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| Version | Date | Description of Revisions |
| 1 | March 18, 2016 | New Specification |
| 2 | June 8, 2018 | Document reformatted, references updated  2.1.1.4 Section removed  2.1.1.5 Section removed  2.1.1.6 Section removed  (BM) |
| 3 | August 19, 2021 | Removed OPSS.MUNI 706 references throughout, incorporated applicable requirements. (BM) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

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# GENERAL

## Scope

### Under this Section, the Contractor shall supply, install, operate, maintain (including programming messages as directed by the Consultant), relocate and remove Portable Variable Message Signs (PVMS).

## Related Sections

### [Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

### Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

### Contractor is responsible for coordination of the Work.

### This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

### [List Sections specifying related requirements.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

#### Sections:

##### Section 01040 – Coordination

##### Section 01060 – Regulatory Requirements

##### Section 01550 – ­­­­Traffic Control

## References

### The following is a list of standards which may be referenced in this Section:

#### Ontario Traffic Manual, Book 7 – Temporary Conditions, January, 2014.

#### ASTM E991-21, Standard Practice for Color Measurement of Fluorescent Specimens Using the One-Monochromator Method.

#### ASTM E1247-12(2017), Standard Practice for Detecting Fluorescence in Object-Color Specimens by Spectrophotometry.

## Measurement for Payment

### The unit price tendered for item [ ] in the Bid Form shall be full compensation for all labour, equipment and material required to do the work described in this specification including supply, installation, operation, maintenance, relocation and removal of the PVMS. For measurement purposes, a count shall be made of the number of PVMS installed and paid on a monthly basis that they are in use.

## General

### Where indicated in the Contract, the Contractor shall provide portable variable message signs. All portable variable message signs shall be installed, operated, relocated and removed and delivered/handed over to the Region, as directed by the Consultant.

### The message brightness shall be adjusted to ambient light conditions as determined by the Consultant.

### During any period of time that a sign will not be used within 24 hours, the sign shall remain blank and turned away from traffic.

### The Contractor is not required to create messages. The Consultant will provide the Contractor with customized messages as required. The use of any messages other than those provided is prohibited.

# PRODUCTS

## Operating Characteristics

### The PVMS shall exhibit the following operating characteristics while in use:

#### Light emitting diode (LED) technology or hybrid LED/Flip Disk Technology.

#### Antiglare polycarbonate sheeting.

#### Solar powered.

#### Capable of operating for seven consecutive Days on battery power supply with solar panels disconnected.

#### Shall include all hardware and software necessary to facilitate reliable local sign control.

#### Programmable (25 message sequence for one week duration).

#### Capable of displaying a multiphase message with variable dwell times for each phase.

#### Text of message shall not scroll or travel horizontally or vertically across the face of the sign.

#### Capable of displaying 3 lines of 8 characters, each character being approximately 457mm high.

#### Each character matrix comprised of 35 pixels, 5 wide by 7 high.

#### Message visible from 500 m away in all ambient light conditions.

#### Message legible from 300 m away in all ambient light conditions.

#### Ability to raise the bottom of the display board a minimum of 1.5 metres above ground level.

#### Flat black background on the display area when the pixels are in the off position.

#### Trailer painted orange or yellow.

#### Capability to accurately level the sign and aim it towards oncoming traffic.

#### Photosensor array to enable the luminance of the sign to be controlled both automatically and manually in relation to ambient light levels.

#### Locking device to prevent rotation of the sign in winds up to 100-km/ hour, while the sign is in display mode.

## Trailer Mounting

### The PVMS shall be mounted on a trailer.

### The maximum dimensions of the PVMS and trailer assembly while in display mode shall be as follows:

#### Maximum overall height = 4.5 m

#### Maximum overall width = 3.75 m

#### Maximum overall length = 5.5 m

#### Maximum gross unit weight = 2,500 kg

## Conspicuity Markings

### PVMS trailer assemblies shall have high reflectivity micro-prismatic fluorescent sheeting tape (or Equivalent) (e.g. diamond grade or Type VII) meeting ASTM standard E991 and ASTM standard E1247 for fluorescent materials.

### The reflectorized tape shall be of alternating, uniform white and orange or white and yellow sections. Sections of reflectorized tape shall be placed around the trailer frame, tongue or other outermost dimension, at uniform height and width so as to reflect the light from the headlights of a vehicle approaching from any direction.

### The reflectorized tape shall be construction orange in colour, and 13 mm in width. The tape shall surround the outside of the sign assembly on all sides and shall be a uniform distance from the outmost pixels.

### The manufacturer shall not change material or Product type or source, production methods, or design of unit without the prior written authorization of the Region.

# EXECUTION

## Installation of PVMS

### The exact location of the PVMS shall be proposed by the Contractor and shall meet the following criteria:

#### The Region shall approve the location of the PVMS prior to it being deployed. The Region shall be notified at least 2 Business Days in advance regarding the delivery and removal of PVMS within the site.

#### The signs shall be set at the proper angle to traffic so that they can be viewed at the highest possible luminance value.

#### Maximizes visibility for motorists without impacting safety.

#### Installed on a level surface with adequate bearing capacity to support the weight of the PVMS and temporary base materials. The bottom of the sign display shall be at least 1.5 metres above the adjacent edge of pavement elevation with locking pin in place.

#### The signs shall not obstruct any existing signs.

#### The PVMS control box shall be secured from entry by unauthorized personnel. There shall be security measures or devices in place to prevent message tampering of the sign.

#### All PVMS and any temporary base shall be removed upon completion of the Work.

## Maintenance of PVMS

### Maintenance shall be performed for the continuous operation of the PVMS, as required, throughout the duration of the Contract. Daily inspection of the PVMS shall be conducted to ensure that the PVMS meets the following maintenance requirements:

#### PVMS sign face is aimed with the sign sight tube to the centre of the approach roadway approximately 300 m upstream of the sign to ensure maximum visibility.

#### Solar panels are tilted and rotated to face south.

#### All pixels and LEDs in the sign face remain operational.

#### Sign face is to be regularly cleaned from dirt, road salt, or debris that may obstruct the visibility of the sign.

#### Batteries are replaced as needed to ensure that battery levels are maintained per the supplier’s operational requirements.

### Immediate repairs shall be required whenever there is a failure or cessation of the operation of any components of the PVMS. The Contractor shall notify the Region and take immediate action to correct any problem.

**END OF SECTION**