CS-5 if work is to take a day or more.
	Hazard Markers		Rotary Light	Rotary Light	
Road Rating					
	AC & Granular				
	Gauging		F.1, F.2, G.3	G.8	Must add at least one person to act as traffic control.
	Everything Else		Rotary Lights	Rotary Lights	Measurements done from the truck.
	TMS				
	Rutting Measurement		Rotary Lights		The recorder acts as a traffic control person.
	Without Rutting Measurement		Rotary Lights		Measurements done from the truck.
	Gravel		Rotary Lights		Measurements done from the truck.
Traffic Guidance					
	Sign Inspections		Rotary Light	Rotary Lights	
	Sign Repair				See Table A-8-4.
	Pavement Marking				See Table A-8-2.
	Guardrail Preservation				See Table A-8-6.
Other Activities					
	Measuring Clearances		C.1	C.1, G.8	
	Railway Crossing		G.3	G.8, G.9	If road not closed.
			F.2		If work on both sides of the road.
	Surveying				See Table A-8-5.

A.4 QUESTIONS & ANSWER CHECKLIST FOR SUPPLEMENTARY CONSIDERATIONS & MODIFYING PLANS

Is your work zone located on High Priority Traffic Accommodation Corridors (see 105 Definitions) and expected to last for five days or longer? If yes, refer to:

- Section 404 and Typical Plans K.4 and K.5 for portable rumble strips
- Section 505 and Typical Plan L.1 for duplication of key signs
- Section 502 and Typical Plans B.2 and B.3 for gateway assembly requirements

Is your construction project value greater that $3M? If yes, refer to Section B.1 for major project courtesy signs.

Are you unsure if you can authorize a reduced speed zone for your work zone? If yes, refer to the table in Section 401 for details regarding the level of delegation of authority for work zone speed limits.

Are you unsure what the reduced speed limit should be in your work zone or between work areas in your work zone? If yes, refer to Section 401 for guidance.

Would you like to request automated speed enforcement in your work zone? If yes, refer to Section 303 for information regarding a request and Typical Plans K.1 to K.3 for information regarding signing for automated speed enforcement.

Is your work area greater than 3 km in length or longer? If yes, refer to Typical Plans L.2 to L.5 for signing requirements in extended work zones.

Is there a location where you anticipate trucks entering, leaving or crossing the highway that would not be expected by road users or where sight distance is limited, or roadway grades are steep? If yes, refer to Typical Plan L.6 to setup Truck Entrance Signs.

Is the visibility of the approach to your work zone limited by horizontal or vertical curves or other sight line obstructions? If yes, refer to Typical Plan L.7 for information on how to adjust your sign setup to make it more visible.

Are any of the following located within your work zone?

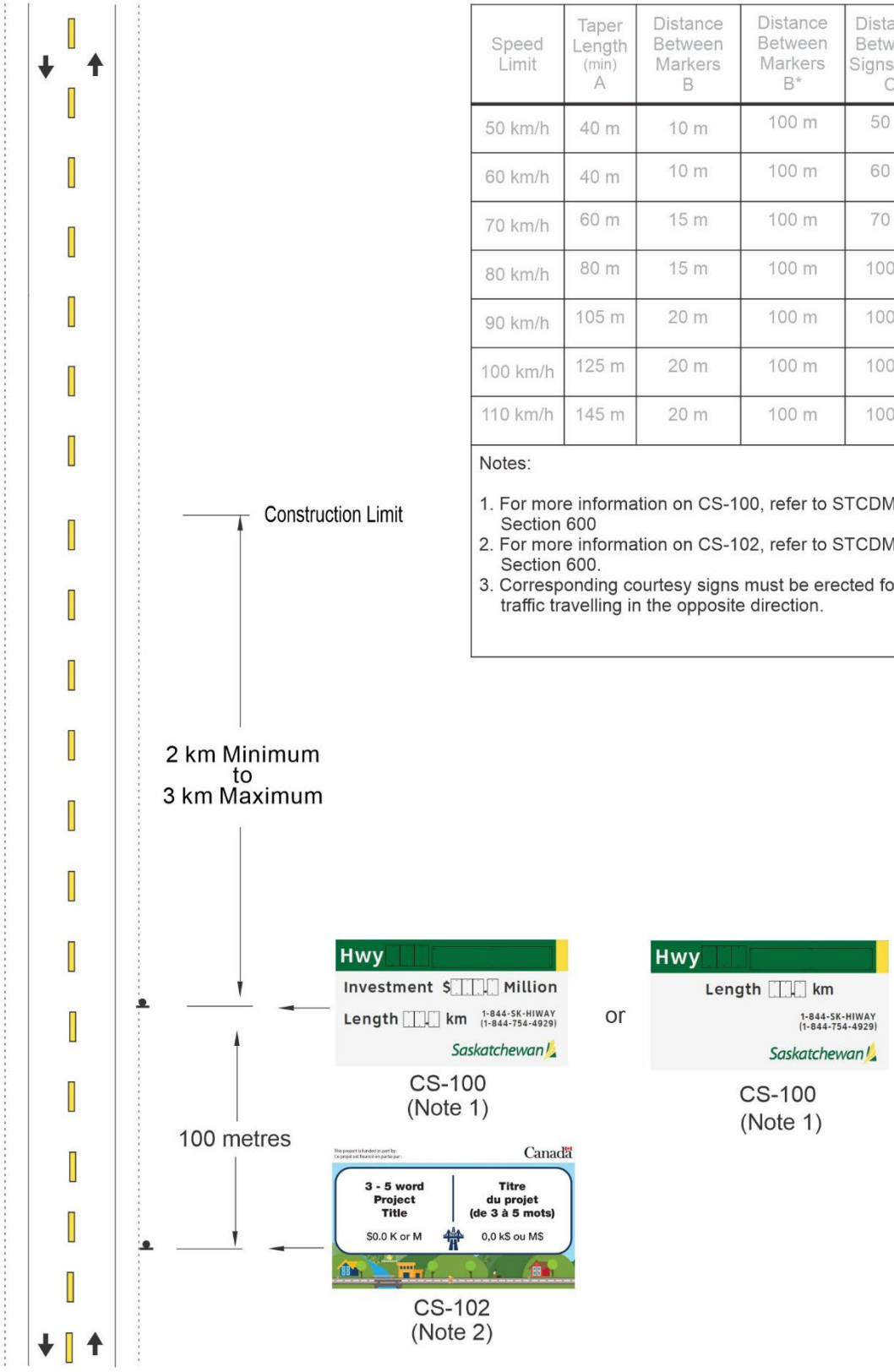
- Cross road intersections. If yes, refer to Typical Plan L.9 to adjust your setup at those locations.
- Exit ramp closures. If yes, refer to Typical Plan I.5 for sign setups.
- At-grade railway crossings. If yes, refer to Typical Plan L.10 for sign setups.

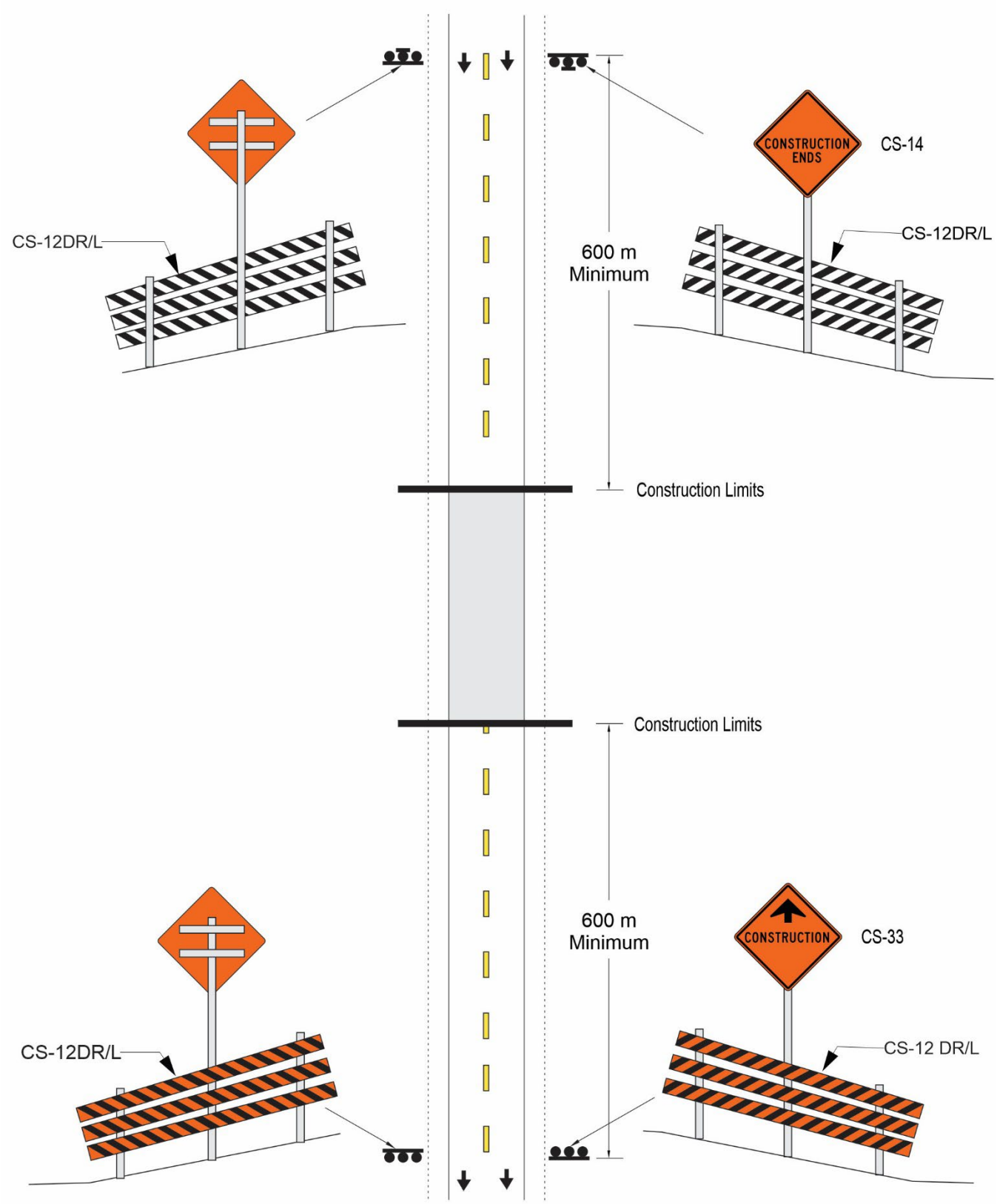
Do you experience long queues entering the work zone? If yes, refer to Typical Plan L.8.

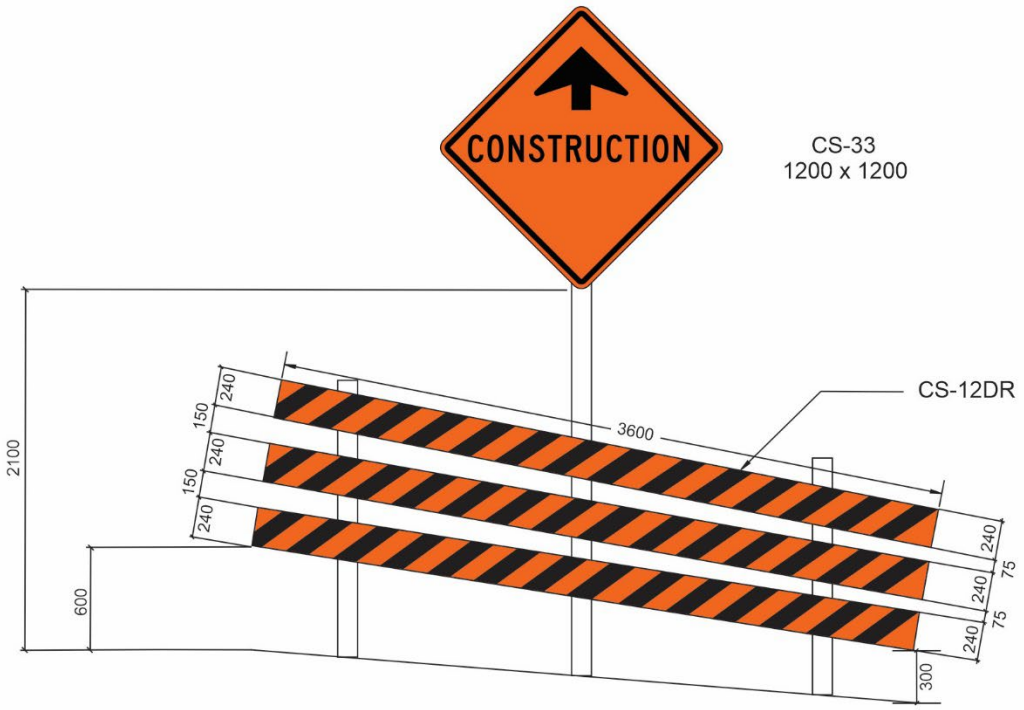
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

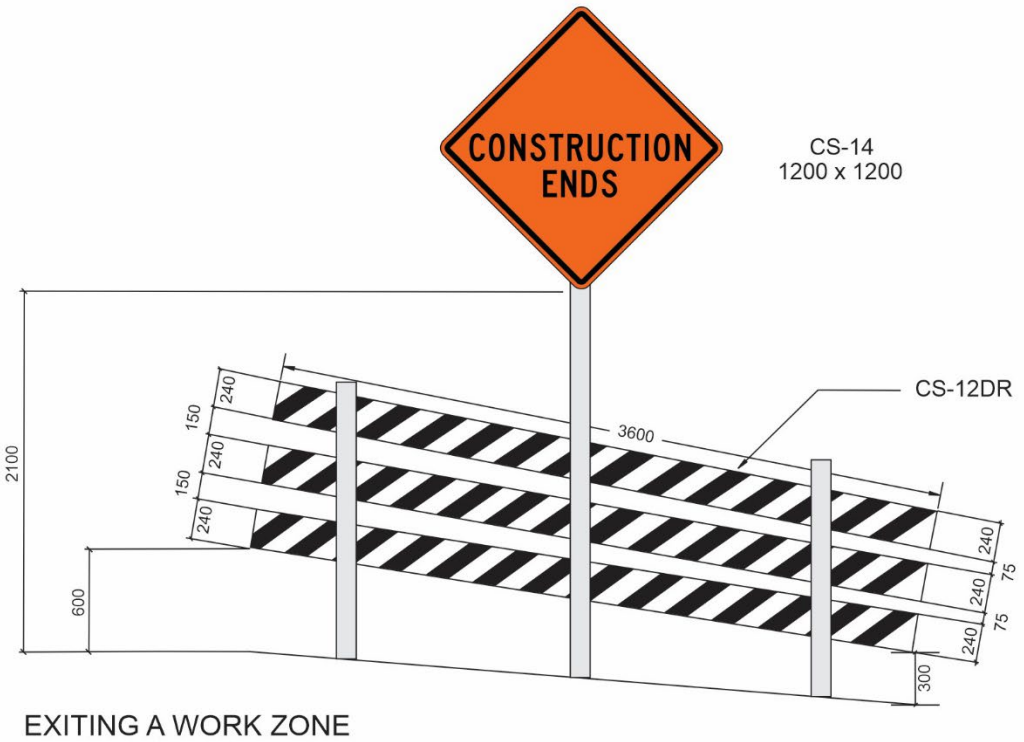
1. For more information on CS-100, refer to STCDM Section 600
2. For more information on CS-102, refer to STCDM Section 600.
3. Corresponding courtesy signs must be erected for traffic travelling in the opposite direction.




CS-12DR/L
CONSTRUCTION ENDS
CS-14
CS-12DR/L
600 m Minimum
Construction Limits
Construction Limits
600 m Minimum
CONSTRUCTION
CS-33
CS-12DR/L
CS-12 DR/L

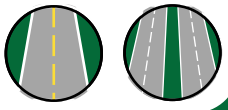


ENTERING A WORK ZONE



EXITING A WORK ZONE

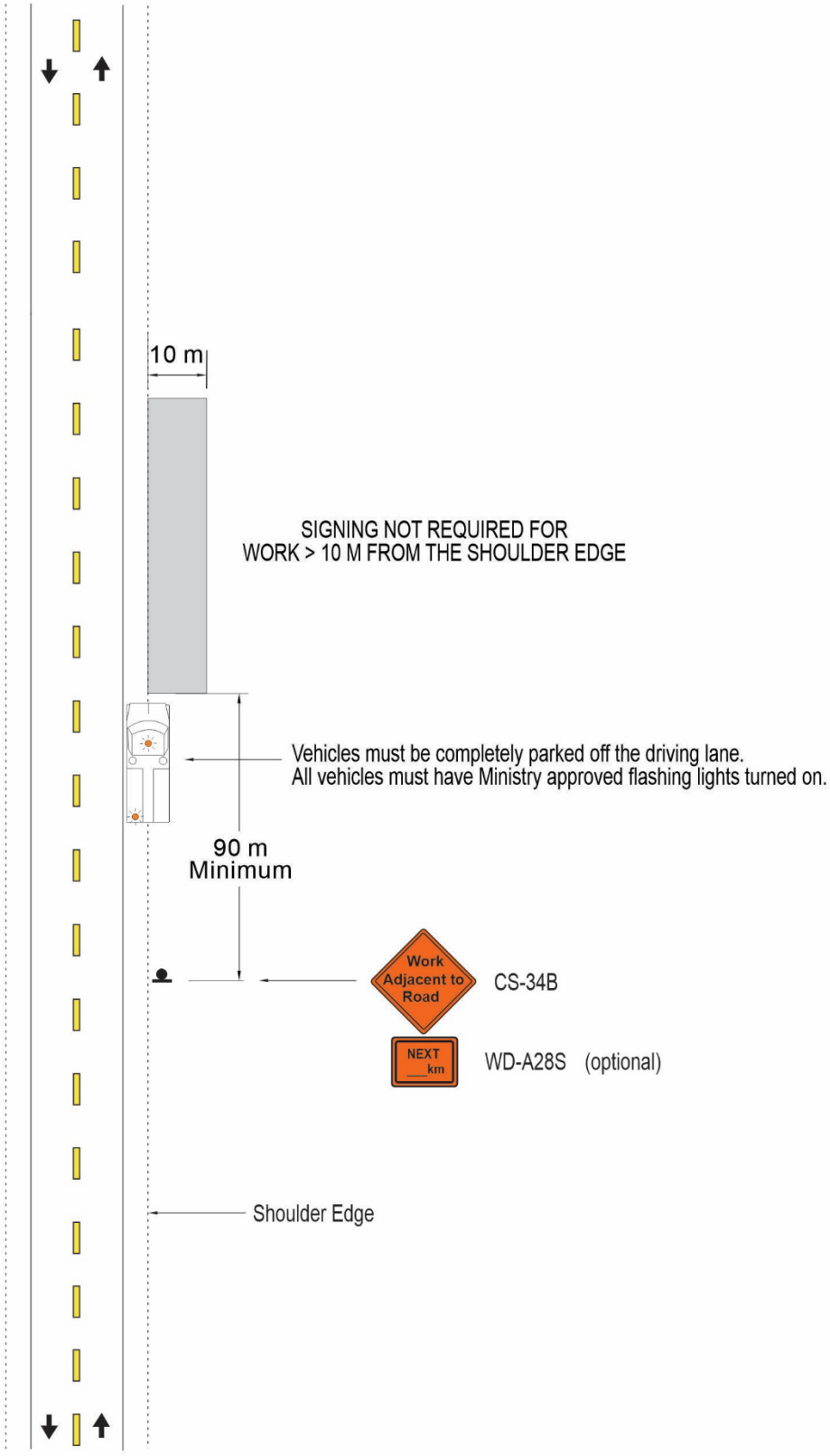
- All dimensions shown in mm



Moving Operation
Brief Duration
Short Duration
Long Duration

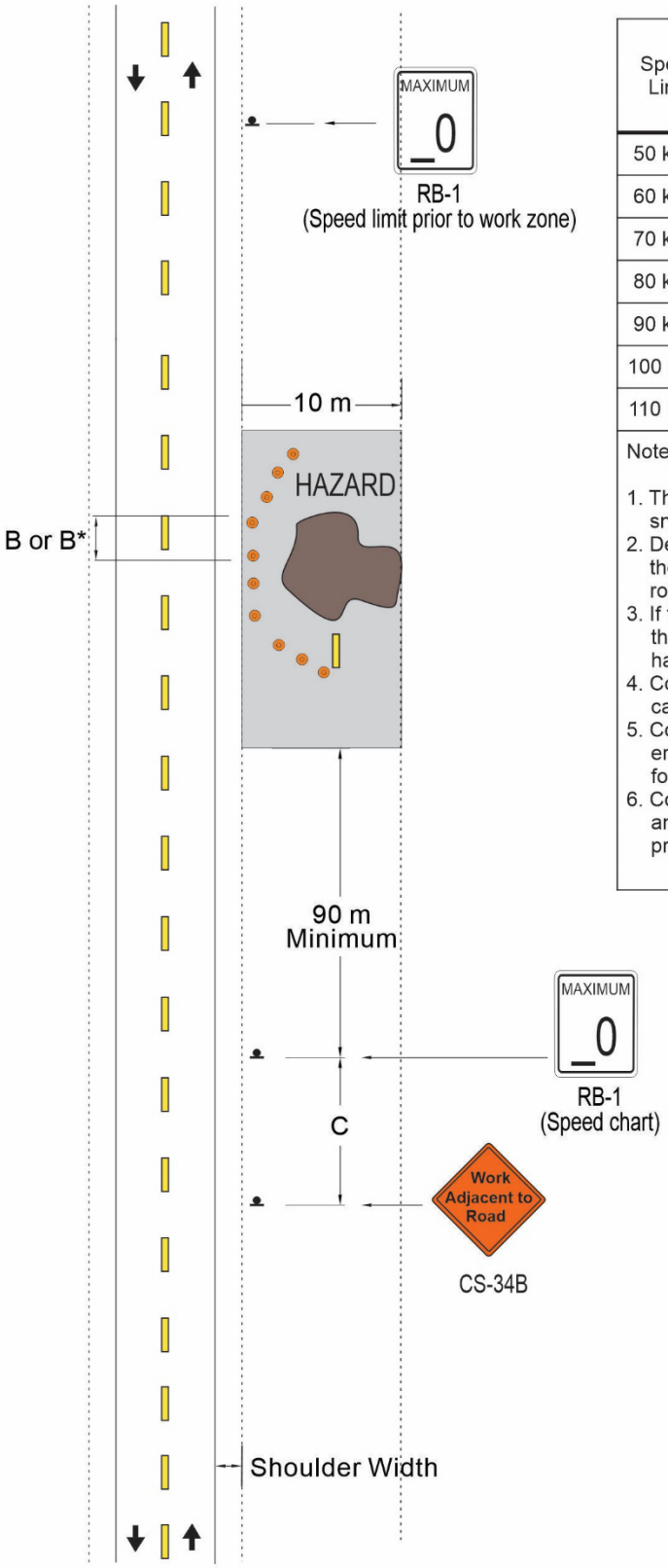
C.1 WORK ADJACENT TO ROADWAY - WITHOUT HAZARD

Revised: May, 2020



C.2 WORK ADJACENT TO ROADWAY - WITH HAZARD

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

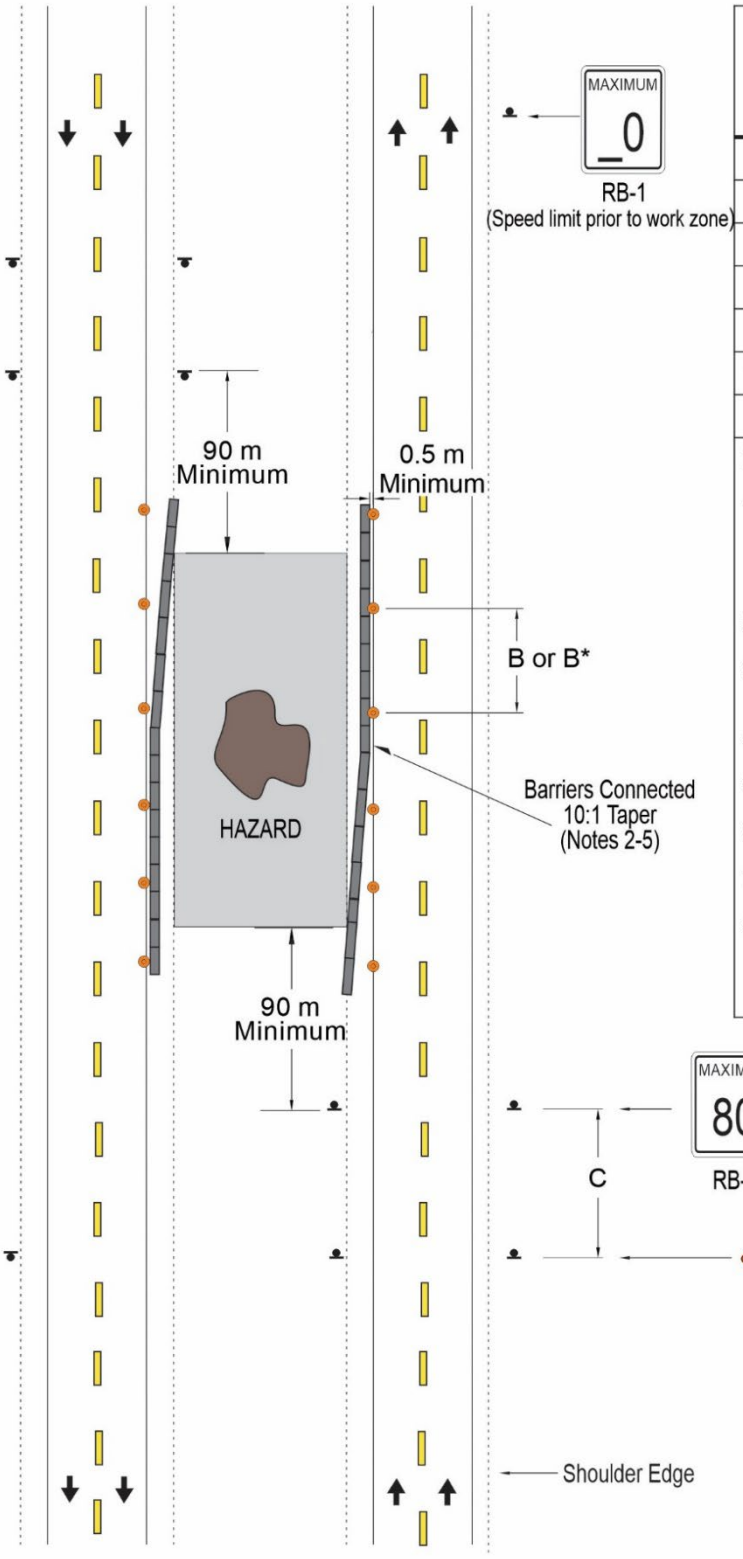
1. The hazard can be delineated using delineators, snow fence or retro-reflective barricades.
2. Delineation of the hazard must be placed as close to the hazard as possible and still be visible from the road surface.
3. If the hazard is located between 10 m and 20 m from the shoulder edge no signing is required but the hazard must be delineated.
4. Concrete barriers shall be used for hazards that may cause severe injury or a fatality upon collision.
5. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
6. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

SPEED CHART (Based on Clear Zone)	
Distance from the road that hazard is located	SPEED LIMIT
≤ 4 meters + Shoulder Width	60 km/h
> 5 and ≤ 6 + Shoulder Width	70 km/h
> 6 and ≤ 7 + Shoulder Width	80 km/h
> 7 and ≤ 8 + Shoulder Width	90 km/h
> 8 and ≤ 9 + Shoulder Width	100 km/h
> 9 and ≤ 10 + Shoulder Width	110 km/h

Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

C.3 WORK WITHIN MEDIAN WITH CONCRETE BARRIERS

Revised: August, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

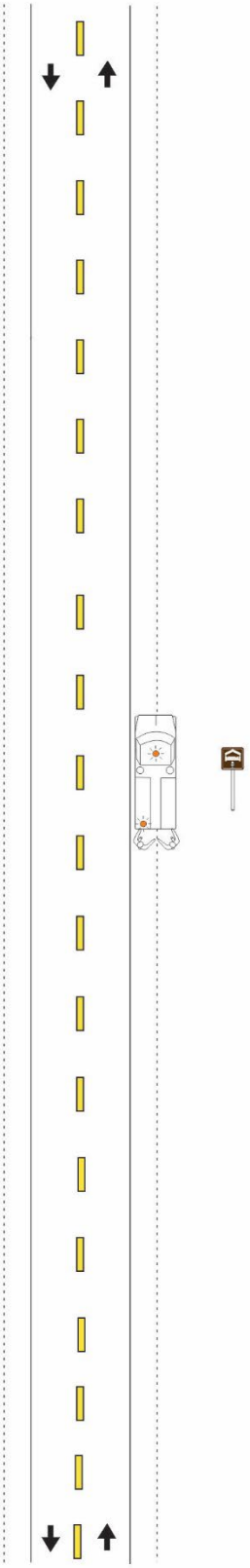
Notes:

1. The regulatory speed shall be reduced to 80 km/h when concrete barriers are used. If the current regulatory speed is lower than the recommended speed no additional speed signs are required, but may be used as a reminder.
2. Interlocking concrete barriers must be used to ensure traffic remains out of the work/hazard site.
3. Concrete barrier must be placed on a flat surface with longitudinal and cross slopes of 10:1 (Horizontal:Vertical) or flatter.
4. Concrete barrier placement must be a minimum of 0.5 m from the driving lane.
5. Taper concrete barrier at the first practical opportunity at a rate of 10:1.
6. ***Reference for crash barrier protection needed from MHI.***
7. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
8. Column B shall be used when workers are present, and column B* maybe used when workers are not present.

D. SHOULDER PLANS

D.1 SIGN INSTALLATION - SHOULDER

Revised: July, 2020

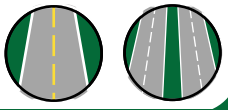


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Amber rotating/flashing lights.
2. Set up unit completely off of the driving lanes, including the outriggers.

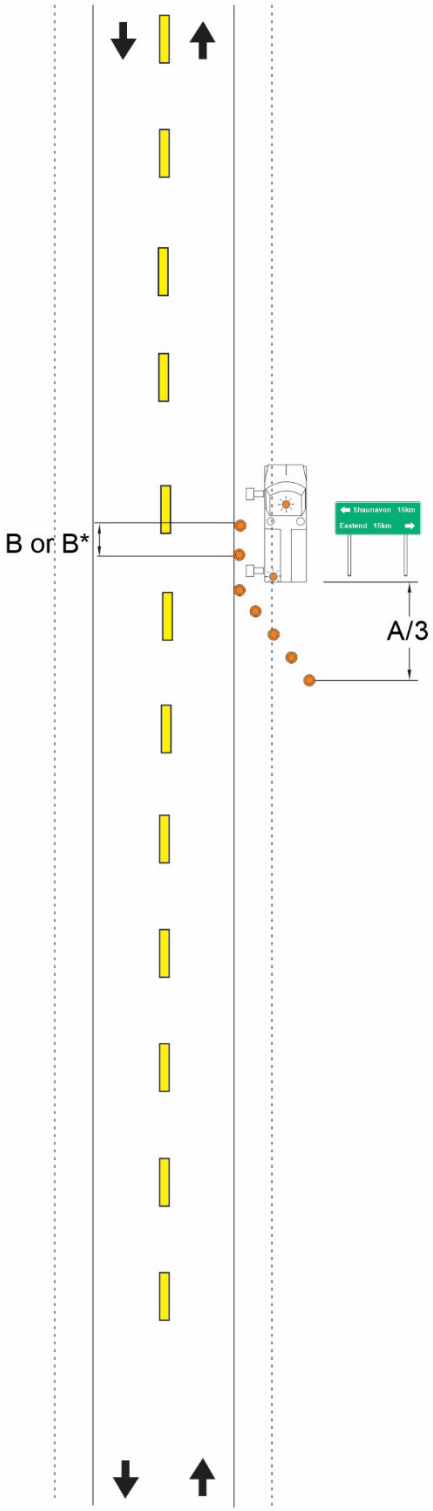
Installation	Highway Classification		
<15 Minutes	4 Lane	2 Lane > 1000 AADT	2 Lane < 1000 AADT
>15 Minutes			2 Lane <1000 AADT



Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

D.2 SIGN INSTALLATION - SHOULDER SHORT DURATION

Revised: August, 2020



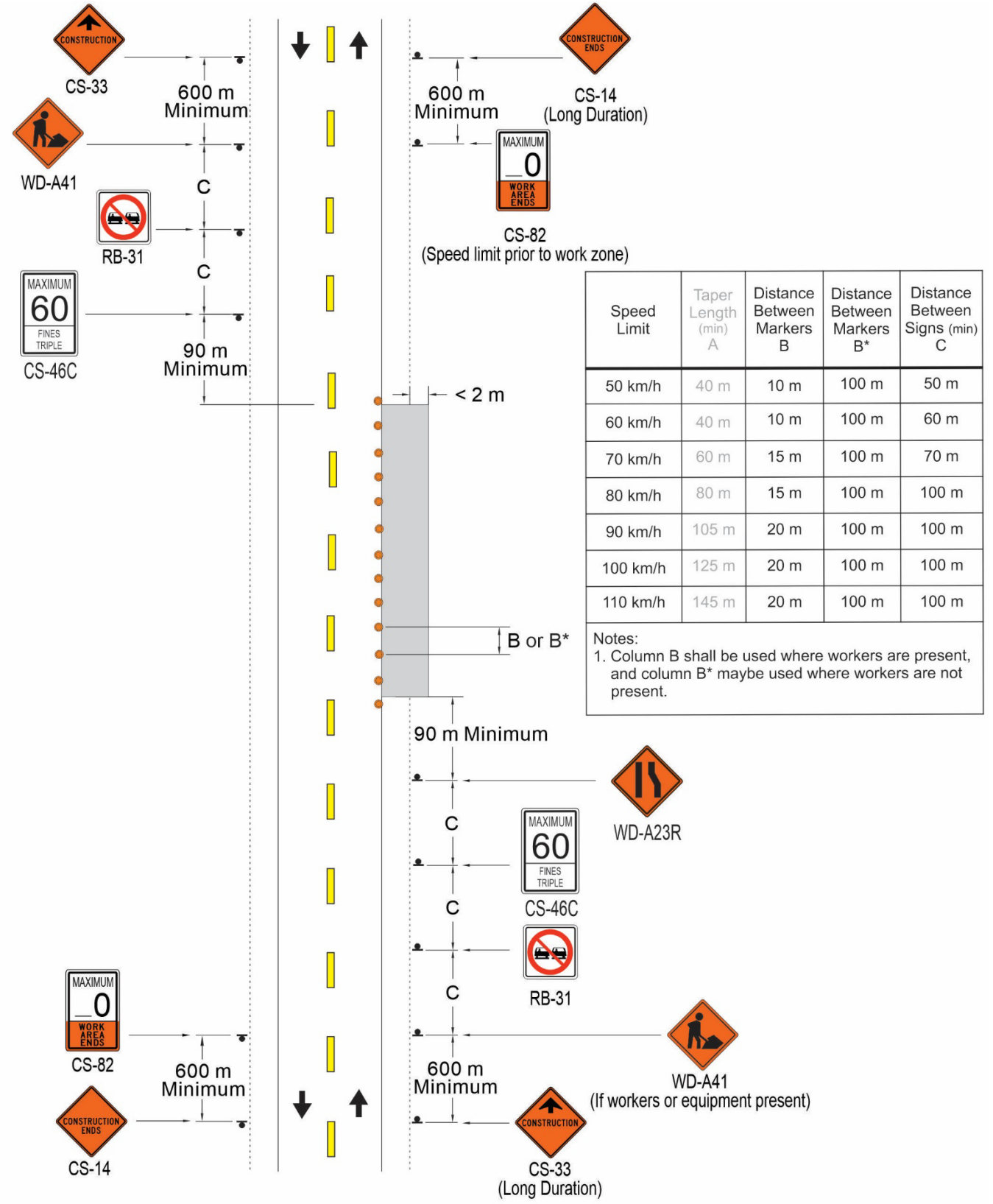
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Amber rotating/flashing lights, either cones and/or unit mounted light board.
2. Set up unit completely off of the driving lanes, including the outriggers.
3. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Installation	Highway Classification	
>15 Minutes	4 Lane	2 Lane >1000 AADT

