TENDER DOCUMENTS

SUBSECTION 6.14

TRAFFIC CONTROL
AND TEMPORARY SIGNAGE

TABLE OF CONTENTS

PAGE

SUBSECTION 6.14 TRAFFIC CONTROL AND TEMPORARY SIGNAGE

6.14.1 GENERAL

6.14.1.1 This subsection describes the requirements for traffic control and temporary signage to be provided for any intervention affecting traffic on the Owner's structures, which include the Jacques Cartier Bridge and the federal portion of the Honoré Mercier Bridge as well as the approaches thereto, the Melocheville Tunnel, the Estacade and the federal portion of the Bonaventure Expressway.

6.14.1.2 The Owner's traffic control and temporary signage requirements take into account the standards referred to in Article 6.14.3 *Reference Standards* of this subsection (hereinafter "*Reference Standards*"). The purpose of the Owner's requirements is not to repeat the requirements of these standards, but rather to define the Owner's specific requirements for signage on the structures under its management in view of the high volume of traffic. The requirements are also intended to minimize the risk of incidents during work and to reduce inconvenience to users.

6.14.1.3 These traffic control and temporary signage requirements take into consideration the particular conditions encountered on the Owner's road network. The main adjustments to the minimum requirements of the Reference Standards take into account, as a first step, the speed used for the purpose of designing the temporary signage. Rather than relying on the posted speed limit, the actual speed (which is higher in some places than the posted speed limit) was used to increase safety in the work zones. This results in greater perception, stopping sight, decision sight and decision-making distances. The temporary signage upstream of the work zones was therefore adjusted and the lengths of the tapers increased. As a second step, the distance between the visual markers are or could be reduced in some locations according to the temporary signalization plans and the Engineer's directives in order to avoid users infiltrating the work zones or the buffer zones during traffic congestion. Finally, the quantity of a number of temporary traffic control devices is increased to take into account the speed of traffic, and to compensate for the reduced visibility resulting from the presence of many heavy vehicles on the Owner's road network.

6.14.1.4 Although the Reference Standards apply to this Contract, this subsection describes a significant number of different and more binding measures.

6.14.1.4.1 The Contractor remains responsible at all times for the temporary signage implemented on its worksite.

6.14.1.4.2 In case of conflict or discrepancy between the requirements of the Reference Standards and those of this subsection, the most stringent requirements shall apply.

6.14.1.5 The expression "Traffic Management and Control Plan" in this subsection means everything that the Contractor is required to provide and all the work that the Contractor is required to carry out under this Contract that relates to traffic control and temporary signage.

6.14.1.6 The expression, "Global Traffic Management Plan" in this subsection means the overall measures developed by the Engineer to ensure the coordination of the Owner's various construction sites. The Contractor's Traffic Management and Control Plan shall be integrated with the Owner's Global Traffic Management Plan.

6.14.1.7 The following definitions of work durations, as prescribed by the Reference Standards, apply to this Contract. However, the nature of the temporary signage work and the measures recommended may differ significantly from the Reference Standard for each category of work duration:

6.14.1.7.1 very short duration work: work to be completed within thirty (30) minutes;

6.14.1.7.2 short duration work: work to be completed within twenty-four (24) hours;

6.14.1.7.3 long duration work: work requiring more than twenty-four (24) hours to be completed;

6.14.1.7.4 mobile work: work involving a vehicle moving at a speed of at least 5 km/h and at most 20 km/h (slow-moving work) or of at least 20 km/h and at most 60 km/h (fast-moving work).

6.14.1.8 The expression “contraflow lane” means any lane in which the direction of traffic at the time the work is carried out is in the opposite direction to that normally prevailing in that lane.

6.14.1.9 The Contractor shall design, provide, install and maintain all temporary signage required to properly direct vehicular, pedestrian and cyclist traffic on the worksite at all times. The signage shall be carried out in accordance with this subsection, Section 4 *Special Technical Conditions*, the Owner’s signalization plans, the plans and the requirements of the Reference Standards.

6.14.2 MEASUREMENT UNITS

6.14.2.1 The measurement units and respective symbols thereof used in this subsection are described as follows:

Measurement Unit	Designation	Symbol
length	meter	m
length	millimeter	mm
length	kilometer	km
mass	kilogram	kg
volume	liter	L
time	hour	h
time	minute	min

6.14.3 REFERENCE STANDARDS

6.14.3.1 The Contractor shall carry out all work related to traffic control and temporary signage in accordance with the requirements of the following standards and documents to which the provisions of this Contract are added:

6.14.3.1.1 (MTQ) Ministère des Transports du Québec:

- MTQ – *Cahier des charges et devis généraux* (CCDG);
- MTQ – *Normes – Ouvrages routiers* – Tome I *Conception routière*;
- MTQ – *Normes – Ouvrages routiers* – Tome V *Signalisation routière*;
- MTQ – *Normes – Ouvrages routiers* – Tome VII *Matériaux*:
    - 14101 *Pellicules rétroréfléchissantes*;
- MTQ – *Normes – Ouvrages routiers* – Tome VIII *Dispositifs de retenue*.

6.14.3.1.2 (NCHRP) National Cooperative Highway Research Program:

- NCHRP Report 350 *Recommended Procedures for the Safety Performance Evaluation of Highway Features*.

6.14.4 TEMPORARY SIGNAGE PLANNING

6.14.4.1 TRAFFIC MANAGEMENT AND CONTROL PLAN

6.14.4.1.1 The Traffic Management and Control Plan shall include, without however being limited to, the following:

6.14.4.1.1.1 plans of the temporary signage planned for each of the different scenarios of lane closures, diversion or contraflow of road traffic (vehicles, bicycles and pedestrians) contemplated by the Contractor in the course of carrying out its work;

6.14.4.1.1.2 traffic diversion plans, including, where necessary, the alternative routes and detours or bypasses proposed and signposted to users;

6.14.4.1.1.3 protocol (dates, schedules and sequence of operations) for lane closures and reopenings as well as implementation of signage, markings and traffic control devices;

6.14.4.1.1.4 restrictions including, without limitation, the weight, speed and dimensions;

6.14.4.1.1.5 programming of user information including, without limitation, the communication plan and variable message signs;

6.14.4.1.1.6 means the Contractor intends to take to ensure effective management of the temporary signage.

6.14.4.1.2 The Contractor's Traffic Management and Control Plan shall be developed jointly and in coordination with the Owner and shall be integrated with the Owner's Global Traffic Management Plan. In this regard, the Contractor shall collaborate with the Engineer, the other contractors, the MTQ, the cities concerned or any other stakeholder involved in the road traffic management in the Greater Montreal area. The Traffic Management and Control Plan shall be submitted to the Engineer, for review, at least fourteen (14) days prior to the start of the Contractor's work on the worksite.

