



Manual of uniform traffic control devices

Part 7: Railway crossings



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- ARRB Group—Australian Road Research Board
- Association of Consultants in Access Australia
- Australian Automobile Association
- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Australian Motorcycle Council
- Austroads (Representative from VicRoads)
- Department of Lands, Planning and the Environment, NT
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- Department of Transport and Main Roads, Qld
- Institute of Public Works Engineering Australasia
- Main Roads Western Australia
- Rail Industry Safety and Standards Board
- Roadmarking Industry Association of Australia
- Roads and Maritime Services, NSW

Additional Interests:

- Australian Level Crossing Assessment Model (ALCAM) Committee
-

This Standard was issued in draft form for comment as DR2 AS 1742.7:2015.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard[®]

Manual of uniform traffic control devices

Part 7: Railway crossings

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PREFACE

This Standard was prepared by the Standards Australia Committee MS-012, Road Signs and Traffic Signals, to supersede AS 1742.7—2007. It is Part 7 in a series of fourteen Standards which together form the *Manual of uniform traffic control devices*. The series comprises the following Standards:

AS

1742	Manual of uniform traffic control devices
1742.1	Part 1: General introduction and index of signs
1742.2	Part 2: Traffic control devices for general use
1742.3	Part 3: Traffic control devices for works on roads
1742.4	Part 4: Speed controls
1742.5	Part 5: Street name and community facility name signs
1742.6	Part 6: Tourist and services signs
1742.7	Part 7: Railway crossings (this Standard)
1742.9	Part 9: Bicycle facilities
1742.10	Part 10: Pedestrian control and protection
1742.11	Part 11: Parking controls
1742.12	Part 12: Bus, transit, tram and truck lanes
1742.13	Part 13: Local area traffic management
1742.14	Part 14: Traffic signals
1742.15	Part 15: Direction signs, information signs and route numbering

This Standard incorporates Amendment No. 1 (January 2019). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

This revised Standard results from ongoing review by both road authorities and railway companies of the safety requirements at railway crossings.

In addition to clarifications and general improvements, a key change in this revised Standard is that there is a greater emphasis on cooperation between rail companies and road authorities, e.g. through level crossing interface agreements (where they exist). It also provides more information in the appendices, particularly at Appendix D (sight distances), across a range of vehicle types, grades and driving behaviours such that safety decisions can be more risk-based.

The relationship between Australian Standards and publications produced by Austroads should be noted. Australian Standards provide specifications and procedures that ensure that products and services are safe and reliable, and consistently perform the way they are intended. Austroads provides guidance documents that deal with the design, construction maintenance and operation of the road network. Austroads documents are also used by road authorities in New Zealand.

In cases of similar subject matter, Australian Standards and Austroads documents aim to provide information that is consistent, complimentary and supportive of the other. This is the case with the following documents: Austroads, *Guide to Road Safety*, Part 3: *Speed Limits and Speed Management*, Austroads, *Guide to Traffic Management*, Part 5: *Road Management*, and Australian Standard AS 1742.4, *Manual of uniform traffic control devices*, Part 4: *Speed controls*.

Statements expressed in mandatory terms in notes to figures are deemed to be requirements of this Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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FOREWORD

Uniform standards and practices in the use of signs, markings and other devices at railway crossings are essential in the interests of safety for both rail traffic and road users.

Essential to this compliance is an understanding of the risks inherent at railway crossings. Long, heavy freight trains and high-speed passenger trains constitute a massive energy source that can be highly destructive. Trains, even those moving relatively slowly, cannot be stopped anywhere near as readily as road traffic and this factor may not be apparent to some road users. It is imperative that vehicle occupants do not come into contact with such large energy sources and that road users recognize the need and are given every opportunity to give way to trains.

Problems associated with long and heavy road vehicles can influence both the location and safe operation of crossings. Long and heavy vehicles with slow acceleration from the stopped position can, when sight distance along the railway is poor, have difficulty starting up and clearing a crossing before the arrival of a previously unseen train unless there is some form of active control to warn that a train is approaching. Likewise, long vehicles can present problems if there is an intersection or other vehicular check point close to the crossing on the departure side and the rear of such a vehicle inadvertently fails to clear the conflict area. Appropriate solutions need to be considered for all of these conditions.

Before any works, features or devices (e.g. pedestrian crossing, bus stop, intersection control, temporary works site) are introduced at or in the vicinity of a railway crossing, the relevant road authorities and rail infrastructure managers need to confer (e.g. via level crossing interface agreements where they exist, as per National Rail Safety Law) to determine the most suitable method of handling the situation; especially if those works, features or devices could cause road traffic to queue across the crossing.

Other problems, such as ill-defined crossings which may occur within freight loading areas, and crossings that are only used seasonally or very rarely at any time of the year may present operational and management challenges that can only be partially met (if at all in some cases) by application of this Standard. Where possible, this Standard provides ranges in various parameters such that decisions in these and other situations can be risk based.

Railway crossings should be located to avoid sub-standard geometric features of the road, such as sub-standard curves, reduced pavement widths and vertical obstructions. If this cannot be avoided, special attention should be given to the signing and marking of these features as well as the railway crossing itself. Sub-standard geometric features can lead to increased numbers of crashes not involving trains as well as having an effect on the incidence of vehicle/train collisions.

This Standard does not provide guidance on when a crossing should progress from one hierarchical step in the type of control to the next, i.e. passive control to active control and active control to elimination.

STANDARDS AUSTRALIA

Australian Standard

Manual of uniform traffic control devices

Part 7: Railway crossings

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies traffic control devices to be used to control and warn traffic at and in advance of railway crossings at grade. It specifies the way in which these devices are used to achieve the level of traffic control required for the safety of rail traffic and road users, including pedestrians. Requirements and guidance are also given in appendices on the illumination and reflectorization of signs, on their installation and location, and on selection of the appropriate sign size.

1.2 OBJECTIVE

The objective of this Standard is to provide for the uniform application of the traffic control devices specified for each method of control for traffic approaching and using a railway crossing and for the uniform application of safety measures designed to provide the separation of road and rail traffic.

1.3 APPLICATION

This Standard shall apply to new crossings and existing crossings where a change, such as an upgrade or addition of a new vehicle type, is planned. Otherwise, this Standard is not intended to be retrospective.

