



Roadside Cabinets

Intelligent transport systems (ITS) delivery specification

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More information

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1 Overview

This section defines the purpose of the equipment within the operational system.

1.1 Scope

The scope of this specification is to provide requirements for:

1. Supply of roadside cabinets, and the following equipment and hardware:
 - a. Physical enclosure.
 - b. Doors.
 - c. Mounting hardware.
 - d. Locking mechanism.
2. Physical installation of the cabinet.
3. Physical connection of the cabinet to power supply and communication equipment.

1.2 Overview

1.2.1 NZTA ITS class

011 Enclosures – Cabinets and similar used to house roadside equipment.

[Class definitions](#)

2 Requirements

This section outlines what all equipment and systems need to do (functional), and how they need to do it (non-functional).

2.1 External functional requirements

- 2.1.1 The cabinet shall withstand all weather conditions to protect internal equipment.
 - 2.1.1.1 The cabinet shall be safe from sharp edges with a minimum external radius of 3mm and with deburred edges.
- 2.1.2 The cabinet supplied shall be non-removable and provide structural support for equipment to be mounted internally.
 - 2.1.2.1 Pole-mounted cabinets do not require a plinth.
- 2.1.3 Cabinets shall provide access to all internal equipment
 - 2.1.3.1 The use of cable clamps and terminals for the connection of external wiring shall be effective and safe for maintenance access.
- 2.1.4 The cabinet shall ensure the internal equipment stays secure from theft and vandalism.

2.2 Internal functional requirements

- 2.2.1 The cabinet and associated equipment shall be free from sharp corners and projections, to minimise the likelihood of causing injury when working at the cabinet.
- 2.2.2 Safe and secure access to the cabinet shall be available under all weather conditions.
- 2.2.3 The cabinet shall be capable of managing internal temperatures through ventilation.
- 2.2.4 The cabinet shall have sufficient space for a document holder to securely store system information and plans.
- 2.2.5 The cabinet shall have sufficient space for any shelf and mounting rack so that the ITS can be securely fastened within the internal shell.
- 2.2.6 The cabinet shall provide cable clamping bars, where necessary, for securing and supporting all cables (other than telecommunications lines).

3 Performance requirements

This section outlines the reliability and availability requirements of equipment, which may require independent certification and/or declarations of conformity.

Refer to the section titled 'Reliability and availability' in the latest version of ITS core requirements standard: *General requirements* for further details.

3.1 Monitoring

The cabinet shall be monitored continuously under all weather conditions.

3.2 Resistance to the effects of external conditions

Cabinets are to be weather- and vermin-proof with a minimum ingress protection (IP) rating of IP55 and shall be provided to meet the requirements specified in the ITS core requirements specification: *Environmental requirements*.

3.2.1 Cabinet housing

The cabinet shall protect its interior surfaces and all electrical equipment, modules and systems from condensation where possible.

The cabinet shall provide a means to collect and to guide condensation to drain points (eg drip trays or equivalent).

Equipment mounting shall allow separation for internal vertical surfaces via sufficient gap of 5-10mm

3.2.2 Cabinet doors

All doors of the cabinet shall be provided with durable and resilient weatherproof sealing gaskets. The gaskets shall be resistant to ultraviolet (UV) and be securely held in position, whilst still being readily replaceable while the equipment is being serviced (maintenance).

Doors shall have the same surface treatments as the cabinet.

3.2.3 Resistance to vandalism

The cabinet shall be able to withstand, or otherwise minimise the effects of, vandalism.

This shall include:

- i. forcibly opening the access door
- ii. opening the access door by simple tools or implements being used to open the door locks or part the hinges
- iii. forcibly pushing the cabinet from its mountings

- iv. damage to the cabinet or door or mounting base by kicking or pushing
- v. the cabinet being used by unauthorised persons to access and/or vandalise other ITS equipment/assets.

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4 Technical requirements

This section outlines specific technical and physical requirements for the equipment.

4.1 Cabinet manufacture

A declaration of conformity shall be completed by the supplier based on this specification with details such as paint thickness and material thickness.

4.2 External cabinet specifications

All cabinets shall have sufficient internal space for all the equipment required by the cabinets' purpose.

The cabinet shall allow for sufficient space to include the front power supply, including allowance for the bend radius of fibres from the front of the cabinet. The depth of the cabinet shall be sufficient for all the required equipment to be housed in the cabinet.

