



Tram Stop – Signage and Pavement Marking

Engineering Standard

Asset Management

CS2-DOC-003445

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1. Introduction

The primary function of signage and pavement marking is to provide passengers with safe, efficient and equitable signage that provides the require information at Adelaide Metropolitan Railway Network (AMPRN) tram stops.

2. Purpose

The purpose of this standard is to outline the fundamental requirements for the type, details and placement of tram stop precinct signage and pavement marking for platforms, primary access paths, mazes, cycle lanes, boarding patches and tram stop facilities on the AMPRN.

This standard must be read in conjunction with The Rail Commissioner's tram stop standards, relevant tram system standards and The Department's Master Specifications.

3. Scope

This standard applies to all new or upgraded signage and pavement markings.

Existing pedestrian access may be rated against this standard. In the context of this standard, 'rating' is the compliance review of pedestrian access that has been designed and installed prior to this standard being published.

4. Compliance

There are 3 types of provisions contained within this standard:

1. Requirements
2. Recommendations
3. Permissions

Requirements – it is mandatory to follow all requirements to claim full compliance with the standard. Requirements are identified within the text by the term '**must**'.

Recommendations – do not mention or exclude other possibilities but do offer the one that is preferred. Recommendations are identified within the text by the term '**should**'.

Recommendations recognise that there could be limitations to the universal application of the control, i.e. the identified control is not able to be applied or other controls are more appropriate or better.

Permissions – conveys consent by providing an allowable option. Permissions are identified within the text by the term '**may**'.

Deviation from a mandatory requirement noted within this standard is only permitted when an Engineering Waiver has been provided to and approved by Rail Asset Management.

5. Related Documents

Table 1 – Related Documents

DOCUMENT NAME	DOCUMENT NUMBER
Standard Drawing - Marginal Platform - Signage & Pavement Marking - General Layout	CS2-DRG-365081
Standard Drawing - Island Platform - Signage & Pavement Marking - General Layout	CS2-DRG-365083
Standard Drawing – Tram Stop – Platform Arrangements – General Layout	CS2-DRG-365079
Standard Drawing - Signage Schedule - Drawing Register	CS2-DRG-365085
Standard Drawing - Marginal Platform – Urban Standard Amenity Shelter - General Layout	CS2-DRG-365080

Standard Drawing - Island Platform – Urban Standard Amenity Shelter - General Layout	CS2-DRG-365082
Standard Drawing - Marginal Platform – Closed Corridor Standard Amenity Shelter - General Layout	CS2-DRG-365274
Standard Drawing - Island Platform – Closed Corridor Standard Amenity Shelter - General Layout	CS2-DRG-365275
Standard Drawing - TGSI & Pavement Marking - General Layout	CS2-DRG-365084
Standard Drawing – Tram Overpass – Signage – General Layout	CS2-DRG-365086
Standard Drawing – Tram System – Pedestrian Maze Arrangement Passive Control – Standard Details	TC2-DRG-201543
Standard Drawing – Tram System – Passive Pedestrian Crossing – Signage and Pavement Marking Layout	TC2-DRG-201544
Standard Drawing – Tram System – Passive Pedestrian Crossing – Single or Multiple Tracks – Signage and Pavement Marking Layout	TC2-DRG-201545
Standard Drawing – Tram System – Passive Pedestrian Crossing – Unidirectional Track – Signage and Pavement Marking Layout	TC2-DRG-201546
Public Transport Standard – Electrical Infrastructure	CS5-DOC-003511
Standard - Tram Stop Platforms - Tram System	CS2-DOC-003441
Standard - Tram Stop Bicycle Facilities	CS2-DOC-003448
SAPTA Wayfinding Rulebook v3.0 Rev E	

6. References

The following referenced documents are used by this standard for information only:

