TCS 001: 2022

Specification

Traffic Signal Posts, Mast Arms, Rigid Street Lighting Poles, and Attachments

Supply of

Version: June 2022
Revision: B

VICTORIA State Government | Department of Transport

TCS 001: 2022

Foreword

This specification has been developed by DoT (Roads). It is one of a number of technical specifications, and associated standard drawings, which set out the requirements for roadside ITS devices, traffic signal equipment and other electrical equipment and associated devices and control systems.

This specification is intended for use in all relevant works undertaken by or on behalf of DoT (Roads).

VicRoads Standard Drawings, Specifications and Guidelines are available for downloading from the VicRoads website:
https://www.vicroads.vic.gov.au/business-and-industry/technical-publications/electrical-and-intelligent-transport-systems

Specification updates. VicRoads specifications and associated standard drawings are subject to periodic review. To keep the specifications up to date, amendments or new editions are issued as necessary. It is therefore important for users of VicRoads specifications to ensure that they have the latest version and associated amendments.

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Revision History

Version	Revision	Date	Author	Description
2005		Sept 2005	ITS	Released
2022	A	June 2022	ITS	New version Updated content Updated format Added Flashing Pedestrian Crossing Poles
2022	B	June 2022	ITS	Corrected error in Revision date and number

Contents

SECTION 1 – SCOPE AND GENERAL

1.1 SCOPE

1.1.1 This specification covers the requirements for the design and manufacture of traffic signal poles for use on Department of Transport (Roads) projects including:

- Traffic signal posts.
- Mast arms.
- Joint-use mast arms.
- Joint-use poles.
- Flashing pedestrian crossing poles.
- Lantern mounting brackets.
- Cable termination facilities.

1.1.2 This specification covers the requirements for the design and manufacture of rigid street lighting poles for use on DoT (Roads) Projects.

1.1.3 This specification also covers the requirements for the design and manufacture of lantern mounting brackets, and cable termination facilities for use on DoT (Roads) Projects.

1.2 GENERAL

1.2.1 All traffic signal mast arms, joint-use mast arms and joint-use poles shall comply with the requirements of AS2339, traffic signal posts, mast arms and attachments.

1.2.2 Where this specification differs from the requirements of AS2339, this specification shall take precedence. Expectations and clarifications can be found in Clause 2.4.

1.2.3 All poles covered by this specification that are supplied to DoT (Roads) shall hold current DoT (Roads) Type Approval (See Appendix A).

1.2.4 All poles supplied shall conform to a sample previously supplied to, and formally approved by DoT (Roads).

1.2.5 Reference to “approved” within this specification shall mean individual components or methods that have been previously accepted by DoT (Roads) and documented in DoT (Roads) ITS Approved Consultant List and ITS Type Approval List.

1.2.6 All poles covered by this specification shall have a design life, including an in-service fatigue life, of not less than 50 years.

1.2.7 Threads shall be supplied for fasteners in accordance with AS 1275.

1.2.8 Threaded fasteners shall be hot-dip galvanized in accordance with AS/NZS 1214.

1.2.9 Each finished pole (including lantern mounting brackets) shall be handled and individually packed in such a manner so as to prevent any damage to the pole or the finish during storage, handling and transport.

1.2.10 For information regarding traffic signal lanterns and lantern mounting straps refer to TCS 038.

1.2.11 For information regarding street lighting brackets refer to TCS 050.

1.3 DEFINITIONS

Term	Definition
Mini mast arm	A heavy-duty Type 2 pole (5360mm height) primarily intended for use with a small 1.4m length outreach. Also referred to as a Type 2D.
Rigid street lighting poles	A rigid street lighting pole is a non-frangible pole designed to remain in an upright position and without excessive deformation after experiencing any vehicular impact. This type of pole should not be used in areas that experience a reasonable likelihood of vehicular impact.
Flashing pedestrian crossing poles	A flashing pedestrian crossing pole is a non-frangible pole bearing a flashing yellow lantern on its vertical section and a floodlight on its outreach arm.

Table 1.1 – Definitions of traffic signal poles used by DoT (Roads) not defined in AS 2339

1.4 ACRONYMS

The acronyms used in this document shall be interpreted as follows:

AS	Australian Standard
AS/NZS	Australian Standard / New Zealand Standard
ESLS	Electronic Speed Limit Sign
DoT (Roads)	Department of Transport (Roads) *(formerly VicRoads)*
FPCP	Flashing Pedestrian Crossing Pole
MA	Mast Arm
JUMA	Joint-Use Mast Arm
JUP	Joint-Use Pole
RSLP	Rigid Street Lighting Pole
UMA	Upper Mounting Assembly

SECTION 2 – RELATED SPECIFICATIONS AND DRAWINGS

2.1 AUSTRALIAN STANDARDS

2.1.1 Subject to the following clauses, the fabrication and supply of all components for all traffic signal mast arms, joint-use mast arms and joint-use poles shall comply fully with the most recent issue of the Australian Standards listed below, together with any amendments to these standards.

