

 Ontario

Book 1

**Ontario
Traffic
Manual**

March 2005

Introduction to the Ontario Traffic Manual

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Ontario Traffic Manual

Foreword

The purpose of the Ontario Traffic Manual (OTM) is to provide information and guidance for transportation practitioners and to promote uniformity of treatment in the design, application and operation of traffic control devices and systems across Ontario. The objective is safe driving behaviour, achieved by a predictable roadway environment through the consistent, appropriate application of traffic control devices. Further purposes of the OTM are to provide a set of guidelines consistent with the intent of the Highway Traffic Act and to provide a basis for road authorities to generate or update their own guidelines and standards.

The OTM is made up of a number of Books, which are being generated over a period of time, and for which a process of continuous updating is planned. Through the updating process, it is proposed that the OTM will become more comprehensive and representative by including many traffic control devices and applications appropriate for municipal use, in addition to those for highway use. Some of the Books of the OTM are new, while others incorporate updated material from the Ontario Manual of Uniform Traffic Control Devices (MUTCD) and the King's Highway Guide Signing Policy Manual (KHGSPM).

The Ontario Traffic Manual is directed to its primary users, traffic practitioners. The OTM incorporates current best practices in the Province of Ontario. The interpretations, recommendations and guidelines in the Ontario Traffic Manual are intended to provide an understanding of traffic operations and they cover a broad range of traffic situations encountered in practice. They are based on many factors which may determine the specific design and operational effectiveness of traffic control systems. However, no manual can cover all contingencies or all cases encountered in the field. Therefore, field experience and knowledge of application are essential in deciding what to do in the absence of specific direction from the Manual itself and in overriding any recommendations in this Manual.

The traffic practitioner's fundamental responsibility is to exercise engineering judgement and experience on technical matters in the best interests of the public and workers. Guidelines are provided in the OTM to assist in making those judgements, but they should not be used as a substitute for judgement.

Design, application and operational guidelines and procedures should be used with judicious care and proper consideration of the prevailing circumstances. In some designs, applications, or operational features, the traffic practitioner's judgement is to meet or exceed a guideline while in others a guideline might not be met for sound reasons, such as space availability, yet still produce a design or operation which may be judged to be safe. Every effort should be made to stay as close to the guidelines as possible in situations like these, to document reasons for departures from them, and to maintain consistency of design so as not to violate driver expectations.

Custodial Office

Inquiries about amendments, suggestions or comments regarding the Ontario Traffic Manual may be directed to:

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A user response form is provided at the end of Book 1 of this Manual. Inquiries regarding the purchase and distribution of this Manual may be directed to the custodial office, or to:

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1. Organization of Ontario Traffic Manual

Books labelled “N/A” are not yet available. In the list of books below, Books 8 and 9 exist to some degree in the form of the 1990 Ministry “King’s Highway Guide Signing Policy Manual” and the 1995 “Tourism-Oriented Directional Signing Policy.” These will be revised to conform to the Ontario Traffic Manual.

	Date of Issue
Book 1	Introduction November 2004
	Book 1A Illustrated Sign and Signal Display Index July 2001
	Book 1B Sign Design Principles July 2001
	Book 1C Positive Guidance Toolkit July 2001
Book 2	Sign Patterns and Fabrication November 2004
Book 3	Sign Support and Installation N/A
Book 4	Sign Maintenance N/A
Book 5	Regulatory Signs March 2000
Book 6	Warning Signs July 2001
Book 7	Temporary Conditions (Office Edition) March 2001
Book 7	Temporary Conditions (Field Edition) March 2001
Book 8	Directional Guide Signs N/A
Book 9	Tourism and Commercial Signs N/A
Book 10	Dynamic Message Signs N/A
Book 11	Markings and Delineation March 2000
Book 12	Traffic Signals July 2001
Book 13	Traffic Characteristics, Planning and Operations N/A
Book 14	Speed Zoning and Speed Controls N/A
Book 15	Pedestrian Control and Protection N/A
Book 16	Parking Controls N/A
Book 17	Reserved Lane Controls N/A
Book 18	Bicycle Facilities N/A
Book 19	Advanced Traffic Management Systems N/A
Book 20	Traffic Calming N/A
Book 21	Road Safety Management N/A
Book 22	Corridor Control Issues N/A

2. Overview of the Ontario Traffic Manual

2.1 Background and Scope

For many years, the two primary traffic manuals used in Ontario were the:

- **Ontario Manual of Uniform Traffic Control Devices (MUTCD)**
covering regulatory and warning signs, signing for temporary conditions, pavement markings, and traffic signals. Some of these traffic control devices were intended for general use and others were specific to Ministry of Transportation highway applications;
- **King's Highway Guide Signing Policy Manual (KHGSPM)**
covering information (guide and tourism) signing, primarily intended for use on provincial highways, but also applicable in many respects to non-highways if road jurisdictions chose to use them.

In recent years, however, and into the future, the Ministry of Transportation of Ontario (MTO) has been and will be moving away from direct service delivery, towards a role of service management, and towards service delivery by others, including the private sector and municipalities. Traffic management and traffic control devices are becoming the direct responsibility of a greater number of governing road authorities or their agents, including new players in the field with varying degrees of knowledge and experience. This trend has prompted the need to move away from reference manuals, toward a more comprehensive, user-friendly user's manual. This has led to a manual which contains more practical guidance and application information, including new sections in

the manual. It has expanded beyond traffic control devices only (although it includes them), into the broader field of traffic management. Consideration has also been given to the cost of the manuals and ease of updating; this has led to a bound modular format, so that practitioners interested in one part of the manual need not purchase all parts.

Until recently, MTO has been the developer and custodian of both the MUTCD and the KHGSPM. In the future, it is intended that the MTO will jointly develop the Ontario Traffic Manual (OTM) with municipalities, private contractors and other stakeholders and will expand its applicability, particularly for urban situations. MTO will remain the authority and custodian for the Ontario Traffic Manual.

The Ontario Traffic Manual provides policy and practical guidance on the full range of traffic control devices and their application, and is comprised of 22 Books, separately bound. Book 1 provides an introduction to the whole Manual, and contains considerable essential information about the fundamental principles and policies behind the design and application of traffic control signs, signals, markings, and delineation devices. Book 1 includes the tables of contents for its appendices (Books 1A, 1B and 1C), as well as the master indexes for the Manual. Separately bound as appendices to Book 1 are:

- Book 1A, Appendix A, Illustrated Sign and Signal Display Index
- Book 1B, Appendix B, Sign Design Principles
- Book 1C, Appendix C, Positive Guidance Toolkit.

These appendices are included as part of Book 1 because they have general applicability throughout the OTM.

A new edition of Book 1 will be produced to coincide with the production of each new Book or Books in the OTM. This is necessary in order to have a master table of contents and indexes which are up-to-date at any given time.

Book 1 should be read prior to the use and application of any of the other Books in the Ontario Traffic Manual. The use of any of the devices and applications discussed in those Books should be considered in conjunction with the contents of other related OTM Books, as appropriate.

This edition of Book 1 has been produced at the same time as the new version of Book 2.

Books 2 to 4 are new. Book 2 addresses practical guidelines and techniques for sign design, sign fabrication and patterns. Book 3 addresses sign support and installation, and will incorporate the Ministry's Sign Support Manual. Book 4 addresses sign maintenance. Books 5 through 12 (except for the new Book 10 on dynamic message signs) generally cover the traditional traffic control device material of the previous two manuals (MUTCD and KHGSPM), with appropriate additions and revisions. Book 13 addresses Traffic Characteristics, Planning, and Operations, covering basic traffic characteristics and behaviour, transportation planning and operating issues related to various road designs and design features and their treatment through the use of traffic control devices. Books 14 to 22 address specific traffic applications in focussed documents, each of which summarizes the various approaches that may be taken for that application, and brings together material that might otherwise be scattered among Books 5 to 12.

2.2 Objectives

Traffic control and management relies on a system of traffic control devices for conveying messages to the road user. The objective of these messages is to advise motorists of traffic regulations in order to enable observance of the law, warn them of roadway characteristics and road hazards, and provide them the information necessary for route selection. Meeting these objectives improves safety and convenience for the road user, and promotes the efficient movement of people and goods and the orderly flow of traffic. Simplification of the driving task through uniformity in the design and application of traffic control devices is necessary to accomplish these objectives.

If traffic control devices are not carefully designed and properly installed and maintained, they can interfere with and distract from each other, become visually ineffective, and lose their authority through excessive use. Therefore, simplicity in design, care in placement and a high standard of maintenance are essential. An effective traffic control device will attract attention, be legible and comprehensible, and be appropriate to the motorist's needs.

A principal goal in the development of the Ontario Traffic Manual is the achievement of uniformity throughout the Province and compatibility throughout Canada and North America. Achievement of this goal requires that the Manual provide the user with the design and dimensions of devices, and with guidance on fabrication, installation and maintenance. A secondary benefit of uniformity is the more economical manufacture of traffic control devices.

2.3 Relation to Manual of Uniform Traffic Control Devices for Canada

The Ministry of Transportation and the municipalities of Ontario have adopted the policy of the National Committee on Uniform Traffic Control, to:

- (1) Provide for clearly recognizable symbolization of the messages in traffic control devices as quickly and reasonably as possible.
- (2) Establish and maintain a code of traffic sign shapes and colours related to function.
- (3) Revise the Manual only in response to a demonstrated need, based upon research that establishes the most effective action.

In support of these policy aims, this edition of the Ontario Traffic Manual is published as an extended version of the Canadian Manual (MUTCDC), and is designed to meet the specific needs or conditions of the Province, its laws, and traffic requirements.

2.4 Ontario Traffic Manual Committee (OTMC)

The Ontario Traffic Manual will remain under the authority and custodianship of the Ministry of Transportation Ontario. The Ontario Traffic Manual is not solely for Ministry use, however, but it is intended to reflect the needs and practices of a broad community of users, which goes beyond the Ministry itself and includes municipalities and private sector practitioners. This means that a mechanism is needed in which communication and exchange of ideas can take place, and through which revisions and additions to the manual can be proposed, discussed, compared, evaluated, and adopted. The Ontario Traffic Manual Committee has been set up for this purpose.

Role and Mandate

The Ontario Traffic Manual Committee's role is to act as an advisory body to the Ministry of Transportation Ontario with respect to all matters relating to the Ontario Traffic Manual.

The Ontario Traffic Manual Committee's mandate is to serve as the official advisory body of the Ontario transportation and traffic community, for the consideration and recommendation of all proposed standards, warrants and policies and other related matters, for traffic signing, pavement markings, delineation, traffic signals, and traffic management systems and applications, on all classes of roadway in Ontario.

Committee Members

Committee membership is intended to include a wide range of interests and stakeholders, and includes representatives from MTO (several), municipalities, private road construction and maintenance contractors/consortia, consultants and associations such as the Municipal Engineers Association (MEA), the Ontario Traffic Conference (OTC), and the Ontario Good Roads Association (OGRA).

As individual Books of the OTM are developed or revised, subcommittees of the Ontario Traffic Manual Committee will be set up to act as the stakeholder advisory committee for each Book.

The custodial office and secretariat of the Ontario Traffic Manual is the:

Traffic Office

Ministry of Transportation Ontario
 301 St. Paul Street, 2nd Floor
 St. Catharines, ON L2R 7R4
 Telephone: (905) 704-2960
 Fax: (905) 704-2888

Any circumstances which merit special consideration or which are not covered by the Manual should be submitted to the Chair of the Ontario Traffic Manual Committee at the above address.

2.5 Process for Revision and Adoption of Sign Designs into the OTM

No manual intended to be a living document can remain static. The Books of the OTM are proposed to be updated on a regular, periodic basis. This raises the need for a process by which changes to the OTM can be introduced and adopted. Desired changes may come about for a variety of reasons:

- Evaluation of existing sign designs against the Sign Design Principles outlined in Book 1B, Appendix B (intended to be comprehensively and systematically applied over a period of time), suggests the desirability of an improved or alternative sign design in specific cases.
- Improved designs for existing signs may be visualized or developed, even in the absence of a demonstrated problem, such as symbolizing an existing worded message sign.
- New applications may arise, necessitating new signs.
- Municipalities currently use a number of signs specific to urban use that are not found in the MUTCD. To broaden the base of usage and applicability of the OTM, many such signs should be brought into the Manual, as and when they can be standardized and receive a broad level of support.

It is proposed that a formalized process be followed for the revision and adoption of sign designs (and also for designs of other traffic control devices, and for revisions to existing standards and adoption of

new standards) into the OTM, with the involvement of the Ontario traffic engineering community, through the Ontario Traffic Manual Committee and its subcommittees.

The process is proposed as follows:

Existing Signs

- Identify those signs which appear problematic, or for which potentially superior designs have been developed, or which are municipal signs for potential inclusion in the OTM.
- Subject these sign designs to human factors analysis, to determine the appropriate size, characteristics and letter height, as outlined in Appendix B, Sign Design Principles.
- For any such signs found to be deficient, or that appear to require significant increases in sign size, develop and test alternative sign designs for comprehension, or develop an alternative signing approach.
- Present and discuss alternatives at the OTMC and adopt the design approved by the OTMC, for incorporation in the next edition of that Book of the OTM. Municipal signs, to be approved for inclusion in the OTM, should receive a substantial degree of support from a number of municipalities, including major ones. (Over time, all existing signs should be reviewed in this manner.)
- Prepare documentation for any regulatory signs, and obtain approval from the Province's Legislation and Regulations Committee for any changes to the Highway Traffic Act or its regulations. This must be done in parallel with any proposed changes to the OTM, to ensure consistency between the OTM and the HTA and its regulations at any given time.

New Signs

- Any new sign designs (all categories) should be developed on the basis of current knowledge of driver needs. Sign design principles to achieve this are described in Appendices B and C. If the resulting sign designs are very large or are substantially larger in size than existing signs, raising questions as to feasibility, this may require an alternative sign design or an alternative signing approach.
- Follow essentially the same process as outlined under Existing Signs.

3. Legal Authority of Traffic Control Devices

For the purpose of this edition of the Ontario Traffic Manual, references to the Highway Traffic Act and its regulations will be to the Revised Statutes of Ontario 1990 (R.S.O. 1990) and to the Revised Regulations of Ontario (R.R.O. 1990), respectively.

3.1 Legal Authority – Signs

Prescribed Signs

The Highway Traffic Act (HTA), Section 182 (R.S.O. 1990), provides for the regulation of various signs, their type and location on the roadway. The criteria and specifications for application, dimensions, location and orientation are prescribed and illustrated under Regulations 615, 608, 581 and 599 (R.R.O. 1990) and are indicated as such in this Manual. Signs erected in accordance with the Regulations, and pursuant to the Highway Traffic Act, are enforceable under various provisions of the Act. Enforcement is permitted under the particular section under the authority of which a prescribed sign may be erected to indicate a traffic regulation, or HTA Section 182 (R.S.O. 1990), which requires obedience to prescribed signs.

Official Signs

Under the Highway Traffic Act, Sub-section 1(1), Paragraph 26 (R.S.O. 1990), “official signs” are any signs approved by the Ministry of Transportation (MTO). Official signs are required to be used under certain sections of the Highway Traffic Act which become effective on the use of an official sign (for example, HTA Sections 153 and 154(c) (R.S.O. 1990)). Such signs are enforceable only under the

particular provisions of the Highway Traffic Act which apply to their use. Contained in this Manual are signs which would be approved for use under these provisions.

Other Signs

There are other situations in which the use of signs may be necessary or advisable. The signs recommended for such use are also set out in this Manual.

General

Where the use of prescribed or official signs is required by the HTA or the Regulations, such signs may be erected by the public authority having jurisdiction over the particular highway, or by its agent. However, in the cases set out more particularly in the HTA, where a municipal by-law is required, the prescribed or official sign indicated must not be erected without the authority of such a by-law.

Signs may not be placed on a public highway by private organizations without the approval of the road authority. All unauthorized signs should be removed since they divert attention from authorized signs.

Road authorities may, at their discretion, authorize public utility companies to install temporary conditions signing without requiring such utilities to obtain specific permission in each case. Temporary Conditions signs and devices required to protect workers and equipment engaged in maintenance or repair work on a public highway (as well as highway users) must comply with OTM Book 7 (Temporary Conditions), and with the requirements of the Occupational Health and Safety Act and its regulations. Slight deviations are permissible if found more effective and if they are approved by the proper road authorities. Temporary Conditions

devices and the policies pertaining to their use, are found in Book 7, Temporary Conditions, of this Manual.

Traffic signs, or their supports, should not bear unauthorized commercial advertising.

3.2 Legal Authority – Markings and Delineation

Provincial legislation provides that markings and delineation may be placed by the road authority having jurisdiction for the purpose of regulating, warning, or guiding traffic (Section 182 of the Highway Traffic Act (R.S.O. 1990)).

Markings and delineation, being exclusively within the boundaries of public highways, should only be placed by the road authority, or its authorized agent. Delineators and markings installed on objects as a warning of their hazardous location are also normally within the highway right-of-way and should be subject to the same jurisdictional regulations and/or policies.

Markings and delineation serve an advisory or warning function, and do not have legal force on their own. They may be used to complement other traffic control devices that are enforceable under the HTA, its regulations, or a municipal by-law, but the enforceability derives from the main regulatory traffic control device, not from the markings or delineation.

3.3 Legal Authority – Traffic Signals

A revision to the Highway Traffic Act (HTA), Subsection 144(31), was proclaimed into law in the Ontario Legislature on March 3, 1997. The following is the text of the revision:

- **Subsection (31)**

Subject to subsection (31.1), no traffic control signal system or traffic control signal used in conjunction with a traffic control signal system shall be erected or installed except in accordance with an approval obtained from a person designated to give such approvals by the municipality or other authority that has jurisdiction over the highway or the intersection.

- **Subsection (31.1)**

No traffic control signal system or traffic control signal used in conjunction with a traffic control signal system shall be erected or installed on a highway designated as a connecting link under subsection 21(1) of the Public Transportation and Highway Improvement Act except in accordance with an approval obtained from the Minister or an official of the Ministry authorized by the Minister to grant such approval.

Interpretation:

- (1) Municipalities are responsible for designating a person to approve traffic signal designs and installations on their own roadways;
- (2) The Ministry of Transportation will still approve traffic signal designs and installations for connecting links;
- (3) For highways and ramp terminal intersections under Ministry jurisdiction, the Ministry will continue to follow the practice of preparing form PHM-125 for each signal and these will be reviewed and approved internally;
- (4) For highways and ramp terminal intersections under Ministry jurisdiction but where the Ministry has entered into maintenance and operations agreements with municipalities, the particular municipality is responsible for preparing form PHM-125 and submitting it to the Ministry for approval.

4. Legal Liability in Traffic Engineering

The main purpose of this section is to provide some limited guidance on how to minimize the risk of liability. Virtually every act contains some potential for liability. **For information and guidance on legal liability, the reader is strongly advised to consult his/her own agency's or company's legal advisors and policies.** Additional background and discussion of this issue may be found in the ITE Transportation and Traffic Engineering Handbook. Some of the discussion in this section draws on information in that handbook.

One of the major objectives of traffic engineering is to maintain and improve safety. Safety activities carried out by traffic engineering practitioners to reduce injury and injury severity include the installation of devices or making design and operational improvements. It is the responsibility of the road authority and/or its agent to ensure that the most suitable safety concepts and devices are in effect as it is practical to achieve.

One of the best ways to avoid or reduce the risk of litigation is through the use of accepted standards and practices. Often it is important to conform to known and accepted documentation, such as the Ontario Traffic Manual, or other standards, such as OPS standards. If there are variations from such standards, they may yet be defensible if the variation is for technical reasons, and the rationale is documented. This usual reference to and reliance upon standards does not, however, preclude designed and monitored experimental programs.

In traffic engineering, negligence is the most common basis for tort liability cases. Briefly, negligence is the failure to use reasonable care (due diligence) in the dealings one party has with another. As noted in the ITE Handbook, in a negligence suit the plaintiff (injured party) must prove five elements of a negligence suit:

- (1) The defendant had duty to the injured. For example, public agencies have a duty to maintain their street and road system in a reasonably safe condition.
- (2) There was a breach of that duty. For example, there was a failure or an abuse of discretion in the design, or a failure in the operation or maintenance of the system.
- (3) The breach of duty was the *proximate cause* of the injury. The proximate cause is the legal cause of the injuries or damages that are sustained. Generally, when a collision has occurred, it has two causes:
 - (a) The actual cause – for example, the cause in a right-angle intersectional crash was the fact that the signals were completely out.
 - (b) The proximate cause – the proximate (legal) cause in the example was the fact that signals were not maintained properly. The breach of the proximate (legal) cause determines how liability will be assigned to a particular individual or public entity.
- (4) There was no contributory negligence on the plaintiff's part. In some jurisdictions, if the plaintiffs have contributed to their own injuries, they are precluded from any recovery.
- (5) There must have been damages. To recover, the injured party must have suffered some kind of personal injury or property damage.

Negligence may take several forms:

- **Nonfeasance** is the failure to perform some act that one ought or is required to perform. In road design and traffic engineering, this condition may arise when a hazard exists, whether known or unknown, and no effort is made or is planned to be made to correct the problem. Examples include: trees too close to the roadway; blunt guide rail ends; non-frangible poles; traffic signal visibility; deliberate deviation from safety standards to meet some other conflicting agenda.

This sometimes occurs when a roadway has been reconstructed or when a new roadway is constructed, and deficiencies are built in, or hazards are not removed or shielded from the public.

- **Misfeasance** is the performance of a lawful act in an unlawful or improper way.
- **Malfeasance** is wrongdoing or misconduct, especially by a public official. Sometimes malfeasance is defined as including misfeasance, for example, if it is known that a hazard exists, and a corrective action is made or planned to be made, but the improvement is unsuccessful, claimed to be due to poor judgement and/or poor implementation. Examples include: guide rails installed contrary to standard, guide rail standards not updated, poor traffic signal maintenance, poor maintenance on knocked-down signs, potholes, and illumination. This normally occurs when it can be shown that the road authority is aware of hazards and has made some effort to remove them and/or shield them or warn drivers of them, but has done the job poorly.

Planning to initiate maintenance or to remove the hazard may often be considered as a satisfactory approach to the problem, provided a well-documented plan can be shown and the necessary funding has been set up. The necessary funding need not be provided in one year, but can be allocated in a multi-year plan. That is, it is generally accepted that funding programs may limit the amount of work that can be done in a given year; it will be helpful to document reasons in such cases. However, the implementation dates must be reasonable, illustrating a balance of funding and priorities; for example, a 50-year implementation plan would not normally be considered acceptable.

Book 21 provides more detail on Road Safety Management.

5. Principles

5.1 Driver Needs and Limitations

Traffic control devices are intended to provide vital information to drivers. They will be more effective if they are designed with driver needs and limitations in mind. In particular, consideration must be given to how drivers search the roadway, how driving demands affect what drivers notice, and drivers' tendency to inattention in familiar or monotonous environments.

The visual field of the human eye is very large. However, only a small area of this allows accurate vision. This central area covers a cone of about two to four degrees, which is an area about the size of a quarter held at arm's length. In order to identify a target one must look directly at it. When driving, the driver searches the roadway scene in a series of fixations, looking at successive objects of interest.

Studies of driver eye movements show that, while driving, fixations range from 1/10 second minimum up to two seconds or more. At 100 km/hour, a driver moves 3 m during the shortest glance. During more complex tasks, like reading a guide sign, a driver can move up to 60 m or more during a single fixation. Thus the number of fixations that can be made, and the number of objects that can be identified as a driver moves through a road section, is quite limited.

Where drivers look is mainly determined by the demands of the driving task. On curves, eye movement studies show that the number of glances a driver makes at the road to maintain lane position doubles. Time available for noticing or reading signs is reduced. At intersections, freeway interchanges, or merges, drivers also face increased visual search demands associated with other road users and have less time to devote to reading signs or noticing

unusual roadway features. For this reason standardization in location and design of traffic control devices is critical in assisting the driver to know where to direct his attention and when.

Finally, drivers are limited in their ability to pay continuous attention. For drivers with some degree of experience, driving is a highly automated task. It can be carried out while drivers are on “automatic pilot”. This is particularly likely to occur in monotonous or very familiar environments. For this reason drivers are at risk when the roadway features are unusual or when a change, such as a new stop sign, is made in a familiar environment. Drivers must be given advance and clear notice of such situations in order to avoid surprise and consequent driver error.

5.2 Function and Objectives of Traffic Control Devices

A traffic control device is a sign, signal, marking or other device placed upon, over or adjacent to a roadway by a public authority or official having jurisdiction. The device is designed to regulate, warn, guide and inform the road user.

Traffic control devices constitute a system for conveying messages to the road user. The objective of these messages is to advise motorists of traffic regulations in order to enable observance of the law, warn of roadway characteristics and road hazards, and provide the information necessary for route selection. Meeting these objectives improves the safety of, and serves as a convenience to, the road user. It promotes the efficient movement of persons and goods and the orderly flow of traffic. Simplification of the driving task through uniformity in the design and application of traffic control devices is necessary to accomplish these objectives.

If traffic control devices are not carefully designed and properly installed, they can interfere with and distract from each other, become visually ineffective, and lose their authority through excessive use.

Therefore, simplicity in design, care in placement, and a high standard of maintenance are essential. An effective traffic control device will attract attention, be legible and comprehensible, and be appropriate to the road user’s needs.

A principal goal in the development of the Ontario Traffic Manual is the achievement of uniformity throughout the Province and compatibility throughout Canada and North America. Achievement of this goal requires that the Manual provide the user with the design and dimensions of devices, and with guidance in the preferred usage and methods of application.

5.3 Excessive Use of Traffic Control Devices

Traffic control devices should be well chosen and located to assist the road user. Improper or excessive use, particularly of regulatory and warning signs, tends to cultivate disrespect for signs in general. As a result, signs tend to lose their authority.

5.4 Standardization of Traffic Control Devices

The wide variation in roadway speeds and complexity requires that traffic control devices be readily recognizable and understandable at a glance. Uniformity and simplicity in design (including shape, colour, pattern, dimensions, symbols, wording, lettering and illumination or reflectorization), position and application are of great importance in aiding recognition. The majority of these designs, symbols and word messages have been approved by the National Committee on Uniform Traffic Control Devices, after a thorough review of the varying designs used in Canada, supplemented by test studies.

All traffic control devices installed on any roadway must conform to the standards set forth in this manual. Recommended sign design standards are set out in Book 1B, Appendix B (Sign Design Principles). Standard sign patterns are provided in Book 2. Standard traffic signal displays are shown in Book 12 and in Book 1A, Appendix A (Illustrated Sign and Signal Display Index). Standardization of these designs does not preclude further improvement by minor changes in the proportions of symbols, stroke width and height of letters, width of border, or in the layout of word messages. All shapes and colours must be as indicated, all symbols must be unmistakably similar to those shown, and where a worded message is applicable the wording must be as herein provided. In situations where messages are required, other than those herein provided for, the signs must be of the same shape and colour as standard signs of the same classification.

Detailed Sign Drawings

Detailed sign drawings are provided in Book 2, in a CD-ROM containing the Master Sign Library (MSL) and Sign Parts Library. Sign drawings of the standard signs included in the Manual (Books 5, 6, and 7) are provided in the MSL in 1/10 scale, which may be scaled up to full size for sign fabrication. Signs in Books 8 and 9 are also illustrated in the MSL, including a 1/10 scale “typical” sign of each type. However, these patterns cannot simply be applied for sign fabrication, as the message needs to be customized in accordance with sign design rules (also included in Book 2) and to suit the location.

5.5 Standard Shape and Colour Codes for Signs and Pavement Markings




















Sign Shapes and Colours

Standardization of sign shapes advises the road user of the class of message contained. The task of driving can be simplified by enabling the road user to judge in advance the type of message to be expected. To meet the road user’s requirements, a code of sign shapes has been established that applies to all signs. The shapes and orientations for each sub-class of signs are illustrated in Table 1, Shape and Colour Codes for Signs. This table should be viewed as a broad reference for the more typical sign shapes and colour codes applicable to the sub-classes with each of the major sign classifications.

Standardization of colours also assists the road user in a manner similar to the standardization of shapes. A code of sign colours has been established that applies to all signs. These are illustrated in Table 1.

Colour and reflectivity specifications have been established by the American Society for Testing and Materials (ASTM) and by the Canadian General Standards Board (CGSB). All colours used on signs must conform to ASTM specification D 4956-95 or its subsequent revisions, or to CGSB specification 62-GP-11M or its subsequent revisions. Regarding reflectivity specifications, the significant difference between the ASTM standard and the CGSB standard is that the CGSB standard sets out a performance level requirement at 50 degrees entrance angle, while the ASTM standard only requires that performance be met at 30 degrees entrance angle. If signs are to be used where viewing is likely to occur beyond 30 degrees, the CGSB specification should be used.

Table 1 – Shape and Colour Codes for Signs

Class	Sub-Class	Shape Code	Colour Code			Comments
			Back-Ground	Message	Border	
R Regulatory	Ra Right of Way Control		Red	White	White	Shape reserved for STOP sign
	Ra Right of Way Control		White	Red	Red	Shape reserved for YIELD sign
	Ra Right of Way Control		White	Black	Black	Various Pedestrian Right of Way Control Signs
	Rb Road Use Control		White	Black	Black	A green annular band shall indicate a permissive message A red annular band with interdictory stroke shall indicate a prohibitive message
	Rb Road Use Control		White Black	Black White	Black White	A green annular band shall indicate a permissive message A red annular band with interdictory stroke shall indicate a prohibitive message
	Rb Road Use Control		Blue	White	White	Reserved for School Area Signs
	Rc Miscellaneous Control Signs		White	Black	Black	
W Warning	Wa Physical Conditions		Yellow	Black	Black	
	Wb Traffic Regulations Ahead		Yellow	Black	Black	Some messages contain other colours to adequately represent symbols
	Wc Intermittent Moving Hazards		Yellow	Black	Black	
	Wc Intermittent Moving Hazards		Blue	White	White	Reserved for School Area Signs
Tc Temporary Conditions			Orange	Black	Black	
Information	G Guide Signs		Green Blue White	White White Black	White White Black	Some signs in this group may contain minor elements of other colours
	G Guide Signs		Green White	White Black	White Black	
	G Guide Signs		Black	White	White	Some signs in this group have a brown background; or a white background with a blue message and blue border
	M Highway Markers		Black Green Brown	White White White	White White White	Some signs in this group may contain minor elements of other colours
	M Highway Markers		Black Green	White White	White White	
Tab Signs ALL Classes		 	Colours on tab signs to be the same as on primary sign			

Pavement Marking Types and Colours

Standardization of pavement marking types and colours also advises the road user of the class of message contained. The task of driving can be simplified by enabling the road user to judge in advance the type of message to be expected. To meet the road user's requirements, a code of pavement marking types has been established that applies to all pavement markings. The types and principles of colour and pattern for pavement markings are illustrated in Figure 1, Types of Markings, and Figure 2, Markings: Principles of Colour and Pattern.