6.14.4.1.3 The Contractor's temporary road signage shall be designed and installed so as to guide the user throughout its travel. It shall clearly illustrate the route to follow and give users advance notice of any potential dangers. It shall thus allow users to adapt their driving behavior to the various situations they may encounter, and enable them to anticipate any manoeuvre and be prepared for it.

6.14.4.1.4 The temporary signage shall:

6.14.4.1.4.1 be bilingual (French and English) across the Owner's territory;

6.14.4.1.4.2 be in French on the property of the MTQ, cities and boroughs;

6.14.4.1.4.3 be uniform, homogeneous and completely integrated with the peripheral road signage;

6.14.4.1.4.4 attract attention;

6.14.4.1.4.5 be perfectly visible and legible at the required standardized distances;

6.14.4.1.4.6 be intelligible, easy to understand;

6.14.4.1.4.7 be in new condition;

6.14.4.1.4.8 be well adapted to the dangers and specific situations to be signalled.

6.14.4.1.5 The implementation of the worksite signage shall:

6.14.4.1.5.1 comply with the signage and traffic management rules described in this subsection in order to ensure the safety of users and workers;

6.14.4.1.5.2 be carried out according to well-defined procedures agreed between the stakeholders involved, in particular the Engineer and the Contractor;

6.14.4.1.5.3 allow users to be informed of the start and end dates of the work.

6.14.4.2 PREPARATION OF THE TEMPORARY SIGNAGE PLANS

6.14.4.2.1 The temporary signage plans shall indicate the following: new signs, devices and markings added, permanent devices temporarily removed or masked, and minimum lane width requirements and shall be designed to:

6.14.4.2.1.1 indicate hazards;

6.14.4.2.1.2 ensure the safety of users of both the lanes affected by the work and those adjacent to the work;

6.14.4.2.1.3 ensure the safety of workers during the execution of the work;

6.14.4.2.1.4 provide users with any relevant indications or information;

6.14.4.2.1.5 take into account the local particularities including, without limitation, the geometry and actual speed of vehicles.

6.14.4.2.2 For each required configuration, the temporary signage plans submitted shall contain, at a minimum, the following information:

6.14.4.2.2.1 diagram showing the geometry and profile of the affected structure as well as the route of the detour road;

6.14.4.2.2.2 identification of the proposed work area;

6.14.4.2.2.3 implementation (position, distance, alignment) and symbolic of the traffic control signs and any other proposed devices;

6.14.4.2.2.4 sequential grouping of the devices according to the order in which to be installed and removed;

6.14.4.2.2.5 any explanatory notes required for a proper understanding of the proposed implementation;

6.14.4.2.2.6 operating schedule for each suggested configuration, where applicable;

6.14.4.2.2.7 an appropriate legend conforming to the Owner's standards;

6.14.4.2.2.8 permanent speed limits signs along with the stationing and kilometer reference.

6.14.4.2.3 All the Contractor's temporary signage plans shall be signed and sealed by an engineer who is specialized in the field and a member of the *Ordre des ingénieurs du Québec* (OIQ), and has at least five (5) years of relevant experience.

6.14.4.2.4 The Contractor shall submit to the Engineer the plans of the temporary signage that the Contractor intends to install on and in the vicinity of the worksite. The Engineer reserves a period of fourteen (14) days to review said plans. The Contractor shall make the necessary corrections taking into account the Engineer's comments. No signage installation work by the Contractor shall be permitted until written authorization from the Engineer has been issued.

6.14.4.2.5 The temporary signage plans shall be drawn at a minimum scale of 1:1000. However, the plans showing the signage for contraflow lanes or for specific situations not described in this subsection or in the Reference Standards shall be drawn at a minimum scale of 1:500.

6.14.4.2.6 The Contractor shall position the work zone signs so that the delineation of the work zone and tapers thereof does not begin in a vertical curve, such as the top of a bridge, or in a horizontal curve.

6.14.4.2.7 The tapers shall start on a straight segment where the visibility is at least 200 m at all points.

6.14.4.2.8 In order to assist the Contractor in the preparation of its signage plans, the Owner may, upon request and subject to availability, provide plan templates of the Owner's network, to be used for that purpose.

6.14.4.3 AUTHORIZED LANE CLOSURES

6.14.4.3.1 Unless otherwise indicated on the plans, lane closures on the Owner's property are permitted only as indicated in the *Table(s) of Lanes to be Maintained Open* provided by the Owner. For purposes of applying these tables, the following statutory holidays shall be considered as Saturdays or Sundays: Victoria Day, Saint-Jean-Baptiste Day, Canada Day, Labour Day and Thanksgiving Monday. Furthermore, no lane closures are permitted in the afternoon of the day before a statutory holiday or a long weekend. These tables shall be complied with at all times.

6.14.4.3.2 In addition to the requirements mentioned in paragraph 6.14.4.3.1 of this subsection, for work to be carried out on structures with more than two (2) traffic lanes in one direction and with a posted speed limit greater than 50 km/h, or if indicated on the plans or if so required by the CNESST, the Contractor shall comply with the following specific elements:

6.14.4.3.2.1 In the presence of workers not protected by a rigid barrier in a traffic lane, the Contractor shall also close the lane adjacent to said lane in order to increase the level of safety of the persons working on the structure, unless special authorization has been obtained from the Engineer.

6.14.4.3.2.1.1 Notwithstanding the foregoing, the installation and removal of the traffic control devices shall be carried out by closing only one (1) lane.

6.14.4.3.2.1.2 Notwithstanding the foregoing, the installation of worksite concrete barriers shall be carried out by closing two (2) lanes.

6.14.4.3.2.1.3 Such double or single lane closures are permitted only according to the *Table(s) of Lanes to be Maintained Open* provided by the Owner.

6.14.4.3.2.1.4 When double lane closures occur, the amount of reduction in the Contract price, as described in Article 6.14.12 *Traffic Hindrance Minimization System*, shall apply to each of the closed lanes. In such a case, the reduction of the price of this Contract shall be $100/hr/lane x 2 lanes.

6.14.4.3.3 All work, removal of signage and evacuation of workers shall be completed and all lanes open to traffic according to the schedules specified in the *Table(s) of Lanes to be Maintained Open* provided by the Owner. No extensions of these hours will be granted by the Engineer.

6.14.4.3.4 Any early closure, delay in reopening the traffic lanes, unauthorized closure as well as any closure resulting from defect in the work in contravention of the requirements of this Contract will result in the application of Article 5.35.5 *Damages arising from Closure of Vehicular Traffic Lanes* of Section 5 *Standard Administrative Conditions*.

6.14.4.3.4.1 A lane that is open to traffic but considered by the Engineer to be unsafe for road users, such as traffic on a milled surface, will result in the application of Article 5.35.5 *Damages arising from Closure of Vehicular Traffic Lanes* of Section 5 *Standard Administrative Conditions*.