- AS 1428 Design for Access and Mobility
- AS 1734 Aluminum and Aluminum Alloys
- AS 1742 Manual for Uniform Traffic Control Devices
- AS 1743 Road Signs - Specifications
- AS 1906 Retroreflective Materials and Devices for Road Traffic Control Purposes
- AS 2293 Emergency Escape Lighting and Exit Signs for Buildings
- AS 2312.2 Guide to the Protection of Structural Steel against Atmospheric Corrosion by the use of Protective Coatings: Hot-dip Galvanising
- AS 2700 Colour Standards for General Purpose
- AS 2890 Parking Facilities
- AS 4049 Paints and Related Materials – Pavement Marking Materials
- AS 4586 Slip Resistant Classification of New Pedestrian Surface Materials
- AS 4663 Slip Resistant Measurement of Existing Pedestrian Surfaces
- AS 4680 Hot-dip Galvanised (Zinc) Coatings on Fabricated Ferrous Articles
- DPTI Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices Part 2 – Code of Technical Requirements.
- DPTI Operational Instruction Pub 5 Pavement Marking Manual (DPMM) (KNet#2244015)
- DPTI SA Standards for Workzone Traffic Management
- DPTI Master Specification Parts R45 –Materials for Pavement Marking, R46 – Application of Pavement Marking, R48 – Supply of Signs, and R49 – Sign Installation.
- HB 197 An Introductory Guide to the Slip Resistance of Pedestrian Surface Materials
- National Construction Code (NCC)
- Part RD-LM-C4 Sign Installation
- Part RD-LM-S2 Supply of Signs
- Road Traffic Act of 1961

“Road Related Areas” as defined by the Road Traffic Act includes:

1. a footpath or nature strip adjacent to a road;

2. an area that is not a public road and is open to the public and designated for use by cyclists; and
3. any area that is accessible to the public and where a vehicle may be driven, although these areas may not be a public road.

Road related areas within the station precinct may include, but are not limited to:

1. drop off & pick up
2. car parks;
3. cycle paths;
4. mazes which form part of the cycle path; and
5. some access paths and other paths.

Signage in areas that are considered road related areas must be in accordance with AS 1742

7. Traffic Control Devices

Traffic Control Devices are signs, signals, markings, structures or other devices to direct or warn motorists and the public. Traffic Control Devices are those referred to within AS 1742 and DPTI's Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices Part 2 – Code of Technical Requirements.

The signage and pavement marking drawings must comply with and must be produced in accordance with DPTI Operational Instruction Pub 5 Pavement Marking Manual (DPMM).

8. Design Requirements – Signage

8.1. Design Life

All signage elements must have a design life as follows:

Table 2 – Design life for elements

ELEMENT	DESIGN LIFE (YEARS)
Other sign support structures and other roadside furniture	30
Sign faces	10

8.2. Sign Sizing

The sizing of the signs must be in accordance with the relevant sign detail drawing which can be identified in CS2-DRG-365085 Standard Drawing - Signage Schedule - Drawing Register.

8.3. Sign Material Properties

8.3.1. General

Signs must:

1. comply with the Rail Commissioner's Wayfinding Rulebook
2. have an adhesive backed matt vinyl printed graphic sign face;
3. be free of cracks, tears and other surface blemishes;
4. have edges which are de-burred and smoothed with corners which are rounded and have a radius of 15 mm;
5. have an anti-graffiti application on sign faces either in the form of plastic overlay / film or an approved anti-graffiti liquid application to allow for easy removal of graffiti.

8.3.2. Sign Material

Signs must be manufactured from:

1. aluminium sheeting;
2. colorbond;
3. metal anodized plates;

4. polycarbonate;
5. steel frame; or
6. self-adhesive matte vinyl lettering

The material to be used for each sign must be in accordance with the relevant sign detail drawing, which can be identified in CS2-DRG-365085 Standard Drawing - Signage Schedule - Drawing Register.

8.3.3. Backing

The backing of signs that may create glare issues for tram drivers, motorists or pedestrians must be painted to AS 2700 – G61 “Dark Green”, with long life paint compatible with the sign material or covered with an adhesive cast vinyl material.

8.3.4. Stiffeners

Stiffeners must be continuous horizontal lengths of galvanized cold rolled steel channel with internal clamping ridges compatible with a metal strut mounted clamping system designed to withstand exposure to oils, chemicals and industrial cleaning compounds while minimizing noise and absorbing shock and vibrations.

The following signs are to be stiffened:

1. colorbond signs by fixing to a post;
2. aluminium signs with a plate thickness $t = 1.6$ mm and overall width > 1 200 mm;
3. aluminium signs with a plate thickness $t = 2.0$ mm and overall width > 1 500 mm; and
4. signs with a width to height ratio of 2.5 or greater.

