Government of South Australia
Department for Infrastructure and Transport

Station Shelters – Train System

Engineering Standard

Rail Commissioner

AR-PW-PM-SPE-00129005 (D064)

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1. Introduction

The Department of Infrastructure and Transport owns the Adelaide Metropolitan Passenger Rail Network (AMPRN) currently operated and maintained under the Rail Accreditation of third party. There are approximately 89 train stations serving the AMPRN.

The primary function of a shelter in a station precinct is to provide cover and protection for passengers while being safe for all users in all weather and under all light conditions. The shelter shall provide equity of access and accommodate all users.

2. Purpose

The purpose of this standard is to specify the requirements for new shelters at station precincts. This standard shall be read in conjunction with the remainder of the DIT Station Standards for the Train System, as listed in DIT Master Specification Part RW-STS-D1 Stations.

3. Scope

This standard applies to all new DIT shelters on the AMPRN. Existing shelters may be rated against this standard.

4. Related Documents

DOCUMENT NAME	DOCUMENT NUMBER
25 kV Overhead Wiring System Pantograph Electrical and Mechanical Clearance	TP1-DRG-000022
Electrical and Mechanical Clearances for the 25kV Electrified Train Network – Engineering Standard (KNet #8597339)	TP1-DOC-000389
Platform Clearance - 1600 mm Gauge Track	301-A3-2010-2389
Signal Sighting	PTS-MS-10-SG-STD-00000033
STA Allowable Infringements Minimum Structures – 1600 mm Gauge	301-A2-86-2240
Standard Drawing Signage Schedule Drawing Register	CS1-DRG-361816
Standard Drawing Station Platform General Layout	CS1-DRG-361819
Standard Drawing Standard Amenity Shelter for Marginal Platform General Layout	CS1-DRG-361820
Standard Drawing Standard Amenity Shelter for Island Platform General Layout	CS1-DRG-361821
Station Precinct Concept – TGSIs and Pavement Marking Layout	S7071 sheet 21
Station Precinct Concept – Shelter Furniture	S7071 sheet 22
Station Precinct Concept – Bus Shelter	S7071 sheet 23

5. References

- AS/NZS 1170 Structural Design Actions
- AS 1428.1-2021 Design for access and mobility – General requirements for access – New building work
- AS 1428.2-1992 Design for access and mobility – Enhanced and additional requirements – Buildings and facilities
- AS 1580 Paints and Related Materials
- AS 1627 Metal Finishing – Preparation and pre-treatment of Surfaces
- AS/NZS 1891 Industrial Fall-arrest Systems and Devices

- AS/NZS 2312.2 Guide to the Protection of Structural Steel against Atmospheric Corrosion by the use of Protective Coatings Part 2 Galvanising
- AS 2700 Colour Standards for General Purpose
- AS/NZS 3500.3 Plumbing and Drainage – Stormwater drainage
- AS 3894 Site Testing of Protective Coatings
- AS/NZS 4680 Hot-dip Galvanised (zinc) Coatings on Fabricated Ferrous Articles
- AUSTROADS Guide to Traffic Management
- AUSTROADS Guide to Road Design
- AR-EL-STD-0102 Guidelines for the Protective Provisions related to Electrical Safety and Earthing for the Adelaide Metro Electrified Rail Network
- HB 295.3.21 Product Safety Framework – Gaps and openings – Finger Entrapment

Legislative Requirements

- *Rail Safety National Law Act (South Australia) 2012*
- *Disability Discrimination Act 1992 (DDA)*
- *Disability Standards for Accessible Public Transport 2002 (DSAPT)*

6. Acronyms

ACRONYM	FULL NAME
AMPRN	Adelaide Metropolitan Passenger Rail Network
CHS	Circular Hollow Sections
CPTED	Crime Prevention Through Environmental Design
DIT	Department of Infrastructure and Transport
DSAPT	Disability Standards for Accessible Public Transport
PID	Passenger Information Display

7. Design Requirements

7.1. Design Life

Structural elements of the shelter shall be constructed of materials that have a 50 year design life with minimal maintenance and easy cleaning. All elements of the shelters shall be robust and durable. Weather screens shall have a minimum design life of 25 years.