6.14.4.3.5 In order to minimize its impact on traffic flow, the work shall be carried out so as to minimize hindrances on the Owner's road network. The Engineer may refuse the Contractor's sequences of work that unduly penalize road users when other alternatives exist.

6.14.4.3.6 The Engineer may refuse the reopening of the traffic lanes for safety reasons notably because of missing traffic control signs, lack of cleanliness of the worksite, or missing or unremoved pavement marking. In such cases, any delay in the reopening of traffic lanes will result in the application of Article 5.35.5 *Damages arising from Closure of Vehicular Traffic Lanes* of Section 5 *Standard Administrative Conditions*.

6.14.4.3.7 All lane closures shall be authorized in advance by the Engineer according to the Owner's procedure provided to the Contractor. The Contractor shall submit its request for closure to the Engineer within the time limits specified in the form attached in Appendix 4.14-I *Request for Specific Interventions*.

6.14.4.3.8 The Owner reserves the right to refuse the closure of one or more lanes or to modify the time slots thereof in order to avoid closures in conflict with the work of the other contracts that is being carried out at the same time as the work of this Contract, on a portion or in the vicinity of the Contractor's worksite.

6.14.4.3.9 If the Contractor wishes to carry out an intervention on the MTQ's network, the Contractor shall, at least fourteen (14) days prior to the commencement of each intervention, submit a request to the MTQ in accordance with the requirements of the MTQ and within the timeframe prescribed thereby, and obtain authorization therefrom.

6.14.4.3.10 Where the Contractor wishes to carry out an intervention on the municipal network, the Contractor shall, prior to the commencement of each intervention, obtain from the borough or municipality concerned a ***Permis d'occupation ou d'obstruction temporaire du domaine public*** or any other required permit.

6.14.4.3.10.1 The Contractor is responsible for obtaining information from the relevant departments on the applicable deadlines and the documents to be provided for the processing of the permit application.

6.14.4.3.11 The Contractor shall provide the Engineer, prior to the commencement of each intervention, with a copy of the authorization or permit referred to in paragraphs 6.14.4.3.9 and 6.14.4.3.10 of this subsection, if applicable.

6.14.4.4 ROAD TRAFFIC MANAGEMENT

6.14.4.4.1 The Contractor shall carry out the work under this Contract in such a way so as not to interfere with road traffic, except as authorized by the Engineer in exceptional circumstances that are necessary due to the nature of the work.

6.14.4.4.2 The Contractor shall always comply with the Engineer's instructions regarding the prompt reopening of a lane when the situation so requires, even during off peak-hours. The Contractor shall not be entitled to claim compensation for the movement of its work teams from one place to another on the worksite.

6.14.4.4.2.1 The Engineer may request the reopening of the lanes during a peak period when, in his opinion, the progress of the Contractor's work so allows.

6.14.4.4.3 The Contractor shall provide and maintain a sufficient number of traffic control signs, barriers, light signals, signal arrows, worksite concrete barriers and any other equipment necessary to direct and control road traffic.

6.14.4.4.4 With respect to all detour roads or lanes, the Contractor shall obtain, at its expense, all required permits from the relevant authorities.

6.14.4.4.5 The Contractor shall protect road traffic against any damage that may result from its work (including, in particular, during the entry and exit of trucks) and provide the required traffic control persons and, if necessary the required number of escort vehicles.

6.14.4.4.6 In the event of an accident or incident on or near the worksite, the Contractor shall immediately contact the Cartier-Champlain *Sûreté du Québec* station at 514-596-7379 in order to inform the dispatchers of the situation on the site. The Contractor and shall also notify the Engineer thereof.

6.14.4.5 SIGNAGE CREW

6.14.4.5.1 Prior to the kick-off meeting, the Contractor shall appoint and have approved by the Engineer a signage manager, who shall be the only representative authorized by the Contractor to have signage installed and modified.

6.14.4.5.2 The signage manager shall be an employee of the Contractor and shall actively participate in the planning of lane closures. He shall attend all worksite meetings and all daily planning meetings.

6.14.4.5.3 The Contractor's signage manager as well as the foreman of the temporary signage subcontractor, if any, shall have successfully completed courses STC-102 or STC-SUP *Supervision et surveillance de la signalisation de chantier routier* and STC-201 *Gestion des impacts des travaux routiers sur la circulation* or STC-GES-2 *Gestion des impacts des travaux routiers* given by the *Association québécoise des transports* (AQTr) and shall hold a valid certificate issued by the AQTr for the duration of the work.

6.14.4.5.4 The workers in charge of traffic control and temporary signage, including the traffic control persons, shall be at least eighteen (18) years old, have successfully completed the STC-102 or STC-SUP course given by the AQTr and hold a valid certificate issued by the AQTr for the duration of the work.

6.14.4.5.5 At the kick-off meeting, the Contractor shall provide the Engineer with the list of all its personnel assigned to signage and forming its signage crews, together with a copy of their certificates of successful completion of the required training, failing which the Contractor will not be authorized to commence the work.

6.14.4.5.6 The Contractor's signage manager shall be present on the worksite during all movements of signs and phase changes.

6.14.4.5.7 The Contractor's signage manager may be replaced by another member of the Contractor's personnel for certain work, with the prior authorization of the Engineer. The substitute shall meet the training requirements set out in paragraph 6.14.4.5.3 of this subsection.

6.14.4.5.8 Prior to starting any signage work, the Contractor's signage manager shall contact the Engineer to obtain authorization to commence the work and shall notify him in real time of any changes or developments. The signage manager shall be reachable at all times. To this end, the Contractor shall provide its signage manager with a cell phone, which shall include a message processing service, and be operational at all times.

6.14.4.6 TRUCK-MOUNTED ATTENUATOR (TMA)

6.14.4.6.1 During the closing or the opening of a traffic lane or during the implementation of a contraflow, the Contractor shall always equip the upstream vehicle with an impact attenuator. Such vehicle shall also be used during very short duration work, mobile work or work near lanes open to traffic.

6.14.4.6.2 The impact attenuator shall be connected to the rear of the vehicle and be a TMA, approved in accordance with standard NCHRP Report 350, and designed for a speed of at least 100 km/h (level TL-3).

6.14.4.6.3 Every TMA-equipped truck shall have a gross vehicle mass (including the TMA) that meets the requirements of the manufacturer of the model used, and have a flashing luminous signal arrow, rotating beacons and Type III retroreflective strips on the sides and rear in accordance with MTQ standard 14101.

6.14.4.6.4 The personnel assigned to drive a TMA-equipped truck shall be assigned to this task exclusively.

6.14.4.7 ESCORT VEHICLE

6.14.4.7.1 The Contractor shall provide, operate and maintain, throughout the duration of any closures of one or more lanes, an escort vehicle whose function is the following:

6.14.4.7.1.1 continuously operate in the traffic lanes at the permitted speed when contraflow lanes are in use;

6.14.4.7.1.2 make at least one passage every hour in all other cases.