5.6 Standardization of Position

Signs must, in all cases, be placed in the most advantageous position and must be accommodated to the roadway design and alignment. See Book 1B, Appendix B (Sign Design Principles) and Book 3 (Sign Support and Installation).

5.7 Standardization of Application

Uniformity of application is important. Similar conditions should be treated in a similar manner, to accommodate driver expectation. Different types of information (and signs) should not be displayed on the same sign support.

This Manual sets forth criteria for the application of all types of traffic control devices. It is impossible to set up specifications that apply to every case, or to cover every possible situation. The proper signing and signalization of roads depends to a great extent on the experience and good judgement of the engineer or other traffic practitioner responsible for placement, installation and maintenance of traffic control devices.

Similar conditions in urban and rural areas, in general, should be treated in the same manner. It is recognized that urban conditions differ from rural conditions with respect to speed, frequency of intersections, traffic congestion, parking, use of road space by other vehicles and pedestrians, and other lights and displays competing for the road user's attention. In such instances, traffic control devices must be appropriately applied and located. Where practical, this Manual sets out guidelines for rural and urban areas.

Before any new highway, street, detour or temporary route is opened to traffic, all necessary traffic control devices must be in place.

Local traffic control device requirements should be reviewed on a regular basis, including when there are significant changes in the traffic characteristics of a roadway, and including those relating to construction and temporary conditions. Signs required by road conditions or traffic restrictions must be removed when those conditions cease to exist or the restrictions are withdrawn. Guide signs directing traffic to and along temporary routes or detours must be immediately removed when no longer applicable.

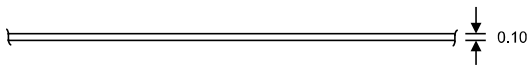
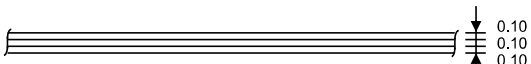
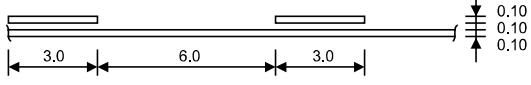

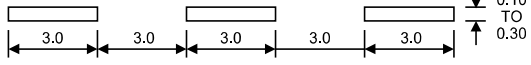
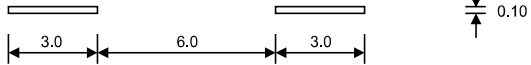
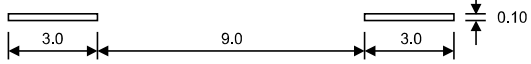
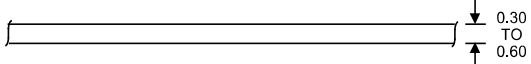
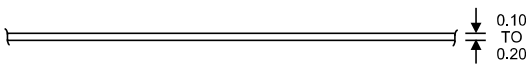
5.8 Illumination and Reflectorization

Legibility of signs that carry messages of warning, important regulations or essential directional information is as necessary at night as by day. Such legibility must be provided by illumination and/or reflectorization, as addressed in Book 1B, Appendix B (Sign Design Principles).

5.9 Maintenance

All traffic control devices must be kept in proper position, clean, visible and legible at all times. Damaged devices should be repaired or replaced as soon as possible. Inspection (both day and night),

Figure 1 – Types of Markings

		NAME OF LINE	DIMENSIONS (m)	USE
LONGITUDINAL		SOLID		EDGELINES (WHITE OR YELLOW), DIRECTIONAL DIVIDING LINES (YELLOW), LANE LINES PROHIBITING LANE CHANGES (WHITE)
		DOUBLE SOLID		DIRECTIONAL DIVIDING LINES (YELLOW)
		SIMULTANEOUS SOLID AND BROKEN		DIRECTIONAL DIVIDING LINES TWO-WAY LEFT TURN LANES (YELLOW)
		CONDENSED BROKEN		GUIDING LINES (E.G. INTERSECTION MOVEMENTS) (WHITE)
		WIDE BROKEN		CONTINUITY LINES (WHITE)
		BROKEN		DIRECTIONAL DIVIDING LINES (YELLOW) URBAN LANE LINES, LOW SPEED (WHITE)
		BROKEN		LANE LINES (WHITE) HIGH SPEED ROADWAY
TRANSVERSE		STOP *		INTERSECTION STOP LINES (WHITE)
		CROSSWALK * *		CROSSWALKS (WHITE)

* 45 - 60 cm on the King's Highway

* * 10 cm on the King's Highway

Figure 2 – Markings: Principles of Colour and Pattern

(1) LONGITUDINAL PAVEMENT MARKINGS BETWEEN VEHICULAR TRAFFIC LANES

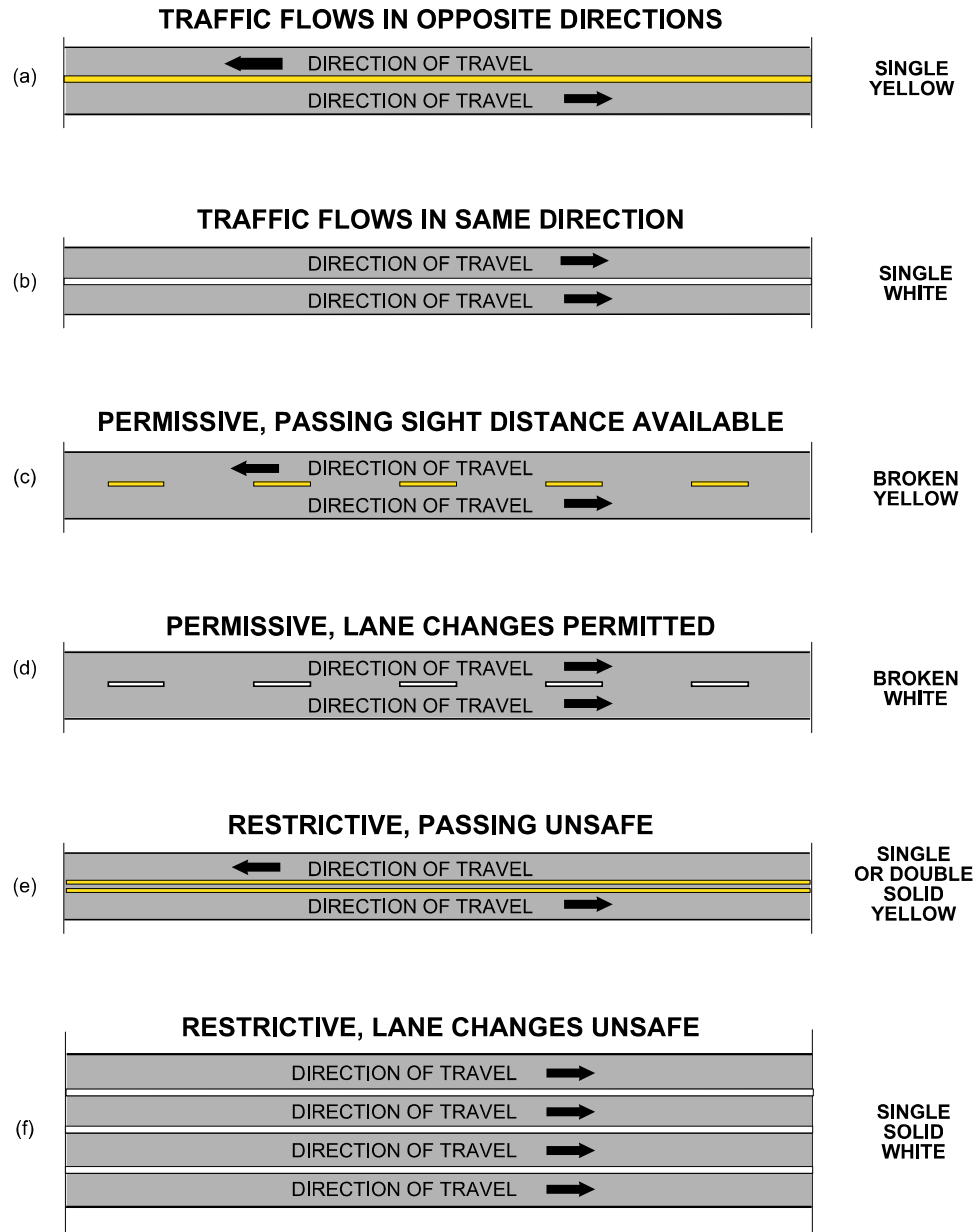
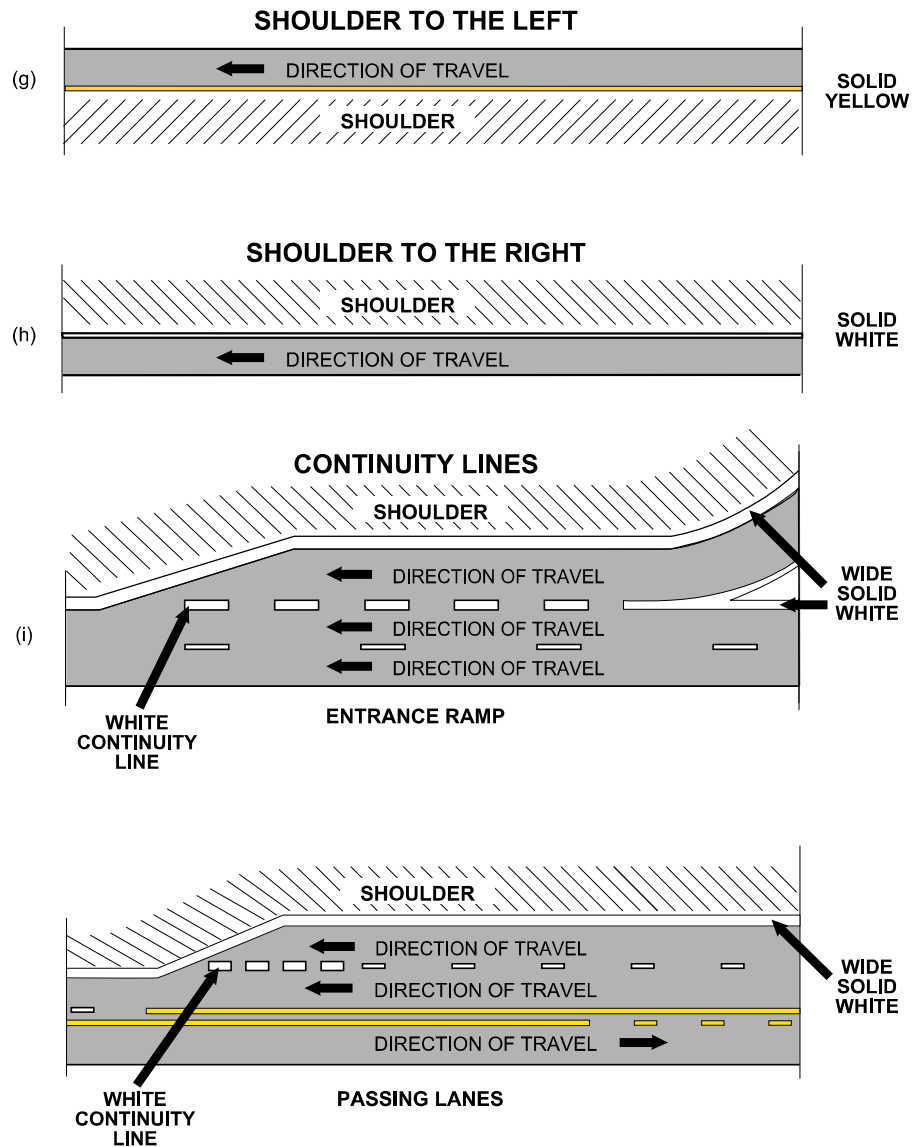


Figure 2 – Markings: Principles of Colour and Pattern (cont'd)

(2) BETWEEN VEHICULAR TRAFFIC LANES AND SHOULDERS



cleaning and replacement of traffic control devices should be regularly scheduled. See Book 1B, Appendix B (Sign Design Principles), Book 4 (Sign Maintenance) and Book 12 (Traffic Signals).

5.10 Metric Measurement

All dimensions of traffic control devices shown in this Manual, including supports, positioning, and pertinent installation details, are expressed in S.I. Units to metric measurement standards.

5.11 Meaning of “Must”, “Should”, “May”

Must indicates a mandatory condition. Where certain requirements in the design or application of the device are described with the “must” stipulation, it is mandatory that these requirements be met when an installation is made.

Shall means the same as “must.” The terminology “No (device or practice) shall be used...” means “The (device or practice) must not be used...”.

Should indicates an advisory condition. Where the word “should” is used, the action is advised; recommended but not mandatory. This term is meant to suggest good practice in most situations, but also to recognize that in some situations, for good reasons, the recommended action cannot or need not be followed.

May indicates a permissive condition. No requirement for design or application is intended. However, mandatory requirements apply to some specific options if and when they are selected.

5.12 Development of New Traffic Control Devices

Traffic control devices should not be revised or newly developed unless there is a clearly established need and review has shown that no existing device will meet the need. Proposals for revisions or new devices should be forwarded to the Ontario Traffic Manual Committee. (See Book 1, Sections 2.4 and 2.5). To the greatest extent possible, newly developed or revised signs should retain identity with the basic standards of shape, colour, and dimensions, and the functional grouping of signs set forth in this Manual when they are incorporated into the Manual following official approval.

In urgent cases, where a new traffic control device must be developed and installed quickly, the proponent may have to respond quickly, but should also forward the design to the Ontario Traffic Manual Committee for consideration for adoption and inclusion in the Manual. Before a new traffic control device is developed, the proponent should refer to Book 1B, Appendix B, for compliance with sign design principles, and to Book 1C, Appendix C, to determine whether the device is really required. The proponent should also check with the OTMC as to whether other practitioners have already developed a sign for such a purpose, which may be listed in the OTMC’s catalog of non-standard signs (signs not yet reviewed and adopted for inclusion in the OTM). If the proponent still decides to design a new sign, he/she should also collect survey data after installation, on driver/road user response to the new design (as described in Book 1B, Appendix B), and forward the information to the OTMC to assist it in its review.

6. Classification of Highways for Application of Traffic Control Devices

The selection and application of the traffic control device(s) to be used in a given situation depend on various factors, one of which is the classification of the highway on which it is to be applied.

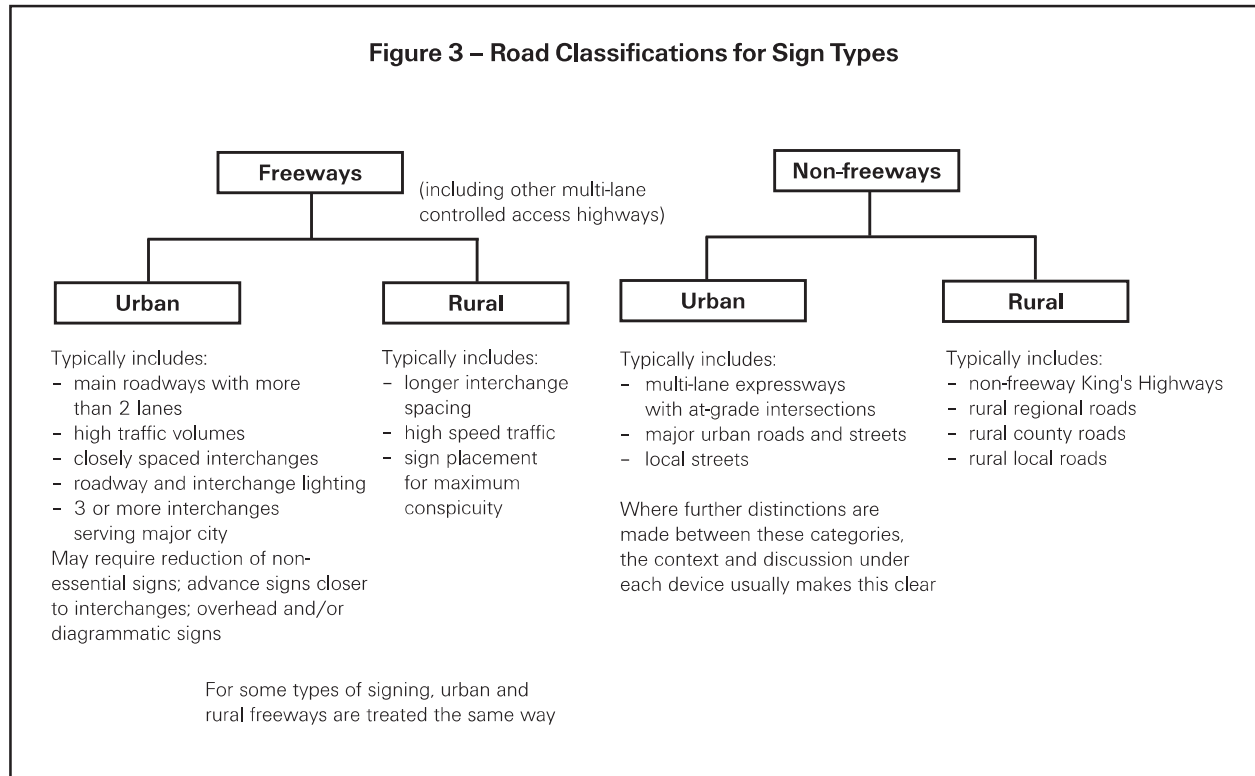
Highway or road classification affects the selection of traffic control devices in the following ways:

- (1) It may affect the type of signing to be provided. For example, the type of tourism-oriented directional signing (TODS) in Book 9 varies from road type to road type.

In the OTM, for purposes of determining the *type* of signing, roads have been classified as shown in Figure 3.

Terms are defined in Section 11, Definitions. The terms “urban” and “rural” have not been defined, as they are often interpreted according to local conditions and practice.

- (2) It may affect the selection of sign size. Sign size and letter/symbol size depend on many factors, as described in Book 1B, Appendix B. One of those important factors is speed, and hence, for purposes of selection of sign size, road classification is determined on the basis of speed. Where possible, throughout Books 5 to 9, recommended sign size has been related to one of three speed ranges, as defined by posted speed limit. (Actual operating speeds, or 85th percentile speeds, are often higher



than posted speed limits; this has been taken into account in the relationship between recommended sign size and posted speed limit. The advantage of taking posted speed as the basis for the selected size is that it is readily known without the need for additional field study, and provides a stable reference value.)

In the OTM, for purposes of defining the *size* of signing, the following three speed ranges have been adopted:

- (a) Speed limit of 60 km/h or lower;
- (b) Speed limit of 70 or 80 km/h;
- (c) Speed limit of 90 km/h or higher.

Where various sign sizes are shown in the OTM, the base or standard sign size is recommended as the minimum sign size. It is typically the sign size that will apply for speed range (a). Where specific sign sizes are recommended for speed ranges (b) and (c), they should also be regarded as minimum sizes for those speeds. For some sign designs, only one or two sign sizes are shown. In this case, one or more of the three speed ranges will be combined into one. Where, in the traffic practitioner's judgement, it is felt that the recommended minimum size is too small, and/or greater emphasis is needed, a larger sign size may be used.

7. Classification of Traffic Control Devices

7.1 Hierarchy of Signing

The following listing identifies the **order of importance** and defines the various types of signs in the hierarchy of signing.

In situations where limited space and/or other considerations require a limit to be placed on the number of signs that can be erected, the **Hierarchy of Signs must be applied**.

- (1) **Signs required to have high-intensity or high reflectivity micro-prismatic (e.g., diamond grade) sheeting as of a prescribed date:**
 - (a) **Temporary Condition Signs** (Book 7)
These are highest priority; the requirement for high-intensity or high reflectivity micro-prismatic (e.g., diamond grade) sheeting means this is an important sign; temporary condition signs take priority over other signs requiring high-intensity or high reflectivity micro-prismatic (e.g., diamond grade) sheeting because of the unexpected situations drivers may encounter, and also, temporary conditions sign placement may be more critical than for other signs.
 - (b) **Regulatory Signs** (Book 5)
 - (c) **Warning Signs** (Book 6)
- (2) **Other Temporary Condition Signs** (Book 7)
- (3) **Other Regulatory Signs** (Book 5)
- (4) **Other Warning Signs** (Book 6)
- (5) **Information Signs**
 - (a) **Directional Guide Signs** (Book 8)
 - (b) **Emergency Services Signs** (Book 8)
(give directions to hospitals providing emergency services, law enforcement offices, and recommend radio frequencies for severe weather advisories)
 - (c) **Motorist Services Signs** (Book 9) (give directions to gas, food, lodging establishments, public telephones, and travel information)
 - (d) **Public Transportation Signs** (Book 8)
(give directions to rail transit stations, bus terminals, and airports)
 - (e) **Boundary Signs** (Book 8)
(mark municipal, regional, and county boundary lines)
 - (f) **Attraction Signs** (Book 9)
(identify and direct motorists to special points of interest meeting certain criteria. Examples include provincial and national parks, tourist attractions, historic sites, museums, special commercial attractions, campgrounds)

Note that the reference to a prescribed date does not affect the priority of this class of signs; that is, whether or not the signs already have high-intensity sheeting, they still retain their priority over signs in the other groups.

- (g) **General Information Signs** (Book 8)
(identify lakes, rivers, and other items of general interest)

7.2 Classification of Traffic Signs

Class R – Regulatory Signs (Book 5)

Regulatory signs are signs which inform the driver/road user as to things they should or must do (or not do) under a given set of circumstances. They often indicate traffic regulations which apply at any time (or at times specified) or place upon a street or highway, disregard of which may constitute a violation. They may be supported (1) by the Highway Traffic Act or its regulations, (2) by municipal by-law, or (3) not at all. In the first two cases, the signs are enforceable; in the third case, although the signs advise road users as to what they should do, they are not enforceable. Sub-classes are:

Sub-class Ra, Right-of-Way Control Signs

Right-of-Way Control Signs indicate the right-of-way of vehicles on the approaches to an intersection, or of pedestrians at a crosswalk.

Sub-class Rb, Road Use Control Signs

Road Use Control Signs indicate the permitted or prohibited use of a street or highway. These signs relate to control of speed, turns, direction of travel, passing, traffic lane usage, vehicle weights and dimensions, parking, pedestrians, and other road uses.

Sub-class Rc, Miscellaneous Control Signs

Miscellaneous Control Signs indicate those regulatory signs not otherwise provided for in Class R.

Class W – Warning Signs (Book 6)

Warning signs indicate, in advance, conditions upon or adjacent to a street or highway that are potentially hazardous to road users. Sub-classes are:

Sub-class Wa, Physical Conditions Warning Signs

Physical Conditions Signs indicate features or conditions of the roadway itself.

Sub-class Wb, Traffic Regulations Ahead Signs

Traffic Regulations Ahead Signs indicate, in advance, warning of a traffic regulation upon a street or highway.

Sub-class Wc, Pedestrian and Intermittent Hazard Signs

Pedestrian and Intermittent Hazard Signs indicate the possibility of some event which may require road user response if the event occurs.

Class TC – Temporary Conditions (Book 7)

Temporary Conditions signs and other traffic control devices indicate construction, maintenance or utility activities or other temporary and unusual situations. The traffic control devices used for temporary conditions may be either regulatory (supported by legislation, regulation and/or by-laws) or warning in nature.

Class I – Information Signs (Books 8 and 9)

Information signs indicate information for selection of route, for locating off-road facilities, or for identification of road/street names, geographical features or points of interest. Sub-classes are:

Sub-class G, Directional Guide Signs

Sub-class G, Directional Guide Signs are signs that the road authority must provide for route and direction finding (Book 8)

Sub-class M, Route Markers (Book 8)

Sub-class T, Tourism Attraction Signing (Book 9)

Sub-class L, Logo Signing for Motorist Services (Book 9)

Sub-class C, Commercial Signs

Signs for which a fee may be charged. (Book 9)

Tab Signs

A Tab Sign is typically smaller in size than the primary sign with which it is associated, and is mounted below the primary sign. Tab Signs are of two types:

Supplementary Tab Signs

Supplementary Tab Signs indicate additional information which supplements the message conveyed by the primary sign. They may be used where, for a specific application, the entire message cannot be conveyed using the standard primary sign.

Educational Tab Signs

Educational Tab Signs indicate in legend form the same message represented by a symbol on the primary sign and must never be used alone. They may be used to convey the meaning of symbols during their introductory period.

Dynamic Message Signs (Book 10)

Dynamic Message Signs (DMSs), in contrast to the other static classes of signs listed above, are signs where the messages may be changed. They may have a variety of media (electro-mechanical or electronic), technologies, and flexibility. They are described in OTM Book 10, and their application to temporary conditions is described in OTM Book 7.

7.3 Classification of Markings and Delineation (Book 11)

Pavement Markings

Markings are those that are applied directly to the pavement or, less frequently, the curb, typically using paint, thermoplastics, tapes or devices, such as raised pavement markers or rumble strips. Sub-classes are:

- Lines (including directional dividing lines, lane lines and edge lines)
- Transition and Continuity Lines
- Interchange Ramps and Channelization Lines
- Barrier Lines
- Intersections
- Reserved Facility Markings (including markings for transit and high occupancy vehicles, bicycles, pedestrians and railways)
- Parking Space Markings
- Coloured Pavement
- Words and Symbols

Delineation

Delineation devices are those reflective devices that are usually mounted on the curb or at the edge of the road, and include curb markings, delineators and CHEVRON ALIGNMENT signs.

Object Markings

Object markings include:

- Markings on objects adjacent to the pavement
- Markings on objects within the roadway
- Barricades
- Channelizing devices

Glare Control

Various devices may be used for control of glare from headlights of oncoming vehicles.

7.4 Classification of Traffic Signal Types (Book 12)

Traffic signals include all electrically operated traffic control devices, except signs, by which traffic is warned or is directed to take some specific action. They are classified as follows:

Primary Traffic Control Signals which Alternate Vehicular Right-of-way

These are the most common type of traffic control signals.

Miscellaneous Traffic Control Signals

These include the following sub-classes:

- Pedestrian Signals
 - Intersection Pedestrian Signals
 - Mid-block Pedestrian Signals
- Lane Direction Signals
- Ramp Metering Signals
- Signals Near Railway Crossings
- Transit Priority Signals
- Moveable Span Bridge Signals
- Portable Lane Control Signals
- Signals with Audible Indications
- Tunnel Signals
- Bicycle Control Signals

Flashing Beacons

- at intersections
- warning of other special hazards

Integrated Traffic Signal Systems (Book 19)

This subject is addressed in Book 19 (Advanced Traffic Management Systems). Book 12 addresses primarily traffic signal displays, devices, and design, and operation as isolated traffic signal installations. Book 19 addresses the planning, design, integration, and operation of traffic signals as complete systems

8. Bilingual Signing Policy

The French Language Services Act, 1986, requires bilingual signs to be installed on Provincial highways located in designated areas. To provide uniformity and consistency of Provincial highway routes, additional lengths of Provincial highways will have bilingual signs installed. The Act notes that the obligations of government agencies under the Act are subject to such limits as circumstances make reasonable and necessary, if all reasonable measures and plans for compliance with the Act have been taken or made. Provincial highways located in designated and additional areas, as listed at the end of this section, require bilingual signs.

These requirements do not apply to municipalities. However, if municipalities wish to implement bilingual signing, they are encouraged to follow the bilingual signing guidelines and standards outlined herein.

For standard OTM signs for which a bilingual sign pattern is required, the reader should contact the Ministry.

Bilingual Sign Categories

Regulatory signs in designated areas will be symbolized or bilingual.

Warning signs in designated areas will be symbolized or bilingual.

Every attempt possible will be made to install bilingual temporary signs. Certain situations may arise when it may not be feasible to install bilingual temporary conditions signs. These situations are:

- (1) When worker and motorist safety may be jeopardized due to restrictions in visibility and increased proliferation of signs in confined areas.
- (2) When physical space limitations in confined areas of construction and maintenance work zones are present.

In such cases, however, consideration should be given to posting a bilingual warning sign in advance of the construction, warning motorists in both languages that they are entering a construction zone ahead.

Information signs:

- (1) **Navigational Guide Signs (Directional Guide Signs)**
Official names of municipalities and streets will be displayed on signs. Other messages on navigational guide signs will be symbolized or bilingual.
- (2) **Emergency Services Signs**
All emergency services signs will be symbolized or bilingual.
- (3) **Motorist Services Signs**
All motorist services signs will be symbolized or bilingual.
- (4) **Public Transportation Signs**
Official names of the community that airports are located in will be displayed on signs. Other messages on public transportation signs will be symbolized or bilingual.
- (5) **Boundary Signs**
Official names of municipal, regional, and county lines will be displayed on signs. Other messages on boundary signs will be bilingual.

(6) Attraction Signs
 Official names of recreational/resort facilities, tourist attractions, historic sites, museums, provincial parks, conservation areas, etc. will be displayed on signs. Other messages on attraction signs will be symbolized or bilingual.

(7) General Information Signs
 Official names of lakes, rivers, and other items of general interest will be displayed on signs. Other messages on general information signs will be bilingual.

Official Names

If official names for roads, streets, etc., are bilingual as identified by municipal resolution/by-law and installed on municipal roads, bilingual signs are to be installed on the Provincial highway.

Geographic names of inhabited or populated places as identified in the Gazetteer of Canada – Ontario Edition are not to be translated. Definers for such names (administrative titles such as town, city, regional, municipality, provincial park, etc.) are to be translated.

Generic terms forming part of the names of geographic features are not to be translated (for example, Muskrat Lake remains Muskrat Lake). A listing of official names is provided in the Gazetteer of Canada – Ontario Edition.

Whenever an officially approved alternate name (for a name which is official) has been adopted by the Ontario Names Board, this alternate name will be displayed in addition to the official name. The following listing identifies the only 21 alternate names approved by the Ontario Geographic Names Board.