7.2. General

The shelter shall provide passengers with shelter from the elements including sun, wind and rain at all times. Given that wet weather can increase the risks of slips, trips and falls, adequate protection from the elements will mitigate some of these risks.

Shelters shall be designed to encourage natural light entry and enhance spatial quality. Appropriate material selection can help increase natural light entry. To improve spatial quality, passengers shall be able to move through the space with purpose and there shall be good visibility around the station precinct.

The shelter shall minimise crime and vandalism by facilitating Crime Prevention Through Environmental Design (CPTED) principles such as passive surveillance, natural access control and territorial reinforcement. Clear sightlines and good visibility

facilitates territorial reinforcement and passive surveillance. Territorial reinforcement supports psychological ownership of the station and the station precinct in order to increase the vigilance of patrons.

The shelter shall minimise climbing opportunities, for example by recessing shelter columns so that they are difficult to climb. Graffiti opportunities shall be minimised through material choice and coating, and surfaces shall be coated with an approved anti-graffiti coating without compromising on luminance contrast requirements.

General requirements for all shelters are:

1. shall be compliant with AR-EL-STD-0102 Guidelines for the Protective Provisions related to Electrical Safety and Earthing for the Adelaide Metro Electrified Rail Network;
2. shall be designed in modular / sectional manner to allow cost effective extension in the future;
3. designed for and provided with appropriate fall-arrest points for maintenance in accordance with AS/NZS 1891 and Safework SA; and
4. ladder anchor points shall be fitted at both ends of the station shelter.

7.3. Shelter Styles at Standard Amenity Stations

Shelters must comply with minimum requirements specified in CS1-DRG-361820 Standard Drawing Standard Amenity Shelter for Marginal Platform General Layout and CS1-DRG-361821 Standard Drawing Standard Amenity Shelter for Island Platform General Layout.

7.4. Shelter Styles at Enhanced Amenity Stations

Enhanced Amenity Stations are larger interchanges or terminus stations and have a number of enhanced facilities to enable higher patronage and longer journeys. The new shelter shall:

1. consist of a full length structure spanning both platforms with covered core waiting areas;
2. use high quality, robust and durable materials that promote civic character for the station precinct and address the local environment and context;
3. allow for easy installation, repair, replacement and incremental extension of the roof covering as required in the future;
4. allow access and maintenance in a safe environment for both workers and passengers;
5. be designed to limit climbing opportunities and prevent roosting opportunities for vermin;
6. include fully integrated signage;
7. use materials and finishes that do not interfere with way finding and decision-making; and
8. incorporate finishes and details that allow easy cleaning as well as not collecting dust and dirt in inaccessible areas.

Proposed alternative shelter designs shall be approved by the Unit Manager Track & Civil Engineering.

7.5. Shelter Structure

The shelter structure shall comply with sight line requirements and shall not obstruct signal sighting, in accordance with PTS-MS-10-SG-STD-00000033 Signal Sighting. Shelters shall be positioned on the platform so as to optimise the useable space on the platform. For marginal platforms, the shelter should be located as close to the back of the platform as possible.

7.5.1. Shelter Structure at Standard Amenity Station

The shelter structure shall be modular in design to allow for expansion should future demand dictate. The shelter structure must comply with minimum measurements specified in CS1-DRG-361820 Standard Drawing Standard Amenity Shelter for Marginal Platform General Layout and CS1-DRG-361821 Standard Drawing Standard Amenity Shelter for Island Platform General Layout.

7.5.2. Structure at Enhanced Amenity Station

Shelters shall:

1. provide weather protection to the physical structure zone of the platform as a minimum;
2. locate columns centrally on island platforms and in the physical structure zones for side platforms;
3. integrate shelter canopy with all operational equipment (integrated system); and
4. consider adjacent properties and their views onto roof elements of the shelter, in terms of colour and glare.