6.14.4.7.2 The duties of the escort vehicle operator shall include, without limitation, the following:

6.14.4.7.2.1 contacting the *Sûreté du Québec* for off-site towing of any disabled vehicle requiring such service;

6.14.4.7.2.2 reinstalling or replacing defective signage;

6.14.4.7.2.3 removing any obstructions or debris of any kind and passing on to the Contractor's works superintendent any information regarding any misplaced or inoperative signage that may impede or interfere with the proper functioning of the traffic lanes;

6.14.4.7.2.4 facilitating the exit and entry of vehicles in the work area.

6.14.4.7.3 The escort vehicle shall have the following characteristics:

6.14.4.7.3.1 be a pick-up truck;

6.14.4.7.3.2 have a gross vehicle mass of at least 2,700 kg;

6.14.4.7.3.3 have insurance coverage in accordance with the requirements of Section 9 *Contract Security and Insurance Conditions* of this Contract.

6.14.4.7.4 Every escort vehicle shall contain or be equipped with the following:

6.14.4.7.4.1 one (1) shovel;

6.14.4.7.4.2 one (1) broom (brush);

6.14.4.7.4.3 one (1) first aid kit;

6.14.4.7.4.4 one (1) Class ABC fire extinguisher with a minimum size of 5 kg;

6.14.4.7.4.5 twenty-four (24) signalling flares;

6.14.4.7.4.6 three (3) 20 kg bags of absorbent material;

6.14.4.7.4.7 three (3) 20 kg bags of abrasive;

6.14.4.7.4.8 three (3) 20 kg bags of cold asphalt;

6.14.4.7.4.9 one (1) cellular telephone;

6.14.4.7.4.10 rotating beacons and a directional luminous signal arrow conforming to the Reference Standards;

6.14.4.7.4.11 be equipped with a wide Type III retroreflective strip in accordance with MTQ standard 14101 on the sides and rear of the vehicle;

6.14.4.7.4.12 bear a "*Patrouille"* identification on the rear (with reflective material).

6.14.4.7.5 Upon written request of the Engineer, the Contractor shall provide any missing or replacement equipment within twenty-four (24) hours.

6.14.4.8 WORK ZONE SIGNAGE

6.14.4.8.1 Required signage

6.14.4.8.1.1 The Contractor shall use one (1) signal arrow for each lane that is completely or partially closed to traffic. The signal arrows shall be installed to close a lane even in cases where there is a lane control signal system to indicate that one or more lanes or ramps are closed. The signal arrow shall meet the requirements of this subsection as well as those of the Reference Standards. It shall be used in accordance with these documents during all phases of the work and for all situations encountered.

6.14.4.8.2 Visual markers

6.14.4.8.2.1 Unless otherwise indicated on the plans, the only visual markers authorized are T-RV-1 directional chevrons and non-metallic T-RV-2 beacons or T-RV-7 beacons, or equivalent authorized by the Engineer. The use of cones is prohibited.

6.14.4.8.2.2 The visual markers used shall meet the Reference Standards requirements in terms of shape, colour and reflection coefficient of their retroreflective film. The visual markers shall be new, in sufficient numbers, clean and well positioned, both in operation and out of operation.

6.14.4.8.2.3 The spacing between the visual markers, Variable E described in *Chapitre* 4 *Travaux* of *Tome V* of the MTQ, shall be no more than 10 m. The spacing in the tapers shall be no more than 5 m. The maximum spacing between visual markers for the closure of an entrance or exit ramp shall be 2 m.

6.14.4.8.2.4 In tapers, the directional chevrons shall be spaced not more than 10 m apart for 75 m tapers or not more than 20 m apart for 150 m tapers.

6.14.4.8.2.5 In the tapers that serve to reduce the number of available lanes, the Contractor shall use T-RV-1 directional chevrons as visual markers.

6.14.4.8.2.6 At the location of the diversion, the Contractor shall install directional chevrons in the curves every 10 m. The height of the chevrons measured from the level of the roadway to its lower edge shall be 1,200 mm.

6.14.4.8.2.7 For all situations encountered, the spacing between the signs (Variable B, described in *Chapitre* 4 *Travaux* of *Tome V* of the MTQ) and between the visual markers shall correspond to that indicated on the signalization plans provided by the Owner and on the plans.

6.14.4.8.2.8 As an indication, Table 1 summarizes the spacing shown on the signalization plans for posted speed limits of 50 km/h and 70 km/h.

Table 1: Owner's Requirements for Spacing

		Posted Speed	
		50 km/h	**70 km/h**
D	(Lane width)	3.65 m	3.65 m
L	(Taper length)	75 m	150 m
E	(Visual marker spacing – Lanes)	10 m	10 m
E	(Visual marker spacing – Tapers)	5 m	5 m
E_b	(Spacing between chevrons in 75 m tapers)	10 m	10 m
E_b	(Spacing between chevrons in 150 m tapers)	20 m	20 m
E_c	(Spacing between visual markers in contraflow lanes)	10 m	10 m
B	(Spacing between signs)	75 m	125 m

6.14.4.8.2.9 When lanes are closed, acceleration and deceleration lanes shall be provided. Such lanes shall be at least twice the length of the tapers, Variable L. The tapers shall be delineated in accordance with *Tome V Signalisation routière* of the MTQ, but the length thereof shall be as shown on the signalization plans provided by the Owner. Said signalization plans shall not relieve the Contractor of the obligation to provide its own signalization plans.

6.14.4.8.3 Work zone signs

6.14.4.8.3.1 The work zone signs shall have an orange background and be equipped with fluorescent type VII retroreflective film in accordance with MTQ standard 14101. The signs shall be new, clean, in sufficient numbers and well positioned in accordance with the Reference Standards, both in operation and out of operation.

6.14.4.8.3.2 The use of pictograms shall be preferred to lettering. The pictograms shall comply with the requirements of *Chapitre* 4 *Travaux* of *Tome V* of the MTQ.

6.14.4.8.3.3 The lettering on the signs shall be in both official languages (French and English) and appear on two (2) different signs.

6.14.4.8.3.4 In the locations where it is required, the Contractor shall provide adequate signage for motorcyclists, cyclists and pedestrians.

6.14.4.8.3.5 Under no circumstances shall the work zone signs completely or partially hide the permanent signage in place.

6.14.4.8.3.6 When taken out of service, the signs shall be covered with a rigid cover in accordance with Article 4.44 *Masquage des panneaux* of *Tome V Signalisation routière* of the MTQ.

