



**TS 03791:1.0**  
T LR EL 00003 ST  
**Standard**

# High Voltage Network

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## Document information

**Owner:** Director Energy Networks and Systems  
Asset Management  
Planning, Integration and Passenger

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**Discipline:** Electrical

## Document history

Revision	Effective date	Summary of changes
1.0	25 May 2017	First issue as T LR EL 00003 ST
2.0	21 December 2017	Second issue as T LR EL 0000 ST, minor clarification to content
1.0	25 October 2024	First issue as TS 03791, superseding T LR EL 0003 ST version 2. Version numbering recommenced in line with new designation.

## Preface

This standard is a first issue as TS 03791 and supersedes T LR EL 00003 ST, version 2.0. This document sets out the technical requirements for the HV alternating current cable infrastructure of the HV network within light rail HV networks.

Power supply to light rail traction substations is primarily provided by HV feeders connecting the traction substations and the 11 kV network of local electricity distributors. Depending on the arrangement with the electricity distributor, some of these HV feeders may be owned by TfNSW.

A light rail network may also have some or all of its traction substations interconnected by means of 11 kV feeders.

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# 1 Scope

This standard sets out the requirements of HV cables within light rail HV networks.

This document does not cover the following:

- HV cables that are not owned by TfNSW
- HV cables of the TfNSW heavy rail or rapid transit systems.

# 2 Application

This document applies to HV cables that form part of light rail HV networks.

This document is applicable to all new HV cable installations. It is also applicable to the modification of existing HV cable infrastructure within the light rail HV networks.

Where a new HV cable installation or modification is constructed and energised in stages, the requirements of this document also apply to the configuration at each stage of construction.

This document is intended to be used by competent personnel engaged in the provision of services relating to light rail infrastructure. In addition to the requirements of this document, asset decisions should also take into account the life cycle cost considerations specified in TS 01505.

# 3 Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

## **Transport for NSW standards**

TS 01505 (T MU AM 01001 ST) *Life Cycle Costing*

TS 02361 (T LR CI 12530 ST) *Corridor Interface Requirements*

TS 03748 (T HR EL 20001 ST) *High Voltage AC and 1500 V DC Traction Power Supply Cable Requirements*

TS 03750 (T HR EL 20003 ST) *Underground Installation Configurations for High Voltage and 1500 V DC Cables*

TS 03751 (T HR EL 20004 ST) *High Voltage AC and 1500 V DC Traction Power Supply Cable Infrastructure – Standards for Design and Construction*

TS 03752 (T HR EL 20005 ST) *Above Ground Installation Configurations for High Voltage AC and 1500 V DC Cables*

TS 03753 (T HR EL 20006 ST) *High Voltage ac and 1500 V dc Cables – Transitions Between Underground and Above Ground Installation Configurations*

TS 03754 (T HR EL 20007 ST) *Cable Pits*

TS 03755 (T HR EL 20008 ST) *Underground Cables and Cable Enclosures – Location Data Recording*

TS 03756 (T HR EL 20009 ST) *Testing of HV AC and 1500 V DC Cables*

TS 03757 (T HR EL 20010 ST) *HV and 1500 V dc Cables – Joints and Terminations*

TS 06197.1 (T MU MD 00009 ST) *TAO Authorisation Requirements*

## 4 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply in this document:

**HV** high voltage; voltage exceeding 1000 V ac or 1500 V dc

**HV network** HV feeder cables that are owned by TfNSW either for supply to or interconnection of light rail traction substations

**JOS** judgement of significance; an assessment of the technical risk introduced by the implementation of the design and considers both the probability and consequence of partial performance or failure of a design

**mixed alignment** fully integrated into the road space used by light rail, road users and pedestrians

**segregated alignment** a dedicated corridor for light rail use only to which access for other road and rail traffic, and pedestrians is controlled

**separated alignment** intended for exclusive use by light rail but integrated into the road space in such a way that occasional access by other traffic and pedestrians is possible

**SFAIRP** so far as is reasonably practicable

**TAO** Technically Assured Organisation

**TfNSW** Transport for NSW

## 5 Application to existing high voltage cable installations

Where existing HV cable installations are modified, the design and construction of the modification shall ensure that the resultant configuration also complies with this document, SFAIRP. Where it is not reasonably practicable to do so, the design shall be reviewed and accepted by the relevant TAO in accordance with the TAO's JOS processes for HV cables. Refer to TS 06197.1 for more information. Where the TAO has not established an Asset Management Branch accepted JOS process for HV cables, the proposed design shall be documented through a standards concession.

## 6 Mandatory standards

HV cable infrastructure shall comply with the requirements relevant to HV cables in the following standards, with the exception of provisions set out in Section 7 and Section 8:

- TS 03748
- TS 03750
- TS 03751
- TS 03752
- TS 03753
- TS 03754
- TS 03755
- TS 03756
- TS 03757.

## 7 Underground installation configurations

For light rail installations, several requirements of TS 03750 are applicable only to areas within segregated alignments with boundary fences installed along both sides of the alignments.

Where TS 03750 states 'within the rail corridor', those requirements shall apply to installations within light rail segregated alignments with boundary fences installed along both sides of the alignment. 1500 V dc cables in TS 03750 shall be read as 750 V dc cables for light rail installations.

Conduits for HV cables may be encased within the concrete track slab, or in the concrete slab between the track slabs, at reduced depth.

For civil requirements that are applicable to undertrack crossings, refer to TS 02361.

## 8 Above ground installation configurations

Above ground installation configurations shall only be used in a cable installation that is located within high-security environments.

High-security environments may include, but are not limited to the following:

- traction substations
- cable pits
- cable tunnels and shafts
- secure confines of a depot.

Above ground installation configurations shall not be used in areas that are accessible to the public, including the light rail corridor in separated or mixed alignments.

Above ground installation configurations may be installed in areas within segregated alignments that feature boundary fences installed along both sides of the alignment, provided that the safety risk is controlled SFAIRP in accordance with a risk analysis undertaken in the design process.

Ground line troughing shall not be used.