2.1.2 The following related Australian Standards are referenced:

AS 1742.10	Manual of uniform traffic control devices – Part 10: Pedestrian control and protection
AS 2144	Traffic signal lanterns
AS 2339	Traffic signal posts, mast arms and attachments
AS 4100	Steel Structures

2.2 DOT (ROADS) SPECIFICATIONS AND DRAWINGS

The fabrication and supply of all components shall conform to the relevant DoT (Roads) specifications and standard drawings, and related specifications and standards, as indicated throughout this document.

2.2.1 DoT (Roads) Specifications

The following DoT (Roads) Specifications are referenced:

TCS 038	Traffic Signal Lanterns
TCS 050	Fabrication and Supply of Street Lighting Brackets

2.2.2 DoT (Roads) Standard Drawings

The following DoT (Roads) Standard Drawings are referenced:

TC-1061	Street Lighting Bracket Single & Double – Type 2
TC-1068	RSLP Base Section
TC-1100	Traffic Signal Post – Types 2A, 2B & 3
TC-1101	Traffic Signal Mounting Brackets
TC-1103	Mini Mast Arm (Type 2D)
TC-1104	Flashing Pedestrian Crossing Details
TC-1106	Traffic Signal MA and JUMA Overhead Lantern Mounting Assembly
TC-1107	MA, JUMA, JUP and RSLP Baseplate Detail
TC-1108	Weather Cap
TC-1109	Traffic Signal MA and JUMA Mast Arm Outreach Clamping Detail
TC-1110	Traffic Signal MA, JUMA and JUP Column Conduit Entry Detail

TC-1111	JUMA, JUP and RSLP Street Lighting Extensions Spigot Detail and Spigot Cap
TC-1112	Typical 5.5m Mast Arm Installation (2.5m Outreach)
TC-1113	MA, JUMA and JUP Lantern Support Detail
TC-1114	51 Way Terminal Assembly
TC-1115	Lantern and Mounting Bracket Orientation
TC-1116	Traffic Signal Mounting Arrangements
TC-1117	Lantern Orientation and Mounting Heights for 300mm Lanterns on Standard Posts
TC-1118	Door Openings and Cable Termination Block Mounting Details
TC-1119	Lantern Mounting Details
TC-1120	JUP Base Section
TC-1121	JUMA Base Section
TC-1122	MA Base Section
TC-1123	JUMA, JUP and RSLP Street Lighting Extension Sections
TC-1124	MA and JUMA Outreach Sections
TC-1128	Terminal Assembly for Use with MA, JUMA, and JUP
TC-1129	19 Way Terminal Assembly
TC-1200	Foundation for Pedestals
TC-1201	Bored Pile for MA, JUP and JUMA
TC-1202	Spread Footing
TC-1601	Rag Bolt Assembly

2.3 EXCEPTIONS AND CLARIFICATIONS TO AS 2339: 2017

The following changes or clarifications to AS 2339: 2017 are summarised in Table 2.1 below.

AS 2339 Clause	Description	TCS 001 Exception / Clarification
2.2	Post type designations	Refer Section 3.2
2.3	Material and construction	Refer Section 3.3
2.4.1	Column lantern fixings	Refer Section 9
2.4.3	Baseplate	Refer Sections 3.4.1 & 3.4.2
Not used	Type 2D (mini mast arms)	Refer Section 3.4.3
3.2	Mast arm type designations	Refer Section 4.2
3.5.1	General (MA)	Refer Sections 4.3.2 & 4.3.3
3.5.3	Provision for attachment of lanterns (MA)	Refer Section 4.3.4
3.5.5	Baseplate (MA)	Refer Section 4.3.5
3.6.2	Type M1 (MA)	Refer Section 4.3.4
3.6.3	Type M2A and M2B mast arms (MA)	Not used
3.6.4	Type M3A, M3B and M3C mast arms (MA)	Not used
4.3.1	Design basis (JUP)	Refer Section 5.2.3
4.4.1	General (JUP)	Refer Section 5.2.2
4.4.2	Provision for attachment of lanterns (JUP)	Refer Section 5.2.4
4.4.4	Baseplate (JUP)	Refer Section 5.2.5
4.5	Provision for traffic signal cables (JUP)	Refer Section 5.3.1
5.2.1	Design basis (JUMA)	Refer Section 6.2.4
5.3	Physical arrangement and dimensions (JUMA)	Refer Section 6.2
5.4	Provision for road lighting cables (JUMA)	Refer Section 6.3.2
Not used	Rigid street lighting poles	Refer Section 7
Not used	Flashing pedestrian crossing poles	Refer Section 8

6.1	Types of mounting brackets	Refer Section 9.2
6.2.1	Provision for mounting bolts	Refer Section 9.3
7.1	Terminal assembly	Refer Section 10.2

Table 2.1 – Changes and clarifications to AS 2339: 2017

SECTION 3 – TRAFFIC SIGNAL POSTS

3.1 GENERAL

Traffic signal posts shall comply with AS2339, Section 2 unless otherwise specified in the clauses of this section.