The cabinet, plinth and apron shall comply with the following ITS standard drawings.

- i. 000-0000-0-7104-03-R1 *Roadside control cabinet*
- ii. 000-0000-0-7104-04-R1 *Roadside control cabinet & apron details*
- iii. 000-0000-0-7104-05-R1 *Network node cabinet*
- iv. 000-0000-0-7104-06-R1 *Network node cabinet & apron details.*

4.2.1 Materials

The complete housings (ie body, roof, base and access door) shall be 2.5mm aluminium alloy. Reinforcing shall be provided as necessary to produce a rigid structure and to provide adequate strength against vandalism.

4.2.2 Paint

All internal and external surfaces shall be powder coated to a minimum dry film thickness of 50 microns. The coating colour shall be either Karaka Green (RAL 6015), Almond (RAL 1015) or T33 Smoke Blue (AS2700).

The cabinet colour shall be based on the cabinet's location and surrounding environment, as follows.

- i. Karaka Green shall be provided in high pedestrian volume and/or urban areas, areas with a history of graffiti, and high foliage areas
- ii. Almond shall be provided in areas that are very exposed to sunlight.

Cabinets decorated with art are also acceptable for graffiti control purpose.

Paint shall be suited for outdoor conditions and shall be UV stable (as aligned with AS/NZS 2312.1:2014 *Guide for protection of structural steel against atmospheric corrosion by use of protective coatings – Part 1: Paint coatings*).

All cabinets shall be finished with an anti-graffiti coating such as Anti-Graffiti Product 910 Line prior to installation and in accordance with NZTA S10 *Specification for anti-graffiti coatings*.

4.2.3 Name plate

Cabinets shall be provided with a black nameplate, 300mm × 60mm × 1.5mm thick laminated acrylonitrile butadiene styrene (ABS) plastic with the cabinet number engraved in white 48mm Times New Roman letters and numerals (refer to Figure 2 in Appendix A).

The cabinet name plate shall be installed near the top of the cabinet facing the approaching traffic with four 3mm stainless steel fasteners.

4.2.4 Labels

Cabinets shall have schematics/labels that convey the contents of the cabinet and UPS (if present), and are placed on the doors of the cabinet. These shall include electricity flash and radiation sticker where appropriate (see Figure 1 and Figure 3 in Appendix A).

4.2.5 Construction

The interior and exterior of the cabinet shall be free from sharp corners and projections, to decrease the likelihood of causing injury. All edges shall be de-burred.

Cabinets shall have welded construction with no rivets, nuts or bolts visible from the outside. All joins shall be sealed to prevent insects from entering the cabinet. They shall also be stiffened to prevent the cabinet from flexing once installed.

The cabinet's gas plate (area below the cabinet where excess lengths of cable are coiled up) depth shall be between 120mm and 150mm.

4.2.6 Door

The required access shall be provided when the door is opened not more than 110 degrees from the closed position. Double doors shall have one at the front and one at the back.

The size of the door opening shall be as close as practicable to the external width and height dimensions of the cabinet, subject to the requirements for mechanical strength. Doors shall be aligned appropriately to avoid gaps between the door and the walls of the cabinet.

The cabinet shall be provided with a door retaining device, that as a minimum provides for the door to be held open at 110 degrees and at 90 degrees from the closed position (see Figure 7 in Appendix A).

Each door shall have a rust-resistant recessed handle. See Appendix A for examples.

The doors shall be designed in such a way as to preclude forced entry.

All doors shall be earth bonded.

4.2.6.1 Door hinges

All doors shall have three internal, concealed hinges on the left side of each door and shall not restrict the door from being opened a minimum of 110 degrees from the closed position (when seen facing the cabinet – see Figure 4 in Appendix A). The door hinges shall be of robust construction and shall be made of a corrosion resistant material such as stainless steel designed to be used in an external environment. The hinges shall be of a type that does not require lubrication to prevent seizing.

The door hinges shall not be damaged when the door is swung forcefully open or closed, such as when the door is blown by a gust of wind.

The door shall swing freely without binding on any portion of the cabinet.

Long hinges, such as piano hinges shall not be provided.

4.2.7 Locking system

The lock system shall be defined in the design.

All doors shall have a three-point locking system. Each door shall have top and bottom locking rods and a side tongue connected to the handle for securing the door in the closed position.

The locking systems shall use a positive locking action and be designed so that pressure applied to the door does not allow the levers to be dislodged from their locking positions (this is not required for some mechanical door locks) and hold the door tightly against the cabinet to minimise the gap to protect from forced entry.

