

Technical Specification

**Transport and Main Roads Specifications
MRTS77 Bridge Deck**

July 2019

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1 Introduction

This Technical Specification applies to the construction of a reinforced concrete bridge deck constructed on prestressed concrete deck units, prestressed concrete girders or steel girders.

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*.

3 Referenced documents

Table 3 lists documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
AGPT-T250-08	<i>Modified surface texture depth (pestle method)</i>
AS 1214	<i>Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)</i>
AS 2439.1	<i>Perforated plastics drainage and effluent pipe and fittings - Perforated drainage pipe and associated fittings</i>
AS/NZS 2053.1	<i>Conduits and fittings for electrical installations - General requirements</i>
AS/NZS 2053.2	<i>Conduits and fittings for electrical installations - Rigid plain conduits and fittings of insulating material</i>
AS/NZS 2053.5	<i>Conduits and fittings for electrical installations - Corrugated conduits and fittings of insulating material</i>
AS/NZS 3000	<i>Electrical Installations (known as The Australian/New Zealand Wiring Rules)</i>
AS/NZS 4680	<i>Hot-dip galvanized (zinc) coatings on fabricated ferrous articles</i>
MRTS01	<i>Introduction to Technical Specifications</i>
MRTS04	<i>General Earthworks</i>
MRTS50	<i>Specific Quality System Requirements</i>
MRTS70	<i>Concrete</i>
MRTS71	<i>Reinforcing Steel</i>
MRTS71A	<i>Stainless Steel Reinforcing</i>
MRTS72	<i>Manufacture of Precast Concrete Elements</i>
MRTS73	<i>Manufacture of Prestressed Concrete Members and Stressing Units</i>
MRTS78	<i>Fabrication of Structural Steelwork</i>
MRTS78A	<i>Fabrication of Structural Stainless Steelwork</i>
MRTS79	<i>Fabrication of Aluminium Components</i>
MRTS82	<i>Bridge Deck Expansion Joints</i>

Reference	Title
MRTS82A	<i>Finger Type Bridge Deck Expansion Joints</i>
MRTS83	<i>Anti-Graffiti Protection</i>
MRTS84	<i>Deck Wearing Surface</i>
MRTS90	<i>Modular Bridge Expansion Joints</i>
MRTS91	<i>Conduits and Pits</i>
MRTS256	<i>Power Cables</i>
TS-009	<i>Austel Technical Standard - Installation Requirements for Customer Cabling (Wiring Rules)</i>

3.1 Standard Drawings

Table 3.1 lists Standard Drawings referenced in this Technical Specification.

Table 3.1 – Standard Drawings

Standard Drawing Number	Title
2005	<i>Standard Bridge Date Plate – General Details</i>
2255	<i>Bridge approaches – Relieving slab 3 metre span</i>
2256	<i>Bridge approaches – Relieving slab 6 metre span</i>

4 Quality system requirements

4.1 Hold Points, Witness Points and Milestones

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 4.1

Table 4.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
7.2			Submission of details for bracing cross girders (14 days)
7.3	1. Preparation for cross girders		
8.1	2. Casting deck		
8.4	3. Lifting of deck surface levels		
8.5	4. Pre-camber of deck formwork		
8.7	5. Deck placement procedure		Submission of deck placement procedure (21 days)

Clause	Hold Point	Witness Point	Milestone
8.9	6. Remedial work for deck surface finish		
9.2		1. Concreting around anchors for extruded aluminium expansion joints	
14	7. Erection procedure for footway slabs		Submission of precast concrete footway slab erection procedure (14 days)
15.3	8. Loading of deck (heavy construction loads)		
15.4	9. Legal traffic loads		

4.2 Construction procedures

The Contractor shall prepare documented procedures for all construction processes in accordance with the quality system requirements of the Contract.

Procedures for those activities listed in Table 4.2 shall be submitted to the Administrator in accordance with the quality system requirements of the Contract.

