TCS 046 - 2021

Specification

Small Cells
on Traffic Signal Poles

Installation

Issued: March 2021
Revision: A

VICTORIA State Government | Department of Transport

TCS 046 - 2021

Foreword

This specification has been developed by DoT (Roads). It is one of a number of technical specifications, and associated standard drawings, which set out the requirements for roadside ITS devices, traffic signal equipment and other electrical equipment and associated devices and control systems.

This specification is intended for use in all relevant works undertaken by or on behalf of DoT (Roads).

DoT (Roads) Standard Drawings, Specifications and Guidelines are available for downloading from the VicRoads website: https://www.vicroads.vic.gov.au/business-and-industry/technical-publications/electrical-and-intelligent-transport-systems

Specification updates. DoT (Roads) specifications and associated standard drawings are subject to periodic review. To keep the specifications up to date, amendments or new editions are issued as necessary. It is therefore important for users of DoT (Roads) specifications to ensure that they have the latest version and associated amendments.

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Revision History

Version	Revision	Date	Author	Description
2005	A	Feb 2005	SJS	New specification
2021	A	March 2021	ITS	Fully revised, DoT template

Contents

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

1.1.1 This document covers the requirements for the installation of small cells on Department of Transport (DoT) traffic signal poles, within the state of Victoria.

1.1.2 For the purpose of this specification a ‘small cell’ is deemed to refer to equipment such as power supply, control devices, modems, antennas and associated cabling associated with the broadcasting of 4G and 5G mobile telecommunications installed and owned by a licensed carrier onto a DoT (Roads) asset.

1.2 GENERAL

1.2.1 Small cells are part of the digital mobile telephone network and are installed by communications provider to increase the capacity and coverage of their network.

1.2.2 All costs associated with the installation of small cells shall be borne by the communications provider.

1.2.3 No works shall commence on site prior to DoT (Roads) approval and payment of all costs and/or fees associated with the issue of road permits.

1.3 APPROVAL

1.3.1 The installation of all small cell antenna units onto traffic signal poles shall be in accordance with the requirements of DoT (Roads).

1.3.2 The carrier and/or carrier’s representative must consult with DoT and obtain consent over the suitability of the location.

1.3.3 The type and location of traffic signal pole the Communications Provider proposes to use shall be approved by DoT (Roads) and subject to the provision of a DoT licensing agreement prior to any works commencing.

1.3.4 The approval shall be sought by the Communications Provider for each individual installation.

1.3.5 Detailed drawings and appropriate engineering calculations shall be provided with each application.

1.4 ACRONYMS

The acronyms used in this document shall be interpreted as follows:

ACMA	Australian Communications and Media Authority
AS	Australian Standard
AS/NZS	Australian Standard / New Zealand Standard
CCTV	Closed circuit television camera
DoT (Roads)	Department of Transport (Roads) (formerly known as VicRoads)
EMC	Electromagnetic Compatibility
ITS	Intelligent Transport Systems
JUP	Joint Use Pole
JUMA	Joint Use Mast Arm
LAAN	Land access and activity notice
MA	Mast Arm
LV	Low Voltage (240V AC)
OH&S	Occupational health and safety
RF	Radio Frequency
RFNSA	Radio Frequency National Site Archive (database of Australian mobile network base stations)

SECTION 2 - RELATED SPECIFICATIONS AND DRAWINGS

2.1 AUSTRALIAN STANDARDS

2.1.1 Subject to the following clauses, the fabrication and supply of all components for traffic signal lanterns shall fully comply with the most recent issue of the Australian Standards listed below, together with any amendments to these standards.

2.1.2 The following related Australian Standards are referenced:

AS 2144: 2014	Traffic Signal Lanterns
AS 2339: 2017	Traffic Signal Posts, Mast Arms and Attachments
AS/NZS 3000: 2018	Wiring Rules
AS 60038: 2012	Standard Voltages

2.2 DOT SPECIFICATIONS AND DRAWINGS

2.2.1 The fabrication and supply of all components shall conform to the relevant DoT specifications, and related specifications and standards, as indicated throughout this document.