The requirements of this Standard are not applicable to railway crossings provided for the exclusive use of the occupier of private land or by other people with the knowledge and agreement of the occupier (sometimes known as ‘occupation’ crossings).

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1428	Design for access and mobility
1428.1	Part 1: General requirements for access—New building work
1742	Manual of uniform traffic control devices
1742.2	Part 2: Traffic control devices for general use
1742.3	Part 3: Traffic control devices for works on roads
1742.4	Part 4: Speed controls
1742.12	Part 12: Bus, transit, tram and truck lanes
1742.14	Part 14: Traffic signals
1743	Road signs—Specification
2144	Traffic signal lanterns
2979	Traffic signal mast arms
A1 7658	Railway infrastructure: Railway level crossings

AS/NZS

- 1158 Lighting for roads and public spaces
- 1158.3.1 Part 3.1: Pedestrian area (Category P) lighting—Performance and design requirements
- 1428 Design for access and mobility
- 1428.4.1 Part 4.1: Means to assist the orientation of people with vision impairment—Tactile ground surface indicators
- 1906 Retroreflective materials and devices for road traffic control purposes
- 1906.1 Part 1: Retroreflective sheeting
- HB 197 An introductory guide to the slip resistance of pedestrian surface materials

Austroads

Research Report, AP_R347/09, Heavy Vehicle Sight Distance Requirements at Rail Crossings (Stage 2), November 2009

Guide to Traffic Management

Guide to Road Design

ARRB

ARRB report 'Determination of vehicle average acceleration and grade correction factors based on Austroads project R347/09' May 2014.

National Heavy Vehicle Regulator (NHVR)

PBS Scheme—The Standards and Vehicle Assessment Rules

Available at:

<https://www.nhvr.gov.au/road-access/performance-based-standards/about-performance-based-standards>

1.5 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.5.1 Active control

Control of the movement of vehicular or pedestrian traffic across a railway crossing by devices such as flashing signals, gates or barriers, or a combination of these, where the device is activated prior to and during the passage of a train through the crossing.

1.5.2 Downstream

For the direction of travel of traffic (rail or road), a location that is after a vehicle would pass through a level crossing.

1.5.3 Light rail vehicle/tram (light rail network/tramway)

Urban public transport systems comprising railed vehicles, which commonly but not necessarily travel on streets intermingling with road traffic (e.g. they can be grade separated, or even have completely segregated infrastructure). Light rail vehicles/trams may have exclusive or shared rights of way with road vehicles. They typically maintain separation from other traffic by line of sight.

1.5.4 May

Indicates the existence of an option.

1.5.5 Passive control

Control of the movement of vehicular or pedestrian traffic across a railway crossing by signs and devices, none of which are activated during the approach or passage of a train, and which rely on the road user including pedestrians detecting the approach or presence of a train by direct observation.

1.5.6 Pedestrians

People travelling on foot or using mobility aids (e.g. wheelchairs, scooters) or walking with bicycles, baby carriages or animals.

1.5.7 Railway

A guided track system together with associated infrastructure designed for the movement of rolling stock and includes a heavy railway, a light railway, an inclined railway or a tramway, having a nominal gauge in each case of not less than 600 mm.

1.5.8 Railway crossing

Any crossing of a railway at grade, providing for vehicular traffic and/or other road users, including pedestrians.

1.5.9 Shall

Indicates that a statement is mandatory.

1.5.10 Should

Indicates a recommendation.

1.5.11 Traffic control device

Any sign, signal, pavement marking or other installation placed or erected by a public authority or official body having the necessary jurisdiction, for the purpose of regulating, warning or guiding road users.

1.5.12 Upstream

For the direction of travel of traffic (rail or road), a location that is before a vehicle would arrive at a level crossing.

1.5.13 85th percentile speed (V_{85} km/h) (operating speed)

The speed at or below which 85% of road vehicles are observed to travel under free-flowing conditions past a nominated point. A vehicle is considered to be operating under free-flowing conditions when the preceding vehicle has at least four seconds headway and there is no apparent attempt to overtake the vehicle ahead.

NOTE: For the purpose of this Standard, it is normal to include all types of vehicles on the road and to aggregate the results of measurements unless specifically noted otherwise. It is desirable to make speed measurements by unobtrusive means. A detailed guide to the determination of 85th percentile speed is given in AS 1742.4.

1.6 COOPERATION BETWEEN ROAD AUTHORITIES AND RAIL INFRASTRUCTURE MANAGERS

Attention is drawn to the need for meaningful cooperation on maintenance and safety issues at railway crossings between the relevant road authorities (also known as road managers) and rail infrastructure managers (e.g. via level crossing interface agreements where they exist, as per National Rail Safety Law). The safety of railway users is heavily dependent among other things, on the successful control and guidance of road users approaching a crossing. Equally the safety of road users is dependent on their ability to detect the approach of a train. Although the responsibility for provision and maintenance of various traffic control devices may be split between multiple parties, there needs to be coordination of risk assessment, maintenance and safety audit activities. Any changes in infrastructure or operation contemplated by one party that may increase the risk should be done in consultation with the other. This includes the addition of new road vehicle classes to particular routes, and changes in rail line speed.

1.7 RESTRICTED ACCESS ROAD VEHICLES

This Standard applies generally to the use of railway crossings by standard road vehicles of the types permitted unrestricted access under applicable traffic regulations. If restricted access vehicles or vehicles operating under permit (e.g. overdimensional vehicles) are to be allowed to use a railway crossing, requirements for the safe operation of the crossing may need to be modified or any increased risk managed in another appropriate way.

SECTION 2 SIGNS, DEVICES AND ASSEMBLIES — DESCRIPTION AND USE

2.1 GENERAL

Standard assemblies of signs and devices used at railway crossings are designated in the series RX-1 to RX-12, and are listed in Table 2.1. Where flashing signals are used at a crossing, they are shown as an element of the appropriate assembly. Signs used either alone or as components of these assemblies are listed in Table 2.2.

The description and use of signs and assemblies is given as follows:

- (a) *Passive control devices* Clause 2.2.
- (b) *Active control devices* Clause 2.3.
- (c) *Devices used in either form of control* Clause 2.4.