3.2 POST TYPE DESIGNATIONS

Traffic signal posts used in Victoria are shown in Table 3.1.

AS 2339 Designation (Clause 2.2)	DoT (Roads) Designation	Typical Use
P1	Type 3	Pedestrian push button
P2A	2A	Tertiary and secondary signal lanterns for pedestrian operated signal sites. Other locations where specified in individual contract specifications.
P2B	2B	Signal lanterns School and shopping centre ESLS without solar panel
P2C	2C	For placing other devices above signal lanterns where suitable.
P6	Not used	Not used
Not used	2D	Traffic signals – mini mast arms

Table 3.1 – Post Designations

3.3 MATERIAL AND CONSTRUCTION

Buried posts are not used in Victoria.

3.4 PHYSICAL ARRANGEMENT AND DIMENSIONS

3.4.1 Type 2A, 2B, and 3 Posts

Type 2A, 2B, and 3 traffic signal posts shall be in accordance with Standard Drawing TC-1100.

3.4.2 Type 2C Posts

Type 2C posts shall be in accordance with Types 2A and 2B posts in Standard Drawing TC-1100, with a height as specified in AS 2339, Clause 2.2.

3.4.3 Type 2D Posts

3.4.3.1 General

DoT (Roads) allows the use of a Type 2D post (also known as a mini mast arm) supplied in accordance with Standard Drawing TC-1103.

3.4.3.2 Lantern Mounting Lugs

3.4.3.2.1 Lantern mounting lugs shall be welded to the outreach arm of a Type 2D post and shall conform to the dimensions of the lugs detailed in Standard Drawing TC-1106.

3.4.3.2.2 The hole in all lantern mounting lugs shall be a clearance hole.

3.4.3.3 Baseplate

The Type 2D post baseplate shall be in accordance with the baseplate shown in Standard Drawing TC-1100 with a baseplate thickness in accordance with Standard Drawing TC-1103.

SECTION 4 – MAST ARMS

4.1 GENERAL

Mast arms shall comply with AS2339, Section 3 unless otherwise specified in the clauses of this section.

4.2 MAST ARM TYPE DESIGNATIONS

4.2.1 Mast arm type shall be designated as M1 in accordance with AS2339, Clause 3.2.

4.2.2 Type M2A, M2B, M3A, M3B and M3C (See AS2339, Clauses 3.2b, 3.2c, 3.2d, 3.2e, 3.2f) are not used in Victoria.

4.3 PHYSICAL ARRANGEMENT AND DIMENSIONS

4.3.1 General

The requirements for mast arms are detailed in Standard Drawing TC-1105.

4.3.2 Base Section

The mast arm base section shall be in accordance with Standard Drawing TC-1122.

4.3.3 Outreach Section

4.3.3.1 The mast arm outreach shall be either 2.5m, 3.7m, or 5.5m in length, in accordance with Standard Drawing TC-1124.

4.3.3.2 The mast arm outreach shall be clamped to the pole in accordance with Standard Drawing TC-1109.

4.3.3.3 To prevent the ingress of water into the overhead lantern mounting assembly, a weather cap shall be designed and installed in accordance with Standard Drawing TC-1108.

4.3.4 Provision for Attachment of Lanterns

4.3.4.1 Overhead Lantern Mounting Assembly

The overhead lantern mounting assembly and lantern support on the outreach arm shall be in accordance with Standard Drawing TC-1106.

4.3.4.2 Column Lantern Fixings

Lantern support on the column (base section) shall be in accordance with Standard Drawing TC-1113.

4.3.4.3 Lantern Mounting Lugs

All lantern mounting lugs shall be welded to the mast arm, and the hole in all lugs shall be a clearance hole.

4.3.5 Baseplate

The mast arm baseplate shall be in accordance with Standard Drawing TC-1107.

4.4 PROVISION FOR TRAFFIC SIGNAL CABLES

4.4.1 The mast arm traffic signal cable opening, traffic signal terminal panel access door, and traffic signal termination support plate shall be in accordance with Standard Drawing TC-1118.

