



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil)

Category: Standard

# Level Crossings – Configuration Standards

## ETD-16-04

### Applicability

New South Wales	✓	CRIA (NSW CRN)	
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### Primary Source

ARTC NSW Standard XDS 01
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### Document Status

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1.0	08 Nov 11	Standards	Standards & Procedures Administrator	Track Standards Engineer	Manager Standards

### Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.0	01 Dec 09		Implementation draft. Supersedes NSW Standard XDS 01 v1.2
1.1	18 Jun 10		Banner added regarding mandatory requirements in other documents and alternative interpretations.
1.0	08 Nov 11		Document number changed from ETD-16-01 as this number already belongs to an approved published document.

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**Mandatory requirements also exist in other documents.**

**Where alternative interpretations occur, the Manager Standards shall be informed so the ambiguity can be removed. Pending removal of the ambiguity the interpretation with the safest outcome shall be adopted.**

## 1 General Description

This Standard sets out configuration standards for Level Crossings on railway lines owned by the Australian Rail Track Corporation. Broad aspects of configuration only are discussed. For details about specific track components including bearers, fastenings and guard rail assemblies, refer to relevant track component configuration standards.

## 2 Definitions and Abbreviations

The following defined terms are used throughout this standard:

Level Crossing	A crossing provided for road motor vehicles, pedestrians and/or livestock traffic to cross rail tracks at grade.
Public Level Crossing	A Level Crossing provided to maintain continuity of a public thoroughfare.
Private Level Crossing	A Level Crossing provided to permit access to private property or to extend access between parts of private property.  Private Level Crossings are for the use of property holders and their nominees and are not available for public access.
Service Level Crossing	A Level Crossing provided for authorised persons to cross the track.  Service Level Crossings may be provided at station platforms, in depots and station yards and in field situations for maintenance access.  Track vehicle access points are deemed to be Service Level Crossings.
Active Control	See AS 1742.7
Passive Control	See AS 1742.7
Authorised Person	A person authorised by the Australian Rail Track Corporation or its agents to enter onto and cross rail tracks at a Service Level Crossing.
Main Road	A State or Regional Road maintained by the NSW Roads and Traffic Authority
Road Authority	The entity responsible for the road that the Level Crossing accommodates.  For public roads, the Road Authority is usually the NSW Roads and Traffic Authority or the local council.  For private roads, the Road Authority is usually the landowner See relevant ARTC standards for definitions of other terms.

## 3 References

The principal references used in this document are:

- AS 1742.7 Manual of uniform traffic control devices, Part 7: Railway crossings
- AS 1743 Road signs — Specification
- Traffic Engineering Manual, Section 6: Railway Level Crossings, NSW Roads and Traffic Authority, draft (1994)
- Guidelines for railway level crossing protection devices in New South Wales — Department of Main Roads NSW, 1987
- ETD-16-02 Level Crossings — Design and Installation
- ESD-03-01 Level Crossing Design
- ETD-16-03 Pedestrian Level Crossings - Design and Installation

## 4 Functional Requirements

### 4.1 General

Level Crossings are installed to provide a safe track crossing, at grade, for road, pedestrian and stock traffic. Level Crossings may also provide access points for on and off tracking combination road/rail vehicles.

A safe crossing equates to the ability to:

- warn users (rail, road and pedestrian users) of the existence of a Level Crossing
- warn users of the approach of conflicting traffic with sufficient time for protective action to be taken
- allow for the passage of specified (size, weight and speed) road, rail and pedestrian traffic

## 5 Allowable Configurations

### 5.1 General

General road Level Crossing configurations include:

- open Level Crossings with “Give Way” signs
- open Level Crossings with “Stop” signs
- Level Crossings protected by flashing lights
- Level Crossings protected by flashing lights and boom barriers
- gated Level Crossings

These are defined more precisely in AS 1742.7.

Each configuration has an inherent level of safety associated with it. The configuration adopted for any particular site is determined by the level of risk to be managed.

The type of protection or control applied to a particular Level Crossing is determined by:

- road/rail/pedestrian traffic volumes and speed
- sight distance
- road and rail track alignment
- roadside activity
- accident history
- number of rail tracks

Level Crossing configurations are determined in consultation with the relevant Road Authority and with reference to the guidelines detailed in AS 1742.7, the RTA Traffic Engineering Manual Section 6, ETD-16-02 Level Crossings — Design and Installation, and ETD-16-03 Pedestrian Level Crossings - Design and Installation, for pedestrian crossings.

### 5.2 Authorised Protection Types

#### 5.2.1 Level 1A

**Control:** Passive

**Protection:** Give Way Signs

**Category:** Minimum Treatment

This is the minimum treatment to be adopted at road Level Crossings.

Signs are to be installed in accordance with AS 1742.7.

### 5.2.2 Level 1 B

**Control:** Passive

**Protection:** Give Way Signs + Approach Warning Signs

**Category:** Standard Treatment

This is the treatment to be adopted at road Level Crossings when Level 1A is inadequate and a higher level of protection is not warranted.

Signs are to be installed in accordance with AS 1742.7.

### 5.2.3 Level 2

**Control:** Passive

**Protection:** Stop Signs

This is the treatment to be adopted at road Level Crossings when there are inadequate sight distances for Level 1 control and active control Level 3 or 4 is not warranted. Vehicles are required to stop.

This is the minimum treatment to be adopted at Service Level Crossings, where it is to be used in conjunction with an "Authorised Vehicles Only" sign.

At Public and Private Level Crossings, signs are to be installed in accordance with AS 1742.7.

