PREFACE

Part 2 is based on AS 1742.2 – Traffic Control Devices for General Use.

This Part deals with traffic control devices for general use and is applicable to all roads other than freeways. It has been divided into two main sections, one dealing with controls at intersections and the other with controls between intersections. The latter section being further divided by relating the devices to specific traffic situations and problem areas between intersections.

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1.1 SCOPE
This Part of the Manual specifies requirements for regulatory and warning signs, pavement markings and other devices for general use on roads including expressway type roads, and sets out the way they are applied at intersections and interchanges, between intersections, and at a number of specific situations including substandard horizontal and vertical curves, approaches to structures and obstructions, changes in pavement width, climbing and overtaking lanes, steep grades and water crossings.

1.2 APPLICATION
Apart from specific exceptions in the text this Part of the Manual applies to all roads other than unsealed roads in remote areas (see Clause 1.4.4). Provisions of this Part of the Manual should be applied in the latter case wherever relevant.

1.3 REFERENCED DOCUMENTS
The following documents are referred to in this Part of the Manual:

AS
1163 Structural steel hollow sections
1348 Road and traffic engineering – Glossary of terms
1743 Road signs Specifications
1744 Forms of letters and numerals for road signs
1906 Retroreflective materials and devices for road traffic control purposes
1906.3 Part 3: Raised pavement markers (retroreflective and non-retroreflective)
2144 Traffic signal lanterns
2700 Colour standards for general purposes
4049 Paints and related materials – Road marking materials
4001 Motor vehicles - Rear marker plates
4001.1 Part 1: Manufacturing and classification requirements for Class 1A and Class 1 reflective plates

AS/NZS
1158 Lighting for roads and public spaces
1158.1.1 Part 1.1: Vehicular traffic (Category V) lighting - Performance and design requirements
1906 Retroreflective materials and devices for road traffic control purposes
1906.1 Part 1: Retroreflective sheeting
1906.2 Part 2: Retroreflective devices (non-pavement application)
2009 Glass beads for pavement-marking materials
3845 Road safety barrier systems

AUSTROADS
Rural Road Design, 2003
1.4 DEFINITIONS

For the purpose of this Part of the Manual the definitions in AS 1348 and those below apply.

1.4.1 Annual average daily traffic (AADT)
The total yearly traffic volume in both directions at a road location, divided by the number of days in the year.

NOTE: This term also applies to estimates of AADT based on short-term traffic volume counts.

1.4.2 Expressway type road (expressway)
A divided highway for through traffic with full or partial control of access and generally with grade separation at intersections. The term includes expressways, freeways, tollways and motorways (as defined in AS 1348).

1.4.3 May
A permissive condition. Where the word "may" is used, it indicates that usage of the device is conditional, or optional. Usually, no specific requirement for design or application is intended.

1.4.4 Merge
The point, the area or the manoeuvre where a line of traffic is required to join with another line when a lane is discontinued, by either a zip-merge or a lane change.

1.4.5 Road in a remote area
Unless otherwise determined by the road authority, a road in a sparsely populated area with a traffic volume less than 50 vpd.

1.4.6 Shall
A mandatory condition. Where certain requirements in the design or application of the device are described with the "shall" stipulation, it is mandatory that when an installation is made, these requirements be met.

1.4.7 Should
Indicates a recommendation. Where the word "should" is used, it is considered to be recommended usage, but not mandatory. Any recommendation that is not applied must be based on sound traffic engineering judgement and documented.

1.4.8 Traffic control device
Any sign, signal, pavement marking or other installation placed or erected under authority of the Transport Operations (Road Use Management) Act for the purpose of regulating, warning or guiding road users.

1.4.9 Zip-merge
The merging of lines of traffic which does not require any line of traffic to change lanes (i.e. by crossing a lane or continuity line) to complete the merge.

NOTE: At time of publication of this Part of the Manual this term was synonymous with the term 'merge' in the Australian Road Rules.

1.4.10 85th percentile speed ($V_{85}$ km/h)
The speed at or below which 85% of vehicles are observed to travel under free-flowing conditions past a nominated point.

NOTE: For the purpose of this Manual it is normal to include all types of vehicle on the road and to aggregate the results of measurements unless specifically noted otherwise. Where speed measuring devices are not available, the 85th percentile speed can often be estimated by travelling the route and attempting to match the average speed of the faster group of vehicles, such speed being an approximation of the 85th percentile speed. Such an estimate may not be reliable where there are substantial differences among observed speeds within this group. Where the Manual indicates application of an 85th percentile speed to the approach to a hazard, intersection or other road feature, it should be measured well in advance of the point where the hazard, intersection or other road feature, itself begins to influence travel speeds, e.g. 200 m urban to 500 m rural in advance. A guide to the determination of 85th percentile speed is set out in Part 4 of this Manual, Appendix C and Appendix G.

1.4.11 Official traffic sign
A traffic control device in relation to which the methods, standards and procedures are prescribed in this Manual or are approved by the Director-General, Transport and Main Roads.
1.5 SPECIFICATION OF SIGNS, MARKINGS AND DELINEATORS

For detailed specifications for the materials and manufacture of the signs and devices, and for pavement marking materials specified in this Part of the Manual reference shall be made to the following Standards:


1.6 RESPONSIBILITY AND AUTHORITY FOR INSTALLATION

Road users are required by law to comply with many of the devices included in this Manual. The Transport Operations (Road Use Management) Act provides that Official Traffic Signs shall be installed only by the authority of the Director-General, Transport and Main Roads or a local government. The Act also provides that any such sign shall be installed in accordance with the methods, standards and procedures prescribed in this Manual.

Where a regulatory sign or device is erected, removed or changed e.g. alteration to speed limit or sign size, it is necessary to record the circumstances for use in any prosecutions or litigation. Form M994 is used for this purpose. Procedures for the recording of regulatory signs on roads controlled by the Department of Transport and Main Roads are given in Appendix C to Part 1 of this Manual.

The placement of traffic signs or devices on or adjacent to the road by a private or commercial organisation without the authority of the controlling body causes distraction and lessens the effect of devices essential to the road user. Display of unofficial and non-essential devices should not be permitted.

1.7 GENERAL PRINCIPLES

1.7.1 Basic principles for all traffic control devices

To achieve the purpose for which they are installed, traffic control devices should be used only after engineering studies have indicated the need for them. A device should conform to the following basic principles:

(a) It should be capable of fulfilling an important need.
(b) It should command attention.
(c) It should convey a clear, simple meaning with the minimum number of messages required to obtain the desired response from the driver.
(d) It should command respect.
(e) It should be located to give adequate time for response.
(f) It should not obscure any other traffic control devices.