The locking system shall be recessed to be flush with the cabinet to minimise vandalism.

4.2.7.1 Mechanical door lock

The mechanical door lock shall have threaded stainless steel fasteners. The means of access as defined in the design shall be common across the region or maintenance contract.

The fasteners shall screw into threaded mating sections in the cabinet or shall operate levers that provide the locking action.

When the door is locked, the door-locking mechanisms shall securely hold the door in the closed position and shall be flush with the cabinet or incorporated in the handle design.

If PIN pads are included as the locking mechanism as part of the design, they shall have a minimum of a five-figure code.

4.2.8 Mounting

Ground mounted cabinets shall be mounted on a plinth.

The cabinet shall be constructed with a base section that provides strength for mounting on a concrete footing. The cabinet shall not distort when mounted on an uneven concrete footing.

If the gas plate for the housing is constructed from aluminium sheet, then the gas plate/base shall include an integral reinforcing frame to provide rigidity and to provide adequate strength for the mounting bolts. The reinforcing frame shall be made from heavy gauge aluminium.

4.3 Internal cabinet equipment

4.3.1 Instrument rack

The cabinet shall include an instrument rack installed to securely hold and mount monitoring equipment.

The types of instruments mounted on the rack shall include:

- i. an RJ45, RS323 or RS485 communications interface
- ii. 10 digital i/o connections (limit to 12V)
- iii. 4 analogue i/o connections (0–10V)
- iv. 6 relay outputs.
- v. Uninterruptible Power Supply

The design shall identify the equipment types to be mounted on the instrument rack and will guide the number of RU required.

4.3.2 Door switch

A lighting switch shall be provided that activates when the cabinet is accessed. Equipment to activate the lighting switch shall be stored in the instrument rack.

The alert system shall connect back through the communications network to notify the Principal operator if someone is accessing the cabinet.

4.3.3 Document holder and documents

The inside of the cabinet door shall have a fixed free-draining document holder of at least 20mm depth and 170mm height, capable of holding the A4 laminated design documents listed below. See Figure 5 in Appendix A for an example.

The Supplier shall provide the following documents in the holder:

- i. electrical schematics – circuit identification charts (as-builts) for all distribution boards with full circuit information, and identification in line with the drawings
- ii. systems schematics – a chart showing the cabinet power source and route
- iii. network design
- iv. cabinet site layout.

4.3.4 Ventilation

Cabinets shall be ventilated with a passive system, sufficient to cool equipment proposed in the cabinet in order to prevent overheating.

Cabinets shall have filters to reduce dust, pollen and other particles circulating through the cabinet. Filters shall be snug fitting ('cut to size' material), maintainable (easy to wash) and replaceable when necessary. Refer to Figure 6 in Appendix A for an example of a dust and vermin filter.

If the use of passive ventilation is not practicable to prevent overheating, the Supplier shall provide air conditioning with approval.

4.4 Cabinet equipment

Cabinets shall be fully equipped to maintain the required operation conditions for the equipment enclosed within.

The following section details non-functional requirements to enable the internal equipment to function as required.

4.4.1 Internal layout

All electrical terminations shall occur in a dedicated distribution board and the location shall be defined in the design.

Sufficient space shall be provided to allow all internal components to be mounted to their manufacturer's requirements and for all connections to these components such as power and communications. The locations of equipment shall be functional and accessible for users of the cabinet.

Equipment layouts shall be symmetrical.

4.4.2 Rack mounting

The mounting rack will be based on a 19-inch mount. The equipment shall be on a standard DIN mounting rail.

The cabinet shall have four side rails (two at the front and two at the back), and the equipment shall be stack mounted via a 19-inch rack. The rack will be selected to fit the required equipment to be housed by the cabinet. The rails shall be parallel with each other so that shelving is level. Equipment that cannot be mounted on the rack shall be mounted on shelves.

Panel-mounted equipment and mounting panels shall be fixed by screws into captive nuts using rust-resistant screws. Self-tapping screws are not acceptable.

5 Installation requirements

5.1 Electrical installation and safety

Electrical installation shall comply with and be installed in accordance with the Electricity (Safety) Regulations 2010 (SR 2010/36) and AS/NZS 3000:2018 *Electrical installations – Known as the Australian/New Zealand Wiring Rules* (AS/NZS 3000:2018).

