

Main Roads Technical Standard

MRTS61

Mounting Structures for ITS Devices

June 09

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Mounting Structures for ITS Devices

1 INTRODUCTION

This Technical Standard applies to the requirements for the design, supply, installation, tests and commissioning, performance, documentation and maintenance associated with the provision of mounting structures for ITS devices.

This Technical Standard shall be read in conjunction with MRTS01 *Introduction to Technical Standards* and other Technical Standards as appropriate.

This Technical Standard forms part of the Main Roads Specifications and Technical Standards Manual.

2 DEFINITION OF TERMS

The terms used in this Standard shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Standards*. Further definitions shall be as defined in Table 2.

Table 2 – Definitions

Term	Definition
ITS Device	Equipment that provides an Intelligent Transport System solution.
Overhead Structure	A cantilevered structure, maintenance platform and/or gantry and pole.

3 REFERENCED DOCUMENTS

Table 3 lists documents referenced in this Technical Standard.

Table 3 – Referenced Documents

Reference	Title
AS 1101.3	Graphical symbols for general engineering - Welding and non-destructive examination
AS 1170.1	Dead and Live loads and load combinations
AS 1170.2	Wind Loads
AS 1657	Fixed Platforms, walkways, Stairways and ladders – Design, Construction and Installation
AS/NZS 3000	Electrical Installation-Building Structure and Premises (Wiring Rules)
AS 3845	Road System Barrier Systems
AS 3990	Mechanical Equipment-Steelwork
AS 4100	Steel Structures
AS 5100.x	Bridge Design (Various Parts)
AS/ACIF S009	Installation Requirements for Customer Cabling – Wiring Rules

4 QUALITY SYSTEM REQUIREMENTS

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Standards*.

The Hold Point and Milestone applicable to this Technical Standard are summarised in Table 4.

Table 4 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Milestone
7.2	1. Commencement of fabrication and/or construction.	Submission of design drawings and documentation (14 days).

5 FUNCTIONAL REQUIREMENTS

The mounting structures shall be able to mount ITS Devices in the verge beside the carriageway and/or overhead above the carriageway. It shall be possible to mount devices above each trafficable lane of the carriageway. The mounting structures shall be easily accessible for inspection and maintenance purposes and include an access system that allows ease of maintenance, yet prohibits access by unauthorised personnel.

The footing and barrier protection shall be entirely suitable to each specific site. The location shall be suitable for the intended ITS Device.

6 EQUIPMENT COMPONENTS

The structures for mounting ITS Device(s) consist of one of the following –

- a) a cantilever system, consisting of ITS Device mounting brackets, a maintenance platform, support structure(s) and footing(s);
- b) a gantry spanning the carriageway, consisting of ITS Device mounting brackets, a maintenance platform, support structures and footings;
- c) support structure; or
- d) poles.

The mounting structure shall include facilities to install all ducts, cable trays and junction boxes for all cables required for the ITS Device(s).

7 DESIGN REQUIREMENTS

7.1 Structural Design

Unless otherwise specified, the design life shall be a minimum of 50 years.

The design shall meet the following criteria –

- a) The design loads shall be in accordance with AS/NZS 1170.1 and AS/NZS 1170.2;
- b) the support structure shall be designed to AS 4100 for the limit state design or AS 3990 for the working stress method;
- c) the platform shall be design for the following minimum Design Loads –
 - i) design Live Load of 3 kPa; and
 - ii) with a simultaneous local Moving Live Load of 5 kPa applied over an area of 1 square metre,
- d) the ladder and surround frames shall be designed to the relevant Australian Standards and relevant Acts and Regulations;
- e) the minimum lateral restraint capacity shall be in accordance with AS 5100.2;
- f) collision loads shall be in accordance with AS 5100.2 and AS 3845 as appropriate;
- g) vibration shall be in accordance with AS 5100 and manufacturers requirements for each particular ITS device;
- h) load combinations shall be in accordance with AS 5100;
- i) steel design shall be in accordance with AS 5100; and
- j) all weld details shall be shown on the design drawings and weld symbols shall be in accordance with AS 1101.3.

7.2 Design Review and Approval

Design of mounting structures for ITS devices shall be undertaken by the Contractor in accordance with the design by the Contractor requirements of the Contract.

The Drawings shall be submitted for approval to the Administrator not less than 14 days prior to the commencement of any fabrication or construction work. **Milestone** Prior to such submission, all design drawings and supporting documentation shall be certified by a person experienced in the design of gantry structures and holding a current registration as a Registered Professional Engineer, Queensland.

No fabrication or construction of work represented by the drawings and/or documentation shall commence until expiration of the 14 day period. **Hold Point 1**

7.3 Wiring Enclosures

All wiring enclosures for installation of power cables shall comply with AS/NZS 3000. All wiring enclosures for telecommunications cables shall comply with AS/ACIF S009. Conduits shall comply with MRTS91 *Conduits and Pits*.