The failure of a device to fulfil its function may result from –

(i) inadequate traffic engineering studies;
(ii) the device conveying the wrong message, or more messages than the driver can assimilate in the reading time available;
(iii) disregard of weather and physical conditions (such as grades and sight distance), driver psychology, and vehicle limitations;
(iv) lack of maintenance;
(v) disrespect caused by excessive use of the device;
(vi) inadequate design of the road facility (traffic control devices cannot overcome inadequacies in the geometric design); or
(vii) placement of the device either too close to other control devices, or too remote from the hazard or place of action, or outside the driver’s normal cone of vision.

It is essential that similar conditions should always be treated with the same type of device so that road users can anticipate the course of action required. The use of a device which is at variance with its use elsewhere is confusing and may create a potentially hazardous situation.
1.7.2 Specific principles for signs

1.7.2.1 General

Traffic signs are provided to aid the safe and orderly movement of traffic. The signs covered by this Part of the Manual contain regulatory requirements and non-regulatory traffic instructions for the road user, warning of hazards that may not be self-evident, and signs delineating hazards.

As uniformity in the design of signs facilitates identification by the road user, the shape and colour of each class of sign shall be in accordance with this Manual. This assists the road user in promptly interpreting the message or instruction which may be either a legend or a symbol, or both.

As signs are an essential part of the road traffic system, their messages should be consistent, their design and placement coordinated with the road geometric design, and their size selected so that they are both conspicuous and legible at required reading distances. Guidance on sign size selection is given in Part 1 of this Manual.

1.7.2.2 Illumination and reflectorisation

Signs that are intended to convey messages during the hours of darkness shall be either illuminated or reflectorised, as given in Part 1 of this Manual, so that their daytime colours and shapes are displayed at night.

1.7.2.3 Installation and location of signs

General principles for the installation and location of signs are given in Part 1 of this Manual.

1.7.2.4 Non-standard signs

Authorities responsible for the erection of signs should not develop signs for their own particular use. However, there may be instances where no suitable standard sign exists. In such cases, the procedures specified in Clause 1.9 of Part 1 of this Manual shall apply. Any sign developed should comply with the design principles specified in this Manual for the particular sign classification as far as is practicable.

1.7.2.5 Excessive use

The use of regulatory and warning signs should be restricted to the minimum consistent with their particular requirements, as signs tend to lose their effectiveness if used unnecessarily or too frequently.

1.7.2.6 Safety aspects

As safety of the road user is of major importance in traffic and highway engineering, traffic control devices and their supporting structures should not present a hazard to road users by contributing to the occurrence or severity of accidents.
SECTION 2. TREATMENTS AT INTERSECTIONS

2.1 SCOPE
This Section specifies regulatory and warning signs, and other devices for use at nonexpressway intersections and sets out principles for their installation together with typical applications. Requirements for expressway type interchanges including ramp terminal intersections are specified in Section 3.

2.2 DEVICES USED
Signs and devices used in or near intersections comprise the following:

(a) *Regulatory signs* –
   Movement Series (R1).
   Direction Series (R2).
   Miscellaneous Series (R6).

(b) *Warning signs* –
   Intersection Series (W2 and W3).

(c) *Guide signs, information signs and route numbering* (G1 to G4, G8) - See Part 15.

(d) *Traffic Instruction signs* (G9).

(e) *Pavement markings*

(f) *Hazard markers* (D1 to D4).

2.3 INTERSECTION CONTROL AND MOVEMENT REGULATION
This Section deals with the control of conflicting traffic streams at grade and the regulation of their movement as follows:

(a) *Stream control*  This is achieved by the following measures:
   (i) Control by STOP signs, see Clause 2.5.
   (ii) Control by GIVE WAY signs, see Clause 2.5.
   (iii) Roundabout control, see Clause 2.6.
   (iv) Control by traffic signals, see Part 14 of the Manual.

   NOTE: STOP sign control, GIVE WAY sign control and roundabout control are NOT a series of hierarchical steps. The use of each is dependent on the geometry of the intersection and in the particular case of STOP and GIVE WAY sign control, the sight distance available for entering traffic.

(b) *Movement regulation*  This is required for the control of turning movements, oneway operation and wrong way entry, see Clause 2.8.

(c) *Hazard warning*  This is required under certain conditions to warn road users on either the major or minor approach to an intersection of the presence or configuration of the intersection or to give advance warning of intersection traffic control devices.

(d) *Direction signposting*  This is dealt with in Part 15 of the Manual.

2.4 APPLICATION OF DEVICES
It is not possible to describe all circumstances that arise at intersections. This Section deals only with the principles of applying and installing the various devices with guides to their use. It is important, however, that similar situations be treated in a consistent manner and that the type of treatment used at a particular intersection is consistent with its importance.

Pavement markings supplement the devices specified in this Section and may also impose regulatory controls. At complex intersections, channelising islands also supplement the devices by directing traffic into the correct path for the route selected.

Devices used to control intersecting streams at an intersection are covered in Clauses 2.5, 2.6 and 2.7. Devices for the regulation of other movements, and for the warning of traffic approaching and within intersections, are covered in Clauses 2.8 to 2.11. Typical intersection treatments are illustrated in Clause 2.12.

Signs for stop, give-way and roundabout control, and the regulation of movements at intersections, are listed in Table 2.1.

Warning signs used in advance of intersections are listed in Table 2.2.
2.5 CONTROL BY GIVE WAY AND STOP SIGNS

2.5.1 General

GIVE WAY signs and STOP signs are used to control traffic at intersections other than those controlled by means of roundabouts or traffic signals, by allocating priority to traffic on one of the intersecting roads.

These signs are provided as follows:

(a) GIVE WAY or STOP signs shall be provided at all intersections with four or more legs.

(b) GIVE WAY or STOP signs shall be provided at any three-way intersection where the layout is such that it is not clear how or whether the T-junction rule would operate, for example, at a Y-junction.

(c) GIVE WAY or STOP signs should be used for road safety reasons at unsignalised T-junctions where the continuing road (i.e. the bar of the T) is an arterial or sub-arterial road, urban or rural.

(d) STOP signs shall be provided instead of GIVE WAY signs on any controlled approach where intersection sight distance is substandard as determined in accordance with Clause 2.5.4. STOP signs shall not be used where intersection sight distance is adequate for GIVE WAY signs.

In all other cases, GIVE WAY signs are not required if the T-intersection rule operates satisfactorily and there is no requirement for STOP signs due to reduced intersection sight distance.

Give-way control may not be required at intersections between unsealed roads in remote areas.

The signs used for GIVE WAY or STOP control at intersections are set out in Table 2.1.