Table 4.2 – Construction procedures

Clause	Conformance Requirement
8.7	Placement of concrete in deck
8.9	Remedial measure for deck surface finish
14	Erection of precast concrete footway slab

5 Materials

5.1 Registered suppliers and proprietary products

Work Operations that require the use of registered suppliers and proprietary products are listed in Table 5.1.

Table 5.1 – Item requiring use of registered suppliers and proprietary products

Clause	Category of Work
5.2 and 8.8.3	Application of joint sealants in construction joints
5.3 and 8.3	Use of fibre cement sheeting as sacrificial formwork
5.4 and 8.8.3	Application of compressible fillers in construction joints
5.5 and 8.8.2	Application of closed cell expanded polyethylene sheeting in joints
5.8 and 6	Use of tape for sealing joints between precast elements
5.9 and 8.8.3	Application of closed-cell polyethylene foam backing rods in construction joints
5.13 and 8.7	Use of curing compounds for concrete curing
1.1 and 8.7	Use of evaporation retarding compounds for protection of concrete surface

Clauses 1 to 7 of Annexure MRTS77.1 lists the registered proprietary products to be used for the project.

Registered suppliers and proprietary products are listed in Transport and Mains Roads Product Index for Bridges and Other Structures. Access this document via:

<https://www.tmr.qld.gov.au/business-industry/Business-with-us/Approved-products-and-suppliers/Bridges-and-other-structures-approved-products-and-suppliers>

5.2 Joint sealants

5.2.1 General

Joint sealants shall exhibit superior adhesion to concrete and steel surfaces and shall have consistent extension properties at temperatures between -15°C and 70°C. They shall form a soft rubber like characteristic at these temperatures and have an extension characteristic of at least 300% at 25°C.

5.2.2 Bitumen based joint sealant

Bitumen based joint sealant shall be a registered proprietary product. Bitumen based joint sealants shall not melt at temperatures below 170°C.

Clause 1.1 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.2.3 Gun grade polyurethane elastomer joint sealant

Gun grade polyurethane elastomer joint sealant shall be a registered proprietary product.

Polyurethane elastomer based joint sealant shall be a two-component product suitable for application in vertical joints using a dispensing gun.

Clause 1.2 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.2.4 Silicone joint sealant

Silicone joint sealant shall be a registered proprietary product.

Silicone joint sealant shall be suitable for application using a dispensing gun.

Clause 1.3 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.3 Fibre cement sheeting

Fibre cement sheeting shall be a compressed fibre cement product capable of supporting deck concrete placement loads.

5.4 Compressible filler

Compressible filler shall be a registered proprietary product.

Compressible filler shall consist of a bitumen impregnated fibrous material such as caneite.

The performance of the compressible filler shall be effective in the temperature range between -15°C and 70°C and has superior resistant to rain, flowing water and dust storms.

Clause 2 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.5 Closed cell expanded polyethylene sheeting

Closed cell expanded polyethylene sheeting shall be a registered proprietary product.

The performance of the closed cell expanded polyethylene sheeting shall be effective in the temperature range between -15°C and 70°C and has water absorption of less than 0.02 g/cm³.

The thickness of the closed cell polyethylene sheeting shall be as shown in the project drawings.

Clause 3 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.6 Cement mortar

Cement mortar shall consist of 1 part of Type GP cement and 3 parts of clean sharp sand uniformly mixed (1:3) with just sufficient water added to form a trowelable / plastic consistency.

5.7 Dry stabilised sand

Dry stabilised sand shall comply with the requirements of MRTS04 *General Earthworks*.

5.8 Tape

Tape for use in sealing gap / joint between precast elements shall be a registered proprietary product.

Tape shall comprise a self-adhesive bituminous membrane incorporating a reinforcing heavy-duty plastic film or woven fibre.

Tape shall have tear resistance of at least 45 N and breaking or tensile strength of at least 43 N.

