WAKA KOTAHI
NZ TRANSPORT AGENCY

CABINETS

Intelligent transport systems (ITS) delivery specification

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More information
If you have further queries, contact the Intelligent Transport Systems Standards and Specifications (ITS S&S) team via email: itsspec@nzta.govt.nz

More information about ITS is available on the NZTA website at https://www.nzta.govt.nz/its

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1 OVERVIEW AND OUTCOMES

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

1.1 Purpose

The purpose of this delivery specification is to specify the requirements for the procurement of cabinets used for the operational purposes by the NZ Transport Agency Waka Kotahi (Client) In addition, this delivery specification details system integration requirements (such as site, equipment, protocols, interfaces, data specifications and so on) to ensure compliance with NZTA operational and asset management systems.

Delivery assurance is managed through a series of delivery specifications which support procurement and systems integration. The key risks that specifications address are ensuring the correct equipment is being procured, that it will integrate with operational systems, and will deliver the correct functionality and performance requirements.

1.2 Overview

The outcomes of this delivery specification are to provide the specific requirements in order to procure high quality, durable, and secure cabinets.

1.2.1 NZTA ITS class

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

Class definitions

2 FUNCTIONAL REQUIREMENTS

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

The internal and external functionality requirements for ITS cabinets are presented in the following section.

2.1 External Functionality Requirements

i. **External cabinet housing** - an exterior shell with a minimum external radius of 3mm and with deburred edges. The exterior shall be required to withstand all weather conditions.

ii. **Plinth** – a ground mounted cabinet shall be attached to a plinth for structural support with the ground. Pole mounted cabinets do not require a plinth.

iii. **Doors** - provide direct access to all internal equipment including cable clamps and terminals for the connection of external wiring. Cabinets shall have either single or double doors.

iv. **Locking system** – a cabinet shall be fitted with a locking system to ensure the internal cabinets stay secure from theft and vandalism.

v. **Cable clamping bars** - clamping bars shall be provided, where necessary, for securing and supporting all external cables (other than telecommunications lines).

2.2 Internal Functionality Requirements

i. **Internal cabinet housing** – the interior cabinet shell is to be free from sharp corners and projections, which may cause injury when working at the cabinet interiors.

ii. **Door retainer** - a retaining device shall be provided at each door to securely hold the door in the open position, under all weather conditions.

iii. **Ventilation** – the cabinet shall be ventilated to ensure the internal cabinet temperature is managed.

iv. **Document holder** – the cabinet shall have sufficient space for a document holder to securely store system information and plans.

v. **Equipment shelf and mounting rack** - The cabinet shall have sufficient space for any shelf and mounting rack so that the ITS systems can be securely and directly fastened within the internal shell.

2.2.1 Cabinets telecommunications functionality requirements

For the ITS system to function, there shall be internal and external cabinet provisions for the optical fibre interface. If an optical fibre connection is not achievable, then a non-fibre optical solution may be considered for communications, including the use of any external antennas for adequate system functionality.

Refer to the ITS Design Standard: Optical Fibre.

Where the Telecommunications Service Provider's (TSP) communications network design requires the use of third-party communications services at the roadside, the physical interface between the third-party provider's cable infrastructure and the TSP's cable infrastructure shall be housed in the Node cabinet.

NOTE Advice on cabinet requirements can be obtained from the TSP such that the enclosure, access and maintenance needs of the third-party provider and the TSP are both satisfactorily accommodated.

3 PERFORMANCE REQUIREMENTS

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

3.1 Reliability

The reliability of a cabinet is crucial to ensure the electrical system and its components can operate consistently. Refer to Section 4 in ITS Delivery Specification: General Requirements for further details.

3.2 Availability

Availability of cabinets to be defined.