Official Names	Officially Approved Alternate Names
1. French River	Rivière des Français
2. St. Lawrence River	Fleuve Saint-Laurent
3. Ottawa River	Rivière des Outaouais
4. Georgian Bay	Baie Georgienne
5. Lake Superior	Lac Supérieur
6. Lake Erie	Lac Erie
7. Lake Huron	Lac Huron
8. Lake of the Woods	Lac des Bois
9. Rainy River	Rivière à la Pluie
10. Rainy Lake	Lac à la Pluie
11. Rideau River	Rivière Rideau
12. Lake Timiskaming	Lac Témiscamingue
13. Lake Nipissing	Lac Nipissing
14. Lake Ontario	Lac Ontario
15. Niagara River	Rivière Niagara
16. Detroit River	Rivière Detroit
17. Lake Nipigon	Lac Nipigon
18. Nipigon River	Rivière Nipigon
19. Lake Abitibi	Lac Abitibi
20. Lake St. Clair	Lac Sainte-Claire
21. St. Clair River	Rivière Sainte-Claire

Provincial Designated Areas

Municipality or District	Area
Toronto	All
Regional Municipality of Hamilton-Wentworth	City of Hamilton
Regional Municipality of Niagara	Cities of Port Colborne and Welland
Regional Municipality of Ottawa-Carleton	All
Regional Municipality of Peel	City of Mississauga
Regional Municipality of Sudbury	All
County of Dundas	Township of Winchester
County of Essex	City of Windsor
Towns of Belle River and Tecumseh	Townships of Anderdon, Colchester North, Maidstone, Sandwich South, Sandwich West, Tilbury North, Tilbury West and Rochester
County of Glengarry	All
County of Kent	Town of Tilbury, Townships of Dover and Tilbury East
County of Middlesex	City of London
County of Prescott	All
County of Renfrew	City of Pembroke, Townships of Stafford and Westmeath
County of Simcoe	Town of Penetanguishene, Townships of Tiny and Essa
County of Stormont	All
District of Algoma	All
District of Cochrane	All
District of Kenora	Township of Ignace
District of Nipissing	All
District of Sudbury	All
District of Thunder Bay	Town of Geraldton, Townships of Longlac, Manitouwadge, Marathon, Beardmore, Nakina and Terrace Bay
District of Temiskaming	All

9. Manual Revisions

9.1 General

Revisions and updates to the OTM will be made from time to time by the Ministry of Transportation's custodial office for the Manual, on the advice of the Ontario Traffic Manual Committee. These revisions will be based on two elements:

- (1) The regular, scheduled revisions and updates of all Books, according to a schedule defined by MTO with the advice of the OTMC. These revisions will incorporate the advice and input from the members of MTO, the OTMC and the OTMC subcommittees.
- (2) The collection, and consideration by the OTMC, of comments, questions, concerns, problems, and suggestions submitted by users of the OTM. These points will be acknowledged upon receipt, and replied to, as appropriate. If the points raised are of an essential or critical nature, they will be resolved and all subscribers to the OTM or the affected Book(s) will be advised by means of an information bulletin. If the points are less critical, they will be considered by the OTMC in the course of its regular revision schedule. Consequently, some of the less important points may not be addressed in a revised Book until that new version is produced in its defined revision cycle.

Purchasers/subscribers of the OTM or individual Books thereof will be kept on a mailing list by University of Toronto Press along with the Books ordered. Users are advised to check periodically with University of Toronto Press to determine the latest versions and availability of various OTM Books.

9.2 Manual Revisions Since the Last Issue

This section of Book 1 is developed with each revision to any of the Books, or with the production of any new Book. The new section(s) are noted, along with the Books and/or sections(s) from the previous issue that have been replaced.

The Manual revisions in this edition are:

- | | |
|--------|---|
| Book 1 | Introduction to the OTM
New, Replaces Book 1 dated July 2001 |
| Book 2 | Sign Design, Fabrication and Patterns
New; incorporates Book 1B and some design rules from the King's Highway Guide Signing Policy Manual, and a CD-ROM with the electronic Master Sign Library (illustrations of all OTM signs and 1/10 scale drawings of all standard signs). |

10. Definitions

A

AADT

Average Annual Daily Traffic.

AASHTO

American Association of State Highway and Transportation Officials.

Abrasion

A condition manifested in pavement markings by gradual surface erosion, thinning, and disappearance of the film due to wind, water, sand, and vehicle tire wear.

AC

Asphaltic Concrete, or Alternating Current, depending on context.

AC+

120 V a.c., 60 Hz power bus.

AC-

The 120 V a.c., 60 Hz neutral bus grounded at the power source

Acceleration

A rate of change of speed (km/h/sec or m/sec²) resulting in an increase in travel speed.

Acceleration Lane

A speed change lane for the purpose of:

- (1) enabling a vehicle entering a roadway to increase its speed to a rate at which it can more safely merge with through traffic;
- (2) providing the necessary merging distance; and
- (3) giving the main road traffic the necessary time to make appropriate adjustments.

Access

A way of entering or travelling towards a location. It is used when describing which vehicle movements may be permitted at an intersection (such as with an access-only barrier). It is also used when describing the location of driveways and walkways which provide an entrance to a property. See Egress and Ingress.

Accident

See Collision.

Actuation

The operation of a detector in registering the presence or passage of a vehicle or pedestrian.

Adhesion

The ability of a sign sheeting to adhere (bond strongly) to the substrate to which it is attached. The specification indicates the bond strength of the adhesive backing of the sheeting, in terms of minimum weight supported for 5 minutes, without the bond peeling for more than a specified maximum distance, when tested according to the procedure described in the specification. The minimum weight that must be supported varies by class of adhesive.

ADT

Average Daily Traffic.

Advanced Public Transportation Systems (APTS)

The application of advanced electronic and communications technologies to improve the safety and efficiency of public transit systems. See also Intelligent Transportation Systems (ITS).

Advanced Traffic Management Systems (ATMS)

Systems using high-technology devices, on both freeways and urban streets, to more efficiently manage traffic. These include roadside sensors, ramp metering, cameras, dynamic message signs, HOV lanes and synchronized traffic signals that respond to traffic flows.

Advanced Traveller Information Systems (ATIS)

This system provides travellers with information to help in trip planning and changing course en route to bypass congestion, e.g., broadcast traffic reports, in-car computerized maps and highway DMSs. Also can include automated transit trip planning and automated rideshare matching.

Advance Warning Area

The first component of a work zone, upstream of the approach area, used to alert drivers to road work ahead.

Advisory Maximum Speed

An advisory speed posted when the roadway geometrics result in a maximum safe speed which is 20 km/h or more below the operating speed, and is 10 km/h or more below the regulatory speed limit.

Advisory Speed

The speed, determined to the nearest 5 km/h, at which traffic may safely negotiate a potential hazard under favourable driving conditions.

AID

Automatic Incident Detection.

Air Brake

A brake in which the mechanism is actuated by the manipulation of air pressure. The term is often used to describe brakes that employ air under pressure above atmospheric, in contrast to vacuum brakes, which employ pressure below atmospheric.

Algorithm

A step-by-step procedure for solving a mathematical problem, such as the processing of input data or sensor data to determine traffic control strategies or commands.

Alley

A narrow lane between houses or buildings giving access to the rear of those houses or buildings.

All-red Interval (Traffic Signal)

The time in seconds of a red indication for all intersection traffic. It is used following an Amber Clearance Interval to permit vehicles or pedestrians to clear the intersection before conflicting traffic receives a green indication. In Temporary Conditions, the All-red Interval is used to clear a one-lane section through a work site before opposing traffic receives a green indication.

Amber Clearance Interval (Traffic Signal)

The clearance interval in which the signal indication for that Phase is amber. A clearance interval to warn approaching traffic to clear the intersection before conflicting traffic receives a green indication.

A.M. Peak Hour

The one hour in the morning when traffic volumes are highest.

A.M. Peak Period

The period (generally two to three hours) in the morning when traffic volumes are highest. Colloquially called *rush hour*.

Annual Average Daily Traffic (AADT)

The total yearly traffic volume on a given road divided by the number of days in the year.

Annual Average Weekday Daily Traffic (AAWDT)

The total yearly traffic volume on a given road collected on weekdays and divided by the number of weekdays (252 or 253 days) in the year. Traffic volumes on statutory holidays are not included.

Antenna

Any structure or device used to collect or radiate electromagnetic waves.

Approach Area

The second component of a work zone, downstream of the advance warning area, and upstream of the transition area, in which the driver is informed of lane changes, speed reductions, passing restrictions and the like.

Approach Nose

The end of a traffic island first encountered by a road user approaching from a given direction; also called the Upstream End. Depending on the situation, traffic may pass only to the right of the island, or on both sides. Each traffic island has two approach ends, one for each direction of travel.

Approach Speed

The maximum safe speed that can be maintained over a short section of highway immediately in advance of a potentially hazardous location, taking into account pavement and shoulder width, horizontal and vertical alignment, sight distance, and other controlling factors. The approach speed does not necessarily coincide with the Design Speed.

APTS

Advanced Public Transit Systems.
See Intelligent Transportation Systems (ITS).

Area Parking Control

A parking control plan for an area or community.

Arrow

A symbol indicating the direction of movement that a driver may or must make, as the case may be, or the direction of a destination.

Arterial Road

A Major Road, used primarily for through traffic rather than for access to adjacent land, that is characterized by high vehicular capacity and continuity of movement. Intersections are spaced relatively far apart and are frequently signalized. See also Collector Road and Local Road.

Assurance Sign

A Directional Guide Sign or Trailblazer, providing confirmation to the travellers that they are on the desired route or road, and/or are travelling toward the desired destination.

ASTM

American Society for Testing and Materials.

ATC

Area Traffic Control.

At-grade Intersection

An intersection of two roadways where there is no vertical separation between the two roadways at their point of intersection.

ATIS

Advanced Traveller information Systems.

ATM

Asynchronous Transfer Mode.

ATMS

Advanced Traffic Management Systems.

ATSSA

American Traffic Safety Services Association.

Automatic Vehicle Identification (AVI)

Vehicles equipped with AVI transponders are identified when they come within range of a roadside communication unit. Most common application is for automatically collected tolls on toll highway; however, the system may also be used as a means of automatically collecting travel time information along freeways.

Automatic Vehicle Identification in Ontario (AVION)

A commercial vehicle electronic clearance system along Highway 401 (Windsor to Whitby) and Interstate I-75 in the U.S.

Automatic Vehicle Location (AVL)

A system which enables the approximate location of a vehicle to be determined and tracked as it traverses the transportation network. Commonly used by emergency services and transit agencies to track location of vehicles. Also can be used to monitor traffic conditions by obtaining probe reports from vehicles travelling in the network.

AVC

Automated Vehicle Classification.

Average Daily Traffic (ADT)

The total volume during a given time period in whole days greater than one day and less than one year divided by the number of days in that time period.

AVG

Automated Vehicle Guidance.

AVI

Automatic Vehicle Identification.

AVION

Automatic Vehicle Identification in Ontario.

AVL

Automatic Vehicle Location.

AWG

American Wire Gauge.

B**Bailey Bridge**

See Temporary Bridge.

Ball Bank Indicator

A mechanical or electronic device that can be mounted inside a four-wheel vehicle. Readings of the ball bank indicator show the combined effects of the body rolling angle, centrifugal force and superelevation angle to estimate the safe operating speed around a curve.

Band

A discrete interval of the electromagnetic spectrum between two wavelength values.

Bandwidth

The information-carrying capacity of an optical fibre. It is measured in MHz-km and GHz-km, as distance plays an important role.

Barricade

A device which provides a visual indicator of a hazardous location or the desired path a motorist should take, but is not intended to contain or redirect a vehicle. A barricade is intended to provide separation or to inform of closure, or to provide direction to pedestrians. A barricade is not a primary means of providing direction to motorists, but is supplemental to other traffic control devices providing delineation.

Barrier

A device which provides a physical limitation, through which a vehicle would not normally pass, and is intended to contain or redirect an errant vehicle of a particular size range, at a given speed and angle of impact.

Base Period

See Off-peak Period.

Baud

A unit of data transfer speed used in digital communications. One baud generally equates to a transfer speed of one bit per second, for serial (RS232) communications.

Benefit/Cost Ratio (B/C Ratio)

A ratio used to compare the benefit versus the cost of proposed alternatives. For highway projects, benefits may include reduced fuel consumption, travel time, and air pollution; costs may include construction, right of way, and maintenance.

Bicycle

A vehicle having only two tandem wheels, propelled solely by human power, upon which typically one or two persons may travel. The HTA definition of bicycle includes tricycles and uni-cycles and excludes motor-assisted bicycles.

Bicycle Facility

A general term denoting a facility with improvements and provisions made or administered by public agencies to accommodate or encourage bicycling, including bikeways and bikeway parking facilities.

Bicycle Lane

A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bicycle Parking Area

A general term referring to any facility provided for parking bicycles. It can include racks, compounds, stands or lockers.

Bicycle Path

A bikeway physically separated from the motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way.

Bicycle Route

A segment of a system of bikeways designated by the jurisdiction having authority, with appropriate directional and information markers, with or without a specific bicycle route number.

Bicycle Trail

An unimproved bikeway.

Bidirectional Bikeway

A two-way bikeway.

Bikeway

Any road, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Bilingual Sign

A sign which has its message (legend) in both English and French.

Blank Number

See Sign Blank Number.

Blank-out Sign

A type of CMS with two states, either on or off. When the blank-out sign is off, there is no message displayed. When the sign is on, a pre-determined message is displayed to motorists.

Blocker Truck (BT)

A Buffer Vehicle (BV) not equipped with a Truck-mounted Attenuator.

Bond

Adhesive quality of a coating or sheeting to a Substrate.

Bottleneck

A highway section with reduced capacity that experiences operational problems such as congestion. Bottlenecks may result from factors other than reduced roadway width. For example, the close spacing of exit and entrance ramps can cause weaving patterns that result in congestion. A less obvious example is a steep freeway grade that can slow trucks and cause a localized "bottleneck."

Boulevard

An improved strip of land:

- (1) between the roadway and the sidewalk; or
- (2) between two opposing roadways (median boulevard).

Boulevard Bikeway

A bikeway on a roadway boulevard.

Breakdown Service

A service which provides assistance to motorists in case of breakdown or emergency.

Brightness

A term that refers to human perception of Luminance. Whereas luminance is a photometrically measured quantity, brightness describes how intense a light source or lighted surface appears to the human eye.

Broadcast

The simultaneous transmission of a message to all receivers on the channel.

Broken Line

A Pavement Marking consisting of a cycle of marking segments and gaps. Broken lines are permissive and inform drivers that they are permitted to cross a broken line, (two-lane, two-way highways or multi-lane roadways) or that there is a change in use of a particular lane (continuity lines).

BT

Blocker Truck.

BTU

British Thermal Unit.

Buffer Vehicle (BV)

A truck positioned in a stationary work zone or in a mobile work operation to provide buffer protection for workers against errant vehicles intruding into a work zone or mobile work operation. The generic term Buffer Vehicle refers to either a Blocker Truck or a Crash Truck. As required by OHSA, a Buffer Vehicle must have a minimum mass of 6,800 kg, and must have a mounted TC-12 flashing arrow board and four-way flashers. All Buffer Vehicles used on freeways must be Crash Trucks. For MTO contracts, additional BV requirements apply.

Built-up Area

The territory contiguous to a highway not within a city, town, village or police village where:

- (1) not less than 50% of the frontage upon one side of the highway for a distance of not less than 200 m is occupied by dwellings, buildings used for business purposes, schools or churches;
- (2) not less than 50% of the frontage upon both sides of the highway for a distance of not less than 100 m is occupied by dwellings, buildings used for business purposes, schools or churches;
- (3) not more than 200 m of the highway separates any territory described in clause (1) or (2) from any other territory described in clause (1) or (2); and signs are displayed as required.

Bull Nose

The area or point of divergence between two diverging roadways, such as between freeway mainline lanes and an exit ramp.

Bus

Any motor vehicle designed, constructed and/or used in the transportation of ten or more seated passengers.

Business District

The territory contiguous to and including a highway when within 180 m along such highway there are buildings in use for business or industrial purposes, including but not limited to, hotels, banks or office buildings which occupy at least 90 m of frontage on one side or 90 collectively on both sides of the highway.

Bus Lane

A street or highway lane intended exclusively or primarily for buses, either all day, or during specified periods. See also Reserved Lane and Transit Lane.

BV

Buffer Vehicle.

C**Cabinet (Traffic Signal)**

An outdoor enclosure for housing a Controller Unit and associated equipment.

Call (Traffic Signal)

A registration of a demand for right-of-way by traffic (vehicular or pedestrian) at a controller.

Call Box

A telephone or other communications device located at given locations along the side of a freeway. Motorists can request various services (such as police fire, or ambulance, etc.) by pressing certain buttons or using voice communications.

Candela

The basic SI unit of luminous intensity.

Capacity

The maximum number of vehicles which can pass over a given section of lane or a roadway in one direction, or in both directions for a two-lane or three-lane highway, during a given time period (usually one hour) under prevailing roadway and traffic conditions.

Carbon Monoxide (CO)

A pollutant produced during fossil fuel combustion.

Carpool

An arrangement in which a group of people share the use and possibly the cost of a car in travelling to and from pre-arranged destinations together.

Catastrophe Theory Approach

The word "Catastrophe" means the loss of stability in a dynamic system. The major method of this theory is sorting dynamic variables into slow and fast. Then stability features of fast variables may change slowly due to dynamics of slow variables.

CATV

Cable Television.

Causeway

A bridge or raised way constructed over marshy land or water. It may be either an earth fill or bridge type structure.

CBD

Central Business District.

CB Radio

Citizen Band Radio.

CCD

Charge-Coupled Device.

CCG

Canadian Capacity Guide for Signalized (Urban) Intersections.

CCR

Camera Control Receivers.

CCTV

Closed Circuit Television.

Central Business District (CBD)

The downtown retail trade and commercial area of a city or an area of very high land valuation, traffic flow, and concentration of retail business offices, theatres, hotels and services.

Central Computer (Traffic Signal)

The combination of the application software, operating system, and computer hardware operating a traffic signal system from a single location.

Centralized Control System

A central computer-based control installation used to manage and control traffic on a road network. The system is controlled by a central processor, which is connected to a number of I/O (input/output) units. The communication between the processor and the I/O units usually consists of data messages. Other kinds of messages have no meaning for a centralized system. E.g., an I/O-unit cannot send a status message, because it is usually not able to determine its own status.

Central Processor Unit (CPU)

The main computer used in the Computer Centre, used to control field equipment (i.e., traffic control signs and signals, etc.).

Centre Lane Facility

A reserved lane at or near the centre of a roadway.

Centreline

See Directional Dividing Line.

CGSB

Canadian General Standards Board.

Changeable Message Sign

A specific subset of Dynamic Message Signs which may display a limited number of fixed messages, any one of which may be displayed at any given time, or no message at all. It is an electrical, electro-optical, electro-mechanical, or mechanical sign which permits the sign message to be changed, either locally or remotely. See also Dynamic Message Sign and Variable Message Sign.

Channelization

The separation or regulation of traffic movements into definite paths of travel by use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movement of traffic, both vehicular and pedestrian.

Channelizing Devices

Cones, construction markers, flexible drums (barrels), pavement markings and any temporary barriers used to alert drivers to and direct traffic past hazards created by construction or maintenance activities.

Chevron Alignment Sign

A delineation sign used to delineate sharp roadway alignment changes. See Books 6, 7 or 11.

Chicane

A series of Curb Extensions on alternating sides of a roadway, which narrow a roadway and require vehicles to meander to travel through the chicane. Typically, a series of three curb extensions is used.

Choker

See Curb Extension.

Citizen Band (CB) Radio

A two-way, short distance, voice communications service. The service may be used for virtually any form of personal voice communications activity, whether it is recreational, domestic, or in connection with work or business.

Closed Circuit Television (CCTV)

A system using remote control video cameras to monitor traffic patterns at sites susceptible to traffic congestion such as tunnels, intersections and interchanges. The images are transmitted from the camera to the control room.

Closed Lane

A traffic lane on a roadway that has been closed off to traffic by either channelizing devices, signs, temporary concrete barriers, and/or TC-12 flashing arrow boards.

CMOS

Complementary Metal Oxide Semiconductor.

CMS

Changeable Message Sign.

CO

Carbon Monoxide.

Coaxial Cable

A cable with a single central conductor having a common axis with a second outer cylindrical conductor.

Collector Road

A road for which vehicle movement and access are of equal importance. Direct access to adjacent properties may be permitted in some cases, typically in lower-density residential areas. Intersections are spaced at varying intervals and are typically only signalized where the collector road intersects an arterial road or in some cases another collector road. See Arterial Road and Local Road.

Collision

An incident resulting in property damage, personal injury or death and involving the loss of control and/or the striking of one or more vehicles with another vehicle, a person, an animal or an inanimate object.

Colourfastness

The ability of Sign Sheeting to retain its original colours after testing or after use in the field.

Colour Sequence (Traffic Signal)

A predetermined order of signal indications within a cycle.

Commercial Motor Vehicle

A motor vehicle having a permanently attached truck or delivery body, including fire apparatus, buses, and truck tractors and trailers (combination units) used for hauling purposes on the highways, and requiring a Commercial Vehicle Operating Registration (CVOR).

Commercial Sign

A sign falling into one of the following classes:

- (1) field advertising;
- (2) third-party signs; or
- (3) other commercial signs, on the highway right-of-way, for which a fee may be charged.

Commercial Vehicle Operations (CVO)

The application of advanced electronic and communications technologies to improve the safety and efficiency of commercial vehicle/fleet operations. See also Intelligent Transportation Systems (ITS).

Communication

The transfer of information from one location to another, electronically or by other media.

Communications Protocol

Hardware and software standards that govern transmission between two stations. On personal computers, communications programs offer a variety of protocol to transfer files via modem. Internet connections typically use a combination of PPP and TCP/IP. On LANs, data link protocol such as Ethernet, provides the access method that moves packets from station to station, and higher level protocol, such as TCP/IP is used to control and route the transmission.

Communication System

A system used at the traffic operations centre coordinating the operation of time division multiplexed communication with the field controllers.

Community

A group of individuals with a common interest. A community is often defined by neighbourhood boundaries, but may also include individuals who live outside the neighbourhood, but who work or operate businesses in the neighbourhood, or whose children attend school in the neighbourhood.

Comprehension

The ability of drivers to understand the meaning of a sign message, including any symbols or abbreviations.

Computer System

In ATMS, the complete computer made up of the CPU, memory and related electronics (main cabinet), all the peripheral devices connected to it and its Operating System. Computer systems fall into ranges called microcomputers (personal computers), minicomputers and mainframes.

Concurrent Flow Lane

A reserved lane for vehicles on which the direction of traffic is the same as the flow of traffic on the adjacent lanes.

Concurrent Timing (Traffic Signal)

A mode of controller operation whereby a traffic phase can be selected and timed independently and simultaneously with another traffic phase.

Cone of Vision

The small three-dimensional angle of vision, measured about the axis of the eye's pupil, and from the surface of the eye, within which angle maximum visual acuity is achieved.

Conflict

A Collision or near-collision which requires evasive action on the part of one or more persons. Conflicts can occur between two motorists, between a motorist and cyclist, between a motorist and pedestrian, and between a cyclist and pedestrian.

Conflicting Phase (Traffic Signal)

Two or more phases which will cause interfering traffic movements if operated concurrently.

Conflict Monitor (Traffic Signal)

A device used to continually check for the presence of conflicting signal indications and to provide an output in response to conflict.

Congestion Management System

A systematic process that provides information on transportation system performance and alternative strategies to alleviate congestion and enhance the mobility of persons and goods. A Congestion Management System includes methods to monitor and evaluate performance, identify alternative actions, access and implement cost-effective actions, as well as to evaluate the effectiveness of implemented actions.

Console

A terminal used to monitor and control a computer or network.

Conspicuity

The ability of a traffic control device to attract or command attention, given the visual setting in which it is placed.

Construction

All work zone activities, including pre-engineering activities, relating to the building, capital maintenance, or rehabilitation of highways or utilities along or crossing highways.

Construction and Maintenance Signs

A group of Regulatory and Warning Signs used for the protection of public traffic and workers in the vicinity of a work area located on or near the roadway.

Construction Marker

A TC-52 Channelizing Device.

Construction Zone

One or more highway work zones located on or near the roadway. A construction zone must be designated and signed in order to have enforceable maximum speed limits.

Continuity Line

A lane line of reduced spacing and increased width, designed to alert road users to an impending change in lane function. See also Wide Line.

Continuous Wide Median

On a divided highway, a median that has a continuous width of 10 m or more. See also Divided Highway.

Contra-flow

A flow of vehicles on which the direction of traffic is opposite to the flow of traffic on the adjacent lanes.

Contra-flow Lane

A reserved lane for vehicles on which the direction of traffic is opposite to the flow of traffic on the adjacent lanes.

Contrast

Contrast refers to differences in colour or in brightness which allow a target, such as a sign message or symbol, to be seen against the sign background.

$$\text{Contrast} = \frac{R_L - R_B}{R_B}$$

$$\text{Contrast Ratio} = \frac{R_L}{R_B}$$

Where: R_L is Reflectance of Legend; and

R_B is Reflectance of Background.

For light-emitting dynamic message signs, the same relationships apply, except that reflectance is replaced by emitted light intensity, for both legend and background.

Controlled Access Highway

A major highway along which the right of access to abutting property is controlled by the road authority, and where access to and from the highway is provided through interchange entrance and exit ramps.

Controlled Access Rights-of-way

Control of access is the condition where the right to access to or from a highway, by owners or occupants of abutting land or by other persons, is fully or partially controlled by the public authority.

Controlled Intersection

An intersection where traffic approaching from any or all directions is regulated by some form of traffic control device.

Controller (Traffic Signal)

The general usage term for the controller unit, cabinet and associated appurtenances.

Controller Cabinet (Traffic Signal)

An outdoor enclosure used for the housing of a controller unit and all associated power, control, protection, activation or interconnection devices.

Controller Unit (Traffic Signal)

That part of the controller which performs the basic timing and logic functions. A microprocessor-based or electro-mechanical timing unit.

Coordination (Traffic Signal)

The control of Controller Units in a manner to provide a relationship between specific green indications at adjacent intersections, in accordance with a time schedule to permit continuous operation of groups (platoons) of vehicles along the street at a planned speed.

Corridor

A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments.

Corridor Control

The process of managing and controlling utilities, buildings, road access, and commercial signing on the highway right-of-way and the areas on either side adjacent thereto.

Corridor Traffic Management

The process of managing and controlling traffic between/among parallel roads within a corridor.

Cost Effectiveness

The relationship between a measure's benefit over its service life and the total costs it incurs over its service life, often expressed as a ratio.

CPU

Central Processing Unit.

Crash

See Collision.

Crash Cushion

A traffic barrier used to safely shield fixed objects or other hazards from approximately head-on impacts by errant vehicles, consisting of energy-absorbing elements that are progressively deformed on impact.

Crash Truck (CT)

A Buffer Vehicle (BV) equipped with a Truck-mounted Attenuator (TMA) meeting National Cooperative Highway Research Program Report NCHRP 350 requirements.

Crossover

See Pedestrian Crossover.

Crosswalk

See Pedestrian Crosswalk.

Crown

A particular type of sign symbol, in the shape of a crown, used for King's Highway numbers, either by itself or as part of a Directional Guide Sign.

CT

Crash Truck.

CTS

Clear to Send.

Cul-de-sac

The round or circular section of the end of a dead-end street.

Curb

A vertical or sloping construction element along the edge of the pavement or shoulder forming part of a gutter, strengthening or protecting the edge, and clearly defining the edge to vehicle operators. The surface of the curb facing the general direction of the pavement is called the “face”.

Curb Extension

The intrusion of the curb into the roadway to reduce its width.

Curb Marking

A marking used to delineate the location of a curb.

Curb Radius

The radius of the circular curved curb which connects the tangent curb sections of intersecting streets.

Curve

A horizontal or vertical deviation in the roadway. A horizontal curve appears as a bend in the roadway, requiring drivers to turn the steering wheel. A vertical curve appears either as a “crest” or a “sag” to provide for a change in gradient on the profile of the roadway.

Curve Sign

A Warning Sign used to inform drivers of an upcoming change in roadway alignment. In some cases, a reduction in speed is recommended.

Customized Standard Sign

A sign which is in the Master Sign Library, but which needs to be adjusted to accommodate a specific local sign message. Most customized standard signs are Directional Guide Signs and need to be designed according to the sign design rules and sign design process outlined in Book 2, Sections 2.14 and 2.15.

Cut Image

The accurate, scaled template of a standard regulatory, warning, or temporary conditions sign that may be used directly for sign manufacture, supplied in the MSL.

CVO

Commercial Vehicle Operations.
See also Intelligent Transportation Systems (ITS).

CVOR

Commercial Vehicle Operating Registration.

Cycle

- (1) When referring to a traffic signal, cycle describes one complete sequence of signal indications.
- (2) See Bicycle.

Cycle Length (Traffic Signal)

The time (in seconds) required for one complete sequence of signal indications.

Cycle Splits (Traffic Signal)

The times in percent of the cycle for the phases making up the cycle.

Cyclist

A person riding a bicycle.

Cyclist Rest Area

A general term referring to a facility provided for cyclists to stop. It can include benches or picnic tables, bicycle parking facilities, trash cans, washrooms, drinking fountains, and bikeway network maps.

D**DAB**

Digital Audio Broadcast.

Daily Vehicle Traffic

The amount of vehicle traffic accumulated over a 24-hour period, traversed along a public road by motorized vehicles, excluding active construction equipment.

Dangerous Goods Carrier

A commercial goods carrier which transports goods deemed dangerous by the relevant provincial and federal legislation.

Data Network

A communications network that transmits data.

Data Processor

A computer that processes data.

Data Transmission

Sending data over a communications network.

Daytime Colour

Daytime Sign Sheeting colour as defined by daytime colour specification limits using four pairs of chromaticity coordinates to determine the acceptable colour in terms of the CIE 1931 Standard Colorimetric System.

DCE

Data Communications Equipment.

DCP

Data Channel Port.

DDE

Data Distribution Equipment.

Deceleration Lane

A speed change lane for the purpose of enabling a vehicle that is to make an exit from a roadway to slow to the safe speed on the exit after it has left the main stream of traffic.

Decision Time

The time required to make a decision and initiate a manoeuvre, if required, after reading or encountering a Traffic Control Device. Also called perception-reaction time.

