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Technical Specification

**Transport and Main Roads Specifications
MRTS61 Gantries and Support Structures for Road
Signs, Tolling Systems and ITS Devices**

March 2018

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1 Introduction

This Technical Specification applies to the design, supply and installation of gantries and support structures for static road signs, tolling systems and Intelligent Transport Systems (ITS) devices.

The requirements apply to the following types of gantries and support structures:

- above road gantry structures
- above road cantilever structures
- tolling structures on carriageway and side of the road, and
- sign supports on the side of the road for signs greater than 7.5 m wide or 8 m high or 40 m² sign face area.

Note that support structures for traffic signs and tolling systems on the side of the road up to 7.5 m wide or 8 m high, up to a maximum sign face area of 40 m² may be designed in accordance with the department's Design Guide for Roadside Signs manual.

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Definition of terms

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

Table 2 – Definition of terms

Term	Definition
Gantries and support structures	Gantries spanning over the carriageway / road, mounting structures with multiple supports and cantilevered structures.

3 Referenced documents

Table 3 lists documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
AS 5100	<i>Bridge Design</i>
DDPSM Vol 3 Chapter 21	<i>Drafting and Design Presentation Standards Volume 3: Structural Drafting Standards Chapter 21: Major Sign Structures</i>
MRTS01	<i>Introduction to Technical Specifications</i>
MRTS50	<i>Specific Quality System Requirements</i>
MRTS78	<i>Fabrication of Structural Steelwork</i>
MRTS79	<i>Fabrication of Aluminium Components</i>
TN62	<i>Technical Note 62 - Assembly and Tensioning of High Strength Bolts and Nuts</i>

Reference	Title
TN174	Technical Note 174 – <i>Purchasing Guidelines for TMR Major Sign Structures</i>
-	<i>Design Guide for Roadside Signs</i>
-	<i>Design Criteria for Bridges and Other Structures</i>

4 Quality system requirements

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*. The Hold Points, Witness Points and Milestones applicable to this Technical Specification are summarised in Table 4.

Table 4 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
5.2			Submission of design documentation (14 days)
6	1. Commencement of foundation construction		
7	2. Commencement of fabrication 3. Steel and aluminium components shall only be fabricated by a Transport and Main Roads registered fabricator		
8.1	4. Handling, transport and storage of fabricated steelwork and aluminium components		Submission of procedure for handling, transport and storage of fabricated steelwork and aluminium components
9.1	5. Erection of gantries and support structures	1. Erection of gantries and support structures	Submission of procedure for erection of gantries and support structures
9.2	6. Mortar packing of bases		

5 Design requirements

5.1 General

Design of gantries, support structures and their associated components, e.g. protection from vehicle impacts, maintenance platforms and access shall be in accordance with TN174, *Design Criteria for Bridges and Other Structures* and AS 5100.

The gantries and support structures shall allow for flexibility in mounting of signs, tolling systems and ITS devices on the structures and / or at any location along the length of the overhead part of the structures.

5.2 Design review and approval

Design documentation shall be submitted to the Director (Structures Review and Standards) via the Administrator for review and acceptance. The required documentations and submission procedures shall be in accordance with Chapter 10 of the *Design Criteria for Bridges and Other Structures*.

Milestone

6 Foundation construction

Construction of the gantry foundations shall not commence until acceptance of the design has been granted by the Administrator. **Hold Point 1** Foundations including pile caps shall be constructed in accordance with the project documentation.

7 Fabrication of steelwork and aluminium components

Fabrication of steelwork and aluminium components shall not commence until acceptance of the design has been granted by the Administrator. **Hold Point 2**

Structural steelwork and aluminium components shall only be fabricated by a fabricator that is registered by Transport and Main Roads. **Hold Point 3**

All structural steelwork including steel bolts, nuts and washers shall be fabricated, inspected and hot-dip galvanised to MRTS78 *Fabrication of Structural Steelwork*.

All aluminium components including steel bolts, nuts and washers shall be to MRTS79 *Fabrication of Aluminium Components*.

All structural steelwork and all aluminium work shall be inspected by a Registered Professional Engineer Queensland (RPEQ) engineer or their approved delegate who is experienced in the fabrication of structural steelwork and aluminium components. The RPEQ Engineer or their approved delegate shall ensure all the requirements of the Technical Specification are met.

The inspection and documentation during fabrication of the structural steelwork and aluminium components shall be in accordance with the *Design Criteria for Bridges and Other Structures*.