5.2 Cable ducts

Ducts shall be blocked using expanding foam or foam duct blocks to prevent rat and moisture ingress.

Unused or unconnected ducts shall terminate 1m past the edge of the concrete pad or any associated paved maintenance area, but ducts shall all be connected to the nearest chamber where possible. All ducts and conduits used or unused shall be left with a draw-wire in place. Refer to the latest version of ITS design standard: *Civil and structural requirements* for more information.

Ducts shall be installed as per ITS design standard and delivery specification: *Duct supply and installation*.

5.3 Cable glands

Non-proprietary cable glands shall be used for all metal-sheathed, armoured, and neutral-screened cables entering or exiting any enclosure. Gland holes shall be a maximum of 32mm.

All cable entries/exits for external cables shall be through the bottom of the cabinet. Different types of proprietary glands shall be used depending on the cable system used. These are listed below:

- i. Thermoplastic-sheathed (TPS) – bushed holes (sealed)
- ii. Mineral-insulated copper-clad (MICC) – MICC glands
- iii. Mineral-insulated metal-s heathed/polyvinyl chloride (MIMS/PVC) – MIMS glands with plastic sleeves
- iv. Neutral-screened (NS) – compression type glands
- v. Paper-insulated, lead-alloy-sheathed, steel-wire armoured, served (PLYSS) – sealing box and brass wiping gland
- vi. Paper-insulated, lead-covered, steel-wire-armoured, served (PLSWAS) – sealing box and armour clamping gland
- vii. Cross-linked polyethylene/high temperature polyvinyl chloride (XLPE/HT-PVC) – compression type glands
- viii. Cross-linked polyethylene/steel-wire-armoured/polyvinyl chloride (XLPE/SWA/PVC) and PVC/PVC/SWA/PVC – compression type glands with armour clamp

Cable glands used shall be sealed appropriately so as not to compromise the IP rating of its enclosure.

Cable bends shall be followed by a minimum of 50mm of straight cable before the cable enters a gland where practical.

Earthing rings shall be used in conjunction with armour clamps.

5.3.1 Cable management

A dedicated cable management system shall be installed to prevent the use of zip ties or cable ties around/through mounting holes. Sufficient space is required within the cabinet to allow this to be carried out effectively

5.4 Power supply

A power board shall be mounted on a 19-inch rack and connected to the power switch. Refer to section 5 of this delivery specification for details on installation.

5.4.1 General power supply

All cabinets shall be provided with an appropriate fault current limiter, main switch, surge diverter and main distribution board.

The main distribution board (or submains) shall either be of a self-contained type with additional neutral link(s) and earth link, or shall be assembled from separate components.

The distribution board shall be mounted in a readily accessible position in the lower part of the housing as part of a 19-inch rack-mounted system. With the housing access door open, the fault current limiter, main switch and circuit breakers shall be directly accessible without the need to remove or swing back any panel or any equipment in the housing.

If the distribution board has a protective cover, such as provided on commercially available assemblies, then it is acceptable for the protective cover to be raised to gain access to the main switch and circuit breakers.

The distribution board shall be suitably positioned to be protected from rain, as far as is practicable, when the access door is open.

5.4.2 Main switch and fault current limiter

The main switch shall control the supply to all circuit breakers in the distribution board, but shall not control supply to the fault current limiter. When switched on, the main switch shall also be connected to the surge diverter. The main switch shall be appropriately rated.

The fault current limiter shall be an appropriately rated replaceable low voltage (LV) cartridge fuse. The fault current limiter shall be suitably positioned to facilitate connection of the active conductor of the consumer mains.

5.4.3 Circuit breakers

A total of no less than six circuit breakers shall be provided, including the provision of necessary spare terminals on the earth link and neutral link(s), as follows:

- i. An 'Auxiliary' circuit breaker, rated at 10A with a breaking capacity of not less than 8kA, shall be provided for controlling the socket outlets and any auxiliary circuits.

- ii. A 'Logic/Equipment 1' circuit breaker, rated at not greater than 10A with a breaking capacity not less than 8kA, shall be provided to supply low-power equipment in the housing (such as the controller of the main traffic and transport related equipment on site).
- iii. Four 'Equipment' circuit breakers (identified as 'Equipment CB2', 'Equipment CB3', etc), rated at not greater than 10A with a breaking capacity of not less than 8kA, shall be provided to supply other equipment inside the cabinet.

