



Government of South Australia

Department of Planning,
Transport and Infrastructure

PUBLIC TRANSPORT SERVICES

STANDARD FOR RAILWAY PEDESTRIAN CROSSINGS

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and THINK

Zero Harm



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1.0 INTRODUCTION AND CONTEXT

1.1 INTRODUCTION

The Department of Planning, Transport and Infrastructure (DPTI) Public Transport Services Division (PTS) owns, operates and maintains the Adelaide Metropolitan Passenger Rail Network (AMPRN). This standard forms part of the engineering management system used to ensure safety and customer service levels are efficiently and effectively supported.

Pedestrian crossings allow people to access train services at railway stations and enable pedestrians to cross from one side of the railway to another at road level crossings or at other points along the rail corridor. To ensure that the risk associated with public use of pedestrian crossings is as low as reasonably practicable a set of rules and requirements is essential for the design, construction and maintenance of these crossings.

This standard complies with the mandatory provisions of AS1742.7-2007: *Manual of uniform traffic control devices*.

It is a legal requirement that new public transport infrastructure conforms to the Disability Discrimination Act 1992 (DDA) and its subordinate instruments. This standard complies with DDA and any referenced versions and clauses of Australian Standards. Where there are any conflicting requirements; they override this standard. Any other Australian standards are secondary to the above.

1.2 PURPOSE

The purpose of this document is to provide technical standards for the design, construction and maintenance of railway pedestrian crossings on the Adelaide Metropolitan Passenger Rail Network (AMPRN).

1.3 SCOPE

This standard is applicable to all train and tram pedestrian crossings on the AMPRN.

This standard is not applicable to pedestrian crossings on the in-street sections of the tramline

1.4 ACRONYMS, DEFINITIONS AND REFERENCED DOCUMENTS

1.4.1 Acronyms

| Acronym | Full Name |
|---------|--|
| AMPRN | Adelaide Metropolitan Passenger Rail Network |
| ARTC | Australian Rail Track Corporation |
| DDA | Disability Discrimination Act |
| DPTI | Department of Planning, Transport and Infrastructure |
| GWA | Genesee Wyoming Australia |
| PTSOM | PTS Operations and Maintenance |
| PTS | Public Transport Services |
| RISSB | Rail Industry Safety and Standards Board |
| TGSIs | Tactile Ground Surface Indicators |



1.4.2 Definitions

| Term | Meaning |
|---|---|
| Access Path ¹ | A path that permits independent travel for all passengers within public transport premises, infrastructure or conveyances. |
| Continuous Accessible Path of Travel ² | An uninterrupted path of travel to, into or within a building providing access to all accessible facilities. |
| Pedestrians ³ | People travelling on foot or using mobility aids (e.g. wheelchair, scooters) or walking with bicycles, baby carriages or animals. |
| Pedestrian Crossing ⁴ | A crossing at substantially the same level as a railway track that is used by pedestrians to cross the railway track. |
| Level Crossing | An at-grade crossing over the railway, providing for both vehicular traffic and other road users |
| Active Pedestrian Crossing | A pedestrian crossing where an automatic gate (barrier), flashing lights and an audible warning device, interlocked with the signaling system, warns and controls the access of the pedestrians crossing the railway tracks. |
| Passive Pedestrian Crossing | A pedestrian crossing which relies on the pedestrian detecting the approach or presence of a train by direct observation before making a decision to cross the railway tracks. |
| Caution More Than One Train(CMTOT) Signals | Visual and audible signals installed at pedestrian crossings located adjacent to level crossings that warn pedestrians of the approach of a second train that will arrive in addition to the train that originally activated the boom gates and flashing lights at the level crossing |
| Ambient Noise ⁵ | The total noise in a given environment, in the absence of the noise under investigation |
| Intermediate Pedestrian Crossing | A pedestrian crossing which is not located adjacent to a road level crossing, train station or tram stop. |
| Adjacent | Shall be taken to mean: within a distance from a station or level crossing such that the calculated unobstructed sighting distance will require a reduction in the speed of approaching trains or implementation of other controls as defined in Section 3 - Hierarchy of Control Measures. |
| Upgrade | In the context of a pedestrian crossing, upgrade means any works that result in a substantial change to the dimensional properties of the pedestrian maze layout. |