4.4.2 The mast arm shall include drilled and tapped holes to facilitate cable entry from traffic signal lanterns, audio tactile drivers and other required hardware in accordance with Standard Drawings TC-1106 and TC-1110.

4.4.3 The mast arm shall be supplied with a suitable terminal assembly, selected from the DoT (Roads) ITS Type Approval List, subject to the approval of DoT (Roads).

4.5 EARTHING FACILITIES

Provision for earthing facilities for mast arms shall be in accordance with Standard Drawing TC-1118.

4.6 PROOF-ENGINEERING

4.6.1 Design of all mast arms covered by this specification shall be proof-engineered by an independent third-party appearing on the DoT (Roads) Register of prequalified contractors & consultants for Road and Bridge Design – Structures (Proof-Engineering).

4.6.2 Proof-engineering certification shall be submitted to DoT (Roads) in accordance with Appendix A2.

4.7 MINI MAST ARMS

Mini mast arms shall comply with Type 2D posts as per Section 3, and the outreach section shall be in accordance with Standard Drawing TC-1103.

SECTION 5 – JOINT-USE POLES

5.1 GENERAL

Joint-use poles shall comply with AS2339, Section 4 unless otherwise specified in the clauses of this section.

5.2 PHYSICAL ARRANGEMENT AND DIMENSIONS

5.2.1 General

The requirements for joint-use poles are detailed in Standard Drawing TC-1105.

5.2.2 Base Section

The joint-use pole base section shall be in accordance with Standard Drawing TC-1120.

5.2.3 Street Lighting Extension

The joint-use pole street lighting extension shall be in accordance with Clause 7.4.3 of this specification.

5.2.4 Provision for Attachment of Lanterns

The provision for the attachment of lanterns on the joint-use pole shall be in accordance with Clause 4.3.4.2 and Clause 4.3.4.3.

5.2.5 Baseplate

The joint-use pole baseplate shall be in accordance with Standard Drawing TC-1107.

5.3 PROVISION FOR CABLES

5.3.1 Provision for Traffic Signal Cables

5.3.1.1 The joint-use pole traffic signal cable opening, traffic signal terminal panel access door, and traffic signal termination support plate shall be in accordance with Standard Drawing TC-1118.

5.3.1.2 The joint-use pole shall incorporate drilled and tapped holes to facilitate cable entry from traffic signal lanterns, audio tactile drivers and other required hardware in accordance with Standard Drawing TC-1110.

5.3.1.3 The joint-use pole shall be supplied with a suitable terminal assembly, selected from the DoT (Roads) ITS Type Approval List, subject to the approval of DoT (Roads).

5.3.2 Provision for Street Lighting Cables

5.3.2.1 Provision for street lighting cables for joint-use poles shall be in accordance with Clause 7.5 of this specification.

5.4 EARTHING FACILITIES

Provision for earthing facilities for joint-use poles shall be in accordance with Clause 4.5.

5.5 PROOF-ENGINEERING

Proof-engineering of all joint-use poles covered by this specification shall be in accordance with Clause 4.6 of this specification.

SECTION 6 – JOINT-USE MAST ARMS

6.1 GENERAL

6.1.1 Joint-use mast arms shall comply with AS2339, Section 5 unless otherwise specified in the clauses of this section.

6.1.2 Joint-use mast arm type designations shall be in accordance with Clause 4.2.

6.2 PHYSICAL ARRANGEMENT AND DIMENSIONS

6.2.1 General

The requirements for joint-use mast arms are detailed in Standard Drawing TC-1105.

6.2.2 Base Section

The joint-use mast arm base section shall be in accordance with Standard Drawing TC-1121.

6.2.3 Outreach Section

The joint-use mast arm outreach shall be in accordance with Clause 4.3.3 of this specification.

6.2.4 Street Lighting Extension

The joint-use mast arm street lighting extension shall be in accordance with Clause 5.2.3 of this specification.

6.2.5 Provision for Attachment of Lanterns

The provision for attachment of lanterns on the joint-use mast arm shall be in accordance with Clause 4.3.4 of this specification.

6.2.6 Baseplate

The joint-use mast arm baseplate shall be in accordance with Standard Drawing TC-1107.

6.3 PROVISION FOR CABLES

6.3.1 Provision for Traffic Signal Cables

Provision for traffic signal cables for joint-use mast arms shall be in accordance with Clause 4.4 of this specification.

6.3.2 Provision for Street Lighting Cables

Provision for street lighting cables for joint-use mast arms shall be in accordance with Clause 7.5 of this specification.

6.4 EARTHING FACILITIES

Provision for earthing facilities for joint-use mast arms shall be in accordance with Clause 4.5.