3.3 Monitoring

Provision for a 19-inch rack mountable instrument module shall be provided inside the cabinet. This may include:

i. Temperature gauge.
ii. Humidity monitoring.
iii. Door switch/alarm.
iv. GPS capabilities (if required).
v. Seismic devices/ switches.
vi. Digital analogue input/ outputs.
vii. Relay switched outputs.

3.4 Resistance to the effects of external conditions

Cabinets are to be weather and vermin proof with a minimum rating of IP55 and shall be provided to meet the requirements specified in the ITS Delivery Specification: Environmental Requirements.

3.4.1 Cabinet housing

The cabinet shall protect its interior surfaces and all electrical equipment, modules and systems from condensation where possible. As a minimum, the following shall be provided:

i. **Dip tray(s) or equivalent** – collection and guide for any condensation away from drain points.
ii. **Provisions for mounting equipment** – ensuring the electrical modules and parts are positioned away from internal vertical surfaces of the cabinet via a sufficient gap of 5-10mm.

3.4.2 Cabinet doors

All doors of the cabinet shall be provided with durable and resilient weatherproof sealing gaskets. The gaskets shall be made of an ultra-violet stable closed-cell material and securely held in position, and readily replaceable while the equipment is being serviced (maintenance).

Doors shall have the same surface treatments as the cabinet.

For further information, refer to the corresponding ITS Design Standard: Cabinets.

3.4.3 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. Location of the cabinet shall minimise access to other ITS equipment/ assets;
iii. Opening the access door by simple tools or implements being used to open the door locks or part the hinges;
iv. Forcibly pushing the cabinet from its mountings; and
v. Damage to the cabinet or door or mounting base by kicking or pushing.

4 TECHNICAL REQUIREMENTS

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

4.1 General requirements

At enforcement sites, the requirements for cabinets shall be agreed with the Client.

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.

The shared use of cabinets for different users' roadside technology equipment requires prior approval from the Client.

4.2 Electrical safety

All electrical installations will comply with and be installed in accordance with Electricity (Safety) Regulations 2010 (SR 2010/36) and AS/NZS 3000:2018.

4.3 Cable ducts

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

Unused or unconnected ducts shall terminate one metre (m) 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 ITS Design Standard: Civil and Structural Requirements for more information.

Ducts shall be installed as per ITS Design Standard and Specification: Duct supply and installation.

4.4 Cable glands

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

Cable entries/ exits for external cables shall be through the bottom of the cabinet.

- TPS - bushed holes (sealed).
- MICC - MICC glands.
- MIMS/PVC - MIMS glands with plastic sleeves.
- NS - compression type glands.
- PLYSS - sealing box and brass wiping gland.
- PLSWAS - sealing box and armour clamping gland.
- XLPE/HT-PVC - compression type glands.

- 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.

4.5 Power Supply

This section is to be redirected and therefore, to be defined.

A power board shall be rack mounted on a 19-inch rack and connected to the power switch. Refer to Section 4.7 of this delivery specification for details on installation.

All ITS equipment must comply with and be installed in accordance with Electricity (Safety) Regulations 2010 (SR 2010/36) and AS/NZS 3000:2018.

4.5.1 General

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

NOTE: The above requirements and other requirements in 4.18 sub-clauses and clauses 4.19 may be varied in accordance with AS/NZS 3000:2018 where the source of electricity supply is from a stand-alone (i.e. isolated) extra-low voltage source (e.g. an extra-low voltage solar supply).

The fault current limiter, main switch, switchboard, submains and wiring shall strictly comply with all relevant requirements of AS/NZS 3000:2018.

The main Distribution board (or submains) may be of a self-contained type with additional Neutral Link(s) and Earth Link, or may 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 rank 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.

4.5.2 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 appropriate, rated replaceable low voltage (LV) cartridge fuse.

The fault current limiter shall be suitably positioned to facilitate connection of the active conductor of the consumers mains.