Clause 4 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.9 Closed cell polyethylene foam backing rod

Closed cell polyethylene foam backing rod for use in sealing joints between precast elements shall be a registered proprietary product.

The performance of the closed cell expanded polyethylene foam backing rod shall be effective in the temperature range between -15°C and 70°C.

Clause 5 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.10 Cold galvanising paint (zinc rich)

Cold galvanising paint (zinc rich) shall be based on inorganic zinc rich material as per MRTS78 and applied in accordance with the manufacturer's recommendations.

5.11 Concrete

The supply and manufacture of concrete shall be in accordance with the requirements of MRTS70 *Concrete*.

5.12 Evaporation retarding compound

Evaporation retarding compound shall be a registered proprietary product.

Evaporation retarding compound shall be in accordance with the requirements of MRTS70 *Concrete*.

Clause 7 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.13 Curing compound

Curing compound shall be a registered proprietary product.

Curing compound shall be in accordance with the requirements of MRTS70 *Concrete*.

Clause 6 of Annexure MRTS77.1 lists the registered products to be used for the project.

5.14 Steel reinforcing

Steel reinforcing and mechanical reinforcing bar splices shall be supplied and fabricated to the details shown on the project drawings and in accordance with the requirements of MRTS71 *Reinforcing Steel* or MRTS71A *Stainless Steel Reinforcing*.

6 Preparation of prestressed concrete deck units and prestressed concrete girders

No additional surface roughening to the top surface of the units and girders is required unless specifically stated otherwise in the project drawings.

Where the project drawings show the gap / joint between the units or girders to be sealed using tape, the tape shall be installed on to the top surface of the units or girders and extended passing the edges of the units or girders by at least 40 mm. Prior to application of the tape, the top surface of the units or girders shall be swept clean.

Tape shall be a registered product in accordance with Clause 5.8.

The tape shall be applied in accordance with the manufacturer's recommendations.

Where the project drawings show the gap between the units to be sealed using fibre cement sheeting, refer to Clause 8.3 for requirements.

Fibre cement sheeting shall be installed to cover the voids in the girders, refer to Clause 8.3 for requirements.

Tape or fibre cement sheeting shall not extend into the cover zone of ligatures extending from the deck units or girders.

7 Construction of cross girders

7.1 General

Construction of concrete shall be in accordance with the requirements of MRTS70 *Concrete*.

Reinforcing steel shall be installed in accordance with the requirements of MRTS71 *Reinforcing Steel* or MRTS71A *Stainless Steel Reinforcing*.

7.2 Temporary bracing

Temporary bracing, consisting of struts and ties to prevent lateral movement of the girders during construction shall be erected near each cross girder. Details of temporary bracing shall be submitted to the Administrator at least 14 days before construction of the cross girders. **Milestone**

The bracing shall remain in place for at least two days after the adjacent cross girders have been cast.

7.3 Preparation for cross girders to prestressed concrete girders

For a deck supported by prestressed concrete girders, cross girders shall not be cast until the interface area on the girders have been roughened by scabbling or sand blasting as shown in the project drawings. **Hold Point 1** Unless otherwise specified, this roughening shall have been carried out as part of the girder manufacture in accordance with MRTS73 *Manufacture of Prestressed Concrete Members and Stressing Units*.

7.4 Formwork

The formwork for the cross girders shall be supported from the girders.

8 Construction of reinforced concrete deck, kerbs, parapets and relieving slabs

8.1 General

Construction of concrete shall be in accordance with the requirements of MRTS70 *Concrete*.

Reinforcing steel and mechanical reinforcing bar splices shall be installed in accordance with the requirements of MRTS71 *Reinforcing Steel* or MRTS71A *Stainless Steel Reinforcing*.

The reinforced concrete deck, kerbs and parapets shall be cast in the sequence shown in the project drawings. The deck shall not be cast until seven days after cross girders have been cast, where applicable. **Hold Point 2**

Parapets shall be cast separately from the reinforced concrete deck and/or kerbs. Parapets shall be cast in one lift vertically.