6.14.4.9 INSTALLATION OF TEMPORARY SIGNAGE DEVICES

6.14.4.9.1 The signage devices used for securing work areas shall be:

6.14.4.9.1.1 installed from the furthest point towards the work area prior to the start of the work;

6.14.4.9.1.2 installed in sufficient numbers according to the location and in accordance with the Owner's signalization plans, the MTQ *Tome V* standardized drawings and the Contractor's temporary signage plans, signed and sealed by an engineer who is a member of the OIQ;

6.14.4.9.1.3 in good working order (reflectivity, brightness, etc.);

6.14.4.9.1.4 visible at the decision sight distance, or twice the stopping sight distance.

6.14.4.9.2 When installing and removing temporary signage, the Contractor shall ensure that occupational health and safety requirements are met and that the Owner's safety requirements are met. The signage crew shall be protected by a vehicle equipped with an impact attenuator, in accordance with Article 6.14.4.6 *Truck Mounted Attenuator (TMA)*, positioned upstream of the traffic.

6.14.4.9.2.1 The Contractor shall also provide, install, clean and maintain all appropriate traffic control signs, worksite concrete barriers and visual markers, to the satisfaction of the Engineer.

6.14.4.9.2.2 The Contractor shall ensure that the advance warning signs are installed outside of the traffic lanes. With respect to signs installed on a bridge, they shall be placed, by the Contractor, on the lateral barriers or on fixed objects outside the traffic lanes. The fasteners and supports shall be capable of withstanding the force of the wind and the turbulence created by passing trucks. The type of fasteners used shall be the subject of an installation certificate signed by an engineer who is a member of the OIQ. The anchors shall be made of stainless steel.

6.14.4.9.2.2.1 The Contractor shall install the signs taking into account the passage of special vehicles, such as buses.

6.14.4.9.2.3 The Contractor shall install and maintain the traffic control signs, guardrails, barriers, light signals and signal arrows, and shall further position and keep the traffic control persons present on the worksite, throughout the duration of the work, in order to ensure the protection of the public, workers and structures, to the satisfaction of the Engineer.

6.14.4.9.2.4 The Contractor shall provide for the sequence of operations for the installation of the temporary signage, as well as for the safety measures and information signs that ensure the safety of users, both inside and outside its work area.

6.14.4.9.2.5 The Contractor shall not use any means to hold the signage devices in place other than the weights provided for that purpose. A minimum of two (2) weights shall be used to hold each device in place.

6.14.4.9.2.6 All compliant signage measures and devices specified in the Contractor's Traffic Management and Control Plan shall be completely implemented before any construction work may commence.

6.14.4.10 MAINTENANCE OF TEMPORARY SIGNAGE DEVICES

6.14.4.10.1 The Contractor shall take the necessary measures to ensure that any signage device that is removed, soiled, vandalized, damaged or displaced is replaced or reinstalled within a maximum of twenty-four (24) hours after the problem is reported thereto by the *Sûreté du Québec*, the Engineer, an employee of the Owner or any other person. The Owner reserves the right to reduce the aforementioned time period based on the nature of the intervention. Should the Contractor fail to comply with these requirements or should the Owner be unable to reach the Contractor's representative within the same time period, corrective action will be taken by the Owner, the Engineer or the *Sûreté du Québec* at the Contractor's expense and the costs incurred by the Owner in that respect will be deducted from the amounts payable to the Contractor under this Contract.

6.14.4.10.2 The Contractor shall clean, repair or, as appropriate, replace the signage devices in order to maintain their clarity and reflectivity.

6.14.4.10.3 Where temporary signage equipment is in place, whether in operation or not, the Contractor shall provide the labour and equipment necessary for its maintenance.

6.14.4.11 MASKING OF SIGNAGE DEVICES DURING WORK

6.14.4.11.1 The permanent signage devices installed along or above a traffic lane which, for the duration or part of the duration of the work, are not useful for signage purposes or which give messages contradictory to temporary signage, shall either be removed or masked by means of totally opaque materials, both by day and by night.

6.14.4.11.2 The temporary signage devices previously installed along or above a traffic lane, for the entire duration or part of the duration of the work, which give messages contradictory to the signage planned for the current stage of the work shall either be removed or masked by means of totally opaque materials, both by day and by night.

6.14.4.12 REMOVAL OF TEMPORARY SIGNAGE DEVICES

6.14.4.12.1 The temporary signage devices shall be removed in the reverse order of their installation or in the specific sequence provided in the Traffic Management and Control Plan.

6.14.4.12.2 The Contractor shall thoroughly clean a closed lane before reopening it to traffic.

6.14.4.12.3 The signage crew shall be protected by a vehicle equipped with an impact attenuator positioned upstream of the traffic.

6.14.4.12.4 It is prohibited to leave temporary signage equipment, including traffic control signs and other devices, on traffic lanes or shoulders outside the working hours. The indications appearing on any temporary signage equipment moved to permitted locations shall not be visible from the traffic lanes.

6.14.4.12.5 No removed signage device shall be left on the Owner's road network, including the shoulders.

6.14.4.13 MAINTENANCE OF TRAFFIC LANES

6.14.4.13.1 The Contractor shall be responsible for the maintenance of the traffic lanes used by road users during the period of the work, within the limits of the worksite. More specifically, the Contractor shall, at a minimum:

6.14.4.13.1.1 patch the holes 25 mm deep and more on the traffic lanes and shoulders;

6.14.4.13.1.2 clean the asphalt surfaces on which traffic is maintained and keep them free of any debris, liquid or solid material, whether or not this material comes from the worksite;

6.14.4.13.1.3 take all necessary steps to prevent the deposit of such materials on the roadway and intervene immediately to remove them, should the need arise;

6.14.4.13.1.4 maintain the work area and traffic lanes in such a way that there is no dust generation;

6.14.4.13.1.5 ensure proper drainage of the roadways;

6.14.4.13.1.6 carry out any other work necessary to maintain traffic flow.

6.14.4.14 ENTRIES AND EXITS FROM THE WORK AREAS

6.14.4.14.1 The vehicles entering the work area shall be equipped with a rotating beacon, failing which they shall be followed by at least one escort vehicle.

6.14.4.14.2 The exit of vehicles from the work area shall be made downstream of that area and in the extension of the lane that is closed for construction. An escort vehicle, as defined in Article 6.14.4.7 *Escort Vehicle* of this subsection, shall be used to slow or stop traffic in order to facilitate the entry of the vehicle into the lane open to traffic.

6.14.4.14.3 Based on the geometry of the site, the visibility involved and the Contractor's Traffic Management and Control Plan, coordination is required between the incoming and outgoing vehicles, the traffic control persons and the escort vehicle. For each of these situations, a description of the tasks and coordination mechanisms, together with signage plans provided for this purpose, shall govern the use of this practice. Special signage shall be provided on the escort vehicle to indicate to users that they will be required to slow down or go around an obstacle.