Decorative Municipality Identification Display

Signs placed in the highway right-of-way, typically with supplementary vegetative plantings, to identify and advertize a municipality.

Deflection

A vertical and/or horizontal change in the course or path of a vehicle as the result of a physical feature of a roadway. For example, a Speed Hump deflects the wheels, suspension and chassis of a vehicle in a vertical direction. A traffic circle requires that the vehicle be steered from its straight path to manoeuvre past the feature.

Delineation

One, or a combination of several types of devices (excluding Guide Signs) that regulate, warn, or provide tracking information and guidance to drivers.

Delineation Technique

Refers to methods chosen to accomplish effective delineation. Selection of an appropriate marking material and method of application are part of a delineation technique.

Delineation Treatment

Refers to the higher-level decision process of designing delineation to be installed. Issues such as use of raised pavement markers and post markers are part of delineation treatment.

Delineators

Small, Retroreflective devices erected in a series adjacent to the edge of a travelled portion of the roadway for the purpose of providing positive driver guidance.

Demand Detector

A device for indicating the presence or passage of vehicles including sensor device, lead-in cable and detector sensor (amplifier) unit.

Demand Responsive Transit

Non-fixed-route service utilizing vans or buses with passengers boarding and alighting at pre-arranged times at any location within the system's service area. Also called "Dial-a-Ride".

Density

The number of vehicles per kilometre per lane on the travelled way at a given instant.

Density (Traffic Signal)

A measure of the concentration of vehicles usually stated as the number of vehicles per kilometre per lane.

Design Capacity

A capacity selected for the purposes of design, usually related to a desired level of service.

Design Hour

The ranked hour in the year, in which the design hourly volume occurs. The design hour is sometimes taken as the hour in which the thirtieth highest hourly volume in the year occurs.

Design Hourly Volume (DHV)

The hourly volume for which a road or Traffic Signal is to be designed.

Design Incoming Vehicle (DIV)

The selected vehicle or vehicles with the size and mass which correspond to a certain proportion of the vehicle population, or to a defined level of protection, used in the determination of Buffer Vehicle mass and Roll-ahead Distances for the design of construction and maintenance work zones.

Design Speed

A speed selected for purposes of design and correlation of those features of a highway, such as curvature, superelevation, and sight distance, upon which the safe operation of vehicles is dependent.

Design Vehicle

The selected vehicle or vehicles with the size, dimensions, performance, and turning characteristics which correspond to a certain proportion of the vehicle population (such as 85th percentile or worst-case conditions) for road design purposes.

Detection Zone (Traffic Signal)

That area of the roadway within which a vehicle will be detected by a vehicle detector.

Detector (Traffic Signal)

A device for indicating the presence or passage of vehicles including sensor device, lead-in cable and detector sensor (amplifier) unit.

Detector Loop (Traffic Signal)

A detector that senses a change in inductance of its inductive sensor loop caused by the passage or presence of a vehicle in the detection zone of the loop.

Detector Memory (Traffic Signal)

The retention of an actuation for future utilization by the controller unit.

Detector Mode (Traffic Signal)

A term used to describe the operation of a detector channel output when a presence detection occurs:

- (1) Pulse Mode – Detector produces a short output pulse when detection occurs.
- (2) Controlled Output – The ability of a detector to produce a pulse that has a predetermined duration regardless of the length of time a vehicle is in the detection zone.
- (3) Continuous-presence Mode – Detector output continues if any vehicle (first or last remaining) remains in the detection zone.

- (4) Limit-presence Mode – Detector output continues for a limited period of time if vehicles remain in the detection zone.

Detour

A diversion from the usual travelled roadway; either a crossover from one multi-lane roadway to another (within the highway right-of-way), or a Route Detour.

Detour Marker

A sign used to identify a Route Detour for detour route continuity, to assist driver navigation.

Device (Traffic Calming)

A physical feature of the roadway, constructed for the purpose of affecting the movement of motor vehicles, bicycles and/or pedestrians.

Device (Traffic Control)

See Traffic Control Device.

DFE

Discounted Future Earnings.

DHV

Design Hour Volume.

Diagrammatic Sign

A sign, used primarily on freeways, which uses graphics to display the approximate geometry of the interchange or intersection, including lane configuration, along with essential directional information.

Diamond Grade Material

A non-metallized, high reflectivity micro-prismatic sign sheeting material (ASTM Type VII, VIII, or IX). The material may be fluorescent or non-fluorescent.

Digital Communications

Transmission of text, voice and video in binary form.

Dilemma Zone

The roadway approach area to a signalized intersection (or other signal device) in which it is unclear to the driver, when the amber clearance interval appears, whether it is safer to attempt to stop before the stop line or to proceed through the intersection.

Directional Closure (Traffic Calming)

The intrusion of the curb, approximately to the Centreline of a roadway, to obstruct (prohibit) one direction of travel.

Directional Distribution

The directional split of traffic during the Peak or Design Hour, commonly expressed as percent in the peak and off-peak flow directions.

Directional Dividing Line

A yellow Pavement Marking indicating the division of the roadway between traffic travelling in opposite directions.

Directional Guide Sign

A broad class of signs providing route-finding or operational guidance to road users, including direction to specific destinations.

Display (Traffic Signal)

A display consists of the total illuminated and non-illuminated signals facing the motorists. "Display" is interchangeable with "Indication".

Distributed Control System

A traffic control system with distributed processor capacity. The processor capacity is distributed within the system, separated upon different nodes. Each node ought to be occupied with its own separate task. The communication between different nodes in a distributed control system consists of both data messages (from gauges etc.), and different kinds of administrative messages. As a consequence, the complexity of a Distributed Control System can be a lot higher than for a Centralized Control System.

Diverging

The dividing of a single stream of traffic into separate streams.

Diversion Route

A route where a driver is required to depart completely from the normal route and is directed to use an alternate route.

Divert

To redirect traffic, typically through the use of physical obstructions or Regulatory Signs.

Diverter

A raised barrier placed diagonally across an intersection which forces traffic to turn rather than proceed straight through. A diverter effectively creates two separate roadways with no access between them for motor vehicles.

Divided Highway

A multi-lane highway consisting of roadways for opposing traffic which are separated by an unpaved area or other physical barrier, including a curbed island. See also Continuous Wide Median.

DMS

Dynamic Message Sign.

Doppler Shift

The change in electromagnetic frequency that occurs when the source of the radiation and its observer move towards or away from each other. The faster they come together, the higher the frequency. The faster they move away, the lower the frequency.

DOT

U.S. Department of Transportation.

Double Line

A Pavement Marking used on two-way, undivided roadways to inform the driver of a “no-passing” zone in both directions of travel.

Downloading (Traffic Signal)

The transmission of data from a master or central computer system to a Slave or a Remote Controller Unit.

Downstream

The direction that traffic is going to.

DRGS

Dynamic Route Guidance Systems.

Driver

A person who operates a vehicle on a highway.

Driver Response

The driver action taken as a result of reading a traffic sign or encountering another traffic control device.

Driveway

A private road giving access from a public way to a building or property on abutting grounds.

DSP

Digital Signal Processing.

DSRC

Dedicated Short Range Communications.

DTE

Data Terminal Equipment.

Duration

- (1) The length of time for which a given state, condition or phase exists.
- (2) In Temporary Conditions, the length of time for specific construction, maintenance or utility work activities to take place, and for which specific requirements and typical layouts apply. See Mobile Operations, Very Short Duration, Short Duration, and Long Duration.

Dwell (Traffic Signal)

The interval portion of a phase when present timing requirements have been completed. “Rest” as in “rest in green”.

Dynamic Message Sign (DMS)

An array of sign technologies that have the capability of displaying different messages to suit changing conditions on the roadway. Included within the family of dynamic message signs are full matrix displays, single line or character matrix displays, multiple pre-set message displays and simple on-off or “blank-out” displays. The terms “Changeable” and “Variable” are used in the OTM to describe specific sub-sets of Dynamic Message Signs. See Book 10.

E**E**

Rate of superelevation.

Easement

A right to use or control the property of another for designated purposes:

- (1) Drainage – for directing the flow of water;
- (2) Planting – for reshaping roadside areas and establishing, maintaining, and controlling plant growth thereon;
- (3) Scenic – for conservation and development of roadside views and natural features;
- (4) Sight Line – for maintaining or improving the sight distance;
- (5) Slope – for cuts and fills;
- (6) Access – to utility corridor for maintenance and repair.

Edge Line

A painted line marking the edge of the roadway.

EDI

Electronic Data Interchange.

EEPROM

Electrically Erasable Programmable Read Only Memory.

EFT

Electronic Funds Transfer.

Egress

A way of exiting or travelling away from a location. Is used when describing which vehicle movements may be permitted at an intersection (such as with an egress-only barrier). Is used when describing the location of driveways and walkways which provide an exit from a property.

Eighty-fifth (85th) Percentile Speed

The speed at, or below which, 85% of motorists are travelling.

Electronic Changeable Message Sign

See Changeable Message Sign.

Electronic Toll System

Systems that allow drivers to pay tolls electronically, generally through use of a Transponder. Also known as Electronic Toll and Traffic Management (ETTM).

Electronic Toll and Traffic Management (ETTM)

See Electronic Toll System.

Embedded Detector

Traffic detector system that consists of sensors in or below the surface of the roadway.

Emergency

With regard to road works, an emergency is an unforeseen, unplanned combination of circumstances or the resulting situation that calls for immediate action in order to prevent or reduce damage or hazard to road users, workers, or infrastructure. In an emergency, short duration traffic control provisions should be implemented to the greatest extent practicable, including adequate reflectorization if at night, in order to avoid the creation of additional hazard.

Encroachment

Unauthorized use of highway right-of-way or easements for signs, fences, buildings, etc., unless authorized by encroachment permit.

Encroachment Permit

See Encroachment.

Engineering Grade Material

A retroreflective sign sheeting material meeting ASTM Specification for Type I material or CGSB Specification 62-GP-11M for Reflectivity Level II material.

Entrance Angle

The horizontal angle between the headlight beam and a line perpendicular to the sign. For computation of the entrance angle, the headlight beam is usually considered to emanate from a point midway between the two headlights.

Environmental Protection Agency (EPA)

A Federal agency charged with protecting the natural resources on the nation.

EPA

U.S. Environmental Protection Agency.

EPROM

Erasable Programmable Read-Only Memory.

ETC

Electronic Toll Collection.

Ethernet

The most widely-used LAN access method, which is defined by the IEEE 802.3 standard. Ethernet is normally a shared media LAN. All stations on the segment share the total bandwidth, which is either 10 Mbps (Ethernet), 100 Mbps (Fast Ethernet) or 1000 Mbps (Gigabit Ethernet). With switched Ethernet, each sender and receiver pair have the full bandwidth.

ETP

Epoxy Thermoplastic Paint.

ETTM

Electronic Toll and Traffic Management Systems. See Electronic Toll System.

Expectancy

Used in traffic engineering to describe a driver's anticipation of upcoming road design and traffic control conditions. Driver expectancy is usually affected by previous experience and the consistency and continuity of traffic control devices encountered.

Expressway

A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at major intersections.

Extendible Portion (Traffic Signal)

That part of the green interval in an actuation phase following the initial portion which may be exceeded by traffic actuations to the Maximum Green.

F

F

Coefficient of friction.

Fabrication

The construction and/or assembly of a traffic control device and/or its supports.

Farm Tractor

A self-propelled vehicle designed and used primarily as an implement for drawing ploughs, mowing machines and other implements of husbandry and not designed or used for carrying a load.

Faze

See Movement (Traffic Signal).

FDIN

Field Drop and Insert Node.

FDM

Frequency Division Multiplexing.

FDVDM

Frequency Division Video Demultiplexer.

FDVM

Frequency Division Video Multiplexer.

Feeder Road

See Collector Road.

FHWA

U.S. Federal Highway Administration.

FHWA Fonts

A series of fonts used in sign design.

Fibre Optics

A thin glass wire designed for light transmission, capable of transmitting trillions of bits per second.

Fibre Optic Signs

Fibre optic signs are light emitting signs that utilize a halogen bulb light source and fibre optic cable to illuminate the pixels, which are lenses coupled with shutters that either let the light through or block the light from being displayed.

Field Advertizing

Commercial advertizing signs located off the highway right-of-way, or, in bush country, located on, and at the edge of, the highway right-of-way.

Field Edition

The portable, abbreviated field edition of Book 7.

Firefighting Vehicle

A vehicle designed specifically for use in the suppression of fires.

Fixed Route

Service provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers to specific locations; each fixed-route trip serves the same origins and destinations, unlike demand responsive and taxicabs.

Flasher (Traffic Signal)

A device used to open and close signal circuits at a repetitive rate.

Flow

Movement of traffic:

- (1) Interrupted – Non-continuous movement of traffic;
- (2) Uninterrupted – Continuous movement of traffic.

Fluorescence

The emission of light produced by certain substances when excited by an ultraviolet (UV) energy source. This emission ceases when the UV source is removed.

Fluorescent Orange and Yellow-Green

Fluorescent sign sheeting colours designed for high conspicuity in daytime. Fluorescent sign sheeting may be non-reflective (daytime use only) or reflective (daytime and nighttime use).

FMS

Freeway Management Systems.

Font

A set of letters, numbers, and symbols of a unified design and given size, and designated by name.

Force Off (Traffic Signal)

A command to the Controller Unit that will force the termination of the current right-of-way (green) interval during the extendible portion.

Freeway

A multi-lane Divided Highway with continuous dividing median, full control of access and interchanges in place of At-grade Intersections, and a posted speed of 90 km/h or greater.

Freeway Traffic Management System

A system of electronic devices, including some or all of detectors, communication system, Central Computer with management software, Changeable Message Signs, closed circuit television cameras, and incident detection, installed for the purpose of managing traffic flow on a Freeway.

French Language (French) Signs

A sign whose text message is in the French language only.

Frequency

The number of oscillations of a signal per unit of time; usually expressed in cycles per second (cps) or Hertz (Hz).

Frequency Division Multiplexing (FDM)

Technology that transmits multiple signals simultaneously over a single transmission path, such as a cable or wireless system. Each signal travels within its own unique frequency range (carrier), which is modulated by the data (text, voice, video, etc.)

Fringe Parking

An area for parking usually located outside the Central Business District and most often used by suburban residents who work or shop downtown.

FSK

Frequency Shift Keying.

FTMS

Freeway Traffic Management Systems.

FTP

File Transfer Protocol.

Full Closure (Traffic Calming)

A raised barrier extending across the entire width of a roadway, which obstructs all motor vehicle traffic movements.

Fully Actuated (Traffic Signal)

(1) a fully actuated mode of operation is one in which both the side (minor) road and the main (major) road utilize detection devices. During operation, if no actuation occurs at the intersection, the controller will rest either in the last phase actuated or return to the main road green to rest (recalled to main road green);

(2) a fully actuated mode of operation can be one in which the passage loops are used on all approaches, or on one of the roads if the other has detection at the intersection.

Fuzzy Logic

A mathematical technique for dealing with imprecise data and problems that have many solutions rather than one.

G

Gap Reduction (Traffic Signal)

A controller feature whereby the unit extension or allowed time spacing between successive vehicle actuations on the phase displaying the green in the extendible portion of the intervals is reduced after each extension, usually in proportion to another parameter. Time waiting gap reduction is a feature whereby the unit extension in the Phase having the green is reduced in proportion to the time vehicles have waited on the phase having the red.

Geographic Information System (GIS)

A digital mapping system used for exploration, demographics, dispatching and tracking.

Geometry

When referring to roadway design, geometry refers to the physical characteristics and dimensions of parts of the roadway.

GIS

Geographic Information Systems.

Glass Beads

Spheres used in conjunction with traffic paint to produce retroreflectivity in pavement markings.

Global Positioning System (GPS)

A system of 24 satellites for identifying earth locations.

Gore

The area between and immediately adjacent to two merging or diverging roadways; the area may be painted or unpainted.

GPS

Global Positioning System.

Grade Crossing

A railroad crossing a highway at the same elevation (no vertical separation).

Grade Separation

The vertical separation of two or more intersecting roadways or a roadway and another transportation mode, e.g., railroad, thus permitting traffic on all roads to cross traffic on all other roads without interference.

Graphical User Interface (GUI)

The graphics-based user interface that enables users to interact (interface) with their computers, which incorporates icons, pull-down menus and a mouse. In a client/server environment, the GUI resides in the user's client machine.

Gross Axle Weight

That part of the gross vehicle weight in kilograms transmitted to the highway by an axle unit.

Gross Vehicle Weight

The total weight in kilograms transmitted to the highway by a vehicle or combination of vehicle and load. This is not the same as the Registered Gross Vehicle Weight, which is a licensed measure.

Ground-mounted Sign

A sign mounted beside the Roadway rather than above it.

GTA

Greater Toronto Area.

GUI

Graphical User Interface.

Guideline

A recommended practice, method or value for a specific design feature or operating practice.

Guide Rail

A fence or barrier to guide and help restrain vehicles from leaving the roadway.

Guide Sign

A Traffic Sign used to direct traffic along a route towards a destination.

H

HAR

Highway Advisory Radio.

Hazard Marker

See Object Marker.

Hazardous Materials

Materials that are considered dangerous if the transport of such goods might cause harm, risk, peril, or other evil to people, environment, equipment or any property whatsoever.

HCM

Highway Capacity Manual.

Headway

The spatial distance or time interval between the front ends of vehicles moving along the same lane or track in the same direction.

Heavy Rail

An electric railway with the capacity for "heavy volume" of traffic and characterized by exclusive right-of-way, multi-car trains, high speeds and rapid acceleration, sophisticated signalling, and high platform loading. Also known as "rapid rail", "subway", elevated (railway) or "metropolitan railway (metro)".

HELP

Heavy Vehicle Electronic License Plate.

High Intensity Material

A retroreflective sign sheeting material meeting ASTM Specification D4956-01a for Type III or IV, or CGSB Specification 62-GP-11M for Reflectivity Level I material.

High Occupancy Free, Others Toll (HOT) Lane

Exclusive roadway or lane identified as a reserved facility for HOVs, on which a travel fee is charged for non-HOVs.

High Occupancy Vehicle (HOV)

A vehicle that carries a defined minimum number of persons (typically two or three).

High Occupancy Vehicle (HOV) Lane

Exclusive roadway or lane limited to high-occupancy vehicles, such as buses, vanpools, carpools and emergency vehicles. Some road authorities also permit motorcycles.

High Occupancy Vehicle (HOV) Management

The collective application of physical facilities to support HOV operation including HOV lane, park-and-ride lots, park-and-pool lots, and/or other supporting facilities.

Highway

A general term denoting a public way for purposes of vehicular and pedestrian travel, including the entire area within the Right-of-way. This includes King's Highways, regional and county roads, rural roads, municipal roads and streets.

Highway Advisory Radio (HAR)

A low-powered radio (generally AM) station devoted to presenting travel-related information to the public.

Highway Delineator

One of a series of short posts with reflective heads or chevrons, used to indicate horizontal alignment.

Highway Traffic Act (HTA)

The Ontario Highway Traffic Act.

Historic Site

A building, monument, park, cemetery or other site having public interest and national, provincial, regional or local significance, which should be considered in the location and design of a highway.

HLDL

High Level Data Link.

Hold (Traffic Signal)

A command to the controller unit which causes it to retain the existing right-of-way (green) interval.

Horizontal Sign Offset

The horizontal distance between the edge of the pavement and the nearer edge of a ground-mounted traffic sign.

HOT Lane

High Occupancy Free, Others Toll Lane.

HOV

High Occupancy Vehicle.

HTA

Highway Traffic Act (Ontario).

Human Factors

The consideration of human physical, perceptual and mental limitations in engineering design, so as to optimize the relationship between people and things. The objective is to reduce error and increase user comfort.

Hybrid Sign

A light-emitting VMS which combines Fibre Optic or LED-based technologies with reflective flip-disk technology. When pixels are activated, the electro-mechanical shutter rotates to display the reflective surface of the disk and the light source through an opening in the shutter for the illuminated pixel. The display of fluorescent yellow sheeting on the open shutter enhances the visibility of the display under direct sunlight.

I**ILD**

Inductive Loop Detection.

Illuminance

Luminous flux incident per unit of area (direct light).

Incident

An incident may be any of the following: traffic collision, stalled vehicle, load spillage, or other action that affects one or more lanes of traffic. A collision typically involves a moving vehicle striking or being struck by another vehicle, person, or object.

Incident Detection Algorithm

Computer software developed to automatically identify incidents on the basis of field data received from detection equipment.

Indication (Traffic Signal)

The illumination of a traffic signal lens or combination of signal lenses at the same time. See Display.

Inductive Loop Detector

Coil of cable embedded in the pavement surface that creates a magnetic field. A vehicle is detected when this magnetic field is disturbed.

Information Load

The amount of information presented to a driver by a Sign or other Traffic Control Device, which is a factor in determining the amount of time drivers require to read, comprehend, and act upon the message.

Information Service Provider (ISP)

An organization that provides access to various information.

Ingress

A way of entering or travelling into a location. Is used when describing which vehicle movements may be permitted at an intersection (such as ingress-only barriers). Is also used when describing the location of driveways and walkways which provide access into a property.

Initial Portion (Traffic Signal)

The first timed part of the green interval of an actuated phase.

In-line Skater

A person using a manufactured or assembled device consisting of a shoe, boot, or other foot covering, with a frame or chassis holding two or more ball bearing wheels aligned in a single straight line, and used to skate, or glide, by means of muscle power.

Installation

The process or act of placing, erecting, and/or connecting a traffic control device or system into its functional position and state of operational readiness.

Integrated Pedestrian Facility

Facilities where pedestrians are integrated with other road users, where special measures must be taken to control pedestrians and other road users, to ensure that pedestrians are protected.

Intelligent Transportation Systems (ITS)

A wide range of advanced electronics and communications technologies applied to roads and vehicles, designed to improve safety and decrease congestion. When the term is applied to transit, it is called APTS; in commercial trucking, it is referred to as CVO.

Intelligent Vehicle-highway Systems (IVHS)

See Intelligent Transportation Systems (ITS).

Interchange

A system of interconnecting roadways in conjunction with one or more grade separations, providing for the interchange of traffic between two or more roadways on different levels.

Interchange Types

- (1) Cloverleaf – A full cloverleaf is a four-quadrant interchange with an inner loop for left turns and a direct outer connection for right turns in each quadrant. A partial cloverleaf is a two-quadrant interchange where loops are provided in two quadrants, and traffic exits from the main road on a single ramp for both left and right turns;
- (2) Diamond – A four-leg interchange with a single one-way ramp in each quadrant. All left turns are made directly on to or off of the minor highway;
- (3) Directional – An interchange, generally having more than one highway grade separation, with direct connections for the major left turning movements.

Intercity

A term referring to a connecting service or roadway between two or more adjacent municipalities and their suburban areas.

Interconnected Controller (Traffic Signal)

A controller which operates traffic control signals under the supervision of a master controller.

Interconnection (Traffic Signal)

- (1) A means of remotely controlling some or all of the functions of a traffic control signal;
- (2) An electronic, fibre optic, time synchronization, radio, telephone or electrical connection with coordination units or modems in the controller cabinets; the physical interconnection.

Interdictory Symbol

An annular (circular) red band with a diagonal red stroke at 45 degrees, or as close to 45 degrees as practical, signifying that whatever is depicted within the symbol is prohibited.

Interline Spacing

The vertical space between the bottom of one message line and the top of the message line beneath it. Also called line spacing or 'leading' (pronounced 'ledding').

Intermittent

Not continuous. As used for traffic control devices, usually means regularly spaced either in time (flashing beacon) or space (broken pavement lines). Otherwise, may mean regularly or irregularly spaced (such as intermittent hazard).

Intermodal

Used to denote transfer points for travel by more than one mode.

Internet

- (1) A large network made up of a number of smaller networks;
- (2) The Internet is made up of well over 100,000 interconnected networks in more than 100 countries covering commercial, academic and government endeavours. Users have access to unpublished data and journals on a huge variety of subjects. Today, the Internet has become commercialized into a world-wide 'information highway'.

Intersection

The area embraced by the prolongation of lateral curb lines or, if none, of the rights-of-way of two or more highways that join one another at an angle, whether or not one highway crosses the other.

Intersection Approach

That part of an Intersection Leg used by traffic approaching the intersection.

Intersection Channelization

Raised or painted islands at an intersection that prevent specific movement(s) from being made or provide better definition of large uncontrolled areas of pavement.

Intersection Leg

That part of any one of the roadways radiating from the intersection which is close to the intersection but outside the area of the intersection proper.

Intersection Sight Distance

The distance at which a driver on the roadway approaching an intersection can see vehicles on the other intersection legs to the left and right of the path of travel. May also be referred to as Vision Triangle.

Interval (Traffic Signal)

A part of a phase that is individually timed by the controller unit.

Interval Sequence (Traffic Signal)

The order of appearance of Signal Indications during successive intervals of a cycle.

IP

Internet Protocol.

IPS

Intersection Pedestrian Signals.

ISM

Industrial Science Medical.

ISO

International Standards Organization.

ISP

Information Service Provider.

ITE

Institute of Transportation Engineers.

ITS

Intelligent Transportation Systems.

IVHS

Intelligent Vehicle Highway Systems.

IVIS

In-Vehicle Information Systems.

J

Junction

See Intersection.

Jurisdiction

A legal or other authority with responsibility and control for specific actions within a defined area.

K

KHGSPM

King's Highway Guide Signing Policy Manual (Ontario).

Kilometre

A measure of distance equal to 1,000 m (.621 miles).

King's Highway

A highway, including secondary and tertiary roads designated under the Public Transportation and Highway Improvement Act.

King's Highway Guide Signing Policy Manual (KHGSPM)

The Ministry of Transportation Ontario manual for guide signing on provincial highways. It is being superseded by OTM Book 8 (Directional and Information Signs) and Book 9 (Tourism and Commercial Signs).

Kiosks

Video monitors mounted on a cabinet, in a wall, or on a counter top which travellers can access to request travel-related information.

Kiss and Ride

A place where commuters are driven and dropped off or picked up at a station to board, or alight from, respectively, a public transportation vehicle. (Also Kiss 'n' Ride.)

km

Abbreviation for kilometre.

L

LAN

Local Area Network.

Lane

A defined width of road intended to accommodate a single line of moving vehicles.

Lane Closure

Closing of a highway lane to road users.

Lane Designation Sign

An Overhead or Ground-mounted Sign, erected at or in advance of an intersection, or over a lane or lanes, to regulate traffic on an approach by assigning certain traffic movements to specific lanes or a reserved lane. These signs should not be confused with Turn Control Signs.

Lane Line

A Pavement Marking, other than a Directional Dividing Line, which separates two traffic lanes assigned to traffic moving in the same direction.

Lane Use Sign

See Lane Designation Sign.

Large Arrow Sign

A Warning Sign intended to inform drivers of a sharp change in roadway alignment (e.g., Wa-108, TC-7 and TC-12).

Lateral Intrusion Deterrence Gap (LIDG)

The gap between a buffer vehicle and the work area to discourage lateral vehicle intrusions into a closed lane upstream of a stationary work area, or the gap between buffer vehicle and work vehicle (and between buffer vehicles) to discourage lateral vehicle intrusions into a lane in which mobile work operations are taking place.

LBA

See Longitudinal Buffer Area.

LCD

Liquid Crystal Display.

LCS

Lane Control Signs.

Leapfrogging

The practice of installing lane closures using two or more installers, whereby one installer installs barrels up to where the previous (second) installer started, then drives beyond (leapfrogs) the second installer, leaving a gap in the closure, to resume installation of the closure downstream. When the second installer reaches the point where the first installer resumed installation, he leapfrogs the first installer, and the process is repeated. This procedure should not be used.

LED

Light Emitting Diode.

Left-turn Lane

A lane reserved for left-turning vehicles and so designated by Pavement Markings and/or Lane Designation signs.

Left-turn Slip-around

An additional lane or width of pavement provided for through traffic to separate this traffic from left-turning traffic at an intersection.

Legal Authority

The authority provided, by legislation and regulations, to a jurisdiction or enforcement body for the actions it takes.

Legend

The complete message on a sign, which may include text, symbols, arrows, markers, shields, crowns, and diagrams.

Legibility

Sign legibility is governed by the distance at which the sign becomes legible and the duration for which it remains legible. Legibility depends on Font, character, word and Line Spacing, Contrast ratio, and clarity of symbols.

Legibility Distance

The distance at which a sign can be read by a given driver under prevailing conditions.

Legibility Distance, Required

The distance at which a sign must be legible, based on the travel speed and the sum of Reading Time, Decision (perception-reaction) Time, and Manoeuvre Time.

Level of Service

A term which, broadly interpreted, denotes any one of an infinite number of differing combinations of operating conditions that may occur on a given lane or roadway when it is accommodating various traffic volumes. Level of service is a qualitative measure of the effect of a number of factors, which include speed and travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort and convenience, and operating costs. In practice, selected specific levels are defined in terms of particular limiting values of certain of these factors, as in levels A (free-flow) to F (stop and go) in the Highway Capacity Manual (HCM).

LIDG

See Lateral Intrusion Deterrence Gap.

Light Emitting Diode (LED)

Light emitting diode or LED VMSs are currently the preferred type of light emitting sign technology. The pixels for LED signs are comprised of multiple light emitting diodes, which are solid state electronic devices that glow when a voltage is applied. Adjusting the voltage that is transmitted to each pixel controls the intensity of the light emitted from each LED pixel.

Light Rail (LRT)

An electric railway with a “light volume” traffic capacity compared to “heavy rail”. Light rail may use shared or exclusive right-of-way, high or low platform loading, and multi-car trains or single cars. Also known as Streetcar, Trolley, and Tramway.

Line Spacing

See Interline Spacing.

Live Lane

A roadway lane open to traffic. It includes a traffic lane where vehicles, though they may be present, are being diverted away from a stationary or mobile work activity by work vehicles or Buffer Vehicles equipped with Traffic Control Devices, such as a TC-12.

Loadswitch (Traffic Signal)

A device used to switch 120 volt power to the traffic control signal heads. Loadswitches are normally semiconductor devices which are switched by a low voltage signal from the controller unit.

Local Road

A street or road primarily for access to residence, business or other abutting property.

Local Traffic

Traffic which originates from or is destined to a location within a Neighbourhood.

Logo Services Signing

Logo-based signing located on freeways, on approaches to interchanges, for specific food, fuel and accommodation (lodging) services and establishments.