The stiffening of the signs must be undertaken in accordance with Part RD-LM-S2 Supply of Signs.

8.3.5. Punched holes

Signs that require holes for mounting purposes must be cleanly punched during manufacture to fit the relevant fixings.

8.4. Sign Visibility

8.4.1. Illumination

Passenger Information Displays must meet lighting levels in accordance with CS5-DOC-003511 Public Transport Standard – Electrical Infrastructure.

All other signs must be lit sufficiently at all times for passengers, pedestrians and motorists to read the signs including:

1. by ambient light from adjacent stop precinct lighting – for signs directed at passengers and local pedestrians; or
2. by retro-reflectivity – for signs directed at motorists.

8.4.2. Retro-reflective Signs

Pedestrian maze way related must be retro-reflective.

No signs on the platform must be retro-reflective.

The retro-reflective signs must be “Class 400” and must conform with AS 1906.1 and AS 1742.2. The retro-reflective material must be applied to the sign blank in one continuous piece and in accordance with the retro-reflective sheeting manufacturer’s recommendations.

The reflectivity requirements for each sign must be in accordance with Part RD-LM-S2 Supply of Signs.

8.4.3. Contrast

The sign must be placed in a position where the surrounding (mounting) surface provides a minimum 30% luminance contrast to the sign.

Where this 30% minimum luminance contrast cannot be provided, and the sign cannot be relocated to an alternative site a 40 mm wide suitably contrasting border (>30% minimum luminance contrast to the sign) must be provided on the sign. This constitutes a non-standard sign.

8.5. Sign Installation Details

Signs must be installed in accordance with this clause and Part RD-LM-C4 Sign Installation.

8.5.1. Sign Fixing Mediums

Signs must typically be fixed to:

1. fences / railings;
2. light poles;
3. vertical flat surfaces including platform faces, canopy support columns, walls, overpass structures; or
4. individual posts.

There must be one tram stop identification sign made printed to translucent vinyl for lightbox application located on each platform.

8.5.2. Sign Mounting Heights

The sign mounting height is the distance from the underside of any signs to the finished floor level. Table 3 indicates the minimum mounting height according to the sign functions / locations.

Table 3 – Minimum Sign Mounting Heights

FUNCTION / LOCATION	MINIMUM HEIGHT (MM)
Flush against a vertical flat surface e.g. a wall, canopy support columns, overpass structure	1400 – 1600
Temporarily obscured e.g. behind regular crowds and flush against a vertical flat surface	2000
Areas accessible by pedestrians within public areas	2400
Areas non trafficable or not accessible by pedestrians (where site conditions dictate e.g., on an embankment)	1500

8.5.3. Posts

Sign posts must be circular hollow sections and must be in accordance with Part RD-LM-S2 Supply of Signs.

A post must not protrude above the top edge of a sign. Sign supports must be placed within 1° of vertical. The posts must be installed in accordance with Part RD-LM-C4 Sign Installation.

The post must have a minimum 30% luminance contrast to the surroundings in both daylight and night conditions to assist patrons with vision impairments.

8.5.4. Footings

Sign post footings must be designed in accordance with Part RD-LM-C4 Sign Installation. All sign posts footing must be recessed flushed with the surrounding surface and fixings must be countersunk.

8.5.5. Sign Fixings

Fixing mechanisms for the various fixing mediums must include:

Table 4 – Sign Fixings Matrix

FIXING MEDIUMS FIXING	FENCES / RAILINGS	LIGHT POLES	VERTICAL FLAT SURFACES	INDIVIDUAL POSTS	LETTERING
Vandal Resistant Screws	✓		✓		
Vandal Resistant Bolts / Tek Screws	✓		✓	✓	
Rivets	✓		✓	✓	
Stainless Steel Banding	✓	✓			
Channel Supports (Unistrut)	✓	✓		✓	
Silicone Adhesive			✓		
Acrylic Foam Tapes			✓		
Wire	Existing chain mesh fences ONLY				
Vinyl Lettering					✓

All steel fixing mechanisms except stainless steel must be galvanized to 125 g/m² in accordance with AS 4680.