Guidance on the illumination and reflectorization of signs and assemblies, their location and the selection of the appropriate sign sizes, is given in Appendices A, B and C, respectively. Specific requirements for the reflectorization of certain signs in the immediate vicinity of railway crossings are given in Appendix A.

Detailed specifications for the manufacture of signs are given in AS 1743.

TABLE 2.1
ASSEMBLIES USED AT RAILWAY CROSSINGS

Assembly	Assembly designation	Signs incorporated	Reference Clause
Railway crossing GIVE WAY assembly	RX-1	R6-25, W7-2-2, R1-2	2.2.1
Railway crossing STOP assembly	RX-2	R6-25, W7-2-2, R1-1, G9-48	2.2.2
Railway crossing diagrammatic warning assembly with LOOK FOR TRAINS	RX-3-1 RX-3-2 RX-3-3	W7-8, G9-48 W7-9(L), G9-48 W7-9(R), G9-48	2.2.4
Railway crossing ON SIDE ROAD assembly—Passive control crossing	RX-4	W7-7(R), W8-3(L or R)	2.2.5
Railway crossing flashing signal assembly	RX-5	R6-25, W7-2-2, R6-9	2.3.1
Railway crossing gate position assembly	RX-6	R6-25, W7-2-2 (beside gates); R6-8 (on gates)	2.3.2
Railway crossing flashing signal ahead ON SIDE ROAD assembly	RX-7	W7-4, W8-3(L or R)	2.3.5
Railway crossing RAILWAY GATE, ON SIDE ROAD assembly	RX-8	W7-15, W8-3(L or R)	2.3.6
Railway crossing width marker assembly	RX-9	G9-32, G9-33, D4-3 (L and R)	2.4.2
Railway crossing x m (km) ahead—Passive control crossing	RX-10	W7-7(L and R), W8-5	2.2.3
Railway crossing flashing lights active advance warning signal assembly	RX-11	W7-4, W8-27	2.3.7
Red symbolic standing pedestrian signal	RX-12		6.5.3

TABLE 2.2
SIGNS USED AT RAILWAY CROSSINGS

Sign	Sign number	Size, mm	Used in assembly
STOP	R1-1A R1-1B	600 × 600 750 × 750	RX-2
GIVE WAY	R1-2A R1-2B	750 (ht) 900 (ht)	RX-1
NO ENTRY (special small size for pedestrian gate)	R2-4	300 × 300	RX-6
STOP (gate sign)	R6-8C R6-8D	750 (dia) 900 (dia)	RX-6
STOP ON RED SIGNAL	R6-9	450 × 600	RX-5
RAILWAY CROSSING position	R6-25B	1350 × 900	RX-1 RX-2 RX-5
(Number) . . . TRACKS	W7-2-2	1000 × 150	RX-6
TRAMWAY CROSSING position	R6-26	1350 × 900	
Stop Sign Ahead	W3-1A W3-1B W3-1C	600 × 600 750 × 750 900 × 900	
Railway Crossing Flashing Signals Ahead	W7-4A W7-4B W7-4C	Not used 750 × 750 900 × 900	Alone and RX-11
Railway Crossing (passive control) Ahead—Symbolic Train	W7-7A (L, R) W7-7B (L, R) W7-7C (L, R)	600 × 600 750 × 750 900 × 900	Alone and RX-10
Railway Crossing Ahead Diagrammatic			
—Right Angle Crossing	W7-8A, B, C	A-600 × 600	RX-3
—Oblique Crossing	W7-9(L, R)A, B, C	B-750 × 750 C-900 × 900	
—Crossing on Side Road	W7-12(L, R) A, B, C	A-600 × 600	See Clause 2.2.6
—Crossing on Cross Road	W7-13(L, R) A, B, C	B-750 × 750	
—Crossing on Bar of T-junction	W7-17(L, R) A, B, C	C-900 × 900	
Railway Crossing Pedestrian Warning			
— Look for trains, (number) tracks	W7-14-4	300 × 450	
— Look for trains	W7-14-5	300 × 450	
Do not cross while.....	W7-14-6	450 × 400	
RAILWAY GATE	W7-15A W7-15B W7-15C	600 × 600 750 × 750 900 × 900	RX-8
ON SIDE ROAD	W8-3A W8-3B W8-3C	600 × 400 750 × 500 900 × 600	RX-4 RX-7 RX-8
(Distance) m	W8-5A W8-5B W8-5C	Not used 750 × 250 900 × 300	RX-10

(continued)

TABLE 2.2 (continued)

Sign	Sign number	Size, mm	Used in assembly
RAILWAY CROSSING	G9-32 G9-33	2100 × 450 2100 × 450	RX-9
LOOK FOR TRAINS	G9-48A G9-48B G9-48C	600 × 600 750 × 750 900 × 900	RX-2 RX-3
Cyclists Dismount	G9-58A	450 × 450	
KEEP TRACKS CLEAR	G9-67-1A G9-67-1B	600 × 600 750 × 750	
KEEP TRACKS CLEAR (box marking)	G9-67-2	600 × 1200	
Emergency Exit, Push Gate	G9-68	400 × 300	
RAILWAY CROSSING NOT IN USE	G9-74	750 × 600	
Width marker	D4-3 (L or R)	450 × 900	RX-9
Chevron alignment marker	D4-6A D4-6B D4-6C	600 × 750 750 × 900 900 × 1100	

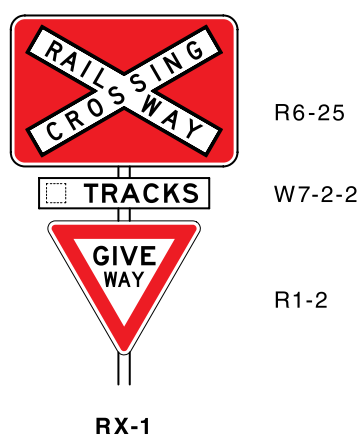
2.2 PASSIVE CONTROL DEVICES

2.2.1 Railway crossing give-way assembly (RX-1)

The RX-1 assembly shall be used at railway crossings controlled by GIVE WAY signs (see Clause 4.2).