¹ Disability Standards for Accessible Public Transport 2002

² AS 1428.1 Design for access and mobility

³ AS 1742.7 Manual of uniform traffic control devices Part 7: Railway Crossings

⁴ National Guideline - RISSB Glossary of Railway Terminology 3rd December 2010

⁵ EPA SA Noise Guidelines



1.4.3 Referenced Documents

| Document Number or Abbreviation | Title |
|---------------------------------|---|
| Rail Safety Law 2012 | Rail Safety National Law Act (South Australia) Act 2012 |
| DDA Act | Disability Discrimination Act 1992 |
| AS 1742.7 | Manual of uniform traffic control devices |
| AS 1158.0 | Lighting for roads and public spaces |
| AS 4586 | Slip resistance classification of new pedestrian surface materials |
| AS 4663 | Slip resistance measurement of existing pedestrian surfaces |
| AS 1428 | Design for access and mobility |
| AS 1055.2 | Acoustics – Description and measurement of environmental noise Part 2: Application to specific situations |
| AS1269.1 2005 | Measurement & assessment of noise immission & exposure. |
| RISSB Glossary | Rail Industry Standards and Safety Board National Guideline Glossary of Railway Technology |
| S7071 Sheet 14 | Pedestrian Crossings Arrangement Passive Control Standard Details (Knet # 6918164) |
| S7071 Sheet 9 | Pedestrian Maze Signage and Pavement Marking Layout Standard Details (Knet # 6918070) |
| TC1-DRG-200000 | Pedestrian Crossing Arrangement Active Control Standard Details (S7071 Sheet 15, Knet # 7574863) |
| TC1-DRG-200001 | Pedestrian Crossing Arrangement Active Control Fence Layout(S7071 Sheet 16, Knet # 7574941) |
| PTS-MS-10-TR-STD-00000047 | Structural Clearances Design and Rating. |
| PR-AM-GE-807 | Development & Approval of Engineering Waivers |
| EPA SA Noise Guidelines | Guidelines for the Assessment of Noise from Rail Infrastructure |



2.0 SIGHTING DISTANCE

The 'sighting distance' at a pedestrian crossing is based on the length of the unobstructed view from the eye of a pedestrian to an approaching train.

At passive pedestrian crossings the sighting distance (SD) in metres, along the track, to oncoming trains, to enable pedestrians to cross safely, shall be calculated as follows⁶:

$$SD = \frac{V}{3.6} \left\{ \frac{d}{0.8} + 2 \right\}$$

Where:

V = track speed of trains/trams in km/hr

d = pedestrian crossing distance in metres, measured from one trackside maze opening to the other plus 0.8 m (allows for 0.8m from maze opening to the viewing point). A walking speed of 0.8m/s shall be used in the calculation, with an extra safety margin of 2 seconds added as shown.

The design sighting distance SD is calculated using the above formula and compared with the actual distance in the field. Obstructions must be considered in making this comparison. A viewing point 800mm back from the maze opening shall be used to take account of the position that would be assumed by a person using a mobility aid. The actual distance from this point to the train shall be determined and then computed to arrive at the distance along the track which can then be compared to the design sighting distance SD.

Notes:

- 1) AS1428.2: *Design for access and mobility* specifies the average eye height of a person with a mobility aid as 1220 mm. When assessing the impact of any obstruction this height shall also be used in arriving at the actual sighting distance.
- 2) The sighting distance is based on the pedestrian viewing the head lights of the train and/or 70% of train frontage.
- 3) In assessing sighting distances consideration shall be given to removing any obstructions that reduce the Train Drivers ability to see and, if required, warn pedestrians.