D.3 WORK ON SHOULDER

Revised: July, 2020



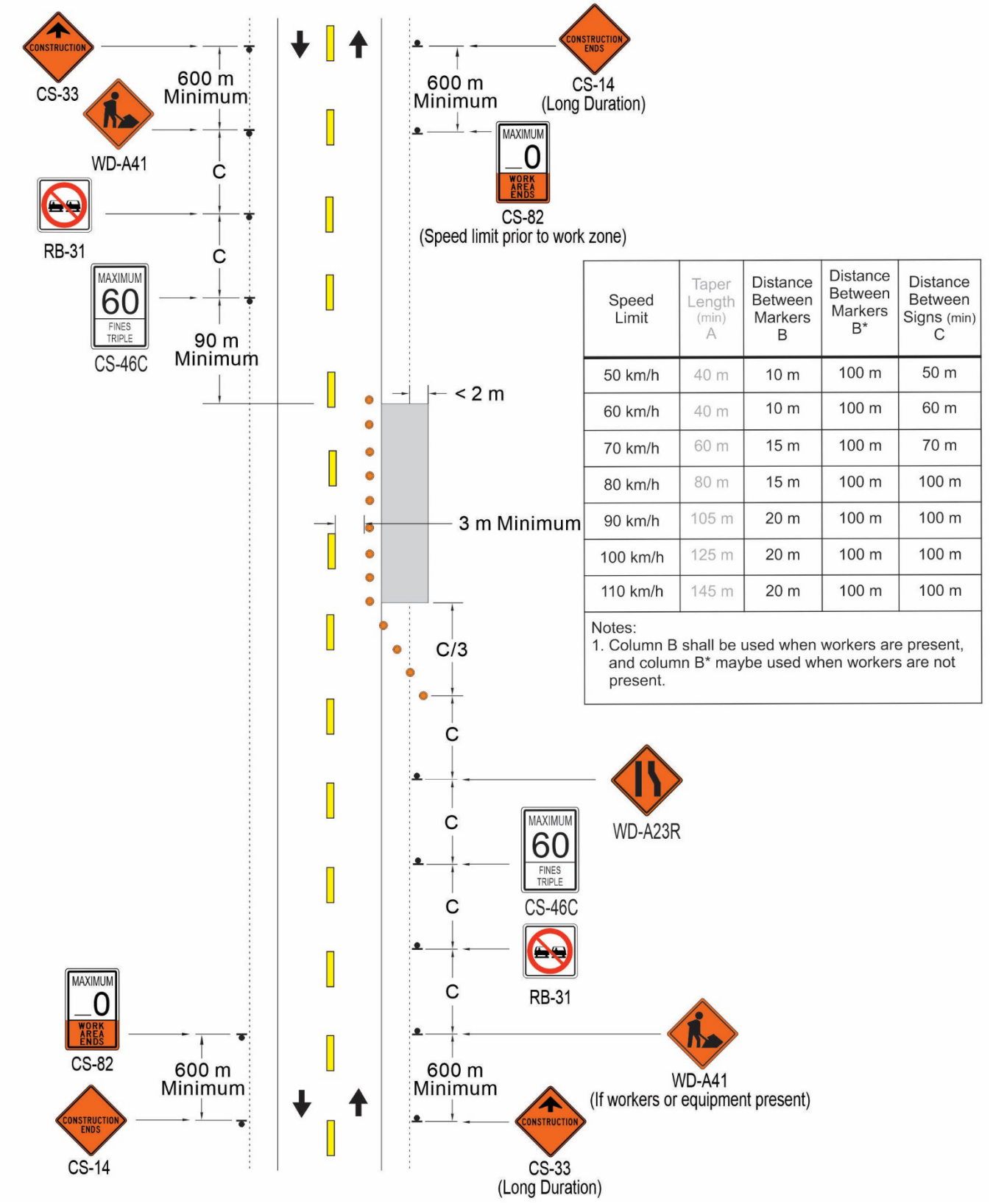
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

E. LANE ENCROACHMENT

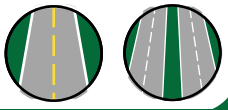
E.1 LANE ENCROACHMENT

Revised May 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

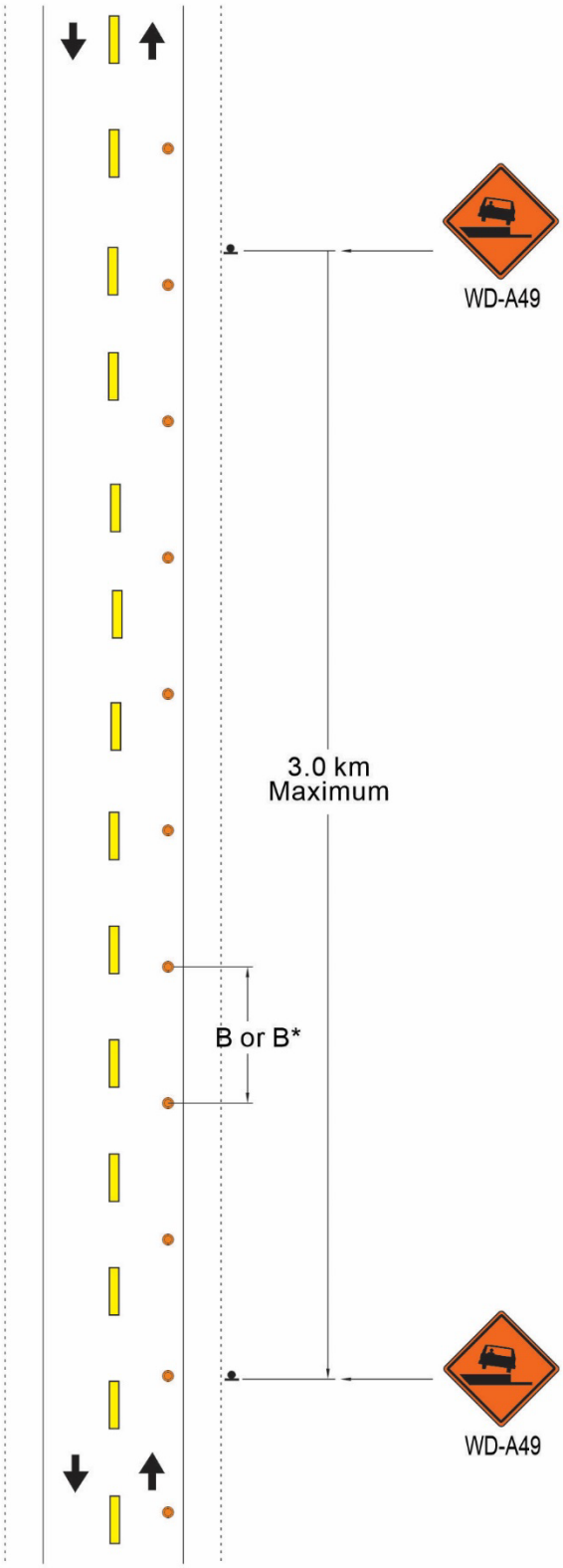
Notes:
1. Column B shall be used when workers are present, and column B* maybe used when workers are not present.



Moving Operation
Brief Duration
Short Duration
Long Duration

E.2 PAVEMENT EDGE DROP-OFF - TRAVELED WAY

Revised May 2020



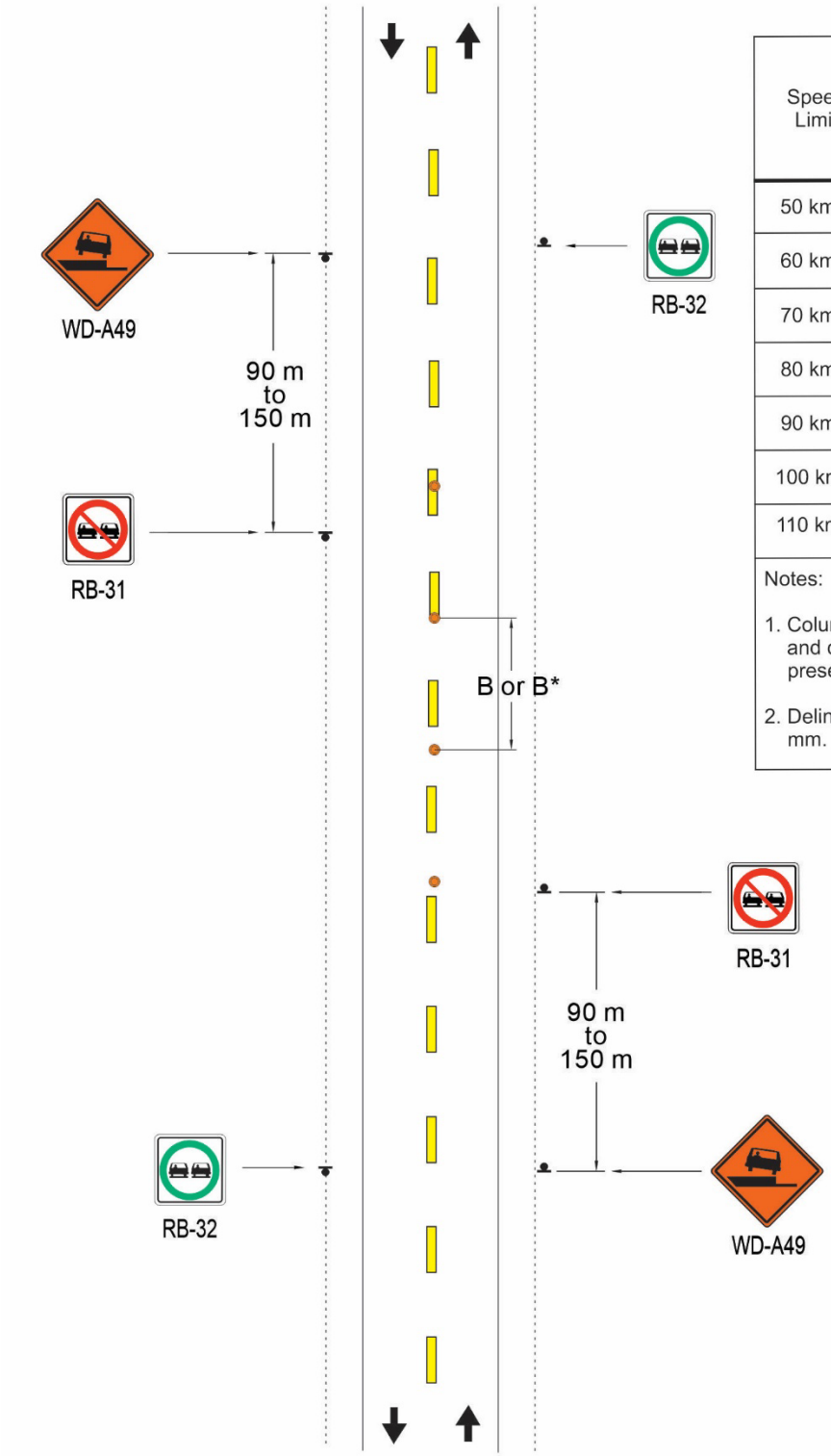
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Column B shall be used when workers are present, and column B* maybe used when workers are not present.

2. Delineate pavement drop-off when it exceeds 60 mm.

E.3 PAVEMENT EDGE DROP-OFF - CENTRELINE

Revised May 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

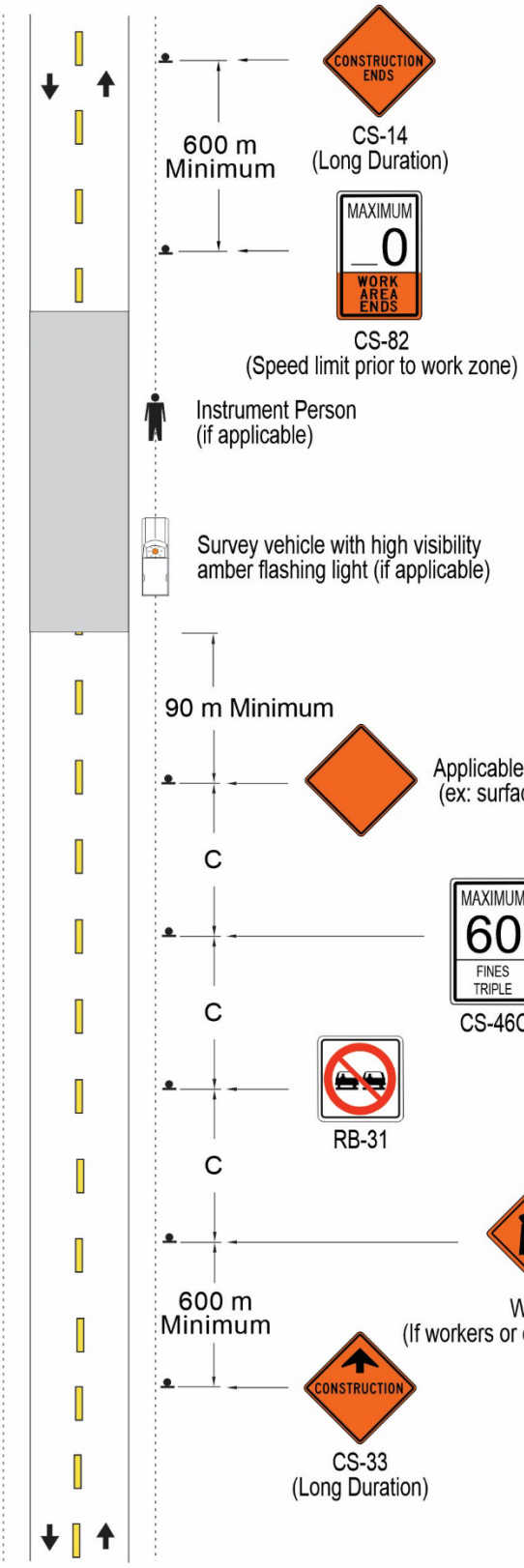
Notes:

1. Column B shall be used when workers are present, and column B* maybe used when workers are not present.
2. Delineate pavement drop-off when it exceeds 60 mm.

F. OPEN ROAD UNDER REPAIR

F.1 WORKERS PRESENT - NO FLAGGING

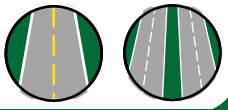
Revised: July 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

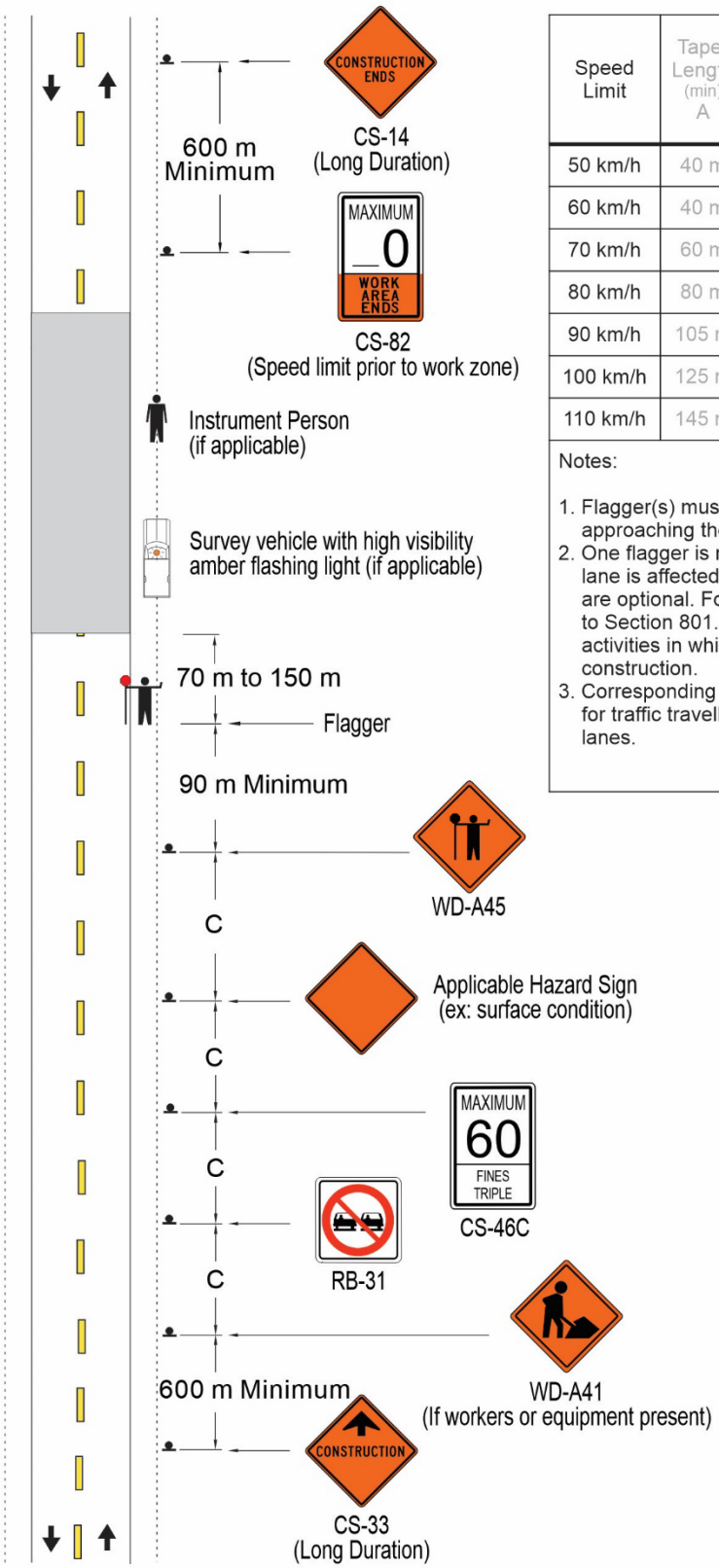
1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.



Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ●

F.2 WORKERS PRESENT - FLAGGING

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	20 m	100 m	70 m
80 km/h	80 m	30 m	100 m	100 m
90 km/h	105 m	40 m	100 m	100 m
100 km/h	125 m	50 m	100 m	100 m
110 km/h	145 m	50 m	100 m	100 m

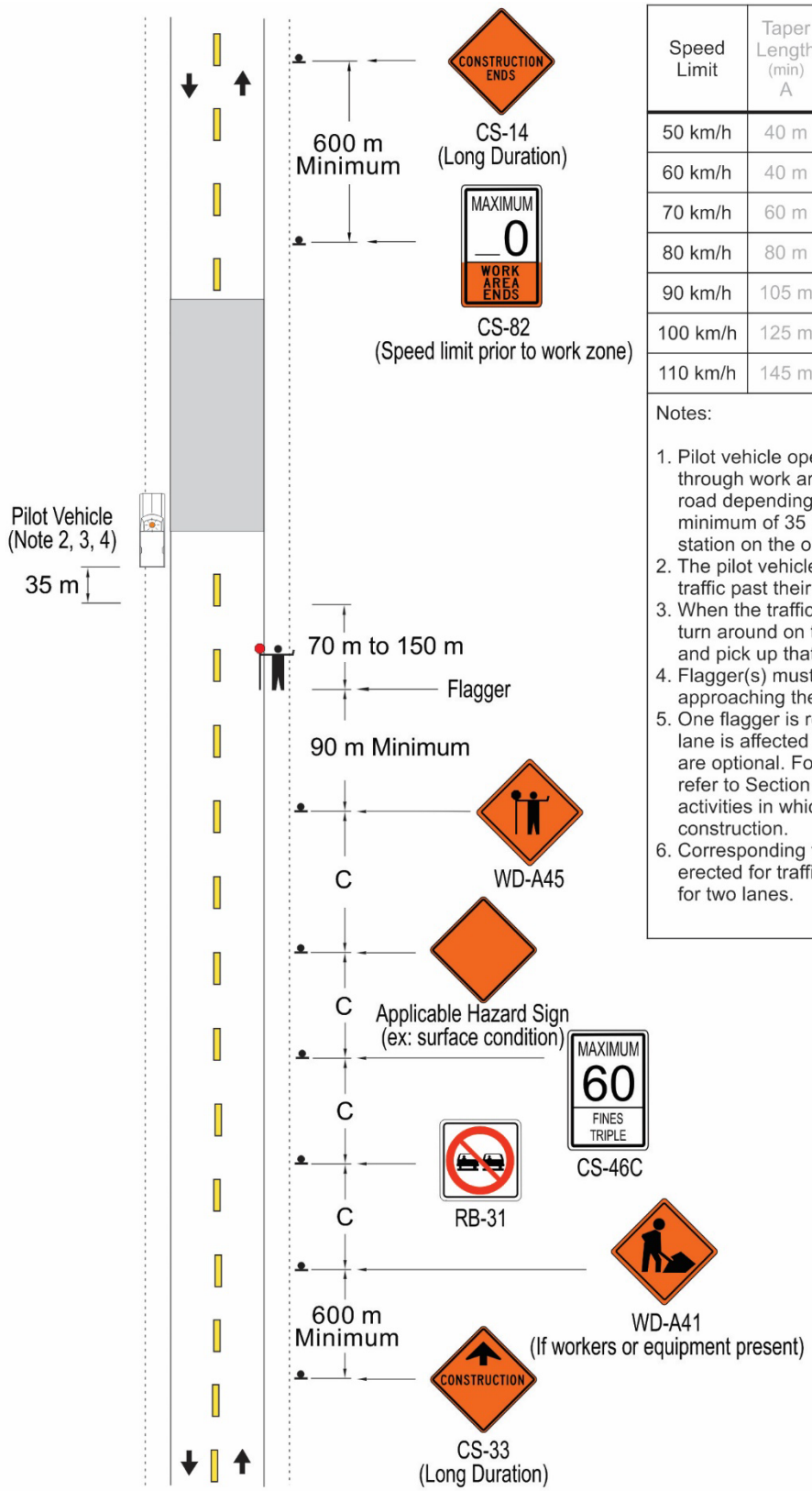
Notes:

1. Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 m.
2. One flagger is required for all activities in which one lane is affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801. Two flaggers are required for all activities in which both lanes are being affected by construction.
3. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.

Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ●

F.3 PILOT VEHICLE OPERATION

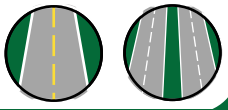
Revised: Sept. 2019



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

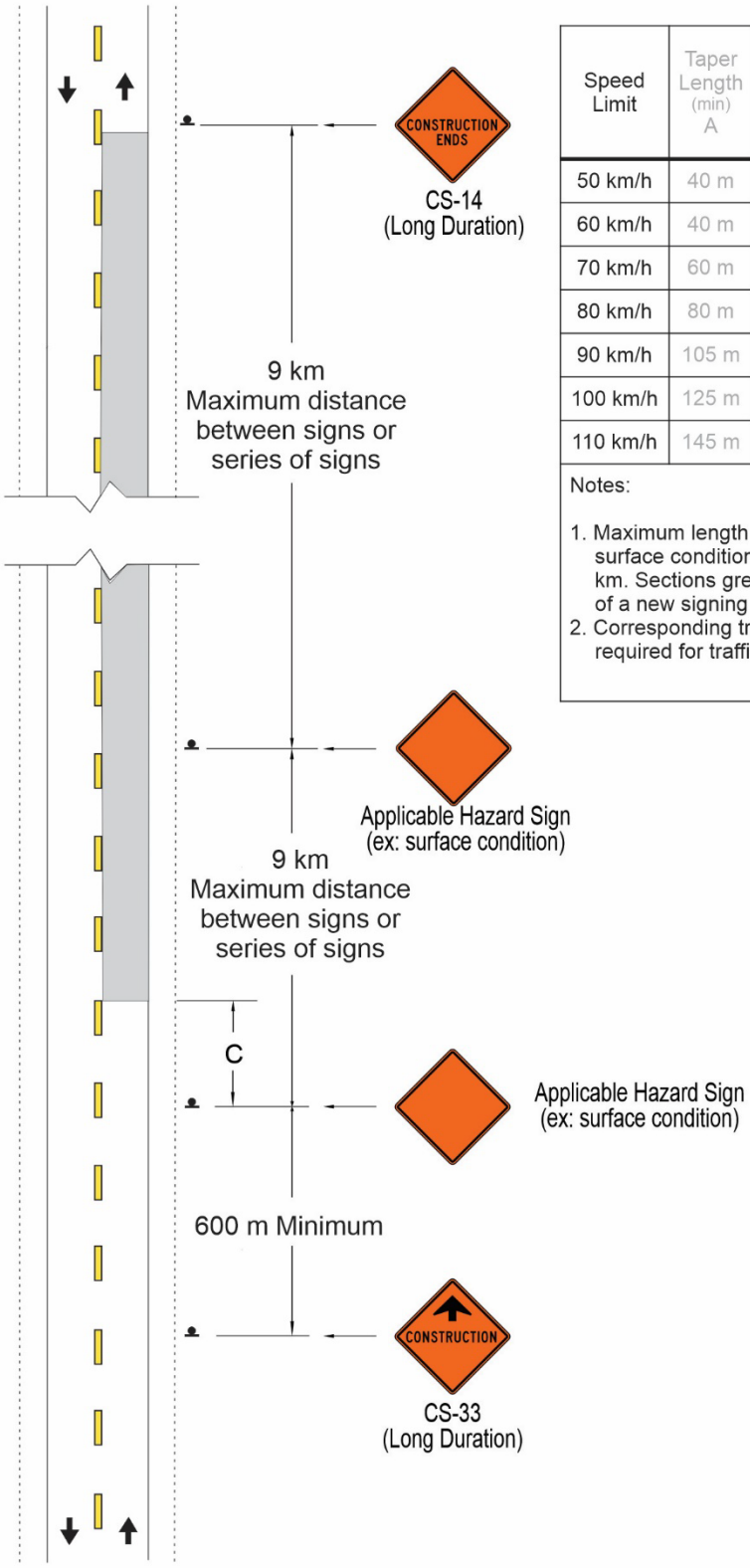
1. Pilot vehicle operator would escort line of traffic through work area, move over to right/left shoulder of road depending on the direction of work, to a minimum of 35 metres in advance of the flagger station on the opposing lane and stop.
2. The pilot vehicle operator would wave the escorted traffic past their position.
3. When the traffic had cleared and it was safe to do so, turn around on the road surface in front of the flagger and pick up that lane of traffic.
4. Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 m.
5. One flagger is required for all activities in which one lane is affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801. Two flaggers are required for all activities in which both lanes are being affected by construction.
6. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.



Moving Operation
Brief Duration
Short Duration
Long Duration

F.4 NO WORKERS PRESENT

Revised: July, 2020



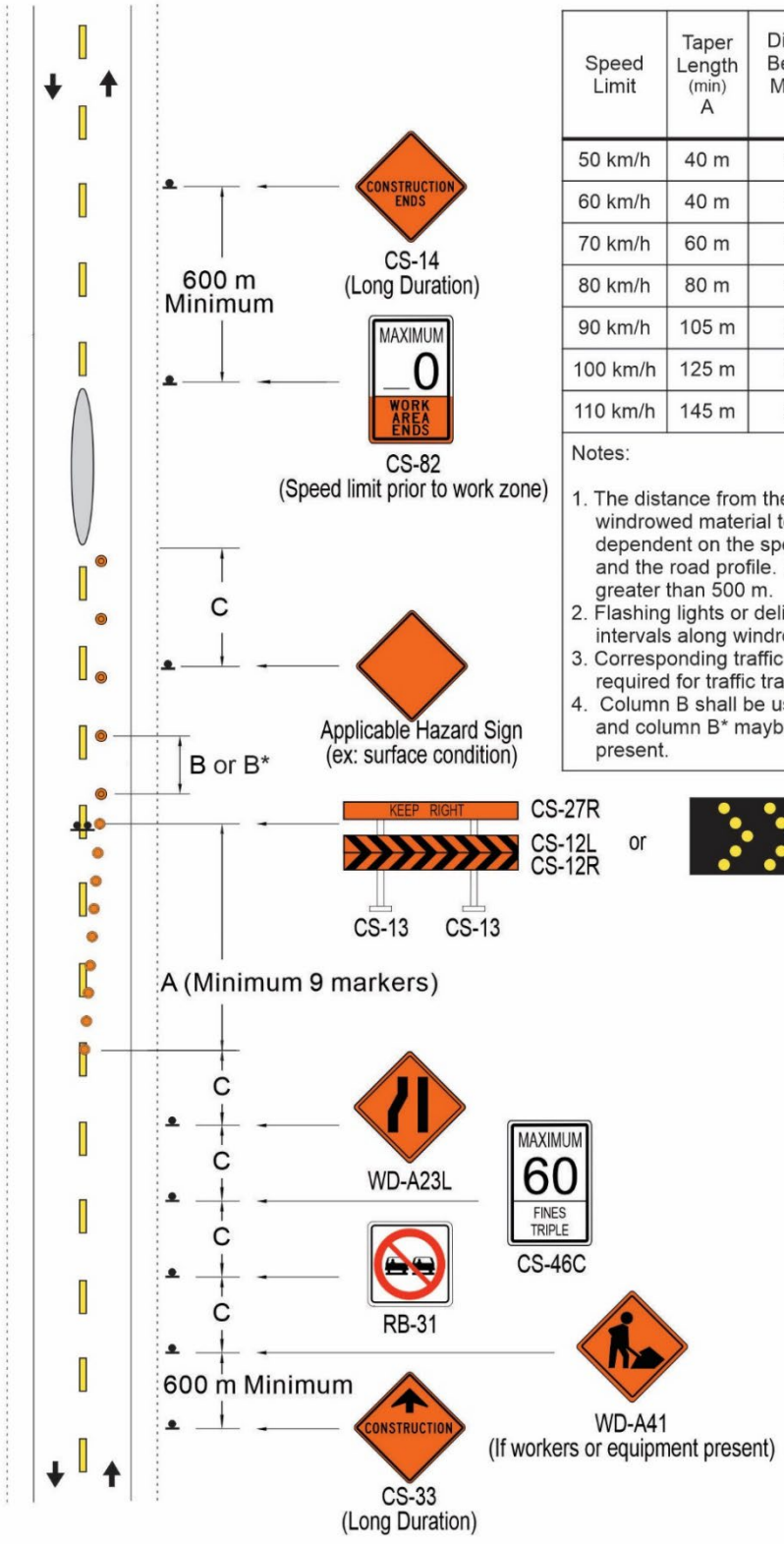
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Maximum length of section with no temporary surface conditions allowed within a signing zone is 2 km. Sections greater than 2 km necessitate the start of a new signing zone.
2. Corresponding traffic control devices may be required for traffic travelling in the opposite direction.

F.5 CENTRELINE SURFACE AFFECTED

Revised: July, 2020

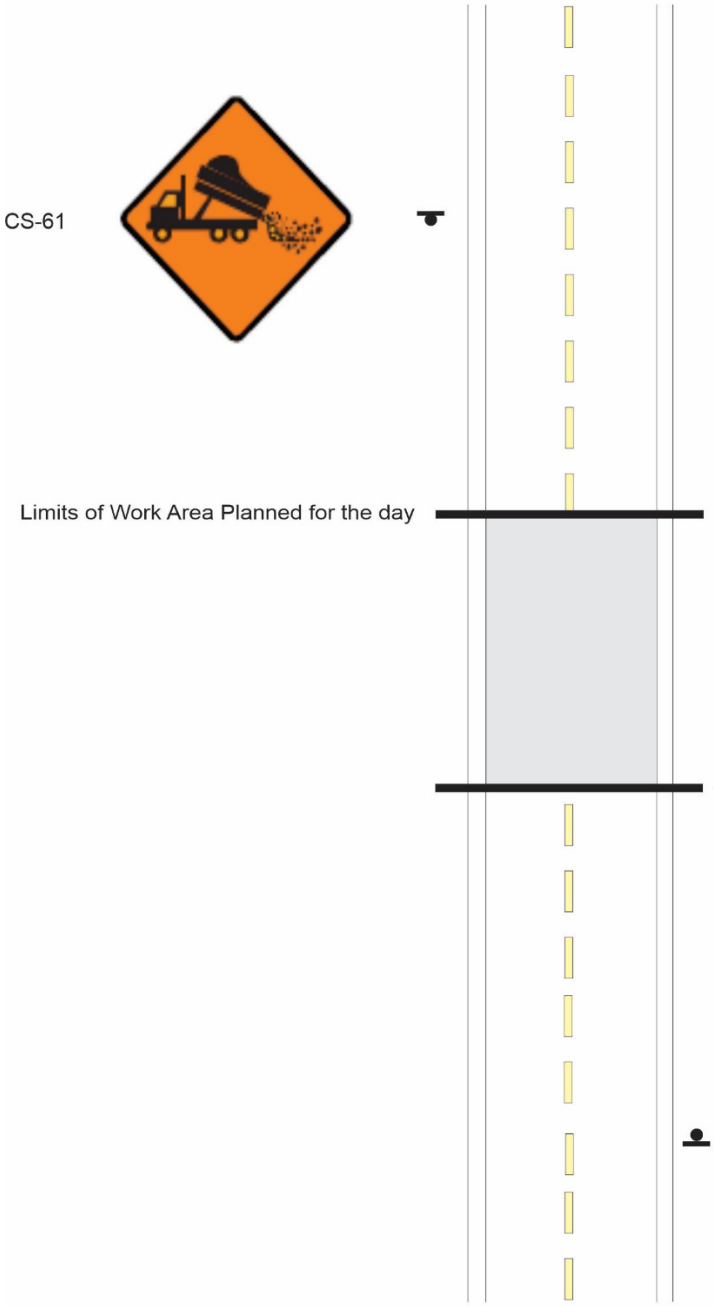


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. The distance from the lead end of the piled or windrowed material to the barricade shall be dependent on the speed of the contractor's operation and the road profile. In no case must this distance be greater than 500 m.
2. Flashing lights or delineators must be spaced at "C" intervals along windrow and fresh oil let over night.
3. Corresponding traffic control devices must be required for traffic travelling in the opposite direction.
4. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

F.6 GRAVELING IN PROGRESS



Notes:

Only graveling projects satisfying all of the following criteria are eligible to use the Graveling in Progress Sign option:

- Utilizing bottom/belly dump gravel trailers, where the gravel is spread evenly across the road surface minimizing the hazard to the public;
- On a highway located in the Northern Region;
- On a highways with an AADT ≤ 200;
- In daylight hours only; and
- With no other equipment or workers on the road surface.

In addition to the Graveling in Progress signs, the following shall also be implemented:

- Trucks to wait until all traffic has cleared the work area before spreading gravel;
- All equipment must have headlights and rotating lights on; and
- Additional warning devices due to site-specific conditions, such as poor sight lines, major intersections, etc.

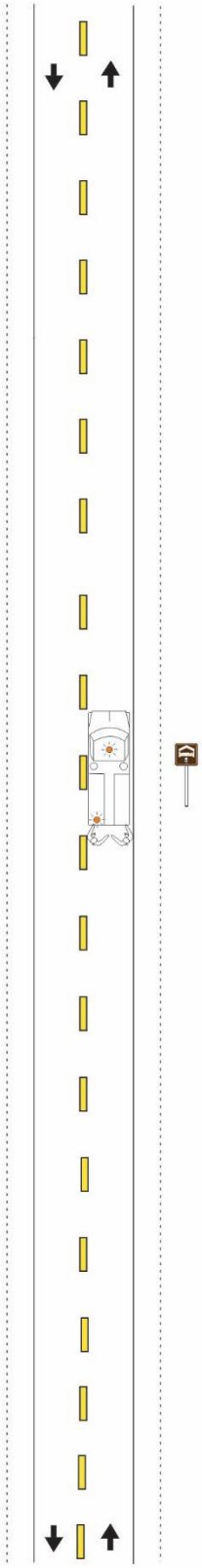
If these conditions cannot be met, Sign Plan TCDMWZ F.1, shall be used.