6.5 PROOF-ENGINEERING

Proof-engineering of all joint-use mast arms covered by this specification shall be in accordance with Clause 4.6 of this specification.

SECTION 7 – RIGID STREET LIGHTING POLES

7.1 GENERAL

7.1.1 Rigid street-lighting poles shall be designed to withstand loadings due to wind and the mass of the pole, brackets, and lanterns as outlined by the requirements of this section.

7.1.2 Rigid street-lighting poles shall only be used in accordance with the requirements of TCG 006, Clause 2.13.5.

7.2 MATERIALS AND CONSTRUCTION

7.2.1 Rigid street-lighting poles shall be manufactured from steel and shall comply with the requirements in AS 4100, unless otherwise specified in the clauses of this section.

7.2.2 Exposed corners shall be machined or ground to a radius of 3mm minimum.

7.2.3 Nuts, bolts, and threaded holes shall be re-run after galvanising.

7.2.4 All extension joint(s) shall be screwed together using a self-drilling screw or otherwise fixed both sides of the pole extensions joints(s).

7.2.5 All internal corners, such as cut-outs for doors or slots, shall have a radius of five (5) times the plate thickness.

7.3 STRUCTURAL REQUIREMENTS

7.3.1 The structural requirements for rigid street lighting poles shall comply with the requirements for mast arm Type M1 as specified in AS 2339, Section 3.4, unless otherwise specified in this section.

7.3.2 Rigid street-lighting poles shall be designed to carry the following attachments:

(a) A Type 2 double street lighting bracket of 5m outreach designed and mounted in accordance with TCS 050.
(b) A luminaire of mass 20kg with a projected area of 0.25m^2 mounted at the end of each bracket in accordance with TCS 065.

7.4 PHYSICAL ARRANGEMENT AND DIMENSIONS

7.4.1 General

The requirements for rigid street lighting poles are detailed in Standard Drawing TC-1105.

7.4.2 Base Section

The rigid street lighting pole base section shall be in accordance with Standard Drawing TC-1068.

7.4.3 Street Lighting Extension

7.4.3.1 The rigid street lighting pole street lighting extension shall comply with Standard Drawing TC-1123.

7.4.3.2 The rigid street lighting pole spigot shall be in accordance with Standard Drawing TC-1111.

7.4.4 Baseplate

The rigid street lighting pole baseplate shall be in accordance with Standard Drawing TC-1107.

7.5 PROVISION FOR STREET LIGHTING CABLES

The rigid street lighting pole street lighting cable opening, street lighting access door, and street lighting mounting plate shall be in accordance with Standard Drawing TC-1118.

7.6 FINISH

The finish for rigid street lighting poles shall be in accordance with the requirements for mast arms in AS 2339, Clause 3.7.

7.7 EARTHING FACILITIES

Provision for earthing facilities for rigid street lighting poles shall be in accordance with Clause 4.5.

7.8 MARKINGS

Markings and instructions for rigid street lighting poles shall be in accordance with the requirements for mast arms in AS 2339, Clause 3.10.

7.9 PROOF-ENGINEERING

Proof-engineering of all rigid street lighting poles covered by this specification shall be in accordance with Clause 4.6 of this specification.

SECTION 8 – FLASHING PEDESTRIAN CROSSING POLES

8.1 GENERAL

8.1.1 Flashing pedestrian crossing poles shall comply with the clauses in this section.

8.1.2 Flashing pedestrian crossing poles shall be manufactured in accordance with AS 4100.

8.2 STRUCTURAL REQUIREMENTS

8.2.1 The structural requirements for flashing pedestrian crossing poles shall comply with the requirements for mast arm Type M1 as specified in AS 2339, Section 3.4, unless otherwise specified in this section.

8.2.2 Flashing pedestrian crossing poles shall be designed to carry the following attachments:

(c) Two flashing pedestrian crossing lanterns designed and mounted in accordance with AS 2144;
(d) A luminaire of mass 20kg with a projected area of 0.25m^2 mounted on the spigot at the end of the outreach section in accordance with Standard Drawing TC-1104; and
(e) Two Pedestrian Crossing signs designed and mounted in accordance with AS 1742.10, Section 6.

8.3 PHYSICAL ARRANGEMENT AND DIMENSIONS

8.3.1 General

Flashing pedestrian crossing poles shall be designed in accordance with Standard Drawing TC-1104.

8.3.2 Pole

8.3.2.1 The curved component of the pole (vertical to horizontal transition) shall conform to a circle centre of minimum radius 1.5m.

8.3.2.2 The minimum clearance from the pavement shall be 5.5m measured at a distance from 1.1m from the centre of the column and allowing a kerb height of 150mm.

