

Specification (Measurement)

**Transport and Main Roads Specifications
MRS260 Temporary Variable Speed Limit Signs**

July 2017

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1 Introduction

This Specification applies to the requirements for the supply, installation, testing, commissioning and maintenance handover documentation (including the provision for operator training) of Temporary Variable Speed Limit (TVSL) Signs.

This Specification forms part of the Transport and Main Roads Specifications Manual and should be read in conjunction with MRS01 *Introduction to Specifications* and other Specifications as appropriate.

2 Measurement of Works

2.1 Standard Work Items

In accordance with the provisions of Clause 2.1.3 of MRS01 *Introduction to Specifications*, the Standard Work Items covered by this Specification are listed in Table 2.1.

Table 2.1 – Standard Work Items

Standard Item No.	Description	Unit of measurement
TVSL Mounting footings		
67501	Supply and installation of Trailer mounted Type [A B C D] TVSL Sign including but not limited to [with without] solar panels, [with without] battery bank, site controller, [with without] LED sign display, [with without] flashing yellow alert light, [with without] gyroscopic sensor, [with without] directional compass, wheels and tyres, stabilisers and [with without] storage compartments	each
67502	Supply and installation of concrete block mounted Type [A B C D] TVSL sign including but not limited to [with without] solar panels, [with without] battery bank, site controller, [with without] LED sign display, [with without] flashing yellow alert light, [with without] GPS sensor, movement sensors and [with without] storage compartments	each
67503	Supply and installation of a Type [A B C D] TVSL LED Sign display extension with flashing yellow alert light on a post-mounted support structure and foundation	each
67504	Supply and installation of a separate TVSL Solar Panel Array with Battery Bank Enclosure Extension utilising a post-mounted support structure and foundation	each
TVSL external cabling		
67521	Supply and Installation of a 10 metre connecting cable between the TVSL [trailer concrete block] and the [Type [A B C D] TVSL LED Sign display extension TVSL Solar Panel Array with Battery Bank Enclosure Extension]	each
Short range controller (SRC)		
67531	Supply and configuration of a hand-held SRC device to control each TVSL Sign	each
Remote Sign control system (RSCS) software		
67541	Supply, installation and configuration of RSCS Software on a [Laptop PC]	each

Standard Item No.	Description	Unit of measurement
Configuration software		
67551	Supply, installation and configuration of configuration software on a [Laptop Other compatible device]	each
External communications		
67561	Supply and configuration of a [3G 4G] mobile phone service to allow communications between a TVSL Site Controller and [RSCS software Mobile Phone alerts]	each
Temporary Variable Message Signs		
67571	Supply and installation of static MUTCD compliant default [100 km/h 80 km/h 60 km/h 40 km/h] speed limit sign "WHEN SIGN ABOVE IS BLANK"	each

2.2 Work Operations

Item 67501 Supply and installation of Trailer mounted Type [A | B | C | D] TVSL Sign including but not limited to [with | without] solar panels, [with | without] battery bank, site controller, [with | without] LED sign display, [with | without] flashing yellow alert light, [with | without] gyroscopic sensor, [with | without] directional compass, wheels and tyres, stabilisers and [with | without] storage compartments

Work Operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of fully integrated TVSL Sign components including, but not limited to:
 - i. site controller and associated components
 - ii. wireless UHF Communications transmitter/receiver
 - iii. wireless 3G / 4G Modem
 - iv. GPS Sensor
 - v. TVSL Trailer components including 2 x 185/14 tyres and 2 x 14" hubs, stabiliser struts / bars, standard trailer indicator lights, trailer cable / socket connections
 - vi. optional Solar Panel Array and associated mechanical support assembly and adjustment mechanism
 - vii. optional batteries, charge regulator and all associated components
 - viii. optional Gyroscopic Sensor
 - ix. optional Directional Compass
 - x. optional flashing yellow alert light
 - xi. optional Type [A | B | C | D] TVSL LED sign display component, and
 - xii. optional trailer storage compartments and accompanying keys.
- c) installation of the components listed in 'b)' above fully integrated into a trailer, and

- d) configuration of the trailer-mounted TVSL components listed in 'b)' above in accordance with the TGS, TRUM Volume 1 Part 10 and MRST260.

Item 67502 Supply and installation of concrete block mounted Type [A | B | C | D] TVSL sign including but not limited to [with | without] solar panels, [with | without] battery bank, site controller, [with | without] LED sign display, [with | without] flashing yellow alert light, [with | without] GPS sensor, movement sensors and [with | without] storage compartments

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of fully integrated TVSL sign components including, but not limited to:
 - i. site controller and associated components
 - ii. wireless UHF Communications transmitter / receiver
 - iii. wireless 3G / 4G Modem
 - iv. optional GPS Sensor
 - v. optional Solar Panel Array and associated mechanical support assembly and adjustment mechanism
 - vi. optional batteries, charge regulator and all associated components
 - vii. optional Gyroscopic Sensor
 - viii. optional Directional Compass
 - ix. optional flashing yellow alert light, and
 - x. optional Type [A | B | C | D] TVSL LED sign display component.
- c) installation of the components listed in 'b)' above fully integrated onto the concrete block foundation, and
- d) of the concrete block-mounted TVSL components listed in 'b)' above in accordance with the TGS, TRUM Volume 1 Part 10 and MRST260.