5.4.4 Surge diverter

Provide and install a surge diverter that protects against surges on the incoming mains supply, such as surges induced by lightning, switching spikes, and similar transients.

Where a surge diverter incorporates one or more metal oxide varistor (MOV) devices, it shall include an indicator which shall be lit while the MOV devices are functional, and extinguished when any of the MOV devices has failed.

If a commercially available surge diverter is used, it shall be either a rail-mounted type or a panel-mounted type.

Discrete component surge diverters shall be mounted on terminal blocks provided specifically for this purpose. Surge suppression devices shall not be mounted as 'flying lead' devices in any terminal of the main switch or any circuit breaker, and shall be kept clear of all cables.

The positioning and mounting of consumable surge suppression devices, such as MOV devices, shall facilitate inspection and replacement of these devices.

The surge diverter shall be effectively isolated from the mains supply when the main switch is in the open position.

5.4.5 EMI filters

An in-line electromagnetic interference (EMI) filter shall be provided and connected directly to the load side of each of the 'Equipment' and 'Logic/Equipment' circuit breakers to provide further connection to, and EMI suppression for, the electrical traffic and transport related equipment that will be accommodated by the cabinet.

Alternatively, a single in-line EMI filter shall be installed after the main switch but before these circuit breakers to provide EMI suppression.

The EMI filter(s) shall be adequately rated for LV operation and the maximum power capacity of the circuits as per sections 5.4.2 and 5.4.3 above.

The EMI filter(s) shall be capable of safely carrying a fault current five times its/their rated current value without damage.

Each EMI filter shall be clearly labelled 'EMI FILTER' and indelibly marked with:

- i. the name, trade name or trademark of the manufacturer or supplier
- ii. the load voltage and current ratings of the filter
- iii. the inductance of the filter
- iv. the maximum permitted value of direct current through the filter.

5.4.6 Socket outlet

The cabinet shall be fitted with a double socket outlet with an integral 30mA Type II residual current device, complying with AS/NZS 3190:2016 *Approval and test specification – Residual current devices (current-operated earth-leakage devices)*. This socket outlet shall be protected by the 'Auxiliary' circuit breaker.

The socket outlet shall be mounted in an accessible position in the cabinet. Where the socket outlet is mounted on the switchboard, a barrier shall be provided to segregate the rear of the socket outlet from the switchboard components and wiring.

The socket outlet shall be mounted such that it provides for unobstructed insertion of mains power plug-packs, and operation of inserted mains power plug-packs with the door of the cabinet closed.

5.4.7 Cable clamping bars

Provide clamping bars for each group of cables positioned in the immediate vicinity below the respective termination points for the cables.

The method for clamping the cables shall be such that all cables shall be uniformly clamped regardless of the mix of cable types and sizes.

The clamping bar for the consumer mains shall accommodate two double-insulated single-core cables with sizes from 6mm² to 16mm².

5.4.8 Mains power supply

Electricity connection capacity shall be able to meet the largest load to be experienced under normal operating conditions. The provision of electricity connections shall be agreed with the distribution network operator (DNO). Spare capacity shall be allowed, provided this does not result in the total load exceeding the maximum capacity on a single phase supplied by the DNO.

Where DNOs provide a 3-phase supply, total loads on each phase shall be balanced.

Power design calculations shall be based upon current data obtained from the TSP and the equipment manufacturers.

5.5 External and Internal Mounting

5.5.1 External Cabinet Mounting

Cabinets shall be mounted on a plinth, which shall be sized to provide safe and secure access for maintenance and other activities. This shall consider the environment the cabinet is being installed in and safety-in-design principles. The foundation details shall be supplied to the Principal's engineer for approval.

Cabinets shall be mounted ensuring the edges of the cabinet are secure and flush with the plinth while also ensuring that the bolting of the cabinet is not visible externally to the sump. Therefore, all equipment bases and base plates shall be grouted, and silicon shall be also be used to ensure it is flush.

Cable entry points, plugs and the gas plate must all be sealed as designed and not compromised by the installation method.

5.5.2 Internal Access

Internal equipment layouts within roadside equipment cabinets shall provide access for installation and maintenance. Access includes to the rear of the internal equipment within the cabinet.

The cabinet shall allow a minimum of 25% space at the time of installation, for future equipment additions. Equipment shall be positioned to allow easy maintenance access.

If installing a pole-mounted cabinet, required equipment shall be considered prior to installation to ensure there is enough capacity to fit the intended devices.

