

ELECTRICAL FACT SHEET

November 2019 – Street Light Systems for public streets, roadways and arterial roads.

Access Canberra Electrical Inspections team provide this guidance to electricians in the ACT on some emerging issues affecting the electrical industry.

FACT SHEET

This Electrical Fact Sheet describes the requirements for the electrical installation of low voltage street lights, area lights, combined street and/or traffic lights, CCTV and Wi-Fi.

As the street lighting system is deemed to be a Low Voltage (LV) system under the *ACT Electricity Safety Act 1971* any installation work must be performed by a licenced electrician

Terms

ELV = Extra-Low Voltage. Not exceeding 50 V a.c. or 120 V ripple-free d.c.

LV = Low Voltage. Exceeding extra-low voltage, but not exceeding 1000 V a.c. or 1500 V d.c.

TCCS = Transport Canberra & City Services (Directorate.)

MEN = Multiple Earth Neutral. (AS/NZS3000:2018 Clause 5.1.3 MEN earthing system)

Licensing

Electrical wiring work on Low Voltage (LV) wiring systems requires an Unrestricted Electrical Licence. A Restricted Electrical Licence holder may disconnect and reconnect LV only, this licence class does not permit the installation of LV wiring systems.

Method of Wiring Streetlights

Supplied as a final sub-circuit

Each lighting column will be a lighting point on a final sub-circuit, so will require an earth connection to the column from the switchboard supplying the light. Consideration for voltage drop and fault-loop impedance will be required. The final sub-circuit will require a Circuit Breaker/Residual Current Device (RCD) for protection unless it is covered by the TCCS risk assessment for public streets, roadways and arterial roads to exempt it.

Supplied as an outbuilding

Each lighting column will be regarded as a main switchboard with its own MEN system of earthing. Each street light column is to be installed with a circuit breaker main switch, within the column behind the access cover, which provides protection of circuit wiring and ancillary lighting equipment against overload and short circuit currents.

Where street light installations are covered by the TCCS risk assessment for public streets, roadways and arterial roads, a (6kA fault current) circuit breaker to protect the street light internal wiring and luminaire and forming part of a street light MEN installation is acceptable in these installations.

Where street light installations are not covered by the TCCS risk assessment for public streets, roadways and arterial roads, their installation is to be compliant with AS/NZS3000:2018 Clause 2.6.3.2.3 and be protected with a 30mA Residual Current Device (RCD) rated to 6kA fault current.

Area and/or pathway lighting must comply with AS/NZS3000:2018 Clause 2.6.3.2.3.

Additional protection is to be provided by RCD's with a maximum rated residual current of 30mA, and suitable combination MCB/RCD protection devices are acceptable. In these electrical installations, suitable equipment should be selected to ensure moisture does not cause nuisance tripping of the RCD.

Neutral link

The incoming and outgoing main neutral conductors at each column should not depend upon a terminal of the neutral link for continuity. The neutrals are to be connected together with a take-off tail to the neutral link of the lighting column. Where applicable, the MEN point is to be made at a neutral link located behind the access cover.

This can be achieved by a line clamp or large connector at the base of the streetlight column tying all incoming and outgoing neutral conductors together. This will avoid inadvertently opening the neutral conductor to downstream columns, and preventing a rise in potential to the exposed metal of the columns. AS/NZS 3000:2018 Clause 2.2.1.3 (a) and NOTE 2.

Earth electrode

The method of installing the earth electrode depends on the type of column installed.

Direct Buried

Provided the column is direct buried to a depth of 1.2mtrs, the buried metal of the column may be regarded as the earth electrode. For slip base columns the main earth connection should be the part of the column buried in the ground.

Rag Bolt Assembly and Concrete Columns

An earth electrode needs to comply with AS/NZS 3008:2018 clause 5.3.6 and needs to be installed for each column and/or street light controller. Earth electrodes are to consist of one of the following:

- An approved earth electrode driven to a depth of 1.2mtrs into the ground
- Copper Strap 25mm x 1.6mm x 3000mm buried at a depth of at least 500mm
- Bare Copper Cable 25mm x 3000mm buried at a depth of 500mm

Connection to the earth electrode

A green and yellow insulated copper main earthing conductor is to be installed between the electrode and the main neutral link. The main earth conductor should be sized appropriately to the largest active conductor. AS/NZS3000:2018 Clause 5.3.3 and Table 5.1.