8 Handling, transport and storage

8.1 General

The method of handling, transport and storage shall be such as to avoid damage due to bending, twisting and warping of any parts of the fabricated components, or any damage to protective or decorative coatings. The designated lifting locations shall be shown on the design drawings.

Fabricated components shall be moved only while fully suspended. In no case shall they be moved by dragging across the terrain.

The Contractor shall submit the procedure for the handling, transport and storage of fabricated steelwork and aluminium components to the Administrator at least 14 days prior to commencement of such activities. **Milestone**

Handling, transport and / or storage of the fabricated components shall not proceed until the procedure has been accepted by the Administrator. **Hold Point 4**

8.2 Lifting

All fabricated components, protective or decorative coatings shall not be damaged during lifting. Special lifting devices and equipment shall be provided by the Contractor for this purpose where necessary.

Cranes shall work within their rated capacity. Cranes shall be supported on prepared platforms certified by an experienced RPEQ Geotechnical Engineer. If requested by the Administrator, the Contractor shall submit the load chart(s) of the proposed crane(s) and details of counterweight, jib length and rigging for review and acceptance.

8.3 Transport to Site

Chains shall not be used to tie down fabricated components, nylon strapping or similar shall be used.

Loose parts shall be crated, tied or bolted in place to avoid loss or damage during transport. Temporary bolts and / or other material required to secure loose parts during transport shall be provided by the Contractor.

8.4 Storage

Fabricated components shall be stored in such a manner as to prevent damage to components and protective or decorative coatings. Components shall be stored above ground on timber support bearers and shall be kept free of dirt, grease and other foreign matters.

The bearers shall be sufficiently high to store the fabricated components clear of the ground even if subsidence occurs. The ground beneath the fabricated components shall be levelled so as to maintain the same clearance as at the supports.

Fabricated components stored in the open shall be self-draining and shall be kept free of soil, ashes, vegetable matter and other corrosion-inducing substances.

9 Erection of gantries and support structures

9.1 General

Gantries and support structures shall be erected in accordance with the project documentation.

Witness Point 1

The Contractor shall submit the procedure for erection of gantries and support structures including mortar packing of base plates to the Administrator for review at least 14 days prior to erection.

Milestone Erection shall not commence prior to acceptance of procedure has been given by the Administrator. **Hold Point 5**

Gantries and support structures shall not be placed on the foundation until such time as the concrete in the foundation including the pile caps has reached 100% percent of the characteristic 28 day strength and 14 days age.

9.2 Erection process

Use of levelling nuts to support gantries and structures during erection is prohibited. The gantries and support structures shall be temporarily supported using steel wedges.

The structure shall be supported by proprietary non-shrink mortar with uniform distribution of the load over the whole plan area of the base plate.

An acceptable procedure is as follows:

- a) Stand the column section and level the column by placing a minimum of four steel wedges under each base plate.
- b) Mix the non-shrink mortar to a trowellable consistency and in accordance with the manufacturer's specifications.

When the gantry or support structure is in position and aligned, a detailed survey of heights shall be undertaken by the Contractor prior to packing the bases with mortar. Packing of bases shall not proceed until the alignment and levels have been accepted by the Administrator.

Hold Point 6

- c) Pack the mortar and ensure that the mortar extends over the full area of the base plate.
- d) Wait for the mortar to set sufficiently to support the weight of the structure.
- e) Remove the steel wedges.
- f) Tension the hold down bolts, if specified in the design. Install nuts and washers.
- g) Repair the mortar where the steel wedges were located.

All steel materials including bolts, nuts and washers shall conform to MRTS78. Assembly and tensioning of bolts and nuts for splice joints shall conform to TN62.

9.3 Mortar packing

The entire base shall be tightly packed with a Transport and Main Roads approved non-shrink mortar.

When the mortar has cured, temporary steel wedges shall be removed and the gaps left by the temporary wedges shall be packed with mortar, and the whole mortar pad trimmed neatly to the shape specified on the Project Drawings.

10 Level 2 inspection

Gantries and support structures shall be recorded in the inventory in the Transport and Main Roads' *Bridge Information System* (BIS) and shall be subject to the Level 2 inspection regime at the completion of erection. The Contractor shall arrange the Level 2 inspection.

11 Barrier protection construction

Permanent barrier protection shall be constructed in accordance with the project documentation.

Traffic control or temporary barrier protection shall remain in place until both construction of the permanent barrier protection, gantries and support structures are completed.

12 Fitting out

Signs, ITS devices, electrical components and conduits shall be supplied and installed in accordance with the project documentation.

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