<table>
<thead>
<tr>
<th>Table 2.1</th>
<th>SIGNS FOR STOP, GIVE-WAY AND ROUNDABOUT CONTROL, AND THE REGULATION OF MOVEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign type</td>
<td>Sign number(s)</td>
</tr>
<tr>
<td>STOP</td>
<td>R1-1A</td>
</tr>
<tr>
<td></td>
<td>R1-1B</td>
</tr>
<tr>
<td>GIVE WAY</td>
<td>R1-2A</td>
</tr>
<tr>
<td></td>
<td>R1-2B</td>
</tr>
<tr>
<td>Roundabout Control</td>
<td>R1-3A</td>
</tr>
<tr>
<td></td>
<td>R1-3B</td>
</tr>
<tr>
<td>ONE WAY</td>
<td>R2-2A (L or R)</td>
</tr>
<tr>
<td></td>
<td>R2-2B (L or R)</td>
</tr>
<tr>
<td>KEEP LEFT KEEP RIGHT</td>
<td>R2-3 (L)</td>
</tr>
<tr>
<td></td>
<td>R2-3 (R)</td>
</tr>
<tr>
<td>NO ENTRY</td>
<td>R2-4</td>
</tr>
<tr>
<td>No U-Turn</td>
<td>R2-5</td>
</tr>
<tr>
<td>No Left (Right) Turn</td>
<td>R2-6(L or R)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>No Turns</td>
<td>R2-7A</td>
</tr>
<tr>
<td></td>
<td>R2-7B</td>
</tr>
<tr>
<td>LEFT LANE MUST TURN LEFT</td>
<td>R2-9 (L)</td>
</tr>
<tr>
<td>RIGHT LANE MUST TURN RIGHT</td>
<td>R2-9 (R)</td>
</tr>
<tr>
<td>All Traffic Turn</td>
<td>R2-14A (L or R)</td>
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<tr>
<td></td>
<td>R2-14B (L or R)</td>
</tr>
<tr>
<td>NO HOOK TURN BY BICYCLES</td>
<td>R2-22</td>
</tr>
<tr>
<td>Pedestrians Prohibited</td>
<td>R6-15A</td>
</tr>
<tr>
<td></td>
<td>R6-15B</td>
</tr>
</tbody>
</table>
2.5.2 Application

GIVE WAY and STOP sign control at an intersection needs to be applied in the simplest manner practicable. This is achieved as follows:

(a) Every controlled intersection shall have two uncontrolled legs which together form the major road through the intersection.

(b) The major road through the intersection either –
   (i) should be on a straight or substantially straight alignment; or
   (ii) if on a curved alignment, should have pavement markings, kerbs or other indications aligned in such a way that its path is clearly defined.

Where other than a simple control pattern is unavoidable, and alternative treatments, e.g. a roundabout, are not appropriate, the intersection should be modified by means such as construction or relocation of kerbs, median or channelising islands, widening of the pavement, or a combination of these, so that the path of the major road through the intersection is clearly defined.

The pavement markings used with GIVE WAY and STOP signs shall comply with Clauses 5.4.2, 5.4.3 and 5.4.4. Figure 2.1 shows the use of GIVE WAY signs and the associated give way lines on roads of various widths, with and without medians. The use of STOP signs and associated lines is similar.

2.5.3 Warning signs for STOP and GIVE WAY signs

The use of warning signs in advance of intersections on approaches where GIVE WAY (R1-2) and STOP (R1-1) signs are installed shall be restricted to the following:

(a) The Give Way Sign Ahead (W3-2) sign shall be used in advance of a GIVE WAY sign in accordance with Clause 2.9.3(b).

(b) The Stop Sign Ahead (W3-1) sign shall be used in advance of a STOP sign in accordance with Clause 2.9.3(c).

(c) The Cross Road (W2-1) sign shall not be used on any approach to a STOP or GIVE WAY sign.

(d) The T-intersection sign, W2-3 or W2-14 may be used on the approach to T-intersection if the requirements of Clause 2.9.2.3 are met. The W3-1 sign may be required, see Item (b). If both signs are required, the T-intersection sign shall precede the W3-1 sign.

Care is needed to ensure that intersection warning signs, if used, do not draw attention away from, or otherwise reduce the effect of, the STOP or GIVE WAY signs.
NOTES:

1. Any dividing lines or lane lines on the main road, except double barrier lines, shall be carried through the intersection.
2. No marking should be painted across uncontrolled side roads. Edge or continuity lines should be discontinued across such intersections.
3. For dimensions of linemarking, refer to Figures 5.1 and 5.2.

Figure 2.1  LOCATION OF GIVE WAY SIGNS AND ASSOCIATED PAVEMENT MARKINGS
NOTES:

1. Dividing line (undivided road), or right hand edge of right hand through lane (divided road).
2. A check to the left is not required at a divided road where the median is wide enough to shelter a crossing vehicle.
3. Where visibility is limited due to some removable obstruction, (e.g. vegetation or earth bank) attempts should be made to remove the obstruction rather than install a STOP sign.
4. The posted or general speed limit is used, unless the 85th percentile speed is significantly higher.
5. Where the minor road approach is an arterial road, this dimension should be increased to 4.5 m and where the approach is a bikeway (rather than a road), this dimension should be decreased to 1.0 m.
6. When checking sight distance the height of the observer’s eye is 1.1 m and the height of the object is 0.0 m.
7. At any intersection, traffic on any particular roadway when approaching a STOP or GIVE WAY sign must give way to traffic on the intersecting roadway, including the part of the road within the intersection that the driver is entering when driving through a break in the median strip, even if confirming signs are not provided at the median break.

Figure 2.2  SIGHT DISTANCE RESTRICTIONS REQUIRING USE OF STOP SIGNS
2.5.4 Requirements for installation of STOP signs

This Clause specifies sight distance conditions for determining whether a STOP sign is required on any approach to an intersection on which a driver is required to give way to an intersecting stream. Where these conditions are met a STOP sign shall be used, regardless of whether a GIVE WAY sign would have otherwise been installed.

A STOP sign shall be used when, for minor road traffic, the sight distance, Y, in either direction along the major or uncontrolled road as shown in Figure 2.2 is less than the distance given for the corresponding major road speed. A STOP sign shall NOT be used if the sight distance is equal to or greater than shown in Figure 2.2.

NOTE: A history of crashes may prompt requests for STOP signs. Where intersection sight distance is adequate, it is most likely that crashes can be reduced more effectively by other means, e.g. by improved delineation of the conflict area. Furthermore, the use of STOP signs where poor sight distance is not a factor can lead to driver disobedience, and lack of credibility of STOP signs. For these reasons no crash warrant is given for the use of STOP signs.