The minimum size of the main earthing conductor is to be 6mm.

The electrode must be labelled as required by AS/NZS 3000:2018 Clause 5.5.1.3 and should have mechanical protection in accordance with AS/NZS 3000:2018 Clause 5.5.1.2 (c).

Where the earth electrode has been buried below the ground level then further compliance for inspection and testing as per AS/NZS 3000:2018 Clause 5.5.1.2 (a) and NOTE 1 and the requirements of Clause 5.5.1.2 (b) to (d) must be achieved.

The joint or termination installed in an under-ground or damp location must be sealed to prevent the entry of moisture and to comply with AS/NZS 3000:2018 Clause 5.5.5.3 (a).

Method of Wiring Combination Street & Traffic Lights

Combination Street and traffic lights should be supplied by final sub-circuits which originate from a central control panel. The control panel is to be regarded as a main switchboard.

MEN

The MEN connection is to be located at the main switchboard and have an earth electrode installed. Any exposed metal of columns and equipment should be earthed by means of an earthing conductor originating from the main switchboard. There should be no interconnection, at any column, between neutral and earth.

Final sub-circuits

Final sub-circuits should be protected by circuit breakers, installed at the main switch board, that have the appropriate overload, short circuit and arc fault protection (min 6kA).

Please note

Any earthing conductor incorporated in the sheathing of a multicore cable with live conductors should only be used for the earthing of equipment supplied through the associated active conductors.

Underground wiring systems

All underground wiring systems should be installed in accordance with AS/NZS3000:2018 Clause 3.11. Where underground systems are in public areas a greater depth may be required or additional mechanical protection should be added.

Access covers

To gain access to electrical equipment located within a column, a tool should be required to remove the cover. The Access Canberra electrical inspectors recommend the earthing of the access cover (with an appropriately sized earthing conductor) to an earth stud. If the earth stud is not present, drill and tap a hole to suit a brass bolt with double nuts. Although not required in AS/NZS 3000:2018 when there is no electrical equipment mounted on the cover, this earthing medium provides extra safe guards against covers becoming live and also alleviates the problem of access panels being removed and then inadvertently thrown away.

CCTV AND WI-FI CONNECTIONS

CCTV and Wi-Fi electrical connections inside a streetlight column are deemed to be **FINAL SUB-CIRCUITS** and must be protected accordingly. Fixed electrical equipment can be protected by a Circuit Breaker / Main Switch, installed within the column behind the access cover, which provides protection of circuit wiring. Electrical equipment supplied from a socket outlet should be protected with a 30mA Residual Current Device (RCD). Suitable combination MCB/RCD protection devices are acceptable.

If the electrical equipment is supplied by an alternate power source other than the streetlight and/or traffic light supply, a permanent label “**CAUTION: DUAL SUPPLY**” must be attached inside and outside of the column.

ELECTRICAL WORK

The following is a guide to help with determining the categories of work on existing installations

Repairs- AS/NZS3000:2018 Clause 1.9.3.2

Replacing luminaires for LED upgrade work

Replacing wiring between control panel in streetlight column and luminaire

Please note

- Cabling installed from the circuit protection device to the luminaire for new or up-graded luminaires must be a double insulated or sheathed twin and earth cable. If a streetlight column is re-cabled and the luminaire does not have an earth terminal (the active/neutral terminations are directly into the lamp holder) the earth wire should be left with an insulating connector attached at the luminaire.