4.5.3 Circuit Breakers

A total of not 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 10 Amp with a breaking capacity of not less than 8 kA (kilo Ampere), shall be provided for controlling the socket outlets and any auxiliary circuits;
ii. A "Logic/Equipment 1" circuit breaker, rated at not greater than 10 Amp with a breaking capacity not less than 8 kA, shall be provided to supply low-power equipment in the Housing (such as the controller of the main traffic/ transport related equipment on site);
iii. Four "Equipment" circuit breakers (identified as "Equipment CB2", "Equipment CB3", etc.), rated at not greater than 10 Amp with a breaking capacity of not less than 8 kA, shall be provided to supply other equipment inside the Cabinet.

4.5.4 Surge Diverter

The surge diverter shall provide protection 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 may 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 Metal Oxide Varistor (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.

4.5.5 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 may 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 referred to 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 the following information:

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 d.c.current through the filter.

4.5.6 Socket Outlet

The cabinet shall be fitted with a double socket outlet with an integral 30 milliampere Type II Residual Current Device, complying with AS/NZS 3190. 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.

4.5.7 Cable clamping bars

The clamping bars for each group of cables shall be 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 consumers mains shall accommodate two double-insulated single-core cables with sizes from 6 mm^2 to 16 mm^2.

4.5.8 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 should 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 Telecommunications service provider (TSP) and the equipment manufacturers.

4.5.9 Uninterruptible power supply (UPS)

The UPS shall provide power to the cabinet system and any other components that are necessary to maintain communication with the Active Traffic Management System (ATMS). The UPS shall be sized as per the ITS Delivery Specification and Design Standard: Uninterruptible Power Supply (to be developed). The UPS shall be an on-line type and shall provide a no-break transfer to battery backed power in the event of mains power failure.

The data wire between the UPS and the ITS system will monitor three outputs of the UPS, as detailed in Section 4.6.3 in AS5715:2015 Uninterruptible Power Systems (UPS) For Roadside Devices. These outputs are:

i. Mains failure.
ii. UPS fault.
iii. Battery at <60% remaining capacity (this will also require configuration in the UPS).

4.5.9.1 Batteries for UPS

UPS batteries shall be Lithium Ion, for their longer life expectancy. The UPS shall have a life expectancy of a minimum of ten years and the batteries shall have a life expectancy of a minimum of three years.

4.5.9.2 UPS switches

If the instrumentation rack is not installed as part of the installation, then the UPS should have a UPS active signal and a door switch wired to the external inputs. This ensures that any UPS activation or any door opening, or UPS alarm can be monitored remotely.

The UPS shall have a network port which will support any communications module installed to allow access via the web interface of the UPS. This will provide performance and maintenance support activities for contractors.

A bypass switch shall be provided to enable the UPS to be either:

i. Switched into circuit.
ii. Switched out of circuit.
iii. Disconnect the mains to test the UPS.

4.5.9.3 Isolation switches for UPS

Isolation switch type shall be rotary switches with a lock out facility. A suitable isolator fuse must be installed in the UPS cabinet between the incoming mains supply, and the mains switch.

4.6 Cabinet manufacture

Manufacturers shall be a firm specialising in this type of work and to be approved by the Client.

A declaration of conformity shall be completed by the firm based on this specification (such as paint thickness, material thickness and so on). This shall be provided to the qualified engineer for approval.

4.7 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.

Refer to the standard details (these will be updated).

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

4.7.1 Materials

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

4.7.2 Paint

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

Cabinet colour shall be decided based on the cabinets' location and surrounding environment.

iv. High pedestrian volume and/ or urban areas, areas with a history of graffiti, or high foliage areas may be more suited to Karaka Green due to enabling the cabinet to blend into its' surrounding environment and the reduction of graffiti observed.
v. Areas that are very exposed to sunlight may be more suited to Cream due to reflectivity of the sun and better at temperature control.

This is not to preclude the use of art to decorate on the cabinet as this can reduce the cabinet being graffitied.