It is located on the left side of the roadway at the point at which vehicles must stop if a train is approaching. On divided roads it will usually be necessary to repeat the RX-1 assembly on the median. A give-way line shall be used on sealed pavements to define further the safe stopping position (see Clause 3.4).

Sign W7-2-2, (Number) . . . TRACKS, shall be used at all multiple track crossings.



2.2.2 Railway crossing stop assembly (RX-2)

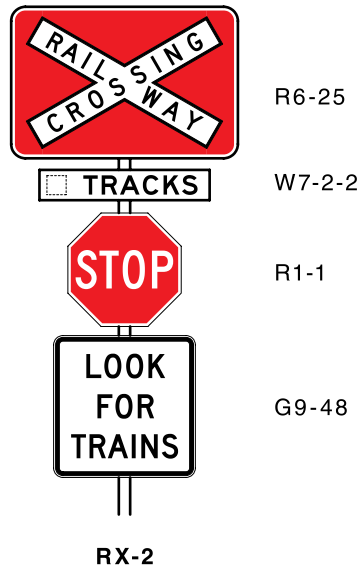
The RX-2 assembly shall be used at a railway crossing where the requirements of Clause 4.2 indicate that the crossing is to be controlled by STOP signs.

It is located on the left side of the roadway at the point at which vehicles are required to stop. On divided roads it will usually be necessary to repeat the RX-2 assembly on the median.

Sign W7-2-2, (Number) . . . TRACKS, shall be used at all multiple track crossings.

A stop line shall be used on sealed roads in conjunction with the RX-2 assembly (see Clause 3.3).

A Stop Sign Ahead sign (W3-1) is normally required (see Clause 2.2.7).



2.2.3 Railway crossing ahead—Passive control (W7-7, RX-10)



W7-7(R)

The W7-7 sign is used to give advance warning of a railway crossing controlled by passive devices, i.e. GIVE WAY signs or STOP signs. It shall be used as the first warning device encountered, except where long distance advance warning signs are used (see below), or where this Standard specifically exempts crossings from the need for advance signs (see Clauses 4.2.2 and 4.4.2).



W7-7(L)

Where a single sign is adequate, the W7-7(R) sign shall be placed on the left side of the carriageway. Where the sign needs to be repeated on the right-hand side of the road for added emphasis, e.g. on a high volume road or on a left hand curve, the W7-7(L) sign shall be used.



RX-10

W7-7(R)

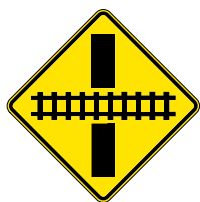
W8-5

If long distance advance warning is required, the RX-10 assembly should be used to show the distance to the crossing, typically 500 m to 1 km on a high speed rural road. This assembly, if used, shall be additional to and not replace the W7-7 signs required in the standard positions indicated above.

The assembly used where the crossing is on a side road is described in Clause 2.2.5.

W7-7 signs shall not be used at active railway crossings.

2.2.4 Railway crossing diagrammatic warning assemblies (RX-2-1, RX-3-2 and RX-3-3)



W7-8



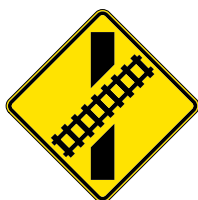
G9-48

RX-3-1

The diagrammatic warning assembly shall be used as the second or intermediate sign in advance of railway crossings controlled by GIVE WAY signs, except where this Standard specifically exempts crossings from the need for advance signs (see Clauses 4.2.2 and 4.4.2). It is located between the first advance warning sign (W7-7) and the crossing.

The assembly is generally required on the left side of the carriageway only, unless it needs to be repeated on the right side for added emphasis or visibility. Assemblies are used as follows:

- (a) RX-3-1 is used on a straight approach where the railway crosses the road substantially at right angles.
- (b) RX-3-2 and RX-3-3 are used on a straight approach where the railway crosses the road obliquely such that road users need to be warned to adjust the directions in which they should look for approaching trains.



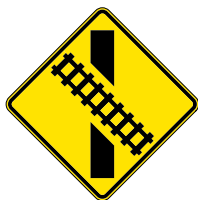
W7-9(L)



G9-48

RX-3-2

If the road or railway or both curve near the crossing such that the direction in which a driver should search for oncoming trains is different from the direction of the rails at the crossing, the assembly should be selected which most clearly indicates the direction of search at or just in advance of its position.



W7-9(R)



G9-48

RX-3-3

If the road on the approach to, or through the crossing is on a substandard curve or reverse curve, the appropriate curve, turn or reverse curve/turn sign with advisory speed sign, selected in accordance with AS 1742.2, shall be placed in advance of the RX-3 assembly, with the W7-7 sign (see Clause 2.2.3) located further in advance.

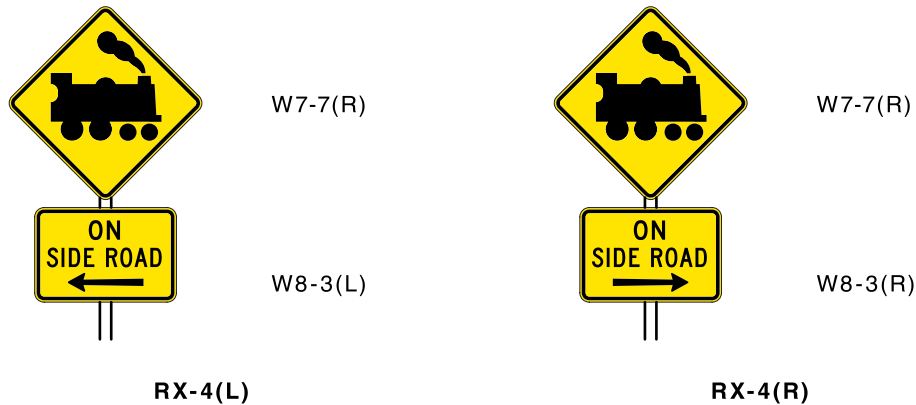
2.2.5 Railway crossing on side road assembly (RX-4)

The RX-4 assembly shall be used in lieu of the RX-3 assembly to give advance warning of a crossing controlled by passive devices, i.e. GIVE WAY signs or STOP signs, and which—

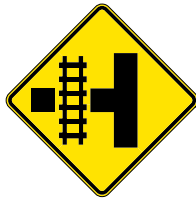
- (a) is on an intersecting road; and
- (b) is too close to the intersection to provide the appropriate distance required for erection of the W7-7 sign and the RX-3 assembly on the side road, see Figure 4.9, Note 5 and Figure 4.10, Note 5.