2.5.5 Signs

The following signs are used for give way and stop control of intersections:

(a) Give way (R1-2)

The GIVE WAY sign shall be used as indicated in Clauses 2.5.1 and 2.5.2.

The sign shall normally be positioned on the left side of a two-way roadway, facing approaching traffic and at, or as close as practicable to, the point where approaching vehicles are required to stop. On a one-way roadway having more than one lane at the intersection, including one side of a two-way roadway where there is a median island at the intersection, GIVE WAY signs should be erected on both sides facing approaching traffic. Except on unsealed roads, the GIVE WAY sign shall be supplemented with the pavement markings shown in Clause 5.4.2.

At intersections, the sign shall be erected as close as practicable to the edge of the intersecting roadway consistent with its still being in view near the edge of the minor road for approaching traffic. Where a sign-controlled road intersects at an acute angle, the sign shall be placed so that its face is not prominently in view of road users on the through roadway.

At a left turn slip-lane which requires entering traffic to give way to the intersecting traffic stream and where priority is not readily apparent, a GIVE WAY sign may be provided. If, however, the slipplane has an acceleration lane of adequate length to enable traffic to merge, a GIVE WAY sign shall not be used.

(b) Stop (R1-1)

The STOP sign shall be used in the same way and for the same purpose as specified for the GIVE WAY sign (R1-2) but with the additional requirement that a complete stop is necessary for safety before entering the intersection.

The STOP sign shall replace the GIVE WAY sign when the requirements of Clause 2.5.4 are met.

STOP signs shall be positioned in accordance with the requirements for GIVE WAY signs. Except on unsealed roads, the Stop sign shall be supplemented with pavement marking shown in Clause 5.4.3.

(c) Warning signs

For warning signs Give Way Sign Ahead (W3-2) and Stop Sign Ahead (W3-1), see Clause 2.9.3.
2.6 ROUNDABOUT CONTROL

2.6.1 Function and installation

Control shall be by use of the Roundabout (R1-3) sign (see Clause 2.6.2(a)) on the immediate approach to roundabouts. Roundabout Ahead (W2-7) warning signs shall also be used on the approaches if the requirements of Clause 2.9.3(a) are met. The need for hazard markers should also be considered (see Clause 4.6.7).

Give-way lines shall be placed across each approach to a roundabout (see Clause 5.4.3 and Figures 2.7 and 2.8).

Exit lines shall be used at multilane roundabouts to guide circulating streams of traffic into an exit (see Clause 5.3.9(a)(v) and Figure 2.7).

The signs and pavement markings used at roundabouts are shown in Figures 2.7 and 2.8.

2.6.2 Signs

The signs used for control of traffic at roundabouts are listed in Tables 2.1 and 2.2.

The R1-3 and W2-7 signs are used as follows:

(a) Roundabout sign (R1-3)

(b) Roundabout Ahead (W2-7)  For Roundabout Ahead warning sign, see Clause 2.9.3(a).

2.7 CONTROL BY TRAFFIC SIGNALS

Requirements for the location and display of traffic signals, and signs and pavement markings used in conjunction with them are specified in -

(a) Part 7 of the Manual for signals at railway crossings;
(b) Part 10 of the Manual for mid-block pedestrian operated signals; and
(c) Part 14 of the Manual for signals at intersections.

NOTE: The following signs are for exclusive use at or in conjunction with traffic signals at intersections, see Part 14 of the Manual:

(a) GIVE WAY TO PEDESTRIANS (R2-10).
(b) U-TURN PERMITTED (R2-15).

2.8 REGULATION OF MOVEMENTS AT INTERSECTIONS

2.8.1 General

Regulatory and traffic instruction signs used to control vehicle movements at intersections are listed in Table 2.1.

Control may apply part-time or full-time or to certain classes of vehicles. If part-time control is required, it may be effected either by adding Times of Operation supplementary plates, R9-1 (see Clause 2.8.10) below the sign, but preferably by using an internally illuminated (static or flashing) sign. Switchable internally illuminated signs shall show no message under any conditions of incident sunlight when switched off.

Guidance in the selection of the appropriate sign size is given in Part 1 of this Manual.
2.8.2 ONE WAY (R2-2) (L or R))

The ONE WAY sign shall be used to indicate roadways upon which vehicular traffic is allowed to travel in one direction only.

The ONE WAY sign shall be located at the beginning and end of a one-way roadway or street and shall be repeated at intermediate intersections along that street. In some circumstances, signs may be warranted on both sides of the roadway. Particular care should be taken to ensure that at least one sign is clearly visible on any approach to the street.

Where a one-way roadway terminates at an intersection, NO ENTRY signs (R2-4) are required to prevent movements in the prohibited direction (see Clause 2.8.4).

A ONE WAY (repeater) (R2-17) may be used on a one-way roadway remote from an intersection as provided for in Clause 4.13.3.

2.8.3 KEEP LEFT and KEEP RIGHT (R2-3 (L or R))

The KEEP LEFT and KEEP RIGHT signs shall be used near the start of a central island, median or similar device where traffic can physically pass on either side, but it is necessary -

(a) for all traffic on the particular approach to pass it on one side only; or

(b) for all traffic except certain classes of vehicle to pass it on one side only, in which case an exception plate (Clause 2.8.10(b)) shall be mounted below the sign.

These signs may not be required if it is readily apparent under all normally encountered conditions that drivers should keep to the left or right of the obstruction.

The signs should be located -

(i) when approached longitudinally, 2 to 8 m from the approach end of the island or median on which it is located;

(ii) when approached at right angles by a right turning vehicle, 600 mm minimum from the end of the island or median and partially rotated towards approaching vehicle.

2.8.4 NO ENTRY (R2-4)

The NO ENTRY sign shall be used at the termination of a one-way roadway to prohibit access from the wrong direction.

At one-way street exits, at least one NO ENTRY sign shall be erected at the intersection facing in the opposite direction to the one-way flow. It may need to be located a short distance into the one-way street if there is a possibility of drivers becoming confused as to which street is closed to entry. Signs should be placed on both sides of the one-way street exit if ONE WAY (R2-2) signs at the exit are not readily visible to all potential wrong-way approaches. Some signs may have to be set at an angle to achieve this purpose.

The sign may also be required to prohibit wrong way movement through a left turn slip lane.

NOTE: A KEEP LEFT sign should not be used for this purpose.

At channelised intersections, signs such as KEEP LEFT (R2-3) which give positive instructions are preferable to NO ENTRY signs.
Where this sign is not applicable full time, it may be provided as a switchable internally illuminated sign within a circular or square enclosure with the symbol and legend colour unchanged.

