

# Fencing and Gates for Rail Corridors and Facilities

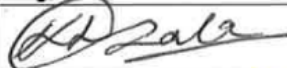

## Engineering Standard

Rail Commissioner

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# Document Control

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## 1. Introduction

The Department of Planning, Transport and Infrastructure (DPTI) owns, operates and maintains the Adelaide Metropolitan Passenger Rail Network (AMPRN) under the Rail Accreditation assigned to the Rail Commissioner. This standard is intended to ensure public transport safety and customer service levels are efficiently and effectively supported.

Fencing and gates on the AMPRN are intended to:

- provide members of the public and DPTI staff with a clear indication of railway boundaries;
- discourage unauthorised entry to a rail corridor or facility;
- enhance safety and amenity for users of the network, by channelling access to stations, tram stops and authorised pedestrian crossings;
- protect rail assets from unauthorised entry risks;
- provide safe access for operational, maintenance and emergency services personnel through the provision of gates; and
- provide emergency egress for staff and passengers through the provision of emergency gates.

## 2. Purpose

To detail the design and installation standards for all new or upgraded fencing and gates installed on rail corridors and at facilities on the AMPRN.

## 3. Scope

This standard is applicable to all new and upgraded fencing and gates installed on the AMPRN.

This standard does not apply to automatic gates installed at pedestrian crossings, entrances to depots, substations and at other DPTI facilities.

## 4. Related Documents

DOCUMENT NAME	DOCUMENT NUMBER
Emergency Response Plan	PL-SE-EM-367 (KNet # 8100894)
Guidelines for The Protective Provisions Related to Electrical Earthing and Bonding for the Adelaide Metro Electrified Rail Network	AR-EL-STD-0102 (KNet # 9387911)
Electrical and Mechanical Clearances for the 25kV Electrified Train Network	TP1-DOC-000389 (KNet # 8597339)
Signal Sighting Standard	PTS-MS-10-SG-STD-00000033 (KNet # 5730359)
Preventative Security Mitigation Plan	PL-SE-SM-201 (KNet # 8041517)
Technical Standard – Part 129009 – Stations Fencing	AR-PW-PM-SPE-00129009 (KNet # 5557395)
Standard for Railway Pedestrian Crossings	CS4-D0C-000446 (KNet # 8315249)
Standard Drawing – 1200mm Pool Type Fence – Details	735-A4-2002-015 (KNet # 9057229)
Standard Drawing – Pressed Spear Fencing – 1800mm High - Details	735-A3-05-002 (KNet # 9055054)
Standard Drawing – Flat Top Fence – 1800mm High – Details	735-A3-10-169 (KNet # 9056813)
Standard Drawing – Isolation Panel – Chain Link Fence – Details	CS1-DRG-350235 (KNet # 9052263)

Standard Drawing – Isolation Panel – Spear Fence – Details	CS1-DRG-350236 (KNet # 9052891)
Standard Drawing – Isolation Panel – Pedestrian Crossing – Details	CS1-DRG-350237 (KNet # 9052747)
Standard Drawing – Chain Link Fence Gates – 1800mm High – Details	CS1-DRG-350238 (KNet # 9050013)
Standard Drawing – Chain Link Fence – 1800mm High – Details	CS1-DRG-350239 (KNet # 9050877)
Standard Drawing – Palisade Pale Fence – 3000mm High – Details	CS1-DRG-350240 (KNet # 9051308)
Standard Drawing – Tubular System – 1200mm – Details	CS1-DRG-350242 (KNet # 9052552)
Standard Drawing – Close Space Welded Mesh – 3600mm High – Details	CS1-DRG-350241 (KNet # 9052023)
Structural Clearances – Design and Rating	PTS-MS-10-TR-STD-00000047 (KNet # 7584069)
STA Allowable Infringements – Minimum Structures – 1600mm gauge	301-A2-86-2239
Technical Standard – Part 129001 - Stations General	AR-PW-PM-SPE-00129001 (KNet # 5413198)

## 5. References

- *Rail Safety National Law (South Australia) Act 2012*
- AS 1725.1 Chain link fabric fencing – Part 1: Security fences and gates – General requirements
- AS 2423 Coated steel wire fencing products for terrestrial, aquatic and general use
- AS 2700 Colour standards for general purposes
- AS 4680 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
- AS1170.1 Structural design actions – Permanent, imposed and other actions
- AS 4506 Metal finishing - Thermoset powder coatings
- AS5100.1 Bridge Design – Part 1: Scope and general principles
- Physical Security Management Guidelines - Security Zones and Risk Mitigation Control Measures v1.4, June 2011