NOTES:

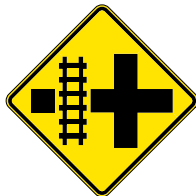
- 1 The W7-7(R) sign is used on both the left and right hand versions of the RX-4 assembly.
- 2 In order not to downgrade the impact of the RX-4 assembly when used to warn of public railway crossings on side roads, it should not be used for farm access or other low vehicle volume property access crossings.



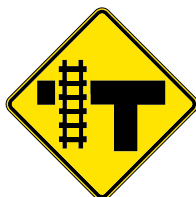
2.2.6 Diagrammatic warning signs, on side road (W7-12, W7-13, W7-17)



W7-12(L)



W7-13(L)



W7-17(L)

If the intersection itself requires an intersection warning sign in accordance with AS 1742.2, signs W7-12, W7-13, shall be used.

When required, signs W7-12 and W7-13 shall be used at railway crossings on intersecting roads in conjunction with the RX-4 assembly where the crossings are controlled by either STOP or GIVE WAY signs. They are located as the first advance warning of the crossing, i.e. in advance of the RX-4 assemblies.

W7-12 (L or R) is used where the crossing is on a side road which makes a T-junction with the through road. This sign may also be used to indicate a crossing on the stem of a T-junction on which a driver is travelling, by rotating it through 90 degrees.

W7-13 (L or R) is used where the crossing is on a side road which forms a crossroad with the through road.

W7-17 (L or R) is used where the crossing is on the bar of a T-junction to warn traffic approaching along the stem.

2.2.7 Stop Sign Ahead (W3-1)



W3-1

The Stop Sign Ahead sign shall be used as the second or intermediate sign in advance of railway crossings controlled by STOP signs, except where this Standard specifically exempts crossings from the need for advance signs (see Clauses 4.2.2 and 4.4.2).

2.3 ACTIVE CONTROL DEVICES

2.3.1 Railway crossing flashing signal assembly (RX-5)



R6-25

W7-2-2

R6-9

RX-5

A1

The RX-5 assembly shall be used at crossings that require flashing signal control.

NOTE: For new or refurbished RX-5 assemblies, the R6-25 sign is to be preferred. The sign should be the same on all assemblies facing any one approach to the crossing.

The railway crossing flashing signal shall consist of twin red circle aspects arranged horizontally and equipped to flash alternately. They may also include provision of multiple flashing signals to cover all approaches (for example see Figure 2.1).

The railway crossing flashing signal assembly shall conform to the performance requirements in AS 7658.

The RX-5 assembly may be supplemented by boom barriers (see Clause 2.3.8).

Sign W7-2-2, (Number) . . . TRACKS, shall be used at all multiple track crossings.

Overhead flashing signals should be used in conjunction with pedestal mounted assemblies in the following cases:

- (a) Where stopping sight distance to the pedestal mounted assembly is inadequate, e.g. because of vertical or horizontal alignment or other sight obstruction.
- (b) Where due to sight obstruction caused either by road geometry or frequent presence of high vehicles, the pedestal mounted assembly is not continuously visible as the road user approaches the crossing over the stopping sight distance.
- (c) Where there are more than two traffic lanes on the approach.

Consideration should be given to the potential for confusion with adjacent road intersection signals.

A typical mast-arm arrangement is shown in Figure 2.1. Further details regarding mast arms are provided in AS 2979.

Overhead signals may be needed on side road approaches to a crossing if any of these requirements are met for traffic on these approaches.

Extended range signal lanterns may be used as recommended in AS 2144.

If intersection type traffic signals are to be incorporated into the RX-5 assembly, they shall be located immediately above the railway crossing flashing signals and below the R6-25 sign.

NOTE: A black supplementary target board of suitable size may be used to enhance the visibility of flashing signals.