7.4 Aesthetics

The structures for mounting ITS Devices shall be aesthetically compatible with other similar structures in the road network. Figure 1 details the conceptual appearance to which all structures shall conform.

7.5 Locations

The general layouts, positions, reduced level for the footing shall be shown on the Drawings.

7.6 Barrier Protection

Suitable barrier protection in accordance with the *Road Planning and Design Manual* (Part 8) published by Transport and Main Roads shall be included in the design.

8 MECHANICAL AND PHYSICAL REQUIREMENTS FOR MOUNTING ITS DEVICES

As the number and combination of devices on the structure shall be site specific, the mounting structure shall allow for flexible mounting of ITS devices on the support structure, and/or at any location along the length of the overhead structure. It shall be possible to maintain equipment mounted anywhere on the mounting structure without requiring traffic control measures, and/or lane closures.

Where specified on the Drawings, it shall be possible for ITS devices mounted on an overhead structure to swing away, and allow passage of over-dimensional vehicles.

Facilities shall be included to allow for the adjustment or re-alignment of ITS Devices without requiring traffic control measures, and/or lane closures.

9 MECHANICAL AND PHYSICAL REQUIREMENTS OF THE MAINTENANCE PLATFORM

The materials and methods of construction of the maintenance platform shall be such that it has the strength and durability to withstand normal conditions of operation when installed in a roadside environment. The design, construction and installation of all fixed platforms, walkways and ladders shall comply with AS 1657 unless otherwise stated.

The platform shall be free of sharp corners and projections that may cause injury.

9.1 Dimensions

The maintenance platform shall be provided for the full length of the overhead structure. The platform design shall ensure that rear access door(s) to ITS Devices are not obstructed by the platform.

9.2 Safety Railing

A safety railing shall be provided on the maintenance gantry. Mesh (e.g. 25 mm x 25 mm) or equivalent, shall be used on the sides of the railing to ensure maintenance tools and equipment cannot fall to the roadway below. The mesh panelling shall be designed to ensure that it shall not interfere with ITS equipment operation.

9.3 Floor

The floor of the maintenance platform shall be fitted with a metal check plate floor (or similar) with a toe plate or kickboard that prevents objects and maintenance tools and equipment from falling to the roadway below. The toe plate or kickboard shall be a minimum height of 400 mm.

Any gaps between the floor of the maintenance platform and the rear of the ITS Device shall also be fitted with metal check plate (or similar) to prevent objects, maintenance tools and equipment from falling to the roadway.

The floor shall have a non-slip finish and be self-draining.

9.4 Access

Routine operation and maintenance access to the mounting structure shall not require traffic control measures, and/or lane closures.

The access shall be secure and ensure unauthorised persons cannot obtain entry to the structure.

The design shall incorporate a path from where maintenance staff can park a vehicle and gain access to the structure. The use of a ladder for the initial access from the ground is permitted.

The monitoring structure shall be considered as a workplace, and the access requirement shall conform to the appropriate Act and Regulations.

The minimum width of the access shall be 800 mm. However, the footway width shall be greater if required to conform to functional requirements (e.g. open doors). Where cameras are mounted in the walkway, 800 mm walkway shall be provided on one side of the camera and 500 mm maintenance access on the other side of the camera.

Unless otherwise specified, access to the maintenance platform shall be by fixed ladder systems from ground level installed to AS 1657. The ladder system shall be fitted with a ladder cage as per AS 1657.

10 MECHANICAL AND PHYSICAL REQUIREMENTS OF THE SUPPORT STRUCTURE

10.1 General

The design length of the mounting column(s) shall take into consideration the variations in the reduced levels between the finished surface level of the carriage way and the footing location. The length of the mounting column(s) shall be designed so that the base plate is installed as close to ground level as possible while leaving sufficient space to grout beneath the base plate.

A minimum 3.5 m vertical clearance shall be provided beneath the support structure in any location not above the carriageway.

The mounting height shall not be less than that shown in the Contract.

10.2 Footings

All footings shall be designed to meet local ground conditions. Driven piles shall not be used in the footing design.

All footings shall be designed in accordance with MRTS63 *Cast In Place Piles* and MRTS63A *Piles for High Moment, Low Axial Load Applications*.

All concrete used for the footings shall comply with MRTS70 *Concrete*, and the respective hold points, witness points and milestones.

11 MECHANICAL AND PHYSICAL REQUIREMENTS OF MOUNTING STRUCTURES

The posts and their footings, shall comply with the requirements of –

- a) MRTS14A *Road Furniture (Steel Work)*;
- b) MRTS92 *Traffic Signal and Road Lighting Footings*; and
- c) MRTS93 *Traffic Signals* and/or MRTS94 *Road Lighting* as applicable.

12 STEEL FABRICATION

All structural components for the support structure fabricated from steel shall comply with the requirements of MRTS78 *Fabrication of Structural Steelwork*.

All fabricated steel work shall be hot dipped galvanised as specified in MRTS78 *Fabrication of Structural Steelwork*.