Item 67503 Supply and installation of a Type [A | B | C | D] TVSL LED Sign display extension with flashing yellow alert light on a post-mounted support structure and foundation

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of Type [A | B | C | D] TVSL LED Sign display enclosure
- c) supply of Type [A | B | C | D] TVSL LED Sign display support posts
- d) supply of foundation base to support the Type [A | B | C | D] LED Sign display enclosure, flashing yellow alert light and support posts
- e) supply of flashing yellow alert light

- f) installation of the flashing alert light on rear of the TVSL LED sign display enclosure, and
- g) installation of Type [A | B | C | D] TVSL LED Sign display enclosure on support posts and foundation.

Item 67504 Supply and installation of a separate TVSL Solar Panel Array with Battery Bank Enclosure Extension utilising a post-mounted support structure and foundation

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of solar panels
- c) supply of solar panel array support brackets
- d) supply of solar panel array support posts
- e) supply of solar panel assembly foundation base
- f) installation of the solar panels, array brackets, posts onto the foundation base
- g) supply of the batteries, charge regulator and associated components, and
- h) installation of the batteries, charge regulator and associated components within a weatherproof enclosure.

Item 67521 Supply and Installation of a 10 metre connecting cable between the TVSL [*trailer | concrete block*] and the [*Type [A | B | C | D] TVSL LED Sign display extension | TVSL Solar Panel Array with Battery Bank Enclosure Extension*]

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of cabling options below:
 - i. supply of 10 metres of connecting ELV power and signal cables from the trailer or concrete block-mounted TVSL sign to the Type [A | B | C | D] TVSL LED Sign Display Extension, and/ or
 - ii. supply of 10 metres of connecting ELV power cable from the trailer or concrete block-mounted TVSL sign to the TVSL Solar Panel Array with Battery Bank Enclosure Extension.
- c) supply of 10 metres of sufficiently-sized corrugated steel conduit
- d) installation of the connecting cable within corrugated steel conduit
- e) supply of Utilux type round 7-pin plug and sockets for cable termination
- f) termination of both ends of the connecting cables with Utilux type round 7-pin plug and socket arrangement, and
- g) installation of the cable between the TVSL Sign Trailer/Concrete Block and the Type [A | B | C | D] TVSL LED Sign display Extension or TVSL Solar Panel Array with Battery Bank Enclosure Extension.

Item 67531 Supply and configuration of a hand-held SRC device to control each TVSL Sign

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of two SRC handheld units with accompanying batteries, and
- c) configuration of the SRC to comply with the TGS, TRUM Volume 1 Part 10, and MRST260.

Item 67541 Supply, installation and configuration of RSCS Software on a [Laptop | PC]

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of a disk containing the RSCS software
- c) installation of the RSCS software onto a compatible laptop or PC
- d) configuration of the RSCS software for administration, user access management, diagnostics and alarm / event monitoring, GIS maps, etc., and
- e) configuration of the RSCS software to comply with the TGS, TRUM Volume 1 Part 10 and MRST260.

Item 67551 Supply, installation and configuration of configuration software on a [Laptop | Other compatible device]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of a disk containing the configuration software
- c) installation of the configuration software onto a compatible laptop or other compatible device
- d) configuration of the configuration software for administration, user access management, diagnostics and alarm / event monitoring, GIS maps, etc.

Item 67561 Supply and configuration of a [3G | 4G] mobile phone service to allow communications between a TVSL Site Controller and [RSCS software | Mobile Phone alerts]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply a 3G or 4G mobile data (if required to suit designed TVSL sign data bandwidth requirements) and SMS communications through the engagement of a suitable mobile phone service provider, such as Telstra, Optus or Vodafone
- c) configure the TVSL sign with the mobile phone service numbers requiring to receive the critical TVSL sign alarm or alert SMS-based notifications, and
- d) configure the TVSL sign such that a secure wireless Ethernet communications channel, such as a Virtual Private Network (VPN), is established between the TVSL sign and the RSCS software.

Item 67571 Supply and installation of static MUTCD compliant default [100 km/h | 80 km/h | 60 km/h | 40 km/h] speed limit sign “WHEN SIGN ABOVE IS BLANK”

Work Operations incorporated in the above item include:

- a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply of a MUTCD compliant static default 100 km/h, 80 km/h, 60 km/h or 40 km/h speed limit sign for each TVSL Sign (TC1568), and
- c) installation of the ‘WHEN SIGN ABOVE IS BLANK’ default speed static sign on the TVSL sign trailer immediately below the TVSL sign LED display.