6.14.4.14.4 The Contractor shall provide for the use of escort vehicles to accompany any vehicle entering or leaving a work area adjacent to a lane open to traffic. The Contractor shall also provide this escort service to the Engineer's and Owner's crews. Such entry and exit operations shall be carried out in a manner that ensures the safety of workers and road users.

6.14.4.14.5 The Contractor shall ensure safe access to the worksite to all parties involved. To this end, the Contractor shall respect the directives issued by the Engineer and provide adequate signage. The entrances and exits shall be numbered and the numbering shall be distinct from that of the other worksites. Under no circumstances shall the Contractor change the existing configuration without the prior authorization of the Engineer.

6.14.4.14.6 During the periods of work, the accesses to the worksite may be kept open in order to facilitate the entry and exit of authorized vehicles. However, the Contractor shall not, under any circumstances, carry out work at the level of the accesses to the worksite.

6.14.4.15 USE OF THE T-20 "CONSTRUCTION AHEAD" SIGN

6.14.4.15.1 A T-20 sign shall be installed 1 km upstream of the work area in accordance with the MTQ *Tome V* signalization plans for long duration work, regardless of the duration of the work. The T-20 sign shall be installed at all intervals indicated on the plans for the structure on which the work is being carried out.

6.14.4.15.2 Not applicable

6.14.4.15.3 For work on the Jacques Cartier Bridge, T-20 signs shall be installed at each major intersection leading to the bridge within a 500 m radius from the worksite.

6.14.4.15.4 For work on the Honoré Mercier Bridge, T-20 signs shall be installed every kilometer as well as at each of the access ramps (entry and exit) leading to the bridge within a 2 km radius from the worksite.

6.14.4.15.5 For work in the Melocheville Tunnel, T-20 signs shall be installed at each major intersection leading to the tunnel within a 1 km radius from the entrance to the tunnel.

6.14.4.15.6 For work on the Bonaventure Expressway and on Lanes “S” and “T”, the Contractor shall install T-20 signs every kilometer as well as at each of the access ramps (entry and/or exit) leading to the Bonaventure Expressway or to Lanes “S” and “T” within a 3 km radius from the worksite. One (1) or more T-20 signs shall be installed on all highways and bridges leading to the Bonaventure Expressway, Lane “S” or Lane “T” within this radius. In addition, T-20 signs shall be installed at each major intersection leading to the Bonaventure Expressway from downtown Montreal within a 500 m radius from the worksite.

6.14.4.16 SPECIAL REQUIREMENTS FOR VERY SHORT DURATION WORK AND MOBILE WORK

6.14.4.16.1 During mobile and very short duration work, the Contractor shall place a TMA-equipped vehicle upstream of the work in accordance with Article 6.14.4.6 *Truck Mounted Attenuator (TMA)*.

6.14.5 SPECIFIC SIGNAGE REQUIREMENTS FOR CONTRAFLOW TRAFFIC

6.14.5.1 GENERAL

6.14.5.1.1 The Contractor shall ensure that the signage work for contraflow traffic complies with the Reference Standards and the particulars shown on the signalization plans and plans for the different diversion scenarios.

6.14.5.1.2 The Contractor shall note that Lane 3 of the Jacques Cartier Bridge (central lane) does not have a predominant direction as it is reversible and equipped with a lane signal control system to indicate when a lane is open or closed. Consequently, when the Contractor carries out work in Lane 1 (right lane towards the South Shore) or in Lane 5 (right lane towards Montreal) of the Jacques Cartier Bridge, or in Lanes 1 and 5 at the same time and uses Lane 3 for traffic in one of the two directions, the Contractor is not required to put up special signage for that central lane.

6.14.5.1.3 For work involving contraflow lanes, the Contractor shall submit to the Engineer, for review, the sequence of installation and removal of the signs. The signalization plans provided by the Owner indicate the minimum requirements for the implementation of contraflow traffic and signage. The Contractor remains responsible at all times for the temporary signage implemented on its worksite.

6.14.5.2 IMPACT ATTENUATOR ON THE END OF THE RIGID BARRIER MOVED FOR CONTRAFLOW TRAFFIC

6.14.5.2.1 The Contractor shall install impact attenuators on the end of the central rigid barriers when they are moved to allow contraflow traffic (please refer to the signalization plans for more information).

6.14.5.2.2 The impact attenuator shall be a frontal restraint system that complies with standard NCHRP Report 350 and shall be designed for a speed of at least 70 km/h (level TL-2).

6.14.5.2.3 The impact attenuator shall be on the list of products approved by the MTQ. The impact attenuator shall be temporary and easy to install, move and remove.

6.14.5.3 ADDITIONAL SIGNAGE REQUIREMENTS

6.14.5.3.1 T-D-80 “Two-Way Traffic Ahead” signs indicating that there are two (2) contiguous lanes with traffic moving in opposite directions, and P-140-1 “No Passing” signs, shall be installed every 250 m in the area where the lanes are contiguous.

6.14.5.3.2 The Owner’s general requirements for the use of visual markers are set out in Table 1 “*Owner’s Requirements for Spacing*” in paragraph 6.14.4.8.2.8 of this subsection.

6.14.5.3.3 When lanes are used in contraflow outside the work area and for distances greater than 1 km and which, for safety reasons, require changes in the temporary signage, the distance between the visual markers shall be 5 m over a distance of 500 m before and after the diversion and 25 m for the beaconing in the diversion, in accordance with Article 4.5 *Repères visuels* of *Chapitre* 4 of *Tome V* of the MTQ.

6.14.6 TEMPORARY PAVEMENT MARKING

6.14.6.1 The Contractor shall design, supply, implement, maintain and remove the temporary pavement marking required to properly direct traffic at all times.

6.14.6.2 Prior to commencing the marking work, the Contractor shall provide marking plans, signed and sealed by an engineer who is a member of the OIQ, for all intended traffic configurations. The pavement marking plans shall comply with the Reference Standards.

6.14.6.3 Where temporary pavement marking is required, the existing marking shall be removed and replaced with the marking required for the work. Upon completion of the work, the temporary marking shall be removed and replaced with the appropriate permanent marking before the lanes are reopened to traffic. The method for removing the temporary marking (alkyd paint) shall be submitted in advance to the Engineer, for approval.

6.14.6.4 The masking of temporary or permanent markings with black paint or black marking tape is prohibited.

6.14.6.5 The Contractor shall ensure that the pavement of the lanes that are open to traffic is appropriately marked; if the use of paint is not possible, the Contractor shall temporarily install reflective surface delineators for a maximum period of seven (7) days.

6.14.6.6 As long as the final marking is not in place, the Contractor shall ensure that the temporary pavement marking is adequate at all times. The use of delineators shall be a temporary measure.