### 5.2.4 Level 3A

**Control:** Active

**Protection:** Flashing Lights + Bells

This is the minimum treatment to be adopted at road Public Level Crossings when passive protection is inadequate.

Signs flashing lights, road guard fender and pavement marking are to be installed in accordance with AS 1742.7.

### 5.2.5 Level 3B

**Control:** Active

**Protection:** Flashing Lights + Bells + Boom Barriers

This is the treatment to be adopted at road Public Level Crossings when Level 3A protection is inadequate.

Installation of half-boom barriers in conjunction with flashing lights and bells should particularly be considered at Level Crossings that pass over more than one track.

Boom position, signs, flashing lights, road guard fender and pavement marking are to be installed in accordance with AS 1742.7.

### 5.2.6 Level 3C

**Control:** Active

**Protection:** Special Warning Lights

This configuration is not approved for Public Level Crossings. It only applies to Private Level Crossings and each installation is subject to approval by the authorised ARTC representative.

### 5.2.7 Level 4

**Control:** Active

**Protection:** Level Crossing Gates

These are gates across the railway line that are manually opened for the passage of each train. Signs are to be installed in accordance with AS 1742.7.

### 5.2.8 Level 5A

**Control:** Active

**Protection:** Manual Control

The Level Crossing is manually controlled by a handsignaller with a hand held STOP banner (R6-7 or R6-8) or red flag (e.g. at a Level Crossing with inoperative flashing lights or gates).

### 5.2.9 Level 5B

**Control:** Active

**Protection:** Special Control

This configuration is not approved for Public or Private Level Crossings.

This is a generic level that is applied to Service Level Crossings when Level 2 protection is inadequate. It can include, but is not limited to:

- Temporary speed restrictions
- Signals
- Access to train running information at the crossing
- Direct communication with trains
- Worksite protection

### 5.2.10 Level P1

**Control:** Passive

**Protection:** Signs only

This is the minimum treatment to be adopted at pedestrian Public Level Crossings. It is to be used only where pedestrian movement is light.

Signs are to be designed in accordance with ETD-16-03 and installed in accordance with AS 1742.7.

### 5.2.11 Level P2

**Control:** Passive

**Protection:** Signs + Pedestrian Maze

This is the passive treatment to be adopted at pedestrian Public Level Crossings where pedestrian movement is heavy.

Pedestrian mazes and signs are to be designed in accordance with ETD-16-03 and installed in accordance with AS 1742.7.

### 5.2.12 Level P3

**Control:** Active

**Protection:** Sign + Lights + Alarms

This is the minimum treatment to be adopted at pedestrian Public Level Crossings when passive protection is inadequate.

Pedestrian crossing lights and alarms are to be installed in accordance with ESD-03-01 Level Crossing Design.

Pedestrian mazes and signs are to be designed in accordance with ETD-16-03 and installed in accordance with AS 1742.7.

### 5.2.13 Level P4

**Control:** Active

**Protection:** Signs + Lights + Alarms + Boom Barriers or Swing Gates

This is the treatment to be adopted at pedestrian Public Level Crossings when Level P3 protection is inadequate.

Pedestrian crossing lights, alarms and boom barriers or Swing Gates are to be installed in accordance with ESD-03-01 Level Crossing Design.

Pedestrian mazes and signs are to be designed in accordance with ETD-16-03 and installed in accordance with AS 1742.7.

### 5.2.14 Level P5

**Control:** Active

**Protection:** Special Control

This configuration is not approved for Public or Private Level Crossings.

This is a generic level that is applied to pedestrian Service Level Crossings. It can include, but is not limited to:

- Signals
- Access to train running information at the crossing
- Direct communication with trains
- Worksite protection
- Temporary speed restrictions

## 5.3 Surface

### 5.3.1 Public Level Crossings (Road)

Various forms of bitumen sealed, concrete and rubber panel road surfaces are approved for Public Level Crossings.

Formed and timber road surfaces are only approved for Public Level Crossings where traffic volumes and approach speeds are low.

Ballast road surfaces are not approved for Public Level Crossings.

If the speed of trucks is less than 80km/hr and there are no impact load initiators such as vertical dips in the road, standard rubber or concrete panel type level crossing panels may be used.

If the speed of trucks is greater than 80km/hr and there are no impact load initiators such as vertical dips in the road, heavy duty rubber including sleeper hold-down fastenings and concrete panels may be used.

If the speed of trucks is greater than 80km/hr and there are impact loads due to humps, sharp curves, or the road angle to the crossing is greater than 30 degrees, panels are not to be used unless they have been type approved for installation under these conditions.

### **5.3.2 Private Level Crossings (Road)**

The minimum requirement is a timber crossing level with the rail surface and plane between the two rails. For multiple tracks, the Level Crossing surface is to be plane between each adjacent pair of rails.

For protection level 1A the minimum requirement is a timber crossing level with the rail surface and plane between the two rails and with a formed gravel road level for 7m either side of the crossing.

The minimum width of road surface for Private Level Crossings is 4.5m.

### **5.3.3 Service Level Crossings (Road)**

The minimum requirement is a formed ballast crossing level with the rail surface and plane between the two rails. For multiple tracks, the Level Crossing surface is to be plane between each adjacent pair of rails.

The minimum width of road surface for Service Level Crossings is 3m.

### **5.3.4 Pedestrian Level Crossings (Public/Service)**

The minimum requirement is a timber crossing level with the rail surface and plane between the two rails. For multiple tracks, the Level Crossing surface is to be plane between each adjacent pair of rails.

### **5.3.5 Flangeway clearance**

The minimum flangeway clearance between the running rails and the Level Crossing surface specified in ETD-16-02 is to be maintained at all Level Crossings.