Precast concrete components including precast parapet shells shall be manufactured in accordance with MRTS72 *Manufacture of Precast Concrete Elements* and as shown in project drawings.

Unless detailed otherwise in the project drawings, relieving slabs shall be constructed in accordance with the details shown on Standard Drawings 2255 and 2256.

8.2 Surface preparation

Steel reinforcing and other steelwork protruding from units or girders shall be cleaned in accordance with MRTS71 *Reinforcing Steel* or MRTS71A *Stainless Steel Reinforcing* before any steel reinforcing bars or concrete is placed.

The top surface of the units and girders shall be cleaned of any oil, clay, grout, rubbish or other foreign materials prior to placing concrete.

8.3 Formwork

Formwork for the concrete deck, kerbs and parapets shall be supported from the units or girders. In no case shall the formwork be supported from the ground.

Where shown in the project drawings, fibre cement sheeting shall be installed over any gaps and/or joints between prestressed deck units and to act as sacrificial formwork. Fibre cement sheet strips shall be set on cement mortar.

Fibre cement sheeting shall be used as sacrificial formwork and in-fill sheeting to cover the voids in the girders.

Fibre cement sheeting shall be cut to the dimensions shown in the project drawings. Cutting and handling shall be in accordance with the manufacturer's recommendations.

8.4 Thickness and level of deck

The deck thickness shall not be less than that shown in the project drawings nor shall it be increased without the Administrator's approval. In cases of excessive hog, lifting of the deck surface levels in order to preserve the minimum thickness of the deck may be required. Lifting of the deck surface levels shall not be carried out without the Administrator's approval. **Hold Point 3**

8.5 Pre-camber of deck formwork

Deck formwork for each span shall be pre-cambered vertically in the longitudinal direction, as shown in the project drawings.

Should the measured deflections of the first spans cast vary considerably from those shown in the project drawings, the pre-cambers for the remaining spans shall be adjusted accordingly with the Administrator's approval. **Hold Point 4**

8.6 Embedded items

Embedded items shall be supplied and installed where shown in the project drawings and in accordance with Clauses 9 to 12, as applicable.

Embedded items shall be installed at the locations shown in the project drawings and shall be securely fixed in position so that they are not displaced during placement of concrete.

8.7 Concrete placement procedure

The Contractor shall submit a concrete placement procedure including full details of the equipment and methods to be used to place, compact and finish the deck concrete to the Administrator, at least 21 days prior to casting the deck. **Milestone** No concrete shall be placed until the concrete placement procedure has been approved by the Administrator. **Hold Point 5**

Unless otherwise specified, concrete in the deck in each span shall be placed in one operation. The concrete in the kerbs shall be placed at the same time as the concrete in the deck slab except where a construction joint between the deck slab and kerb is shown in the project drawings.

Evaporation retarding compound and curing compound shall be a registered product in accordance with Clauses 5.12 and 5.13 respectively. These compounds shall be applied in accordance with MRTS70 *Concrete*.

8.8 Joints

8.8.1 General

Joints shall be installed at the locations and in accordance with the details shown in the project drawings.

Construction joints shall be installed in accordance with the requirements of MRTS70 *Concrete*.

8.8.2 Joint between infill pour section and prestressed concrete deck units

Prior to casting the infill pour section of the deck after the nominated delay period, closed cell expanded polyethylene sheeting shall be installed on the top of the deck units as shown in the project drawings.

Closed cell expanded polyethylene sheeting shall be a registered product in accordance with Clause 5.5.

Closed cell expanded polyethylene sheeting shall be installed in accordance with the manufacturer's recommendations.

8.8.3 Joint sealant, compressible filler and closed-cell expanded polyethylene foam backing rod

Compressible filler shall be a registered product in accordance with Clause 5.4.