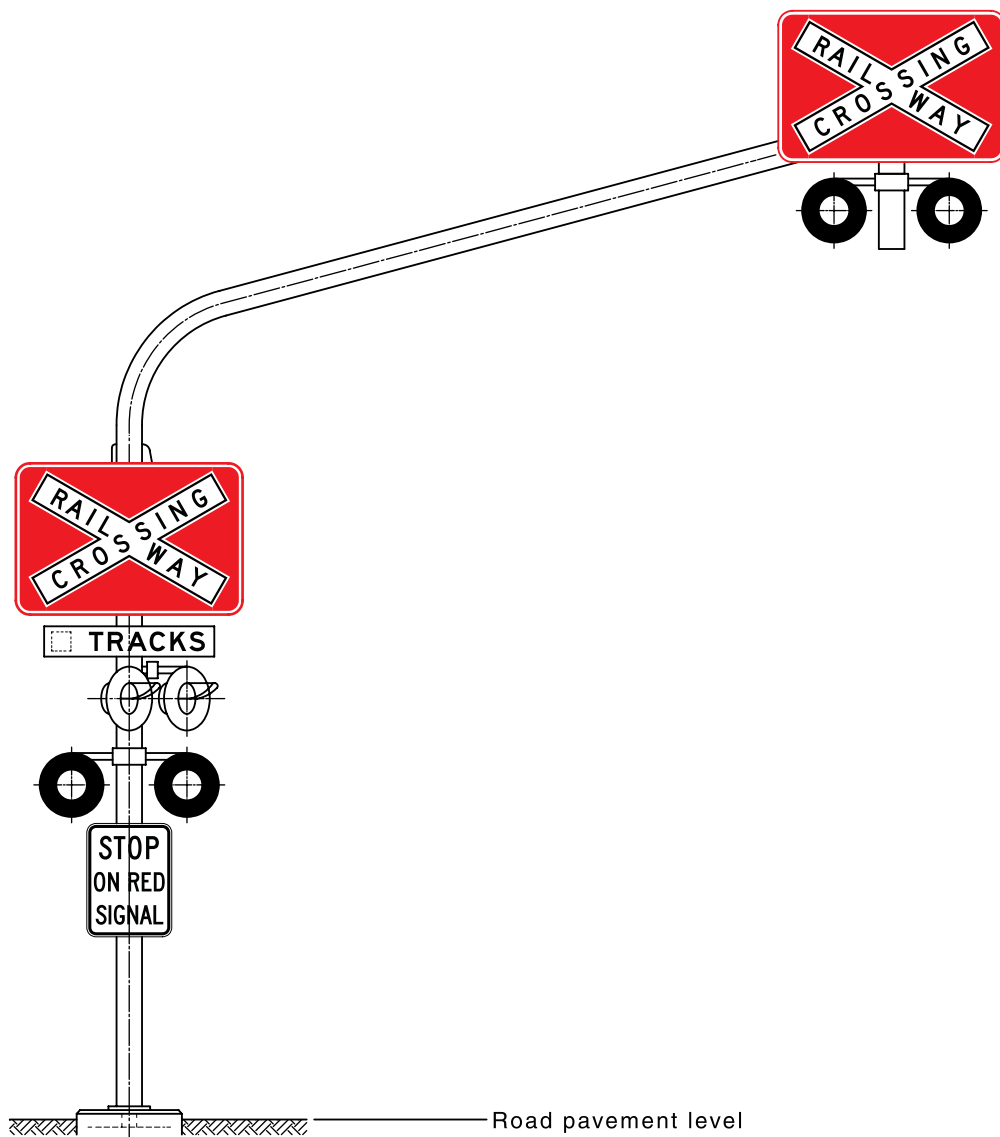


FIGURE 2.1 OVERHEAD FLASHING SIGNAL ASSEMBLY

2.3.2 Railway crossing gate position sign assembly (RX-6)



RX-6



R6-8

R6-25

W7-2-2

The RX-6 assembly comprises a STOP banner (R6-8) attached to the gate, and a RAILWAY CROSSING position sign assembly placed to the left of the gate, and shall be used at all crossings provided with gates. It is not used with boom barriers.

On crossings with a single gate, the R6-8 sign shall be placed on the gate so that it is clearly visible to the oncoming traffic when the gate is closed.

When double gates are used, the R6-8 sign shall be placed on both gates to face approaching traffic.

Only the C or D size R6-8 sign shall be used on railway gates.

Sign W7-2-2, (Number) . . . TRACKS, shall be used at all multiple track crossings.

2.3.3 Railway Crossing Flashing Signals Ahead sign (W7-4)



W7-4

The W7-4 sign shall be used to give advance warning of a crossing controlled by flashing signals (see Clause 2.3.1) including those where boom barriers are installed in conjunction with the signals.

Where the crossing is on the side road, an RX-7 assembly shall be used instead of this sign (see Clause 2.3.5).

This sign may need to be repeated on the right-hand side of the carriageway for added emphasis, e.g. on high volume roads. It may also need to be repeated at a long distance (e.g. 500 m) in advance of the crossing, in which case the Distance plate, W8-5, shall be mounted below the sign.

2.3.4 RAILWAY GATE (W7-15)



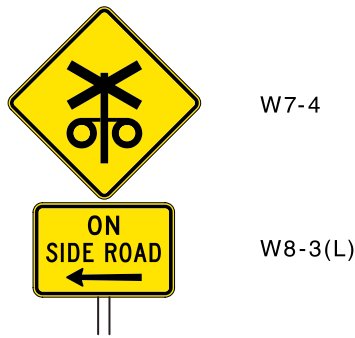
W7-15

The RAILWAY GATE sign shall be used to give advance warning of a crossing controlled by gates. It is positioned on the left side of the carriageway at the appropriate distance from the crossing.

Where a crossing is on a side road, an RX-8 assembly shall be used instead of this sign (see Clause 2.3.6).

This sign may need to be repeated on the right-hand side of the carriageway on high volume roads or other road types for added emphasis. It may also need to be repeated at a long distance (e.g. 500 m) in advance of the crossing, in which case the Distance plate, W8-5, shall be mounted below the sign.

2.3.5 Railway crossing flashing signals ahead on side road assembly (RX-7)



RX-7

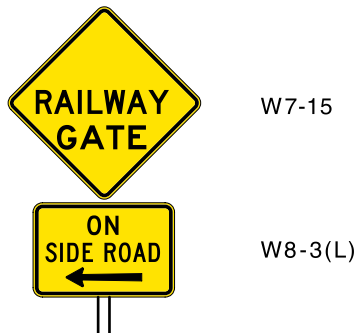
The RX-7 assembly shall be used to give advance warning on a through road of a crossing which is controlled by flashing signals when the crossing—

- (a) is on a side road; and
- (b) is too close to the intersection to provide the appropriate distance required for erection of the W7-4 sign on the side road (see Figure 4.11, Note 4).

The assembly shall be positioned on the through road on the left side of each approach to the intersection.

For a side road on the right the W8-3(R) sign shall be used.

2.3.6 Railway crossing gate on side road assembly (RX-8)



RX-8

The RX-8 assembly shall be used to give advance warning on a through road of a crossing which is controlled by gates when the crossing—

- (a) is on a side road; and
- (b) is too close to the intersection to provide the appropriate distance required for erection of the W7-15 sign on the side road (see Figure 4.12, Note 4).

The assembly shall be positioned on the through road on the left side of each approach to the intersection.

For a side road on the right the W8-3(R) sign shall be used.

2.3.7 Active advance warning assembly (RX-11)

Active advance warning assemblies may be provided in advance of a crossing to supplement railway crossing flashing signals by providing visual advance warning to road users that there is a requirement to stop at a railway crossing due to the impending activation and during operation of the railway crossing flashing signals at the crossing. The lights in the advance warning assembly begin flashing a predetermined number of seconds before the crossing signals activate.

NOTES:

- 1 Guides for use of this device together with recommended methods of locating the assembly and setting its operational timing are given in Appendix E.
- 2 These assemblies are particularly effective in improving safety on high speed road approaches used by heavy vehicles or where the required visibility to the flashing signals at the crossing cannot be attained by other measures.