8.3.3 Provision for Attachment of Lanterns

8.3.3.1 Two lugs (approach and departure sides) shall be welded to the pole at a height of 3.6m and shall be positioned in a manner where they shall be parallel to the roadway once the pole is installed in accordance with Standard Drawing TC-1104.

8.3.3.2 The design of all lantern mounting lugs shall conform to the dimensions of the lugs detailed in Standard Drawing TC-1113.

8.3.3.3 The hole in all lantern mounting lugs shall be a clearance hole.

8.3.4 Provision for Attachment of Street Lighting Luminaires

8.3.4.1 A spigot of 150mm length and 42mm diameter shall be welded to the outreach as per Standard Drawing TC-1061.

8.3.4.2 The spigot shall be angled from the outreach to ensure it is at a right angle to the kerb and perpendicular to the roadway direction of travel once the pole is installed in accordance with Standard Drawing TC-1104.

8.3.5 Baseplate

The baseplate shall be in accordance with Standard Drawing TC-1107 with the exception that the baseplate be suited to match the base section of the pole.

8.4 PROVISION FOR FLASHING LANTERN CABLES

8.4.1 Flashing pedestrian crossing pole cables shall be accessed within an opening of 350mm vertical length and 155mm width as detailed in Standard Drawing TC-1104.

8.4.2 The bottom of the opening shall be positioned at a minimum of 600mm from the baseplate.

8.4.3 A termination support panel shall be installed within this opening, and set back 100mm within, and shall be designed in a manner similar to the traffic signal termination support plate detailed in Standard Drawing TC-1118.

8.4.4 The opening shall be covered by a suitable access door similar to the traffic signal termination panel access door detailed in Standard Drawing TC-1118.

8.4.5 The vertical section of the post shall incorporate two drilled and tapped 16mm holes for 16mm hose terminators to facilitate cable entry from flashing pedestrian lanterns in accordance with Standard Drawing TC-1110.

8.4.6 The topmost drilled hole shall be installed at a height of 3550mm and facing away from the roadway.

8.5 FINISH

The finish for flashing pedestrian crossing poles shall be in accordance with the requirements for mast arms in AS 2339, Clause 3.7.

8.6 EARTHING FACILITIES

8.6.1 Poles shall include provision for earthing by means of M6 screws and washers as detailed in Standard Drawing TC-1118.

8.6.2 Insulated earthing cables shall be supplied as detailed in Standard Drawing TC-1118.

8.7 MARKINGS

Markings and instructions for flashing pedestrian crossing poles shall be in accordance with the requirements for mast arms in AS 2339, Clause 3.10.

8.8 PROOF-ENGINEERING

Proof-engineering of all flashing pedestrian crossing poles covered by this specification shall be in accordance with Clause 4.6 of this specification.

SECTION 9 – LANTERN MOUNTING BRACKETS

9.1 GENERAL

9.1.1 Lantern mounting brackets for traffic signal posts shall comply with AS2339, Section 6 unless otherwise specified in the clauses of this section.

9.1.2 Lantern mounting straps, for connecting brackets to lanterns, are supplied with traffic signal lanterns in accordance with TCS 038.

9.2 TYPES OF MOUNTING BRACKETS

9.2.1 In addition to the standard split shell mounting bracket, DoT (Roads) also uses a 'half' shell mounting bracket.

9.2.2 See details of mounting brackets used by DoT (Roads) in Table 9.1.

AS 2339 Designation	DoT (Roads) Designation	Description	Standard Drawing
Upper mounting bracket	Upper mounting bracket	Bracket for mounting strap and terminal assembly	TC-1101
Split shell mounting bracket	Lower mounting bracket (2-way)	Half of a split shell with a 'U-bolt' for attaching to pole.	TC-1101
Split shell mounting bracket	Lower mounting bracket (4-way)	Same as split shell mounting bracket	AS 2339, Figure 6.1
	Upper mounting assembly	Complete upper mounting bracket with terminal assembly and finial cap	

Table 9.1 – Mounting Bracket Types

9.3 BRACKET REQUIREMENTS

9.3.1 Upper mounting brackets shall be supplied with a terminal assembly, selected from the DoT (Roads) ITS Type Approval List, and finial cap (see Section 10) to form a complete upper mounting assembly.

9.3.2 Lower mounting brackets shall include the bolt retention mechanism as detailed in AS2339, Figure 6.2.

9.4 IMPACT TESTING OF LOCKING MECHANISM

The supplier shall provide evidence of satisfactory performance of the mounting bracket locking mechanism under impact testing (tested in accordance with AS 2339, Appendix D) in accordance with Appendix A2.