3.0 HIERARCHY OF CONTROL MEASURES

If the sighting distance calculated above cannot be achieved one or other of the following shall be implemented:

- 1) Removal of obstructions to achieve the required sighting distance.
- 2) Provision of active control.
- 3) Closure or relocation of the crossing.
- 4) Permanent reduction in train speed.
- 5) Grade separation.

4.0 PEDESTRIAN CROSSINGS ADJACENT TO TRAIN STATION PLATFORMS

All new or upgraded pedestrian crossings adjacent to train station platforms shall have autogates in accordance with TC1-DRG-200000: *Pedestrian Crossing Arrangement Active Control Standard Details* and TC1-DRG-200001: *Pedestrian Crossing Arrangement Active Control Fence Layout*.

Note: This clause is not applicable to tram stops. The lower profile and lower speeds of trams provide more opportunity to achieve adequate sighting. Notwithstanding, pedestrian crossings at tram stops shall comply with this standard in all other respects.

⁶ AS 1742.7 Clause 6.3 Crossing Elements - Design and Performance Requirements



5.0 PEDESTRIAN CROSSINGS ADJACENT TO TRAIN AND TRAM LEVEL CROSSINGS

All new or upgraded pedestrian crossings adjacent to road level crossings shall have autogates in accordance with TC1-DRG-200000: *Pedestrian Crossing Arrangement Active Control Standard Details* and TC1-DRG-200001: *Pedestrian Crossing Arrangement Active Control Fence Layout*.

A passive crossing complying with S7071 Sheet 14 *Pedestrian Crossings Arrangement Passive Control Standard Details* may be installed adjacent to a road level crossing providing that the sighting distance required in Section 2 is available and Caution More Than One Train (CMTOT) signals are installed. If the sighting distance cannot be achieved a permanent speed restriction, calculated using the formula in Section 2, shall be implemented. Where a passive maze is installed at a road level crossing a waiver to this standard will be required in accordance with PR-AM-GE-807 *Development & Approval of Engineering Waivers*.

6.0 INTERMEDIATE PEDESTRIAN CROSSINGS

All new or upgraded intermediate pedestrian crossings shall have autogates in accordance with TC1-DRG-200000: *Pedestrian Crossing Arrangement Active Control Standard Details* and TC1-DRG-200001: *Pedestrian Crossing Arrangement Active Control Fence Layout*.

A passive intermediate crossing may be installed provided a risk assessment is carried out that addresses, but is not limited to, the following:

- Sighting distance and obstructions
- Train speeds
- Pedestrian profile and level of current and potential usage of the crossing
- Lighting
- Number and condition of tracks
- Train frequencies
- Other rail operations i.e. ARTC, GWA
- Local development potential that will increase usage
- Proximity to hospitals, schools, sheltered housing/workshops or aged care facilities etc

A passive crossing shall comply with all of the requirements of this standard. Where a passive maze is installed a waiver to this standard will be required in accordance with PR-AM-GE-807 *Development & Approval of Engineering Waivers*.

7.0 CROSSING WALKWAY REQUIREMENTS

7.1 GENERAL

All walkways, ramps and landings shall comply with AS1428.2: *Design for access and mobility*

Walkways across railway crossings shall provide a continuous accessible path of travel as specified in AS 1428: *Design for access and mobility* and shall have a minimum clear width of 1800 mm between the inside edge of the TGSIs.

The minimum structural clearance between the post centreline of the pedestrian maze opening, gateway or other access point and the track centreline shall be a minimum of 2370 mm. At all other points of the pedestrian crossing the clearance shall be maintained to the PTS structural clearance limit of 2135 mm (plus any curve effects) as defined in PTS-MS-10-TR-STD-0000047 *Structural Clearances Design and Rating*.

The overhead clearance to any part of the pedestrian crossing infrastructure shall be 3000 mm minimum.

The slope of the walkway between the maze opening or other access point and the first rail shall be preferably level but no steeper than 1 in 40 uphill towards the rail.



The surfaces of the access paths shall be free of irregularities that could restrict wheel chair movement or confuse persons using a cane.