A NO ENTRY sign may also be used to temporarily close a road. Where practicable the NO ENTRY sign should be erected in conjunction with the standard signs and barriers required to temporarily close a road.

### 2.8.5 Turn prohibition signs (R2-5, R2-6 and R2-7)

The No U-Turn sign (R2-5) shall be used where vehicles are prohibited from making a turn to reverse the direction of travel. Where state regulations prohibit a U-Turn at traffic signals, the No U-Turn sign shall not be used at signals.

The No Right Turn or No Left Turn signs (R2-6) shall be used at intersections where vehicles are prohibited from making a turn to the right or left. The No Right Turn sign also prohibits U-turns.

The No Turns sign (R2-7) shall be used at intersections where vehicles are prohibited from making turns of any description.

This sign shall not be used to indicate that a street or road is one-way. The ONE WAY repeater sign, R2-17 (see Clause 4.13.3), is used for this purpose.

Full-time turn prohibitions should normally be used for one or more of the following reasons:

(a) To prohibit wrong-way movements at an intersection where one or more legs carry one-way traffic into the intersection. ONE WAY (R2-2) signs or NO ENTRY (R2-4) signs or both will usually also be required to supplement the signs in this instance.

(b) To prevent hazardous or congested traffic conditions that would result if the turn were permitted.

Part-time turn prohibitions should normally be used where turns during peak periods cannot be tolerated. Part-time prohibitions shall be indicated either by adding a Time of Operation module, (R9-1) (see Clause 2.8.10), below the sign, or by displaying the sign as a switchable internally illuminated sign, the latter to be preferred whenever practicable.

Where signs R2-6 and R2-7 are not applicable full time and are internally illuminated the following variations in design and colour are permitted:

(i) Sign R2-6 A circular sign showing the symbolic sign in normal colours.

(ii) Sign R2-6 The sign within a square or circular enclosure comprising a white symbol with red annulus and slash on a black background.

(iii) Sign R2-7 The colours reversed, i.e. white letters and symbol on a black background.

### 2.8.6 LEFT (RIGHT) LANE MUST TURN LEFT (RIGHT) (R2-9)

The LEFT (RIGHT) LANE MUST TURN LEFT (RIGHT) sign may be used alongside a marked lane which is reserved exclusively for vehicles turning left (right) at the next intersection.

The sign is especially useful in conditions where the volume of turning traffic is so great that pavement arrows and other markings are frequently obscured by vehicles ahead.

Where it is desired to advise drivers in advance of an intersection that a lane becomes an exclusive turn lane at a second or subsequent intersection a supplementary plate of the same width, indicating the intersection to which the sign applied, e.g. AT PACIFIC HWY, see Clause 2.8.10(c), may be mounted below this sign.
Where a more complex series of turning indications is required in advance of an intersection, the Advance Lane Designation (Diagrammatic) sign, G9-42 or G9-43 should be considered (see Part 15 of this Manual).

2.8.7 All traffic turn (left or right) (R2-14)

The All Traffic Turn sign may be used at intersections where all approaching traffic on the roadway must turn in the direction indicated by the arrow.

2.8.8 NO HOOK TURN BY BICYCLES (R2-22)

The NO HOOK TURN BY BICYCLES sign shall be used in advance of any intersection where a hook turn by cyclists might be contemplated but is to be prohibited in the particular case.

2.8.9 Pedestrians Prohibited (R6-15)

The Pedestrians Prohibited sign may be used on roads other than expressways to indicate that pedestrians must not proceed past the sign, e.g. on a vehicular roadway on a bridge where pedestrians are provided for elsewhere. For control of pedestrians on expressways, see Clause 3.4.3(a).

2.8.10 Supplementary plates

(a) Time of Operation module (R9-1)

A Time of Operation module shall be used in conjunction with signs R2-5, R2-6 and R2-7 where indicated in Clause 2.8.1. The module shall be mounted below the sign and match it in width.

(b) Exception plates

Exception plates shall be used with regulatory signs where the named classes of traffic are to be exempted from the control. The width of the plate shall match the width of the sign with which it is used.
Other supplementary plates used are BUSES TAXIS EXCEPTED (R9-Q01), TRUCKS EXCEPTED (R9-Q02) and POLICE EXCEPTED (R9-Q03).

(c) Distance and location plates
NEXT x m (km) (R9-7), AT ... (street name) (R9-8), (distance) m (G9-78)

These plates shall be used with turn prohibition signs in the R2-5, R2-6 and R2-7 series to indicate the extent or location of a prohibition when it applies at locations other than the immediate sign position.

2.8.11 SERVICE ROAD ENTRY (G9-71), LEFT TURN FROM SERVICE ROAD ONLY (G9-72)
The SERVICE ROAD ENTRY sign shall be used at an outer separator opening to indicate a point of entry into a service road that cannot otherwise be readily seen by an approaching driver. The sign (name) ST VIA SERVICE ROAD (G5-11) (see Part 5 of the Manual) should be used where the service road entry provides access to side streets off the service road.
The LEFT TURN FROM SERVICE ROAD ONLY shall be used to give advance warning of an outer separator opening in advance of an intersection that must be used to make a left turn at the intersection, e.g. as illustrated in Figure 2.6.

2.8.12 Through traffic keep left (right) (R2-Q02)
The THROUGH TRAFFIC KEEP LEFT (RIGHT) sign shall be used where separate roadways are provided for traffic travelling in the same direction and it is desired to restrict the through movement to one of the roadways.
2.9 INTERSECTION WARNING SIGNS

2.9.1 General

Signs that may be used in advance of intersections are listed in Table 2.2. Guidance in the selection of the appropriate sign size is given in Appendix B.

Where it is necessary to emphasise the warning of a particularly hazardous situation, the use of a sign augmented with flashing lights, examples of which are illustrated in Appendix E, may be considered.

2.9.2 Intersection series

2.9.2.1 General requirements

Warning signs in this series may be provided in advance of an intersection where there is insufficient sight distance along the main road to a vehicle about to enter from the side road. Where the sight distance is less than the stopping sight distance given in Table 2.3 (corresponding to the 85th percentile speed on the main road), a warning sign may be required. They may also be required where an unusual intersection layout is not readily discernible by an approaching driver.