SECTION 10 – CABLE TERMINATION FACILITIES

10.1 GENERAL

Cable termination facilities shall comply with AS2339, Section 7 unless otherwise specified in the clauses of this section.

10.2 TERMINAL ASSEMBLIES

10.2.1 The terminal assembly for Type 2A, 2B, and 2C traffic signal posts shall be as detailed in Standard Drawings TC-1114 and TC-1129 as appropriate.

10.2.2 The terminal assembly for Type 2D posts shall be supplied as appropriate and shall be subject to the approval of DoT (Roads).

10.2.3 The terminal assembly for mast arms, joint-use poles, and joint-use mast arms shall be as detailed in Standard Drawing TC-1128.

SECTION 11 – INSTALLATION

11.1 GENERAL

11.1.1 All poles shall be installed in accordance with Standard Sections 730 and 731 as applicable.

11.1.2 The permittable criteria of use for rigid street lighting poles is outlined in TCG 006, Clause 2.13.5.

11.2 FOUNDATION ASSEMBLY

11.2.1 Foundations shall be in accordance with Standard Section 730.11 unless otherwise specified in the clauses of this section.

11.2.2 Bored piles and spread footings for rigid street lighting poles shall be in accordance with Standard Drawing TC-1201 and TC-1202 respectively with the exception that both foundation types be installed without traffic signal facilities. Both foundation types shall be subject to the approval of DoT (Roads).

11.2.3 Bored piles and spread footings for flashing pedestrian crossing poles shall be in accordance with Standard Drawings TC-1201 and TC-1202 respectively.

11.2.4 Use of spread footing for rigid street lighting poles and flashing pedestrian crossing poles shall be in accordance with Standard Section 730.11.

11.3 POLE ORIENTATION

11.3.1 The foundation shall be installed square with the curb.

11.3.2 The overall dimensions of mast arm and joint-use mast arm installations are detailed in Standard Drawing TC-1112.

11.4 LANTERN MOUNTING

Lantern mounting brackets shall be attached to Type 2 traffic signal posts and lanterns as detailed in Standard Drawing TC-1119.

11.5 PROVISION FOR ELECTRICAL REQUIREMENTS

11.5.1 Type 2D Posts (Mini Mast Arms)

11.5.1.1 A suitable junction box, subject to the approval of DoT (Roads), shall be installed on Type 2D posts (mini mast arms) as shown in Standard Drawing TC-1103.

11.5.1.2 The junction box shall be fitted with a suitable terminal assembly, selected from the DoT (Roads) ITS Type Approval List, subject to the approval of DoT (Roads).

11.5.2 Flashing Pedestrian Crossing Poles

11.5.2.1 The connections of flashing lantern cables to the traffic signal cables shall be made behind the access door of the pole.

11.5.2.2 The flasher shall be installed behind the access door of one of the poles.

11.6 PROVISION FOR STATIC SIGNAGE

Two Pedestrian Crossing signs shall be installed (facing approach and departure sides) on flashing pedestrian crossing poles in accordance with AS 1742.10, Section 6.

11.7 STREET LIGHTING EXTENSION SPIGOT CAP

The street lighting extension spigot of joint-use poles, joint-use mast arms, and rigid street lighting poles shall be protected by use of a spigot cap in accordance with Standard Drawing TC-1111 only in a situation where a pole will be installed without a lighting bracket.

APPENDIX A – REQUIREMENTS FOR TYPE APPROVAL

(Normative)

A1 GENERAL

A1.1 Mast arms, joint-use mast arms, joint-use poles, rigid street lighting poles, flashing pedestrian crossing poles, lantern mounting brackets, and terminal assemblies supplied to DoT (Roads) shall be subject to DoT (Roads) formal Type Approval process.

A1.2 To enable assessment for the purpose of granting Type Approval, the manufacturer / supplier is to submit a formal, written request for Type Approval to DoT (Roads), for each unique product supplied, accompanied by the following for each product:

(a) Documentation to demonstrate that the submitted product conforms to the requirements of DoT (Roads) Specification. This may be by means of submitting test results from approved and appropriately qualified independent testing organisations or providing the manufacturer's assurance that the product complies with each relevant paragraph of the specification, as appropriate.
(b) An outline drawing showing the general presentation and overall dimensions of the submitted product.
(c) Specific submissions detailed in the relevant section of this Appendix.
(d) Where requested by DoT, a complete working sample of the product for inspection purposes as detailed in Appendix A5.
(e) Documentation to demonstrate that the submitted product has been manufactured and supplied under an approved quality assurance system.