All structural elements shall be sealed against water ingress.

All steelwork shall be hot dip galvanised. Galvanised coatings shall be either unpainted or covered in a suitably weatherproof coating.

7.5.3. Station with Integrated Bus / Rail Interchanges

In accordance with AR-PW-PM-SPE-00129011 Station Bus Interchanges, the bus interchange shelter structure shall extend from and be continuous from the rail platform shelter structure and cater for the number of bus stops provided.

The roof of the bus shelter shall match the length of the roof of the station shelter.

7.5.4. Station with Separate Bus Interchanges

In accordance with AR-PW-PM-SPE-00129011 Station Bus Interchanges, the style of shelter shall reflect the design of the nearby station and wider community. The proposed shelter design shall be in accordance with CPTED principles to minimise risk of vandalism and other anti-social behaviours.

7.6. Shelter Roof

The roof shelter shall be designed for the following loading:

1. category “R1” loading in accordance with AS 1170.1, Clause 3.5.1; and
2. any other requirements of AS 1170.

Roof sheeting shall be suitably waterproof so that it protects users from the elements.

7.6.1. Shelter Roof at Standard Amenity Station

The roof coverage shall be for the entire shelter structure, in accordance with CS1-DRG-361820 Standard Drawing Standard Amenity Shelter for Marginal Platform General Layout and CS1-DRG-361821 Standard Drawing Standard Amenity Shelter for Island Platform General Layout.

The shelter shall be positioned over/above the boarding indicator patches to provide cover. Island platforms or marginal platforms with bi-directional track will have two boarding indicator patches and the minimum shelter specified in CS1-DRG-361820 and CS1-DRG-361821 will not provide adequate protection to both patches. In this situation, a minimum of two separate shelters with a combined roof span equivalent or greater than the minimum shelter in CS1-DRG-361820 and CS1-DRG-361821 shall be provided.

For marginal shelters that have an access path immediately behind the shelter structure, the roof coverage shall be extended to cover the footpath. This will provide greater shelter to passengers both waiting at the shelter and travelling through the station precinct. See CS1-DRG-361820 Standard Drawing Standard Amenity Shelter for Marginal Platform General Layout ‘S2’ Shelter Section.

7.6.2. Shelter Roof at Enhanced Amenity Station

A number of factors will influence the design of the roof structure and choice of waterproof cladding, including location, size of spans and aesthetics.

The up track platform shelter roof shall cover an equal or higher percentage of the platform than the down track shelter roof due to typical boarding / alighting patterns at an Enhanced Amenity Station.

The location of the shelter roof on the down track platform shall be entirely adjacent to a section of the shelter roof on the up track platform and shall consider typical alighting patterns and platform access.

For a marginal Enhanced Amenity Station, the roof should cover minimum 60% of the platform on the up track and minimum 30% of the platform on the down track.

7.7. Clearances

All clearances shall comply with the requirements of AR-EL-STD-0102 Guidelines for the Protective Provisions related to Electrical Safety and Earthing for the Adelaide Metro Electrified Rail Network.

The roof of the shelter shall be designed to optimize cover, between the structural clearance of the rolling stock and the clearance of the pantograph. See 301-A2-86-2239 STA Allowable Infringements Minimum Structures 1 600 mm Gauge and TP1-DRG-000022 25kV Overhead Wiring System Pantograph Electrical and Mechanical Clearance.

7.7.1. Vertical Clearances

All parts of the station shelter shall be designed with minimum clear headway 2 700 mm from the platform to minimise climbing opportunities. The shelter

roof shall be designed to accommodate Passenger Information Displays (PIDs) and remain above this minimum height.

7.7.2. Horizontal Clearances

All station shelters shall have minimum horizontal clearance from track centre as shown in 301-A2-86-2239 STA Allowable Infringements Minimum Structures 1 600 mm Gauge.