6.14.6.7 When used, the delineators shall be set at a distance of 3 m for continuous lines, broken edge lines, gores and obstacle approaches, and 2 m for double yellow lines. For double lines, the delineators shall be installed in pairs to match the shape of the double line. The colour of the delineators shall comply with the Reference Standards.

6.14.6.8 The temporary delineators shall be replaced by temporary or permanent marking, in accordance with the plans, as soon as possible.

6.14.6.9 Where work involves the replacement of part of a bridge deck, or approaches to a bridge or pavement with a concrete base, the temporary marking shall be done on a black base so that the marking stands out.

6.14.7 LANE CONTROL SIGNAL SYSTEM AND AUTOMATED GATES

6.14.7.1 The Jacques Cartier Bridge is equipped with a lane control signal system. This system, operated by the *Sûreté du Québec*, offers relatively limited indication possibilities.

6.14.7.2 Table 2 sets out the system characteristics of the Jacques Cartier Bridge.

Table 2: Jacques Cartier Bridge System Characteristics

Lanes	Possible Indications*	
	Towards Montreal	Towards the South Shore
1 (upstream)	Closed	Open or Closed
2	Closed	Open or Closed
3	Open or Closed	Open or Closed
4	Open or Closed	Closed
5 (downstream)	Open or Closed	Closed

*Uniform indication over the entire length of the lane.

6.14.7.3 At the north entrance of the Jacques Cartier Bridge, the automated gates shall be activated or deactivated based on the work being carried out.

6.14.7.4 In developing its Traffic Management and Control Plan, the Contractor shall take into account both this lane control signal system and the automated gates. The Contractor shall consult the Owner and the *Sûreté du Québec* for operational specifics. The Traffic Management and Control Plan shall be developed and operate in full coordination with the operation of the lane control signal system and automated gates in place.

6.14.8 INFORMATION SIGNAGE

6.14.8.1 PERIPHERAL ROAD SIGNAGE

6.14.8.1.1 The Owner may enter into contracts with other contractors for the development, implementation and maintenance of any peripheral road signage rendered necessary by the implementation of several projects, including the signage for proposed alternative routes during lane closures. The administration of these contracts is the responsibility of the Engineer.

6.14.8.1.2 The Contractor shall coordinate, operate, integrate and, if necessary, modify its temporary signage to make it compatible with that of the other contractors and to provide an effective interface between the peripheral road signage and the temporary signage. The Contractor may be required to provide and operate mobile variable message signs (VMS) to manage lane closure and reopening operations as efficiently as possible.

6.14.8.2 COMPLEMENTARY SIGNS

6.14.8.2.1 To supplement the Owner's signalization plans, MTQ's standardized drawings and the Contractor's traffic maintenance plans, the Engineer may require complementary signs to meet the traffic management scenarios, ensure safety, and inform road users. The complementary signs are also required to indicate the detour roads, as well as the required information or routing signs.

6.14.8.2.2 Upon request by the Engineer, the Contractor shall have seventy-two (72) hours to fabricate complementary signs and install them at the designated locations in accordance with the plans and specifications.

6.14.8.2.3 Not applicable

6.14.8.2.4 The complementary signs shall have an orange background and be equipped with a fluorescent Type III or IV reflective film. They shall be rectangular in shape and comply with the requirements of *Tome V* of the MTQ. The lettering shall be at least 150 mm and the series used shall be C, D and E. The shop drawings shall be submitted to the Engineer prior to fabrication, for review. The messages on these signs shall be bilingual (French and English) and the characters shall be the same height in both languages.

6.14.8.2.5 The complementary signs shall be fabricated on 19 mm-thick plywood or aluminium panels of varying thicknesses in accordance with the Reference Standards. Each panel shall consist of one single piece in accordance with *Tome V* of the MTQ, or in accordance with the instructions provided to the Contractor by the Engineer.

6.14.8.2.6 At the request of the Engineer, the signs shall be fabricated on coroplast panels if they are to be installed on existing signs.

6.14.8.2.7 The complementary signs shall remain the property of the Contractor and shall be available for the entire duration of the Contract.

6.14.8.2.8 The name and telephone number of the Contractor shall be written on the back of each complementary sign.

6.14.9 MOBILE VARIABLE MESSAGE SIGNS (VMS)

6.14.9.1 SCOPE

6.14.9.1.1 This article covers the provision and use of mobile VMS where required. These signs are used, notably, to inform users and motorists of lane closure times, available traffic lanes in each direction, road conditions, potential hazards and distance from the work area.

6.14.9.2 SPECIFIC STANDARDS AND REQUIREMENTS

6.14.9.2.1 The Contractor shall inform the Engineer, in real time, of the installation of mobile VMS and shall provide him with the following information regarding the mobile VMS at the time of installation:

6.14.9.2.1.1 name of the owner;

6.14.9.2.1.2 identification number;

6.14.9.2.1.3 exact location (with reference to a stationing);

6.14.9.2.1.4 telephone number including the area code.

6.14.9.2.2 Every time a mobile VMS is moved, modified, changed or dismantled, the Contractor shall provide the Engineer with the same information as that listed in paragraph 6.14.9.2.1 above.

6.14.9.2.3 During the installation of a mobile VMS at the designated location, a representative of the Contractor shall remain on site and ensure the proper operation thereof.

6.14.9.2.4 The Contractor shall submit to the Engineer, for review, the exact location of the mobile VMS to be installed by the Contractor at least seven (7) days prior to the first lanes hindrance.

6.14.9.2.5 The mobile VMS shall be capable of being moved on the instructions of the Engineer. They shall be operational throughout the duration of the work.

6.14.9.2.6 The logistics pertaining to the operation of these VMS shall be part of the Contractor's Traffic Management and Control Plan.

6.14.9.2.7 When the signs are installed on the Owner's territory, the display on these signs shall be bilingual (French-English) and the characters shall be the same height in both languages.

6.14.9.2.8 Each VMS shall be a matrix type allowing for a display of at least three (3) lines of twelve (12) characters each. The lettering shall be at least 300 mm high. The matrix shall be at least 27 x 72 pixels. The VMS housing shall be at least 3.0 m wide by 1.2 m high. The VMS shall display several successive (alternating) messages in a clear and visible manner. Each VMS shall be numbered according to its identification.

6.14.9.2.9 The VMS shall be mounted on a trailer that allows for stable and safe installation. The VMS shall be mounted on a hydraulic mast that allows it to be raised once installed. It shall also be possible to orientate the sign without moving the trailer to improve the visibility of the message.

6.14.9.2.10 The luminous intensity of the signs shall be capable of adapting automatically to the ambient light so that the messages are always perfectly legible at a distance of 250 m.