## 6. Acronyms

ACRONYM	FULL NAME
AMPRN	Adelaide Metropolitan Passenger Rail Network
DPTI	Department of Planning, Transport and Infrastructure
E&B	Earthing and Bonding
OHW	Overhead Wiring

## 7. Definitions

TERM	DEFINITION
Access path	A path that permits independent travel for all passengers within public transport premises, infrastructure or conveyances.
Corridor Fencing	A fence type that restricts the movement of unauthorized access across, along or within a rail corridor or facility of low security requirements.
Channelling Fence	A fence used to direct or guide pedestrians along an access path.
Delineation Fence	A fence that defines the position of a rail corridor boundary.
Depot	A secure location for the storage and maintenance of railway assets

Electrified rail line	Any section of track equipped with overhead line equipment and traction power used for the operation of electric trains or trams.
Pedestrian Crossing	A crossing at substantially the same level as a railway track that is used by pedestrians to cross the track.
Rail Corridor	A restricted tract of land for the passage of rail traffic.
Security Fence	A fence designed and constructed to restrict or prevent unauthorised entry into a public transport facility (i.e. stabling yard, depot) of high security status or movement across a rail boundary or into a rail corridor.
Stabling Yard	A secure location for the storage of railcars
Trespass	Unlawful intrusion into the rail corridor.
Vandalism	Deliberate damage to railway property. Common types of vandalism on the railway include graffiti, littering, illegal dumping and breaking & damaging railway property (such as fences, bridges, signs and tracks).

**8. Fencing Types and Application**

Table below shows various types of fencing based on their functional purpose and application inside the corridor:-

Functional Purpose	Application	Types of fences									
		1200mm Pool type fence - collapsible type (Colour to be "black as per AS2700- N61")	1200mm Tubular system (Colour to be "black as per AS2700- N61")	1600mm Tubular system (Colour to be "black as per AS2700-N61")	1800mm Chain link fabric/mesh fence (Colour to be black as per AS2700- "N61")	1800mm Spear fence (Colour to be black as per AS2700- "N61")	1800mm Spear fence (Hot dipped galvanised)	1800mm Spear fence (Colour to be rivergum green as per AS2700- "G62")	1800mm Flat top fence (Colour to be black as per AS2700- "N61")	3000mm Palisade Pale fence (Galvanised)	3600mm Close space welded mesh (Galvanised)
Delineation (Boundary fencing)	All rail corridors				✓ (Minimum permitted with DPTI approval)	✓ (Preferred)	✓ (High corrosion areas only)	✓ (Minor extension or part replacement of existing green fence)	✓ (Mandatory – shared use path only)		
	50m beyond the extent of railway stations or tram stops					✓ (Mandatory)		✓ (Minor extension or part replacement of existing green fence)	✓ (Mandatory – shared use path only)		
Pedestrian Access	At level crossings	✓ (Mandatory)									
	At intermediate crossings	✓ (Mandatory)									
	At all station access paths and the back and ends of side platforms and tram stops		✓ (Not to be used adjacent to roads)								
Corridor Security	Adjacent to ARTC tracks, such as at the back of the platform (excluding ends of platforms)			✓ (Mandatory)							
	Trespass and vandalism				✓ (Minimum permitted with DPTI approval)	✓ (Mandatory)	✓ (High corrosion areas only)	✓ (Minor extension or part replacement of existing green fence)			
Facilities Security	Deterrence of criminal behaviour at Depots and stabling yards									✓ (Preferred)	✓
	- Protection of substation/converter station or similar DPTI facilities from vandalism - Deterring access to dangerous high voltage equipment									✓	✓ (Preferred)

\*DPTI Approval to be granted from Manager Track & Civil Engineering.

## 9. Fencing and Gate Designs

DPTI manages access to the rail corridor and rail facilities by the provision of appropriate fencing and gates depending on the level of access control required.

There are currently seven (7) types of fencing and gates permitted on the AMPRN:-

On Rail Corridors:

1. 1200mm Pool type fence
2. 1200mm & 1600mm Tubular systems
3. 1800mm Chain link fabric/mesh fence
4. 1800mm Spear fence
5. 1800mm Flat top fence

At Rail Facilities:

6. 3000mm Palisade pale fence
7. 3600mm Close space welded mesh

Where practicable, structures adjacent to boundary fences are to be located and configured so as not to act as a climbing aid to the fence.