The following requirements must apply for each fixing mechanism:

1. Bolts / Screws:
 - a) the thread of the bolt must protrude no less than 5 mm beyond the nut and no more than 12 mm beyond the nut;
 - b) the bolts or screws must be galvanized to a minimum of 125g/m² in accordance with AS 4680;
 - c) all screw and bolt fittings must be anti-vandal type to prevent tampering; and
 - d) self-tapping screws must be used where possible.
2. Rivets:

Fixing of rivets must be in accordance with Part RD-LM-S2 Supply of Signs.
3. Stainless Steel Banding:

Signs attached to street furniture by means of banding must not damage the support asset.
4. Channel Supports:

The spacing of signs supported by two channel supports must be 0.6 times the width of the sign between the supports.
5. Silicone Adhesive and Double Coated Acrylic Foam Tapes:

Signs which are to be attached to a wall or other suitably flat surface can be fixed using a quick drying industrial grade clear or translucent

silicone adhesive that is highly resistant to ultraviolet light and environmental elements.

Foam tapes must be double coated, medium firm, acrylic pressure sensitive adhesives that have high initial adhesion, good shear holding power and a demonstrated long-term holding strength.

Adhesives and tapes must also be capable of withstanding high or low ambient temperatures found in the Adelaide region.

6. Base Plates:

Base Plate assemblies which form part of the sign may be used to affix signposts directly onto platforms and other appropriate concrete surfaces.

The base plate must be designed to minimize both vertical and horizontal protrusions which may cause a trip hazard. The thread of the bolt must protrude no less than 4 mm and no more than 6 mm beyond the nut. The overall vertical height must be no more than 18 mm above the concrete footing.

The base plate must have a minimum 30% luminance contrast, similar to the requirement for the posts, vide Clause 8.5.3 Posts, to the surroundings in both daylight and night conditions to assist passengers with vision impairments.

9. Sign Designs and Placements

9.1. General

Signage to be provided at tram stop precincts is detailed in table 5 below:

Table 5 – Tram Stop Signage Requirements

SIGN TYPE	DESCRIPTION	EXAMPLE APPLICATIONS
Regulatory	Enforceable messages and Traffic Control Devices	“Stop”, “Give Way”, “No Entry”, Bicycle Lanes
Warning	Alerts to dangers, hazards and points of conflicts	“No Trespassing”, “Stand Behind the White Line”, “Do Not Cross the Tracks”, “Look Both Ways for Trams”
Guide	Assists navigation to accesses and facilities	Wayfinding signs identifying Primary Access Path and location of facilities including lifts and stairs
Information	Facility specific information	Stop identification, platform numbers, CCTV surveillance, Exit, toilet facility, lift, voice annunciator, Emergency Help Phone

9.2. Sign Locations

Signs must be provided to enable all user groups to safely navigate their way to and from the main platform access points via:

1. Tram stop parking facilities;
2. maze crossings; or
3. the local road and pedestrian network

Signposts must not be located within the primary access path, other paths or clear circulation zones, refer to CS2-DOC-003441 Standard - Tram Stop Platforms - Tram System.

The number of signs must be limited to the minimum number consistent with this specification. Installation of superfluous signs must be avoided.

9.2.1. Sight Lines

Signs must be located so that their message is clearly visible to all passengers and pedestrians for whom the message is intended. Signs must not be installed in a location where they will:

1. obstruct sight lines of tram drivers or the public;
 2. obstruct other traffic or road users (including pedestrians);
 3. obscure, or be obscured by, other signs;
 4. be obscured by vegetation or landscaping; or
- introduce or pose a road safety hazard to road users, including errant vehicles.

9.2.2. Non-Department Property

Where there is a requirement for a sign to be placed on land not in the ownership / management of The Department, written consent from the relevant landowner(s) for installation and subsequent access permissions (for maintenance) must be obtained.

9.3. Standard Signs

Standard signs for installation within tram stop precincts include:

1. standard tram stop signs as specified in Wayfinding Rulebook and relevant tram stop drawings; and
2. standard traffic control devices in accordance with AS 1742 and DPTI's Code of Technical Requirements for the Legal Use of Traffic Control Devices.

9.4. Non-Standard Signs

The design for any non-standard signs that are required or proposed must be approved by Rail Asset Management.