For any station shelter integrated with a bus interchange, the horizontal clearance from the vertical kerb face (of the kerb and gutter) of the bus interchange to shelter structure and roof shall be 500 mm.

7.8. Roof Drainage

The shelter roof shall have a gutter system to collect and direct rainwater into a drainage system. Stormwater shall not be allowed to drain onto the track. Where possible, rain water runoff should not be allowed to drain onto the platform as this creates a slip hazard.

Drainage systems shall be designed to prevent leakage into or onto the shelter structure. Drainage shall fall into a DIT approved outlet and shall be in accordance with AS/NZS 3500.3 .

All finishes shall be unpainted hot dip galvanized steel with bolted connections.

7.8.1. Gutters

Roof gutters shall be custom designed fabricated steel plate section. Gutters shall be designed and installed to:

1. drain to downpipes;
2. support point loads from ladder support of 100 kg; and
3. support a minimum hanging point load of 100 kg.

7.8.2. Downpipes

Downpipes shall be hot rolled CHS steel section with 3 mm minimum wall thickness, aligned with structure columns and not climbable.

Flying downpipes shall be supported at regular centres from an immediately adjacent structure. Flying downpipes shall be designed to support:

1. point loads from ladder support of 100 kg; and
2. a minimum hanging load of 100 kg.

7.9. Weather Screens

Weather screens shall:

1. be fixed to the shelter frames and spot welded at all joint and connection points;
2. have rivets that are similar metals to that of the weather screen so as to prevent electrolysis;
3. incorporate suitable edge protection from sharp edges;
4. be protected from weathering and vandalism with a suitable coating; and

5. have sufficient transparency to enable passive surveillance and meet CPTED principles with a maximum free area of 50%.

Weather screens that are a dark colour may have perforations with free area as little as 30%, to enable better protection.

For marginal platforms, weather screens may be used instead of fencing for the length of the shelter but the weather screens shall meet the design loadings equivalent to fence design loads. Refer AR-PW-PM-SPE-00129009 Fencing. For island platforms or integrated bus / rail platforms, weather screens shall be staggered in order to allow passengers to move in between platforms.

Weather screens shall be minimum dimensions shown in CS1-DRG-361820 Standard Drawing Standard Amenity Shelter for Marginal Platform General Layout and CS1-DRG-361821 Standard Drawing Standard Amenity Shelter for Island Platform General Layout. Prevailing winds and weather conditions for each site shall be considered, and this shall inform the design of the weather screen orientation in order to best protect customers at the station from inclement weather.

7.10. Furniture

Furniture includes seats, lean rails and litter bins to be located in the station precinct.

7.10.1. Seats and Lean Rails

Seats and lean rails shall be fixed directly to the platform deck and shall not be fixed to the shelter.

Refer to AR-PW-PM-SPE-00129007 Station Furniture for seat and lean rails design requirements.

7.10.2. Litter Bins

For Standard Amenity Stations, litter bins shall not be placed under the shelter area.

Refer to AR-PW-PM-SPE-00129007 Station Furniture for litter bin design requirements.

7.11. Integrated System

All shelters shall have the following system elements integrated into the shelter structure:

7.11.1. Shelter Lighting

The lighting shall be fully integrated into shelters and fixed to the structure to minimise vandalism opportunities and unauthorised access. To reduce the reliance on artificial lighting, the shelter shall be designed so that natural light is sufficient during the day. Artificial light shall be specified to have high efficacy and minimal maintenance.

The design for the shelter lighting shall allow for easy maintenance and shall be in accordance with CS5-DOC-003511 Electrical Infrastructure Engineering - Design.

7.11.2. CCTV

CCTV shall be integrated into the shelter and shall be provided in accordance with PI5-DOC-003517 Public Transport Infrastructure Security Systems – Engineering Specification.

7.11.3. Public Address System

A PA system shall be integrated into the structure and shall be provided in accordance with AR-PW-PM-SPE-00129016 Passenger Information Systems.