A2 TRAFFIC SIGNAL POSTS (TYPES 2A, 2B, 2C, AND 3)

For Type 2A, 2B, 2C, 2D and 3 traffic signal posts, the supplier shall submit the following:

- A report detailing conformance with each relevant clause of this specification.
- A report detailing conformance with each relevant clause of AS 2339.
- Detailed workshop drawings of each pole including cross-sections and dimensions, material details, weld details, finish details.

A3 MAST ARMS, JOINT USE MAST ARMS, JOINT USE POLES AND RIGID STREET LIGHITNG POLES

For mast arms, joint use mast arms, joint use poles and rigid street lighting poles, the supplier shall submit the following:

- A report detailing conformance with each relevant clause of this specification.
- A report detailing conformance with each relevant clause of AS 2339.
- Detailed workshop drawings of each pole including cross-sections and dimensions, material details, weld details, finish details.
- Proof engineering certification in accordance with section 4.6 of this specification.

A4 FLASHING PEDESTRIAN CROSSING POLES

For flashing pedestrian crossing poles, the supplier shall submit the following:

- A report detailing conformance with each relevant clause of this specification.
- A report detailing conformance with each relevant clause of AS 2339.
- Detailed workshop drawings of each pole including cross-sections and dimensions, material details, weld details, finish details.
- Proof engineering certification in accordance with section 8.8 of this specification.

A5 SAMPLE POLES

A5.1 A sample of the product shall be designed and manufactured in accordance with this specification and shall be representative of the products supplied to DoT (Roads).

A5.2 The supplier shall provide a DoT representative access to the manufactures premises for the purpose of viewing the sample pole.

A5.3 As an alternative to A5.2, DoT may accept photographic evidence demonstrating compliance of the sample pole.

A5.4 The supplier shall submit to DoT (Roads) evidence of any previous sample testing or equivalent satisfactory checks for the product design. If evidence to support satisfactory performance of previous sample testing or equivalent satisfactory performance is neither available, nor acceptable to DoT (Roads), a sample of the product shall be subject to compliance testing as detailed in the relevant section of this Appendix.

A6 MOUNTING BRACKETS

A6.1 General

For mounting brackets including two and four way lower mounting brackets, and upper mounting brackets, the supplier shall submit the following:

- A report detailing conformance with each relevant clause of this specification.
- A report detailing conformance with each relevant clause of AS 2339.
- Detailed workshop drawings of each pole including cross-sections and dimensions, material details, weld details, finish details.

A6.2 Testing

A6.2.1 The supplier shall submit a report detailing the results of the following tests:

(a) Bracket strength test (at 670 N) in accordance with AS 2339, Clause 6.2.2 and Appendix D.
(b) Impact test (at 6.3 kg from 300mm) of the mounting bracket, in accordance with AS 2339, Clause 6.2.2 and Appendix D.

(c) Torque test (at 250 Nm) of the lantern strap locking mechanism in accordance with AS 2339, Clause 6.2.3 (b) and Appendix D.

A6.2.2 The suppler shall submit a recording of all the above tests in standard speed .mp4 format.

A7 TERMINAL ASSEMBLIES

For terminal assemblies, the supplier shall submit the following:

- A report detailing conformance with Section 10 of this specification.
- A report detailing conformance with Section 7 of AS 2339.
- Detailed workshop drawings of each pole including cross-sections and dimensions, material details, weld details, finish details.
- Details of the terminal assembly including cross-sections and dimensions, material details, weld details, finish details.
- Detailed workshop drawings of each terminal assembly.
- Evidence that the assembly complies with the relevant standard drawing (TC1114, TC-1128 or TC-1129)
- Details of the manufacturer of the terminal assembly and evidence that it is approved by DoT.

A8 UPPER MOUNTING ASSEMBLIES

For upper mounting assemblies (see Clause 9.3.1), the supplier shall submit the following.

- Evidence of compliance of the bracket as detailed in Appendix A6.
- Evidence of compliance of the terminal assembly as detailed in Appendix A7.
- Evidence of compliance of the finial cap as detailed in AS 2339 Section 7.2.
- Detailed workshop drawings of the complete UMA.

A9 REVIEW PROCESS

A9.1 The information submitted by the supplier will be reviewed by DoT (Roads) to determine whether the fabricated pole will be Type Approved.

A9.2 The decision to grant a Certificate of Type Approval is at the sole discretion of DoT (Roads).

A9.3 DoT (Roads) may require additional information or testing to be carried out as part of its evaluation of the product.

A9.4 If the product is approved, a Certificate of Type Approval will be provided to the supplier. Until such time as this Certificate is issued, the product is not to be used for DoT (Roads) works.

A9.5 The manufacturer shall advise DoT (Roads) in writing of any changes in relation to the Type Approved product, DoT (Roads) reserves the right to review and approve / reject the design changes at DoT (Roads)' discretion.