Long Duration (LD) Work

Stationary maintenance, construction, or utility activities which require a separate work space for longer than 24 hours. See also Short Duration (SD) and Very Short Duration (VSD) work.

Longitudinal Buffer Area (LBA)

The fourth component of a stationary work zone, downstream from the transition area and upstream of the work area, which provides protection for traffic and workers, by providing errant vehicles an opportunity to brake to a halt between the end of the transition area and the work space.

LOS

Level of Service.

Low Volume/High Volume Road

For Temporary Conditions, low volume roads are defined as those with a combined traffic volume in both directions of less than 3,000 vehicles per day. Conversely, high volume roads are those with a combined traffic volume of 3000 vehicles per day or more.

LTL

Left Turn Lane.

Lugs

Metal or hard rubber studs or ridges on tires used to improve traction on dirt surfaces.

Luminance

Reflective light; the luminous flux in a light ray, emanating from a surface or falling on a surface, in a given direction, per unit of projected area of the surface as viewed from that direction, per unit of solid angle.

M

m

Abbreviation for metre.

Maintenance

The upkeep of highways, traffic control devices, other transportation facilities, property and/or equipment.

Major Road

The principal route of two roads at an intersection. Also called Main Road.

Malfeasance

The commission of an unlawful act or an act one has no right to commit; used most often to describe official misconduct.

Manoeuvre Time

The time to complete any required manoeuvre before reaching a sign, other traffic control device, or decision point.

Marker

A particular type of sign symbol used for regional, county, or municipal route numbers, either by itself or as part of a Directional Guide Sign. See also Construction Marker, Detour Marker, Object Marker.

Marking (Pavement)

See Pavement Marking.

Marking Symbol

A Pavement Marking graphical depiction used in a specific location to complement standard pavement markings, to guide, warn, regulate, or inform drivers where standard pavement markings alone would be less clear.

Master Controller (Traffic Signal)

An automatic device for supervising a system of controllers, maintaining definite time interrelationships, selecting among alternate available modes of operation or accomplishing other supervisory functions. A Master Controller which controls one or more Slave Controllers.

Master Sign Library (MSL)

The electronic library of all signs in the OTM, including scaled sign pattern templates and cut images for the fabrication of standard signs. The MSL is stored on a CD-ROM as part of Book 2, and is made up of:

- (1) Sign Blank list and patterns;
- (2) Sign Parts Library; and
- (3) Sign Patterns.

Material Safety Data Sheet (MSDS)

A sheet for each specific product identified under the Workplace Hazardous Materials Information System (WHMIS) which describes the composition of the product. It also gives details on the safe handling and storage of the product as well as personal protective safety equipment that is required when using the product, and other protective devices such as fume hoods and breathing apparatus. Handling, storage and use of each specific product must conform to these regulations.

Matrix

A variable message sign display, made up of a series of dots (pixels) in a matrix format. Parameters or symbols are formed by illuminating different patterns of pixels.

Maximum Green (Traffic Signal)

The maximum time the right-of-way can be extended by actuations on a phase provided an actuation has been registered on a conflicting phase.

Maximum Speed

The maximum speed drivers are permitted to travel. The maximum speed is imposed by the Highway Traffic Act, or municipal by-laws. See also Normal Posted Regulatory Speed.

May

Indicates a permissive condition. No requirement for design or application is intended. However, mandatory requirements apply to some specific options if and when they are selected.

Measure

A physical device, traffic control device, regulation or other action which affects the movement of motor vehicles, bicycles, and/or pedestrians.

Measure of Effectiveness (MOE)

Parameters describing the quality of service provided by a traffic facility to drivers, passengers or pedestrians. Examples include speed, density, delay, and similar measures.

Median

That portion of a Divided Highway separating the travelled ways for traffic in opposite directions.

Median Barrier

A raised island, wall or structure located on the Centreline of a roadway through an intersection or along a road that prevents left turns or straight through movements from being made to and from a side street or private/commercial driveway.

Median Bikeway

A bikeway within the median of a highway.

Median Island

A zone or physical island constructed in the centre of a roadway to separate opposing directions of traffic.

Median Strip

An expanse of hard surface material separating opposing lanes on a highway. The hard surface is flush or nearly flush with the adjacent lanes.

Merging

The convergence of separate streams of traffic into a single stream.

Metre (m)

A metric unit and the base SI unit of linear measure, equal to about 39.4 inches.

Microwave

Electromagnetic energy occupying the frequency band ranging from approximately 223 Mhz to 100 Ghz.

Microwave Radar Detection

A means of vehicle detection using microwave radar beams. Traffic parameters are calculated by measuring the return signal frequency from vehicles.

Midday Period

The period of time between the morning peak period (A.M. Peak Period) and the afternoon peak period (P.M. Peak Period).

Military Specification (Traffic Signal)

Current issues and/or revision of standards or specifications issued by the U.S. Department of Defense.

Milling

The grinding off and removal of old asphalt for purposes of recycling and resurfacing. Milling may produce undesirable longitudinal grooves which affect behaviour of some vehicles.

Minimum Green (Traffic Signal)

The shortest time for which the right-of-way is given to a non-actuated phase; or to an actuated phase provided that an actuation has been registered for that phase.

Minimum Typical Guideline

Where so described, the guideline depicted in the typical layouts for Temporary Conditions represents the minimum requirements that must be achieved.

Ministry

Unless otherwise specified, the Ministry of Transportation Ontario (MTO). Where so specified, the Ministry means the Ontario Ministry of Labour (MOL).

Minor Road

The lesser of two roads at an intersection.

Misfeasance

The doing of a lawful act in an unlawful or improper way.

MIST

Management Information System for Traffic.

Mobile Operations

Work that is done while moving continuously, usually at low speeds, or intermittently, with periodic, brief stops related to the mobile operation, which do not exceed a few minutes in duration (e.g., centreline or edgeline zone painting operations). The advance warning area (where required) moves with the activity area.

Modal Share

The percentage of people who use one particular mode of transportation.

Modal Split

- (1) The proportion of person trips that uses each of the various specified modes of transportation;
- (2) The analytical process of separating total person trips into the modes of travel used;
- (3) A term that describes how many people use alternate forms of transportation.

It is frequently used to describe the percentage of people who use private automobiles, as opposed to the percentage who use public transportation.

Mode

Any of the following transportation methods: rail (intercity rail, commuter and urban transit); highway (automobiles, carpools, vanpools, bus transit, bicycles, pedestrians, and trucks); air; water.

MODEM

Modulate/Demodulate communications interface Unit.

Modem

A device used at both ends of a communications channel to transfer data.

Modulator

A device that is used to modify one wave (the carrier) from the characteristic of another wave (the signal).

Module (Dynamic Message Sign)

A unit in a character matrix sign, which is comprised of several pixels and can display an individual character.

Module (Traffic Signal)

A removable assembly with a fixed pattern of pixels and identical to all other modules.

MOE

Measures of Effectiveness.

MoE

Ministry of Environment.

MOL

The Ontario Ministry of Labour.

MONY-ITBCS

Michigan-Ontario-New York Intelligent Transportation Border Crossing System.

MOS

Metal Oxide Semiconductor.

Motherboard (Traffic Signal)

A printed circuit connector interface board with no active or passive components.

Motorist

See Driver.

Motor Vehicle

Includes an automobile, motorcycle, motor-assisted bicycle (moped), and any other vehicle propelled or driven other than with muscular power, but does not include a streetcar, or other vehicles designed to operate on rails, or a motorized snow vehicle, traction engine, farm tractor and implements of husbandry or road-building machine.

Motor Vehicle Collision

A collision involving one or more motor vehicles.

MOV

Metal Oxide Varistor.

Movement (Traffic Signal)

A movement is the direction of traffic flow and may be straight ahead (a “through movement”), a green left arrow (a “left-turn movement”), etc. Several movements may be allowed within a phase (such as with an advanced green arrow and a circular green display). In some cases, a movement is called a Phase since it is normally part of a Phase.

Moving Operation

See Mobile Operations.

Moving Pictures Experts Group (MPEG)

Pronounced “em-peg.” An ISO/ITU standard for compressing video. MPEG is a lossy compression method, which means that some of the original image is lost during the compression stage and it provides a resolution of 352 x 288 at 30 fps with 24-bit colour and CD-quality sound.

MPEG

Motion Picture Experts Group.

MPU

Microprocessor Unit.

MSDS

Material Safety Data Sheet.

MSL

Master Sign Library.

MTBF

Mean Time Between Failures.

MTO

The Ministry of Transportation Ontario.

MTTR

Mean Time To Repair.

Multi-lane Highway

A roadway with two or more travelled lanes carrying traffic in each direction.

Multimedia

A combination of two or more media, i.e., voice, data, still image, video.

Multi-modal

Refers to the availability of multiple transportation options, especially within a system or corridor. A multi-modal approach to transportation planning focuses on the most efficient way of getting people or goods from place to place, be it by truck, train, bicycle, automobile, airplane, bus, boat, foot or even a computer modem.

Multiplexer

A device that enables more than one signal to be sent simultaneously over one physical channel.

Multi-point

Refers to a communications line (network) that provides a path from one location to many. A cell phone is an example of a multi-point system.

Multi-point Line

In communications, a single line that interconnects three or more devices.

Multi-use Path

Any off-road dedicated facility for non-motorized traffic such as bicycles, pedestrians and in-line skaters.

Must

Indicates a mandatory condition. Where certain requirements in the design or application of the device are described with the “must” stipulation, it is mandatory that these requirements be met when an installation is made.

MUTCD

The Manual of Uniform Traffic Control Devices for Ontario, 1995.

MUTCDC

The Manual of Uniform Traffic Control Devices for Canada, 1997, and its subsequent updates.

MUTCD-US

The U.S. Manual of Uniform Traffic Control Devices, 2003 Edition.

N

Narrow Lanes

Lanes in a work zone which are narrower than usual, as required by construction, maintenance, or utility operations. This may be done through partial lane shifting (See Partial Lane Shift) in Short Duration operations, or through barrels and/or temporary concrete barriers (or equivalent) in Long Duration operations, in which case existing pavement markings should be removed and replaced by temporary pavement markings.

National Television System Committee (NTSC)

A colour TV standard that was developed in the U.S. Administered by the FCC, NTSC broadcasts 30 interlaced frames per second (60 half frames per second, or 60 “fields” per second in TV jargon) at 525 lines of resolution. The signal is a composite of red, green and blue and includes an audio FM frequency and an MTS signal for stereo.

National Transportation Communications for ITS Protocols (NTCIP)

A family of communication protocols developed, or being developed, for the transportation community.

NCHRP

National Cooperative Highway Research Program (U.S.).

Negligence

The failure to exercise the standard of care that would be expected of a normally reasonable and prudent person in a particular set of circumstances.

Neighbourhood

A cohesive urban area defined by geographic features, the road network or socio-economic characteristics. With respect to traffic calming, neighbourhood boundaries are often defined by the arterial roadway network, which typically presents a significant barrier to travel and interaction.

Neighbourhood Transportation Management

A phrase often used to describe an approach which encompasses Traffic Calming Measures as well as design, operations, legal and other techniques to address transportation issues within a Neighbourhood, such as speeding and excessive volumes or conflicts.

NEMA

National Electrical Manufacturers Association.

Neural Network Approach

- (1) A non-linear approach used for designing traffic applications.
- (2) A non-linear mapping between a set of input and output. For example, the approach can associate patterns in traffic data with various traffic conditions. It offers an advantage over conventional incident detection algorithms in that no mathematical model of traffic operation or incident detection process is required, thus eliminating the imperfection in model formulation.

Nighttime

The hours of darkness, taken as the time period from one-half hour before sunset to one-half hour after sunrise.

Nighttime Short Duration Provisions

Provisions required for nighttime short duration work, even though one or more may be shown as optional for the daytime short duration operations illustrated in the typical layouts of Book 7. For nighttime work of any duration, traffic garments meeting OHSA requirements for nighttime work must be used.

Non-conflicting Phases (Traffic Signal)

Two or more traffic phases which will not be in conflict with each other if operated concurrently.

Nonfeasance

The failure to perform some act that one ought or is required to perform.

Non-recurring Congestion

Congestion caused by a random event (e.g., incident, maintenance activity, special event, etc.), which has the effect of reducing capacity on a specific section of freeway.

Non-standard Sign

A sign which is not included in the MSL, and which needs to be designed by the user. Some examples of these are special warning signs. Note however, that non-standard signs still need to follow basic rules of design.

No Parking

See Parking and Parking Restriction.

Normal Posted Regulatory Speed

The regulatory maximum speed posted on a highway under normal conditions, that is, when no construction zone or work activity is present.

No Standing

The prohibition of the halting of a vehicle whether occupied or not, except for the purpose of and while actually engaged in the receiving or discharging of passengers.

No Stopping

The prohibition of the halting of a vehicle, even temporarily, whether occupied or not, except where necessary to avoid conflict with other vehicles, or in compliance with the directions of a police officer or Traffic Control Signal.

NO_x

Oxides of Nitrogen.

NTCIP

National Transportation Communications for ITS Protocol.

NTSC

National Television System Committee.

Numbered Highway

A highway to which a number has been allotted for the purpose of identification throughout its entire length.

O

Object Marker

A traffic sign mounted temporarily or permanently on an obstruction, within or adjacent to the roadway, to make the obstruction as highly visible as possible.

Observation Angle

The vertical angle formed by light travelling from a vehicle's headlights and reflected off the sign back to the driver's eye.

OBU

Onboard Unit.

Occupancy

Percentage of time a given section of roadway is occupied by vehicles.

Occupational Health and Safety Act (OHSA)

The Ontario Occupational Health and Safety Act and Regulations for construction projects, of the Ontario Ministry of Labour (MOL).

Offence

A violation of a traffic law, regulation or requirement that has led or may lead to a police charge against the driver (or in some cases, the owner of a vehicle).

Official Sign

Any sign approved by the Ministry of Transportation Ontario.

Off-peak Period

The period of time, usually outside of the morning and afternoon Peak Periods. If there is a Midday Peak with traffic volumes equalling or approaching those in the A.M. or P.M. Peak Periods, then this Midday Peak should be excluded from the off-peak period.

Off Ramp

That part of an interchange connecting a Deceleration Lane to a crossroad.

Off-road Bikeway

A bicycle path which is not immediately adjacent to a roadway.

Offset (Traffic Signal)

The number of seconds or percent of cycle length that a defined time-reference point (the “yield point”, normally the start of main street green) at the traffic control signal occurs after the time-reference point of a master controller or of an adjacent traffic control signal.

OHBDC

Ontario Highway Bridge Design Code.

OHSA

Occupational Health and Safety Act.

Older Driver

A driver aged 55 years or older.

On Ramp

That part of an interchange connecting a crossroad to an Acceleration Lane leading onto a Major Road.

On-street Bikeway

Any bikeway within the roadway.

On-street Parking

The use of vehicle parking on the roadway surface or on the adjacent shoulder.

Ontario Provincial Standard Specifications (OPSS)

A compilation of standard specifications for materials and products used in road construction and maintenance, compiled by the Ministry of Transportation Ontario together with other stakeholders.

Ontario Traffic Manual (OTM)

A comprehensive user manual for traffic practitioners, addressing the needs of all Ontario road authorities, superseding the Manual of Uniform Traffic Control Devices (MUTCD) and the MTO King’s Highway Guide Signing Policy Manual (KHGSPM). The OTM has been in development since 1997, and is issued as individually bound books.

OPAC

Optimization Policies for Adaptive Control.

Operating Cost

Non-capital costs associated with operating and maintaining a transit system, including labour, fuel, administrative and maintenance.

Operating Speed

The speed at which the majority of vehicles are travelling, typically the 85th Percentile, regardless of the speed limit.

Operating System

The software controlling a computer.

Operator (ATMS)

Person at the Traffic Operation Centre assigned to manage traffic flow on the highway network using system components and functions.

Opposing Traffic (Traffic Signal)

Traffic progressing in the opposite direction to the traffic being considered on a roadway.

OPSS

Ontario Provincial Standard Specifications.

Optical Sensor

A sensor that detects the intensity or brightness of light, or the intensity of red, green and blue for colour systems.

Optical Time Domain Reflectometer (OTDR)

A test instrument that analyzes the light loss in an optical fibre. Used to find faults, splices and bends in the line, it works by sending out a light pulse and measuring its reflection.

OSI

Open Systems Interconnect.

OTDR

Optical Time Domain Reflectometer.

OTM

Ontario Traffic Manual.

Out-of-view Time

The period of time, when approaching a sign, when the sign is very close, is seen on an angle, and becomes difficult to read. It is assumed in the OTM that the sign is not read for the last 1/2 second, the out-of-view time.

Overall Travel Time

The time of travel, including stops and delays except those off the travelled way.

Overhead Sign

A Traffic Sign mounted above the Roadway, usually with 4.5 m to 5.3 m of vertical clearance and preferably located over the lane or lanes to which the sign applies.

Overlap (Traffic Signal)

A right-of-way indication that is derived from the service of two or more traffic phases.

Overpass

A Grade Separation where the travel way in question passes over the other travel way.

Oversize Sign

A Traffic Sign with greater proportional dimensions than the minimum dimensions specified in this Manual. Such signs are generally required on higher speed highways, or on other highways in special cases.

Oxides of Nitrogen (NO_x)

A range of nitrogen-based pollutants produced during fossil fuel combustion, that contribute to ground-level ozone.

P**Pace Range**

The range of speeds for a defined interval (an interval of, for example, 15 or 20 km/h) that contains the largest number of vehicles in a speed study sample.

Paint

See Traffic Paint.

Para-transit

A transit system for those with difficulty accessing a conventional transit system. Para-transit vehicles are often lift- or ramp-equipped to permit access by persons in wheelchairs.

Park & Ride

An access mode to transit in which patrons drive private automobiles or ride bicycles to a transit station, stop, or carpool/vanpool waiting area and park the vehicle in the area provided for that purpose. They then ride the transit system or take a car or vanpool to their destination. (Also Park 'n' Ride.)

Park & Ride Lot

Designated parking area for automobile drivers who then board transit vehicles from these locations.

Parking

The stationary storage or leaving of a vehicle unoccupied or unattended.

Parking Control Sign

A sign which identifies the times of day and days of week parking, stopping or standing restrictions are in place on the section of road adjacent to the sign.

Parking Restriction

A limitation which prohibits vehicles from being parked in specific locations, at specific times, or for specific types of vehicle. Most often used to control on-street parking.

Parking (and Stopping) Signs

A Traffic Sign of the regulatory type which informs drivers of the parking and stopping regulations in effect on facilities where such signs are erected.

Parking Space Marking

Markings intended to inform drivers where they are permitted to park.

Parkway

The classic definition of a parkway is a Freeway on which trucks are prohibited. However, the term has been applied to such a variety of road types, that a commonly agreed definition of parkway is hardly possible. These other types of roads include:

- (1) a Freeway on which trucks are permitted;

- (2) an Expressway with At-grade Intersections, with or without truck prohibitions;
- (3) a Two-lane Highway with partial control of access, with truck prohibitions.

Partial Lane Shift

The temporary, partial shifting of travel lanes by demarcating them through use of cones or barrels, so that the lanes are squeezed while still maintaining usable lane widths of at least 3 m in each lane. See also Narrow Lanes and Roadside Diversions.

Passage Detection (Traffic Signal)

The ability of a vehicle Detector to detect the passage of a vehicle moving through the detection zone and to ignore the presence of a vehicle stopped within the detection zone.

Passage Time (Traffic Signal)

- (1) See Unit Extension Time.
- (2) The time allowed for a vehicle to travel at a selected speed from the detector to the Stop Bar.

Passenger

Any occupant of a Motor Vehicle who is not a Driver.

Passenger Car Equivalence

The representation of larger vehicles, such as trucks and buses, as equal to a quantity of passenger cars for use in Level of Service and Capacity analyses. The magnitude of the equivalency is dependent upon vehicle size and weight, vehicle operating characteristics, vehicle speeds, and roadway characteristics such as gradient.

Passing Sight Distance

The length of highway required for a vehicle to execute a normal passing manoeuvre as related to design conditions and design speed.

Pattern (Traffic Signal)

A unique set of coordination parameters including Cycle Length, split values, Offsets and sequence of Intervals.

Pavement

That part of the Roadway having a constructed hard surface for the facilitation of vehicular movement.

Pavement Marking

A coloured marking applied to the pavement to provide drivers with roadway alignment information.

PCB

Printed Circuit Board.

Peak Hour

The one hour each day when traffic volumes are at their highest on a given road.

Peak Period

The one or more periods each day, usually consisting of two or three hours, when traffic volumes are at their highest on a given road, usually corresponding to a morning “to work” period and an afternoon “from work” period.

Pedestal (Traffic Signal)

Ground-mounted enclosure for communication or a support for a Controller Cabinet.

Pedestrian

Any person who is not in or upon a vehicle, motorized or otherwise propelled, or riding upon an animal.

Pedestrian Clearance Interval (Traffic Signal)

The time in seconds during which the orange hand is flashed, starting after a walking pedestrian indication and ending before conflicting vehicles receive a green indication (may include the vehicle amber time).

Pedestrian Crossover (PXO)

Any portion of a Roadway, designated by municipal by-law, at an intersection or elsewhere, distinctly indicated for pedestrian crossing by signs on the highway and lines or other markings on the surface of the roadway as prescribed by the regulation and the HTA, with associated signs Ra-4, Ra-4t, Ra-10 and Ra-11.

Pedestrian Crosswalk

Any portion of the Roadway, at an Intersection or elsewhere, distinctly indicated for pedestrian crossing by appropriate pavement markings and/or signs, or by the projections of the lateral lines of the sidewalk on opposite sides of the road.

Pedestrian Facility

A facility where pedestrians are controlled and protected from other road users.

Pedestrian Mall

A Pedestrian Facility from which motor vehicles are excluded, except at crossroads.

Pedestrian Sign

See School and Pedestrian Signs.

Pedestrian Signal (Traffic Signal)

A Traffic Signal head or indication showing either a white walking pedestrian on a black background (when pedestrians are permitted to cross) or an orange hand on a black background (when pedestrians are not permitted to cross, if continuous, or are not permitted to start crossing, if flashing).

Pedestrian Walkway

A continuous way designated for pedestrians and separated from the through lanes for motor vehicles by space or a barrier.

People Mover

An automated transportation system (e.g., continuous belt system, moving sidewalk or automated guideway) that provides short haul collection distribution service, usually in a major activity centre.

Perception-reaction Time

See Decision Time.

Permissive

Refers to areas where a driver is permitted to travel.

Permissive Symbol

An annular (circular) green band used on a sign to signify that whatever is depicted within the symbol is permitted.

Personal Digital Assistant

Computer products with radio frequency communication that allow users to obtain various types of travel information.

PGIS

Parking Guidance and Information Systems.

Phase (Traffic Signal)

A part of a cycle where one or more traffic movements receive a green indication at the same time. Phase time is the time required from the start to the finish of the phase including Amber and All-red Interval times.

Phase Sequence (Traffic Signal)

A predetermined order in which the phases of a cycle occur.

Phase Skip (Traffic Signal)

A function used to provide omission of a phase in the absence of actuation on that phase.

PHF

Peak Hour Factor.

PHV

Peak Hourly Volume.

Physically Separated Pedestrian Facility

A pedestrian facility which is separated from a roadway by space or barrier and from which motor vehicles are excluded.

PIT

Pre-Installation Testing.

Pixel

An individual dot of light that is the basic unit from which the images on a variable message sign are made.

Plan (Traffic Calming)

A formulated and sufficiently detailed description of how an objective or number of objectives are to be accomplished. A Traffic Calming plan typically describes measures to be used, where they are to be located, in what order and at what times they will be implemented, and how the costs of the measures will be funded.

Plan (Traffic Signal)

A unique set of timing values, intervals used and sequence of intervals that is stored in or sent to a Controller Unit. Different plans may be used for time of day, time of week, special events and so on or may be traffic-responsive as determined by detector actuation.

P.M. Peak Hour

The one hour each afternoon when traffic volumes are at their highest.

P.M. Peak Period

The period in the afternoon (usually two to three hours) when traffic volumes are at their highest.

Point-to-point

Refers to a communications line that provides a path from one location to another (point A to point B).

Poll (Traffic Signal)

An enquiry message sent from a Master Controller to a Slave Controller on a regularly timed basis to solicit the status of the slave.

POP

Proof of Performance (testing).

Portable Lane Control Signal

See Portable Traffic Control Signal.

Portable Traffic Control Signal

A portable traffic control signal may be used as an alternative to Traffic Control Persons and such signals are used only to stop vehicles intermittently when traffic must use a single lane in situations where the roadway is normally a two-way operation. Portable

traffic control signals must comply in all respects with Regulation 606 of the Highway Traffic Act. (R.S.O. 1990), where they are referred to as Portable Lane Control Signals. See Book 7, and Book 12.

Portable Variable Message Signs (PVMS)

Portable signs typically have the same functionality and basic design as fixed location Variable Message Signs and can be comprised of discrete characters or full matrix arrangements.

Positive Guidance

Provision to road users of the information they need to avoid hazards, when and where they need it, in a form they can best use it. See Book 1C (Positive Guidance Toolkit).

Posted Advisory Speed

The maximum advisory speed as indicated by appropriate Warning or Temporary Conditions Signs.

Posted Speed Zone

A section of highway upon which the maximum speed is indicated by appropriate Regulatory Signs.

Post-mounted Delineator

A delineation device that consists of Retroreflective Material mounted on a 1.2 m post to provide long-range information on roadway alignment.

Power Failure (Traffic Signal)

A power failure is said to have occurred when the incoming line voltage falls below 93 (+2) VAC for 50 milliseconds or longer. The determination of the 50 millisecond interval shall be completed within 67 milliseconds of the time the voltage falls below 93 (+2) VAC.

Power Restoration (Traffic Signal)

Power is said to be restored when the incoming line voltage equals or exceeds 95 VAC for 50 milliseconds or longer. The determination of the 50 millisecond interval shall be completed within 67 milliseconds of the time the voltage falls below 93 (+2) VAC.

Pre-emption (Traffic Signal)

The transfer of the normal control of signals to a special signal control mode for the purpose of servicing railway crossings, emergency vehicle passage, transit vehicle passage and other special tasks, the control of which requires terminating normal traffic control to provide priority needs of the special task.

Pre-emptor (Traffic Signal)

A device or program/routine which provides pre-emption.

Pre-engineering and Engineering Activities

Activities carried out in preparation for, during, or after completion of a construction project (e.g., surveying, geotechnical sampling or testing, pre-construction inspection). For purposes of Book 7 traffic control, pre-engineering activities are considered part of construction work activities.

Pre-marking

A preliminary marking applied to the pavement to guide the operator of a Striper in applying the final Pavement Markings.

Prescribed Sign

A sign prescribed by the Highway Traffic Act (HTA), Section 182 (R.S.O. 1990) and its regulations, providing for the type of sign and its location on the roadway. The criteria and specifications for application, dimensions, location and orientation are prescribed and illustrated under Regulations 615, 608, 581, 599 (R.R.O. 1990). Signs erected in accordance with the Regulations, and pursuant to the Highway Traffic Act, are enforceable under various provisions of the Act. Enforcement is permitted under the particular section under the authority of which a prescribed sign may be erected to indicate a traffic regulation, or HTA Section 182 (R.S.O. 1990), which requires obedience to prescribed signs.

Presence Detection (Traffic Signal)

The ability of a vehicle Detector to sense that a vehicle, whether moving or stopped, has appeared in its field.

Pretimed (Traffic Signal)

A Controller Unit mode of operation of Traffic Control Signals with predetermined fixed cycle lengths, fixed interval durations and fixed interval sequences.

Private Roadway

Any roadway owned and maintained by an individual, group of individuals, or a corporation, with restricted public use.

Probe Vehicles

Vehicles which act as moving sensors (or probes) to provide information about traffic conditions.

Progression (Traffic Signal)

- (1) The time relationship between adjacent signals on a roadway which permits a platoon of vehicles to proceed through the signals at a planned rate of speed;
- (2) The act of various Controller Units providing specific green indications in accordance with a time schedule to permit continuous operation of groups (platoons) of vehicles along the road at a planned speed.

PROM

Programmable Read-Only Memory.

Protocol

A set of rules governing the exchange or transmission of data electronically between devices, over a communication channel, such as a twisted pair wire, fibre optic, etc.

Provincial Highway

Any public highway under the jurisdiction of the Ministry of Transportation of Ontario (MTO). See King's Highway.

Public Roadway

Any roadway under the jurisdiction of and maintained by a public authority and open to public travel.

Public Transportation

Transportation by bus, rail, or other conveyance, either publicly or privately owned, which provides to the public general or special service on a regular and continuing basis. Also known as "mass transportation," "mass transit" and "transit".

Public Way

A sidewalk, street, highway, square, or other open space to which the public has access, as of right or by invitation, either express or implied.

PVMS

Portable Variable Message Sign.

PXO

Pedestrian Crossover.

Q**QEW**

Queen Elizabeth Way.

Queue

A line or sequence of vehicles, etc., awaiting their turn to be attended or to proceed, in which the rate of flow from the front of the queue determines the average speed within the queue. Slow vehicles joining the rear of the queue are usually considered a part of the queue.

QWS

Queue Warning System.

R**RADAR**

Radio Detection and Ranging.

Radio Detection and Ranging (RADAR)

A method of determining the location and speed of an object. Radar works by transmitting signals and measuring the time it takes for them to bounce off the targeted object and return.

Radio Frequency (RF)

The range of electromagnetic frequencies above the audio range and below visible light. All broadcast transmission, from AM radio to satellites, falls into this range, which is between 30 KHz and 300 Ghz.

Radio Propagation Analysis

A field test performed to identify the type of received signals and calculate the propagation over digitized profiles.

Railroad

All forms of non-highway ground transportation that run on rails or electro-magnetic guideways, including:

- (1) Commuter or short haul rail passenger service in a metropolitan or suburban area; and
- (2) high speed ground transportation systems that connect metropolitan areas, without regard to whether they use new technologies not associated with traditional railroads.

Railroad Crossing

A location where one or more railroad tracks cross a public highway, road, street, or a private roadway, and includes sidewalks and pathways at or associated with the crossing.

Rail to Trail

A general term referring to the conversion of an abandoned rail right-of-way to a recreational use, including bikeways.

Rail with Trail

A term referring to a path within an active rail right-of-way.

Raised Crosswalk

A marked Pedestrian Crosswalk at an intersection or mid-block, constructed to the same elevation as adjacent curbs and sidewalks.