Paint shall be suited for outdoor conditions and should be UV stable (as aligned with AS/NZS 2312 Guide for protection of structural steel against atmospheric corrosion by use of protective coatings).

All cabinets shall be finished with an anti-graffiti coating such as Anti-Graffiti Product 910 Line (to be defined), prior to installation. For more details, refer to ITS Delivery Specification: Specification for anti-graffiti coatings (NZTA S10).

4.7.3 Name Plate

The cabinet name plate shall be black 300mm x 60mm x 1.5mm thick laminated ABF 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.

4.7.4 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 can include an electricity flash and radiation sticker (see **Figure 1** and **Figure 3** in Appendix A).

4.7.5 Construction

The interior and exterior of the cabinet shall be free from sharp corners and projections, which may cause injury. All edges shall be de-burred.

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

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

Further details shall be found in ITS Design Standard: Civil and Structural Requirements.

4.7.6 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.

As a minimum, the retaining device shall provide for the door to be held open at 110 degrees and at 90 degrees from the closed position.

Each door shall have a rust resistant recessed handle. See the Appendix A in ITS Delivery Standard: Cabinets for examples.

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

All doors shall be earth bonded.

4.7.6.1 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 Appendix A, **Figure 4**). 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 may occur when the door is blown by a gust of wind.

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

Deformation of the housing along the hinged side makes the use of long hinges, such as “piano hinges”, highly unsuitable. Any design which makes use of long hinges will need to be supported by significant evidence and testing of suitability.

4.7.6.2 Door retainer

A retaining device shall be provided for each door to securely hold the door in the open position under all weather conditions.

As a minimum, the retaining device shall provide for the door to be held open at 110 degrees and at 90 degrees from the closed position.

4.7.7 Locking system

The lock system shall be of one of the following types to be confirmed by the Client.

i. Mechanical door locks in accordance with Section 4.7.7.1;
ii. Mechanical door pin pad in accordance with Section 4.7.7.2;
iii. Electronic door pin pad in accordance with Section 4.7.7.3

Where an electronic solution is required, the Client may direct to a specific manufacturer in order to align with an existing system, or suggest provision of the locking system without the electronic cylinder.

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 may not be required for some mechanical door locks) and hold the door tightly against the cabinet to minimise the gap to protect from forced entry.

Locks and pin pads shall be recessed to be flush with the cabinet.

4.7.7.1 Mechanical door lock

The mechanical door lock shall have threaded stainless steel fasteners operated by means of a key approved by the Client and be appropriate for outdoor use. Keys shall be suited and be common across 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 of flush or incorporated in the handle design.

4.7.7.2 Mechanical door pin-pad

Pin-pads shall have a minimum of a five-figure code and be flush mounted and installed to minimise vandalism. The security code shall be agreed with the Client.

4.7.7.3 Electronic door pin-pad

The cabinet door shall be fitted with a three-point lock system operated by a handle which is secured by one electronic lock/ cylinder. The latching/ locking locations shall be at the top, bottom, and side of the door.

Pin pads shall have a minimum of a five-figure code.

4.7.8 Mounting

Cabinets shall be mounted on a concrete plinth designed in accordance with drawing 000-0000-0-7104-04-R1 Roadside Control Cabinet Apron Details, or 000-0000-0-7104-06-R1 Network Node Cabinet Apron Details. Where a standard preformed plinth base is not used, the foundation details shall be supplied to the Clients Engineer for approval.

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.

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

Cable entry points, plugs and gas plate should all be sealed.

4.8 Internal Cabinet Equipment

4.8.1 Instrument Rack

As per Section 3.3, there shall be an instrument rack installed to securely hold and mount monitoring equipment.

The instrument rack shall have:

i. RJ45, RS323 or RS485 communications interface.
ii. 10 Digital i/o inputs (limit to 12 V).
iii. 4 analogue inputs (0-10 V).
iv. 6 relay outputs.