Where a retaining wall exists on the railway boundary the appropriate standard fence shall be erected on top of the wall.

Security fencing around rail stabling yards, depots and substation/converter stations shall be installed in conjunction with appropriate lighting, CCTV systems and fencing sensors.

### 9.1. 1200mm Pool type fence

1200mm pool type fencing is mandatory for all new and upgraded pedestrian crossings located adjacent to level crossings. New and upgraded fence installations at pedestrian crossings shall comply with *CS4-DOC-000446 – Standard for Railway Pedestrian Crossings*. The colour shall be black “N61” in accordance with *AS 2700: Colour standard for general purposes*. Fence Posts at entry & exit to mazes and either side of gates shall be coloured “Golden Yellow Y14, matt finish” in accordance with *AS 2700 Colour standards for general purposes*.

The pool type fence shall be of a collapsible type, 1200mm high, in accordance with standard drawing *735-A4-2002-015A – 1200mm Pool Type Fence*. Its connections and joints shall be designed so that any high rail shall not come loose in the event of a vehicle impact and spear into the vehicle (*AS5100.1: Bridge Design – Part 1: Scope and general principles*, Clause 12.1 “Geometric Requirements”).

The pool type fence shall be designed to withstand crowd loading Category – Type of Occupancy “C3” in accordance with *AS1170.1: Structural design actions – Permanent, imposed and other actions – Table 3.3 “Minimum imposed actions for barriers”*

Where baseplates are greater than 150mmx150mm they shall be recessed flush with the surrounding surface and all baseplate fixings shall be countersunk.

### 9.2. 1200mm & 1600mm Tubular system

The 1200mm tubular system shall be used at the ends of all platforms and where the station design requires fencing to be installed at the back of marginal platforms. At



access ramps, pedestrian crossings and other station precincts it shall be installed as specified in the station design.

The 1600mm tubular system shall be used at the back of platforms that are adjacent to ARTC tracks.

The tubular system shall be in accordance with the standard drawing *CS1-DRG-350242 –Tubular System – 1200mm*.

Fence shall be black “N61” in accordance with *AS2700: Colour standard for general purposes* to achieve a minimum 30% luminance contrast with the access path / trafficable surface. Where bitumen surface is proposed with black fencing, then the colour contrast to be reviewed and approved by DPTI (Manager, Track & Civil Engineering)

Fence Posts at openings to gates, ramps, stairs, handrails and kick plates (kerb rails) shall be coloured “Golden Yellow Y14, matt finish” in accordance with *AS 2700 Colour standards for general purposes*.

The tubular system shall be designed to withstand crowd loading Category – Type of Occupancy “C5” in accordance with *AS1170.1: Structural design actions – Permanent, imposed and other actions – Table 3.3 “Minimum imposed actions for barriers”*.

Where baseplates are greater than 150mmx150mm they shall be recessed flush with the surrounding surface and all baseplate fixings shall be countersunk.

### **9.3. 1800mm Chain link fabric fence**

The chain link fabric fence shall be of top and bottom rail configuration and 1800mm high in accordance with *AS 1725.1: Chain link fabric fencing – Part 1: Security fences and gates – General requirements*.

The chain link fabric is to be heavy duty and shall have barbed selvedge at the top and knuckled selvedge at the bottom. The colour of the fence shall be black “N61” in accordance with *AS 2700: Colour standard for general purposes*.

Chain link fabric fences shall be in accordance with standard drawing *CS1-DRG-350239 Chain link fabric fence – 1800mm high*.

### **9.4. 1800mm Chain link fence gate**

Chain link fence gate shall be in accordance with standard drawing *CS1-DRG-350238 Chain link fence gates – 1800mm high*.

### **9.5. 1800mm Spear fence**

Spear fencing shall be in accordance with standard drawing *735- A3-2005-02 Pressed spear fencing – 1800 mm high*. The colour of the fence shall be black “N61” in accordance with *AS 2700: Colour standard for general purposes*. Where installed as an extension to existing green spear fences, the colour shall be river gum green “G62” in accordance with *AS 2700: Colour standard for general purposes*.

Spear fencing shall be powder coated in accordance with *AS 4506: Metal finishing – Thermoset powder coatings*.

Spear fencing shall be provided for a distance of 50m beyond the extent of all stations to delineate the corridor boundary and inhibit trespass (extent includes pedestrian crossings).

### 9.6. 1800mm Flat top fence

Flat top fencing shall be in accordance with standard drawing *735-A3-2010-169 Flat top fence – 1800mm high*. The colour of the fence shall be black “N61” in accordance with *AS 2700: Colour standard for general purposes*.