Raised Intersection

An intersection where the elevation of the whole centre of an intersection, including the pedestrian crossing, has been raised to the same height as the adjacent curbs and sidewalks.

RAM

Random Access Memory.

Ramp

An interconnecting roadway of a traffic interchange, or any connection between highways at different levels or between parallel highways, on which the vehicles may enter or leave a designated roadway.

Ramp Control

See Ramp Metering System (RMS).

Ramp Metering System (RMS)

A system used on a freeway or expressway entrance ramp in which the rate of entry of vehicles onto the freeway is metered by a traffic signal; the signal allows one vehicle to enter on each green indication or green flash. The operation of the metering signals is normally carried out only during rush hours and in a preferred direction (normally toward the Central Business District (CBD) in the morning and outbound from it in the evening).

RDS-TMC

Radio Data System – Traffic Message Channel.

Reading Time

The time required to read a sign.

Receiver

An opto-electronic device that converts optical signals into electrical signals.

Recurring Congestion

Typically predictable and occurs at locations where demand exceeds capacity, or at geometric Bottlenecks (e.g., lane drops, high-volume entrance ramps, etc.).

Red Clearance Interval (Traffic Signal)

A clearance interval which may follow an Amber Clearance Interval, intended to allow time at the end of a Phase for vehicles in the intersection to clear prior to release of a Conflicting Phase.

Reflectance

See Reflectivity.

Reflectivity

A measure of the degree to which a surface reflects incident light. A related term, reflectance, is the amount of light reflected back from a sign, relative to the amount of light shining on the sign. See Retroreflectivity, Coefficient of (R).

Reflectorization

A method of incorporating light-reflective material on the approach face of a Traffic Sign so that the face will reflect light during the hours of darkness while retaining the same colours as by day.

Refuge Island

An island provided in a street for the safety of pedestrians, either as a Median Island on a wide street, where the width may not permit pedestrians to cross the street on a single Pedestrian Signal indication, or as a loading island for transit, such as Streetcars.

Regulation

A prescribed rule, supported by legislation, such as any regulation made under the HTA or OHSA or municipal by-law. Regulations provide the legal basis for enforcement.

Regulatory Sign

A Traffic Sign advising drivers of an action they should or must perform (or not perform) under a given set of circumstances. Disregard of a regulatory sign would usually constitute an offence.

Remote-control Device

An electro-mechanical device that is remotely controlled and performs the function of a Traffic Control Person (TCP), as controlled by a TCP.

Representative Vehicle

See Design Vehicle.

RESCU

The Road Emergency Services Communications Unit.

Reserved Lane

A street or highway lane reserved for use by specific classes of vehicles, either all day, or during specified periods. These classes may include any or all of buses, carpools, taxis or bicycles.

Reserved Lane Controls

All controls, including Traffic Control Devices and physical devices, intended to ensure that a Reserved Lane functions in accordance with its intended purpose.

Residential District

That portion of a municipality, or an area within the influence of a municipality, in which the dominant land use is residential development, but where small business areas may be included.

Response Time

The time between the occurrence of an event and the action taken to respond to the event.

Restrictive

Refers to areas where, or times when, a driver is not permitted to travel, stop, stand, or park.

Rest Site

A roadside area usually having facilities for people and vehicles.

Retrofit

The reconstruction of a roadway or other transportation facility with physical changes to the existing design. An example of a common traffic calming retrofit is to reconstruct the curbs at an intersection to incorporate curb extensions.

Retroreflective Material

A type of material applied in either strips or sheets which reflects illumination back to its source.

Retroreflectivity, Coefficient of (R)

R indicates the proportion of light reflected back to the driver from a retroreflective sign surface, in candelas per lux per square metre. See Book 1B (Sign Design Principles), Section 9.1, or Book 2 (Sign Patterns and Fabrication), Section 2.

Reversible Lane

A lane on which the direction of traffic can be changed to utilize maximum roadway Capacity during Peak Periods.

RF

Radio Frequency.

Ride-matching

The function of matching a ride with other passengers in a common vehicle. The term is usually applied to carpools and vanpools.

Right-in/Right-out Island

A raised triangular island at an intersection approach that prevents left turns and through movements to and from the side street.

Right-of-way (ROW)

- (1) Allocation of right of movement to a road user, in preference over other road users;
- (2) The width of the road allowance from the property line on one side to the property line on the opposite side of the roadway.

Right-of-way Rule

Although these may vary in specific localities, generally a vehicle approaching an uncontrolled intersection must yield to a vehicle approaching on the leg to its right.

Right Turn on Red (RTor)

A right-turning movement permitted on a red signal indication after coming to a stop and ensuring that a right turn can be made safely. Allowed by the HTA, but subject to site-specific local by-laws.

RMS

Ramp Metering System.

Road

See Highway.

Road Authority

The body (Municipal, Provincial or private) that has legal jurisdiction over a roadway.

Road Closure

The closing of a highway to road users. Road closures are covered by Regulation 599 of the HTA.

Road Edge Work

Construction, maintenance, or utility work that encroaches on the edge of the road, with much of the work being done on the shoulder. Road edge work is not fully on the shoulder, nor does it result in a remaining travel lane width of less than 3.0 m (3.5 m on freeways), which would necessitate a lane closure or a Partial Lane Shift. See also Roadside Work.

Roadside Diversion

A deviation of the normal roadway, essentially within the highway right-of-way, where traffic is required to make a short diversion to bypass the work area. The diversion must be signed, using a TC-9, TC-16, and/or other appropriate signs.

Roadside Work

Construction, maintenance, or utility work that is done on the shoulder or on the edge of the road. Roadside Work includes both work on the shoulder and Road Edge Work.

Roadway

The part of the highway that is improved, designed or ordinarily used for vehicular traffic, but does not include the Shoulder, and, where a highway includes two or more separate roadways, the term “roadway” refers to any one roadway separately and not to all of the roadways collectively.

Roadway Alignment Sign

A Warning or Temporary Conditions Sign used to inform drivers of an upcoming change in roadway alignment, including turns and Curves.

Roadway Edge Line

See Edge Line.

Roadway Pavement Marker

A ceramic, metal, glass or plastic marking device placed on or in the roadway to substitute for or act as a supplement to standard pavement markings. Roadway pavement markers are comprised of a variety of configurations including retroreflective and non-retroreflective markers, and markers that employ prismatic retroreflection and those that employ spherical retroreflection.

Rollerblader

See In-line Skater.

Roundabout

A raised circular island located in the centre of an intersection, which requires vehicles to travel through the intersection in a counter-clockwise direction around the island. Roundabouts are typically used on arterial and collector roads, and are distinguished by YIELD signs and raised Median Islands on all approaches, and in some cases, gradual widening of the entry approach to two or more lanes.

Route Detour

A detour where a driver is required to depart completely from the normal route and is directed to use an alternate route. The alternative route must be signed using a combination of the appropriate TC-10 directional signs. See OTM Book 7.

Route Marker

A Guide Sign bearing a route number which is erected along numbered highways.

ROW

Right-of-way.

RPM

Roadway Pavement Marker.

RToR

Right turn on red.

RTS

Request to Send.

Rubbernecking

A term used to describe drivers who slow down and gape inquisitively at an incident or accident, often causing congestion problems.

Rumble Strip

Raised buttons, bars or depressions closely spaced at regular intervals on the roadway or shoulder that create both noise and vibration in a moving vehicle to alert the driver or cyclist of an upcoming situation, or of a potentially hazardous deviation from the normal travel way. Also called Singing Strip.

Rural Area

An area outside of the limits of any incorporated or unincorporated city, town, village, or any other designated residential or commercial area.

Rural Bikeway

Any Bikeway that is not an Urban Bikeway.

RWIS

Road Weather Information Systems.

RXD

Receive data.

S**S**

Spacing of Delineators on curves.

Safe Speed

See Advisory Speed.

Safe Stopping Distance

The distance required to bring a vehicle completely and safely to rest with normal braking and road conditions.

SCATS

Sydney Coordinated Adaptive Traffic System.

SCOOT

Split Cycle Offset Optimization Technique.

School Bus

Any bus which is used for the express purpose of transporting students to and from school. Ontario registered vehicles must be Chrome Yellow in colour.

School (and Pedestrian) Signs

A group of signs, both Regulatory and Warning, used to control vehicles and protect pedestrians wherever students and pedestrians are likely to be present and conflict with vehicles may occur.

School Zone

A section of roadway in the vicinity of a school, with a mandatory 40 km/h maximum speed zone, in effect at designated times every school day. The HTA also makes provision for 60 km/h speed zones on King's Highways.

Self Enforcing

A traffic control measure which does not require police enforcement in order to be effective. This is often used to describe Traffic Calming Measures. A Speed Hump is self enforcing, for example, whereas a posted Speed Limit is not.

Semi-actuated (Traffic Signal)

Operation by a type of traffic-actuated controller in which means are provided for traffic actuation on one or more but not all approaches to the intersection.

Sensor

A device that measures or detects a real world condition, such as motion, heat or light and converts the condition into an analogue or digital representation. See also Optical Sensor.

Separate Roadway

A physically separated, access controlled, HOV priority treatment facility, usually located within the median of an urban freeway. Separated roadways can be either reversible or two-way, single or multi-lane facilities.

Serial Interface

A means of digital data transmission whereby the bits that represent an item of information are transmitted sequentially over a single channel.

Service Life (Pavement Marking)

The time required for a pavement marking to become ineffective due to its having lost its luster, lost its retroreflectivity, or having been worn completely from the pavement.

Shall

Means the same as "must".

Shared Roadway

Any roadway upon which a Reserved Lane is not designated and which may be legally used by a variety of vehicle types regardless of whether such facility is specifically designated. This includes bicycles, buses, taxis, and carpools.

Shield

A particular type of sign symbol used for provincial highway numbers, either by itself or as part of a Directional Guide Sign.

Short-cutting

The use by traffic of Neighbourhood or Local Roads in order to bypass congestion or an obstruction on the Arterial or Collector Road network.

Short Duration (SD) Work

Stationary maintenance, construction, or utility activities which require a separate work space, which are continuously attended by workers, and which are more than 30 minutes and less than one 24-hour period in duration. Under certain conditions (see Section 1.8), work at the same location may be extended to more than one day, and still be considered SD work. See also Long Duration (LD) and Very Short Duration (VSD) Work.

Should

Indicates that an action is advised; recommended but not mandatory. 'Should' is meant to suggest good practice but allows that in some situations, for good reasons, the recommended action cannot or need not be followed.

Shoulder

The portion of a Highway between the outer edge of the roadway and the Curb, or point of intersection of the slope lines at the outer edge of the roadway and the fill, ditch, or median slope, for the accommodation of stopped vehicles, for emergency use, and for lateral support.

Shoulder Bikeway

That portion of the road not normally used for motorized vehicular traffic, but paved for the use of bicycles as a separate Bicycle Lane, Bicycle Route or shared use lane.

Side Road (Traffic Signal)

The roadway approach or approaches at an intersection normally carrying the least volume of vehicular traffic. (Also called Minor Road.)

Sidewalk

That portion of a road, adjacent to the travelled roadway, which has been improved for the use of pedestrians.

Sidewalk Bikeway

Any sidewalk of adequate width designed and/or striped to permit cyclists to share the travel right-of-way with pedestrians.

Sidewalk Extension

The sidewalk is continued across a local street intersection at its normal elevation, with the local street being raised to the level of the sidewalk at this location.

Sight Distance

The distance visible to the driver of a passenger vehicle, measured along the normal travel path of a roadway, to the roadway surface or to a specified height above the roadway, when the view is unobstructed by traffic.

Sign

A Traffic Control Device mounted on a fixed or portable support which conveys a specific message by means of symbols or words, and is officially erected for the purpose of regulating, warning, or guiding traffic.

Signal

The physical form of the data or message carried by the communication channel.

Signal Actuation

See Actuation.

Signal Indication (Traffic Signal)

The illumination of one or more lenses in a signal head which conveys a message to traffic approaching the signal from one direction.

Signalized Control

The use of a traffic signal control device to control traffic on a road section or intersection.

Sign Assembly

Any Traffic Sign mounted and erected alone or in conjunction with any combination of associated Tab Signs.

Sign Blank

The Substrate for a given size of standard sign.

Sign Blank List

The list of standard sign blanks and numbers, included as part of the Master Sign Library.

Sign Blank Number

The number given to a given size of standard sign blank (substrate), for purposes of identification, inventory and fabrication.

Sign Blank Pattern

A scaled, dimensioned pattern suitable for fabrication of standard metal Sign Blanks. Sign blank patterns are included as part of the Master Sign Library.

Sign Fabrication

The process of producing a sign including: substrate fabrication, preparation, extruded panel assembly, application of background sheeting, and application of legend, but excludes sign mounting or installation in the field.

Sign Materials

Those materials used in signs, including substrate, extruded aluminum panels and hardware, background sheeting, and legend (vinyl, retroreflective sheeting, paint, or ink).

Sign Parts Library (SPL)

The library of scaled drawings of sign parts, such as arrows, markers, crowns, shields, and symbols, which may be used in the design of signs. The SPL is included as part of the Master Sign Library.

Sign Pattern

The full-size drawings of individual signs, showing sufficient detail and dimensional accuracy for sign fabrication.

Sign Pattern Template (SPT)

The base record of reference in the OTM Master Sign Library for sign design. The SPT includes: a sign image, sign numbers, sizes, sign blank numbers, colours, minimum reflectivities, fonts, special notes, and scaled templates (cut images) for the design of Standard Signs.

Sign Sheeting

The Retroreflective Material used on the surface of a Sign to provide good daytime and nighttime visibility.

Sign Support

The physical means of holding a sign in its intended position.

Sign Symbol

A pictogram, depiction, arrow, silhouette or figure, and/or Interdictory or Permissive Symbol, used to simplify or represent a word message on a sign.

Sign Truck

A vehicle that has:

- (1) four-way flashers and a mounted flashing arrow board sign, or
- (2) a portable trailer with a mounted flashing arrow board sign.

Singing Strip

See Rumble Strip.

Single Axle Weight

The total weight transmitted to the roadway by all wheels whose centres may be included between two parallel transverse vertical planes 1 m apart, extending across the full width of the vehicle.

Single Mode Fibre

An optical fibre in which a signal travels in one mode (path). It typically has an 8 m to 10 m core within a 125 m cladding.

Slave Controller (Traffic Signal)

A slave controller is an intersection traffic signal controller which is locally programmed to suit the interval times required at the intersection but which is set on the phasing and timing of the system as determined by the Master Controller or Central Computer.

SMTP

Simple Mail Transfer Protocol.

SNMP

Simple Network Management Protocol.

Snowmobile

A motorized vehicle solely designed to operate on snow or ice.

Snow Route

A highway where parking is prohibited for purposes of snow removal as decreed by municipal by-law.

Solid Line

A continuous Pavement Marking. Solid lines are restrictive; drivers are being informed that they are not to cross a solid line.

SONET

Synchronous Optical NETWORK.

SOV

Single Occupant Vehicle.

Special Travellers Information Sign

Signing on the highway directing drivers to particular traveller services other than tourism-related attractions and food, fuel and accommodations, such as police, airports, ferries.

Specular Gloss

A measurable characteristic of Retroreflective sheeting which, when subjected to light at specific angles, can result in glare for drivers.

Speed Bump

A raised pavement area that extends transversely across the travel way. Speed bumps generally have a height of 0.075 m to 0.10 m and a length of 0.3 m to 0.9 m.

Speed Change Lane

A tapered auxiliary traffic lane used by traffic entering or leaving a freeway or expressway for the purpose of acceleration or deceleration respectively.

Speed Controls

Speed zoning, enforcement, and non-enforcement measures to control speeds.

Speed Hump

A raised pavement area that extends transversely across the travel way. Speed humps generally have a height of 0.08 m and a length of 4 m to 7 m.

Speeding

Operating at a speed, possibly below the posted limit, above that at which a reasonable and prudent person would operate under the circumstances, or operating at a speed above the legal limit.

Speed Limit

The maximum vehicular speed allowed within any given posted or unposted Speed Zone.

Speed Variance

A measure of the range of speeds chosen by drivers. It is usually measured as the difference between the 15th and 85th Percentile Speeds.

Speed Zone

A specific section of roadway upon which a maximum speed limit has been imposed. Such zones may be posted or unposted. A construction speed zone must be posted.

SPL

Sign Parts Library.

Split (Traffic Signal)

For an actuated Controller Unit, a division of the Cycle Length allocated to each of the various phases (normally expressed in percent). For a pretimed controller unit, split is the time allocated to an Interval.

Spot Speed Study

A vehicle speed study taken at a stationary location.

Spread Spectrum Radio

A technique for spreading the power of a radio channel over a Bandwidth which is many times the bandwidth required to communicate at the signal rate. The transmitted power density (watts per cycle) is low.

SPT

Sign Pattern Template.

Staged Freeway

A highway designated as a possible future freeway, being constructed by stages with either two or four lanes and with both At-grade Intersections and Interchanges. One consequence of the staged freeway designation is the restriction on Field Advertising.

Stakeholder

An individual or organization with an interest in transportation issues generally, or in a neighbourhood or specific location.

Standard

A rule, principle, pattern or measure, which practice or theory has shown to be appropriate for a given set of conditions, and applicable, as the case may be, to planning, design, traffic control devices, operations or maintenance.

Standard Sign

A sign in the Master Sign Library for which the cut images may simply be used as is or with very minor change (e.g., speed limit sign numeral 90 instead of 50 as shown). Most regulatory, warning, and temporary conditions signs (Books 5, 6, and 7 respectively) are standard signs.

Standard Sign, Customized

See Customized Standard Sign.

Standing

The halting of a vehicle whether occupied or not. See also No Standing.

Statutory Speed Limit

A maximum speed limit automatically in effect on all roads, unless otherwise signed. The statutory speed limit applies even where no maximum speed limits are signed.

Steep Hill

A downgrade of 6% or more.

Stop Bar

A Pavement Marking placed laterally across the approach half of a travelled roadway at the site of a STOP sign, Traffic Signal, or Pedestrian Crosswalk. The line indicates the point beyond which the foremost part of a vehicle must not protrude, should the vehicle be required to stop. Also called Stop Line.

Stop Line

See Stop Bar.

Stopping

The halting of a vehicle, even temporarily, whether occupied or not. See also No Stopping.

Stopping Sight Distance

The distance required by a driver of a vehicle, travelling at a given speed, to bring the vehicle to a stop after an object on the roadway becomes visible. It includes the distance travelled during the Decision Time and the vehicle braking distance.

Street

An urban highway.

Streetcar/Tram

An electrically powered rail car that is operated singly or in short trains in mixed traffic on track in city streets. See also Light Rail (LRT).

Streetscaping

A means of enhancing the pedestrian environment through the use of physical features which provide protection, coherence, security, convenience, community identity, way-finding and orientation, aesthetic quality and interest along the main street.

Striper

A self-contained marking system mounted on a truck chassis and used to apply Pavement Markings on the road.

Substrate

The material and surface to which the sign sheeting is applied.

Suburban Area

An area, primarily residential, generally located between an urban centre of a community and the surrounding rural area.

Superelevation Rate

The rate of rise in cross section of the finished surface of a roadway on a curve, measured from the lowest or inside edge to the highest or outside edge.

Surface

The top of the pavement material, Substrate, or Sign Sheeting.

Symbol

See Sign Symbol.

Symbol Marking

A Pavement Marking used in a specific location to guide, warn, regulate, or inform road users where standard pavement markings are not sufficient.

System (Traffic Signal)

A traffic signal system is composed of a number of traffic signal controllers operating from electronic instructions given by a Master Controller at one of the intersections or given by a Central Computer at a traffic control/operations centre. A system may be installed on a single roadway with one master controller and one or more Slave Controllers or on a grid of roadways using either a master controller or a central computer. A system may use interconnection methods or telephone or cable television networks or any combination thereof for the transmission of data commands to the local slave controllers.

T**Tab Sign**

A sign smaller than the primary sign with which it is associated, and mounted below it. There are two types of tab signs:

- (1) Supplementary Tab Sign – contains additional, related information;
- (2) Educational Tab Sign – conveys the meaning of symbols during their introductory period.

TAC

Transportation Association of Canada.

Tangent Section

- (1) A straight section of roadway between curves;
- (2) In Temporary Conditions, the distance between the end of one taper and the beginning of the next taper, where more than one lane is being closed.

Taper

The gradual narrowing of a lane which is intended to safely guide drivers into the adjacent lane. The taper length is the length of the section of roadway required to achieve full lane closure (e.g., construction zone) or full lane transition.

Taxi

A “for-hire” vehicle for the transport of passengers between points not along a fixed route or schedule.

T-Bar

A metal bar used on the back side of an extruded aluminum sign, at right angles to the length of the sign panels, for purposes of connection, bracing, and structural rigidity.

TC

Temporary Conditions.

TCP

Transmission Control Protocol.

TDM

Travel Demand Management.

Temporary Bridge

A modular steel truss bridge often used on construction sites due to its ease and speed of installation and removal, often having a single, narrow lane.

Temporary Conditions

Roadway and traffic control conditions related to non-permanent construction, maintenance and utility work on any highway open to the public.

Temporary Conditions Sign

A Regulatory, Warning, or Guide Sign, intended to be used for Temporary Conditions.

Temporary Pavement Marking

A Pavement Marking intended to be used for Temporary Conditions.

Temporary Sign

A Regulatory, Warning, or Guide Sign, intended to be used for Temporary Conditions.

Temporary Traffic Control Signal

A temporary traffic control signal installed to control traffic at a crossing, such as a temporary roadway, a truck access route, pedestrian crossing, etc., and must comply with Section 144(31) of the Highway Traffic Act. The design specifications for temporary signals, which require approval from the appropriate road authority, are those specifications which apply to permanent traffic control signals at signalized intersections.

Termination Area

The sixth and last component of a work zone, downstream of the work area, used for traffic to make the transition back to the normal path of the road. The termination area extends from the downstream end of the work area to the point where traffic is able to resume normal driving.

Text

The part of a sign legend consisting of words.

Textured Crosswalk

The use of textured material (coloured paving stones or paved concrete) that contrasts with the adjacent roadway, thereby visually demarcating the pedestrian crosswalk area.

Thermoplastic

A class of pavement marking material whose main component is a plastic material that becomes pliable or liquid at high temperatures.

Third-party Sign

Commercial advertising on street furniture (such as bus shelters) or elsewhere on the highway right-of-way for commercial products or services available at a location other than where the sign is located.

Through Band (Traffic Signal)

The time period between the passing of the first and last possible vehicle in a group of vehicles moving in accordance with the designed speed of a signal progression.

Through Roadway

- (1) The portion of the roadway used by through traffic as opposed to the parts used by traffic which is stopping or turning; or
- (2) A road at which vehicular traffic from intersecting roads is required to stop before crossing or entering.

Through Traffic

- (1) Traffic using a through roadway; or
- (2) Traffic proceeding through an area and not having an origin and destination therein.

Time Base Control (Traffic Signal)

A means for automatic selection of modes of operation of traffic control signals in a manner prescribed by a predetermined time schedule.

Time-based Coordination (Traffic Signal)

A means of providing traffic signal progression along a route based on pre-set timed intervals between sequential traffic signals, rather than on communications from a master controller or control computer.

Time of Day Control

The practice of using a different traffic signal system timing plan for each defined time period in the day.

Time of Operation

The time period for which a traffic system is in operation, or during which a prohibition or restriction is in effect.

Time-separated Pedestrian Facility

A pedestrian facility where pedestrians are controlled and protected from other users by “time-sharing” the facility, such as by traffic signals or school-crossing guards.

Time Waiting Gap Reduction

See Gap Reduction (Traffic Signal).

Timing

When referring to traffic signals, timing describes the amount of time allotted to each Phase within each signal cycle.

TMA

Truck-mounted Attenuator.

TMC

Traffic Management Centre.

TOC

Traffic Operations Centre.

TOD

Time of Day.

TODS

Tourism Oriented Destination Signing.

Toll Highway

A highway, often built to freeway configuration, where a fee (toll) is charged for use of the highway.

Tort

Any private or civil wrong by act or omission, but not including breach of contract. Some torts may also be crimes.

Tort Liability

The liability for damages resulting from a tort.

TOS

Traffic Operations Systems.

Tourism Oriented Destination Signing (TODS)

A program of tourism signing developed for provincial highways with trailblazing continuity on other roads. Some municipalities have developed municipal tourism signing programs compatible with TODS.

Tourism Signing

Information signing for tourist-related attractions. Tourism signing includes TODS as well as non-TODS signing for local and municipal attractions.

TRACS

Traffic Adaptive Control Systems.

Traffic Accident

See Collision.

Traffic Adaptive Control System (TRACS)

A system that is responsive to traffic demands, which automatically adjusts itself to adopt optimum control parameters such as cycle length, split and offset, at very short intervals, to optimize operation at an intersection almost on a cycle by cycle basis. This means it can, at the microscopic level and at short term variation, provide the most efficient management of traffic signals, either at a single isolated junction or a network or group of junctions commonly known as sub-systems or sub-areas.

Traffic Calming

The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.

Traffic Calming Measure

A physical device, regulation or other action which affects the movement of motor vehicles, bicycles, and/or pedestrians.

Traffic Circle

A confluence of three or more intersection legs at which traffic merges into and emerges from a one-way roadway in a counterclockwise direction around a central area. Traffic circles are typically used on local streets, and may have either no right-of-way control devices, or YIELD signs. See also Roundabout.

Traffic Control Device

Any sign, signal, marking, or device placed upon, over or adjacent to a roadway by a public authority or official having jurisdiction, for the purpose of regulating, warning, guiding or informing road users.

Traffic Control Installer

A person duly trained and authorized to install and remove Traffic Control Devices at a Work Zone.

Traffic Control Manual for Roadway Work Operations

The old MUTCD Temporary Conditions Field Edition, superseded by the portable, abbreviated Field Edition of Book 7, published March 2001.

Traffic Control Person (TCP)

A person duly trained and authorized to direct traffic at a work zone through the use of the Traffic Control Sign (STOP/SLOW Paddle).

Traffic Control Plan

A detailed plan for the control of traffic during construction, maintenance, or utility operations on a highway, taking into account the organized, systematic, safe conduct of the project, including, as applicable, detours, staging sequences, work vehicle access to and

egress from work sites, temporary barriers, removal of old pavement markings and selection and planned implementation of appropriate typical layouts for traffic control.

Traffic Control Signal (Traffic Signal)

Any power-operated Traffic Control Device, whether manually, electrically or mechanically operated, by which traffic is alternately directed to stop and permitted to proceed. Traffic Signal:

- (1) When used in general discussion, a traffic signal is a complete installation including signal heads, wiring, controller, poles and other appurtenances.
- (2) When used specifically, the term refers to the signal head which conveys a message to the observer.
- (3) That part of a traffic control signal system that consists of one set of no less than three coloured lenses, red, amber and green, mounted on a frame and commonly referred to as a signal head.

Traffic Count

A record of the number of vehicles or people aboard vehicles, or both, and pedestrians that pass a given checkpoint during a given time period.

Traffic Island

A raised or painted island designed to separate streams of vehicular traffic.

Traffic Management

The management and control of traffic on traffic facilities, typically on major highway corridors and networks. See Book 19.

Traffic Offence

A violation of a traffic law, regulation or by-law which may result in a charge by police and a fine.

Traffic Operations Centre (TOC)

The centre comprising the main FTMS computer subsystem and operations centre.

Traffic Paint

A pavement marking material that consists mainly of a binder and a solvent. The material is kept in liquid form by the solvent, which evaporates upon application to the pavement, leaving the binder to form a hard film.

Traffic paints are classified by, among other things, drying time:

- (1) instant dry – less than 30 seconds no track time;
- (2) quick dry – 30 to 120 seconds no track time;
- (3) fast dry – 2 to 7 minutes no track time;
- (4) conventional – over 7 minutes no track time.

See also Water-based Paint.

Traffic Protection Plan

A plan required by the OHS Act and its regulations for the protection of workers in a work zone. The plan must contain a written description of the traffic hazards to which workers may be exposed and measures used to protect them.

Traffic Sign

A device (other than Markings, Delineators and Traffic Control Signals) which may be erected beside or above a roadway for the purpose of regulating, warning or guiding traffic.

Traffic Signal

See Traffic Control Signal.

Traffic Signal Control

The use of traffic signal control devices to control traffic on a road section or intersection.

Traffic Signal Controller

The general usage term for the controller unit, cabinet and associated appurtenances.

Traffic Signal Control System

An area or corridor signal system under centralized control.

Traffic Signal Timing

When referring to traffic signals, timing describes the amount of time allotted to each Phase within each signal cycle.

Trailblazer

A small identification sign which provides continuity and assurance for drivers wishing to follow a given route or to reach a given destination.

Trailer

A vehicle that is drawn upon a highway by a motor vehicle, except an implement of husbandry, a mobile home, or motorcycle side car.

Transceiver

A transmitter and receiver combined in one device.

Transit

Another term for public transportation.

Transition Area

The third component of a work zone, downstream from the approach area, and upstream of the longitudinal buffer area, where traffic is channelled from the normal path to a new path required to move traffic past the work space. The transition area contains the tapers and parallel tangent sections (if more than one lane closed) that are used to close the lanes effectively.

Transit Lane

A street or highway lane intended exclusively or primarily for transit vehicles, including buses, streetcars and trolleys, either all day, or during specified periods.

Transit Priority

A means by which transit vehicles are given an advantage over other traffic (e.g., pre-emption of traffic signals or bus priority lanes).

Transit Vehicle

A vehicle used by a public transportation authority for the transport of patrons.

Transitway

A dedicated right-of-way that is used by transit units (vehicles or trains).

Transmission

The transfer of data over a communications channel.

Transmission Control Protocol/Internet Protocol (TCP/IP)

A communications protocol. TCP provides transport functions, which ensures that the total amount of bytes sent is received correctly at the other end; IP provides the routing mechanism. TCP/IP is a routable protocol, which means that all messages contain not only the address of the destination station, but also the address of a destination network.

Transmitter

An opto-electronic device that converts an electrical signal to an optical signal. It is usually a light emitting diode or laser diode.

Transponder

A small electronic device which, when mounted in or on a vehicle and interrogated electronically by a roadside reader, responds with its transponder identification and possibly additional information, enabling the reader to identify the passage of a specific vehicle. (Used in electronic toll collection systems and other applications.)