Compressible filler shall be installed in accordance with the manufacturer's recommendations.

Joint sealant shall be a registered product in accordance with Clause 5.2.

Joint sealant and surface preparation shall be applied in accordance with the manufacturer's recommendations.

Hot applied bitumen based joint sealant shall be mixed, heated and applied strictly in accordance with the manufacturer's recommendations.

Where bitumen based joint sealant is required to be applied to a recess in a vertical surface, leak-proof forms shall be provided to retain the molten bitumen product. Alternatively, a gun grade, two pack polyurethane elastomer joint sealant may be applied using an appropriate dispensing gun. Two pack polyurethane shall be mixed thoroughly in accordance with the manufacturer's recommendations.

Silicone joint sealant shall be applied direct from the cartridge with an appropriate dispensing gun. Vertical recesses shall be filled from the bottom up.

Closed-cell polyethylene foam backing rods shall be installed in joints where appropriate such that the cross section of the joint sealant remains approximately square or as otherwise recommended by the sealant manufacturer.

Backing rod shall be a registered product in accordance with Clause 5.9.

Backing rod shall be installed in accordance with the manufacturer's recommendations.

8.9 Surface finishes

The deck shall be screeded in the longitudinal direction. The screed shall travel on levelled runners and, preferably, shall extend in one piece from kerb to kerb.

The surface shall be brushed in a direction at right angles to the direction of traffic using a broom not less than 400 mm wide to achieve an average texture depth of 0.8 mm. The texture depth produced by brushing shall be measured by the method described in Test Method AGPT-T250-08. The average texture depth for each set of tests shall not be less than 0.8 mm and not more than one test in each set shall show a texture depth of less than 0.6 mm. Tests in a set shall be carried out at one metre intervals along a line one metre inside any lane edge. The number of tests in a set shall be ten.

Testing shall be carried out as soon as practicable after curing of the concrete and before construction traffic is permitted to use the surface. Where compliance with the requirements of this section is not achieved, the Contractor shall remediate the texture depth by using transverse mechanical grooving of the concrete surface. Prior to carrying out the remedial work, a construction procedure detailing the remedial method shall be submitted to and approved by the Administrator. **Hold Point 6**

In cases where the concrete deck is overlain with a bituminous deck wearing surface, a suitable bond surface shall be achieved by means of brooming after initial set has taken place or, alternatively, by rolling with a small diameter expanded metal roller.

Kerbs and parapets shall be finished to the alignment and position shown in the project drawings and with a smooth even surface and with chamfers neatly formed.

Finishes shall be obtained without plastering. Kerbs and parapets may require to be rubbed with a carborundum stone to produce the required finish.

8.10 Tolerances

Concrete shapes and profiles shall be constructed to the tolerances specified in MRTS70 *Concrete* except as stated below.

In cases where the concrete deck is overlain with a bituminous deck wearing surface, the tolerance on the top surface of the deck may be relaxed to ± 20 mm provided that the deck thickness limitations addressed in Clause 8.4 and minimum concrete cover are maintained.

Notwithstanding all other provisions of the project drawings and/or Specifications, the line of exposed edges of kerbs, parapets and medians shall form straight lines or smooth curves, as appropriate, and exposed faces shall form true planes between edges. The visual impact of the completed structures is considered important.

8.11 Formwork supports

After completion of casting the kerbs and/or parapets, any inserts for formwork supports provided in the prestressed concrete units and girders or cast insitu deck shall be extracted, where possible, and the remaining voids backfilled with cement mortar.

9 Embedded items

9.1 Anchors for bridge railing, guardrail terminals and lamp standards

Anchor studs and sockets for bridge railing, guardrail terminals and lamp standard brackets shall be fabricated as shown in the project drawings. Fabrication shall be carried out in accordance with the requirements of MRTS78 *Fabrication of Structural Steelwork*.