2.2.2 All installation works shall conform to the relevant DoT specifications and related specifications and standards.

2.2.3 The following DoT Contract Standard Section Specifications are referenced:

Standard Section 730	Traffic Signal Installation

2.2.4 The following DoT Specifications are defined:

TCS-001	Mast Arms, Joint Use Mast Arms, Joint Use Poles

2.2.5 The following DoT Standard Drawings are defined:

TC-1105	Components for Standard Traffic Signal and Street Lighting Poles
TC-1120	Joint Use Pole (JUP) Base Section
TC-1121	JUMA Base Section
TC-1122	Mast Arm (MA) Base Section
TC-1123	JUMA, JUP and RSLP Street Lighting Extension Section
TC-1124	MA and JUMA Outreach Sections

2.3 ADDITIONAL SPECIFICATIONS AND DRAWINGS

2.3.1 The fabrication and supply of all components shall conform to the following specifications and drawings as indicated throughout this document.

2.3.2 The following specifications are referenced:

Electricity Distribution Code	Electricity Distribution Code – Version 9

SECTION 3 INSTALLATION REQUIREMENTS

3.1 GENERAL

3.1.1 Small cells that can be installed on traffic signal poles are 4/5G type.

3.1.2 Typical small cells consist of following components:

- Antenna & antenna mount.
- On-pole; RF Isolation/Tilt Switch.
- Antenna cable.
- Off pole isolation switch.
- Communication carrier's cabinet (On-pole or Off-pole).

3.1.3 4G small cells typically have their radio equipment installed within communication provider's cabinet adjacent to the traffic signal pole.

3.1.4 5G small cells typically have their radio equipment installed on a traffic signal pole within a pole mounted Enclosure.

3.1.5 All equipment, cables, conduit, brackets etc. that are mounted onto traffic signal poles shall be mounted on the external surface of the pole using non-intrusive means.

3.1.6 Under no circumstances shall any cables be installed inside a traffic signal pole.

3.1.7 The small cell equipment shall not interfere with or obstruct DoT or other third-party devices already on the pole. These may include:

- Traffic signal lanterns.
- Pedestrian push buttons.
- Maintenance access openings for the poles.
- CCTV cameras.
- Bluetooth devices.

3.1.8 The equipment installed shall not infringe upon pedestrian or vehicle access on footpaths or vehicle running lanes.

3.1.9 All cables associated with the small cell installation (e.g. power and antenna cables) shall be

- Installed on the external surface of the traffic signal pole.
- Protected by suitably colour matched covering such as galvanised steel conduit or galvanised steel duct or sheathing of an acceptable type approved by DoT.

3.1.10 The protective covering shall:

- Cover the cables from ground level to a minimum height of 2.2m.
- Not cover or obstruct any access hatches on the traffic signal pole.
- Not obstruct or interfere with any other assets on the traffic signal pole.

- Be designed and installed in a way not to be deemed a potential safety hazard to pedestrians or vehicles.

3.2 TRAFFIC SIGNAL POLE

3.2.1 Installation of small cells will ONLY be considered on the following pole types:

- Mast arm (refer to section 3.2.3);
- Joint use pole (refer to section 3.2.4); and
- Joint use mast arm (refer to section 3.2.5).

3.2.2 The components for the three pole types are specified in Standard Drawing TC-1105.

3.2.3 A **Mast Arm** pole is shown in Figure 3.1 below indicating acceptable locations for installation of equipment and *no go zones* where equipment shall not be located. The standard drawings for the pole type are listed below:

- TC-1122 - MA Base Section.
- TC-1124 - MA and JUMA Outreach Sections.