Travelled Roadway

See Roadway.

Travel Speed

Rate of motion. Ratio of travel distance and travel time.

Travel Time

The time of travel, including stops and delays except those off the travelled way.

TRL

Transport Research Laboratory.

Trolleycar

See Light Rail.

Truck

A commercial vehicle exceeding a specified weight or length as defined by the Highway Traffic Act, municipal by-law, or toll agency.

Truck-mounted Attenuator (TMA)

An energy-absorbing device mounted on the rear of a truck, to deform on impact in a controlled manner, thereby reducing:

- (1) the rate of deceleration (and associated injury) for the occupants of a vehicle striking the TMA from the rear; and
- (2) the rate of acceleration (and associated injury) for the driver of the truck.

TMA's must satisfy the requirements of NCHRP 350 Level TL-2 (70 km/h) or TL-3 (100 km/h), and should be selected for the appropriate posted speed. After January 1, 2006, all TMA's used on freeways must satisfy the TMA TL-3 requirement (100 km/h).

TTL

Transistor-Transistor Logic.

Turn Control Sign

A Traffic Sign, generally erected at an intersection, indicating by arrows and an Interdictory Symbol the movement or movements traffic on that approach must not take. These signs should not be confused with Lane Designation Signs.

Turning Movement Count

A traffic count at an intersection wherein the arriving and departing direction of travel is recorded.

Turn Lane

A lane designed to facilitate vehicular turn movements from the through roadway.

Turn Prohibition

A regulation prohibiting a straight-through movement or a left or right turn at an intersection.

Turn Sign

A Warning Sign used to inform drivers of an upcoming change in roadway alignment. See also Curve Sign.

Turn Signal

A lamp on a motor vehicle used to indicate to other motorists a change in direction or change of lane by emitting a flashing light on the side of the vehicle towards which a turn will be made.

Twisted Pair

A thin-diameter wire (22 to 26 gauge) commonly used for telephone and network cabling. The wires are twisted around each other to minimize interference from other twisted pairs in the cable. Twisted pairs have less bandwidth than Coaxial Cable or optical fibre.

Two-lane Highway

An undivided two-way facility having one lane for traffic moving in each direction.

Two-way Left-turn Lane

The centre lane on some three, five or seven lane sections of undivided highway which is designed to facilitate left turns from each direction.

TXD

Transmit data.

U

UART

Universal Asynchronous Receiver/Transmitter.

UDP

User Datagram Protocol.

UHF

Ultra High Frequency.

Uncontrolled Intersection

An intersection which does not have right-of-way control devices on any of the approaches.

Underpass

A grade separation where the travel way in question passes under another travel way.

Undivided Highway

A multi-lane highway with no continuous median, or with a paved flush dividing strip (including a Rumble Strip), or with a two-way left-turn lane.

Unidirectional Bikeway

A one-way bikeway.

Uniformity

Consistency in the design and application of traffic control devices and operations.

Unit Extension Time (Traffic Signal)

The timing period during the extendible portion of a right-of-way interval which is resettable by each detector actuation within the limits of the maximum period (extension limit).

Unposted Speed Zone

A section of highway upon which maximum speed signs are not erected and where a Statutory Speed Limit is in effect.

UPS

Uninterruptible Power Supply.

Upstream

The direction that traffic is coming from.

Upstream End (of an Island)

See Approach Nose.

Urban Area

An indefinite area of land used primarily for residential, commercial, and/or industrial purposes, usually associated with a given area size, population, and density.

Urban Bikeway

A Bikeway within an Urban Area.

Urban Highway

Any highway, road, or street within the boundaries of an Urban Area.

Urban Traffic Control Systems (UTCS)

A PC-based traffic control system that provides centralized road and intersection monitoring and traffic flow optimization, used in several major cities.

User-definable Parameters (Traffic Signal)

Parameters which can be modified on-line by the user via some interactive dialogue with the system.

UTC

Urban Traffic Control.

UTCS

Urban Traffic Control Systems.

Utility Corridor

A strip of land reserved for specific utilities (e.g., water, electricity, telephone). The corridor may be located adjacent to, over, under, or across the roadway.

UTM

Urban Traffic Management.

V

v

Velocity.

Vanpool

An arrangement in which a group of people share the use and cost of a van in travelling to and from pre-arranged destinations together.

Variable Message Sign (VMS)

A specific subset of Dynamic Message Signs. VMSs provide the highest level of functionality of all of the DMSs. VMSs contain a variable display, made up of a grid or matrix of discrete dots, known as pixels.

Combinations of pixels render the appearance of a continuous formed character or graphic symbol. The VMS can display a full array of alphanumeric characters and symbols to form message combinations and can also have full graphics capability.

VDS

Vehicle Detection System.

See Embedded Detector.

Vehicle

Includes a motor vehicle, trailer, traction engine, farm tractor, road-building machine, bicycle, and any vehicle drawn, propelled or driven by any kind of power, including muscular power, but does not include a motorized snow vehicle or motorcycle sidecar.

Vehicle Detection System (VDS)

See Embedded Detector.

Vehicle Eligibility

Eligibility of a vehicle to use a reserved lane or parking space, based on meeting defined criteria.

Vehicle Occupancy

The number of persons, including the driver and passenger(s), in a vehicle at a given time. See also High Occupancy Vehicle (HOV).

Vehicles with Lugs

See Lugs.

Vertical Sign Offset (Vertical Sign Clearance)

- (1) For ground-mounted signs, the vertical sign offset is the vertical distance between the bottom of the sign face and the elevation of the edge of the nearest traffic lane or of the sidewalk, as the case may be.
- (2) For overhead-mounted signs, the vertical sign clearance is the vertical distance between the bottom of the sign face and the elevation of the highest point of the pavement surface beneath it.

Very Short Duration (VSD) Work

Any work activity which occupies a fixed location for up to 30 minutes duration, including set-up and takedown of the traffic control provisions (e.g., some utility work, minor road maintenance, stormwater catchbasin cleanout, etc.). The work site may be moved along the road and make frequent, short stops.

VID

Video Image Detection.

Video Image Detection (VID)

A video image input received from video cameras and using algorithms to analyze the video image.

Video Processor

A computer that analyzes video images through specialized systems.

Vision Triangle

See Intersection Sight Distance.

VMS

Variable Message Sign.

VOC

Volatile Organic Compound.

Volume

The number of vehicles or pedestrians that pass over a given section of a lane or a roadway or make a particular movement during a specific time period (such as one hour or 24 hours).

Volume-Capacity Ratio (V/C Ratio)

The ratio of demand flow rate to capacity for a traffic facility.

VRC

Vehicle-Roadside Communications.

W**Walkway**

See Pedestrian Walkway.

Warning Sign

A sign which indicates conditions on or adjacent to a highway or street that are actually or potentially hazardous to traffic operations.

Warrant

A criterion or set of criteria by which justification for a given type of Traffic Control Device or other application is determined.

Watchdog (Traffic Signal)

A circuit or timer that is used to watch that an appropriate action is taken on a regular basis.

Water-based Paint

A Traffic Paint that employs water as a solvent, thus nullifying the environmental concerns with many traffic paints. Also referred to as latex. See also Traffic Paint.

Wavelength

The length of a wave measured from any point on one wave to the corresponding point on the next, such as from crest to crest. Wavelength determines the nature of the various forms of radiant energy that comprise the electromagnetic spectrum. The wavelengths of light used in optical fibre communications are measured in nanometres. Common wavelengths are 850, 1300 and 1350 nm.

Weathering Requirements

Sign material (sign sheeting) specification tests, to verify that sign sheeting is weather resistant and shows no appreciable cracking, scaling, pitting, blistering, edge lifting, or curling, and remains within specified limits for shrinkage and expansion, when tested according to the procedure described in the specification.

Weigh-in-Motion (WIM)

Technology that enables vehicle weights to be determined without the need for a vehicle to physically stop on a scale. High-speed WIM (HSWIM) enables trucks to be weighed at highway speed. Mainline WIM incorporates the use of Automatic Vehicle Identification.

Wheelchair

A mobility aid belonging to any class of three or four wheeled devices, usable indoors and outdoors, designed for and used by individuals with mobility impairments, whether operated manually or powered.

Wheelchair Accessible Vehicle

A vehicle that a wheelchair bound person may enter either:

- (1) Via an on-board retractable lift or ramp;
- (2) Directly from a station platform reached by an elevator or ramp that is either level with the vehicle floor or can be raised to floor level.

See also Para-transit.

WHMIS

Workplace Hazardous Materials Information System. See Material Safety Data Sheet (MSDS).

Wide Curb Lane

A roadway lane which is wider than a normal lane for shared use by bicycles and motorized traffic, characterized by a curb-lane which is of such width that a bicycle and motorized traffic can be accommodated side by side in the same lane.

Wide Line

A pavement marking line wider than the standard 10 cm width, typically 20 cm, up to 30 cm, in width. See also Continuity Line.

WIM

Weigh-in-Motion.

Work Area

The fifth component of a work zone, downstream from the longitudinal buffer area and upstream of the termination area, where the work takes place. It is set aside for workers, equipment and material storage.

The work area may be in a fixed location or may move as work progresses. It may be defined by delineation devices. In a confined location, the work space may be shielded by barriers as an additional feature.

Work Site Identification

Visible identification of the work area by passive and/or active traffic control devices to show road users where work is taking place.

Work Zone

A section of highway or roadway where highway-related construction, maintenance, or utility work takes place. See Book 7.

Y

Yield

To cede the right-of-way.

Yield (Traffic Signal)

A command which permits a Controller Unit to transfer right-of-way.

Z

Z-Bar

A metal bar used on the back side of an extruded aluminum sign, at right angles to the length of the sign panels, for purposes of connection, bracing, and structural rigidity.

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13. Master Sign Number Index

Reference locations are shown after each sign number entry as: sign number, sign name, **OTM Book Number** and Section Number. Sign Patterns are in the Master Sign Library (MSL) (OTM Book 2).

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 Gd-9, Destination **8** 5.2
 Gd-10, Destination **8** 5.2
 Gd-11, Destination **8** 5.2
 Gd-12, Auxiliary Assurance **8** 5.2
 Gd-13, Assurance **8** 5.2
 Gd-14, Urban Destination (1 name) **8** 5.2
 Gd-15, Urban Destination (2 names) **8** 5.2
 Gd-16, Urban Destination (3 names) **8** 5.2
 Gd-17, Municipality Centre Off Highway **8** 5.2
 Gd-17t, Municipality Centre Off Highway Tab **8** 5.2
 Gd-18, Municipality Centre On Highway **8** 5.2
- Gf-1, Advance Guide Sign **8** 4.5
 Gf-2, Interchange Number Tab **8** 4.5
 Gf-3, Turn-off Sign **8** 4.5
 Gf-4, Ground-mounted Exit Sign **8** 4.5
 Gf-5, Interchange Sequence Sign **8** 4.5
 Gf-6,7,8, Municipality on Freeway Sign **8** 4.5
 Gf-9, Downtown, City (Town) Centre, Business Section **8** 4.5
 Gf-10, Composite Services Sign **8** 4.5
 Gf-12, Distance Assurance Sign **8** 4.6
 Gf-13,13t, Distance Markers **8** 4.6
 Gf-14, Roadway Identification Sign – Grade Separation **8** 4.6
 Gf-15, Roadway Identification and Direction Sign **8** 4.6
 Gf-16 to 20, Service Centre Signs **9** 5.3
- Gf-21, Identification of Fire Hydrants adjacent to Freeways **8** 4.6
 Gf-22, Advance Guide Signs (Overhead) **8** 4.5
 Gf-23, Freeway Turn Off (Overhead) **8** 4.5
 Gf-24, Distance Assurance (Overhead) **8** 4.5
- Gh-1 to 4, Highway Numbering Changes **8** 6
- Gl-1, Municipality **8** 5.3
 Gl-2, Municipality **8** 5.3
 Gl-3, Hamlet **8** 5.3
 Gl-4, County or District Boundary **8** 5.3
 Gl-5, Regional Municipality **8** 5.3
 Gl-6, River or Lake **8** 5.3
 Gl-7, First Nation **8** 5.3
 (No Number), Municipality (Boundary) Signing – Use of PI Tab **8** 5.3
- Gor-1, ONTARIO PROVINCIAL POLICE Sign **9** 5.4
 Gor-2, Municipal Police Sign **9** 5.4
 Gor-3,3t, Picnic and Roadside Table Sign **9** 5.4
 Gor-4, First Aid Post Sign **9** 5.4
 Gor-5,6, Scenic Lookout – Advance Sign and Turn-off Sign **9** 5.4
 Gor-7, Boat Launching Sign **9** 5.4
 Gor-8, Public Telephone Sign **9** 5.4
 Gor-9,10,10t, Ontario Travel Information Centre Sign **9** 5.4
 Gor-11,12, Car Pool – Freeway and Trailblazer **8** 5.4
- Gr-1, Channelizing Sign – Right Turn **8** 5.1
 Gr-2, Turn-off to Freeway – Right Turn **8** 5.1
 Gr-3, Channelizing Sign – Left Turn **8** 5.1
 Gr-4, Turn-off to Freeway – Left Turn **8** 5.1
 Gr-6 to 8, Turn-off **8** 5.1
 Gr-9, Advance **8** 5.1
 Gr-10, Turn-off **8** 5.1
 Gr-11, Advance **8** 5.1
 Gr-12, Turn-off **8** 5.1
 Gr-106 to 108, Turn-off **8** 5.1
 Gr-USN, Urban Street Name Signs **8** 5.1

- Grr-1, Private Roadway Identification Fingerboard **9** 5.4
- Grr-2, Personal Direction Fingerboard **9** 5.4
- Grr-4, Private Road Sign **9** 5.4

- Gs-1, Border Crossing Signs **9** 5.4
- Gs-1A*, Decorative Municipality ID Display Signs **9** 5.4
- Gs-3, Signing of Local Radio Stations in Northern Ontario and Selected Areas in Southern Ontario **9** 5.4
- Gs-4,5, King's Highway Notice Sign **8** 5.5
- Gs-6,7, Controlled Access Highway Notice Sign **8** 5.5
- Gs-8A,8B, Neighbourhood Watch Program Signing **9** 5.4
- Gs-9A,9B, Block Parent Program Signing **9** 5.4
- Gs-10,10t, Road Closing Notice Sign **8** 5.5
- Gs-11, Road Closing Sign **8** 5.5
- Gs-12, GARBAGE DISPOSAL Sign **9** 5.4
- Gs-14, SEATBELT COMPULSORY BORDER ENTRY Sign **8** 5.5
- Gs-15, TRUCK INSPECTION STATION 1 KM Sign **8** 5.5
- Gs-17, INSPECTION STATION Turn-off Sign **8** 5.5
- Gs-18, Emergency Route Signing **9** 5.4
- Gs-19, ADOPT A HIGHWAY Signs **9** 5.4
- Gs-20, Emergency Services Property Addressing **9** 5.4
- Gs-21, Metric Conversion Sign **8** 5.5
- Gs-23, Planting Partnership Signs **8** 5.5
- Gs-24 to 26, Safety Signs **8** 5.5

- Gt-12 to 15, Historic Site/Plaque Signs **8** 5.5

- L-1, Mainline Food Logo Signs **8**
- L-2, Mainline Fuel Logo Signs **8**
- L-3, Mainline Accommodation Logo Signs **8**
- L-4, Mainline Composite Logo Signs **8**
- L-5, Ramp Food Logo Signs **8**
- L-6, Ramp Fuel Logo Signs **8**
- L-7, Ramp Accommodation Logo Signs **8**
- L-8, Ramp Composite Logo Signs **8**

- Mf-1, Hospital Marker **9** 5.4
- Mf-2A, Airport Marker, Major **9** 5.4
- Mfa-2B, Airport Marker, Secondary **9** 5.4
- Mfa-2C, Airport Marker, Local **9** 5.4
- Mfa-3, Bus Terminal Marker **9** 5.4
- Mfa-3A, Rail Station Sign **9** 5.4
- Mfa-4, Golf Course Marker **9** 5.4
- Mfa-5, Regional Travel Information Centre Sign **9** 5.4
- Mfa-5, Ontario Travel Information Centre Sign **9** 5.4
- Mf-10, Accommodation Marker **9**
- Mf-11, Food Marker **9**
- Mf-12, Fuel Marker **9**
- Mf-13, Campsite Marker **9**
- Mf-14, Outfitter Marker **9**
- Mf-15, Marina Marker **9**
- Mf-16, Sea Plane Base Marker **9**
- Mf-17, Cross Country Ski Area Marker **9**
- Mf-18, Alpine Ski Area Marker **9**
- Mf-19, Ski Area Marker **9**
- Mf-20, Hostel Marker **9**
- Mf-24, College/University Marker **9**

- Mh-1, Trans Canada Highway Marker – Shield **8** 6
- Mh-2, Provincial Route Marker – Crown **8** 6
- Mh-3, Provincial Route Marker **8** 6
- Mh-4, County/Regional Road Marker **8** 6
- Mh-5, Secondary Highway Route Marker **8** 6
- Mh-6, Tertiary Road Marker **8** 6
- Mh-7, M-C Freeway Marker **8** 6
- Mh-8, 9, Advance Turn Marker **8** 6
- Mh-10, Route Direction Marker **8** 6
- Mh-11, Turn-off Marker **8** 6
- Mh-12, Turn-off Marker **8** 6
- Mh-13, Cardinal Direction Markers **8** 6
- Mh-14, Combined Direction and Turn Markers **8** 6
- Mh-15, Combined Direction and Advance Turn Markers **8** 6
- Mh-16, Combined Direction and Turn-off Markers **8** 6
- Mh-17, Business Marker **8** 6
- Mh-18, ENDS End of Route Marker **8** 6
- Mh-19, Junction Marker **8** 6
- Mh-20, Junction Marker **8** 6
- Mh-21, Route Markers and Trailblazers **8** 4.6

- Mh-21, Highway Trailblazer – Shield **8 6**
- Mh-22, Highway Trailblazer – Crown **8 6**
- Mh-23, QEW Trailblazer – Shield **8 6**
- Mh-24, QEW Trailblazer – Crown **8 6**
- Mh-25, Secondary Highway Trailblazer **8 6**
- Mh-26, Destination Marker **8 6**
- Mh-27, FORMERLY Marker **8 6**
- Mh-28, EXIT 1 KM Marker **8 6**
- Mh-29, Combined Distance and Turn-off Markers **8 6**
- Mh-30, Distance Marker **8 6**
- Mh-31, Availability Markers (Campground) **9 5.4**
- Mh-37, Ferry Service Marker **8**

- Ra-1, STOP Sign **5 2**
- Ra-1t, ALL-WAY Tab Sign **5 2**
- Ra-2, YIELD Sign **5 3, 7 6.1**
- Ra-2t, YIELD Tab Sign **5 3**
- Ra-4, PEDESTRIAN X (Crossover) Sign **5 4.2**
- Ra-4t, STOP FOR PEDESTRIANS Tab Sign **5 4.2**
- Ra-6, CROSS ON GREEN LIGHT ONLY Sign **5 4.1**
- Ra-7, CROSS ON WALK SIGNAL ONLY Sign **5 4.1**
- Ra-8, CROSS ONLY AT CROSSOVER Sign **5 4.1**
- Ra-9, CROSS OTHER SIDE Sign **5 4.1**
- Ra-9A, CROSS OTHER SIDE Sign **5 4.1**
- Ra-10, NO PASSING HERE TO CROSSING Sign **5 4.2**
- Ra-11, PEDESTRIAN PUSHBUTTON Sign **5 4.2**
- Ra-12, PEDESTRIAN PUSHBUTTON Symbol Sign (With Directional Arrow) **5 4.1**
- Ra-13, PEDESTRIAN MUST PUSH BUTTON TO RECEIVE WALK SIGNAL Symbol Sign **5 4.1**

- Rb-1, MAXIMUM SPEED Sign **5 5**
- Rb-1A, MAXIMUM SPEED Sign with KM/H Included **5 5**
- Rb-2, MAXIMUM SPEED BEGINS Sign **5 5**
- Rb-3, MAXIMUM SPEED, KM/H, and BEGINS on One Sign Blank **5 5**
- Rb-5, MAXIMUM SPEED AHEAD Sign **5 5**
- Rb-6, SCHOOL ZONE MAXIMUM SPEED Sign **5 5**
- Rb-6A, SCHOOL ZONE MAXIMUM SPEED WHEN FLASHING Sign **5 5**
- Rb-7t, KM/H Tab Sign **5 5**
- Rb-10, NO STRAIGHT THROUGH Sign **5 6**
- Rb-10A, NO STRAIGHT THROUGH Sign (Specified Times) **5 6**
- Rb-10t, BUSES EXCEPTED Tab Sign **5 6**
- Rb-11, NO RIGHT TURN Sign **5 6**
- Rb-11A, NO RIGHT TURN Sign (Specified Times) **5 6**
- Rb-12, NO LEFT TURN Sign **5 6**
- Rb-12A, NO LEFT TURN Sign (Specified Times) **5 6**
- Rb-13, NO STRAIGHT THROUGH OR RIGHT TURN Sign **5 6**
- Rb-14, NO STRAIGHT THROUGH OR LEFT TURN Sign **5 6**
- Rb-15, NO TURNS Sign **5 6**
- Rb-16, NO U-TURNS Sign **5 6**
- Rb-16t, EXCEPT AUTHORIZED VEHICLES Tab Sign **5 6**
- Rb-19, DO NOT ENTER Sign **5 7**
- Rb-19t, DO NOT ENTER Tab Sign **5 7**
- Rb-20, DO NOT ENTER / WRONG WAY Sign **5 7**
- Rb-21, ONE-WAY Sign **5 7**
- Rb-24, TWO-WAY TRAFFIC Sign **5 8**
- Rb-25, KEEP RIGHT Sign **5 8**
- Rb-27, THROUGH TRAFFIC KEEP RIGHT Sign **5 8**
- Rb-30, PASSING LANE 2 KM AHEAD Sign **5 8**
- Rb-31, DO NOT PASS Sign **5 8**
- Rb-33, KEEP RIGHT EXCEPT TO PASS Sign **5 8**
- Rb-34, SLOWER TRAFFIC KEEP RIGHT Sign **5 8**
- Rb-35, PASSING PERMITTED Sign **5 8**
- Rb-35t, PASS WITH CARE Tab Sign **5 8**
- Rb-36, YIELD CENTRE LANE TO OPPOSING TRAFFIC Sign **5 8**
- Rb-37, STOP FOR SCHOOL BUS WHEN SIGNALS FLASHING Sign **5 8**
- Rb-37t, BOTH DIRECTIONS Tab Sign **5 8**
- Rb-39, LANE USE RESTRICTION Sign (Overhead, Trucks) **5 11.1**
- Rb-39A, LANE USE RESTRICTION Sign (Ground-mounted, Trucks) **5 11.1**
- Rb-40, LANE USE RESTRICTION Sign (Overhead, Trucks, Length-based) **5 11.1**
- Rb-40A, LANE USE RESTRICTION Sign (Ground-mounted, Trucks, Length-based) **5 11.1**
- Rb-41, LEFT TURN ONLY Sign **5 9.1**
- Rb-41t, LEFT LANE Tab Sign **5 9.1**
- Rb-42, RIGHT TURN ONLY Sign **5 9.1**
- Rb-42t, RIGHT LANE Tab Sign **5 9.1**

- Rb-43, STRAIGHT THROUGH OR LEFT TURN ONLY Sign **5** 9.1
- Rb-44, STRAIGHT THROUGH OR RIGHT TURN ONLY Sign **5** 9.1
- Rb-45, LEFT OR RIGHT TURN ONLY Sign **5** 9.1
- Rb-46, ALL MOVEMENTS PERMITTED Sign **5** 9.1
- Rb-47, STRAIGHT THROUGH ONLY Sign **5** 9.1
- Rb-48, TWO-WAY LEFT TURN LANE Sign **5** 9.1
- Rb-48A, TWO-WAY LEFT TURN LANE, CENTRE LANE ONLY Sign **5** 9.1
- Rb-51, NO PARKING Sign **5** 10.1
- Rb-51A, NO PARKING Sign (With Days) **5** 10.1
- Rb-52, NO PARKING Sign (With Days and Times) **5** 10.1
- Rb-53, PARKING RESTRICTED Sign (With Days, Times, Duration) **5** 10.1
- Rb-54, NO STANDING Sign **5** 10.1
- Rb-54A, NO STANDING Sign (With Days and Times) **5** 10.1
- Rb-55, NO STOPPING Sign **5** 10.1
- Rb-55A, NO STOPPING Sign (With Days) **5** 10.1
- Rb-56, NO STOPPING Sign (With Days and Times) **5** 10.1
- Rb-57, NO PARKING, SNOW ROUTE Sign **5** 10.1
- Rb-58, NO PARKING, EMERGENCY PARKING ONLY Sign **5** 10.1
- Rb-60, NO TRACTORS Sign **5** 11.3
- Rb-61, TRUCK ROUTE Sign **5** 11.1
- Rb-61t, MOVEMENTS PERMITTED Tab Signs **5** 11.1, 11.2, 11.3
- Rb-62, NO HEAVY TRUCKS Sign **5** 11.1
- Rb-62A, NO HEAVY TRUCKS Sign (Time of Day) **5** 11.1
- Rb-63, MAXIMUM TONNES Sign (Single Gross Weight) **5** 11.1
- Rb-63A, MAXIMUM TONNES Sign (Differentiated by Truck Type) **5** 11.1
- Rb-64, SNOWMOBILE ROUTE Sign **5** 11.3
- Rb-65, NO SNOWMOBILES Sign **5** 11.3
- Rb-67, NO BICYCLES Sign **5** 11.3
- Rb-68, NO PEDESTRIANS OR BICYCLES Sign **5** 11.3
- Rb-69, BICYCLE ROUTE Sign **5** 11.3
- Rb-76, LOAD RESTRICTION IN EFFECT Sign **5** 11.1
- Rb-77, CLASS B ROAD Sign **5** 11.1
- Rb-78, STOP HERE ON RED SIGNAL Sign **5** 12
- Rb-79R, NO RIGHT TURN ON RED Sign **5** 12
- Rb-79L, NO LEFT TURN ON RED Sign **5** 12
- Rb-80, ADVANCED GREEN WHEN FLASHING Sign **5** 12
- Rb-81, LEFT TURN SIGNAL Sign **5** 12
- Rb-82, DANGEROUS GOODS ROUTE Sign (Symbol) **5** 11.2
- Rb-82t, DANGEROUS GOODS ROUTE Tab Sign **5** 11.2
- Rb-83, NO DANGEROUS GOODS Sign (Symbol) **5** 11.2
- Rb-83t, DANGEROUS GOODS CARRIERS PROHIBITED Tab Sign **5** 11.2
- Rb-84, RESERVED BICYCLE LANE Sign (Overhead) **5** 9.2
- Rb-84A, RESERVED BICYCLE LANE Sign (Ground-mounted) **5** 9.2
- Rb-84t, BEGINS Tab Sign **5** 5, 14
- Rb-84t, Reserved Lane BEGINS Tab Sign **5** 9.2
- Rb-85, RESERVED LANE Sign (One Vehicle Class, Overhead, No Days and Times) **5**
- Rb-85A, RESERVED LANE Sign (One Vehicle Class, Ground-mounted, No Days and Times) **5**
- Rb-85t, Reserved Lane ENDS Tab Sign **5** 9.2, 14
- Rb-86, RESERVED LANE Sign (Multiple Vehicle Classes, Overhead, No Days and Times) **5** 9.2
- Rb-86A, RESERVED LANE Sign (Multiple Vehicle Classes, Ground-mounted, No Days and Times) **5** 9.2
- Rb-87, RESERVED LANE Sign (One or Multiple Vehicle Classes, Overhead, Days and Times) **5** 9.2
- Rb-87A, RESERVED LANE Sign (One or Multiple Vehicle Classes, Ground-mounted, Days and Times) **5** 9.2
- Rb-88, 3 OR MORE PERSONS Sign **5** 9.2
- Rb-89, SCHOOL BUS LOADING ZONE Sign **5** 11.3
- Rb-90A, CONSTRUCTION ZONE BEGINS Sign **5** 13, **7** 6.1
- Rb-90B, CONSTRUCTION ZONE ENDS Sign **5** 13, **7** 6.1
- Rb-91, YIELD TO ONCOMING TRAFFIC Sign **5** 13, **7** 6.1
- Rb-92, ROAD CLOSED Sign **5** 13, **7** 6.1
- Rb-93, DISABLED PARKING PERMIT Sign **5** 10.2
- Rb-94, DISABLED STANDING EXEMPTION Sign **5** 10.2