TGSI's shall be installed in accordance with S7071 Sheet 14: *Pedestrian Maze Arrangement Passive Control Standard Details* and TC1-DRG-200000: *Pedestrian Crossing Arrangement Active Control Standard Details*.

7.2 SLIP RESISTANCE

The surfaces of the access paths shall be designed, installed and maintained to be slip resistant in all weather conditions to meet AS 4586: *Slip resistance classification of new pedestrian surface materials*, AS 4663: *Slip resistance measurement of existing pedestrian surfaces* and HB 197: *An Introductory guide to the slip resistance of pedestrian surface materials*.

The notional contribution of the existing access path surface to the risk of slipping shall be "HIGH" to "VERY HIGH" as interpreted by the test results of wet pendulum test and dry floor friction test as explained in AS 4663 / HB 197. All new surface materials shall be classified as "R10" or "R11" resistant, as defined in Table 5 of AS 4586.

7.3 ANGLE OF CROSSING

The crossing walkway shall be at right angles to the track. If site conditions do not permit this, the angle shall be not less than 70 degrees.

7.4 FLANGEWAY GAP⁷

The flangeway gap shall be 65 mm for new or upgraded crossings and after construction maintained to 75 mm maximum. The maximum depth shall be 50 mm and the change in level between the top of the rail and the adjacent walkway surface shall not be more than 5 mm.

8.0 PASSIVE PEDESTRIAN CROSSINGS LAYOUT

All passive pedestrian crossings shall comply with drawing number S7071 Sheet 14: *Pedestrian Maze Arrangement Passive Control Standard Details*.

9.0 ACTIVE PEDESTRIAN CROSSINGS (AUTOGATE) LAYOUT

All active pedestrian crossings shall comply with drawing number TC1-DRG-200000: *Pedestrian Crossing Arrangement Active Control Standard Details* and TC1-DRG-200001: *Pedestrian Crossing Arrangement Active Control Fence Layout*.

Note: Active crossings using only RX12 (or similar) signals and audible warnings without autogates are not be used on the AMPRN

10.0 SIGNAGE AT PEDESTRIAN CROSSINGS

Signage at pedestrian crossings shall comply with drawing number S7071 Sheet 9: *Pedestrian Maze Signage and Pavement Marking Layout Standard Detail*.

⁷ AS 1742.7 Clause 6.3 Crossing Elements - Design and Performance Requirements



11.0 LIGHTING

Lighting shall be provided to cover the maze arrangement on each side of the track, the walkway across the tracks and the path between the maze and the PTS boundary fences.

Pedestrian crossings shall have a horizontal illuminance of 42 lux average and 21 lux minimum.

Pedestrian crossings shall have a vertical illuminance of 14 lux minimum.

Care shall be taken when determining the lighting arrangements at pedestrian crossings to minimise any impact of lighting spill on local residences and to ensure that there will be no disturbance to the night vision of train drivers for signal sighting and to road users at level crossings.

Note : As defined in AS 1158.0: *Lighting for roads and public spaces* horizontal illuminance is the value of illuminance on a designated horizontal plane at ground level and vertical illuminance is the value of illuminance on a designated vertical plane at a height of 1.5m above ground level.

12.0 AUDIBLE WARNING DEVICES AT PEDESTRIAN CROSSINGS

Cyclic audible warning devices shall be provided at all active crossings.

A sound level of at least 10 dBA above ambient noise level, measured at 3 metres, shall be used.

The sound level shall not be less than 60 dBA under any circumstances.

The use of audible signals at pedestrian crossings that are close to residential areas requires careful assessment. Guidance can be obtained from the South Australian Environmental Protection Authority *Guidelines for the Assessment of Noise from Rail Infrastructure*.

The determination of the ambient noise level shall be carried out in accordance with AS1055.2: *Description and measurement of environmental noise Part 2: Application to specific situations- Appendix A* and AS1269.1: *Measurement & assessment of noise immission & exposure*.

All audible warning devices shall have a functionality whereby the sound level can be adjusted.