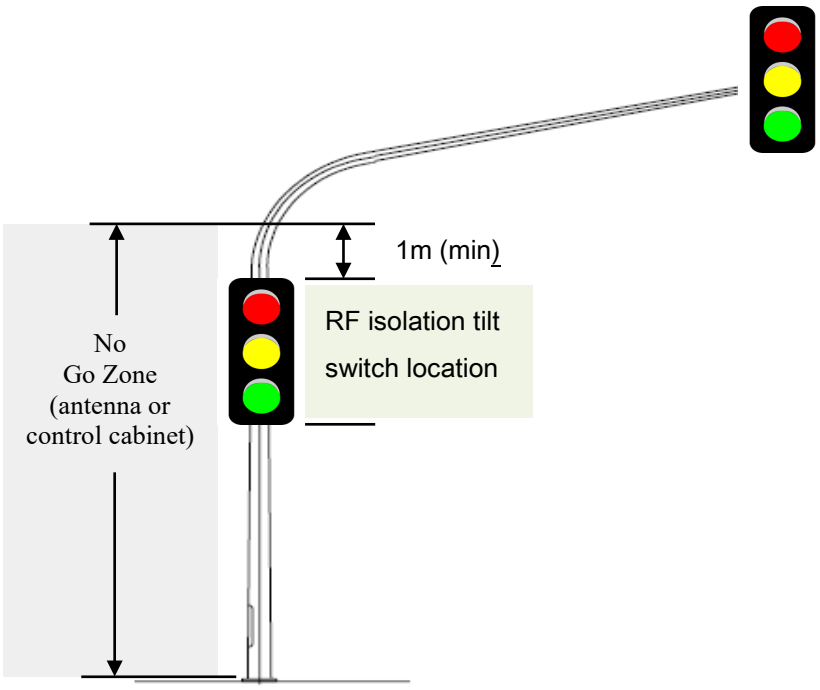

Figure 3.1 – Mast Arm pole

3.2.4 A **Joint Use Pole** is shown in Figure 3.2 below indicating acceptable locations for installation of equipment and *no go zones* where equipment shall not be located. The standard drawings for the pole type are listed below:

- TC-1120 - JUP Base Section.
- TC-1123 - JUMA, JUP and RSLP Street Lighting Extension Sections.

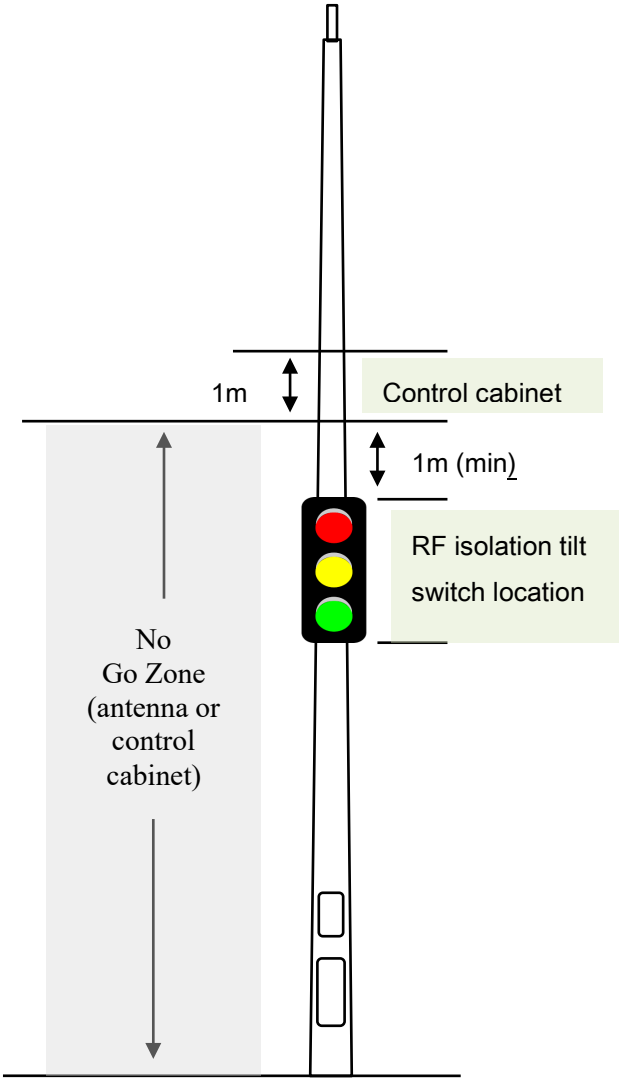

Figure 3.2 – Joint Use Pole

3.2.5 A **Joint Use Mast Arm** pole is shown in Figure 3.3 below indicating acceptable locations for installation of equipment and *no go zones* where equipment shall not be located. The standard drawings for the pole type are listed below:

- TC-1121 - JUMA Base Section.
- TC-1123 - JUMA, JUP and RSLP Street Lighting Extension Sections.
- TC-1124 - MA and JUMA Outreach Sections.