7.11.4. Voice Annunciator and Hearing Impaired Induction Loop

The Voice Annunciator (VA) shall be integrated into the shelter columns and the columns shall be painted to AS 2700 – Y14 “Golden Yellow”, in accordance with Master Specification ST-SS-S2 Protective Treatment of Structural Steelwork, to ensure clear identification by passengers.

An access hatch with a flush fitting cover shall be provided at the base of the column.

The VA and Hearing Impaired Induction Loop (HIIL) design shall be provided in accordance with AR-PW-PM-SPE-00129016 Passenger Information Systems.

7.11.5. Passenger Information Display LCD Screens

The PIDs are 42” LCD Display Screens housed in an integrated protective anti-vandal casing. A typical configuration comprises two LCD displays mounted in a back to back configuration and supported either by the shelter structure or an independent pole.

The number of screens to be installed at stations shall be in accordance with table 7.11.5.

Table 8.11.5 – Details of LCD Display Screens

TYPE OF STATION	TYPE OF PLATFORM	NUMBER OF SCREENS PER PLATFORM	LOCATION
Standard Amenity	Marginal	2	One end of shelter
	Island	4	Each end of shelter
Enhanced Amenity	Marginal	2	Centrally
	Island	4	Centrally

A minimum clearance of 2 700 mm from the finished platform level to the underside of the anti-vandal casing shall be maintained.

The PIDs shall be provided in accordance with AR-PW-PM-SPE-00129016 Passenger Information Systems.

7.11.6. Emergency Help Phone

A wall mounted Emergency Help Phone shall be integrated into the shelter column and the column shall be painted to AS 2700 – B12 “Royal Blue to ensure clear identification by passengers.

The Emergency Help Phone shall be provided in accordance with PI5-DOC-003517 Public Transport Infrastructure Security Systems – Engineering Specification

7.11.7. General Purpose Outlet

General purpose outlets shall be provided in accordance with CS5-DOC-003511 Electrical Infrastructure Engineering – Design..

7.12. Allocated Spaces

A minimum of two allocated spaces of 5 % of the waiting area shall be provided under the shelter in accordance with DSAPT. This waiting area shall be located as close as possible to the accessible boarding indicator patch as shown on CS1-DRG-361819, CS1-DRG-361820, CS1-DRG-361821, Drawing No. S7071, sheet 21.

The allocated space shall have no pavement marking, however its location shall be indicated on the drawings.

7.13. Signage and Pavement Marking

Signage and Pavement Marking shall be provided in accordance with AR-PW-PM-SPE-00129010 Signage and Pavement Marking.

7.14. Coating System of Shelter Columns

The galvanised shelter columns housing the VA and Emergency Help Phone shall be coated using a two-pack epoxy primer with two-pack polyurethane finish. The finish shall be matte or low gloss.

7.14.1. Surface Preparation

All surfaces shall be brush blasted in accordance with AS 4680, Appendix I. The abrasive shall be clean, with a maximum level of total dissolved salt of 0.01%, when determined in accordance with TP765. After brush blasting, all surfaces shall be cleaned using heavy duty detergent in accordance with the manufacturer's instructions. Certification shall be provided from an independent certifier that the blast cleaning meets the requirements of AS 4680, Appendix I.

7.14.2. Colour

The applied dry film thickness shall be as specified by the coating manufacturer. Dry film thickness shall be measured in accordance with TP913. The procedure used shall be as for blast cleaned steel except that target film thicknesses shall be in addition to the average thickness of galvanising measured.

The finish coat specified shall be manufactured using colour fast pigments, and shall provide total coverage of an opacity display chart, as described in AS 1580.203.1 at the manufacturers recommended application rate.

7.14.3. Site Repair of Damaged Galvanising/ Paint

Damaged areas where the galvanising is affected shall be repaired as follows:

1. Power tool clean all bare metal and weld areas to a minimum of Class 2 finish, in accordance with AS 1627.2.
2. Apply two coats of 2-pack epoxy zinc rich primer as approved to APAS-2916 to all bare metal areas.