Where used, the RX-11 assembly shall comprise the following elements:

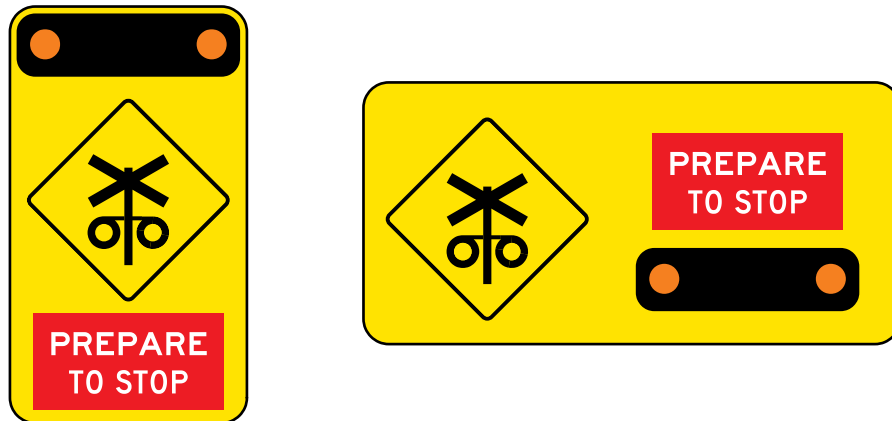
- (a) Railway Crossing Flashing Signals Ahead (W7-4) sign.
- (b) PREPARE TO STOP panel.*

* A suitable design for this panel is shown as Sign No. W8-27 in AS 1743.

- (c) Two alternately flashing yellow lights each conforming to the performance requirements for a yellow traffic signal lantern in AS 2144. The flash cycle shall be the same as that used for the railway crossing flashing signals.

Items (a) and (b) shall be displayed on a yellow rectangular signboard.

Typical formats are shown in Figure 2.2.



RX-11 Vertical format

RX-11 Horizontal format

FIGURE 2.2 EXAMPLES OF RX-11 ACTIVE ADVANCE WARNING ASSEMBLIES

2.3.8 Boom barrier

2.3.8.1 General description and placement

Boom barriers shall comprise as a minimum, a boom extending from the left side of the roadway—

- (a) to the right hand kerb or edge of a one-way roadway;
- (b) to the edge of a median island; or
- (c) in the case of a two-way roadway, to the dividing line or centre of the roadway if no line is marked.

The boom in its lowered state should be placed at right angles to the road centre-line.

2.3.8.2 Design

The boom shall be a minimum width of 100 mm in the vertical plane and may taper from a maximum width of 150 mm at its support end. It shall have 100 mm wide longitudinal strips of retroreflective material on each face, each comprising alternating red and white bands each 450 ± 50 mm in length with ends at 45 degrees to the vertical. The outer band shall be white. The boom shall be equipped with a minimum of three red lamps visible from both directions. The outer lamp shall be steady and the inner two flashing alternately. A typical assembly is shown in Figure 2.3.

NOTE: The height of the boom above road level in its lowered position is subject to Rail Infrastructure Manager requirements. It will generally be between 850 mm and 1000 mm.

2.3.8.3 Preventing misuse

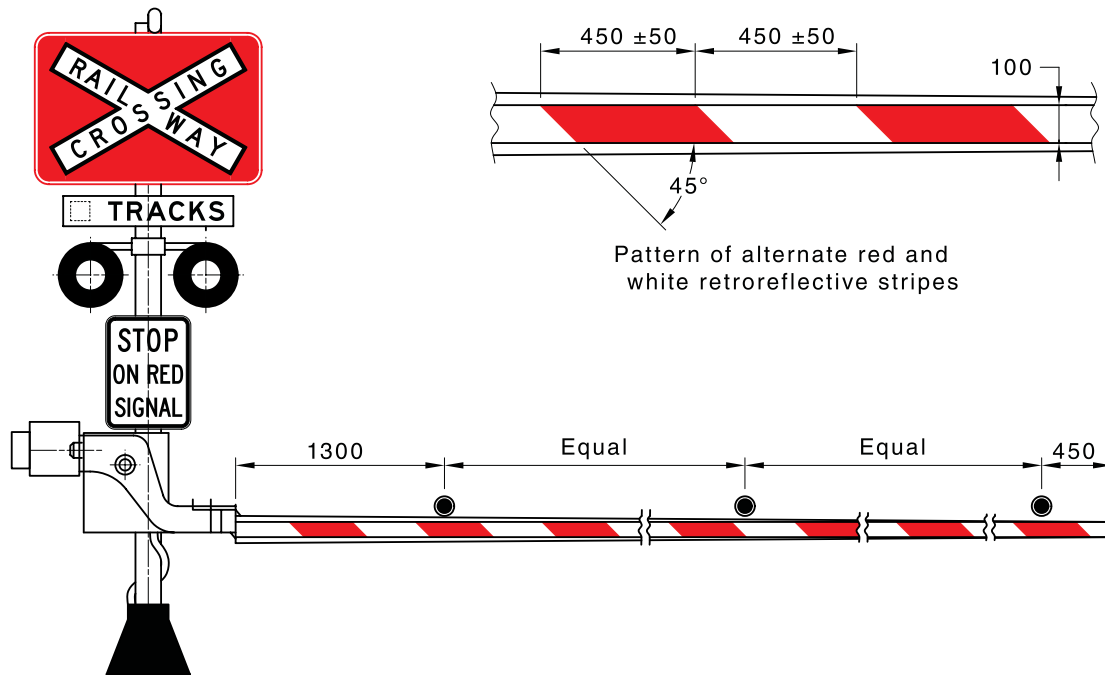
Where on an undivided road there is a history of drivers skirting the barrier in its lowered position, the following steps are recommended to inhibit the practice:

- (a) Provision of a median island on the relevant approaches to the crossing.
- (b) Addition of frangible bollards or fencing in the median.

If a median island extends partly onto the crossing it shall be fully mountable to permit any trapped vehicle to escape across it and shall not infringe the railway minimum structure outline.

2.3.9 Traffic signals at light rail/tramway crossings

Intersection type traffic signals may be used in lieu of RX-5 flashing signal assemblies to provide active control of light rail/tramway crossings in urban areas. Where used, the road approach shall be treated as though it were an approach to an intersection, i.e. with signs and markings provided in accordance with AS 1742.2 and signals in accordance with AS 1742.14. Neither boom barriers nor signs of the type R6-25 or R6-26 shall be used.