For additional information, see TB 404-W CS-61 TB-01 in Section 600 of the STCDM

G. SINGLE LANE CLOSED

G.1 SIGN INSTALLATION - 2 LANE - LESS THAN 15 MINUTES

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

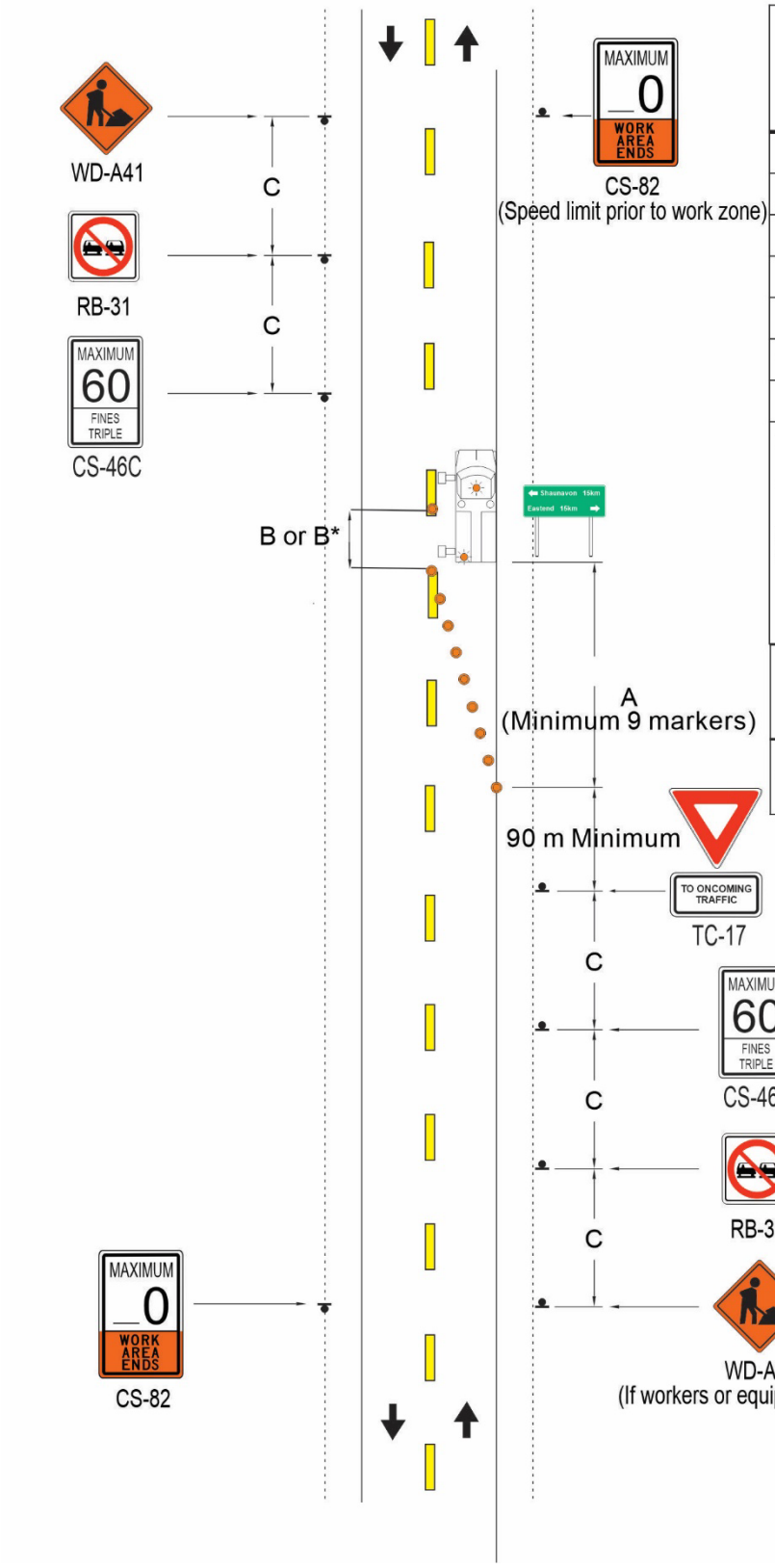
Notes:

1. Amber rotating/flashing lights.
2. Unit is setup wholly or partially in the driving lane.

Installation	Highway Classification	
<15 Minutes	2 Lane >1000 AADT	2 Lane <1000 AADT

G.2 SIGN INSTALLATION - 2 LANE - MORE THAN 15 MINUTES

Revised: July, 2020

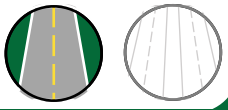


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min)
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Amber rotating/flashing lights, either cones and/or unit mounted light board.
2. Unit is setup wholly or partially in the driving lane.
3. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

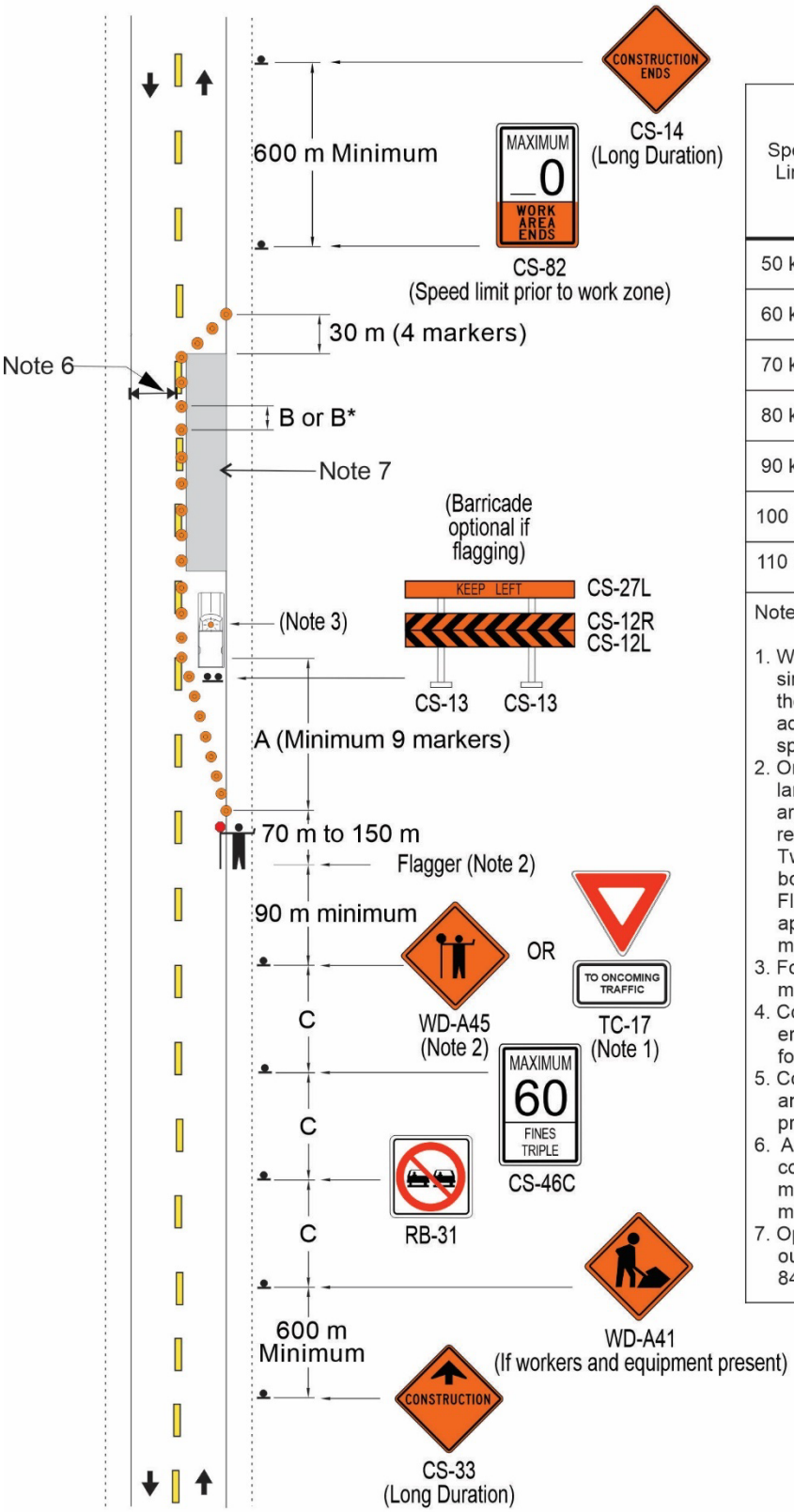
Installation	Highway Classification	
>15 Minutes	2 Lane >1000 AADT	2 Lane <1000 AADT



Moving Operation
Brief Duration
Short Duration
Long Duration

G.3 TWO LANE (INCLUDING OPEN CUT)

Revised: January, 2022



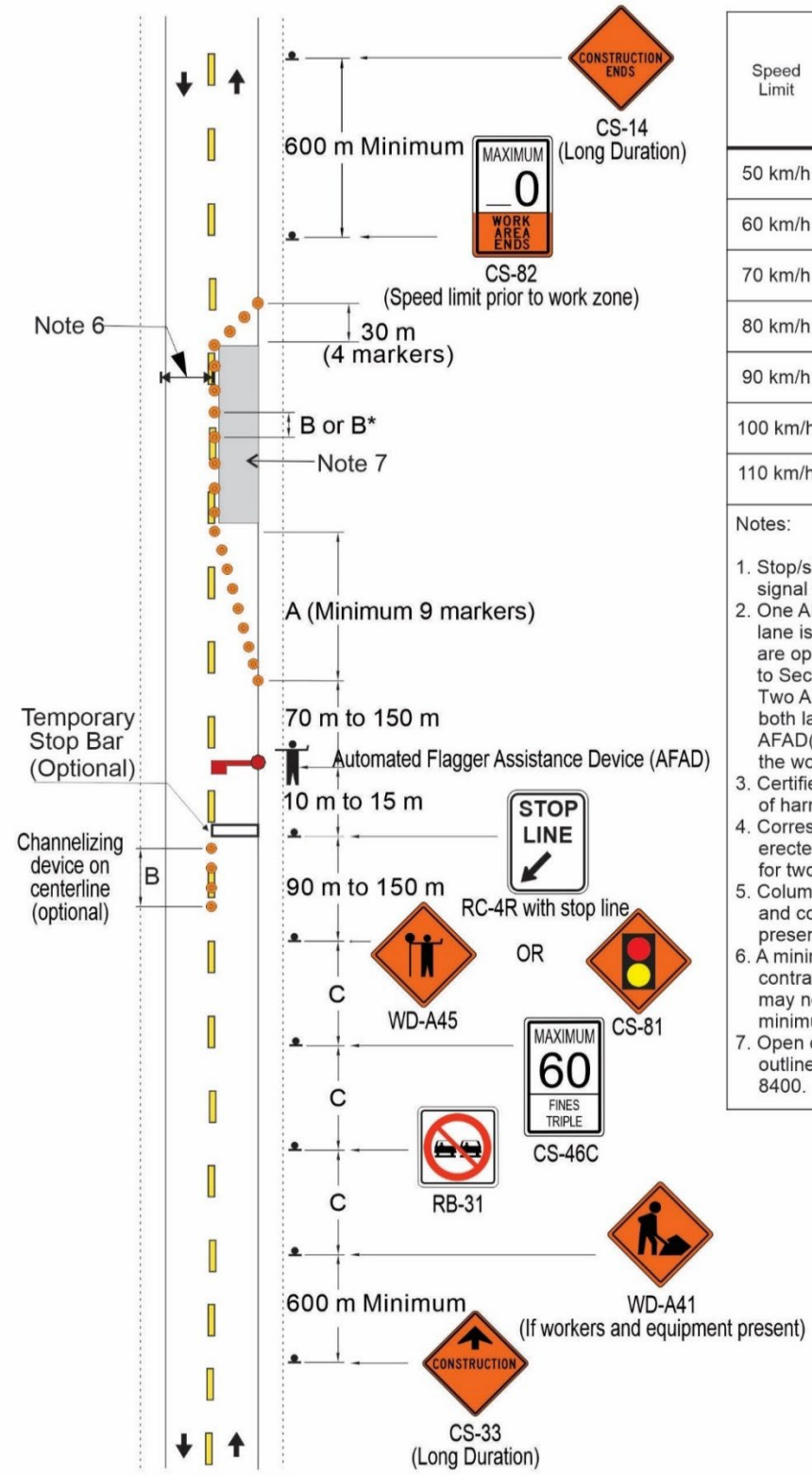
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. When flagger isn't on duty and two-way traffic in a single lane is required a TC-17 sign may be used if the location has short single lane operation, adequate sight distance, low traffic volumes and low speeds.
2. One flagger is required for all activities in which one lane is affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801.
   Two flaggers are required for all activities in which both lanes are being affected by construction. Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 metres.
3. For testing services a safety truck with rotating lights may be used in place of flashing light board.
4. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
5. Column B shall be used where workers are present, and column B* may be used where workers are not present.
6. A minimum of 3.5 metre lane width, or as per the contract, must remain open to traffic. The shoulder may need to be temporarily widened to meet the minimum width.
7. Open excavation must follow the guidance as outlined in Specification for Traffic Accommodation 8400.

G.4 AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)/OPEN CUT

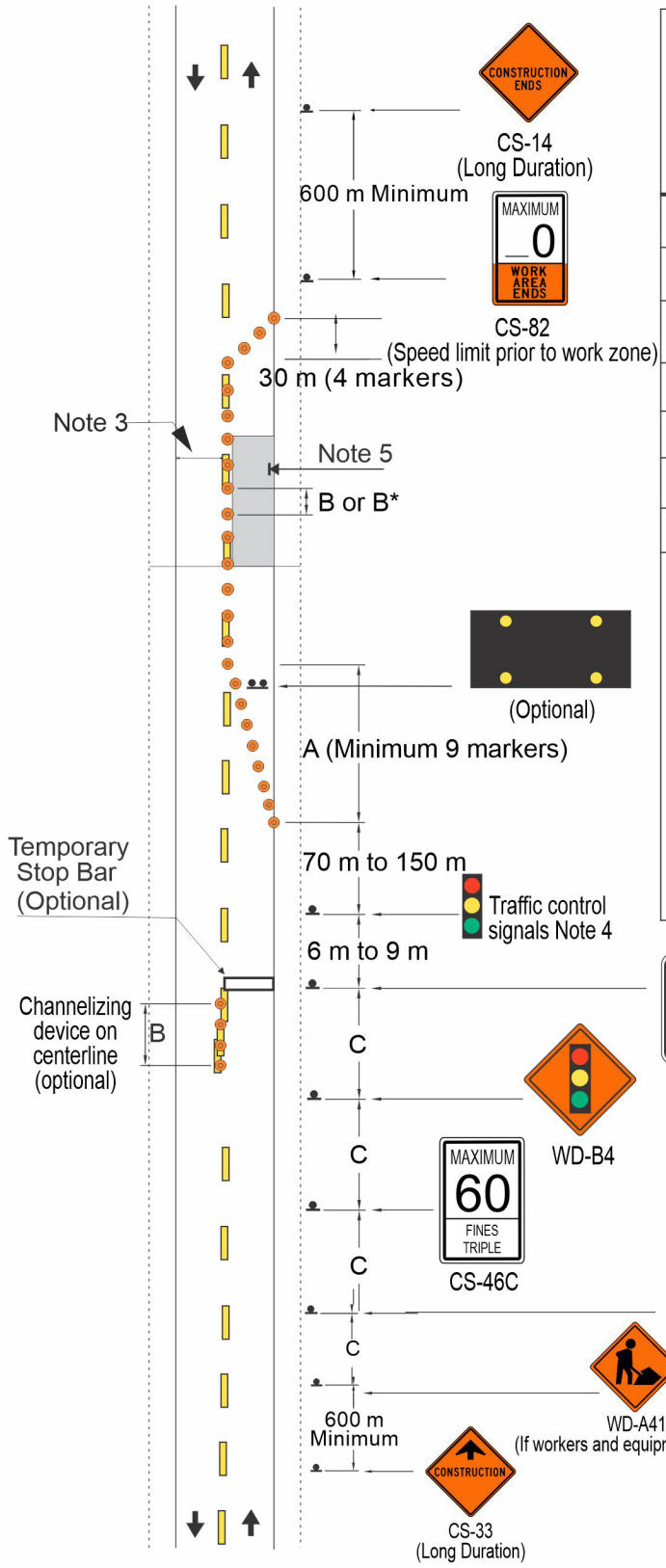
Revised: January, 2022



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Stop/slow type AFAD requires WD-A45, red/amber signal type AFAD requires CS-81.
2. One AFAD is required for all activities in which one lane is affected by construction. Additional AFADs are optional. For when to use additional AFADs refer to Section 801.
   Two AFADs are required for all activities in which both lanes are being affected by construction. AFAD(s) shall be visible to the motorists approaching the work zone for a minimum of 125 metres.
3. Certified flagger must be visible to motorists and out of harm's way.
4. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
5. Column B shall be used where workers are present, and column B* may be used where workers are not present.
6. A minimum of 3.5 metre lane width, or as per the contract, must remain open to traffic. The shoulder may need to be temporarily widened to meet the minimum width.
7. Open excavation must follow the guidance as outlined in Specification for Traffic Accommodation 8400.



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

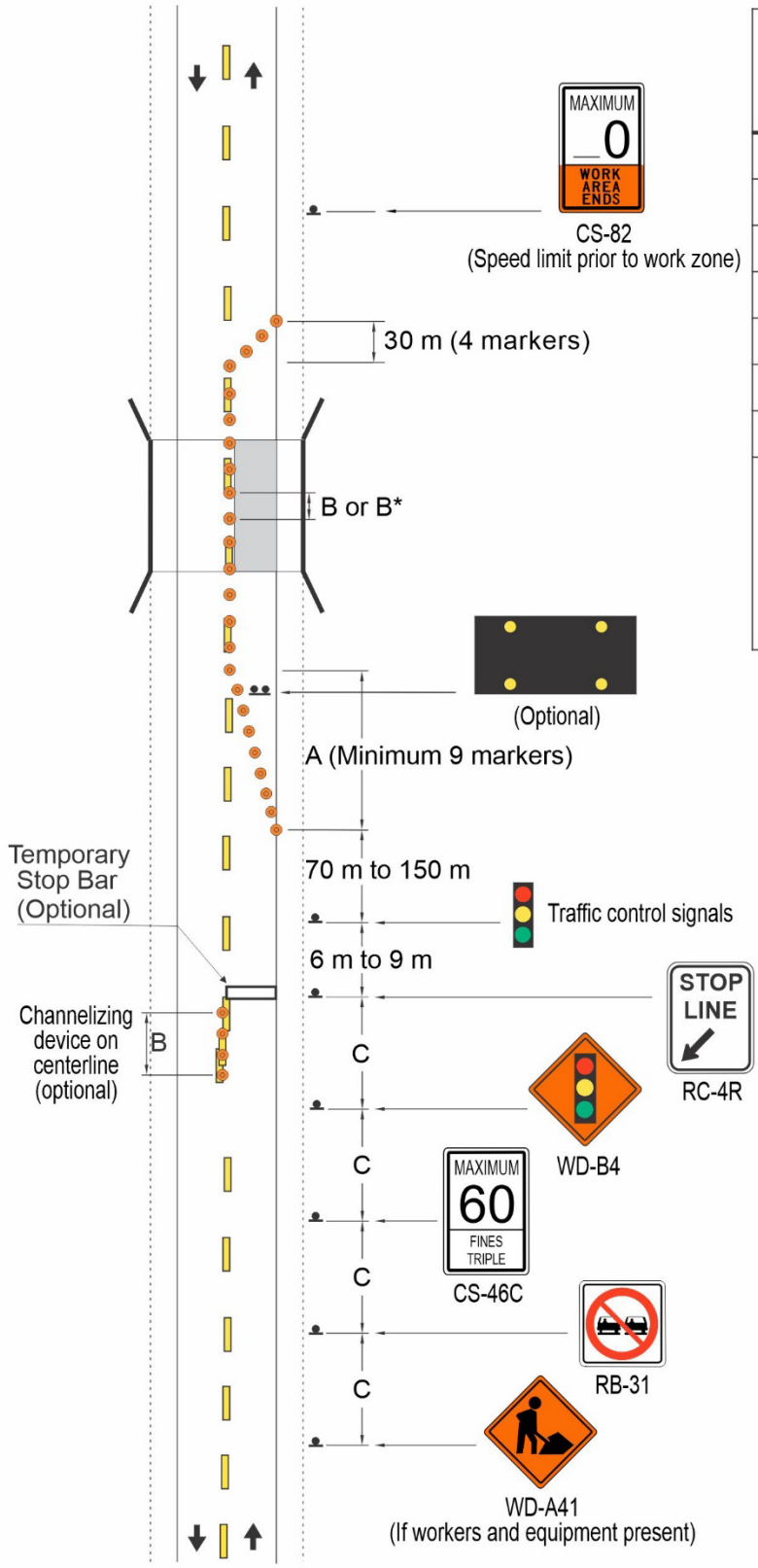
Notes:

1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.
3. A minimum of 3.5 metres lane width, or as per the contract, must remain open to traffic. The shoulder may need to be temporarily widened to meet the minimum width.
4. See TCDMWZ Section 804, for more information on the use of Temporary Traffic Control.
5. Open excavation must follow the guidance as outline in Specification for Traffic Accommodation 8400.

Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

G.5 TWO LANE BRIDGE - TRAFFIC SIGNAL SHORT DURATION

Revised: April, 2022



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

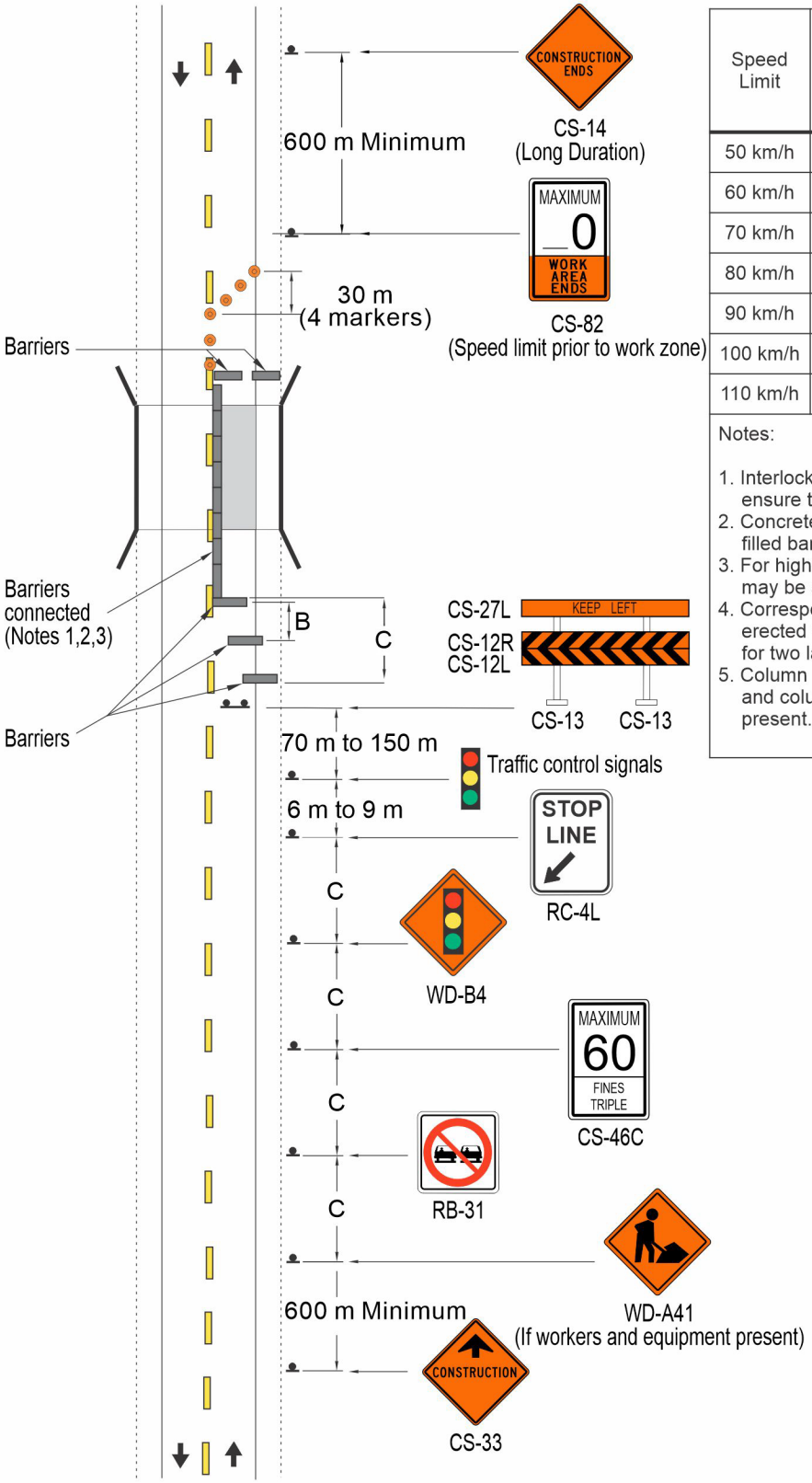
Notes:

1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

G.6 TWO LANE BRIDGE - TRAFFIC SIGNAL LONG DURATION

Revised: April 2022



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Interlocking concrete barricades will be used to ensure traffic remains out of the work area.
2. Concrete barriers may be replaced with water/sand filled barriers.
3. For highways with AADT < 400, concrete barriers may be substituted by cones.
4. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
5. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

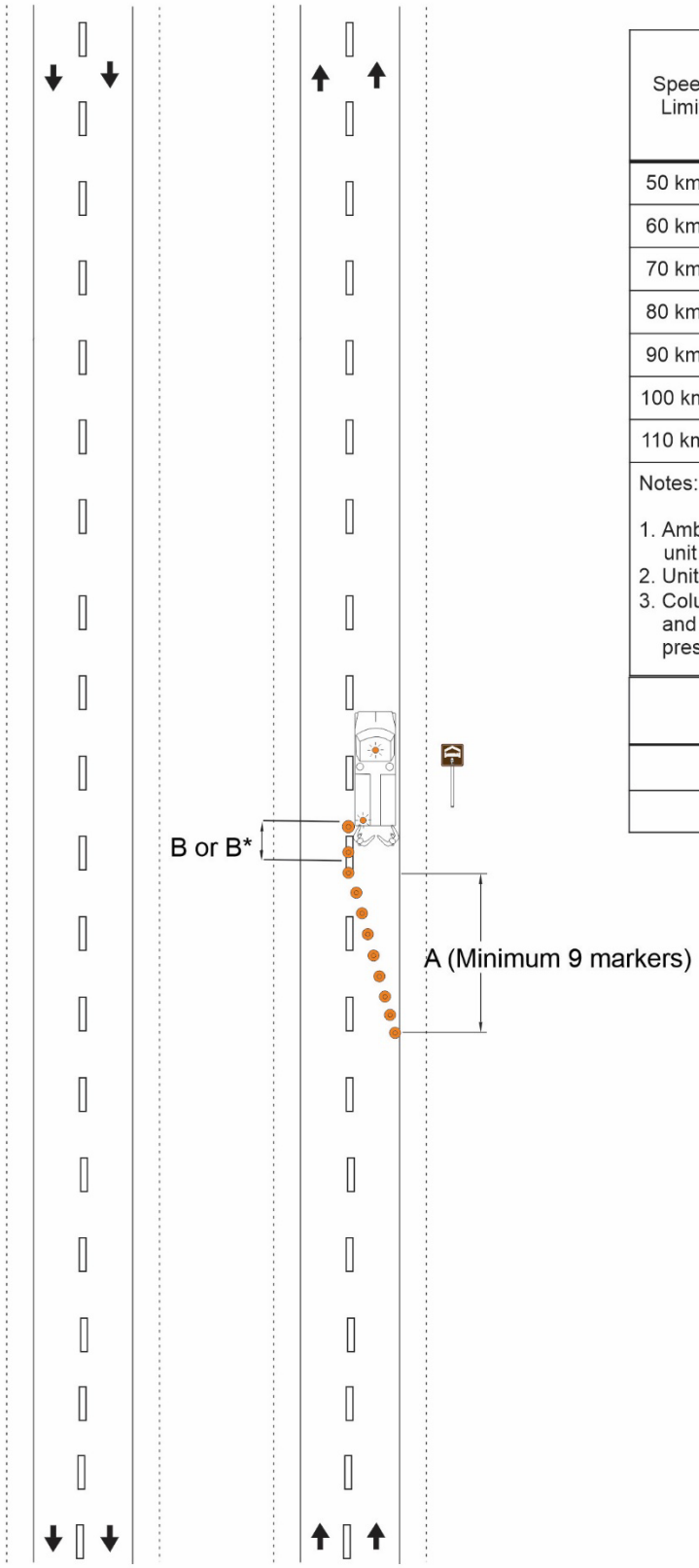




Moving Operation ○
Brief Duration ●
Short Duration ●
Long Duration ○

G.7 SIGN INSTALLATION - 4 LANE

Revised: August, 2020

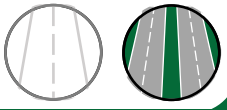


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Amber rotating/flashing lights, either cones and/or unit mounted light board.
2. Unit is setup wholly or partially in the driving lane.
3. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

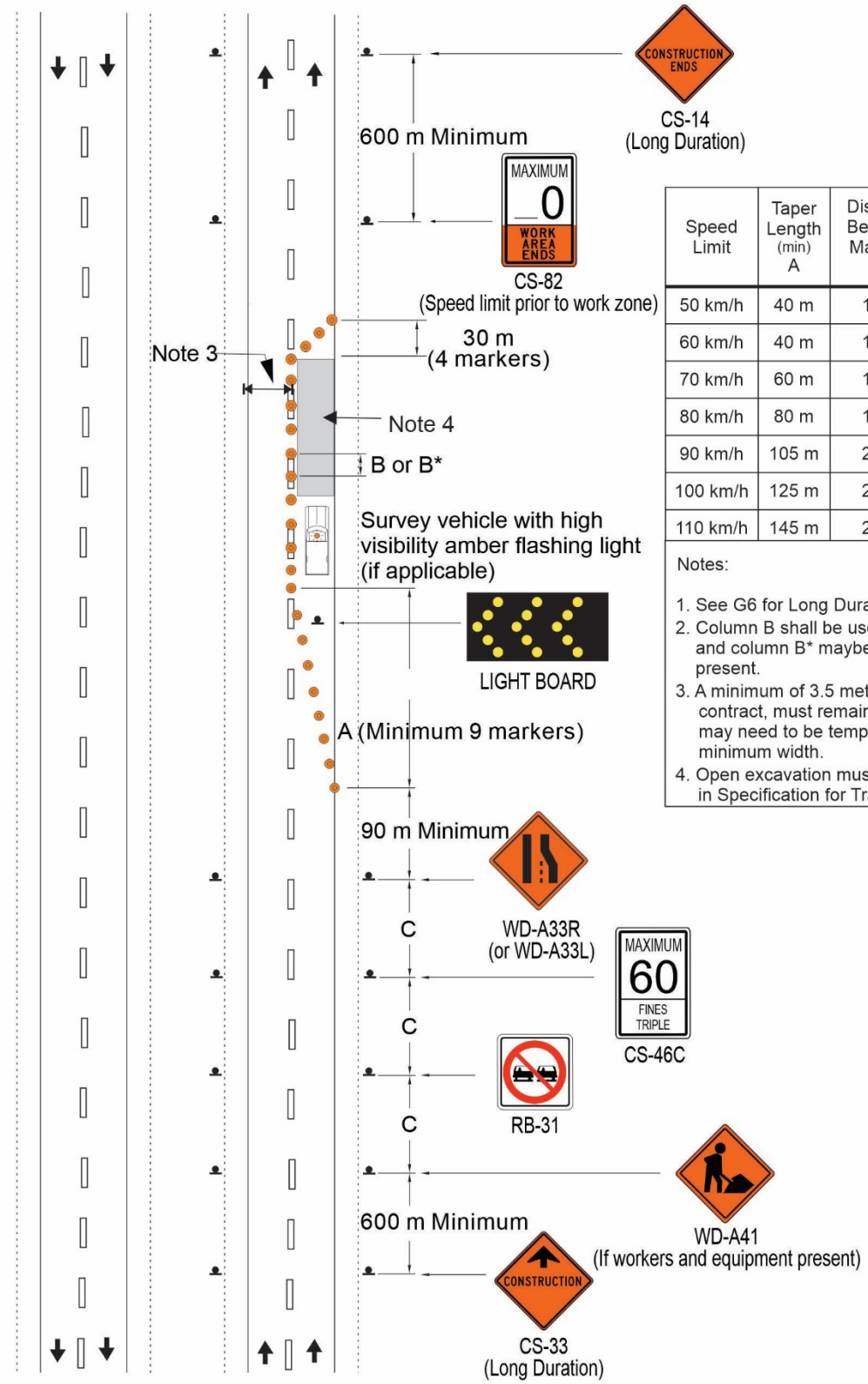
Installation	Highway Classification
<15 Minutes	4 Lane
>15 Minutes	4 Lane



Moving Operation
Brief Duration
Short Duration
Long Duration

G.8 FOUR LANE - NO FLAGGING (INCLUDING OPEN CUT)

Revised: January, 2022



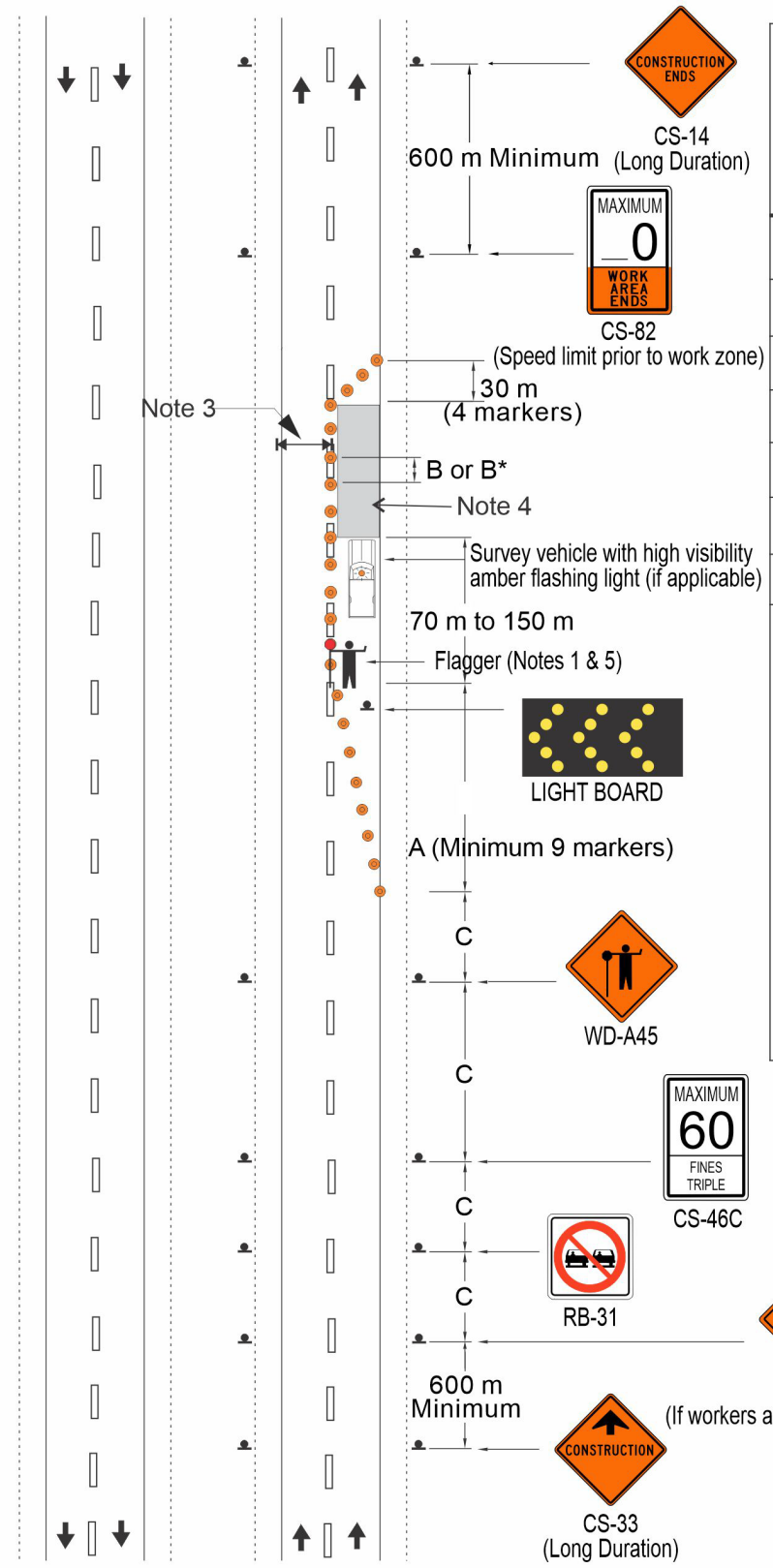
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. See G6 for Long Duration Bridge Barricading.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.
3. A minimum of 3.5 metre lane width, or as per the contract, must remain open to traffic. The shoulder may need to be temporarily widened to meet the minimum width.
4. Open excavation must follow the guidance as outlined in Specification for Traffic Accommodation 8400.