Anchor studs and sockets shall be hot-dipped galvanised in accordance with the requirements of AS 1214 or AS/NZS 4680, as appropriate.

Male threads shall be cleaned after galvanising with a die nut and nuts and washers assembled on to studs. Female threads shall be cleaned with a tap after galvanising and bolts or studs and washers assembled into sockets.

9.2 Sockets for extruded aluminium expansion joint

Sockets for extruded aluminium expansion joints shall be fabricated in accordance with MRTS82 *Bridge Deck Expansion Joints*.

The sockets shall have threads lightly greased and shall be set up to line and level in a rigid template.

Deck concrete shall be placed and well compacted around sockets with care to avoid displacement of sockets. **Witness Point 1**

After stripping of the installation template, plastic plugs shall be inserted in the sockets.

The tolerance on location of sockets shall be as shown in Figure 9.2 and as described in Table 9.2.

Figure 9.2 – Tolerances on expansion joint socket location

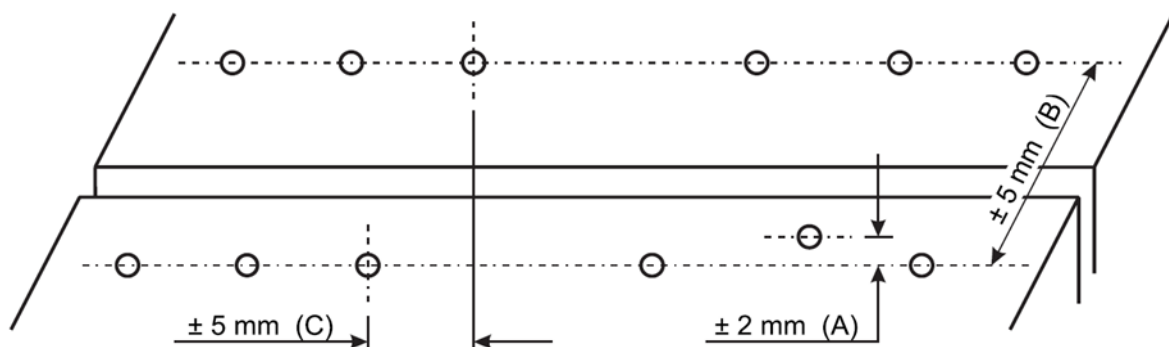


Table 9.2 – Tolerances on expansion joint socket location

Dimension	Tolerance (mm)
a) Deviation from a straight line across the bridge	± 2
b) Deviation from the correct centreline spacing between rows	± 5
c) Deviation from the correct lateral position in each row	± 5
d) Deviation from the correct level	± 5

9.3 Bridge date plate

Date plate shall be cast into the bridge superstructure where shown in the project drawings.

Date plates shall be cast brass plates manufactured in accordance with Standard Drawing 2005.

Date plates shall be supplied by the registered suppliers.

Registered suppliers are listed in Clause 8 of Annexure MRTS77.1.

9.4 Permanent survey mark

Permanent survey mark, shall be cast into the bridge superstructure where shown in the project drawings.

Permanent survey mark shall be brass plaques.

Permanent survey marks shall be supplied by the registered suppliers.

Registered suppliers are listed in Clause 9 of Annexure MRTS77.1.

9.5 Scuppers

Scuppers shall be fabricated from 150 mm diameter UPVC pipe as shown in the project drawings. UPVC pipe and fittings shall conform to the requirements of AS 2439.1.

Scuppers shall be installed in the locations and to the details shown in the project drawings.

10 Electrical and telecommunication components

10.1 Conduits

Conduits for electrical and/or telecommunications purposes shall be:

- a) cast into the kerbs and/or parapets, and/or
- b) installed in the void of bridge footways

at the locations and in accordance with the details shown in the project drawings.