9.5. Sign Designs

Tram Stop signage must be provided in accordance with drawings CS2-DRG-365081, CS2-DRG-365083, CS2-DRG-365085, and CS2-DRG-365086

9.5.1. Stop Name Signage

The name of the stop must be depicted on the platform(s) as nominated in the Wayfinding Rulebook.

9.5.2. Lettering

Refer to the Wayfinding Rulebook for lettering specifications.

9.5.3. Line Colours

Table 6 – Service Route Brand Colours

RAIL LINE	COLOUR
Botanic Gardens	Yellow
Festival Plaza	Blue
Glenelg	Red
Public Transport Overall	Yellow and Black

For further details refer to the Wayfinding Rulebook.

9.5.4. Line Direction

Refer to Wayfinding Rulebook for line direction signage.

9.5.5. Tram Stop Identification Signage

For further details refer to Wayfinding Rulebook, CS2-DRG-365081, CS2-DRG-365083 and CS2-DRG-365085 for the below:

Secondary Node Identification:

- Large Sign - Stop/Platform: Amid710
- Roundel: Amid720
- Wall sign/shelter: Amid730
- City Tram Platform: Amid742

9.5.6. Platform Identification Signage

For further details refer to Wayfinding Rulebook, CS2-DRG-365081, CS2-DRG-365083 and CS2-DRG-365085 for the below:

Secondary Node Identification:

- Roundel: Amid720
- Wall sign/shelter: Amid730

9.5.7. Emergency Exit Signage

Emergency Exit signs must be provided in accordance with AS 2293, the National Construction Code (NCC) and in accordance with drawing CS2-DRG-365085 Standard Drawing - Signage Schedule - Drawing Register.

Enhanced Amenity stops which have a full (enclosed) shelter structure and have individual or limited points of access along the platform must have Emergency Exit Signage (including battery backup) provided on the platform(s).

Open platforms that do not have individual points of access do not require Emergency Exit signage.

Emergency Exit signage for an overpass must direct passengers to the stairs, ramps of any other alternative designates emergency access point. The signs must not direct passengers to the lifts and must advise not to use lifts during emergency.

9.5.8. Facility Signage

Information signage must be provided to inform passengers of the facilities at stops including lifts, stairs, toilet facilities, voice annunciators and emergency help phones in accordance with drawing CS2-DRG-365085 Standard Drawing - Signage Schedule - Drawing Register.

For further details refer to:

- Wayfinding Rulebook
- CS2-DRG-365081
- CS2-DRG-365083
- CS2-DRG-365085, and
- CS2-DRG-365086 for the below:
 - Facility identification:
 - Toilets: Amid610
 - Lifts: Amid620
 - Information: Amid630

Where these facilities and other facilities such as bicycle parking facilities are not clearly visible to passengers from the primary access path and/or platform, guide signs (with arrows) may be required.

These guide and information signs must also include Braille for people with vision impairment.

9.5.9. Bicycle Facilities

The design must provide signage for bicycle facilities including cycle lanes / paths in accordance with AS 1742.9, DPTI Operational Instruction 9.2 and CS2-DOC-003448 Standard - Tram Stop Bicycle Facilities.

9.5.10. Railway Level Crossings

Railway Level crossing signage must be provided in accordance with DPTI Pavement and Marking Manual and AS 1742.7: Manual of Uniform Traffic Control Devices – Railway Crossings.

10. Design Requirements – Pavement Marking

10.1. General

Pavement Markings and paint must be provided in accordance with the DPMM Clause 2.1.2 Messages & Symbols and 2.1.7 Transverse lines, AS 1742, AS 2890.1 and AS 4049.3 where no other information is available.

Refer to Clause 7 “Traffic Control Devices” of this standard for details on Traffic Control Devices and Traffic Control Layout Standards for pavement markings.

10.2. Application Details

10.2.1. Paint Type

All pavement marking paint in the tram stop precinct must be self-cleaning waterborne road marking paint, applied in accordance with AS 4049.3. Other types of paint must be approved by Rail Asset Management.

The pavement marking paint must comply with the non-slip characteristics in accordance with AS 1428, AS 4586 and HB 197. All surface materials must be classified as “R10” or “R11” resistant, as defined in Table 5 of AS 4586. This must be read in conjunction with HB 197.