Where cabinets are to be provided by an upgrade programme, any requirements for housing of the TSP's transmission equipment are determined by the TSP, including the internal environmental conditions, the amount of internal cabinet space required, and the power supply and distribution requirements.

5.5.3 Cable management

Cables shall be labelled.

A 19-inch rack shall be installed and used to assemble the cables in the cabinet.

5.5.4 Vermin and insect protection

The cabinet shall be installed flush to the plinth and gas plate to reduce vermin from accessing the cabinet.

Cable entry points, plugs and the gas plate shall be sealed as designed and not compromised by the installation method.

The cabinet's location shall minimise the proximity of vegetation or other environmental issues that encourage insects such as ants.

5.5.5 Vegetation

There shall be a 1m horizontal and vertical clearance where possible on all edges from the cabinet to be clear of vegetation.

For more details, refer to the latest version of ITS core requirements standard: *Requirements for intelligent transport systems*.

6 Appendix A: Illustrations



Figure 1: Typical communications cabinet



Figure 2: Communications cabinet E-6220-N and ramp signals cabinet E-8139-N with their identification labels facing the approaching traffic



Figure 3: Cabinet that is not visible from the road

Some cabinets cannot be seen from the road, such as the one in Figure 3, which is mounted on a gantry. The (old style three-digit) label is attached on the door with the electricity and laser warning label.



Figure 4: Rear of a cabinet

Figure 4 shows a rear of a cabinet under construction, illustrating the vertical fixing rails for 19-inch racks, the door earth strap, and the three-point locking system in the open position.



Figure 5: Typical door arrangement showing the document pocket and ventilation grille



Figure 6: Example of internal ventilation grille dust and insect filter



Figure 7: Example of a gas strut door stay. Steel rod stays shall be used as a supplement.

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7 References

This section lists all external and NZTA references included in this document.

7.1 Industry standards

Standard number/name
AS 5715:2015 Uninterruptible power systems (UPS) for roadside devices
AS/NZS 2312.1:2014 Guide for protection of structural steel against atmospheric corrosion by use of protective coatings – Part 1: Paint coatings
AS/NZS 3000:2018 Electrical installations – Known as the Australian/New Zealand Wiring Rules
AS/NZS 3190:2016 Approval and test specification – Residual current devices (current-operated earth-leakage devices)

7.2 NZTA standards, specifications and resources

7.2.1 Standards and specifications

See the [NZTA website](#) for the latest versions of the ITS S&S listed below.

Document name
ITS core requirements standard: General requirements
ITS core requirements specification: Environmental requirements
ITS design standard and specification: Duct supply and installation
ITS design standard: Optical fibre
ITS design standard: Cabinets
ITS design standard: Civil and structural requirements

7.2.2 Resources

Document name/code
NZTA S10 – Specification for anti-graffiti coatings

7.3 Legislation

Name
Electricity (Safety) Regulations 2010 (SR 2010/36)

7.4 Other resources

Name

7.5 ITS standard drawings

See the [NZTA website](#) for the latest versions of the ITS standard drawings listed below.

Drawing number
000-0000-0-7104-03-R1 Roadside control cabinet
000-0000-0-7104-04-R1 Roadside control cabinet & apron details
000-0000-0-7104-05-R1 Network node cabinet
000-0000-0-7104-06-R1 Network node cabinet & apron details

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8 Terminology used in this document

Term	Definition
DRAFT	The document is being written and cannot be used outside of NZTA.
FINAL DRAFT (pending ratification)	The document has been finalised and is pending approval and ratification by NZTA. It can be used for procurement at this status.
RATIFIED	The document is an official NZTA document. NZTA projects and other road controlling authorities connected to NZTA back-end systems must include this document in the contracts. The obligation to follow the requirements in this document would come from the inclusion of the S&S document in the contract.
RETIRED	The document is obsolete, and/or superseded.
A	Ampere (unit of electrical current)
ABS	Acrylonitrile butadiene styrene
AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
ATMS	Advanced traffic management system
DNO	Distribution network operator
EMI	Electromagnetic interference
IP	Ingress protection
ITS	Intelligent transport system(s)
kA	Kiloampere
LV	Low voltage
mA	Milliampere
MOV	Metal oxide varistor
MICC	Mineral-insulated, copper-clad
MIMS	Mineral-insulated, metal-sheathed
NS	Neutral-screened
NZTA	NZ Transport Agency Waka Kotahi
PIN	Personal identification number
PLSWAS	Paper-insulated, lead-covered, steel-wire-armoured, served (typically tarred hessian exterior covering)
PLY	Paper-insulated, lead-covered
PLYSS	Paper-insulated, lead-alloy-sheathed, steel-wire-armoured, served
PVC	Polyvinyl chloride (plastic insulation)
S&S	Standards and specifications
SWA	Steel wire armoured