Conduits shall be one of the following, as appropriate and as shown in the project drawings:

- a) for electrical power purposes, conduit and fittings shall be rigid, non-metallic electrical conduit manufactured to comply with the requirements of AS/NZS 2053 and conforming to the heavy duty requirements of AS/NZS 2053, Part 2
- b) where required, flexible electrical conduit and fittings shall be manufactured to comply with the requirements of AS/NZS 2053, Parts 1 and 5, or

- c) for telecommunications cabling purposes, conduit and fittings shall comply with the requirements of Austel Technical Standard TS-009, *Installation Requirements for Customer Cabling (Wiring Rules)*.

Conduits shall be installed in accordance with the requirements of MRTS91 *Conduits and Pits*. Conduits shall be installed to the alignment and position shown in the project drawings and shall be adequately secured to ensure that they do not displace during concreting operations.

A draw rope shall be provided in each conduit. Draw rope shall be a general all-purpose 4 mm diameter synthetic polypropylene filament rope or equivalent. Draw ropes shall have a minimum of 1.5 metres of slack in each conduit and rope ends shall be firmly secured to prevent the ends being lost within the conduit.

10.2 Lamp standard brackets

Lamp standard brackets shall be fabricated to the details shown in the project drawings and in accordance with the requirements of MRTS78 *Fabrication of Structural Steelwork*. Lamp standard brackets shall be hot-dipped galvanised in accordance with the requirements of AS/NZS 4680.

Lamp standard brackets shall be installed onto the bridge superstructure in the locations shown in the project drawings.

11 Stainless steel cover plates

11.1 General

Stainless steel cover plates shall be supplied, fabricated and installed where shown in the project drawings at electrical junction boxes and over kerbs or parapet at expansion joints.

11.2 Material

Plate for cover plates shall be stainless steel Grade 316.

Cast-in sockets or sockets installed after concreting shall be as follows and as detailed in the project drawings:

- a) Grade 316 stainless steel, or
- b) Grade 250 mild steel hot-dipped galvanised in accordance with the requirements of AS 1214 or AS/NZS 4680, as appropriate.

Set screws and/or bolts shall be Grade 304 stainless steel.

11.3 Fabrication

Stainless steel cover plates shall be fabricated to the details shown in the project drawings and in accordance with the requirements of MRTS78A *Fabrication of Structural Stainless Steelwork*.

Before fabrication commences, all dimensions shall be checked on the Site.

Exposed surfaces of cover plate shall be free from cuts, burrs, abrasions and other defects.

11.4 Installation

Sockets for installation of cover plates shall be cast into the bridge deck, kerb or parapet concrete in the locations shown in the project drawings. Alternatively, proprietary sockets may be drilled into the deck after concrete placement and installed in accordance with the manufacturer's recommendations. Concrete shall be at least 14 days old prior to installation of drilled sockets.

Prior to installing bolts and/or set screws into sockets, threads shall be coated with a suitable thread locking compound. Bolts and/or set screws shall be firmly tightened.

Electrical junction box cover plates shall be installed with a neoprene gasket.

Cover plates which do not bed satisfactorily on the concrete surface shall be rejected.

12 Navigation markers

Navigation markers shall be fabricated to the details shown in the project drawings.

Steelwork shall be fabricated in accordance with the requirements of MRTS78 *Fabrication of Structural Steelwork*. Steelwork shall be hot-dipped galvanised in accordance with the requirements of AS/NZS 4680.

Aluminium components shall be fabricated in accordance with the requirements of MRTS79 *Fabrication of Aluminium Components*.

Specific colour coatings shall be applied to the surface of the aluminium marker in accordance with the details shown in the project drawings.

Navigation markers shall be installed in the locations shown in the project drawings. Anchor bolts or sockets shall be cast into the concrete or the concrete shall be drilled and the anchors installed in accordance with the manufacturer's recommendations.

Electrical conduit shall be installed from the nearest junction box to the navigation marker as shown in the project drawings. Conduit shall be installed in accordance with the requirements of MRTS91 *Conduits and Pits*.