G.9 FOUR LANE – FLAGGING (INCLUDING OPEN CUT)

Revised: January, 2022



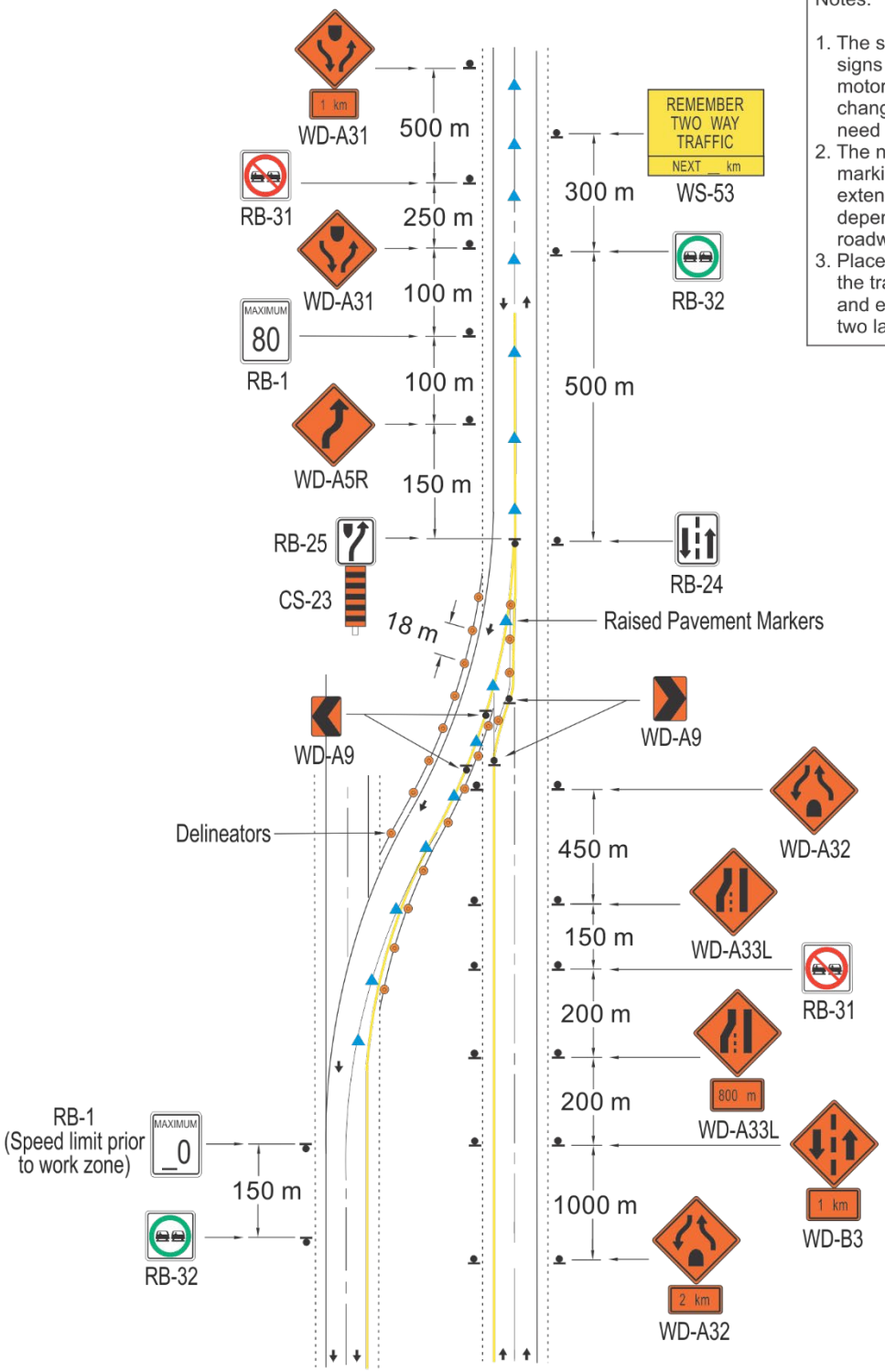
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. The flagger must be visible to the motorist approaching the work zone for a minimum of 125 metres.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.
3. A minimum of 3.5 metre lane width, or as per the contract, must remain open to traffic. The shoulder may need to be temporarily widened to meet the minimum width.
4. Open excavation must follow the guidance as outlined in Specification for Traffic Accommodation 8400.
5. See TCDMWZ Section 801, and Section 133(4) of the Occupational Health and Safety Regulations, for more information on the use of Flaggers (a.k.a. - designated signallers).

H. MEDIAN CROSSOVER

H.1 FOUR TO TWO LANE - RIGHT CROSSOVER

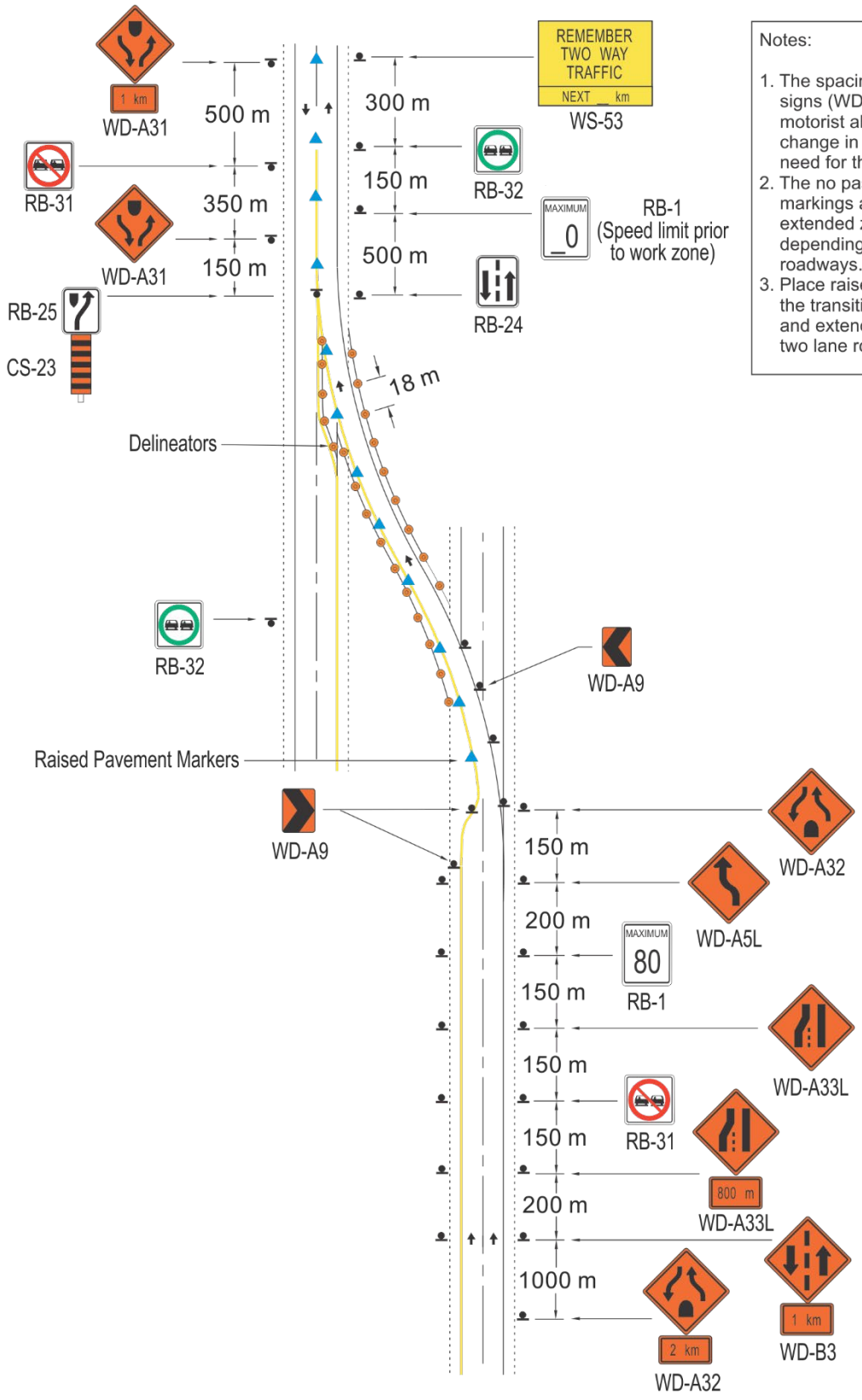


Notes:

1. The spacing of the chevron alignment signs (WD-49) must be such that the motorist always has two in view until the change in alignment eliminates the need for the signs.
2. The no passing zone pavement markings are the minimum required. An extended zone may be required depending on vertical alignment of the roadways.
3. Place raised pavement markers through the transition from four lane to two lane and extend along the centreline of the two lane roadway for 1 km.

Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

H.2 FOUR TO TWO LANE - LEFT CROSSOVER



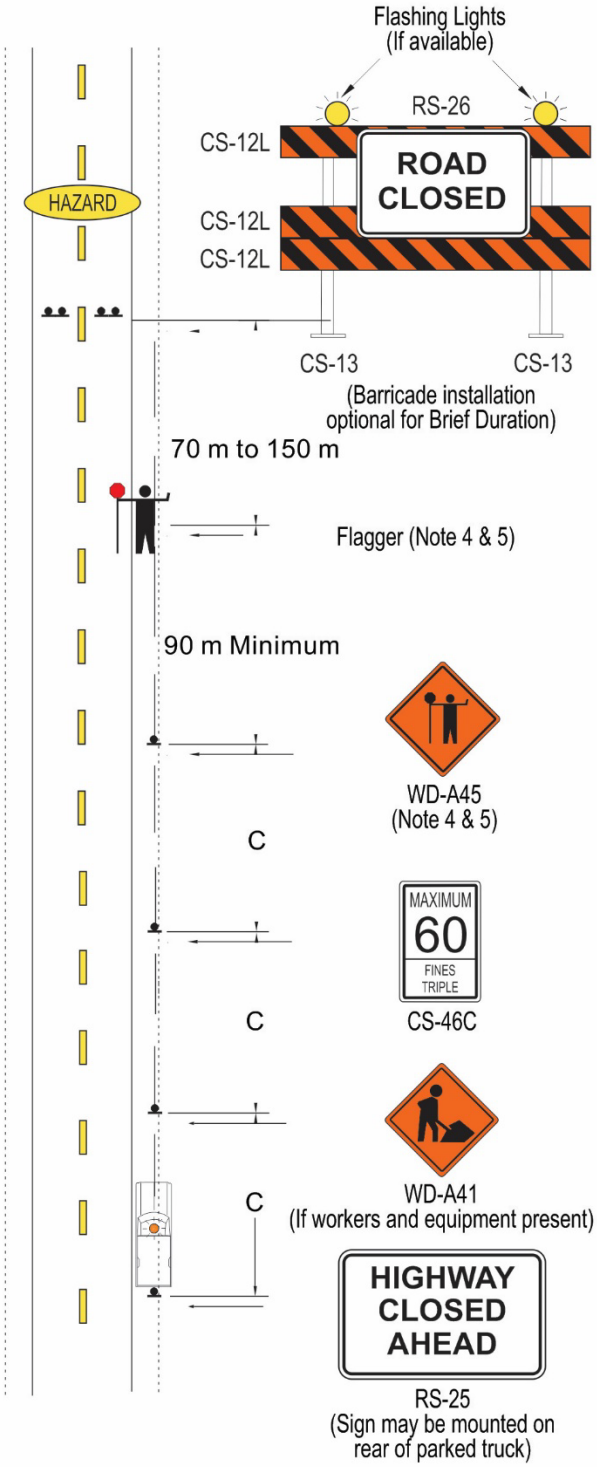
Notes:

1. The spacing of the chevron alignment signs (WD-49) must be such that the motorist always has two in view until the change in alignment eliminates the need for the signs.
2. The no passing zone pavement markings are the minimum required. An extended zone may be required depending on vertical alignment of the roadways.
3. Place raised pavement markers through the transition from four lane to two lane and extend along the centreline of the two lane roadway for 1 km.

I. ROAD CLOSURE AND DETOUR

I.1 ROAD CLOSURE - SHORT AND BRIEF DURATION

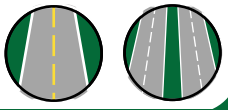
Revised: Sept, 2019



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

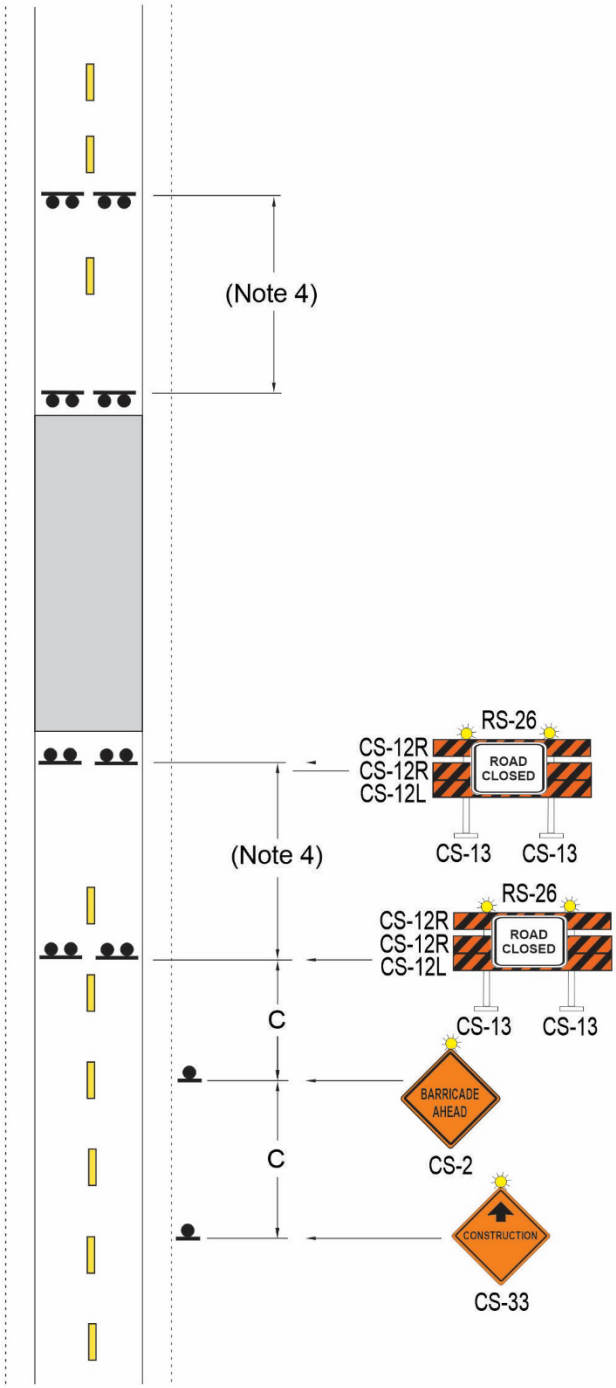
1. Erect only a single barricade when traffic control devices are not required for traffic travelling in the opposite direction.
2. Signing used to advise of a closure farther down the highway must only use a single barricade or in its place an information sign.
3. Erect barricade or sign on right shoulder.
4. If Information Sign (RS-25) is used, flaggers, WD-A45 sign and CS-46C sign may not be required.
5. One flagger is required for all activities in which one lane is being affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801.
   Two flaggers are required for all activities in which both lanes are affected by construction.
   Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 metres.
6. Dependent upon the conditions traffic control devices may or may not be set up for traffic travelling in the opposite direction.



Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

I.2 ROAD CLOSURE - LONG DURATION

Revised: July 2020



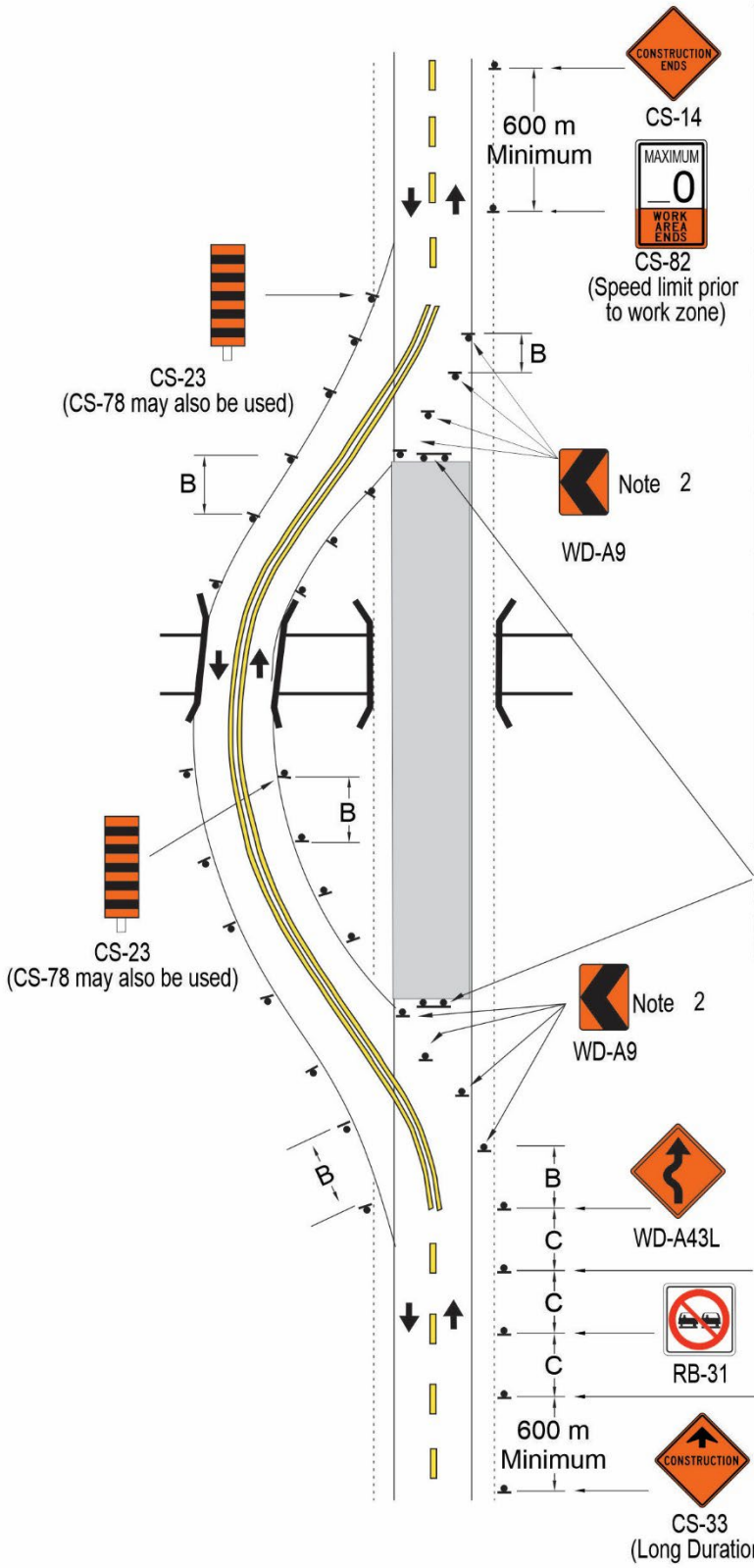
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Advance warning of the work zone can be provided by using TCDM I.6 & I.7.
2. The barricade stand may be replaced by industry standard water/sand filled or concrete barrier stands to make a standard barricade.
3. A flashing light may be placed above the CS-33, CS-2 standard barricade, concrete barrier or water/sand filled barriers during hours of darkness.
4. The distance between barricades is dependent on roadway geometrics and/or geographic location.
5. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
6. Column B shall be used when workers are present, and column B* maybe used when workers are not present.

I.3 ROADSIDE DIVERSION - 2 LANE

Revised: July, 2020

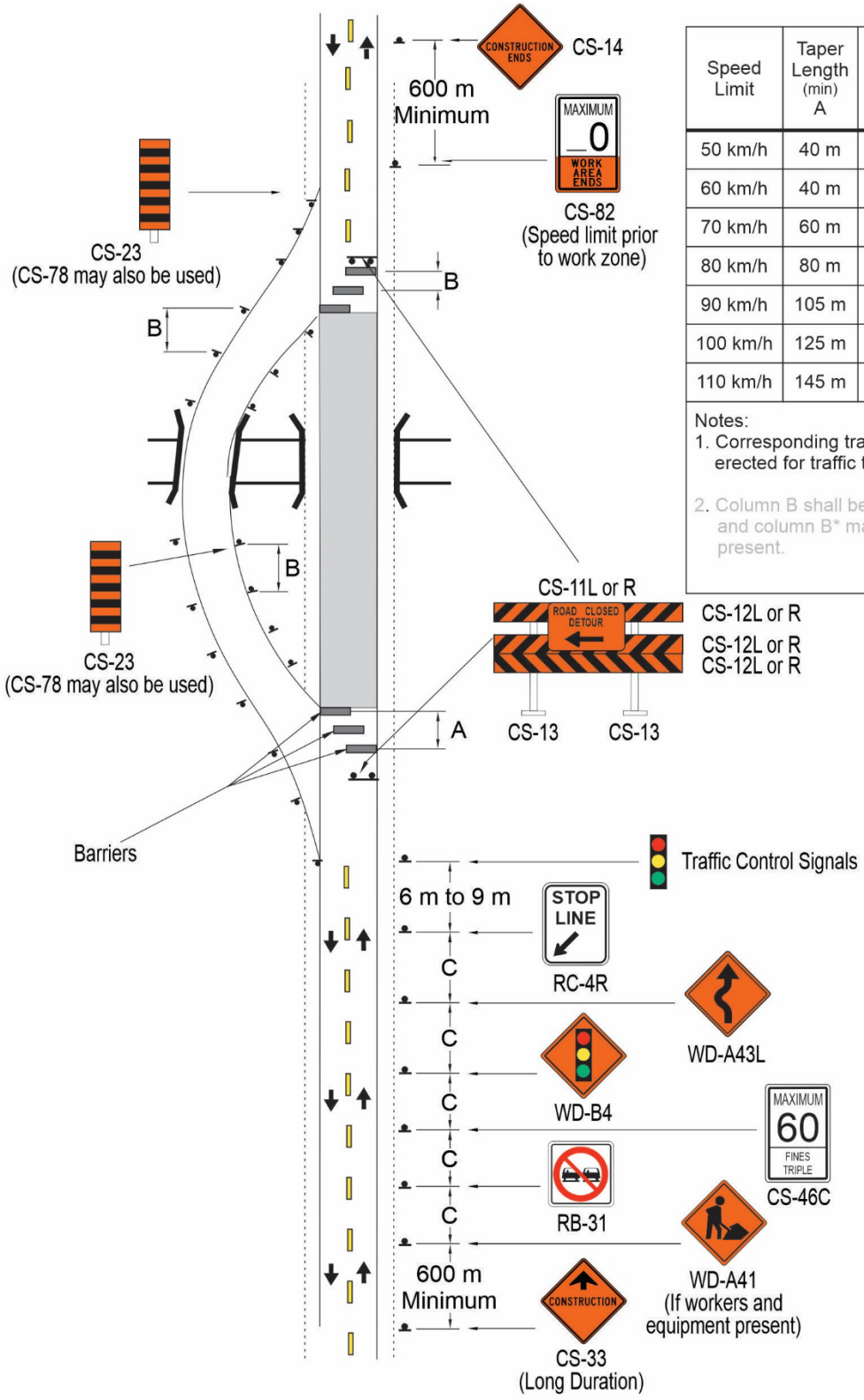


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
2. Chevrons are spaced so the road user always has a minimum of two in view until the change in alignment eliminates the need for the sign.
3. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

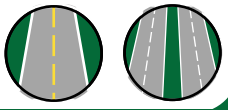
I.4 BRIDGE/CULVERT DIVERSION WITH TRAFFIC SIGNALS

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

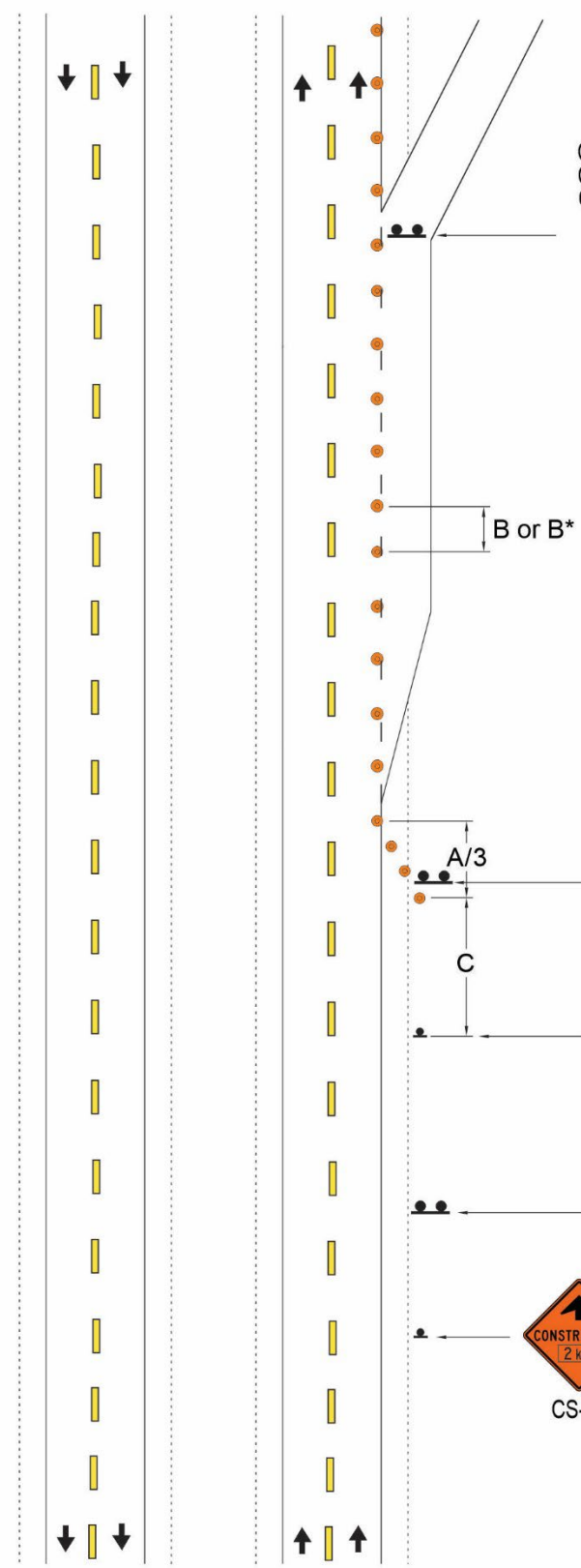
Notes:
1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.



Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

I.5 RAMP CLOSURE

Revised: July 2020



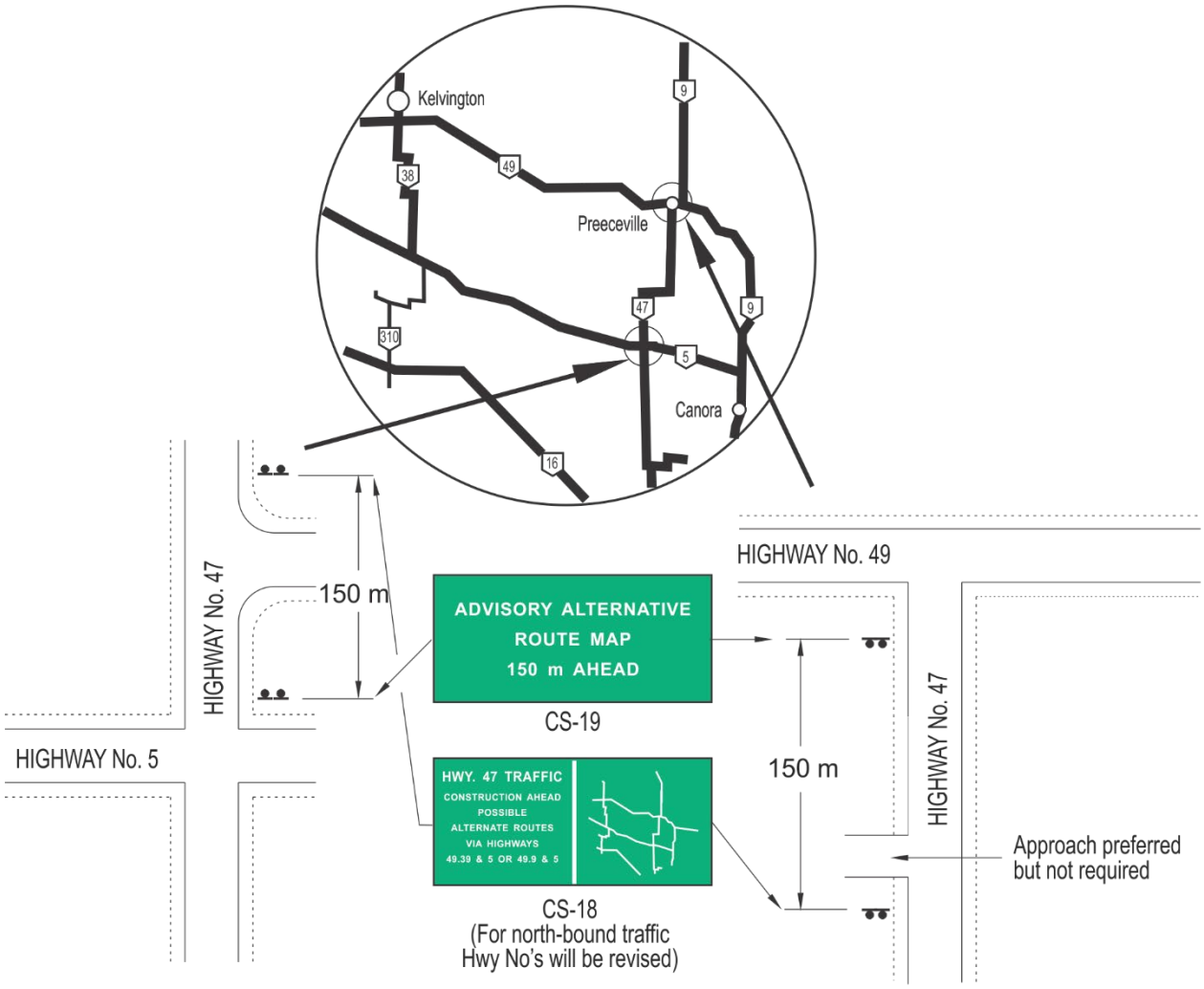
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

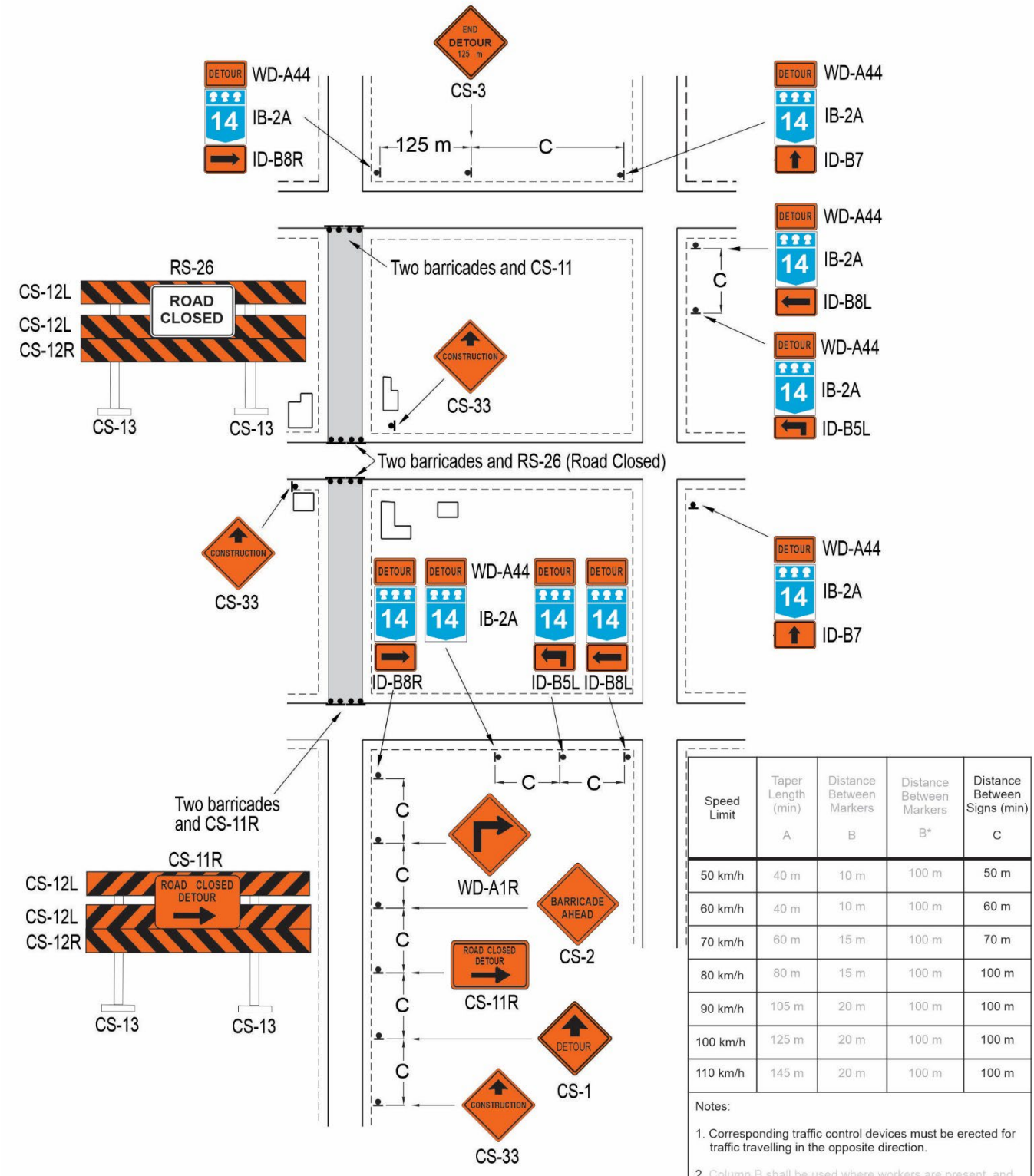
Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

I.6 ADVISORY ALTERNATE ROUTE SIGNS



Notes:

1. The alternate route map may be used when travel through the construction zone cannot be ensured at the designated class of travel accommodation.
2. The alternate route map must be located sufficiently in advance of the construction zone so that the motorist can use other numbered routes to bypass the work area.
3. The alternate route map must be erected in such a manner to allow viewing without leaving the vehicle.
4. During adverse conditions that may require traffic to be assisted, flagpersons must be used to supplement the alternate route map.
5. The alternate route map is not required on projects where there are no feasible alternate routes.
6. Offset 2 m from the shoulder line.