DIMENSIONS IN MILLIMETRES

FIGURE 2.3 TYPICAL RAILWAY CROSSING FLASHING SIGNAL AND BOOM BARRIER ASSEMBLY

2.4 DEVICES USED AT EITHER ACTIVE OR PASSIVE CONTROL CROSSINGS

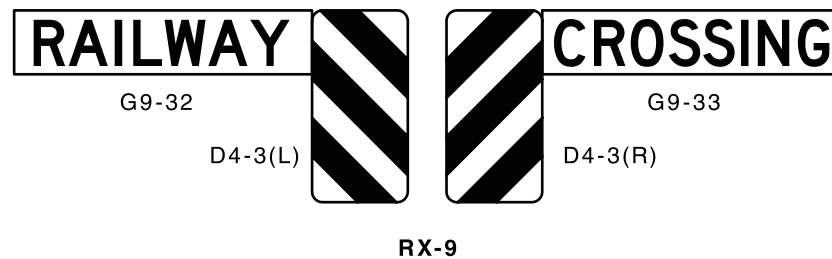
2.4.1 (Distance) m (W8-5)



W8-5

The distance plate shall be used in conjunction with advance warning signs where long distance (e.g. 500 m) advance warning is required.

2.4.2 Railway crossing width marker assembly (RX-9)



The RX-9 assembly should be used as illustrated in Figure 2.4 where the conspicuity of the crossing needs to be enhanced, typically on high speed rural road approaches. It is located immediately in advance of the RX-1, RX-2 or RX-5 assemblies (see Clauses 2.2.1, 2.2.2 and 2.3.1) and on each side of the railway crossing.

Alternatively, if the road approach to the railway crossing is on a sharply curved alignment, it may be desirable to erect both the RAILWAY and CROSSING signs together on one side of the roadway on the outside of the curve at the end of the approach straight with Chevron alignment markers (D4-6) (Clause 2.4.3) mounted above and beside them. The width markers (D4-3) are then mounted on either side of the road at the crossing.

In either of the above installations, care needs to be taken that the signs or assemblies do not obstruct sight lines to trains for road users, including pedestrians, at passive control crossings, or to other road traffic at any crossing.

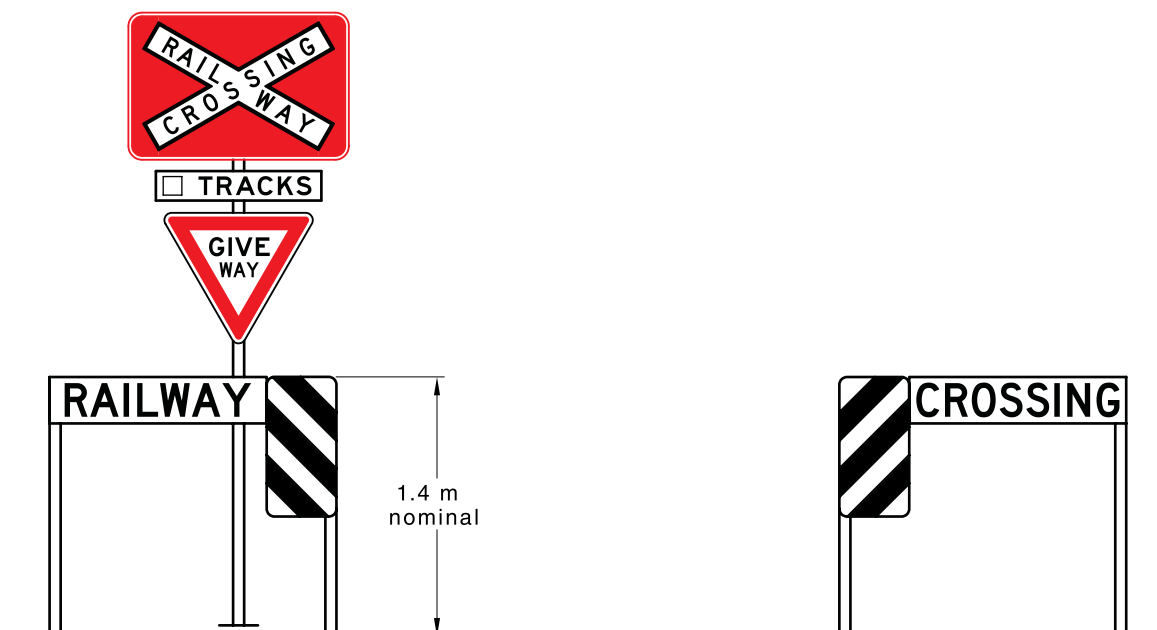


FIGURE 2.4 ARRANGEMENT OF RAILWAY CROSSING SIGNS WITH WIDTH MARKERS

2.4.3 Chevron alignment marker (D4-6)



D4-6

Chevron alignment markers (D4-6) are used where the road approach to the railway crossing is on a sharply curved alignment. The markers should be positioned around the back of the curve as recommended in AS 1742.2. Where close spacing of the markers is required, they may be placed both beside and above the G9-32/G9-33 assembly so that the desired regular spacing is achieved.

2.4.4 KEEP TRACKS CLEAR (G9-67-1, G9-67-2)



G9-67-1



G9-67-2

The G9-67-1 sign shall be used where traffic is likely to queue inadvertently across a crossing due to a downstream traffic delay. Other measures shall be used as appropriate to reduce the risk of a train/road user collision from this cause, see Clauses 5.2 and 5.3.

The G9-67-2 sign shall be used where yellow box markings (see Clause 3.6) have been placed on the crossing. The word 'TRACKS' may be omitted from the G9-67-2 sign.

2.4.5 TRAMWAY CROSSING position (R6-26)



R6-26

This sign may be used in lieu of Sign R6-25 in Assemblies RX-1, RX-2, RX-5 and RX-6 at a crossing of an urban public transport light rail/tramway or where the tracks are in their own dedicated right-of way which is not within a road.

These signs shall not be used where the crossing is controlled by traffic signals, see Clause 2.3.9.

2.4.6 RAILWAY CROSSING NOT IN USE (G9-74)



G9-74

Where the conditions in Clause 4.6 are met this sign shall be used.