Fencing shall be powder coated in accordance with *AS 4506: Metal finishing – Thermoset powder coatings*.

This fencing is mandatory for use along shared use paths.

### 9.7. 3000mm Palisade pale fence

Galvanised Palisade Pale fencing shall be in accordance with standard drawing *CS1-DRG-350240 Palisade Pale Fence – 3000mm High*.

### 9.8. 3600mm Close space welded mesh

Galvanised close space welded fencing shall be in accordance with standard drawing *CS1-DRG-350241 Close Space Welded Mesh – 3600mm High*.

### 9.9. Intersection of fences of different heights

Where fences of different height intersect a transition section of fencing shall be installed.

For example:

At a pedestrian crossing where there is an intersection of 1800 mm corridor spear fence and 1200mm pedestrian pool type fence a tapering flat top fencing section of standard panel length (approximately 2.5 metre) shall be installed.

At a pedestrian crossing where there is an intersection of 1800 mm chain link fabric fence and 1200mm pedestrian pool type fence a tapering chain link fabric fencing section of standard panel length (approximately 2.5 metre) without barbed selvedge shall be installed.

## 10. General Requirements

### 10.1. Design Life

Fencing shall have a design life of 30 years.

### 10.2. Sight Lines and Signal Sighting

Sight lines and signal sighting requirements for fencing are detailed in *CS4-DOC-000446– Standard for Railway Pedestrian Crossings* and *PTS-MS-10-SG-STD-00000033 Signal Sighting Standard*

### 10.3. Gaps

Unless otherwise specified in the earthing and bonding design, where two fences meet at an angle or perpendicular to one another any gap must be closed in such a way as to prevent unauthorized access. The maximum horizontal distance between faces of the adjacent vertical fence posts shall be 100mm.

### 10.4. Redundant Existing Fence

Any redundant existing fencing shall be removed and disposed of or salvaged as directed by DPTI.

## 11. Access gates

For all new and upgraded fencing installations, DPTI shall be consulted to determine access requirements for operational, maintenance and emergency services personnel and gates

provided accordingly. An approved sign showing a unique gate identifier shall be installed on all gates.

Gates are not permitted in fences separating the rail corridor from private residences.

Where a gate is removed a replacement gate shall be installed and match the type and standard of the fence to which it is fixed.

Any gates provided on the rail corridor boundary shall be designed so they can only open outwards away from the tracks. Where a gate opens across a busy road or pathway a risk assessment shall be undertaken to determine an appropriate alternative gate arrangement.

Sliding gates are preferred at the main entry and exit points for vehicular traffic or railcar movements at high security rail facilities.

## 12. Earthing and bonding requirements for fences

All fencing on electrified lines must comply with the *AR-EL-STD-0102 Guidelines for the Protective Provisions Related to Electrical Earthing and Bonding for the Adelaide Metro Electrified Rail Network*.

DPTI shall be consulted regarding all earthing and bonding requirements at the design phase of any fencing or gate works on electrified lines.

### 12.1. Isolation Panels

Isolation panels, a minimum of 2500mm in length, are required in metallic fencing on all 25 kV electrified lines to break the fence into short electrically isolated sections. Standard drawings of isolation panels are listed in the table below:

Drawing Number	Drawing Title
CS1-DRG-350235	Standard Drawing –Isolation Panel – Chain Link Fence – Details
CS1-DRG-350236	Standard Drawing –Isolation Panel – Spear Fence – Details
CS1-DRG-350237	Standard Drawing –Isolation Panel – Pedestrian Crossing – Details

The non-metallic posts shall have a clearance of 50 mm minimum and 100 mm maximum from the adjacent metallic post of the 'continuous' fencing. Each non-metallic post must have a warning sign attached as shown on the drawings listed above.

## 13. Clearances

### 13.1. AMRPN Track Clearances

Fencing and gate works shall comply with the following standards:

- *PTS-MS-10-TR-STD-00000047 – Structural Clearances – Design and Rating. Refer to standard drawing “301-A2-86-2239 – STA Allowable Infringements – Minimum Structures – 1600mm gauge”.*
- *TP1-DOC-000389 – Electrical and Mechanical Clearances for the 25kV Electrified Train Network”* where the rail line is electrified or is proposed to be electrified.

### 13.2. ARTC Track Clearances

Refer to the ARTC website for clearance requirements:

<http://extranet.artc.com.au/>