Alterations - AS/NZS3000:2018 Clause 1.9.3.1

Replacing auxiliary equipment,

Replacing supply cables

Creating an MEN connection

Replacement of wood panels in streetlight column

Please note

- The use of wood panels for the mounting of control and termination equipment is no longer an acceptable practice. An existing wooden panel used to mount the main switchboard board arrangement (circuit breaker, MEN link etc.) is now deemed to be of flammable material and does not comply with AS/NZS3000:2018 Clause 2.10.7 and Clause 4.2.2.3 (a) (i).
- Up-grade of mounting panels is classified as an addition/alteration and all works must then comply with AS/NZS3000:2018 specifically Clause 1.9.3

Changing earthing arrangements

Please note

- Concrete poles cannot rely on their contact with the general mass of earth as a main earth medium. An earth electrode is required to be installed to comply with AS/NZS3000:2018 Clause 5.3.6.1. The connection to the earth electrode should comply with installation methods outlined in '**Connection to the Earth Electrode**' in this fact sheet.

General Requirements

Under the *ACT Electricity Safety Act 1971* a Certificate of Electrical Safety (CES) form must be submitted to Access Canberra no later than 14 working days after completion of work.

The electrical installation is to be tested in accordance with AS/NZS3000:2018 Section 8 (Testing and Verification). TCCS may also have additional test that are required before energisation.

Click on link for additional information on [Certificate of Electrical Safety \(CES\) forms](#)
CES forms can be found on <https://form.act.gov.au/smartforms/landing.htm?formCode=1013>

A 'NEW' CES form is required to be submitted to Access Canberra, before Evoenergy will energise a micro-pillar.

A 'NEW' CES form is required to be submitted to Access Canberra before Evoenergy will energise a Street Light Control Box or a Traffic Light Control Box (assuming the micro-pillar has already been connected).

Best practice would be to organise an appointment with the electrical inspectorate to inspect the micro-pillar and control box at the same time (only one CES form required).

Please note

- TCCS also have requirements for connection.

A 'NEW' CES form is required to be submitted to Access Canberra for the energisation of traffic lights at a new installation.

A 'NEW' CES form is required to be submitted to Access Canberra for the energisation of a new bank of streetlights (installed in a Greenfield development).

An 'ADD/ALT' CES form is required to be submitted to Access Canberra if extra traffic lights or streetlights are added to an existing installation.

A 'ADD/ALT' CES form is required to be submitted to Access Canberra when relocating, replacing or repairing existing streetlights or traffic lights, the associated auxiliary lighting equipment and/or columns. One Certificate of Electrical Safety (CES) form would be required to be submitted to Access Canberra;

- For the total number of new streetlights supplied from a streetlight control box
- For the total number of new streetlights installed on a 'section' in a suburb (i.e. each streetlight is controlled by its own day/night sensor)
- For the total number of streetlights repaired/replaced or relocated from a streetlight control box

Contact us

Access Canberra Electrical Inspections Team

Phone: 02 6207 7775 (8:30am to 4:30pm)

Email: Electrical.Inspections@act.gov.au.

Web: <https://www.accesscanberra.act.gov.au>

Previous electrical notices are available at this link:

https://www.accesscanberra.act.gov.au/app/answers/detail/a_id/2998/kw/electrician%20note#!tabs-5

Credits

- Clause 1.4.128 Voltage Systems; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 1.9.3 Alterations and repairs; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 1.9.3.1 *Alterations*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 1.9.3.2 *Repairs*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 2.2.1.3 *Common neutral*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 2.6.3.2.3 *Non-domestic and non-residential installations—Australia only*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 2.10.7 Fire-protective measures; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 3.11 *Underground Wiring Systems*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 4.2.2.3 *Protection from high temperatures*; from [Standards Australia](#) publication AS/NZS3000:2018
- AS/NZS3000:2018 Clause 5.1.3 MEN earthing system from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 5.3.3 Earthing conductor size (cross-sectional area) ; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 5.3.6 *Earth electrodes*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 5.5.1.2 *Connection to earth electrode*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 5.5.1.3 *Labelling*; from [Standards Australia](#) publication AS/NZS3000:2018
- Clause 5.5.5.3 Particular methods of earthing; from [Standards Australia](#) publication AS/NZS3000:2018
- AS/NZS 3000:2018 B5 *Maximum Circuit Lengths*; from [Standards Australia](#) publication AS/NZS3000:2018