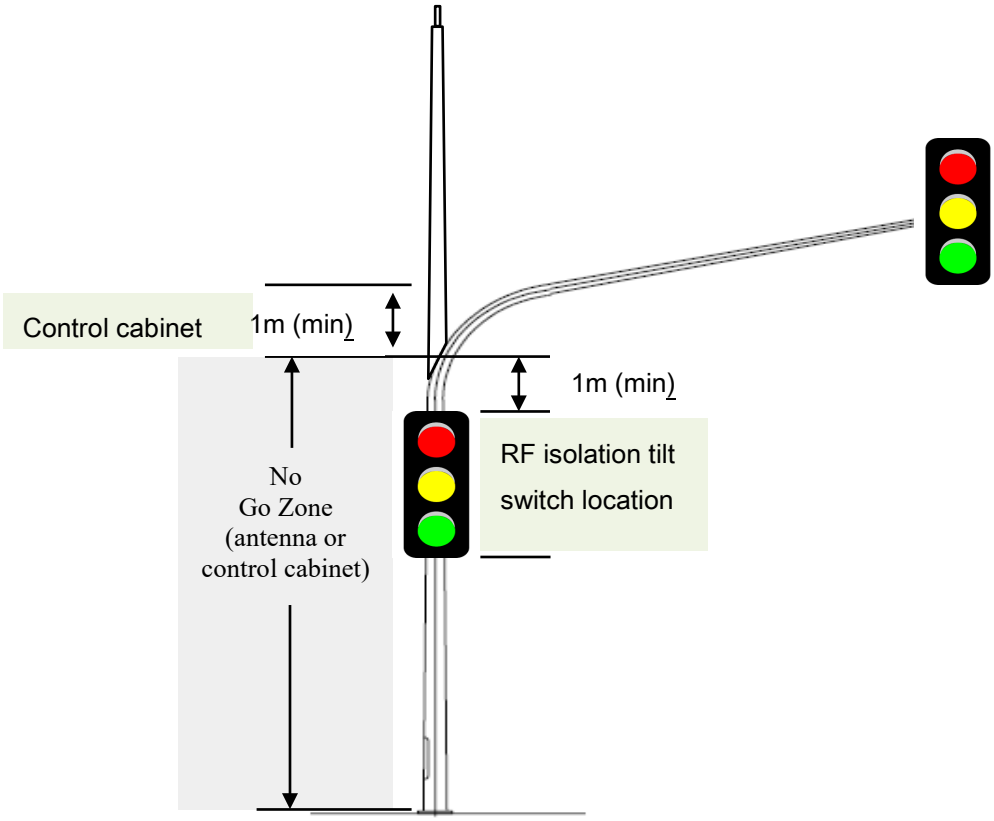

Figure 3.3 - Joint Use Mast Arm pole

3.2.6 Small cells shall not be installed on any other pole type than those specified above.

3.2.7 Before any equipment is mounted on any pole, DoT will require the carrier to certify that the pole can carry the extra proposed load.

3.2.8 DoT will audit the installation upon notification of completion of works to ensure compliance.

3.3 SMALL CELL ANTENNA

3.3.1 Antennas shall not be installed within any of the *no go zones* shown in Figures 3.1, 3.2 and 3.3.

3.3.2 The antenna base shall be mounted on a pole in a manner that provides a safe working clearance from the top of any traffic signal hardware.

3.3.3 The base of the antenna shall be installed within the area 1m from top of the signal lantern or any other traffic signal hardware and 1m below a street lighting outreach for JUP and JUMA.

3.3.4 No part of the antenna or associated cabling shall be attached to the street lighting outreach bracket on a JUP or JUMA.

3.3.5 The antenna cables shall be run on the outside of the pole and protected by suitable colour matched covering such as galvanised steel conduit or steel sheathing of an acceptable type.

3.3.6 The protective covering's height on the pole shall be minimum 2.2m and shall be designed in a way not to be deemed a potential safety hazard to pedestrians or vehicles.

3.3.7 All emissions from the antenna shall be shown to be safe for traffic signal technicians to work on traffic signal hardware. The telecommunications carrier shall provide evidence of this.

3.3.8 Labels shall be mounted at the RF isolation tilt switch and below the antenna base indicating the safe working distance from the antenna.

3.4 SMALL CELL CONTROL EQUIPMENT

3.4.1 All associated control equipment shall be mounted:

- within a suitable ground mounted cabinet located at an approved position; or
- within an approved pole mounted cabinet.