Term	Definition
TPS	Thermoplastic-sheathed
TSP	Telecommunications service provider
UPS	Uninterruptible power supply
UV	Ultraviolet
V	Volts
XLPE	Cross-linked polyethylene insulation

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9 Content to be redirected

This section records any circumstances where content from this document will be reclassified and moved into future documents. This table is then updated with a reference to the new location.

Section reference	Section name	Future document	Class
4.3.3	Optical fibre dimensions	Optical Fibre	Communications infrastructure
4.3.4	Optical fibre termination	Optical Fibre	Communications infrastructure
4.5	Power supply	Power standard	Power
4.5.9	Uninterruptible power supply (UPS)	UPS standard	Power

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10 Document control

10.1 Document information

Document number	ITS-SPEC-CAB-202410
Previous document number/s (if applicable)	ITS-02-04
Document status DRAFT FINAL DRAFT RATIFIED RETIRED	FINAL DRAFT
[IF RETIRED] New document details	
Online ISBN	
Document availability	The controlled version of this document can be accessed from https://www.nzta.govt.nz/roads-and-rail/intelligent-transport-systems/standards-and-specifications/its-current-interim-and-legacy-standards-and-specifications

10.2 Document owner

Role ITS S&S Steering Committee
Organisation NZTA

10.3 Document approvers

This table shows a record of the approvers for this document.

Approval date	Approver	Role	Organisation
DD/MM/YYYY			

10.4 Full version history

This table shows the full history of changes made to this document, both minor and major, in chronological order, since the document was first authored.

Minor versions are numbered 0.1, 0.2 etc until such point as the document is approved and published, then it becomes 1.0 (major version). Subsequent edited versions become 1.1, 1.2 etc, or if it's a major update 2.0, and so on.

Version	Date	Author	Role and organisation	Reason
0.1	23/02/2024	Mark Gregory Allan Arora Alyssa Greaney	Senior Principal Transport Engineer Transport Planner	Initial Drafts for expert panel
0.2	15/04/2024	Mark Gregory Allan Arora Alyssa Greaney	Senior Principal Transport Engineer Transport Planner	Draft for expert panel
0.3	10/05/2024	Mark Gregory Alex Lumsdon Allan Arora Alyssa Greaney	Senior Principal Associate Transport Engineer Transport Engineer Transport Planner	After expert panel for industry consultation
0.4	12/06/2024	Mark Gregory Alyssa Greaney	Senior Principal Transport Planner	Third Draft – for proofer
0.5	17/06/2024	Matthew Bauer	Editor, Clear Edit NZ	Copyedit
0.6	19/06/2024	Mark Gregory Allan Arora Alyssa Greaney	Senior Principal Transport Engineer Transport Planner	Fourth Draft – amending proofer comments
0.7	19/06/2024	Matthew Bauer	Editor, Clear Edit NZ	Clean copy for TSC and ratification submission
0.8	05/07/2024	James Ellison Allan Arora Alyssa Greaney	Principal Transport Engineer Transport Engineer Transport Planner	After TSC feedback and prior to ratification
0.9	18/07/2024	James Ellison Alex Lumsdon Catherine Rochford	Principal Transport Engineer Associate - Transport Engineer Senior Associate – Project Manager	After TSC feedback and prior to ratification
0.10	26/07/2024	James Ellison Alex Lumsdon	Principal Transport Engineer Associate - Transport Engineer	After TSC feedback and prior to ratification

Version	Date	Author	Role and organisation	Reason
		Catherine Rochford	Senior Associate – Project Manager	
0.11	31/07/2024	James Ellison Alex Lumsdon Alyssa Greaney	Principal Transport Engineer Associate - Transport Engineer Transport Planner	Updates prior to ratification
0.12	31/08/2024	James Ellison Alex Lumsdon	Principal Transport Engineer Associate – Transport Engineer	Updates following ratification
0.13	17/10/2024	James Ellison Alex Lumsdon	Principal Transport Engineer Associate – Transport Engineer	Proofing prior to ratification

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