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

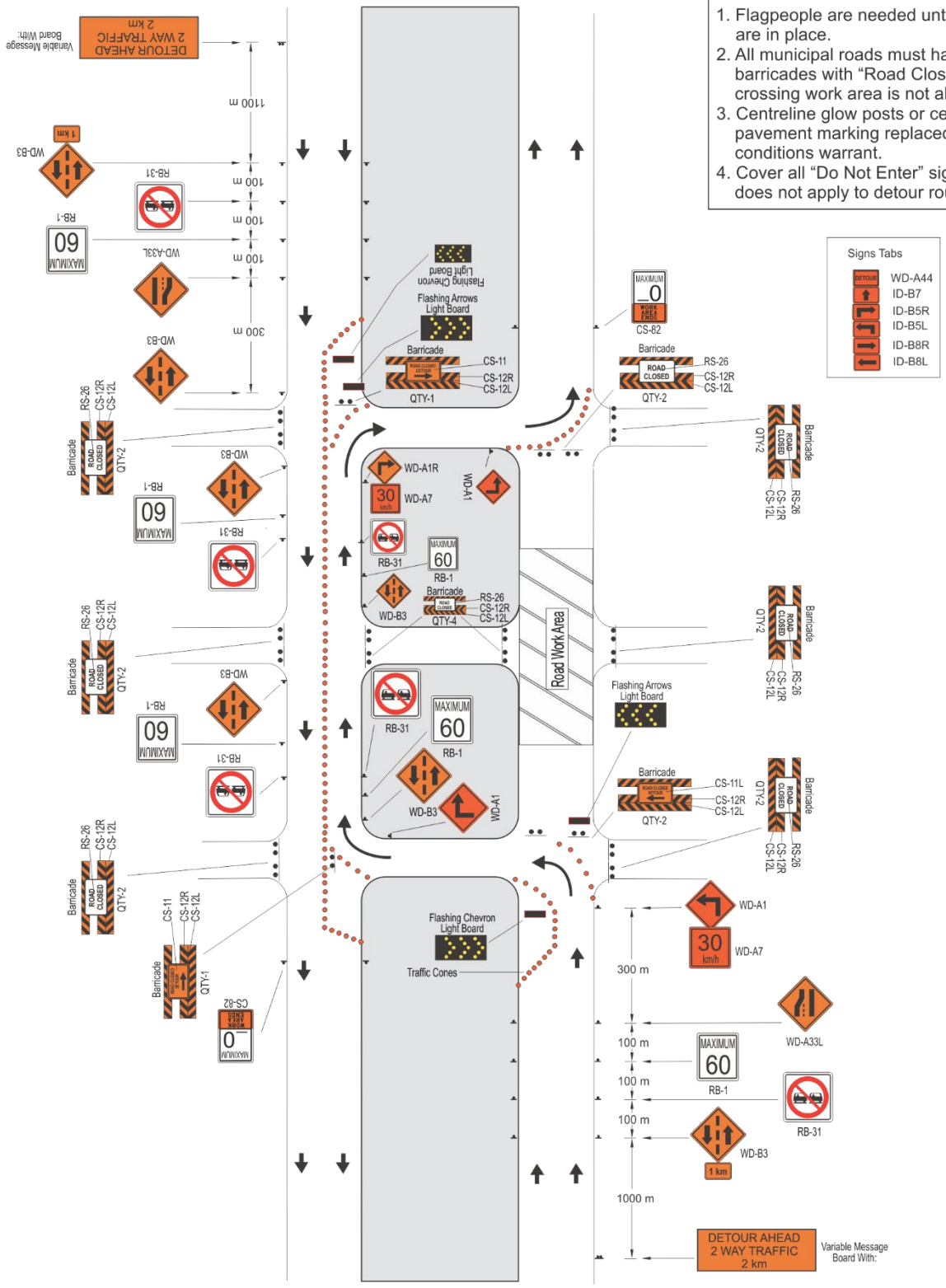
1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ○
Brief Duration ○
Short Duration ○
Long Duration ●

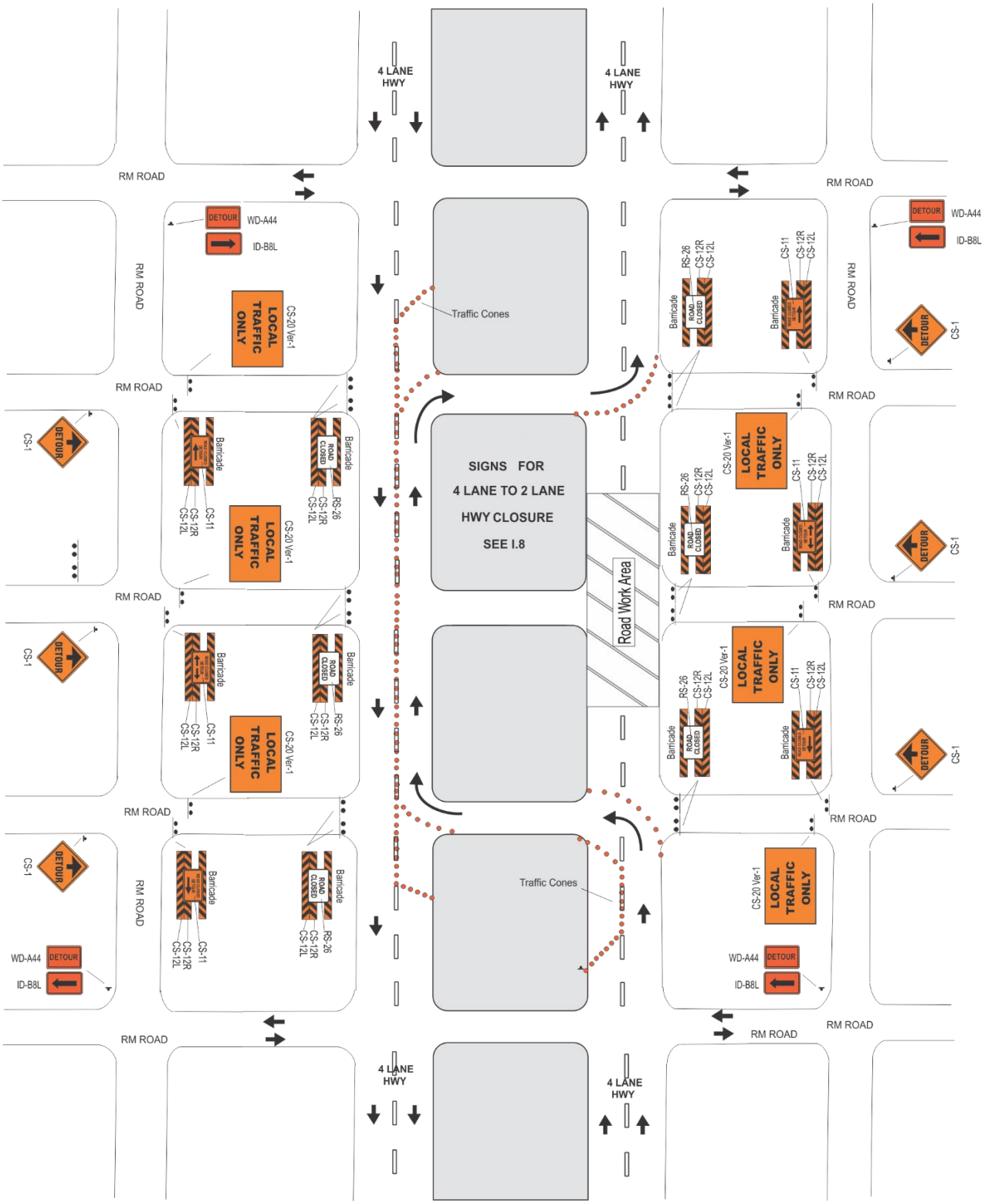
I.8 FOUR LANE TO TWO LANE EMERGENCY DETOUR

Notes:

1. Flagpeople are needed until all signs are in place.
2. All municipal roads must have barricades with “Road Closed” sign, if crossing work area is not allowed.
3. Centreline glow posts or centreline pavement marking replaced as conditions warrant.
4. Cover all “Do Not Enter” signage that does not apply to detour route.



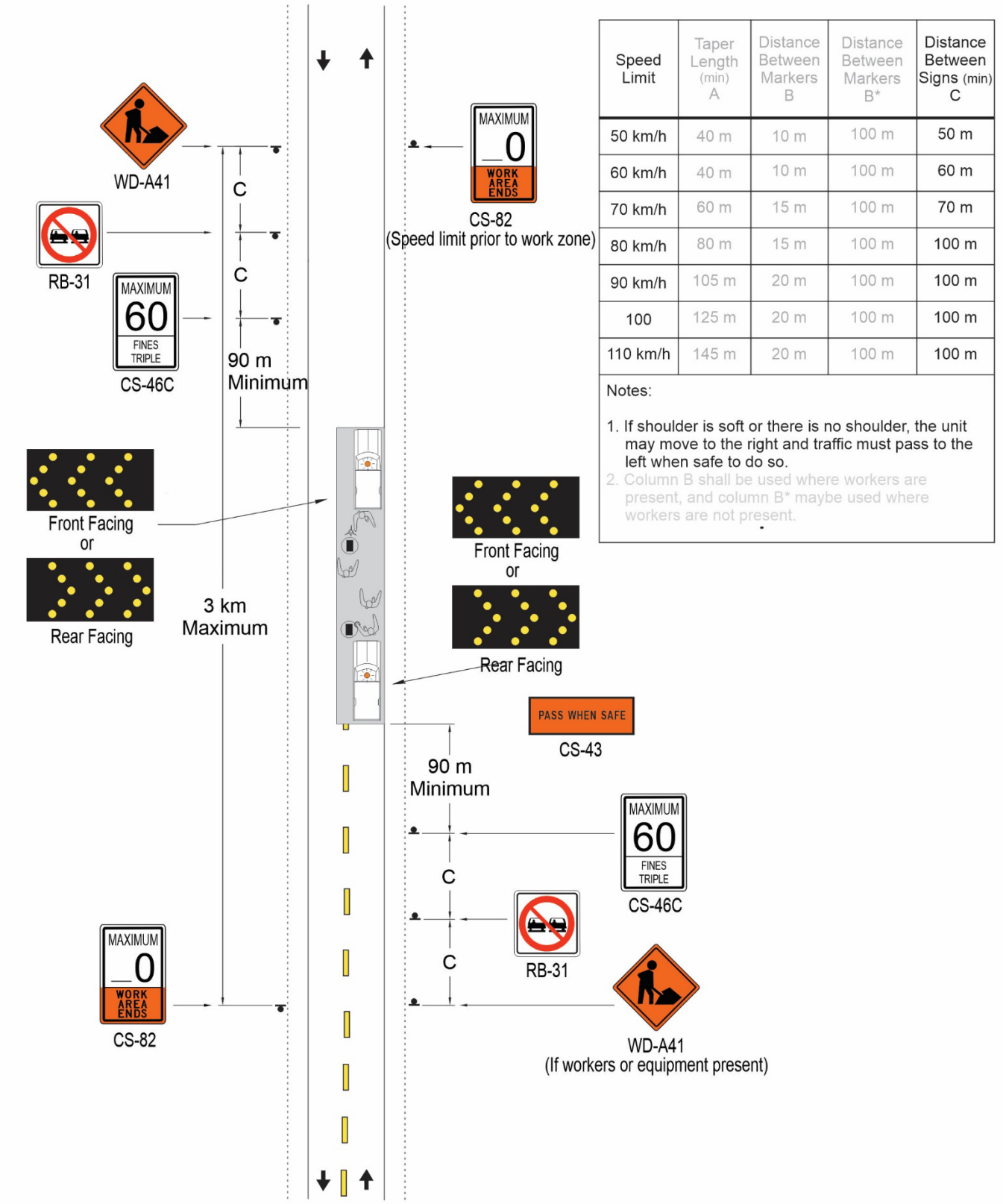
I.9 FOUR LANE TO TWO LANE EMERGENCY RM DETOURS



J.1 PREMARKING, TRPM, BRIGHTENING & SPLITTING - 2 LN

Moving Operation ○
Brief Duration ●
Short Duration ○
Long Duration ○

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

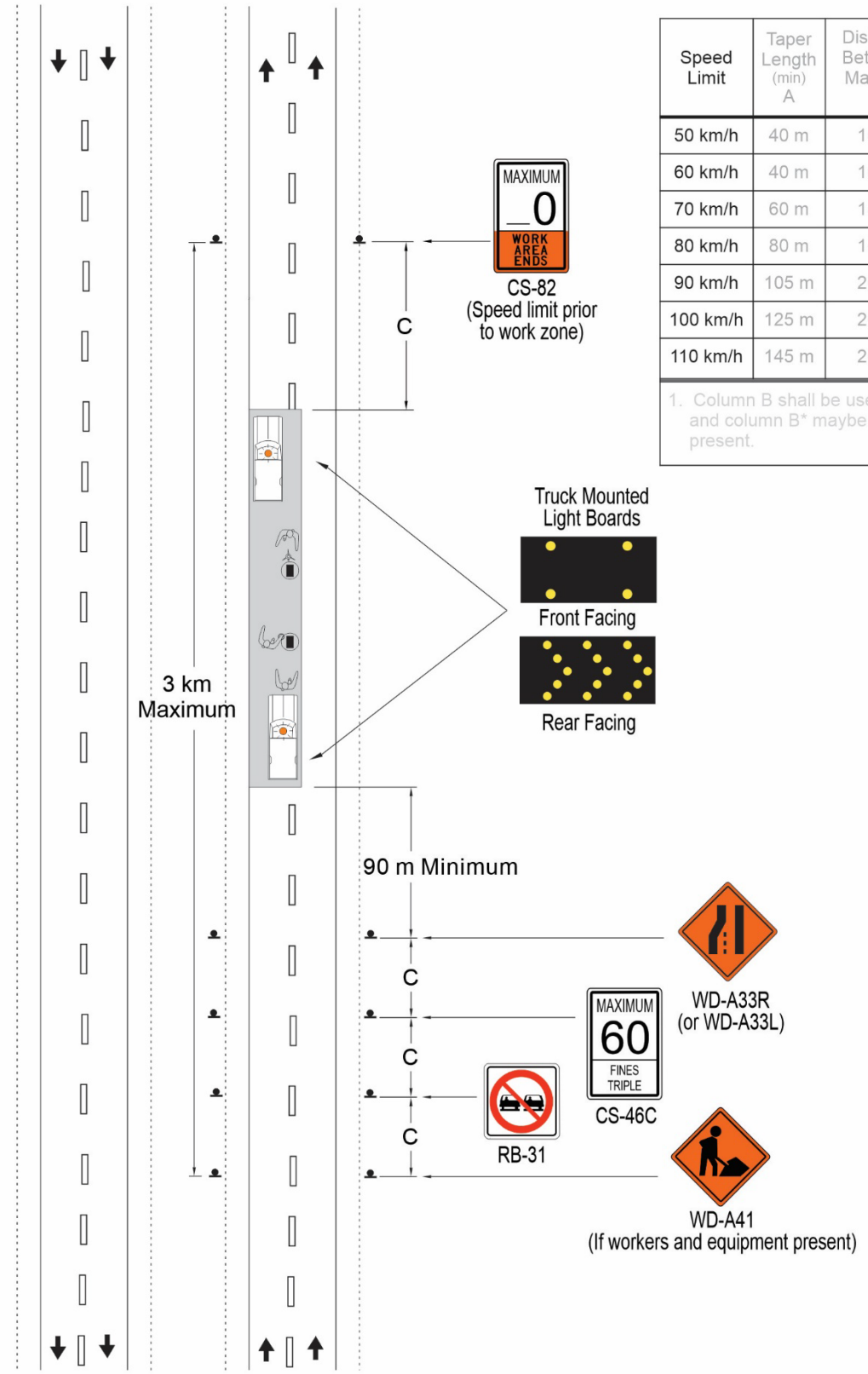
Notes:

1. If shoulder is soft or there is no shoulder, the unit may move to the right and traffic must pass to the left when safe to do so.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

J.2 PREMARKING, TRPM, BRIGHTENING & SPLITTING - 4 LN

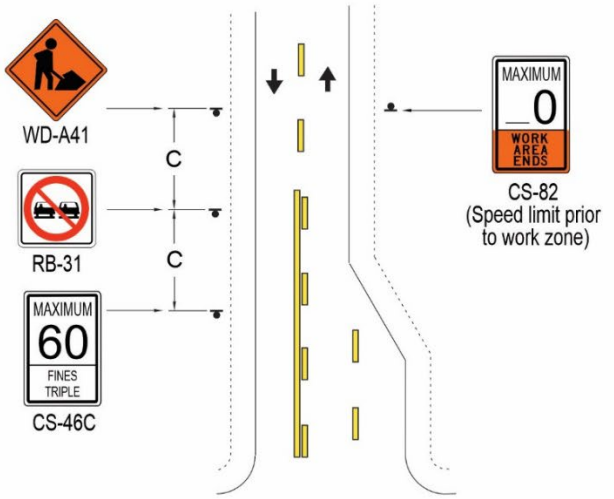
Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

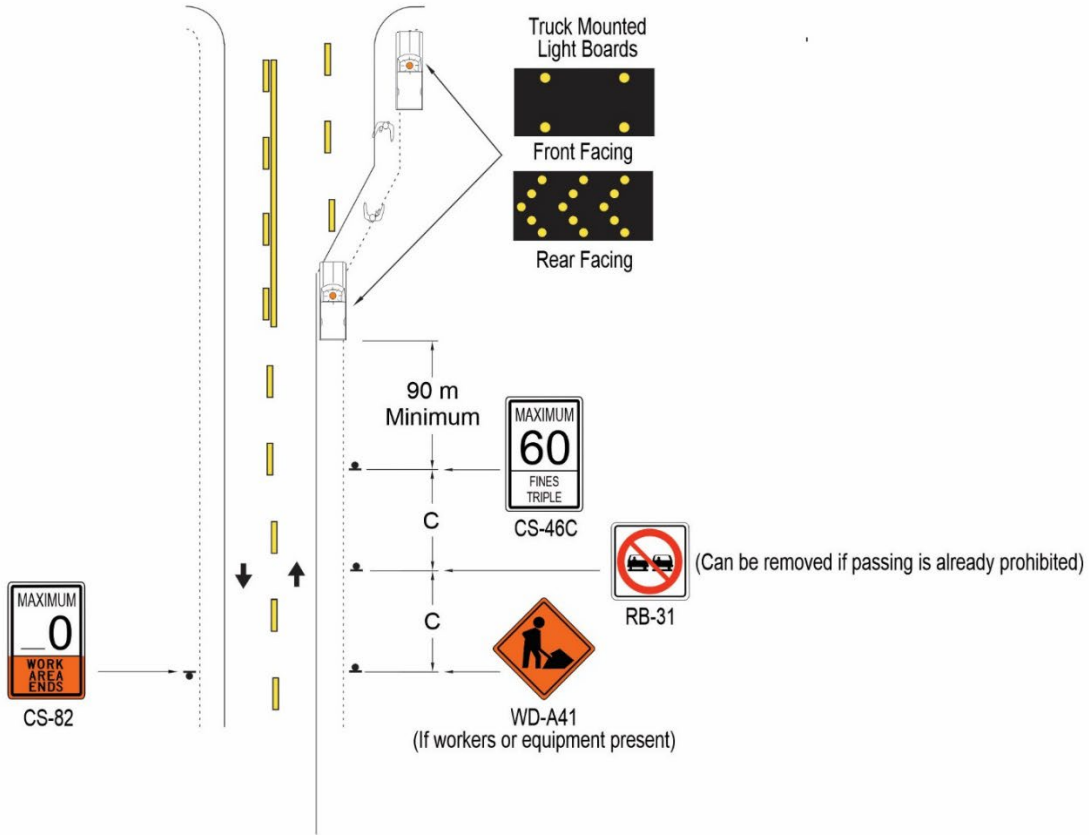
1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

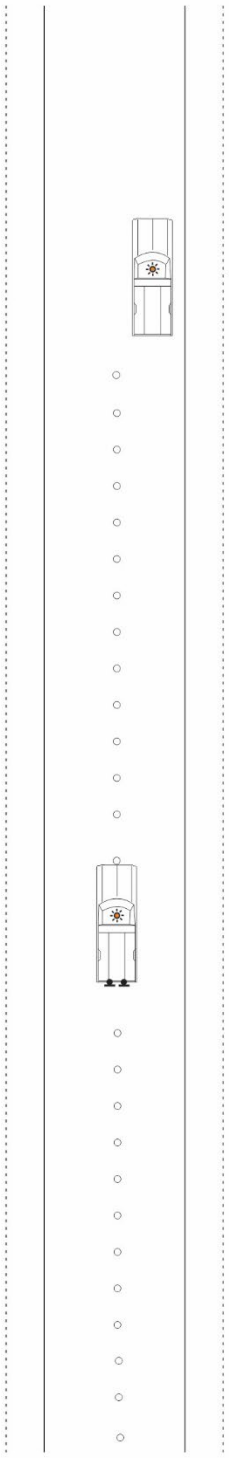
J.3 PREMARKING AT INTERSECTIONS



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Note:
1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.





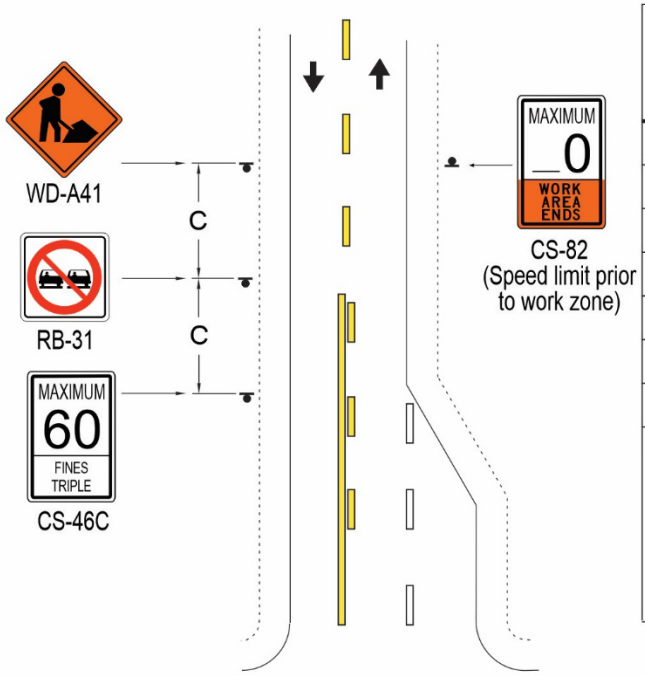
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. The rear facing light boards may indicate flashing chevrons to the right where shoulder width permits passing on the right.
   Pilot vehicle is either in front of or behind depending on work conditions.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

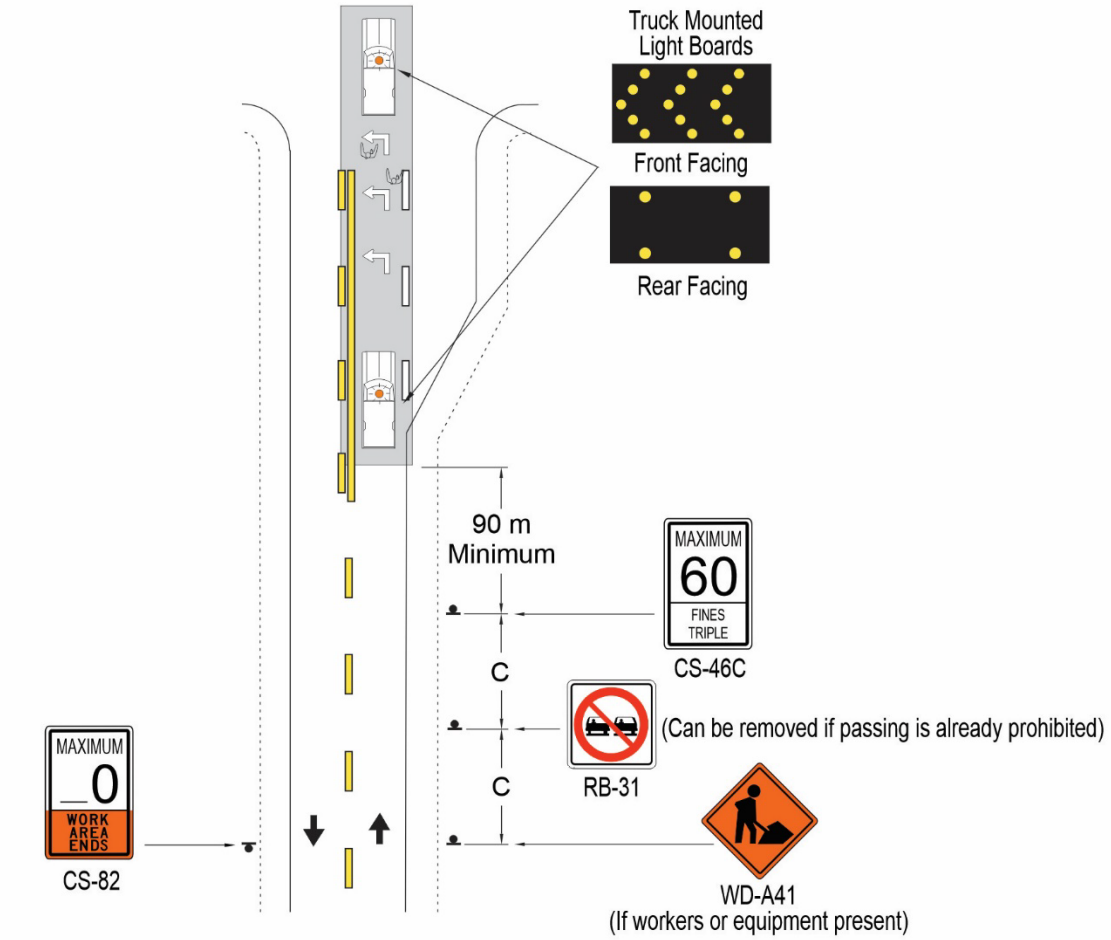
J.5 PAVEMENT SIGNS AT INTERSECTIONS - 2 LANE

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

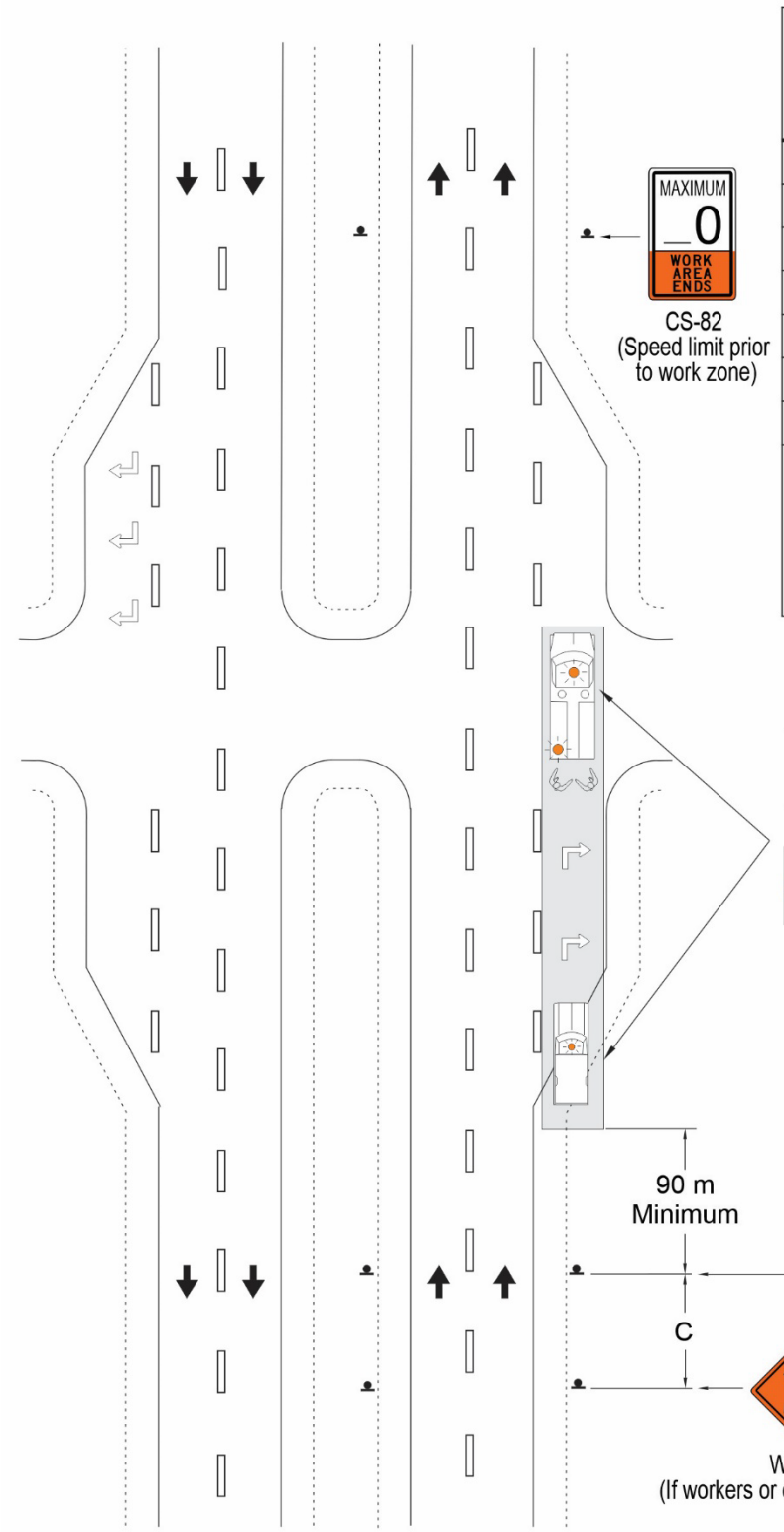
Notes:
1. The rear facing light boards may indicate sequential chevrons to the right where a lane or shoulder width permits passing on the right.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.



Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

J.6 PAVEMENT SIGNS AT INTERSECTIONS - 4 LANE

Revised: July, 2020



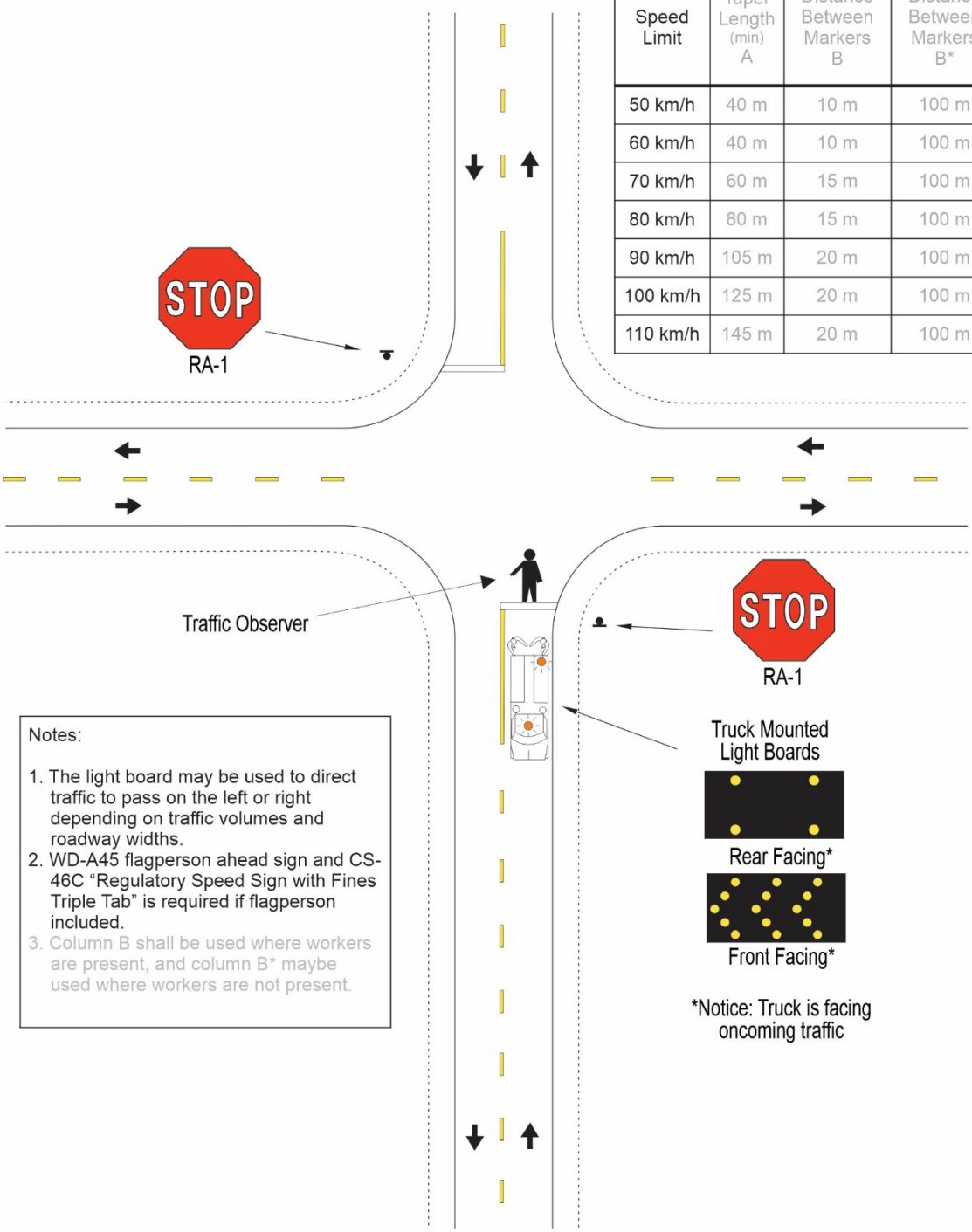
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Four lane left turn lane move trucks to left side and sign as required.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

J.7 PAVEMENT SIGNS - STOP BARS

Revised: July, 2020

Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

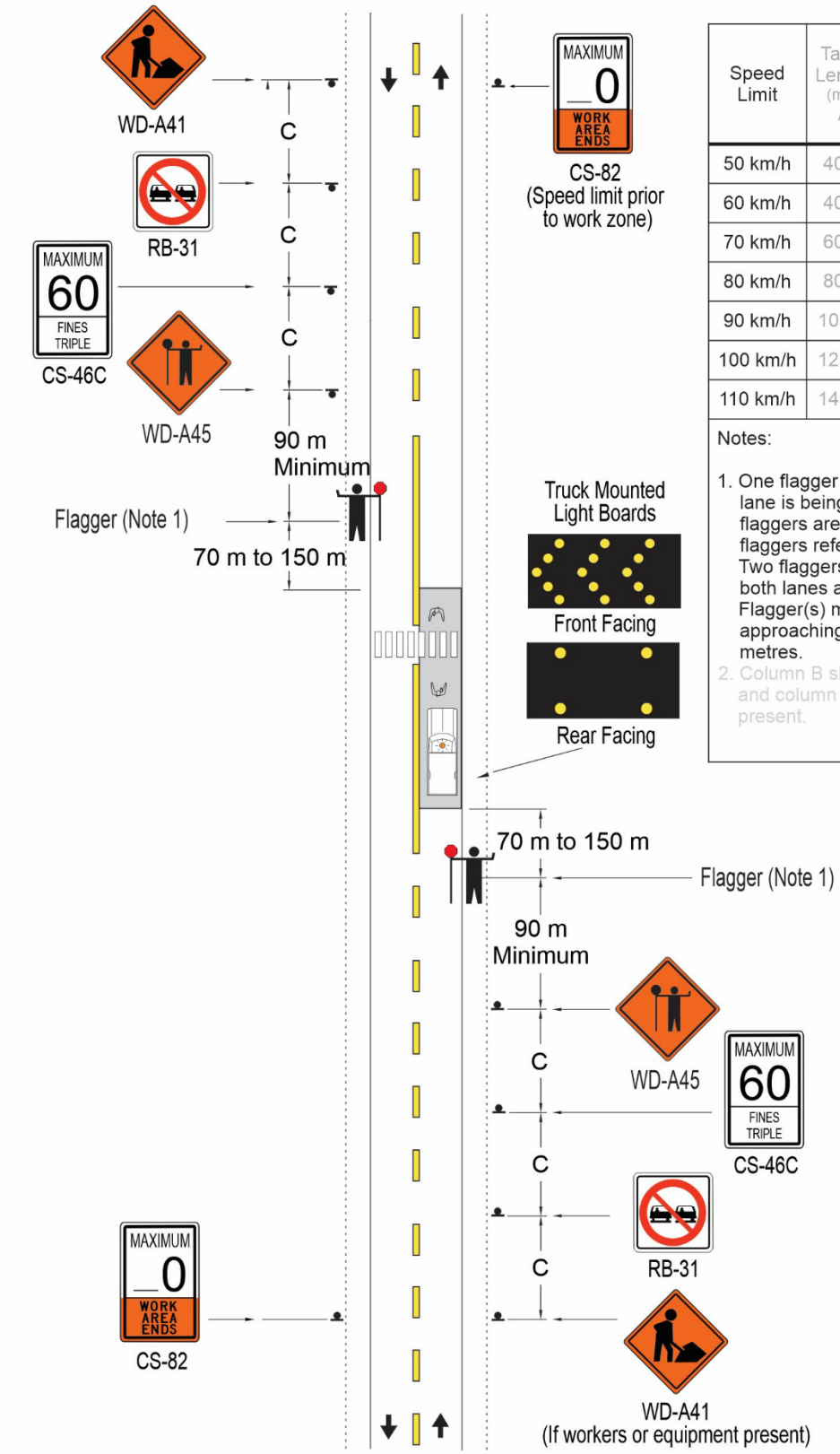


Notes:

1. The light board may be used to direct traffic to pass on the left or right depending on traffic volumes and roadway widths.
2. WD-A45 flagperson ahead sign and CS-46C "Regulatory Speed Sign with Fines Triple Tab" is required if flagperson included.
3. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

J.8 PAVEMENT SIGNS - RAIL XING BARS & CROSSWALKS

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

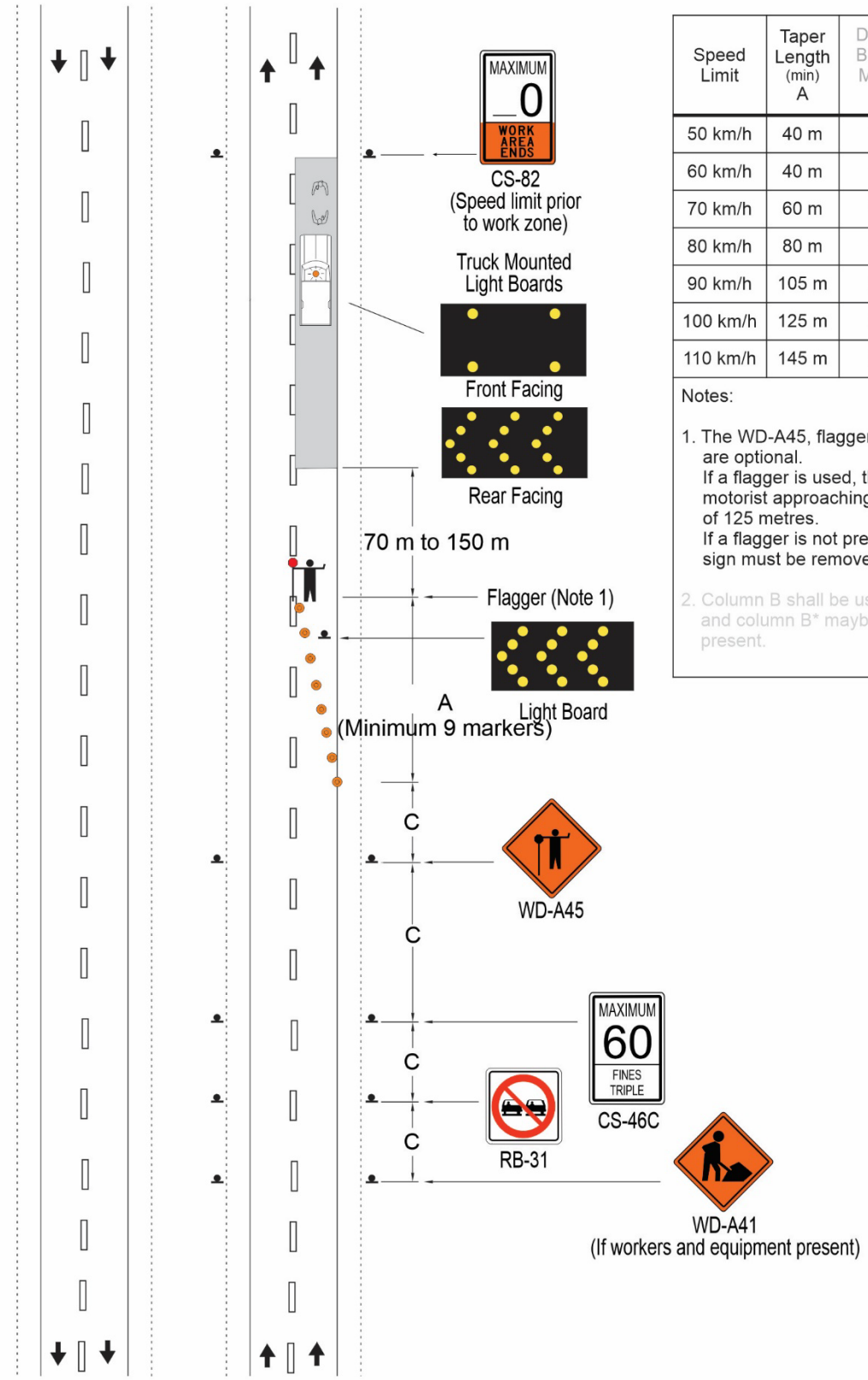
Notes:

1. One flagger is required for all activities in which one lane is being affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801.
   Two flaggers are required for all activities in which both lanes are being affected by construction. Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 metres.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

J.9 FOUR LANE ROADWAY - 1 LANE CLOSED

Revised: July, 2020



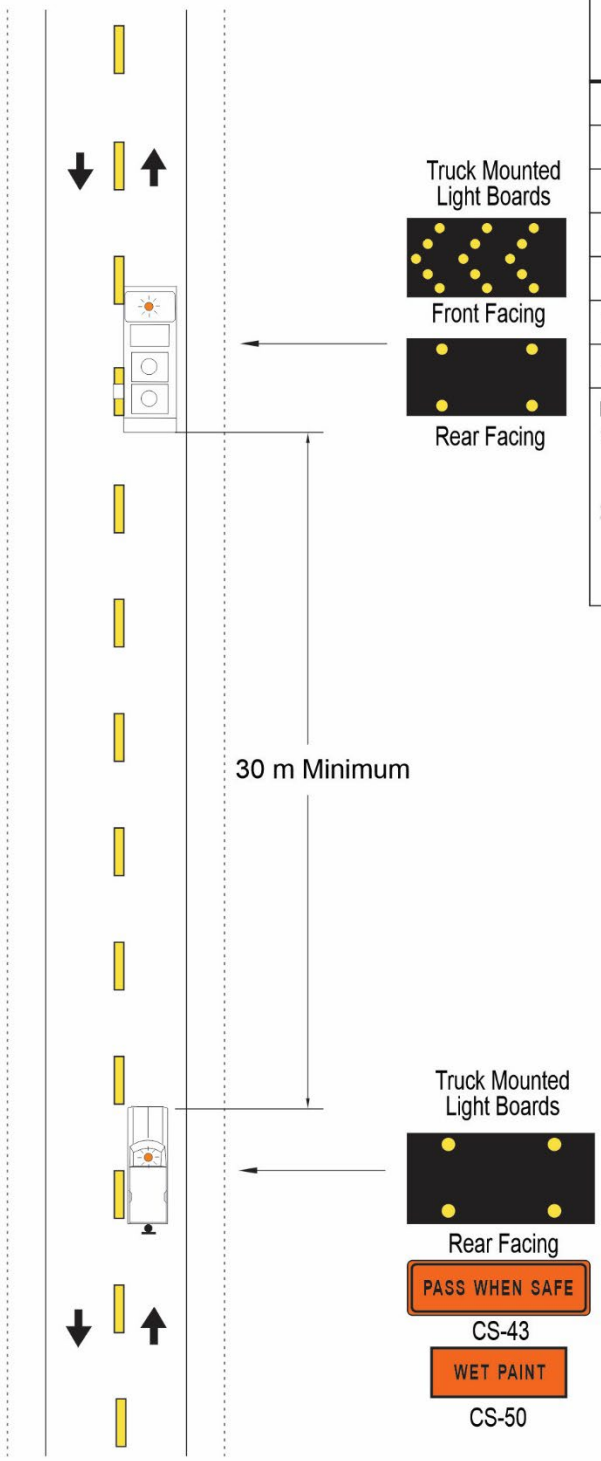
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 ,	100 m

Notes:

1. The WD-A45, flagger, and the 70 to 150 metre space are optional.
   If a flagger is used, the flagger must be visible to the motorist approaching the work zone for a minimum of 125 metres.
   If a flagger is not present or engaged, the WD-A45 sign must be removed or covered.

2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

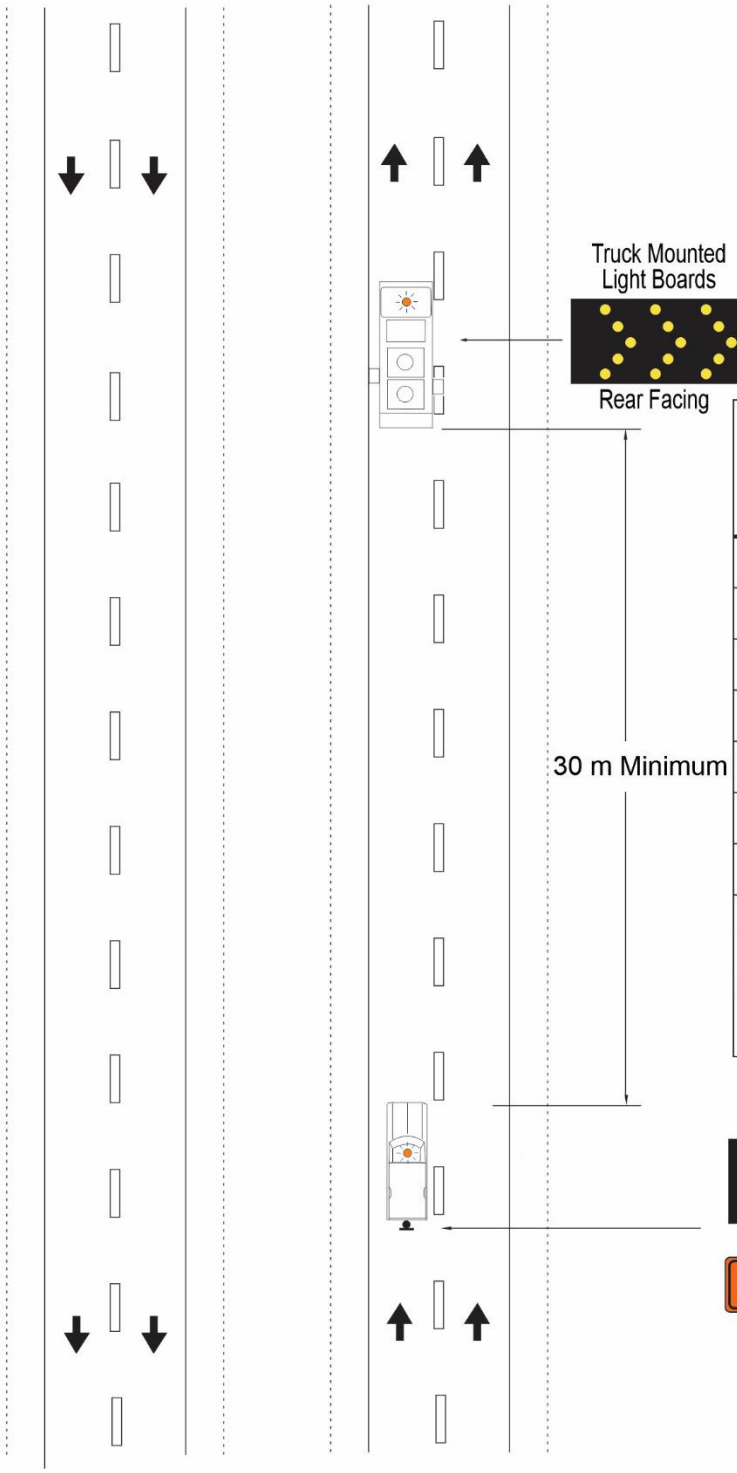
J.10 STRIPING 2 LANE



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. The rear facing light boards may indicate sequential chevrons to the right where shoulder width permits passing on the right.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

J.11 STRIPING 4 LANE



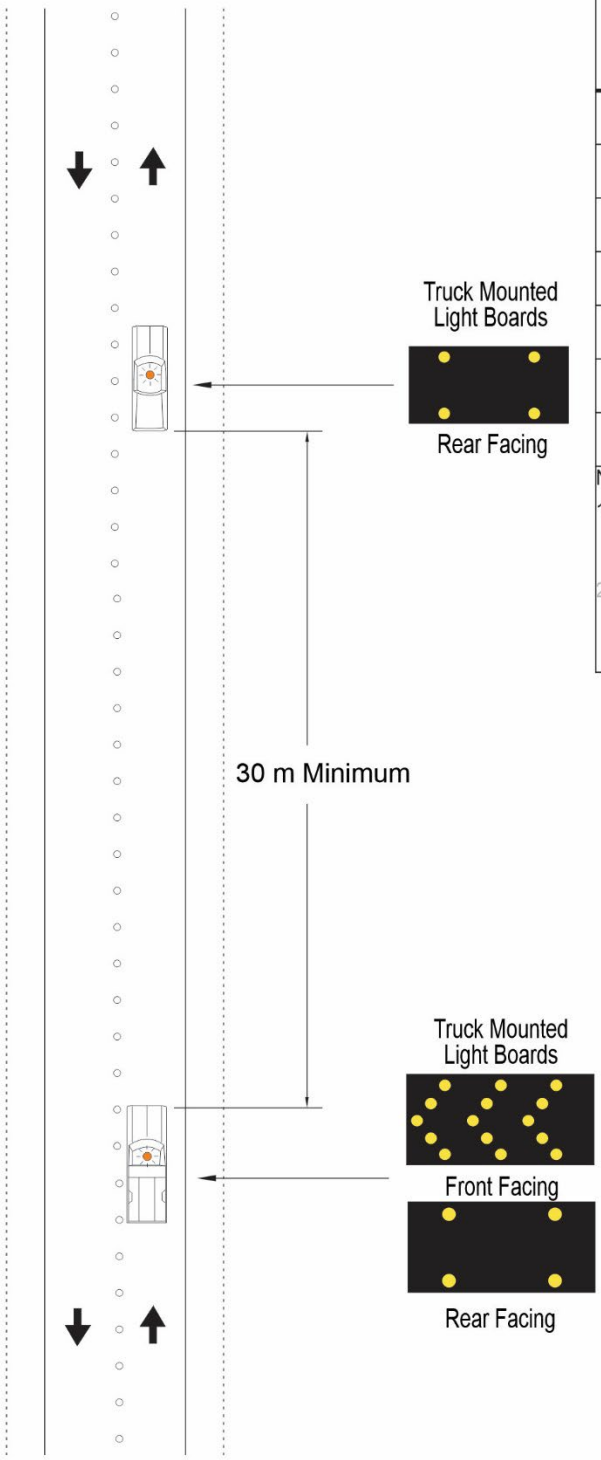
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Lane line will be marked with the striper and pilot truck in the left lane whenever possible.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ●
Brief Duration ○
Short Duration ○
Long Duration ○

J.12 ESTABLISH NO PASSING ZONES WITH PILOT VEHICLES

Revised: July, 2020



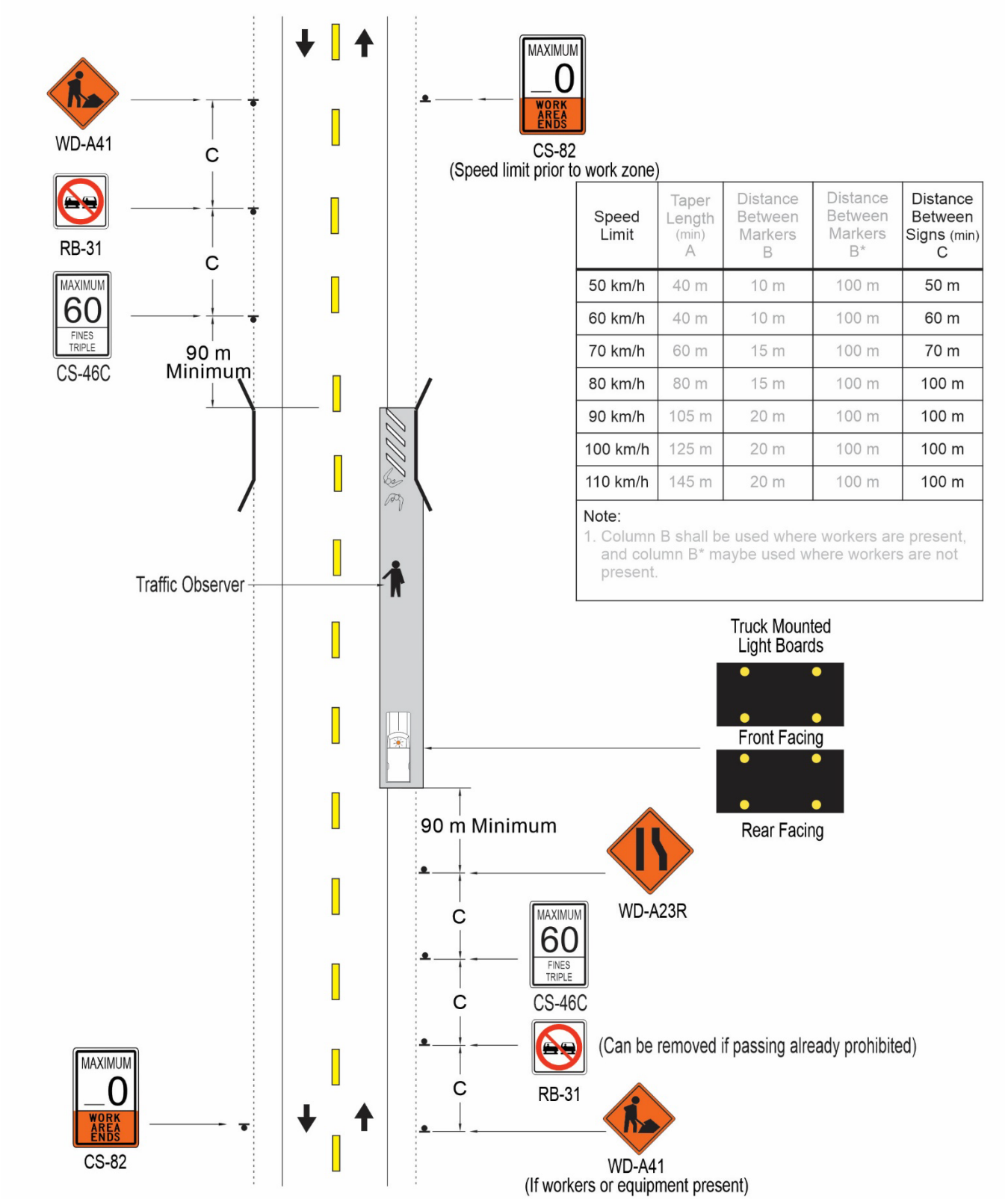
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. The rear facing light boards may indicate sequential chevrons to the right where shoulder width permits passing on the right.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

J.13 PAVEMENT SIGNS - BRIDGE MARKINGS

Revised: July, 2020

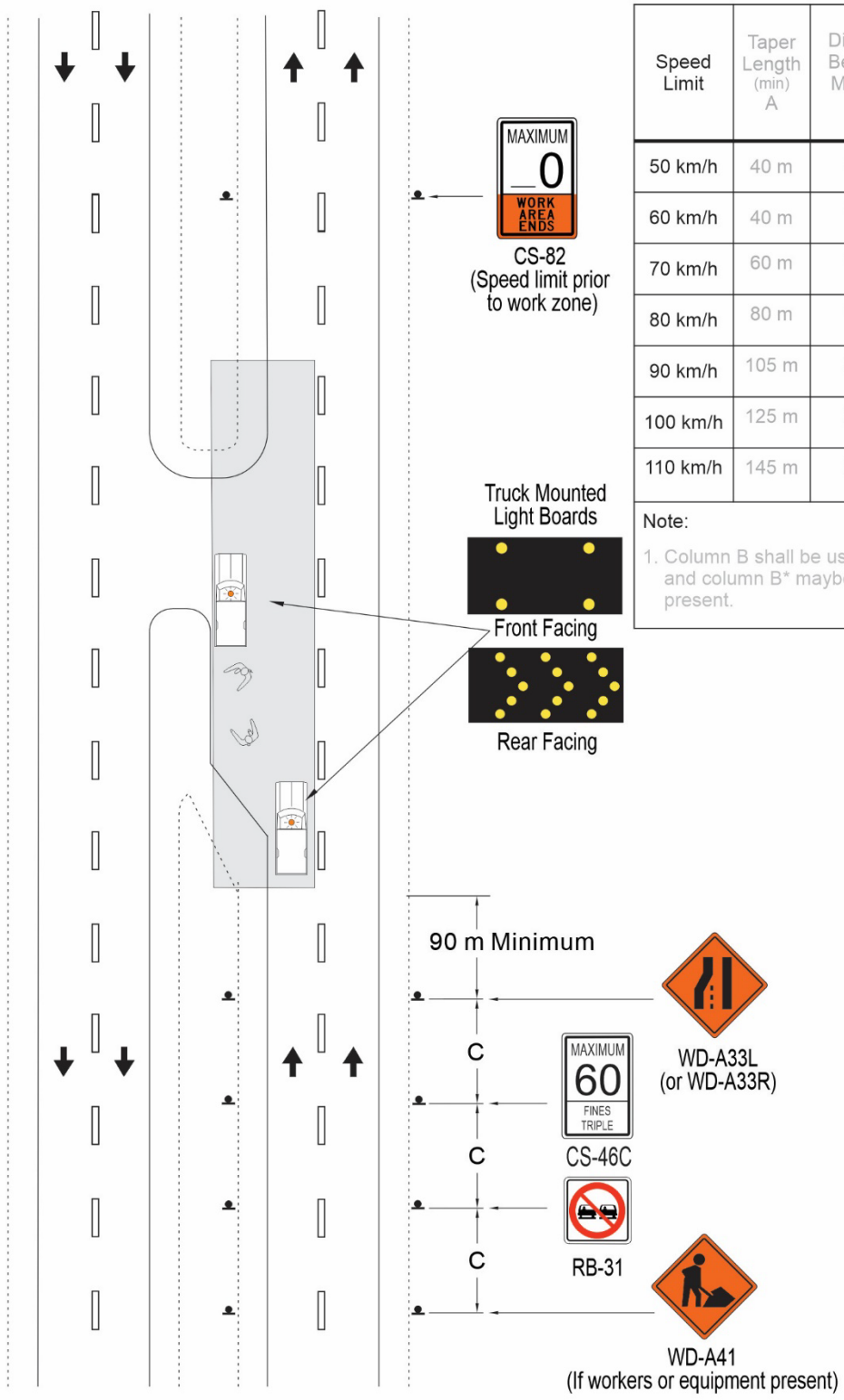


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Note:
1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

J.14 PAVEMENT SIGNS - CURBING

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

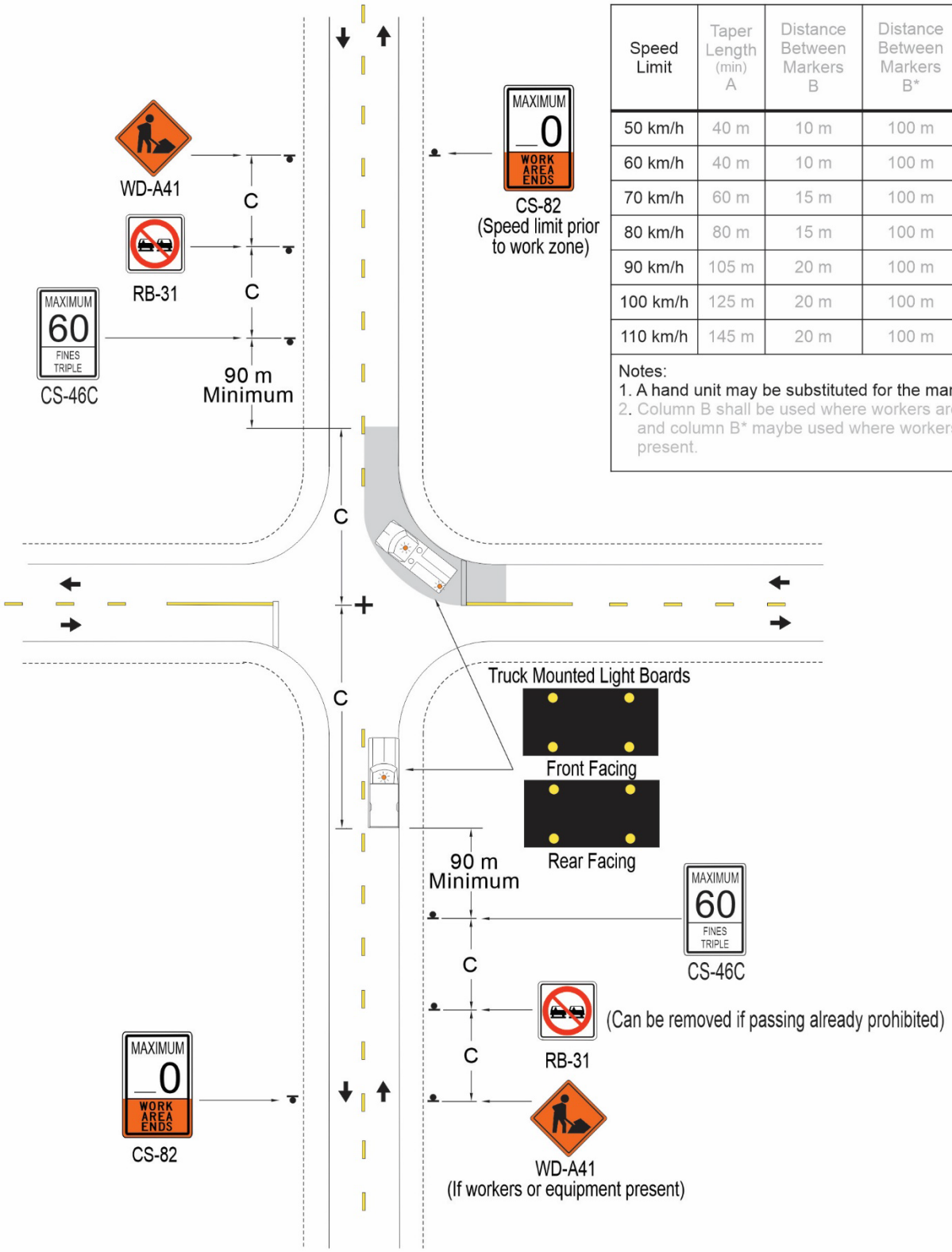
Note:

1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

J.15 WRAP - 2 LANE

Revised: July, 2020



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

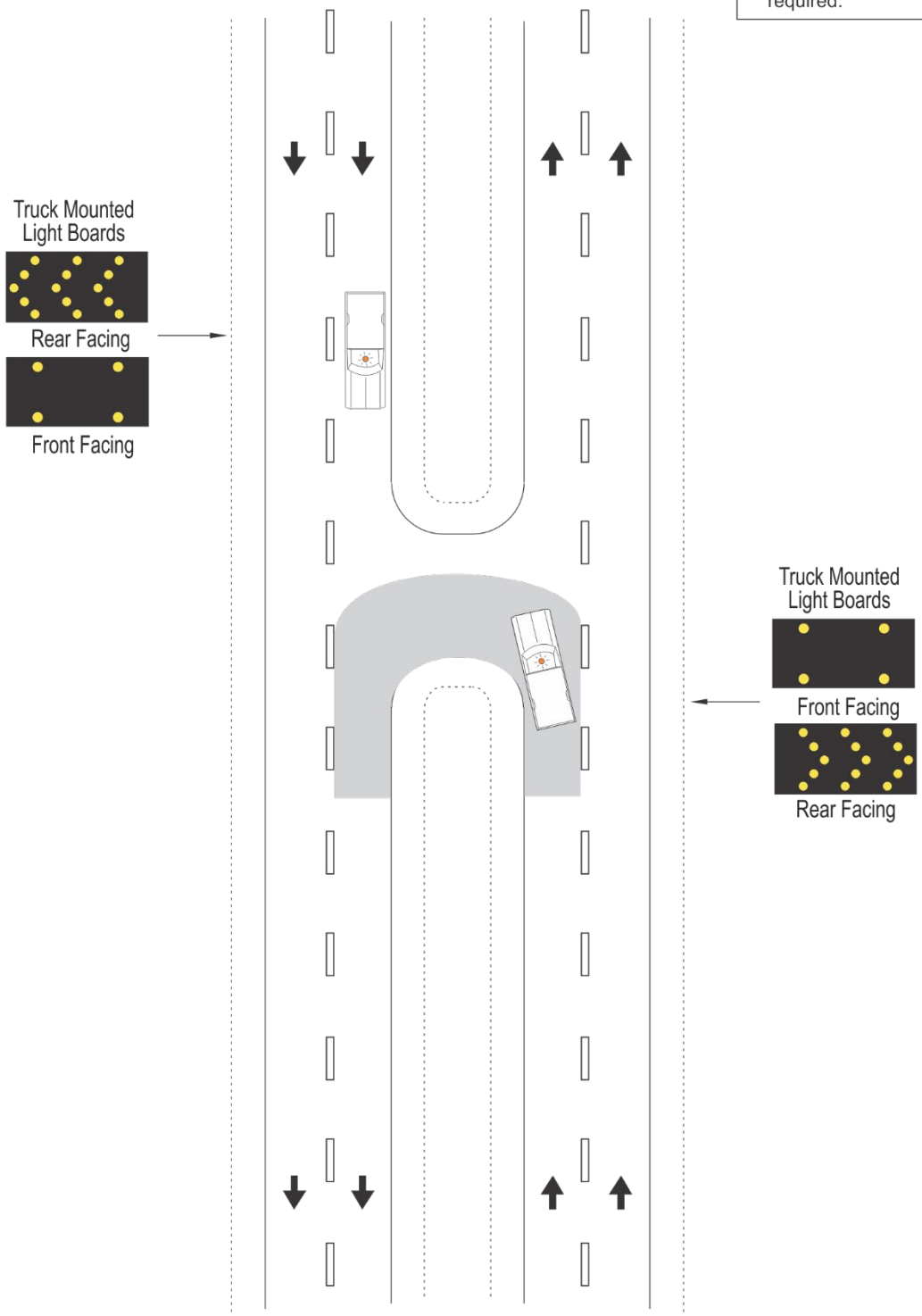
Notes:
1. A hand unit may be substituted for the marking unit.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

Moving Operation ○
Brief Duration ●
Short Duration ○
Long Duration ○

J.16 WRAP - 4 LANE

Notes:

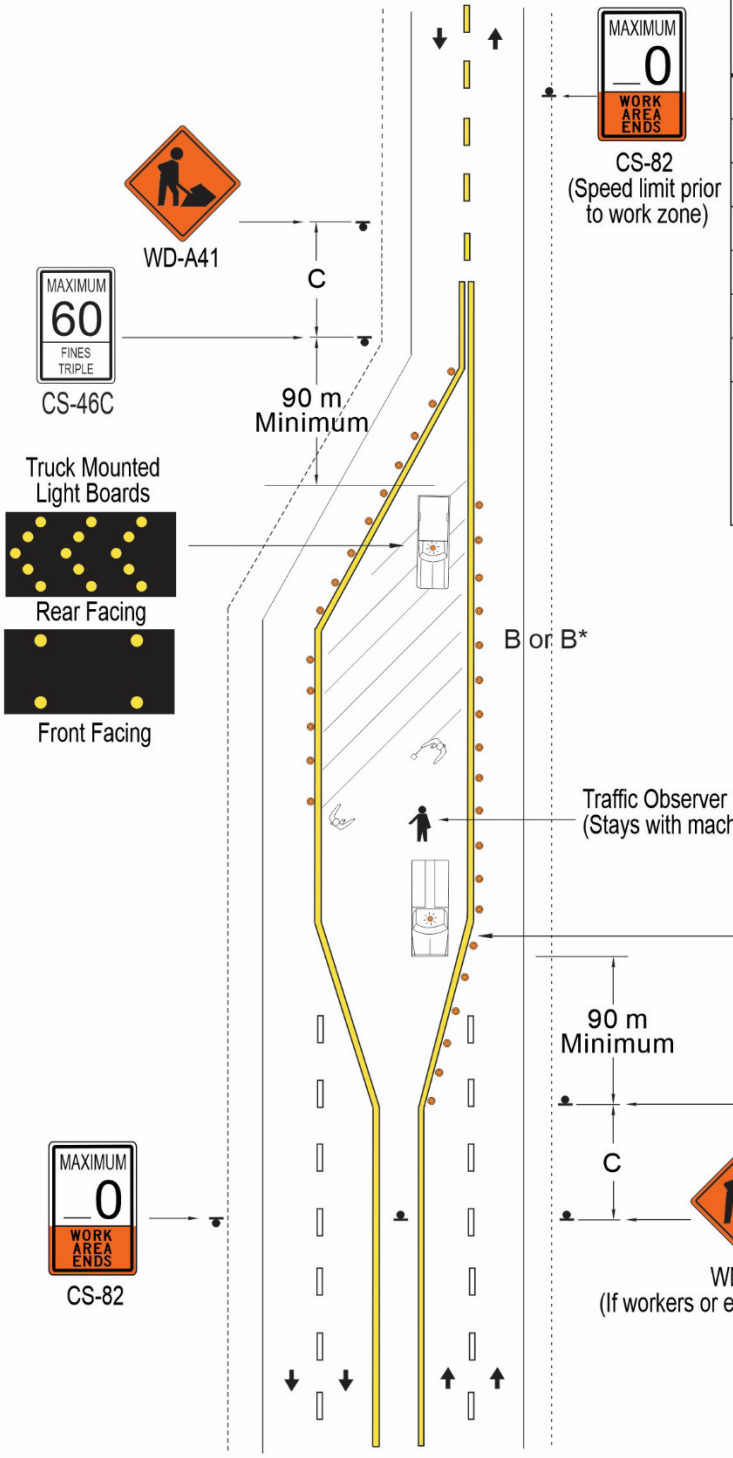
1. If this operation is done manually (with X-Hatch Machine), work zone signs required.



Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ○

J.17 PAVEMENT SIGNS - PAINTED MEDIANS

Revised: July, 2020



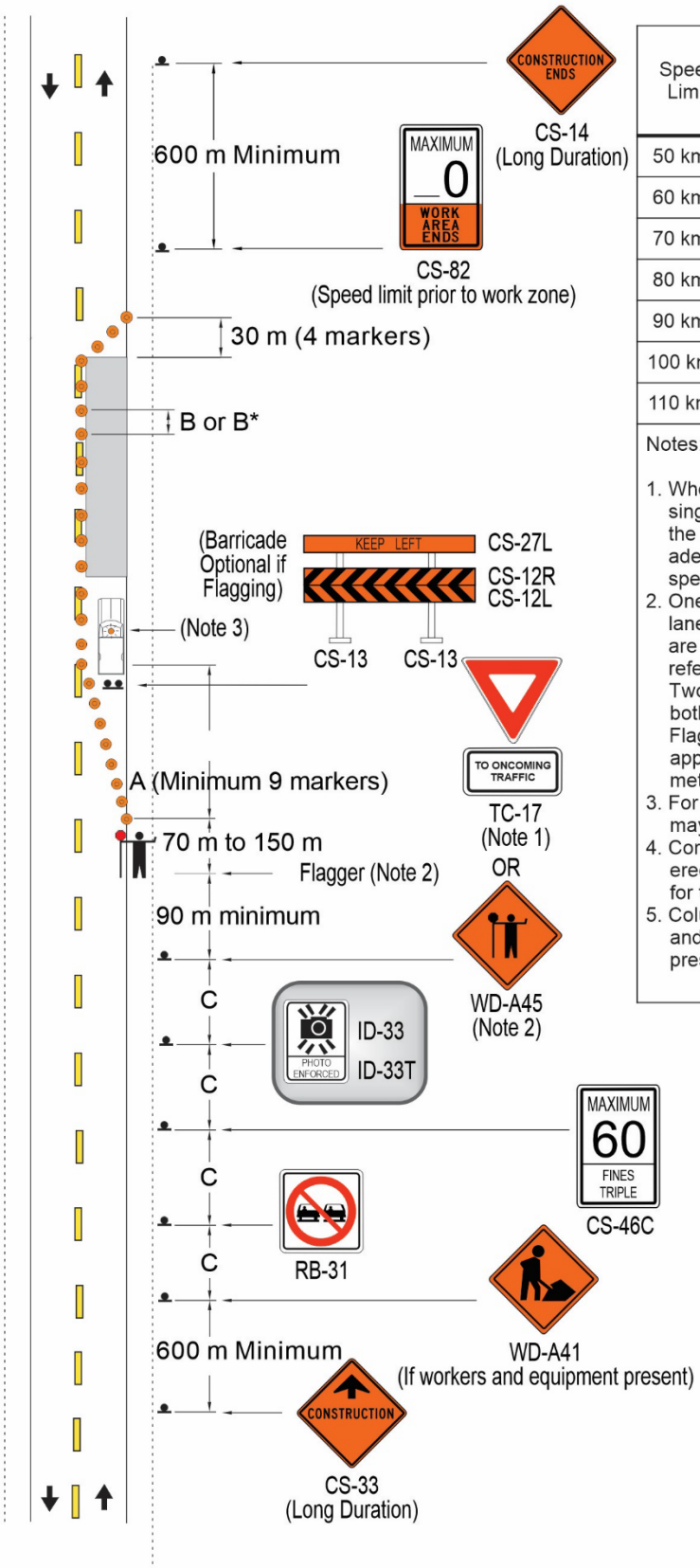
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Median area should be delineated with traffic cones.
2. Column B shall be used where workers are present, and column B* maybe used where workers are not present.

K. SPEED CONTROL

K.1 AUTOMATED SPEED ENFORCEMENT - 2 LANE

Revised: August, 2020



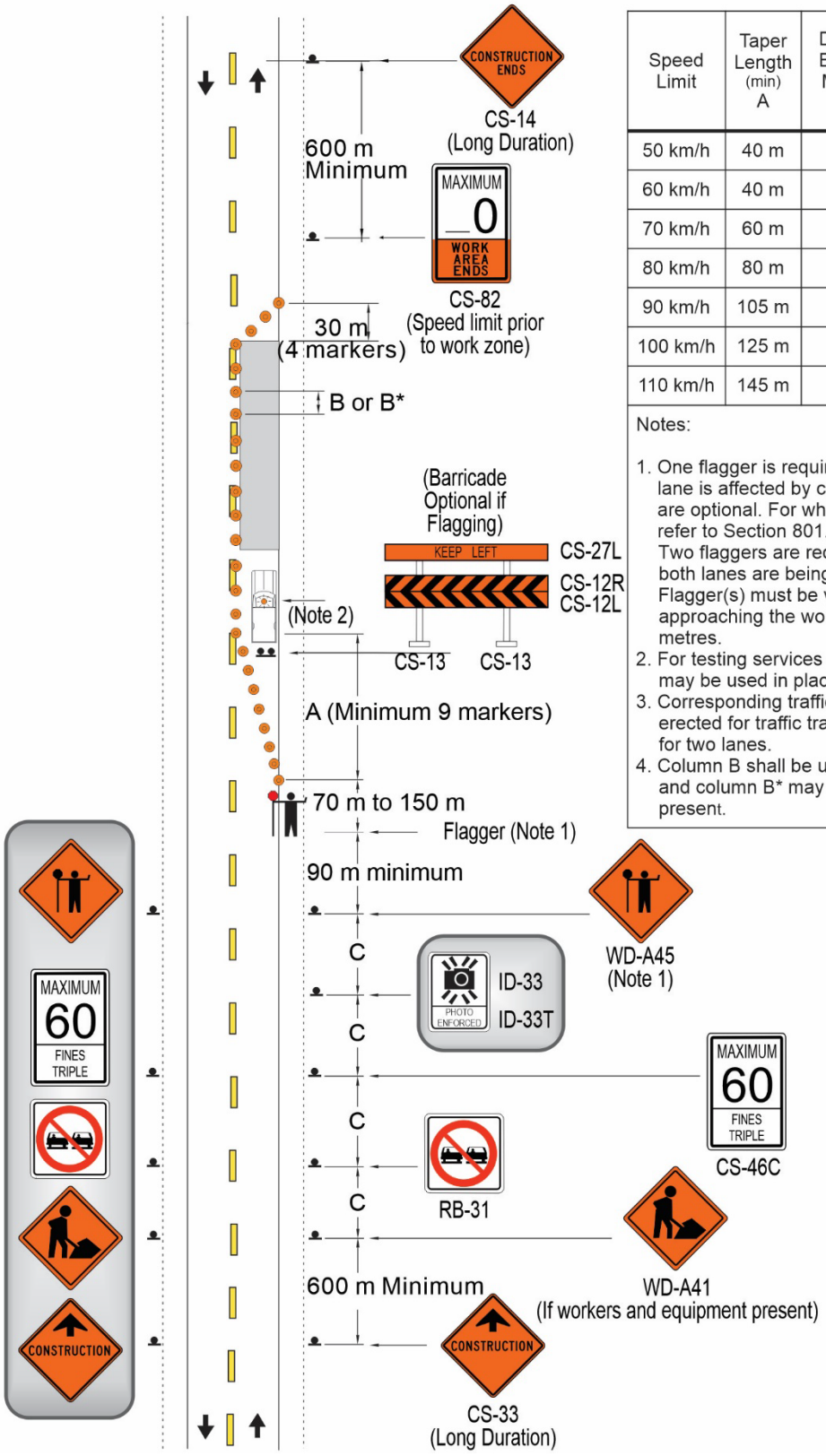
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. When flagger isn't on duty and two-way traffic in a single lane is required a TC-17 sign may be used if the location has short single lane operation, adequate sight distance, low traffic volumes and low speeds.
2. One flagger is required for all activities in which one lane is affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801.
   Two flaggers are required for all activities in which both lanes are being affected by construction. Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 metres.
3. For testing services a safety truck with rotating lights may be used in place of flashing light board.
4. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
5. Column B shall be used when workers are present, and column B* may be used when workers are not present.

K.2 AUTOMATED SPEED ENFORCEMENT - 2 LANE W/DUAL

Revised; August, 2020

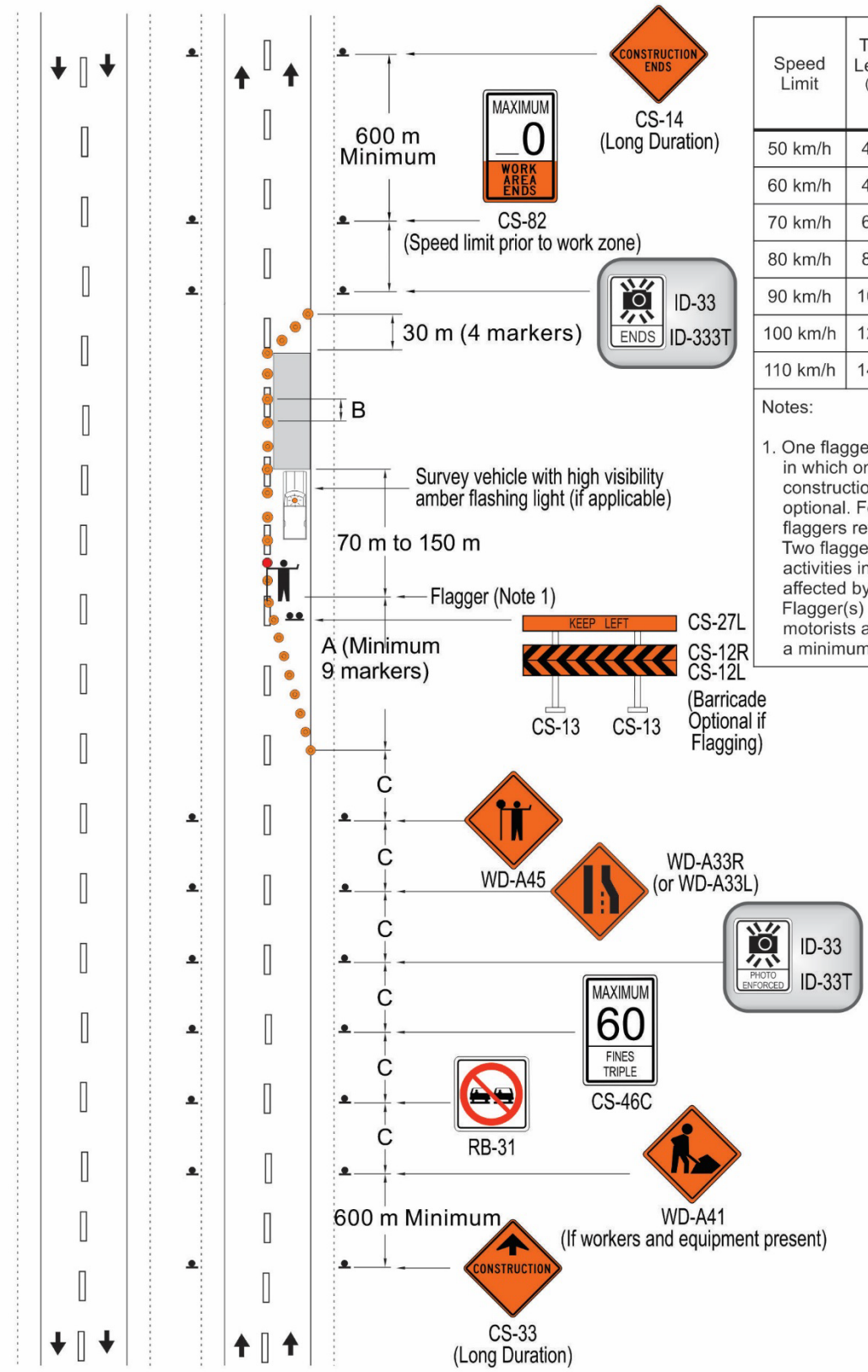


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:

1. One flagger is required for all activities in which one lane is affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to Section 801.
   Two flaggers are required for all activities in which both lanes are being affected by construction. Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 metres.
2. For testing services a safety truck with rotating lights may be used in place of flashing light board.
3. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
4. Column B shall be used when workers are present, and column B* may be used when workers are not present.

K.3 AUTOMATED SPEED ENFORCEMENT - 4 LANE



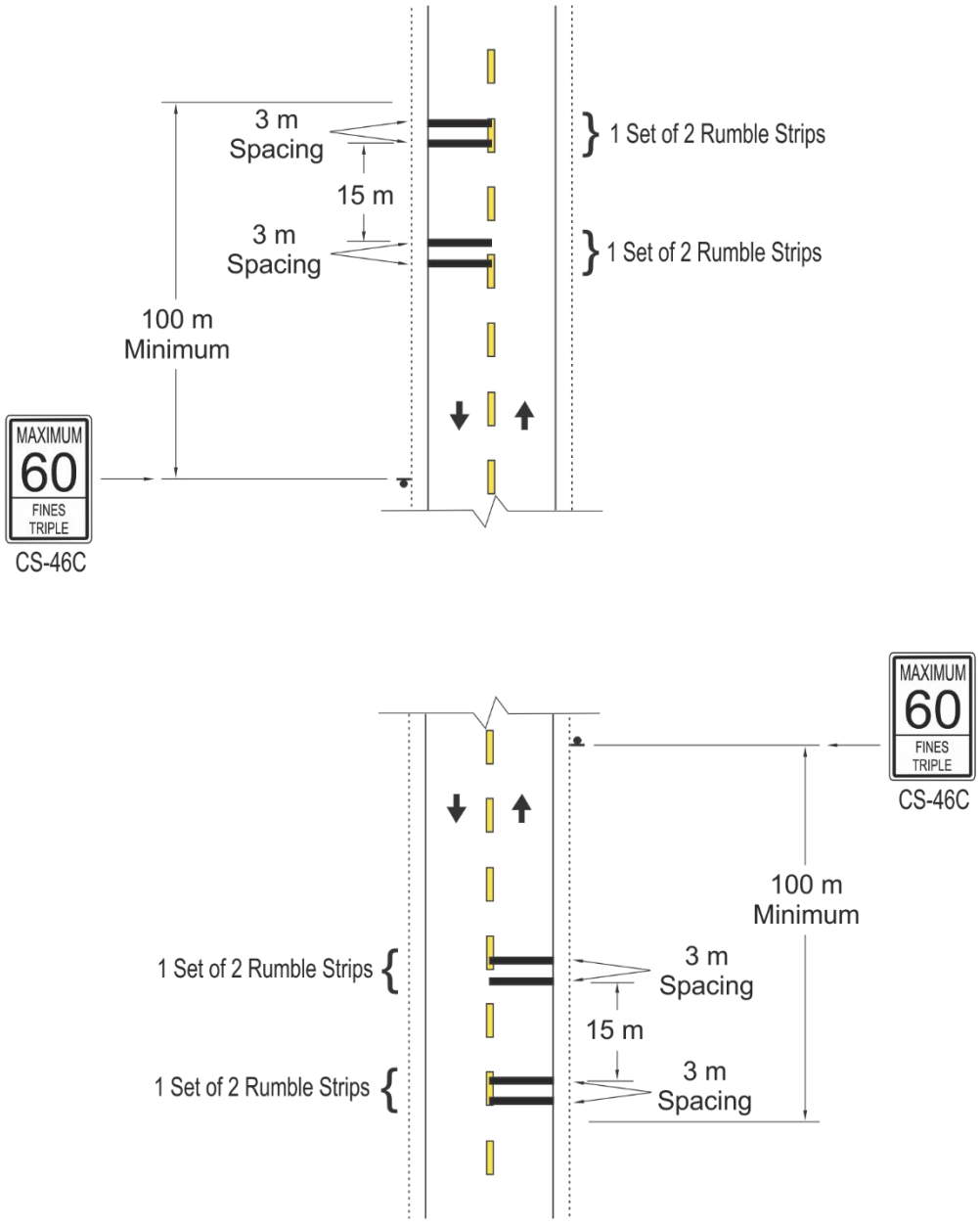
Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Signs (min) C
50 km/h	40 m	10 m	50 m
60 km/h	40 m	10 m	60 m
70 km/h	60 m	15 m	70 m
80 km/h	80 m	15 m	100 m
90 km/h	105 m	20 m	100 m
100 km/h	125 m	20 m	100 m
110 km/h	145 m	20 m	100 m

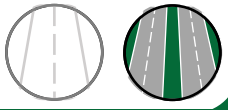
Notes:

1. One flagger is required for all activities in which one lane is affected by construction. Additional flaggers are optional. For when to use additional flaggers refer to TCDM 701.
   Two flaggers are required for all activities in which both lanes are affected by construction.
   Flagger(s) must be visible to the motorists approaching the work zone for a minimum of 125 metres.

K.4 PORTABLE RUMBLE STRIPS - 2 LANE

NOTE:
- Only the relative position of the portable rumble strips, and maximum speed signs to each other is is illustrated. Refer to the other Typical Plans for the other applicable traffic control devices.

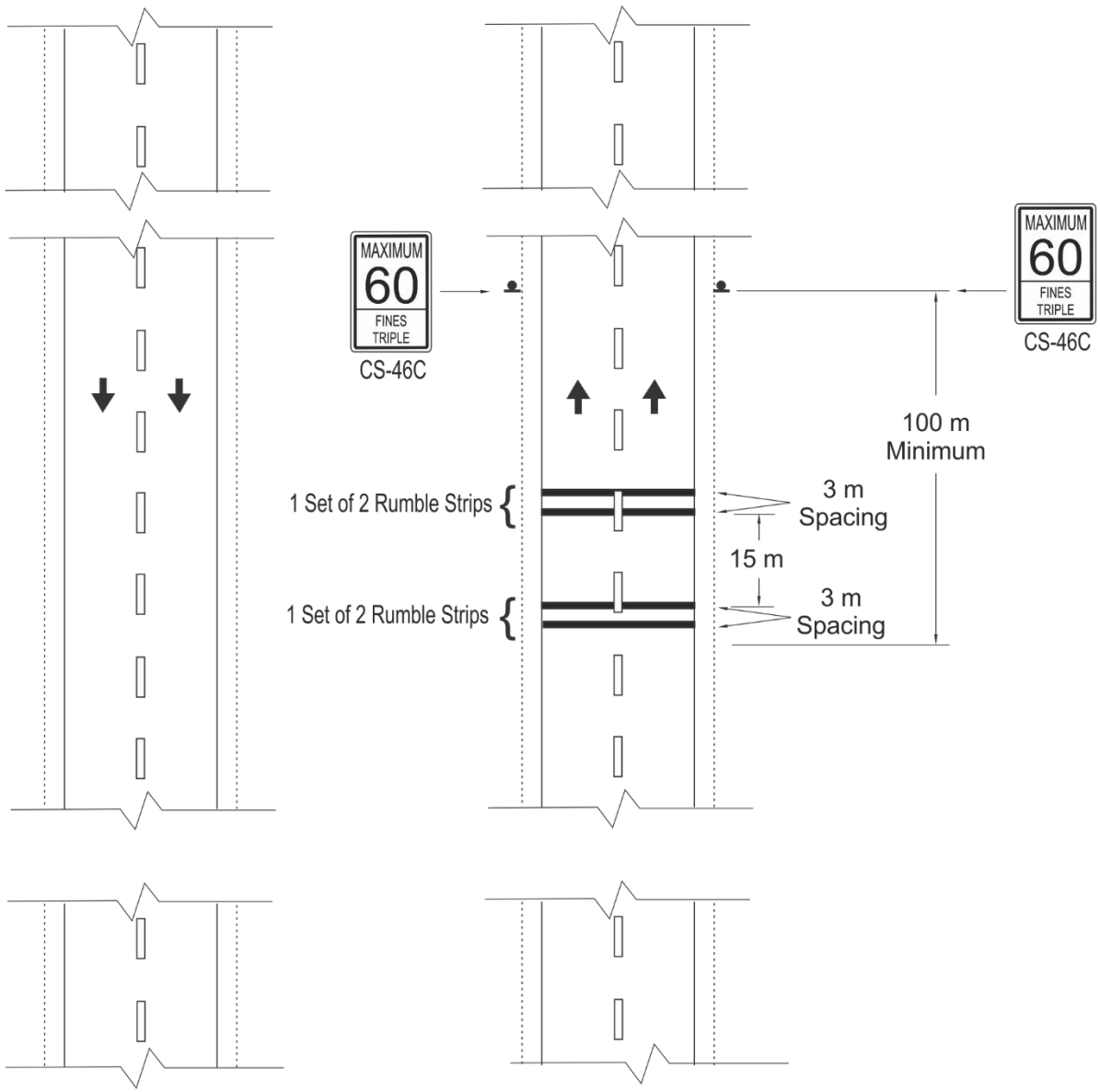




Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ●

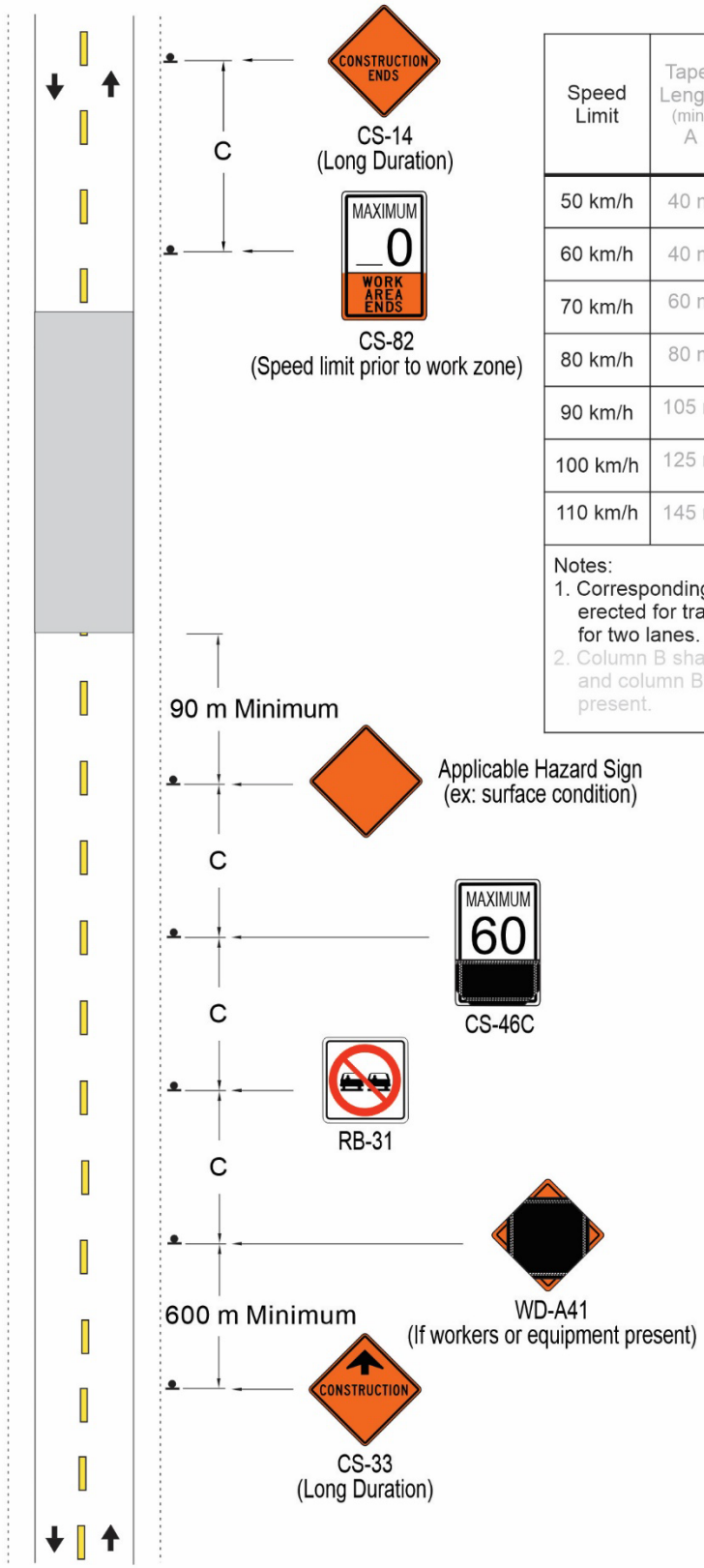
K.5 PORTABLE RUMBLE STRIPS - 4 LANE

NOTE:
- Only the relative position of the portable rumble strips, and maximum speed signs to each other is illustrated. Refer to the other Typical Plans for the other applicable traffic control devices.



K.6 SPEED ZONES - WORKERS NOT PRESENT OVERNIGHT

Revised: August, 2020

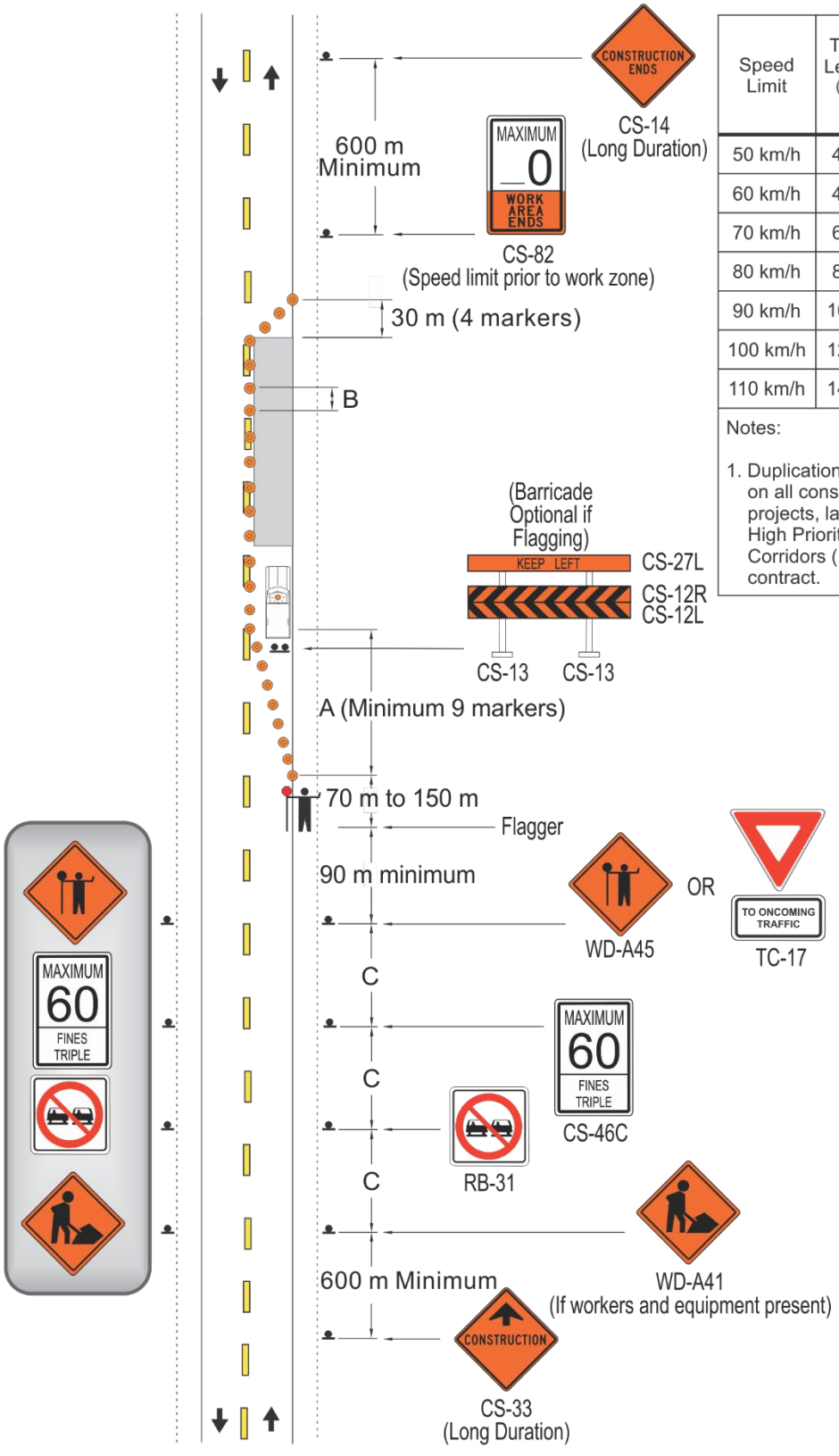


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

Notes:
1. Corresponding traffic control devices must be erected for traffic travelling in the opposite direction for two lanes.
2. Column B shall be used where workers are present, and column B* may be used where workers are not present.

L. MODIFYING AND SUPPLEMENTARY PLANS

L.1 DUPLICATION OF KEY SIGNS

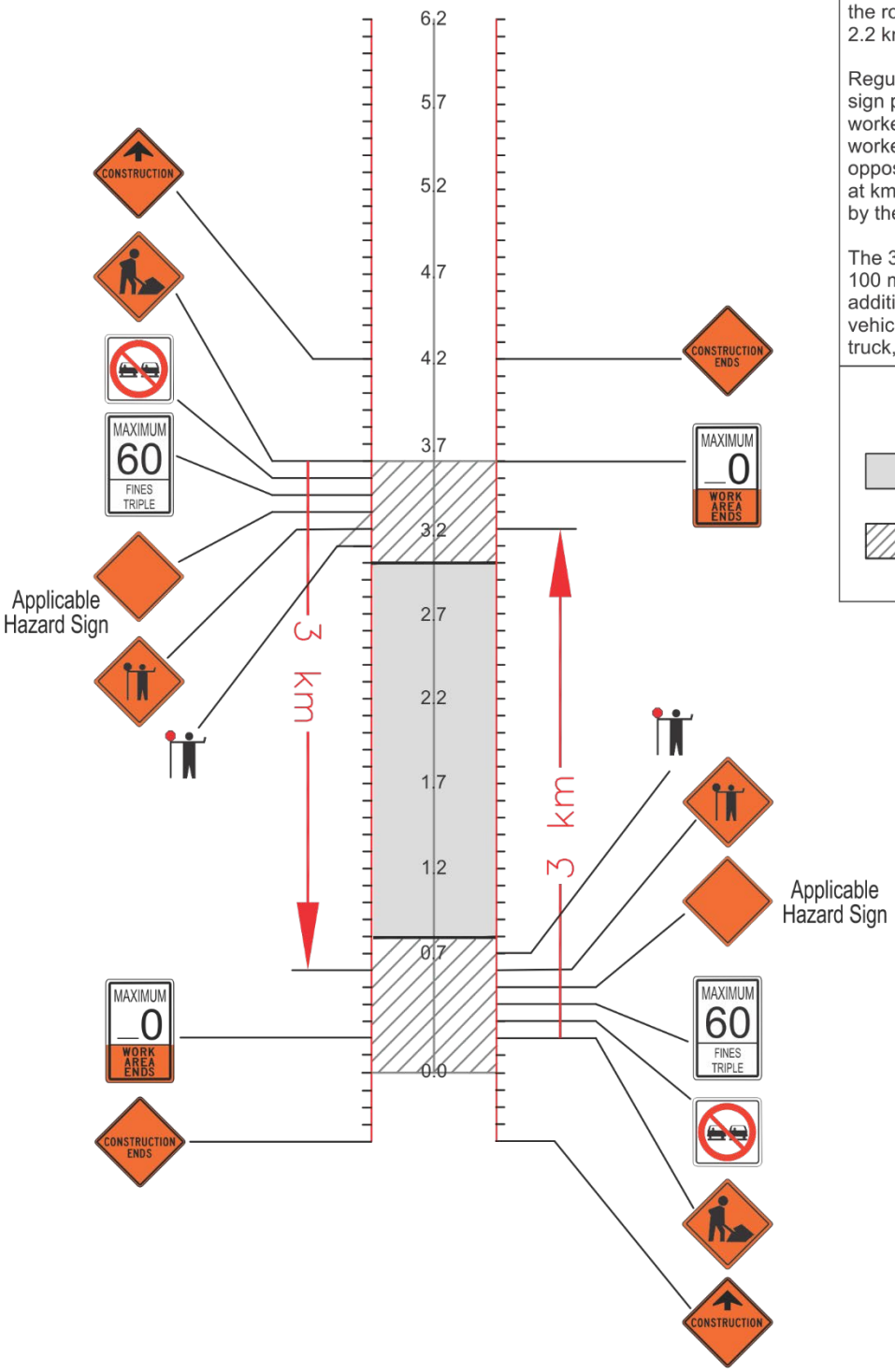


Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Signs (min) C
50 km/h	40 m	10 m	50 m
60 km/h	40 m	10 m	60 m
70 km/h	60 m	15 m	70 m
80 km/h	80 m	15 m	100 m
90 km/h	105 m	20 m	100 m
100 km/h	125 m	20 m	100 m
110 km/h	145 m	20 m	100 m

Notes:

1. Duplication of key signs must be used on all construction and maintenance projects, lasting five days or longer, on High Priority Traffic Accommodation Corridors (HPTAC) or as specified in the contract.

L.2 MAXIMUM SINGLE WORK AREA WORK ZONE



Typical Sign Layout:

Allowable Area for Workers/Equipment on the road is from km 0.8 to km 3.0 which is 2.2 km long.

Regulations require WD-A41 (Roadwork) sign placed no more than 3 km from workers on the road. This applies to all workers including the flagger at the opposite end of the work zone. The flagger at km 3.1 for southbound traffic is covered by the sign at km 0.2 northbound traffic.

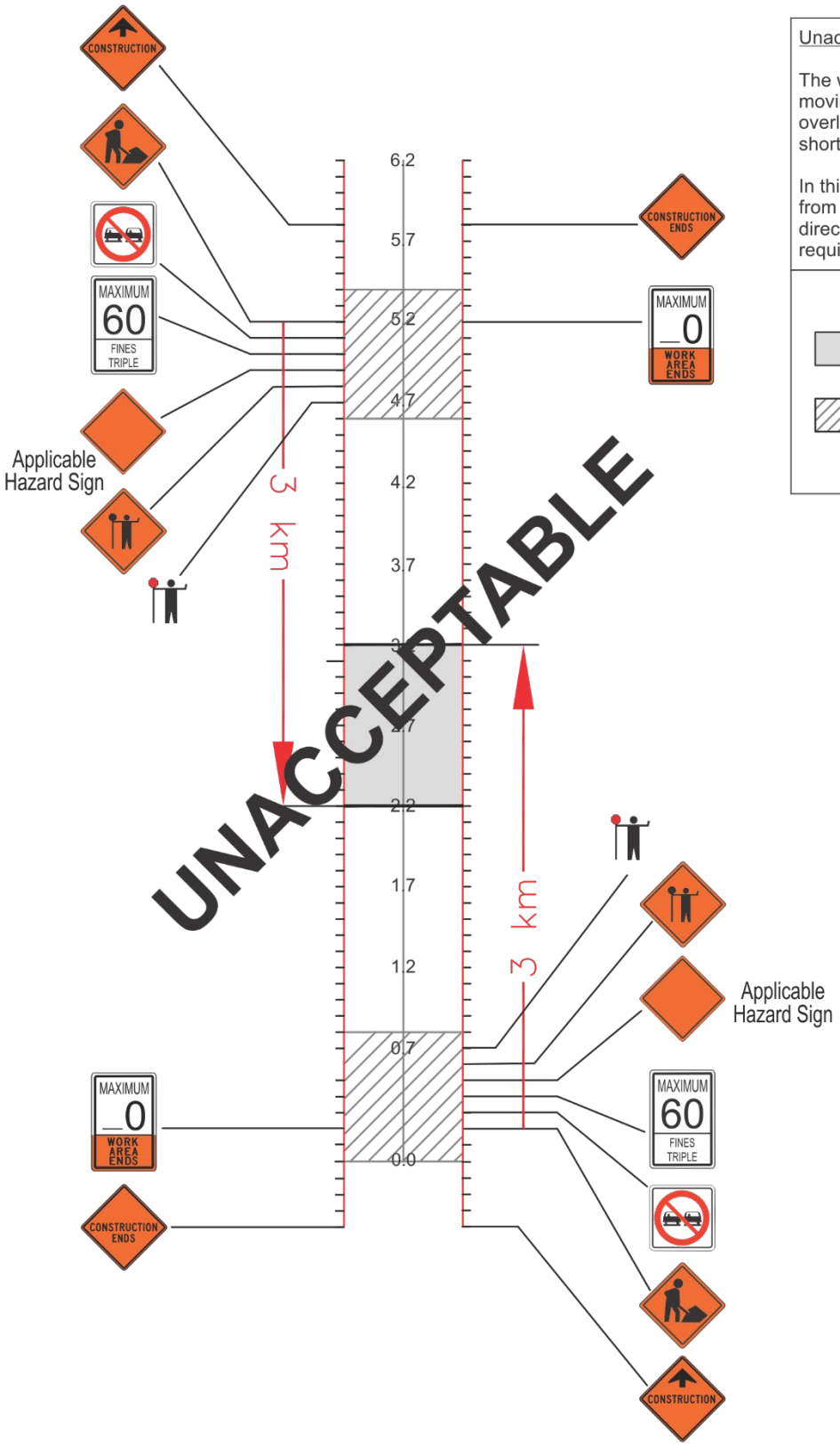
The 3 km coverage limit is shown going 100 m past the flagger to allow for additional or occasional construction vehicle use, such as pilot vehicles, TAS truck, queuing area, etc.