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign number</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Road</td>
<td>W2-1</td>
<td></td>
</tr>
<tr>
<td>T-Intersection</td>
<td>W2-3</td>
<td></td>
</tr>
<tr>
<td>Side Road Intersection</td>
<td>W2-4 (L or R)</td>
<td></td>
</tr>
<tr>
<td>Roundabout Ahead</td>
<td>W2-7</td>
<td></td>
</tr>
<tr>
<td>Staggered Side Road Intersection</td>
<td>W2-8 (L or R)</td>
<td></td>
</tr>
<tr>
<td>Side road intersection on a curve</td>
<td>W2-9 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W2-10 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W2-15 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W2-16 (L or R)</td>
<td></td>
</tr>
<tr>
<td>Successive side road intersections -</td>
<td></td>
<td>A 600 x 600</td>
</tr>
<tr>
<td>on a curve</td>
<td>W2-11 (L or R)</td>
<td></td>
</tr>
<tr>
<td>on a straight</td>
<td>W2-12 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W2-13 (L or R)</td>
<td></td>
</tr>
<tr>
<td>T-Intersection beyond a curve</td>
<td>W2-14 (L or R)</td>
<td></td>
</tr>
<tr>
<td>Stop Sign Ahead</td>
<td>W3-1</td>
<td></td>
</tr>
<tr>
<td>Give Way sign Ahead</td>
<td>W3-2</td>
<td></td>
</tr>
<tr>
<td>Signals Ahead</td>
<td>W3-3</td>
<td></td>
</tr>
<tr>
<td>ISLAND</td>
<td>W4-5</td>
<td></td>
</tr>
<tr>
<td>Merging Traffic</td>
<td>W5-34 (L or R)</td>
<td></td>
</tr>
<tr>
<td>PREPARE TO STOP</td>
<td></td>
<td>750 x 375</td>
</tr>
<tr>
<td></td>
<td>W8-27B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W8-27C</td>
<td>900 x 450</td>
</tr>
<tr>
<td></td>
<td>W8-27D</td>
<td>1200 x 600</td>
</tr>
<tr>
<td>Modified intersection</td>
<td></td>
<td>A 600 x 600</td>
</tr>
<tr>
<td></td>
<td>W9-1 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W9-2 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W9-3 (L or R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B 750 x 750</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 900 x 900</td>
<td></td>
</tr>
</tbody>
</table>
Table 2.3  STOPPING SIGHT DISTANCE ON LEVEL SEALED PAVEMENTS (see Note)

<table>
<thead>
<tr>
<th>$V_{85}$, km/h</th>
<th>Stopping sight distance, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40</td>
<td>40</td>
</tr>
<tr>
<td>41-50</td>
<td>55</td>
</tr>
<tr>
<td>51-60</td>
<td>70</td>
</tr>
<tr>
<td>61-70</td>
<td>90</td>
</tr>
<tr>
<td>71-80</td>
<td>115</td>
</tr>
<tr>
<td>81-90</td>
<td>140</td>
</tr>
<tr>
<td>91-100</td>
<td>170</td>
</tr>
<tr>
<td>101-110</td>
<td>205</td>
</tr>
<tr>
<td>111-120</td>
<td>245</td>
</tr>
<tr>
<td>120-130</td>
<td>280</td>
</tr>
</tbody>
</table>

NOTE: This Table has been adapted from Rural Road Design, AUSTROADS, 2003. Values given are based on a reaction time of 2.5 seconds. The source reference should be consulted where conditions are significantly different from a level sealed pavement.

To maintain their effectiveness, intersection warning signs shall be limited to intersections of greater than general hazard. They shall not be used where -

(a) direction signs, other devices or geometric cues give sufficient information to approaching drivers about the layout, importance or existence of the intersection; or
(b) the intersection presents no greater hazard than other intersections in the vicinity.

The intersection warning signs shown in Clauses 2.9.2.2 and 2.9.2.3 are expected to meet most requirements for warning of intersections in accordance with this Clause.

However, there may arise unusual situations such as an intersection on a curve where it is essential to include the curve in the warning message, or a staggered intersection where two successive side roads enter on a curve or from the same side of the road, or a modified intersection (see Clause 2.9.2.6) where the two uncontrolled legs are not in reasonable prolongation of one another. Where such signs are required, they shall be limited to those specified in Clauses 2.9.2.4, 2.9.2.5 and 2.9.2.6 and shall be used in accordance with Table 2.4.

Signs in this series show only one or two intersecting legs. Where more complex intersection layouts require signing, a diagrammatic direction sign, G1-3 (see Part 15 of the Manual), should be considered, or sections of the intersection signposted separately. Furthermore, side roads are shown only at right angles to the main road as it is considered unnecessary and possibly confusing to alter symbols when side roads enter at other angles.
Table 2.4 USE OF CURVE WARNING SIGNS AT INTERSECTIONS

<table>
<thead>
<tr>
<th>Type of curve, bend or corner</th>
<th>On the major road</th>
<th>On the side road approach to a major road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where curve is substandard (see Clause 4.4.1)</td>
<td>W2-9, W2-10, W2-11, W2-12, W2-15, W2-16</td>
<td>W1-1, W1-2, W1-3, W1-4, W1-5, W1-7</td>
</tr>
<tr>
<td></td>
<td>With advisory speed sign</td>
<td>With advisory speed sign (W1 Series signs are shown in Clause 4.4.7)</td>
</tr>
<tr>
<td>Where curve is not substandard but the road is obviously curved</td>
<td>W2-9, W2-10, W2-11, W2-12, W2-15, W2-16</td>
<td>Warning signs are not usually required (but see Clause 4.4.7.3)</td>
</tr>
<tr>
<td>On a road that is straight or with a minor curve only</td>
<td>W2-1, W2-4, W2-8, W2-13</td>
<td>Warning signs are not required</td>
</tr>
<tr>
<td>Where the priority road goes around the corner at an intersection</td>
<td>W9-1, W9-2, W9-3</td>
<td>In very low speed streets, warning signs may not be required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not applicable (see Clause 2.9.3 (b) and (c))</td>
</tr>
</tbody>
</table>

The requirements upon which the usages specified in Table 2.4 are based, are as follows:

(i) If an intersection requires warning on the through road in accordance with this Clause and is on a curve, not necessarily substandard, signs of the type W2-9, W2-10, W2-11, W2-12, W2-15 and W2-16 shall be used in accordance with Clauses 2.9.2.2, 2.9.2.4 and 2.9.2.5.

(ii) If a curve requires warning, e.g. because it is substandard, but there are intersections on the curve that do not require a warning, curve warning signs in the W1 Series (see Clause 4.4.7), with advisory speed signs shall be used.

NOTE: Sign symbols in the W1 Series other than the W1-3 curve warning sign cannot be used as a basis for a multi-purpose curve/intersection warning sign symbol.

(iii) In either of the above cases, if the curve is substandard, the advisory speed sign shall be used, see Clause 4.4.6.

2.9.2.2 Signs on a major road approaching a side road intersection

The following signs shall be used for the purposes indicated:

(a) Crossroad (W2-1, W2-15)

The Crossroad sign shall be used where warranted in accordance with Clause 2.9.2.1 in advance of an intersection where roads cross at a common point. This sign shall not be used on any approach controlled by STOP or GIVE WAY signs. See also Clause 2.9.3, Items (b) and (c).