The application of pavement marking paint must be in accordance with Part RD-LM-S1 Materials for Pavement Marking and Part RD-LM-C1 Application of Pavement Marking.

10.2.2. Colour and Luminance

The colour of the paint must comply with Table 7

Table 7 – Paint Colour and Luminance

USE	COLOUR	AS 2700S REFERENCE	LUMINANCE FACTOR (%) *
Paint	White	N14 “White”	> 80
Paint	Yellow	Y14 “Golden Yellow”	45 – 50
Paint	Blue	B21 “Ultramarine”	12 – 15

* Luminance factor when measured in accordance with AS 4049.3

10.3. Pavement Marking Locations

Pavement markings must be provided to delineate and identify the following:

1. platform edge hazard line;
2. platform ‘wait behind’ line;
3. accessible boarding indicator patch;

4. maze 'wait behind' lines;
5. maze yellow indicator lines;
6. car parking spaces;
7. disability parking;
8. motor cycle spaces;
9. restricted access / parking areas;
10. pedestrian kerb ramp access (off street);
11. dedicated bus lanes;
12. cycle lanes; and
13. yellow box markings at level crossings.

10.4. Provision of Pavement Marking

The minimum pavement marking that is required to be installed prior to any area in the tram stop precinct being opened to the public must be in accordance with Station Master Spec RW-STS-D1.

10.4.1. Platforms

The platform edge hazard lines and accessible boarding indicator patch must be provided in accordance with the DPMM and Drawings CS2-DRG-365079, CS2-DRG-365080, CS2-DRG-365082 and CS2-DRG-365084.

The accessible boarding indicator patch must be painted on the platform surface immediately out from the designated accessible waiting area, under the platform shelter and directly behind the white Platform 'stand behind' line. The wheelchair symbol must face the direction of the oncoming tram and must be in accordance with DPMM.

10.4.2. Mazes

Maze 'stand behind' lines and yellow indicator lines must be provided in accordance with the following drawings:

- TC2-DRG-201543 Standard Drawing – Tram System – Pedestrian Maze Arrangement Passive Control – Standard Details;
- TC2-DRG-201544 Standard Drawing – Tram System – Passive Pedestrian Crossing – Signage and Pavement Marking Layout;
- TC2-DRG-201545 Standard Drawing – Tram System – Passive Pedestrian Crossing – Single or Multiple Tracks – Signage and Pavement Marking Layout; and
- TC2-DRG-201546 Standard Drawing – Tram System – Passive Pedestrian Crossing – Unidirectional Track – Signage and Pavement Marking Layout.

10.4.3. Parking

Car parking and motorcycle spaces must be marked using white continuous lines 100 mm wide to both long sides of the space in accordance with AS 2890.1 and DPMM.

The disability car parking spaces must be marked using yellow continuous lines 100 mm wide to all side of the space excepting any side delineated by a kerb, barrier or wall and have a painted one metre blue square with the white international symbol of access located within the designated bay as per DPMM and AS 2890.6.

The shared zone adjacent to the disability car parking, where there are more than one accessible parks, must be marked in yellow diagonals in

accordance with DPMM and must have quartz applied in accordance with Part RD-LM-S1 Materials for Pavement Marking.

The pedestrian kerb ramp access areas must have quartz applied in accordance with Part RD-LM-S1 Materials for Pavement Marking.

Non parking areas throughout the stop must be denoted by a continuous yellow no-stopping line which must be 100 mm wide and placed not less than 150 mm from the kerb face and parallel to the edge of the roadway.

10.4.4. Bicycle Facilities

Where cycle lanes are provided they must be clearly marked in accordance with DPTI Operational Instruction 9.2 – Bicycle Lane Signage.

10.4.5. Railway Level Crossings

Railway Level Crossing pavement marking must be provided in accordance with DPTI Pavement Marking Manual and AS 1742.7.

Yellow box marking at a road / rail level crossing must only be provided when warranted in accordance with the DPMM and AS 1742.7.

When required the yellow box markings must be marked in accordance with the DPMM. When repainting existing box markings the existing lines must be repainted.

10.4.6. Other Pavement Markings

Where other road markings are to be included in a tram stop design, they must be specified and designed in accordance with the DPMM and AS 1742.