LEGEND

Available Area for Workers/Equipment

Approach Signing, Queue Area, Flag Station, Buffer Area and Termination Area

L.3 EXAMPLE OF UNACCEPTABLE WORK AREA EXTENSION



Unacceptable Sign Layout:

The work area cannot be lengthened by moving one set of signs. The resulting overlap coverage area actually gets shorter.

In this example, the flaggers are 4.5 km from the WD-A41 sign for the opposite direction traffic. This does not meet legal requirements.

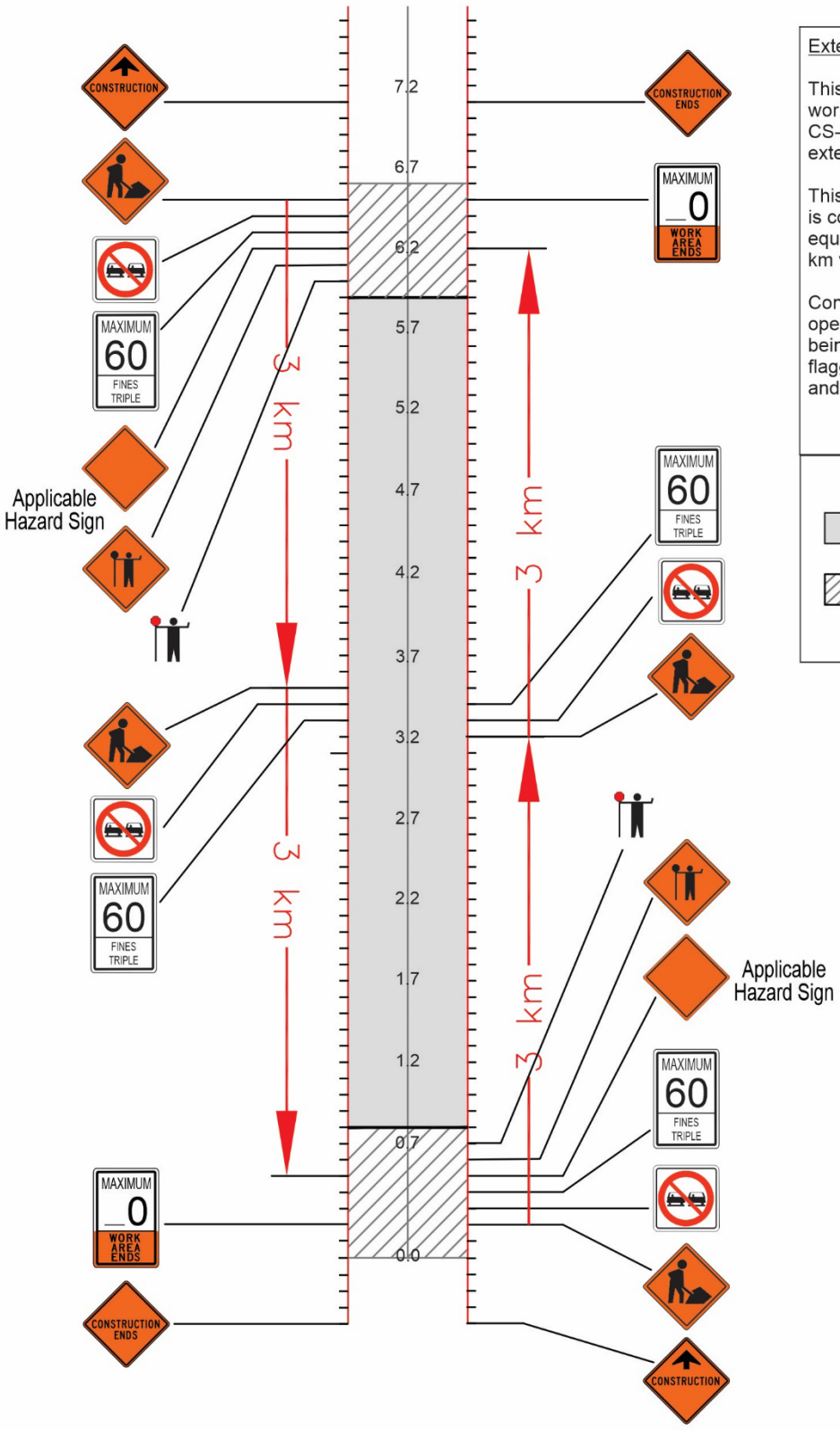
LEGEND

- Available Area for Workers/Equipment
- Approach Signing, Queue Area, Flag Station, Buffer Area and Termination Area

Moving Operation ○
Brief Duration ○
Short Duration ●
Long Duration ●

L.4 EXTENDED SINGLE WORK AREA IN WORK ZONE

Revised: 2020-02-24



Extended Sign Layout:

This example shows how to extend the work area by using additional WD-A41, CS-46C and RB-31 signs. Further extension is possible with further signing.

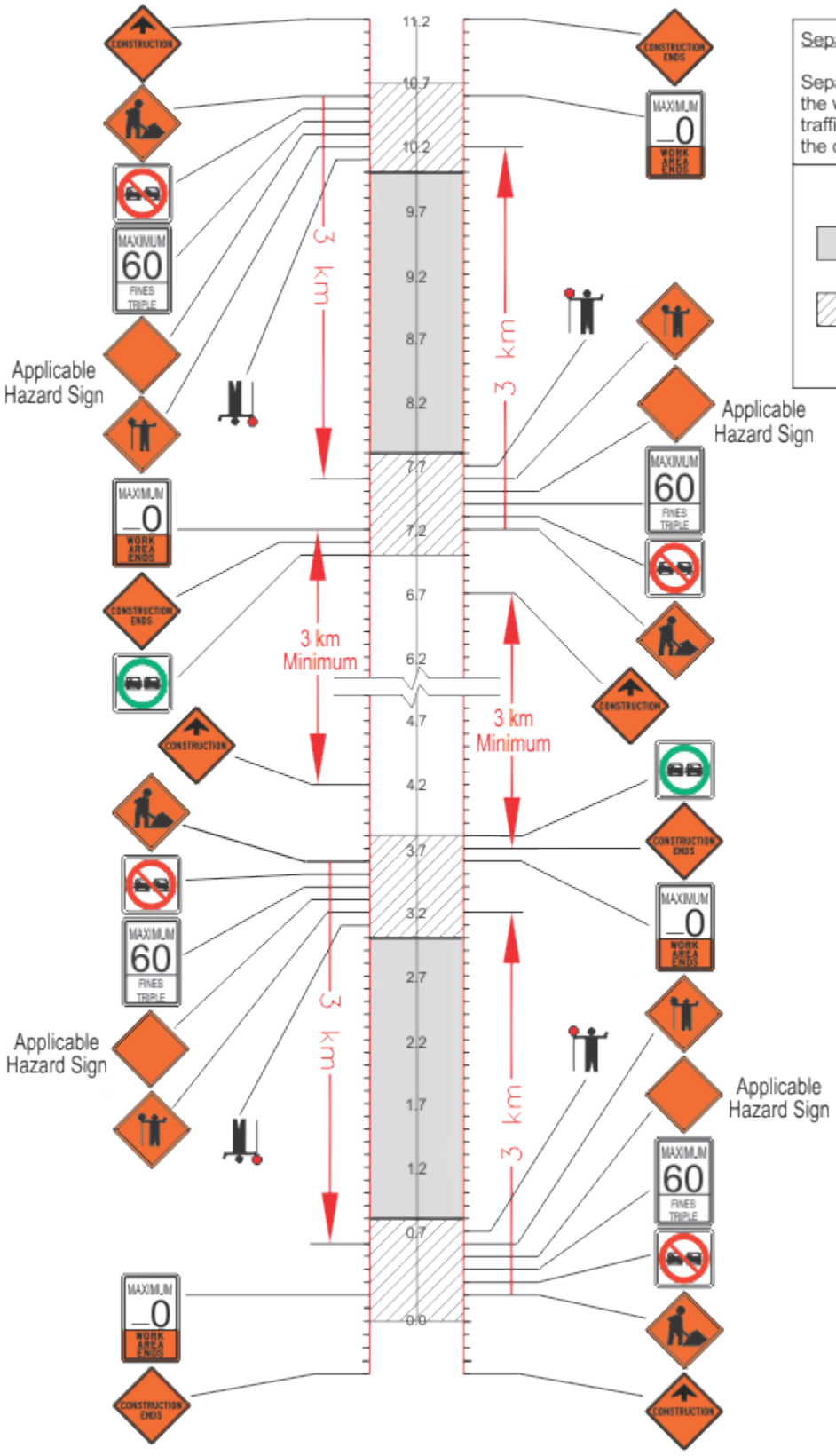
This would normally be in a work area that is continuous with workers and/or equipment present beyond the original 3 km work area.

Continuous zones could include full seal operations, or work zones where traffic is being piloted throughout. Actual sign and flagger locations depend on the activity and onsite safety issues.

LEGEND

- Available Area for Workers/Equipment
- Approach Signing, Queue Area, Flag Station, Buffer Area and Termination Area

L.5 SEPARATE WORK ZONES

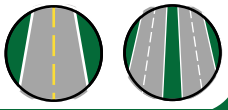


Separate Work Area Layout:

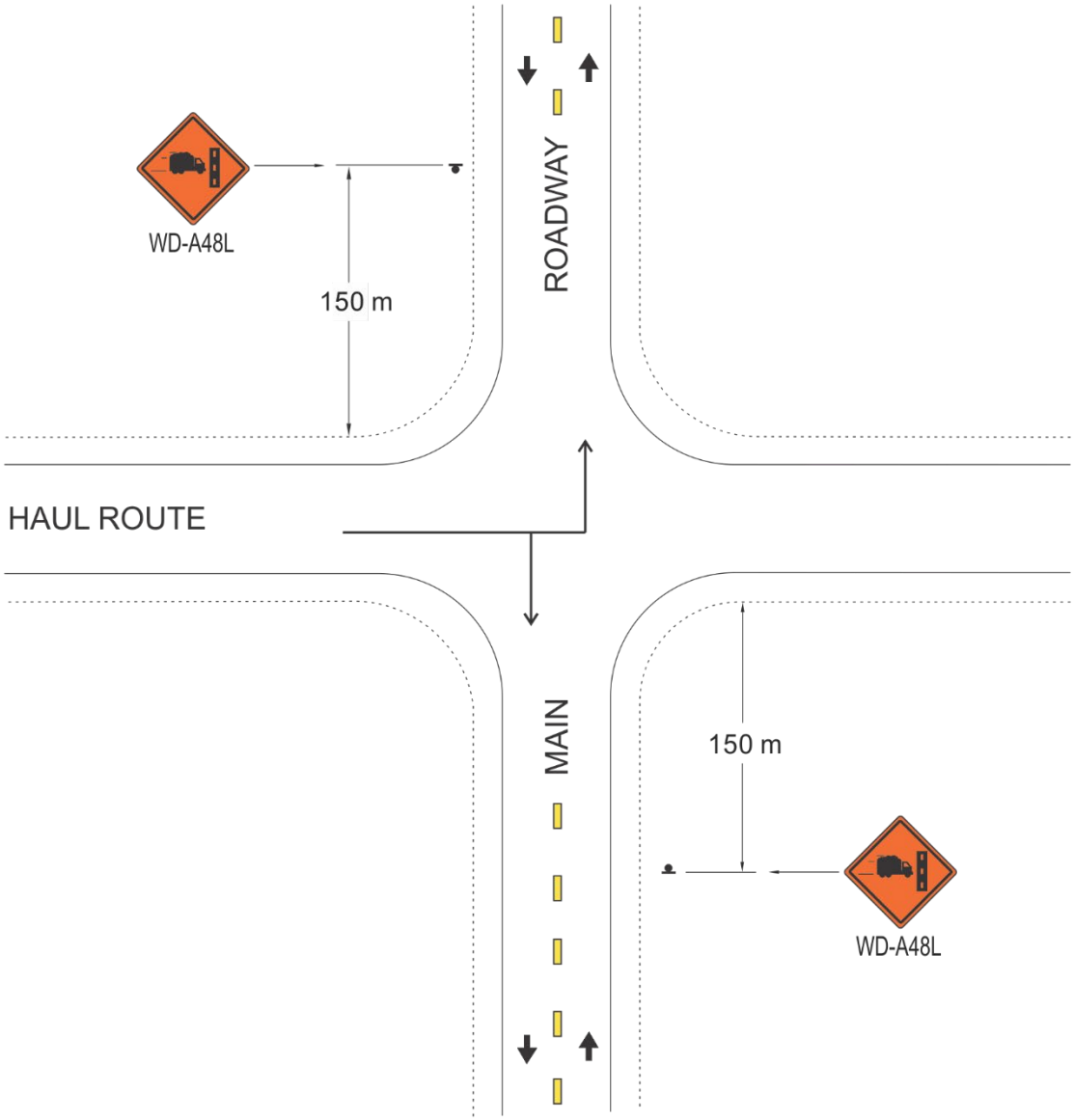
Separate work areas should be used when the work area is NOT continuous, or when traffic is not being controlled throughout the complete work area.

LEGEND

- Available Area for Workers/Equipment
- Approach Signing, Queue Area, Flag Station, Buffer Area and Termination Area

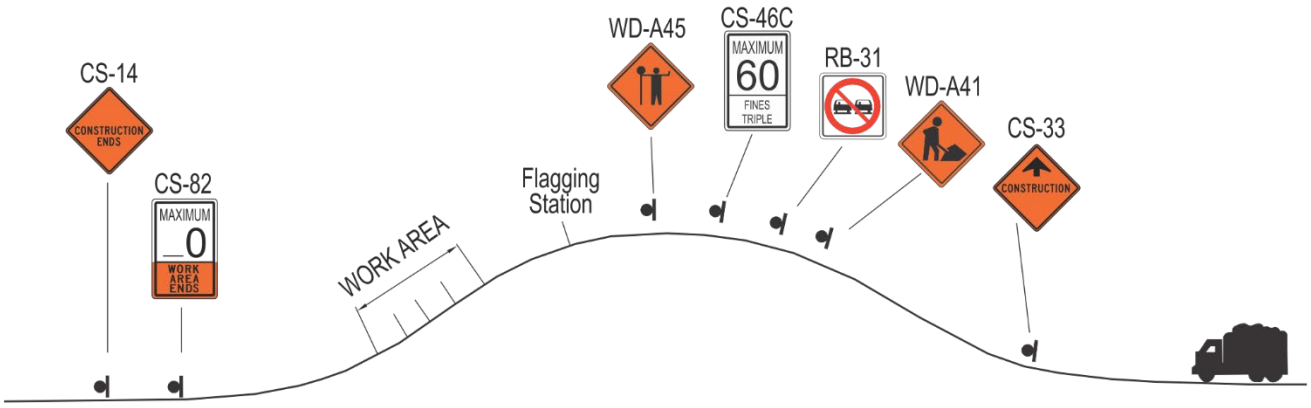


L.6 TRUCK ENTERING ROADWAY

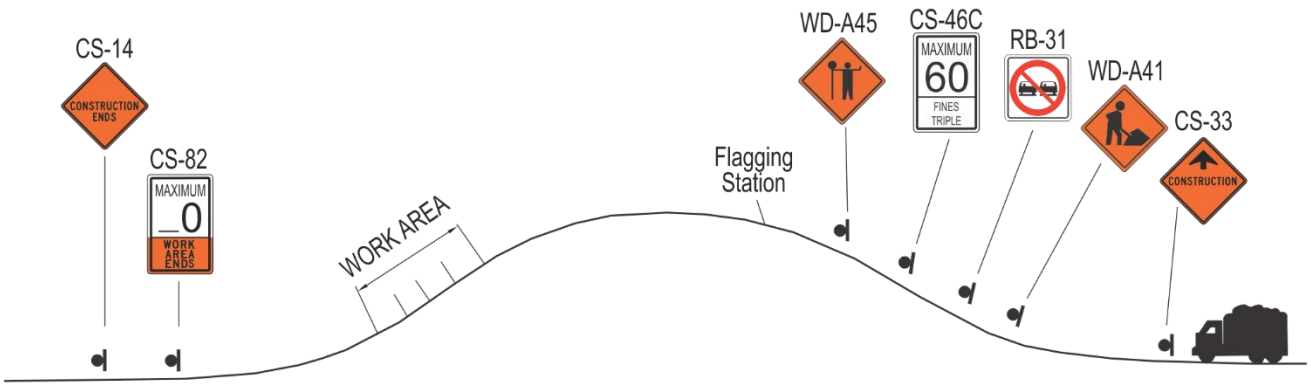


L.7 MODIFICATION - SIGHT DISTANCE LIMITATION

PROBLEM: Vertical Profile of Highway
- Flagger may be hidden or cannot see the vehicles approaching the work area.



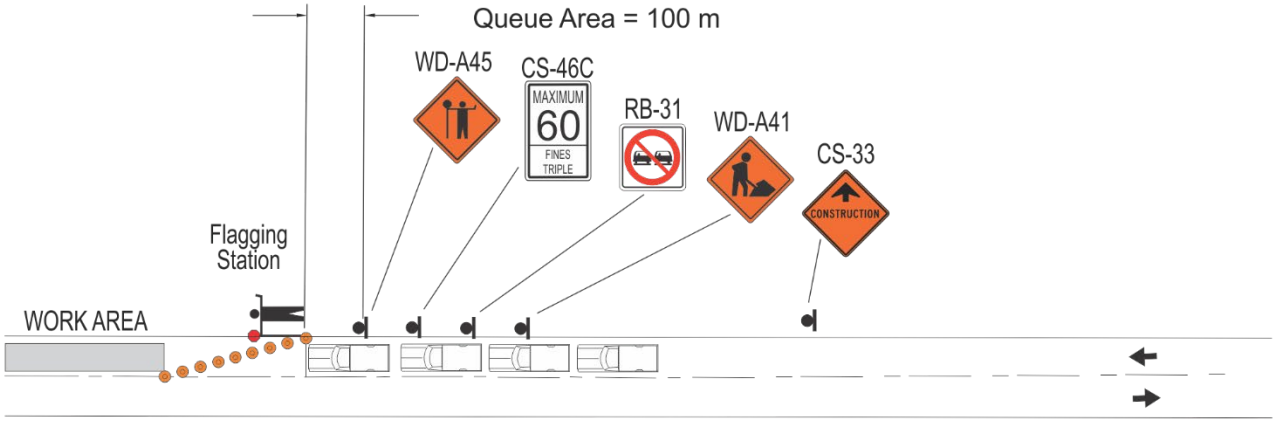
SOLUTION:
- Move advance sign set so flagger can see and be seen by the approaching vehicles.



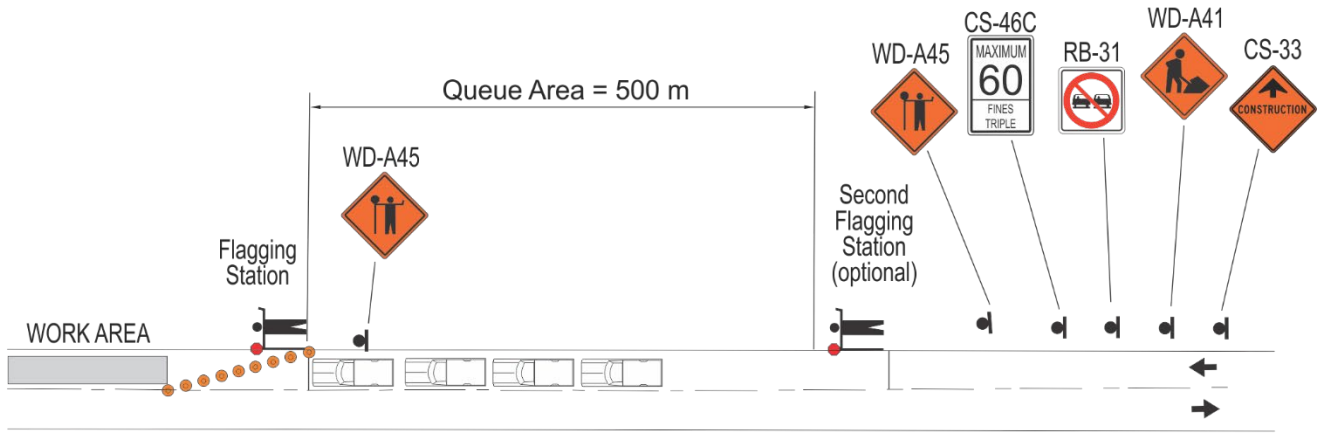
L.8 MODIFICATION - INSUFFICIENT QUEUEING AREA

NOTE:
- Work zone end signage is not shown on this plan. Always install the proper signage at the end of the actual work zone.

PROBLEM: High Volume Two-Lane Traffic
- Traffic backs up in queue and blocks sign.



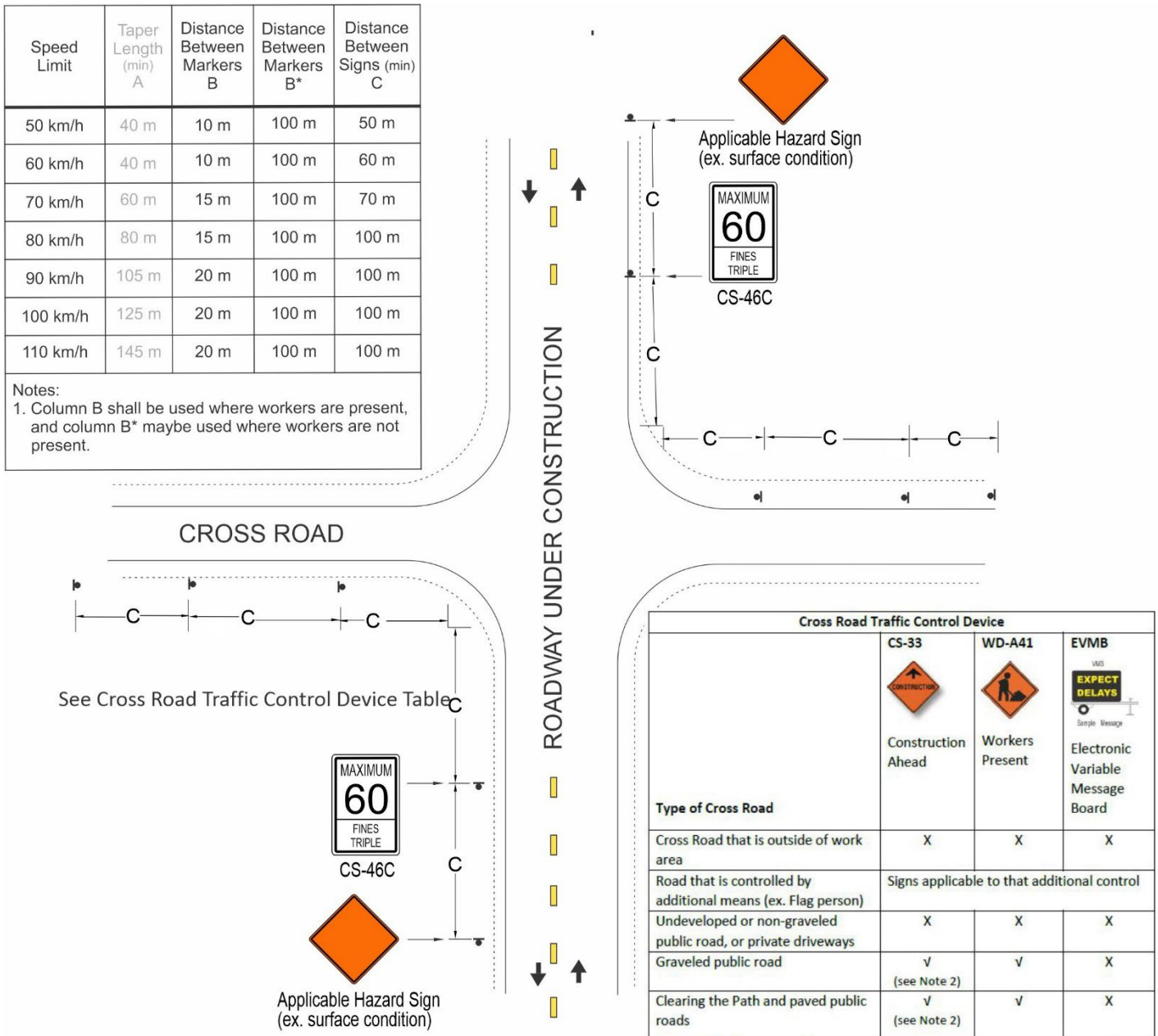
SOLUTION:
- Move the approach sign set back far enough to accommodate a larger queue area.
- Consider adding a second flagger, this person will slow or stop traffic if queue backs up past the second flagging station.



L.9 MODIFICATION - CROSS ROAD INTERSECTION

Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100 m	100 m

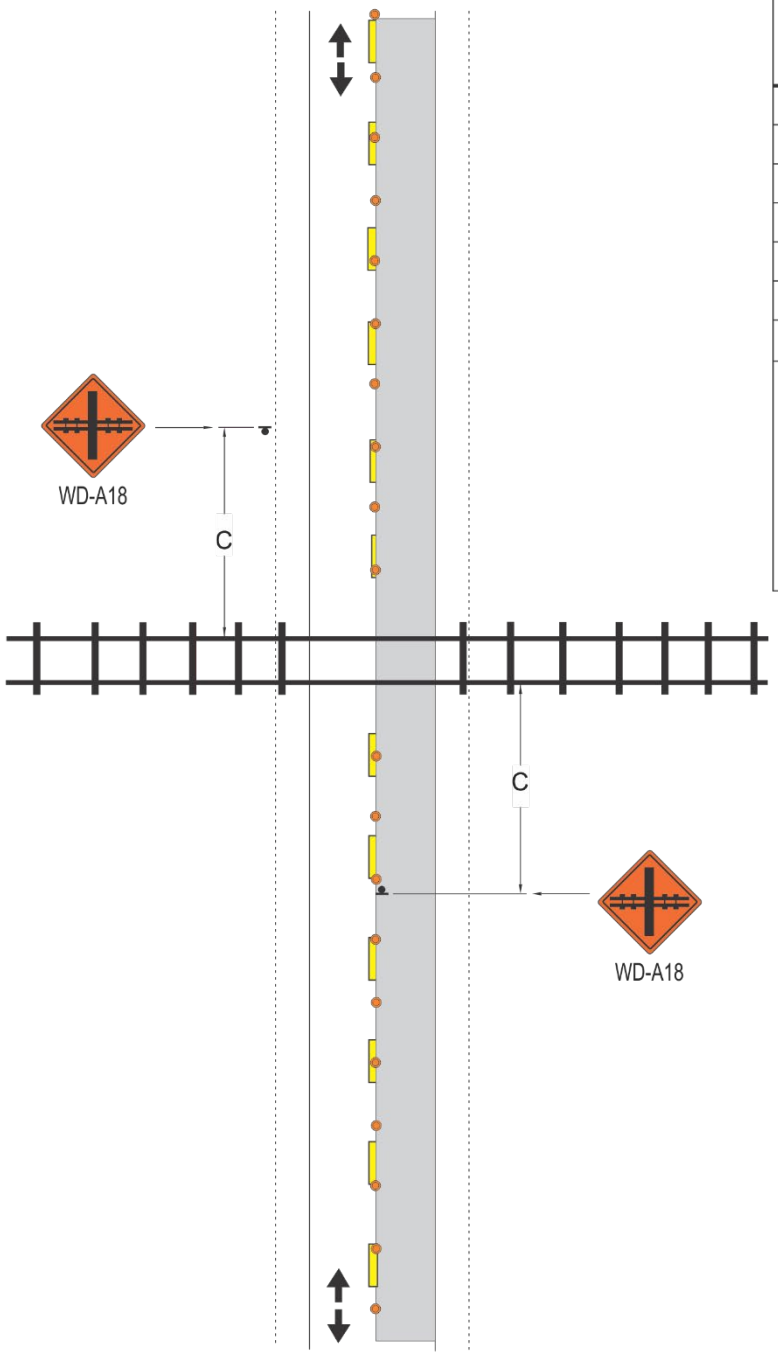
Notes:
1. Column B shall be used where workers are present, and column B* maybe used where workers are not present.



Cross Road Traffic Control Device			
Type of Cross Road	**CS-33** Construction Ahead	**WD-A41** Workers Present	**EVMB** Electronic Variable Message Board
Cross Road that is outside of work area	X	X	X
Road that is controlled by additional means (ex. Flag person)	Signs applicable to that additional control		
Undeveloped or non-graveled public road, or private driveways	X	X	X
Graveled public road	√ (see Note 2)	√	X
Clearing the Path and paved public roads	√ (see Note 2)	√	X
Provincial highway, or other roads under ministry jurisdiction (e.g. - community accesses road)	√ (see Note 2)	√	√
HPTAC provincial highway	Full work zone signing		

Notes:
1. Road classification will be as identified on the Saskatchewan Rural Municipal Road Map.
2. CS-33, Construction Ahead Sign, shall be used on Long Duration projects only.

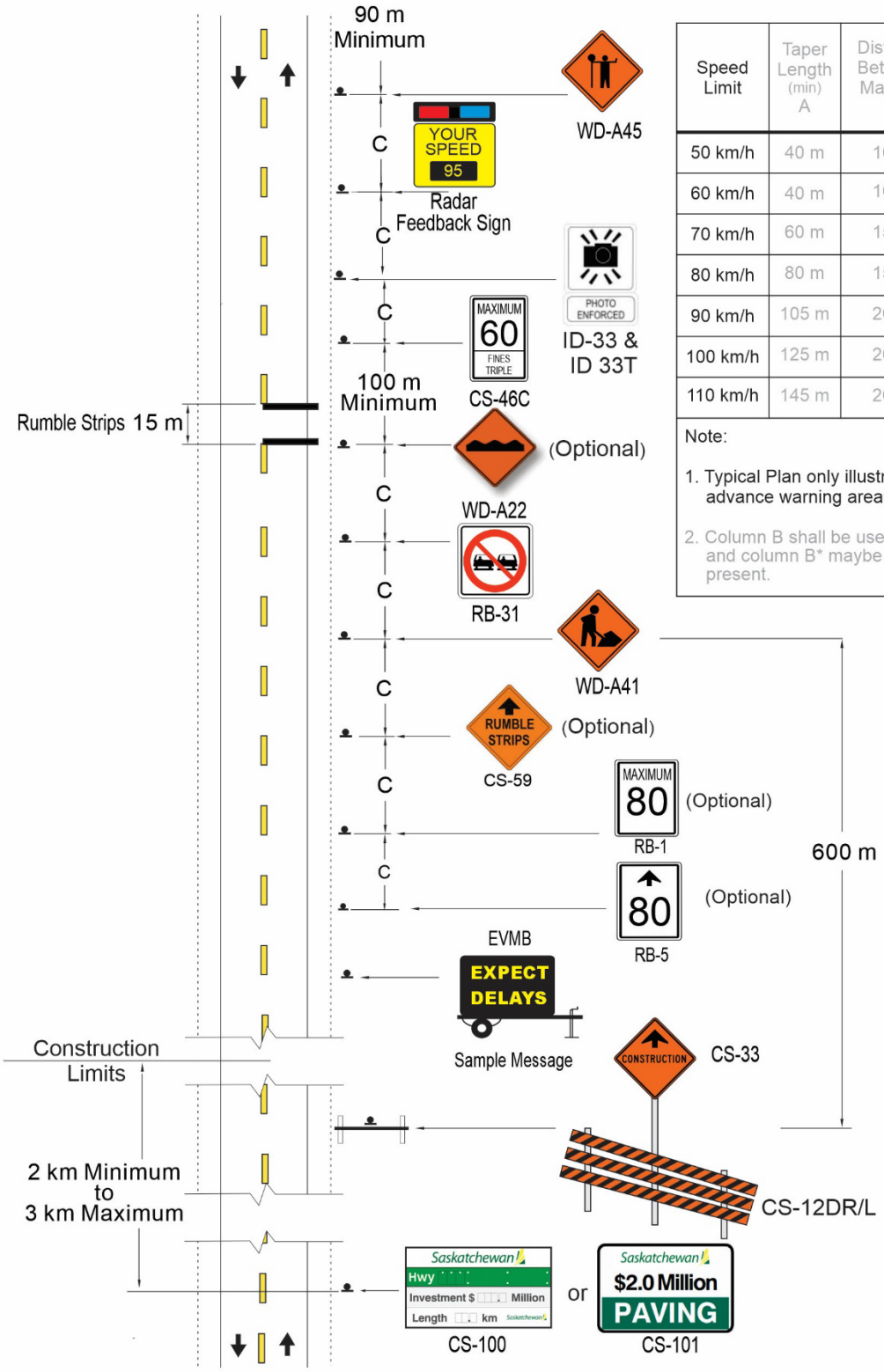
L.10 MODIFICATION - RAILWAY CROSSING



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Signs (min) C
50 km/h	40 m	10 m	50 m
60 km/h	40 m	10 m	60 m
70 km/h	60 m	15 m	70 m
80 km/h	80 m	15 m	100 m
90 km/h	105 m	20 m	100 m
100 km/h	125 m	20 m	100 m
110 km/h	145 m	20 m	100 m

Notes:

When a railway company or a road authority undertakes an activity that could constitute a threat to, or that interferes with, the safety of railway operations, the railway company and the road authority must put in place the necessary protection measures to address the threat or the interference.



Speed Limit	Taper Length (min) A	Distance Between Markers B	Distance Between Markers B*	Distance Between Signs (min) C
50 km/h	40 m	10 m	100 m	50 m
60 km/h	40 m	10 m	100 m	60 m
70 km/h	60 m	15 m	100 m	70 m
80 km/h	80 m	15 m	100 m	100 m
90 km/h	105 m	20 m	100 m	100 m
100 km/h	125 m	20 m	100 m	100 m
110 km/h	145 m	20 m	100m	100 m

Note:

1. Typical Plan only illustrates project information and advance warning areas in one direction of travel.
2. Column B shall be used when workers are present and column B* maybe used when workers are not present.