The sign W2-15, shall be used if the curvature of the road on which the observer is travelling, contributes to the hazard. See also Clause 4.4.7.3 regarding use of this sign at substandard curves.
The Side Road Intersection sign shall be used where warranted in accordance with Clause 2.9.2.1 in advance of a side road intersection where the side road forms the stem of the T.

The Staggered Side Road Intersection sign shall be used in advance of a pair of intersections that occur other than at a common point, and that both require advance warning in accordance with Clause 2.9.2.1, but are not far enough apart to be each signposted separately. The number of side roads shown on any one symbol shall be limited to two.

The T-intersection sign may be used on a minor road on the approach to a T-intersection with a major road.

It is not normally required on an approach controlled by STOP (R1-1) or GIVE WAY (R1-2) signs, or traffic signals.

In such cases, the appropriate signs to give advance warning of these traffic control devices shall be used if warranted under Clause 2.9.3. However, it shall be used if the T-intersection occurs unexpectedly just beyond a crest.

This sign shall not be used if either of the continuing legs of the T are controlled by a STOP or GIVE WAY sign. Sign No. W9-2 (L or R) (see Clause 2.9.2.6) may be required in such cases.

This sign shall be used where a T-intersection occurs just beyond a curve and a driver may not have adequate time to react to the presence of the T-intersection, and where a curve warning sign alone may mislead a driver as to the closeness of the T-intersection to the curve. The Advisory Speed sign shall not be used with this sign.

Relevant signs giving advance warning of STOP signs or traffic signals, where warranted under Clause 2.9.3, Items (c) or (d), shall be used in conjunction with these signs.
2.9.2.4 Side Road Intersection on a Curve (W2-9, W2-10, W2-16)

Where a side road intersection occurs on a curve and the existence of the curve contributes to the magnitude of the hazard, Sign Nos W2-9 or W2-10 may be used. Sign No. W2-16 applies to situations where the road curves but a minor road continues on straight alignment in a situation where a driver may become confused as to which is the continuing major road.

See also Clause 4.4.7.3 regarding use of these signs at substandard curves.

2.9.2.5 Successive Side Road Intersections (W2-11, W2-12, W2-13)

In additions to the signs specified in Clause 2.9.2.2(c), where two side road intersections occur in close succession and both meet the requirements of Clause 2.9.2.1 for side road intersection warning signs, Sign Nos W2-11, W2-12 or W2-13, as appropriate, may be used.

If the two side roads enter on the same side, the relevant sign may also be used if the second intersection alone warrants the warning. The signs showing the main road curved shall only be used where the existence of the curve contributes to the magnitude of the hazard. The number of side roads shown on any one symbol shall be limited to two.

See also Clause 4.4.7.3 regarding use of signs W2-11 and W2-12 at substandard curves.
2.9.2.6 Modified Intersection warning signs (W9-1, W9-2, W9-3)

Where an intersection has been modified so that the major route turns through the intersection, Sign Nos W9-1, W9-2 or W9-3 as appropriate, with reduced width elements for the side road or roads, may be used. These signs shall only be used where the major road turn is not apparent in time to be properly and safely appreciated by a driver before the intersection is reached.

Advisory speed signs shall not be used with these signs.

2.9.3 Advance warning of traffic control devices series

Where needed to give advance warning of the presence of traffic control devices the following signs shall be used:

(a) Roundabout Ahead (W2-7)

The Roundabout Ahead sign is for use on any one or all of the approaches to a roundabout when the presence of the roundabout is not readily apparent to an approaching driver.

It shall not be used where a diagrammatic Advance Direction sign (G1-5) (see Part 15 of the Manual) is used on the approach.

(b) Give Way Sign Ahead (W3-2)

The Give Way Sign Ahead sign shall be restricted to use in advance of a GIVE WAY sign (R1-2) (see Clause 2.5.5(a)) where -

(i) visibility is restricted, i.e. where the sight distance to the GIVE WAY sign is less than the stopping sight distance given in Table 2.3;

(ii) high speeds require advance warning; or

(iii) GIVE WAY sign installations are unexpected.

The sign may not be required on the terminating road at a straight, level approach to a T-intersection where a T-intersection warning sign W2-3 (see Clause 2.9.2.3(a)) has been used.
(c) **Stop Sign Ahead (W3-1)**

The Stop Sign Ahead sign shall be restricted to use in advance of a STOP sign (R1-1) (see Clause 2.5.5(b)) where:

(i) visibility is restricted, i.e. where the sight distance to the STOP sign is less than the stopping sight distance given in Table 2.3;

(ii) high speeds require advance warning;

(iii) STOP sign installations are unexpected; or

(iv) obedience to the STOP sign has proved to be unsatisfactory.

See also Clause 2.5.3(d).

(d) **Signals Ahead (W3-3), PREPARE TO STOP (W8-27)**

Use of these signs is specified in Part 14 of the Manual.

Signs in the Intersection Series W2 other than the T-intersection signs, W2-3 or W2-14, should not be used on the approach to traffic signals.

2.9.4 **ISLAND (W4-5)**

The ISLAND sign shall be used where it is necessary to warn of a raised traffic island, or the first of a series of raised traffic islands, extending over a distance of less than 300 m.

It is not required where visibility of the island, or of signs or delineating devices thereon provide sufficient warning of the existence of the island.

For islands extending over a distance greater than 300 m, the Divided Road sign (W4-4) should be used, (see Clause 4.7.5.4).

2.9.5 **Merging Traffic (W5-34)**

The Merging Traffic sign shall be used where two streams of traffic from separate roadways are required to merge, e.g. at a slip-lane. Wherever practicable, this sign should be placed in the merge gore area so that the one sign is visible to both merging streams.

Use of this sign at entry ramps on expressway type roads is given in Clause 3.5(d)(i).

This sign shall not be used where a slip-lane joins a roadway without merging with another lane. The signs Added Lane (symbolic), ADDED LANE (see Clause 3.5(d)(ii)) may be used.

This sign shall not be used at an intersection where the side road enters at an oblique angle and normal give-way conditions apply. If required, Sign No. W2-4 (see Clause 2.9.2.2(b)) should be used.
2.10 PAVEMENT MARKINGS AT INTERSECTIONS

A system of clear and effective pavement markings is essential for the proper guidance and control of vehicles and pedestrians at intersections.