6.14.9.2.11 The VMS shall have the following operating characteristics:

6.14.9.2.11.1 the panel shall not require any external connection to ensure its energy supply. It shall be self-sufficient and powered by a diesel generator or solar panel(s), whichever is most suitable for the worksite conditions, and shall be capable of operating twenty-four (24) hours a day;

6.14.9.2.11.2 for solar-powered panels, the Contractor shall take into account shading from surrounding structures and shall ensure that the panels function properly in bad or cloudy weather. The Contractor shall make up for any deficient power supply at its own expense;

6.14.9.2.11.3 for diesel-powered panels, the Contractor shall take into account the impact of noise created by such generators and, where applicable, obtain a permit and comply with the requirements of subsection 6.13 *Environmental Protection*;

6.14.9.2.11.4 the VMS shall be capable of storing, in its memory, the messages to be displayed. It shall also be programmable using a compatible computer. The VMS communication language shall be NTCIP (National Transportation Communications for ITS (Intelligent Transportation Systems) Protocol). The VMS shall be programmable on site and by cellular communication;

6.14.9.2.11.5 in the event of a breakdown, the VMS shall automatically display a general message chosen by the Owner to ensure the safety of road users.

6.14.9.2.12 Communication charges for VMS equipped with a cellular device shall be paid by the Contractor.

6.14.9.2.13 The Contractor shall provide the software for communication between the computer and the VMS.

6.14.9.2.14 The Owner owns permanent VMS that broadcast information to users. The Contractor may not use these signs for its own use or signage needs. Furthermore, the Contractor shall plan, own and, if required, operate its own VMS.

6.14.9.2.15 The Contractor shall provide all necessary assistance to the Owner to enable the latter to change and control the messages displayed at any time. The Contractor shall ensure that the Owner has full control over the messages.

6.14.9.2.16 The Contractor shall clear the VMS of snow after each snowfall and ensure that the messages are clearly visible to users at all times.

6.14.10 WORKSITE CONCRETE BARRIERS

6.14.10.1 The worksite concrete barrier sections shall comply with standardized drawings VIII-5-001, VIII-5-002 and VIII-5-009 of *Tome VIII* of the MTQ.

6.14.10.2 All concrete barriers shall be new and comply with *Tome VIII* of the MTQ. Any barriers damaged during handling or damaged and deemed unusable by the Engineer shall be repaired or replaced at the Contractor's expense. The worksite concrete barrier sections found to be ineffective or non-compliant by the Engineer shall be replaced within twenty-four (24) hours of verbal notification by the Engineer. The concrete barriers shall meet the following criteria:

6.14.10.2.1 the worksite concrete barriers shall not have cracks extending on either side of their ends;

6.14.10.2.2 the worksite concrete barriers shall have connections free of detachments at the ends;

6.14.10.2.3 the worksite concrete barriers shall be positioned so that the end of the barrier, at the curb facing traffic, does not present any obstacle likely to allow a tire to enter.

6.14.10.3 The Contractor shall supply and install T-RV-11 visual markers (mini-beacons), on top of the worksite concrete barrier sections, every two (2) sections, in accordance with *Tome V* of the MTQ. The mini-beacons installed on a same barrier section shall be of the same type, the same size and made of the same films.

6.14.11 WORKSITE IMPACT ATTENUATOR

6.14.11.1 At each end of a worksite concrete barrier section representing an obstacle to traffic, the Contractor shall install either a TL-2 or TL-3 performance level impact attenuator, depending on the location and traffic speed.

6.14.11.2 The device used shall be part of the MTQ homologation list HOM-5660-102 *Atténuateurs d'impact* and meet a speed of 70 km/h for a TL-2 and of 100 km/h for a TL-3.

6.14.11.3 The worksite impact attenuator shall not be anchored to the surface on which it is installed and shall cover the end of the barrier section, without however encroaching into the traffic lane or adjacent shoulder. A type V film chevron compliant with MTQ standard 14101 shall be installed on the front face of the impact attenuator.

6.14.11.4 The installation of a temporary impact attenuator shall be subject to a certificate of conformity, signed and sealed by an engineer who is a member of the OIQ, certifying that the impact attenuator is installed in accordance with the manufacturer's recommendations. This certificate shall be sent by the Contractor to the Engineer in writing within a maximum of twenty-four (24) hours following the installation of said impact attenuator.

6.14.11.5 Between October 15 and April 15 of each year, the Contractor shall, at its own expense, take the necessary measures to ensure that the liquid inside the impact attenuator does not freeze. The liquid used shall be non-toxic and of density more or less equal to that of water. The use of a calcium chloride solution, 29% concentration by mass 1.29 kg/L, is recommended. The liquid shall be from a natural source or be factory blended. A certificate confirming this characteristic shall be provided by the Contractor to the Engineer for review prior to use.

6.14.11.6 Following an impact against one of the worksite impact attenuators, the Contractor shall have twenty-four (24) hours to restore it or replace it with a new fully functional impact attenuator. In addition, if the damaged impact attenuator partially or completely obstructs one or more traffic lanes, the Contractor shall have thirty (30) minutes, upon verbal notice from the Engineer, to clear those lanes and adequately secure the front pending replacement of the restraint system.

6.14.12 TRAFFIC HINDRANCE MINIMIZATION SYSTEM

6.14.12.1 Unless otherwise indicated on the plans, the Contractor may, to carry out the work under this Contract, close one or more traffic lanes pursuant to the *Table(s) of Lanes to be Maintained Open* provided by the Owner.

6.14.12.2 Such closures, although permitted under the terms of this Contract, are not without disruption to the flow of traffic during the periods concerned and thus affect the quality of service to users. In order to minimize as far as possible, the impact on users, the Owner hereby implements a system that aims to minimize lane closures.

6.14.12.3 The parties therefore agree that the price of this Contract will be reduced when the Contractor carries out lane closures. For each lane closed within the periods authorized under the *Table(s) of Lanes to be Maintained Open*, the Contract price shall be reduced by an amount of $100/hr/lane, before taxes.

6.14.12.4 The traffic hindrance minimization system applies to any category of work (mobile work, very short duration work, short duration work and long duration work) that requires lane closures.

6.14.12.5 The number of hours of lane closures that fall under the traffic hindrance minimization system shall be compiled jointly by the Contractor and the Engineer. Where the lanes are controlled by lane signals, the hours of closure are counted from the time the lane signal of each lane concerned turns red until the time the lane signal turns green again. If there are no lane signals, the hours of closure are counted from the exact moment when traffic on each lane concerned is interrupted until the exact moment when traffic on each lane concerned is restored.

6.14.12.5.1 For the purpose of calculating the amount of reduction in the price of this Contract, any fraction of an hour during which a lane is closed shall be rounded up to the nearest half hour.

6.14.12.6 Not applicable

6.14.12.7 The reduction in the Contract price will be applied by the Owner when processing any progress claim submitted by the Contractor as the work progresses.

END OF SUBSECTION