A lighting switch shall be activated when someone accesses the cabinet. Equipment to activate lighting switch shall be stored in the instrument rack.

4.8.1.1 Door switch alarm

The cabinet shall have a system that connects back through the communications network to notify the Client or operator if someone is accessing the cabinet.

4.8.2 Document Holder

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 a number of A4 laminated sheets. See Appendix A, **Figure 5** for an example.

As per the ITS Design Standard: Cabinets, documents that shall be included are:

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.

4.8.3 Optical fibre dimensions

The optical fibre patch tray shall be a 19-inch, 1 rack unit (RU) shelf pivoting optical fibre distribution frame with 12 or 24 simplex adaptor positions.

The optical fibre patch tray shall be selected such that the required number of connections by field installations is met at each cabinet.

4.8.4 Optical fibre termination

In Roadside Control cabinets, the termination for only 12 fibres is required.

In Network Node cabinets, termination of all fibres from each ITS backbone fibre optic cable is required. The quantity of fibres will depend upon the type of cable used. The NZTA standard is a minimum of 96 cores for backbone cable.

4.8.5 Ventilation

Cabinets are to be ventilated to prevent overheating. Double skinned top, including a vent at the top of the cabinet shall facilitate circulating airflow inside the cabinet.

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 Appendix A **Figure 6Figure 5Figure 6** for an example of a dust and vermin filter.

To prevent the cabinet from overheating, the need for an air-conditioned cabinet may be required. This is to be agreed by the Client and the operator.

4.9 Cabinet Equipment Installation

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

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

4.9.1 Internal layout

The equipment installed within the cabinet will vary dependant on the requirements, but typically all electrical terminations shall occur at the bottom of the cabinet in a dedicated distribution board.

Sufficient space shall be provided to allow all internal components such that they are mounted to their manufacturer's requirements. Specific locations of equipment shall be functional for the cabinet.

Equipment layouts shall be symmetrical and 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 required, cabinets can house any counters (e.g. non-continuous, single, double loops).

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.

4.9.2 Rack mounting

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

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 so as to fit a standard Client network switch. 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.

4.9.2.1 Access

Internal equipment layouts within roadside equipment cabinets shall provide access for installation and maintenance.

Access may include to the rear of the internal equipment within the cabinet.

5 Appendix A: Illustrations

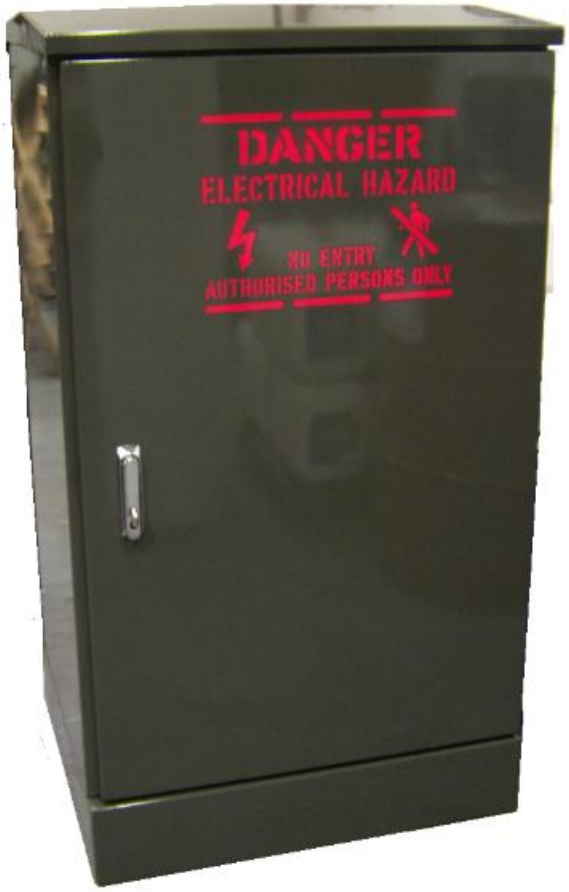

***Figure 1**: Typical Communications Cabinet*

***Figure 2:** Communications cabinet E-6220-N and Ramp Signals Cabinet E-8139-N with their identification labels facing the approaching traffic*

Figure 2: Cabinet with correctly applied electricity warning labels on all doors.