The navigation marker luminaire shall be supplied and installed as shown in the drawing. Installation shall comply with the requirements of AS/NZS 3000.

The luminaire shall be cabled to a point of supply of electricity in accordance with the requirements of MRTS256 *Power Cables*.

The installation shall be tested as required by MRTS256 *Power Cables* and/or AS/NZS 3000.

13 Stabilised sand in footway

Where shown in the project drawings, the void in the footways shall be backfilled with dry stabilised sand.

Dry stabilised sand shall be placed and compacted in accordance with the requirements of MRTS04 *General Earthworks*. Care shall be taken to surround any electrical or telecommunications conduits installed in the footway void with stabilised sand and to compact the stabilised sand without distortion or movement of the conduits.

14 Precast concrete footway slabs

If shown in the project drawings, precast reinforced concrete footway cover slabs shall be manufactured and installed on the bridge superstructure.

Precast reinforced concrete footway slabs shall be manufactured to the details shown in the project drawings and in accordance with the requirements of MRTS72 *Manufacture of Precast Concrete Elements*.

Footway slabs shall be lifted using a suitable bridle or sling attached only to the lifting points cast in the slab.

The Contractor shall submit to the Administrator, at least 14 days before installation commences, its proposed procedure for handling and installation of footway slabs **Milestone** Installation shall not commence until the procedure has been approved by the Administrator. **Hold Point 7**

Footway slabs damaged during manufacture, transport, handling and/or installation shall be rejected.

Following installation, construction plants and vehicles shall not proceed onto footway slabs nor shall equipment and materials be stacked on footway slabs.

15 Load limitation on newly cast decks

15.1 General

Construction plants or equipment or vehicles of any type shall not be placed onto the erected deck units or girders prior to the completion of the bridge concrete deck.

15.2 Light construction loads

The Contractor may move light construction equipment, and light vehicles (twin axle maximum and less than five tonnes of gross mass) and may superimpose small quantities of steel reinforcing and other materials and other light construction loads onto the cast deck provided that:

- a) the strength of the deck concrete has reached 20 MPa, and
- b) a period of at least three days has elapsed since the deck was cast.

15.3 Heavy construction loads

Vehicles (multi axles), cranes, compaction equipment, heavy materials and other concentrated loads may be permitted on the newly cast bridge deck when the concrete has achieved the 28 day characteristic strength and a minimum age of 14 days.

The Contractor shall submit the proposed loads and evidence that the strength of the concrete has achieved the 28 day characteristic strength to the Administrator. **Hold Point 8**

15.4 Legal traffic loads

Operational traffic loads may be permitted on the deck when the concrete has achieved the 28 day characteristic strength and with a minimum age of 21 days. No loading in excess of the design loads shall be permitted on the deck without the approval of the Administrator. **Hold Point 9**

16 Deck wearing surface

Where shown in the project drawings, an asphaltic deck wearing surface shall be constructed on the concrete deck. The deck wearing surface shall be constructed in accordance with the requirements of MRTS84 *Deck Wearing Surface*.

The deck wearing surface shall not be constructed until:

- a) the deck concrete has reached its 28 day characteristic strength, and
- b) 21 days have elapsed since the deck concrete was placed.

17 Bridge deck expansion joints

Where shown in the project drawings, deck expansion joints shall be supplied and installed in accordance with the requirements specified in MRTS82 *Bridge Deck Expansion Joints*, MRTS82A *Finger Type Bridge Deck Expansion Joints*, and MRTS90 *Modular Bridge Expansion Joints*.

18 Anti-graffiti protection

Anti-graffiti protection coatings shall be applied in accordance with the requirements of and at the locations specified in MRTS83 *Anti-Graffiti Protection*.

19 Supplementary requirements

The requirements of MRTS77 *Bridge Deck* are varied by the supplementary requirements given in Clause 10 of Annexure MRTS77.1.

