Technical Directive – Use of Residual Current Devices in Northern Territory Government Streetlighting Circuits

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NORTHERN TERRITORY GOVERNMENT

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Acronyms	Full form
NT	Northern Territory
NTG	Northern Territory Government
DIPL	Department of Infrastructure, Planning and Logistics
RCD	Residual Current Device
AS/NZS	Australian Standards / New Zealand Standards
PWC	Power and Water Corporation

Purpose

The purpose of this technical directive is to address the use of Residual Current Devices (RCDs) on streetlighting circuits installed on Northern Territory Government managed roads.

Background

In 2018 the Department of Infrastructure, Planning and Logistics (DIPL) inherited full responsibility for all streetlights across NTG managed roads from the Power and Water Corporation (PWC).

Until 2018 PWC managed, maintained, and operated the streetlights. These were installed to PWC internal design standards and design management processes. AS/NZS 3000:2018 allows designers to make decisions based on risks associated with loss of supply. PWC excluded the use of RCDs in streetlighting designs due to exemptions provided under AS/NZS 3000:2018 (Standard for low voltage electrical installations across Australia also known as the Wiring Rules) Clause 2.6.3.2.3.3. Following the transfer of management responsibility from PWC to DIPL, RCDs were installed on all new streetlighting assets.

Current DIPL guidelines for streetlighting design and installation refer to AS/NZS 3000 and call for the use of RCDs within streetlighting circuitry. RCD protection could be omitted upon a standalone risk assessment being undertaken by the designer.

RCDs are safety devices installed on electrical circuits to minimise the risk of electric shocks. However, recent compatibility issues have been noted between RCDs and streetlighting systems. These issues have resulted in nuisance tripping by the RCDs, causing streetlight outages, which may go unaddressed for extended periods.

There is an underlying need for organisations to be able to justify why design decisions are made. DIPL has undertaken a global risk assessment to consider whether RCDs are required and standardise the design of streetlighting circuits. Risk assessment workshops were held amongst GHD, NTG, PWC and NT WorkSafe across three separate sessions on the 25/05/2021, 01/09/2021, and 16/11/2021.

One of the major outcomes of the risk assessment was to reduce the inherent safety risk of streetlight outages because of nuisance tripping due to RCDs and to ensure that the NTG lighting design documentation remained compliant with AS/NZS 3000:2018 and NTG requirements.

Use of RCDs on NTG managed streetlights

Clause 2.6 of AS/NZS 3000 addresses the use of RCDs. Installation of RCDs have resulted in nuisance streetlighting outages caused by RCD tripping across roads in regional and urban areas. On several occasions, the issue has not been rectified and resulted in unacceptable levels of lighting outages for extended periods, causing safety and security concerns across NTG managed roads.

To address RCD nuisance tripping and associated consequences, the requirements specified in Clause 2.6 of AS/NZS 3000 have provided an exemption in installing RCDs on electrical circuits. Clause 2.6.3.2.3.3 (Requirements for additional protection extract below) highlights the following:

Exceptions: These requirements need not apply to the following:

1 *Repairs in accordance with Clause 2.6.3.2.6.*

2 *Situations where the disconnection of a circuit by an RCD could cause a danger greater than earth leakage current (e.g. traffic signals).*

3 *Final subcircuits installed for the connection of specific items of equipment, provided that the connected equipment is designed, constructed and installed in such a manner that is not likely to present a significant risk of electric shock and—*

   (i) is required by the owner or operator to perform a function that is essential to the performance of the installation and that function would be adversely affected by a loss of supply caused by the RCD operation; or

   (ii) may cause spurious nuisance tripping through high leakage current being generated in the normal operation of the equipment (e.g. VSDs).

This clause was reviewed during the risk assessment workshops and it was ascertained that the risk created by the loss of supply to streetlights due to RCDs tripping was greater than the risk of removing RCDs from the circuit. As such, in the event of nuisance tripping due to RCDs, no new streetlighting infrastructure are to include RCDs and any existing RCDs may be removed from any lighting circuitry.