***Figure 3**: Cabinet that is not visible from the road*

Some cabinets cannot be seen from the road, such as **Figure 3** that 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, 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 may also be used

6 Appendix B: <Title>

6.1 Use this heading as required 1

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6.1.1 Use this heading if required for another level of detail

To be defined.

6.2 Use this heading as required 2

To be defined.

6.2.1 Use this heading if required for another level of detail

To be defined.

6.3 Use this heading as required 3

To be defined.

6.3.1 Use this heading if required for another level of detail

To be defined.

7 References

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

7.1 Industry standards

Standard number/name	Source
SR 2010/36 Electricity (Safety) Regulations 2010	NZ Legislation website

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 Delivery Specification: Specification for anti-graffiti coatings (NZTA S10).
ITS Delivery Specification: General Requirements
ITS Delivery Specification: Environmental Requirements
ITS Design Standard and Specification: Duct supply and installation
ITS Design Standard: Optical Fibre
ITS Design Standard: Cabinets (being developed)
ITS Design Standard: Civil and Structural Requirements

7.2.2 Resources

Document name/code	NZTA website link

7.3 Legislation

Name	Website link
Electricity (Safety) Regulations 2010 (SR 2010/36)	https://www.legislation.govt.nz/regulation/public/2010/0036/latest/DLM2763501.html

7.4 Other resources

Name	Website link

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

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.
Amp	Ampere (unit of electrical current)
AC	Alternative Current
AS/NZS	Australian and New Zealand Standard
ATMS	Active Traffic Management System
CCTV	Closed-circuit television
DNO	Distribution Network Operator
EI	Electricity Interface
Ethernet Protocol	Industry standard network Broadcast technology.
IP	Degree of protection as per AS 60529
ITS	Intelligent transport system(s)
kA	Kilo Amphere
MICC	Mineral insulated copper clad
MIMS	Mineral insulated metal sheathed
NS	Neutral Screened
NZTA	NZ Transport Agency Waka Kotahi
PLSWAS	Paper insulated, Lead covered, Steel Wire Armoured, Served (typically tarred hessian exterior covering)
PLY	Paper insulated lead covered
PVC	Polyvinyl Chloride (plastic) insulation
S&S	Standards and specifications
SCATS	Sydney Coordinated Adaptive Traffic System
SDP	Service delivery point
STI	Service type instances
SWA	Steel Wire Armoured

Term	Definition
TOC	Transport Operation Centre
TSP	Telecommunications Service Provider
UPS	Uninterruptible Power Supply
V	Volts
VAC	Volts Alternating Current
VDS	To be defined
VMS	To be defined
XLPE	Cross-Linked Polyethylene insulation

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
4.5	Power Supply	Power standard	Power

10 Document control

10.1 Document information

Document number	ITS-SPEC-CAB-202405
Previous document number/s (if applicable)	ITS-02-04
Document status DRAFT | FINAL DRAFT | RATIFIED | RETIRED	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-specificationshttps://www.nzta.govt.nz/resources/intelligent-transport-systems/its-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 Principle Transport Engineer Transport Planner	Initial Drafts for expert panel
0.2	15/04/2024	Mark Gregory Allan Arora Alyssa Greaney	Senior Principle Transport Engineer Transport Planner	Draft for expert panel
0.3	10/05/2024	Mark Gregory Alex Lumsdon Allan Arora Alyssa Greaney	Senior Principle Associate Transport Engineer Transport Engineer Transport Planner	Revised version after the expert panel review