- Rb-95, DISABLED STOPPING EXEMPTION Sign **5** 10.2
- Rb-96, TRUCKS ENTER INSPECTION STATION WHEN LIGHTS FLASHING Sign **5** 11.1
- Rb-97, VEHICLES OVER 5 TONNES MUST HAVE VALID TRANSPONDER Sign **5** 11.1
- Rb-184t, BEGINS Tab Sign **5** 11.1
- Rb-185t, ENDS Tab Sign **5** 11.1
-
- Rc-1, WALK ON LEFT FACING TRAFFIC Sign **5** 16
- Rc-2, NO FISHING FROM BRIDGE Sign **5** 16
- Rc-3, VEHICLES WITH LUGS PROHIBITED Sign **5** 16
- Rc-4, NO LITTERING Sign **5** 16
- Rc-4A, NO LITTERING AND MAXIMUM FINE FOR LITTERING Sign **5** 16
- Rc-4t, MAXIMUM FINE FOR LITTERING Tab Sign **5** 16
- Rc-9, COMMUNITY SAFETY ZONE **5** 14
- Rc-10, NO IN-LINE SKATING Sign **5** 16
- Rc-11, KEEP OFF MEDIAN Sign **5** 16
- Rc-12, NO PEDESTRIANS Sign **5** 16
- Rc-13, FASTEN SEAT BELT Sign **5** 16
- Rc-13t, COMPULSORY Tab Sign **5** 16
-
- T-1A, Freeway Major Attractions (Urban) Assembly and Panels **9**
- T-1B, Freeway Major Attractions (Rural) Assembly and Panels **9**
- T-2A, Freeway Regular Attractions (Urban) Assembly **9**
- T-2B, Freeway Regular Attractions (Rural) Assembly **9**
- T-3, Freeway Ramp Assembly **9**
- T-4A, Freeway Composite – 6 Icons Assembly **9**
- T-4B, Freeway Composite – 3 Icons Assembly **9**
- T-5, Highway Major & Regular Attractions Assembly **9**
- T-6A, Highway Trailblazer (High Speed) Assembly **9**
- T-6B, Highway Trailblazer (Low Speed) Assembly **9**
- T-7, Highway Tourism Route **9**
- T-8, Highway Tourism Route Assurance Marker **9**
- T-9, Area Profile **9**
-
- TC-1, CONSTRUCTION AHEAD Sign **7** 6.1
- TC-1A, CONSTRUCTION AHEAD 1 KM Sign **7** 6.1
- TC-1B, CONSTRUCTION AHEAD 2 KM Sign **7** 6.1
- TC-2A, ROAD WORK Sign (Square) (Short Duration) **7** 6.1
- TC-2B, ROAD WORK Sign (Diamond) (Short & Long Duration) **7** 6.1
- TC-3R, RIGHT LANE CLOSED AHEAD Sign **7** 6.1
- TC-3Rt, RIGHT LANE CLOSED Tab Sign **7** 6.1
- TC-3L, LEFT LANE CLOSED AHEAD Sign **7** 6.1
- TC-3Lt, LEFT LANE CLOSED Tab Sign **7** 6.1
- TC-3tA, 300 M Tab Sign **7** 6.1
- TC-4, LANE CLOSURE ARROW Sign **7** 6.1
- TC-5, DETOUR AHEAD Sign **7** 6.1
- TC-5A, DETOUR AHEAD 1 KM Sign **7** 6.1
- TC-5B, DETOUR AHEAD 2 KM Sign **7** 6.1
- TC-7, DETOUR-TURN OFF/DIVERSION Sign **7** 6.1
- TC-7tA, ROAD CLOSED Tab Sign **7** 6.1
- TC-7tB, LOCAL TRAFFIC ONLY Tab Sign **7** 6.1
- TC-9 (L or R), ROADSIDE DIVERSION WARNING Sign (1 to 3 Arrows) **7** 6.1
- TC-10, DETOUR Marker **7** 6.1
- TC-10AL, DETOUR Marker **7** 6.1
- TC-10AR, DETOUR Marker **7** 6.1
- TC-10BL, DETOUR Marker **7** 6.1
- TC-10BR, DETOUR Marker **7** 6.1
- TC-10C, DETOUR Marker **7** 6.1
- TC-10D, DETOUR Marker **7** 6.1
- TC-10EL, DETOUR Marker **7** 6.1
- TC-10ER, DETOUR Marker **7** 6.1
- TC-10FL, DETOUR Marker **7** 6.1
- TC-10FR, DETOUR Marker **7** 6.1
- TC-10t, DETOUR Designation Tab **7** 6.1
- TC-11, NARROW LANES Sign **7** 6.1
- TC-11t, TRUCKS USE CENTRE LANE Tab Sign **7** 6.1
- TC-11tA, FOR XX KM Tab Sign **7** 6.1
- TC-12, FLASHING ARROW BOARD Sign (Freeway) **7** 1.7, 2.1, 3.2, 6.1
- TC-12, FLASHING ARROW BOARD Sign (Non-freeway) **7** 1.7, 2.1, 3.2, 6.1
- TC-12A, FLASHING ARROW BOARD Sign (Striper) **7** 1.7, 2.1, 3.2, 6.1
- TC-13, PAVEMENT ENDS Sign **7** 6.1
- TC-14, BUMP AHEAD Sign **7** 6.1
- TC-15, BUMP Sign **7** 6.1
- TC-16A (L or R), TURN Sign **7** 6.1
- TC-16B (L or R), SHARP CURVE Sign **7** 6.1

- TC-16C (L or R), CURVE Sign **7** 6.1
- TC-16D (L or R), SHARP REVERSE CURVE Sign **7** 6.1
- TC-16E (L or R), REVERSE CURVE Sign (1 to 3 Arrows) **7** 6.1
- TC-17t, ADVISORY SPEED Tab Sign **7** 6.1
- TC-18, CHEVRON ALIGNMENT Sign **7** 6.1
- TC-19, GROOVED PAVEMENT Sign **7** 6.1
- TC-19t, GROOVED PAVEMENT Tab Sign **7** 6.1
- TC-20, PREPARE TO STOP Sign **7** 6.1
- TC-20A, PREPARE TO STOP Sign (With Amber Flashers) **7** 6.1
- TC-20At, WHEN FLASHING Tab Sign **7** 6.1
- TC-21, TRAFFIC CONTROL PERSON AHEAD Sign **7** 6.1
- TC-22, TRAFFIC CONTROL Sign (STOP/SLOW Paddle) **7** 4.4, 6.1, *Figures 3, 4*
- TC-23, SIGNALS AHEAD Sign **7** 6.1
- TC-23A, REMOTE CONTROL DEVICE AHEAD Sign **7** 6.1
- TC-23At, PREPARE TO STOP Tab Sign **7** 6.1
- TC-24, UNEVEN LANES Sign **7** 6.1
- TC-27, DO NOT PASS WHEN FLASHING Sign **7** 6.1
- TC-31(L or R), TRUCK ENTRANCE Sign **7** 6.1
- TC-31A (L or R), TRUCK ENTRANCE Sign (with amber flashers) **7** 6.1
- TC-32, TEMPORARY BRIDGE Sign **7** 6.1
- TC-32t, TEMPORARY BRIDGE XX KM/H Tab Sign **7** 6.1
- TC-33, LOW BRIDGE AHEAD Sign **7** 6.1
- TC-33A, LOW CLEARANCE AHEAD XX M Sign **7** 6.1
- TC-33B, LOW CLEARANCE XX M Sign **7** 6.1
- TC-34, TWO WAY TRAFFIC Sign **7** 6.1
- TC-35, RAMP CLOSED AHEAD Sign **7** 6.1
- TC-36, MAXIMUM SPEED Advisory Sign **7** 6.1, **14** 3
- TC-37, SOFT SHOULDERS Sign **7** 6.1
- TC-39, NO EXIT Sign **7** 6.1
- TC-40, PEDESTRIAN DIRECTION Sign **7** 6.1
- TC-41A, see Rb-90A
- TC-41B, see Rb-90B
- TC-43, see Rb-91
- TC-44, DO NOT USE RADIO TRANSMITTER Sign **7** 6.1
- TC-45, RESUME USE OF RADIO TRANSMITTER Sign **7** 6.1
- TC-46, see Rb-92
- TC-51A, B, C (Traffic Cones) **7** 6.2
- TC-52 (Construction Marker) **7** 6.2
- TC-53A, B (Barricades) **7** 6.2
- TC-54 (Flexible Drum (Barrel)) **7** 6.2
- Temporary Concrete Barriers **7** 6.2
- TC-61, New Roadway Open Sign (NEW ROADWAY OPEN TO ABC ROAD) **7** 6.3
- TC-62, Alternate Highway Route Sign (THROUGH TRAFFIC USE ROUTE XX TO ROUTE YY) **7** 6.3
- TC-64, Road Closing/Restriction Notice Sign (full-time) (EXIT TO ABC STREET TO BE CLOSED FROM MM/DD/YY) **7** 6.3
- TC-65, Road Closing Notice Sign (THIS STREET WILL BE CLOSED MM/DD FOR JJ WEEKS) **7** 6.3
- TC-66, Highway Section Closed Sign (HIGHWAY XX CLOSED AT ABC STREET) **7** 6.3
- TC-67, Street Section Closed Sign (ABC STREET CLOSED AT DEF AVENUE) **7** 6.3
- TC-71, Contract Identification Sign (road authority) **7** 6.3
- TC-72A-B, Contract Identification Sign (joint project) **7** 6.3
- TC-73A-B, Contract Identification Sign (connecting link/development road project) **7** 6.3
- TC-74, Contract Identification Sign (municipal project) **7** 6.3
- TC-75, Contractor's Identification Sign **7** 6.3
- TC-81A to L, Highway Improvement Signs **7**
- Wa-1, TURN Sign **6** 1, 2, *Table 2, Table 5*
- Wa-2, SHARP CURVE Sign **6** 1, 2, *Table 2, Table 5*
- Wa-3, CURVE Sign **6** 1, 2, *Table 2, Table 5*
- Wa-4, SHARP REVERSE CURVE Sign **6** 1, 2, *Table 2, Table 5*
- Wa-5, REVERSE CURVE Sign **6** 1, 2, *Table 2, Table 5*
- Wa-6, WINDING ROAD Sign **6** 1, 2, *Table 2*
- Wa-6t, HAZARD LENGTH Tab Sign **6** 2, 4, 8, 9, *Table 18*
- Wa-7t, ADVISORY SPEED Tab Sign **6** 2, 4, 8, 9, *Table 5, Table 15, Table 18*
- Wa-8, CHECKERBOARD Sign **6** 1, 2, *Table 1*
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- Wa-8LR, CHECKERBOARD Sign (both directions) **6** 1, 2, 9, *Table 1, Table 15*
- Wa-9, CHEVRON ALIGNMENT Sign **6** 1, 2, *Table 1, Table 7*
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- Wa-11A, INTERSECTION Sign (controlled) **6** 1, 3, *Table 2*
- Wa-12, INTERSECTION Sign (uncontrolled) **6** 1, 3, *Table 2*
- Wa-12A, INTERSECTION Sign (controlled) **6** 1, 3, *Table 2*
- Wa-13, INTERSECTION Sign (uncontrolled) **6** 1, 3, *Table 2*
- Wa-13A, INTERSECTION Sign (controlled) **6** 1, 3, *Table 2*
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- Wa-15, Y-INTERSECTION Sign (uncontrolled) **6** 1, 3, *Table 2*
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- Wa-19, CROSS TRAFFIC DOES NOT STOP Sign **6** 1, 3, *Table 2*
- Wa-19t, AFTER (MONTH AND DAY) Tab Sign **6** 3, 9, *Table 18*
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- Wa-22A, BUMP AHEAD Sign **6** 1, 4, *Table 2*
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- Wa-23 (L or R), LANE ENDS Sign **6** 1, 4, *Table 2, Table 11*
- Wa-23Lt, LEFT LANE ENDS Tab Sign **6** 4, 9, *Table 16, Table 18*
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- Wa-24, NARROW STRUCTURE Sign **6** 1, 4, *Table 2*
- Wa-24A, ONE LANE ONLY WHEN USED BY TRUCKS Sign **6** 1, 4, *Table 2*
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- Wa-24tB, NARROW BRIDGE Tab Sign **6** 4, 9, *Table 16, Table 18*
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- Wa-26, LOW CLEARANCE AHEAD XX M Sign **6** 1, 4, *Table 2*
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- Wa-30, OPENING BRIDGE Sign **6** 1, 4, *Table 2*
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- Wa-32A, Ramp Speed XX Sign **6** 1, 4, 9, *Table 1, Table 2, Table 16*
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- Wa-52R, TWO RIGHT LANES EXIT Sign (freeway) **6** 1, 5, *Table 2*
- Wa-53L, TWO LEFT LANES EXIT, NEXT LANE EXIT OR THROUGH Sign (freeway) **6** 1, 5, *Table 2*
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- Wa-54L, THREE LEFT LANES EXIT Sign (freeway) **6** 1, 5, *Table 2*
- Wa-54R, THREE RIGHT LANES EXIT Sign (freeway) **6** 1, 5, *Table 2*
- Wa-56L, LEFT LANE EXITS Sign (non-freeway) **6** 1, 5, *Table 2*
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- Wa-57R, TWO RIGHT LANES EXIT Sign (non-freeway) **6** 1, 5, *Table 2*
- Wa-58L, THREE LEFT LANES EXIT Sign (non-freeway) **6** 1, 5, *Table 2*
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- Wa-73, DO NOT BLOCK INTERSECTION Sign **6** 1, 3, 9, *Table 2, Table 16*
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- Wa-76t, WHEN FLASHING Tab Sign **6** 4, 9, *Table 2, Table 16, Table 18*
- Wa-1123L, LANE ENDS Sign (overhead) **6** 4, 9, *Table 16*
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- Wb-1A, YIELD AHEAD Sign **6** 1, 6, *Table 2, 7* 6.1
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- Wb-3, NEW Sign (for stop, yield and signal control) **6** 1, 6, 9, *Table 2, Table 17*
- Wb-4, TWO-WAY TRAFFIC AHEAD Sign **6** 1, 6, *Table 2*
- Wb-6, KEEP RIGHT Sign **6** 1, 6, *Table 2*
- Wb-7, RAMP METERED WHEN FLASHING Sign (with amber flashers) **6** 1, 6, 9, *Table 2, Table 16*
- Wb-102A, PREPARE TO STOP AT TRAFFIC SIGNALS AHEAD Sign (with amber flashers) **6** 1, 6, *Table 2, 8*
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- Wc-1, SCHOOL AREA Sign **6** 1, 7, *Table 2*
- Wc-2, SCHOOL CROSSING Sign **6** 7
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- Wc-4, RAILWAY CROSSING AHEAD Sign **6** 1, 8, *Table 2*
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- Wc-104A, PREPARE TO STOP AT RAILWAY CROSSING AHEAD Sign (with amber flashers) **6**, 1, 8, *Table 2*
- Wc-5, SLIPPERY WHEN WET Sign **6** 1, 8, 9, *Table 2, Table 17*
- Wc-5t, SLIPPERY WHEN WET Tab Sign **6** 8, 9, *Table 16, Table 18*
- Wc-6, FALLEN ROCK Sign **6** 1, 8, *Table 2*
- Wc-6t, WATCH FOR FALLEN ROCK Tab Sign **6** 8, 9, *Table 16, Table 18*
- Wc-7, PEDESTRIANS AHEAD Sign **6** 1, 7, *Table 2*
- Wc-7t, (SENIORS Tab Sign **6** 7, 9, *Table 16, Table 18*
- Wc-8 (L or R), TRUCK ENTRANCE Sign **6** 1, 8, 9, *Table 2, Table 12, Table 17*
- Wc-8t, TRUCK ENTRANCE Tab Sign **6** 8, 9, *Table 16, Table 18*
- Wc-9, CATTLE CROSSING Sign **6** 1, 8, *Table 2*
- Wc-10 (L or R), SCHOOL BUS ENTRANCE Sign **6** 1, 8, 9, *Table 2, Table 16*

- Wc-11, DEER CROSSING Sign **6** 1, 8, *Table 2*
- Wc-12, MOOSE CROSSING Sign **6** 1, 8, *Table 2*
- Wc-12t, NIGHT DANGER Tab Sign **6** 8, 9, *Table 18*
- Wc-13, CEMETERY ENTRANCE Sign **6** 1, 8, *Table 2*
- Wc-14, BICYCLE CROSSING AHEAD Sign **6** 1, 8, 9, *Table 2, Table 17*
- Wc-17, CENTRE LINE MARKING ENDS Sign **6** 1, 8, *Table 2*
- Wc-18, SNOWMOBILE CROSSING Sign **6** 1, 8, 9, *Table 2, Table 17*
- Wc-18t, SNOWMOBILE CROSSING Tab Sign **6** 8, 9, *Table 16, Table 18*
- Wc-20, OVERHEAD X Sign **6** 7, *Figure 6*
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- Wc-22, HORSE WITH RIDER Sign **6** 1, 8, 9, *Table 2, Table 16*
- Wc-23, HORSE-DRAWN VEHICLE Sign **6** 1, 8, 9, *Table 2, Table 16*
- Wc-25 (L or R), FIRE TRUCK ENTRANCE Sign **6** 1, 8, 9, *Table 2, Table 16*
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- Wc-26, SCHOOL BUS STOP AHEAD Sign **6** 1, 8, 9, *Table 2, Table 13, Table 14, Table 16*
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14. Renumbered Signs

New	Previous	Name	Date Renumbered
Ra-9A	Ra-9Alt	CROSS OTHER SIDE	March 2000
Rb-1A	Rb-1Alt	MAXIMUM SPEED	March 2000
Rb-7t	Rb-7	KM/H Tab	March 2000
Rb-21	Rb-21A	ONE-WAY	March 2000
Rb-84t	Rb-84ta	BEGINSTab	March 2000
Rb-85t	Rb-84tb	ENDS Tab	March 2000
Rb-89	Rc-5	SCHOOL BUS LOADING ZONE	March 2000
Rb-90A	TC-41A	CONSTRUCTION ZONE BEGINS	March 2000
Rb-90B	TC-41B	CONSTRUCTION ZONE ENDS	March 2000
Rb-91	TC-43	YIELD TO ONCOMING TRAFFIC	March 2000
Rb-92	TC-46	ROAD CLOSED	March 2000
Rb-93	Rc-6	DISABLED PARKING PERMIT	March 2000
Rb-96	G.s-16	TRUCKS ENTER INSPECTION STATION WHEN LIGHTS FLASHING	March 2000
Rc-11	Rb-74	KEEP OFF MEDIAN	March 2000
Rc-12	Rb-66	NO PEDESTRIANS	March 2000
Rc-13	G.s-13	FASTEN SEAT BELT	March 2000
Rc-13t	G.s-13t	COMPULSORY Tab	March 2000
TC-1B	TC-1A	CONSTRUCTION AHEAD 2 KM	March 2001
TC-5A	TC-6	DETOUR AHEAD 1 KM	March 2001
TC 5B	TC-6	DETOUR AHEAD 2 KM	March 2001
TC-7tA	TC-7t	ROAD CLOSED Tab	March 2001
TC-7tB	TC-8t	LOCAL TRAFFIC ONLY Tab	March 2001
Wa-7t	Wa-7	ADVISORY SPEED Tab	February 2001
Wa-8LR	Wa-8 (L & R)	CHECKERBOARD (both directions)	February 2001
Wa-15A	Wa-15	Y-INTERSECTION (controlled)	February 2001
Wa-18t	Wa-18	HIDDEN INTERSECTION Tab	February 2001
Wa-24tB	Wa-70t	NARROW BRIDGE Tab	April 2004
Wa-33LR	Wa-133	OBJECT MARKER (both directions)	February 2001

15. References

- AASHTO Guide for the Design of High Occupancy Vehicle Facilities*; 1992
- Canadian Capacity Guide for Signalized Intersections*; Institute of Transportation Engineers, District 7, Canada, 1995
- Canadian Guide to Neighbourhood Traffic Calming*; Transportation Association of Canada and Institute of Transportation Engineers, 1999
- Changeable Message Response Plan Database Development Guidelines*; Ontario Ministry of Transportation, September 1992
- Changeable Message Signs*; Ontario Ministry of Transportation Special Provisions 685S01
- CIP Community Cycling Manual – A Planning and Design Guide*; 1990
- COMPASS Response Plan Database Development Guidelines*; prepared for Ministry of Transportation of Ontario (MTO) by Delcan Corporation, 1992
- Corridor Control and Permit Procedures Manual*; Ministry of Transportation Ontario, 1989
- County Surveyors' Society: Traffic Calming In Practice*; 1994
- Developing Traveller Information Systems Using the National ITS Architecture*; Intelligent Transportation Systems Joint Program Office, U.S. Department of Transportation, August 1998
- Diversions Content and Behaviour, Transportation Research Record 600*; T. M. Mast and J. A. Ballas, 1976
- Electrical Design Manual*; Ministry of Transportation, Ontario, 1989
- Electrical Maintenance Manual*; Ministry of Transportation, Ontario, 1989
- Environmental & Transportation Planning: Civilized Streets – A Guide to Traffic Calming*; 1992
- Equipment and Material Standards of the Institute of Transportation Engineers*; Institute of Transportation Engineers, Publication ST-017, 1995
- FHWA Pedestrian and Bicyclist Safety and Accommodation*; 1996
- FHWA Study Tour for Pedestrian and Bicyclist Safety in England, Germany and the Netherlands*; 1994
- Freeway Management Handbook*; Federal Highway Administration (FHWA), U.S. Department of Transportation, 1997
- Geometric Design Manual*; American Association State Highway Officials, 1996
- Geometric Design Manual*; Ministry of Transportation Ontario, 1994
- Geometric Design Standards for Ontario Highways*; Ministry of Transportation Ontario, 1985
- Guide for the Design of High Occupancy Vehicle Facilities*; American Association of State Highway and Transportation Officials, 1992
- Guide to Traffic Engineering Practice – Traffic Signals*; Austroads, 1993
- Handbook for Construction Traffic Control Persons*; Construction Safety Association of Ontario, 1991
- High-Occupancy Vehicle Facilities*; Parsons Brinckerhoff Quade & Douglas, Inc., 1990
- Highway Capacity Manual*; Transportation Research Board, 1994
- Highway 401 – Freeway Traffic Management System Before and After System Implementation Study*; prepared for Ministry of Transportation of Ontario (MTO) by Delcan Corporation, 1992
- Highway Traffic Act (HTA)*; Office Consolidation, Revised Statutes of Ontario, 1990, Chapter H.8 and the Regulations thereunder (as amended), Queen's Printer for Ontario, March, 1996
- Human Factors Requirements for Real-Time Motorist Information Displays, vol. 1 – Design Guide*; Texas Transportation Institute, Report FHWA-RD-78-5, C. L. Dudek, R. D. Huchingson, et al., September 1978

- Implementing Effective Travel Demand Management Measures*; Institute of Transportation Engineers (ITE), 1993
- King's Highway Guide Signing Policy Manual*; Ministry of Transportation Ontario, 1990
- Left Turn Phase Criteria*; Metro Transportation (Toronto), 1995
- Manual of Geometric Design Standards for Canadian Roads*; Transportation Association of Canada, 1998
- Manual of Uniform Traffic Control Devices (MUTCD)*; Ministry of Transportation, Ontario, 1995
- Manual on Uniform Traffic Control Devices (2003 Edition)*; U.S. Department of Transportation
- Manual of Uniform Traffic Control Devices for Canada (MUTCDC)*; Fourth Edition, Transportation Association of Canada, 1997 and subsequent revisions
- Metro HOV Monitoring Program
- Metro Transportation, Enhanced Loop Sensitivity for Bicycle Detection at Traffic Signals in Metropolitan Toronto*; 1995
- Metropolitan Toronto High Occupancy Vehicle Network Study*; prepared for Metropolitan Toronto Transportation Department by McCormick Rankin, 1992
- MTO Draft Operational Design Guidelines for HOV Lanes on Ontario Provincial Roadways*; 1992
- MTO HOV Best Practices Guidelines*; 1997
- MTO HOV Facilities on Provincial Highways (draft)*; 1997
- MTO High Occupancy Vehicle Opportunities, Incentives and Examples*; 1993
- MTO Ontario Bikeways Planning and Design Guidelines*; 1996
- MTO Operational Design Guidelines for High Occupancy Vehicle Lanes on Arterial Roadways Including Planning Strategies and Supporting Measures*; 1994
- Municipal Act*; Queen's Printer, 1990
- Municipal Act*; Revised Statutes of Ontario, 1990
- Municipal Road Design – At Grade Intersections*; Ministry of Transportation, Ontario and Municipal Engineering Association, 1995
- Occupational Health and Safety Act (OHSA)*; Revised Statutes of Ontario, Queens Printer for Ontario, 1978
- Occupational Health and Safety Act (OHSA) and Regulations*; Revised Statutes of Ontario, Queens Printer for Ontario, 2001
- Occupational Health and Safety Act and Regulations for Construction Projects*; Revised Statutes of Ontario, 1990, Revised Regulations of Ontario 213/91, 2001
- Ontario Highway Bridge Design Code (Third Edition)*; Ministry of Transportation, Ontario, 1992
- Ontario Highway Bridge Design Code*; Ministry of Transportation, Ontario, 1994
- Ontario Provincial Specification Standards (OPSS)*; Ministry of Transportation Ontario and Municipal Engineering Association
- Ontario Provincial Standard Drawings, Volume 3, Electrical Drawings, Division 1000*; Ministry of Transportation, Ontario and Municipal Engineering Association
- Ontario Traffic Manual*; Books 1A, 1B, 1C, 2, 3, 4, 5, 6, 7, 10, 11, 12, 18, 19, 22, 1998, 2000 and 2001
- Ontario Traffic Manual, Books 1 to 12*; University of Toronto Press, various dates
- Ontario Traffic Signal Control Equipment Specifications*; Ministry of Transportation, Ontario, 1994
- Operational Design Guidelines for High Occupancy Vehicle Lanes on Arterial Roadways*; prepared for Ministry of Transportation of Ontario (MTO) by McCormick Rankin, 1994
- Optical Performance Functional Specification for Discontinuous Variable Message Signs*; Highway Agency U.K. Specification TR 2136 (Issue B), November 1998
- Pedestrian Crossing Time at Signalised Intersections*; Metro Transportation (Toronto), Traffic Branch Operating Practice, 1995

- Preemption of Traffic Signals At or Near Active Warning Railroad Grade Crossings;* Recommended Practice For, ITE, 1979, and Revised Committee Draft, January 1997
- Proposed Interim Purchase Specification: Light Emitting Diode (LED) Vehicle Traffic Signals Assemblies;* ITE Publication ST-021, Institute of Transportation Engineers
- Proposed PCMS Message Format for Incident Management / Construction Closures on Standard Provincial Highways;* Ministry of Transportation Ontario, 1999
- Protection of Workers in a Work Zone from Errant Vehicles;* O. Colavincenzo and M. Harmelink, Dillon Consulting Ltd., 2001
- Public Transportation and Highway Improvement Act;* Revised Statutes of Ontario, 1990, Revised Regulations of Ontario, 1986
- Public Transportation and Highway Improvement Act;* Queen's Printer, 1990
- Quality Standards for Work Zone Traffic Control Devices;* American Traffic Safety Services Association, 1993
- Recommended Procedures for the Safety Performance Evaluation of Highway Features;* NCHRP Report 350, Transportation Research Board, Washington D.C., 1993
- Regulations for Railway and Roadway Level Crossings;* Queen's Printer for Canada, April 1994
- Road Safety – Speed Moderation;* European Conference of Ministers of Transportation, 1996
- Roadside Guide Manual;* Software Version 5.0, AASHTO
- Roadside Safety Manual;* Ministry of Transportation, Ontario, 1993
- Roadside Safety Manual;* Ministry of Transportation, Ontario, 1995
- Roadway Delineation Practices Handbook;* U. S. Federal Highways Administration (FHWA), 1994
- Roundabout Design Guidelines;* Ourston and Doctors, 1995
- RTAC Guidelines for the Design of Bikeways;* 1993
- Safer Roads – A Guide to Road Safety Engineering;* K.W. Ogden, Avebury Publications, 1996
- Safety Impacts Associated with Installation of High Occupancy Vehicle Lanes;* 1988
- Safety, Speed & Speed Management: A Canadian Review;* Traffic Engineering Handbook; Institute of Transportation Engineers
- School Bus Stop Ahead Sign;* Traffic Program Management Operational Policy, Ministry of Transportation of Ontario, 1997
- Section U.D. 18 Urban Supplement to the Geometric Design Guide for Canadian Roads;* Transportation Association of Canada, 1995
- Signalisation des Voies Cyclables;* Ministère des Transport Quebec, 1989
- Specification D 4956-95;* American Society for Testing and Materials, 1995
- Specification 62-GP-11M;* Canadian General Standards Board, 1978 (Amendment No. 1, 1987)
- Speed Reduction in 24 Villages: Details From the VISIP Study;* Department of Transport, 1994
- Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals;* American Association of State Highway and Transportation Officials (AASHTO), 1992
- TAC Bikeway Traffic Control Guidelines (Draft);* 1997
- TAC Guide To Neighbourhood Traffic Calming (Draft);* 1997
- TAC In-Line Skating Review – Phase 2;* 1997
- TAC Urban Supplement to the Geometric Design Guide for Canadian Roads;* 1995
- Technical Handbook of Bikeway Design;* Vélo Québec, 1992
- Technology Evaluation for Changeable Message Signs, Volume 1, Summary Report;* Ontario Ministry of Transportation, 1989
- Technology Evaluation of CMS;* McCormick Rankin, 1989

- Temporary Conditions Traffic Management: Advance Notification, Advance Warning and Alternative Route Signing for Provincial Highways in MTO Central Region*; Ministry of Transportation Ontario, 2000
- Tourism-Oriented Directional Signing (TODS) Policy*; Province of Ontario, 1995
- Traffic Control Devices Handbook*; Institute of Transportation Engineers (ITE)
- Traffic Control Devices Handbook*; U.S. Department of Transportation, Federal Highway Administration, 1983
- Traffic Control Devices on Federal-Aid and Other Streets and Highways; Color Specifications for Retroreflective Sign and Pavement Marking Materials*; Federal Highway Administration Federal Register, Vol. 64, No. 244, December 21, 1999, 23 CFR Part 655, Proposed Changes
- Traffic Control Signal Timing and Capacity Analysis at Signalised Intersections*; Ministry of Transportation, Ontario, 1989
- Traffic Control Systems*; NEMA Standards Publication No. TS 1, National Electrical Manufacturers Association, 1989
- Traffic Control Systems Handbook*; Institute of Transportation Engineers (ITE), 1995
- Traffic Controller Assemblies*; NEMA Standards Publication No. TS 2, National Electrical Manufacturers Association, 1992
- Traffic Engineering Handbook*; Institute of Transportation Engineers, 1992
- Traffic Engineering Handbook (5th Edition)*; Institute of Transportation Engineers, 1999
- The Traffic Safety Toolbox, A Primer on Traffic Safety*; ITE publication, 1993
- Traffic Signal Control at Offset Intersections*; Report to Transportation Committee, Metro Transportation, 1991
- Traffic Signing Handbook*; Institute of Transportation Engineers, 1997
- Traffic and Transportation Engineering Handbook*; Institute of Transportation Engineers (ITE)
- Training Program – FTMS*; Beijing-Tianjin-Tanggu Expressway Project, Ministry of Transportation of Ontario (MTO), 1993
- Transportation Expressions*; U.S. Department of Transportation, Bureau of Transportation Statistics, 1996
- Transportation Planning Handbook*; Institute of Transportation Engineers, 1992
- Transportation and Traffic Engineering Handbook*; Institute of Transportation Engineers, 1982
- Transportation and Traffic Engineering Handbook*; Institute of Transportation Engineers, 1999
- U.S. DOT High Occupancy Vehicle Guidelines for Planning, Design, and Operations*; 1991
- Users Guide to Positive Guidance*; French Languages Services Act (FHWA), 1977
- Vehicle Traffic Control Signal Heads*; ITE Publication ST-107, Institute of Transportation Engineers
- Workplace Hazardous Materials Information System*; Health Canada, administered through federal and provincial ministries, 2000.



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