3.4.2 Any pole mounted cabinet shall be installed within the area shown in Figures 3.1, 3.2 and 3.3.

3.4.3 Where equipment is installed on a pole, it shall be placed 1 metre away from traffic signal equipment and not more than 7m up the pole.

3.5 RF ISOLATION TILT SWITCH

3.5.1 Each small cell installed on a traffic signal pole shall have an 'on-pole' RF isolation tilt switch intended for cutting power to antenna for traffic signal maintenance works.

3.5.2 The RF isolation tilt switch shall be installed at a minimum height of 3.2m from the pole base and where appropriate may be placed behind traffic signal lanterns.

3.5.3 Each RF isolation tilt switch shall have warning label on it with the information as specified in Clause 3.7.

3.6 OFF-POLE ISOLATION SWITCH

3.6.1 Where a small cell is powered by 240V, the off-pole isolation method shall be an inline fuse located within an underground pit or above ground roadside cabinet.

3.6.2 The pit shall be not more the 2 metres from the pole where the associated small cell is installed.

3.6.3 The pit shall be clearly marked with communication carrier's name.

3.6.4 Where the carrier locates the isolation switch within a road side cabinet, access to the isolation switch for DoT contractors shall be provided through a DoT approved, lockable access door or hatch to enable isolation for maintenance purposes.

3.7 SMALL CELL WARNING LABEL

3.7.1 Each pole that has a small cell installed shall have warning label placed at the tilt switch.

3.7.2 The warning label shall be legibly and durably marked with the following information:

- Advising of hazard from the transmission equipment.
- Safe working distance from the antenna.
- Name of the communication carrier.
- Carrier's Site identification number.
- (RFNSA number).
- Emergency contact number.

SECTION 4 ELECTRICAL REQUIREMENTS

4.1 GENERAL

4.1.1 All electrical works shall comply with relevant requirements of AS/NZS 3000.

4.1.2 In accordance with the requirements of the Electricity Distribution Code (See clauses 3.2.2 and 12.5) April 2020, DoT is prohibited from providing power to a third party from DoT traffic signal installation.

4.1.3 Power for the control equipment shall be sourced from a separate 'Point of Supply' negotiated directly between the Provider and the Power Supply Company.

4.2 ELECTROMAGNETIC COMPLIANCE (EMC)

4.2.1 All electrical equipment, such as power supplies, switches, circuit breakers etc, covered by this specification shall comply with:

- AS/NZS 61000.6.1 for immunity; and
- AS/NZS 61000.6.3 for emissions.

4.2.2 All transmission equipment used for the purpose of transmission of 4/5G communications shall comply with relevant telecommunications EMC requirements.

4.2.3 Electrical equipment shall also comply with the relevant requirements of the Australian Communications and Media Authority (ACMA) for EMC and shall be labelled with a conforming RCM compliance label as shown in Figure 4.1.

Figure 4.1 - RCM compliance label

SECTION 5 DOCUMENTATION

5.1 GENERAL

The following documentation shall be supplied with the Communications Provider's request for approval for a small cell installation:

a) A drawing showing the type and location of proposed traffic signal pole to be used;
b) Detailed drawings showing the proposed installation of all equipment on proposed traffic signal pole;
c) Proposed inline supply fuse location;
d) The proposed cabinet design and location;
e) Engineering 'sign off' confirming that the proposed traffic signal pole has spare capacity for the additional load; and
f) Evidence of safe working distances from antenna.

APPENDIX A – APPLICATION FOR SMALL CELL INSTALLATION

(Informative)

Details to be considered when reviewing an application for the installation of a small cell

A.1 When considering an application for the installation of a small cell on a traffic signal pole, the following details should be considered:

a) Ensure that the type of pole proposed is one of the following:
   - Joint Use Pole (JUP)
   - Joint Use Mast Arm (JUMA);
   - Mast Arm (MA).

b) Ensure that the engineering certificate for the additional load has been provided.
c) The size and location of the proposed control cabinet.
d) Confirm location of the 'off pole' inline fuse for mains powered small cell installations.
e) Evidence that a safe working distance from the antenna to the traffic signal hardware has been maintained.
f) Local council approval for the proposed installation (low impact installations may only require the issuing of a LAAN by the Carrier)

If there are any doubts regarding the technical compliance with a proposed small cell installation, DoT ITS Group can assist.