Damaged areas of paint where the galvanising is unaffected, or galvanising has been repaired, shall be repaired as follows:

1. Feather back all edges by hand or mechanical sanding using fine abrasive and remove all loose particles;
2. Apply one full coat of primer with a minimum overlap of 25 mm to sound paint;
3. Apply one full coat of intermediate coat where specified, with a minimum overlap of 25 mm to sound paint; and
4. Apply finish coat(s) ensuring that all primed and intermediate coated areas are covered.

Daily reports of production of galvanised steel shall be maintained using the format as described in AS 3894.12.

7.15. Conduits, Wiring and Pit Access Covers

All conduits shall be concealed from view within the shelter framework and shelter name sign, refer to CS5-DOC-003511 Electrical Infrastructure Engineering – Design, AR-PW-PM-SPE-00129016 Passenger Information Systems and PI5-DOC-003517 Public Transport Infrastructure Security Systems Engineering Specification to co-ordinate the conduiting requirements.

7.16. Vermin Proofing

Shelters and furniture shall be designed to prevent opportunities for vermin to nest in the station precinct. Appropriate measures shall be taken to prevent vermin infestation.

7.17. Public Art

Public art is not required at the stations, but may be included to improve ambience and give the site a sense of identity. Public art should be developed to meet the needs of the location; to minimise vandalism; and to meet general community expectations. Any public art included at the station shall be appropriately durable and weatherproof.

8. Materials, Fixtures and Finishes

The following table details the DIT preferred materials, fixtures and finishes for shelters in the station precinct. Materials and finishes not listed in the table can still be used in station shelter designs provided they comply with the following requirements:

1. provide high quality and high durability with a minimum design life of 50 years;
2. minimise discolouration, mould growth and general deterioration as a result of weathering and UV light;
3. enhance visual surveillance and spatial quality by encouraging natural light entry;
4. eliminate hazards to passengers such as slips, trips and falls, rips and cuts;

5. support CPTED principles and enhance passive surveillance and perceived passenger and public levels of safety;
6. be easily maintained and cleaned without disrupting operations or material performance;
7. be independent of adjacent materials and components so that spot repairs can take place in the case of minor damage and can be easily replaced.;
8. discourage and provide a high level of resistance to vandalism through appropriate material selection and approved anti-graffiti coatings;
9. minimize surfaces and ledges that collect dirt, dust and soiling;
10. withstand damage from vibration generated by trains;
11. satisfy and maintain accessibility requirements for workers and passengers;
12. achieve sustainability requirements and objectives; and,
13. be coordinated with public art, signage and any of DIT's branding elements.

All metal finishes shall have no sharp edges, be de-burred, smooth and shall provide a minimum radius of 3mm. Use of potentially reflective materials in areas that could cause glare for train drivers shall be avoided.

Table 8. Shelter Building Fabric

ELEMENT	MATERIAL	FINISH	NOTES
Main columns	Hot rolled CHS	Galvanised	Top of columns must be sealed to prevent water ingress
Roof structure	Hot rolled steel sections	Galvanised	
Roof sheeting	Translucent UV protective polycarbonate sheeting, minimum 16mm thick	Translucent finish	Designer shall ensure connection of the sheeting to the support structure is suitable, refer to roof sheeting manufacturer for suitable fixings 231
Proprietary connectors	Natural anodized aluminium U connectors and end caps	Unpainted	
Roof gutters	Custom designed fabricated steel plate section	Galvanised	See section 7.8.1
Downpipes	Hot rolled CHS steel section	Galvanised	3 mm minimum wall thickness. See section 7.8.2 for more details
Weather screens	3 mm thick aluminium perforated screen	Powder coated	With perforations no larger than 5 mm at widest point to avoid finger entrapment in accordance with HB295.3.21.