A detailed description of the various types of pavement markings together with requirements and guidelines for their use are given as follows:

(a) **Dividing, lane and edge lines** - on the approaches to and within intersections - see Clause 5.3.9.
(b) **Continuity lines** - see Clause 5.3.6.
(c) **Pavement messages and arrows** - see Clause 5.5.2.
(d) **Turn lines** - see Clause 5.3.7.
(e) **Diagonal and chevron markings** - see Clause 5.5.1.
(f) **Stop, give-way and crosswalk lines** - see Clause 5.4.
(g) **Use of raised pavement markers** - see Clause 5.6.
(h) **Lane guidance through intersections** - see Clause 5.6.5.3.
(i) **Exit lines** - within and on the departure from roundabouts, see Clause 5.3.9(a)(v).

2.11 HAZARD MARKERS AND OTHER DEVICES

2.11.1 Hazard markers
Hazard markers may be used to highlight the start of a channelising island, median or separator, and on the central island of a roundabout to indicate vehicle paths past or around them (see Clause 4.6.7).

2.11.2 Sight boards
Sight boards comprising two Unidirectional Hazard markers (D4-1-1) end to end may be erected to face the stem of a T-intersection where approach speeds are high on the terminating leg of the intersection, and where standard intersection signposting would not provide sufficient warning of the intersection. Sizes may be varied if necessary to suit visibility requirements. The Bi-directional Hazard marker (D4-2-3) (see Clause 4.6.7.2(b)) may be more appropriate where a sight board is required at a low-speed approach.

Intersection Direction signs or Fingerboards (see Part 15 of the Manual) may be mounted in conjunction with these sight boards.

Two Unidirectional Hazard markers (D4-1-1)

A single unidirectional hazard marker may be used on the far side of a T-intersection on a divided road with a wide median.

2.11.3 Kerb markings
Kerb markings should be used where necessary to highlight the presence of kerbed islands (see Clause 5.5.3).

2.11.4 Pavement bars and markings
Pavement bars may be used to control movement and discourage vehicle encroachment on certain areas of the pavement at an intersection in place of raised or painted islands (see Clause 4.3).

Islands and medians formed from pavement bars shall be outlined to give added emphasis.

2.12 TYPICAL ARRANGEMENT DIAGRAMS FOR INTERSECTIONS
The signing and marking treatments for the various intersection types illustrated in Figures 2.3 to 2.11 are typical only, and the layout of a particular intersection may require reference to two or more figures to obtain a suitable guide for a composite treatment.

NOTE: These Figures show direction signs in outline only. Direction sign treatments for these intersection layout examples are given in Part 15 of the Manual.
The precise layout of pavement markings should be adjusted to suit the design of the intersection, and positioning of signs and the need for additional signs or delineating devices may be affected by variations in the layouts, particularly where there are curves or crests on any approach.

Signs at or in the vicinity of intersections should always be co-ordinated with other street furniture to ensure that –

(a) intersection sight distance at critical locations is not affected;
(b) the signs themselves are not obscured by other street furniture;
(c) as much use as possible is made of multiple supports so that unsightly clutter is reduced to a minimum; and
(d) signs and supports are located sufficiently clear of kerbs to avoid being struck by turning vehicles, especially cyclists and high vehicles.

This is particularly important in urban areas where signs may need to be carefully placed with respect to traffic signals, lighting columns, electricity distribution poles and trees.
NOTES:

1. Barrier lines and island outline markings may be augmented with retroreflective raised pavement markers (RRPMs). See Clause 5.6 for location and spacing. Barrier lines are extended if sight conditions on any approach so require.

2. Where the route is not edge lined continuously and edge lines are provided through the intersection they should be continued to the end of approach barrier line.

3. The GIVE WAY sign may be repeated on the median island if visibility to the left hand sign is inadequate and may be provided on the slip lane.

4. The sight board is located for best long distance visibility from the side road approach, i.e. it may need to be offset if the approach is curved, or raised if there is a crest in the side road approach.

5. A part of the parallel portion of the turning lane may be bounded by a single unbroken line if required for control of traffic using the turning lane, or for better delineation of the adjacent through lane.

Figure 2.3 MAJOR RURAL INTERSECTION
NOTES:

1 The W2-14(L) sign is not required if intersection visibility is satisfactory at the distance given in Table 2.3.

2 For use of the side road separation line, see Clause 5.3.9(a)(iv).

3 Barrier lines may be supplemented with RRPMs if night time delineation of the intersection is likely to be a problem and the remainder of the route is not treated continuously with RRPMs.

4 If the curve is substandard, Chevron Alignment markers (CAMs) (D4-6), are placed as shown in accordance with Clause 4.4.7.11. If the curve is not substandard, CAMs are not used but two D4-1-1 Hazard markers may be placed one each side of the intersection in the CAM positions.

5 This sign is provided in accordance with Table 2.4.

6 Similar signs may be required for the opposite approach.

Figure 2.4  MINOR RURAL INTERSECTION – CURVED APPROACH
NOTES:

1. The GIVE WAY sign may be provided if indicated in Clause 2.5.5.
2. The sign is mounted on the signal post where practicable, and angled towards right-turning traffic.
3. Dividing lines and island outline markings may be augmented with RRPMs. For layout and spacing see Clause 5.6.
4. The need for a Hazard marker should be considered if R2-3 is not sufficient to delineate the median end (see Clause 4.6.7).
5. 10 m to 12 m long unbroken lines may be used where lane discipline on the approach is a problem and adequate length remains for turning traffic to enter the right lane (see Clause 5.3.9(a)(iii)).

Figure 2.5 MAJOR URBAN INTERSECTION WITH SIGNALS
NOTES:

1 10 m to 12 m long unbroken lines may be used where lane discipline on the approach is a problem and adequate length remains for turning traffic to enter the right lane (see Clause 5.3.9(a)(iii)).

2 Island outline markings may be augmented with RRPMs. For layout and spacing see Clause 5.6.

3 A Hazard marker may be required if the sign alone is not sufficient to delineate the median end (see Clause 4.6.7).

4 Turn lines may be omitted where the path to be followed is obvious to drivers under all conditions (see Clause 5.3.7).

Figure 2.6  MAJOR URBAN INTERSECTION WITH SIGNALS - DIVIDED ROAD
NOTES:
1 Where geometry permits, exit lines are marked as shown and as described in Clause 5.3.9(a)(v).
2 Pavement arrows are not normally marked on single-lane entries to roundabouts. Where a roundabout has two or more lanes on an entry, pavement arrows shall be marked to show movements permitted from each entry lane (see Clause 5.5.2.3).
3 Sign R1-3 is required on both sides of each approach at a multi-lane approach, see Clause 2.6.2(a).
4 Island outline markings may be augmented by RRPMs. For layout see Figure 5.24.
5 The need for a Hazard marker should be considered if R2-3 is not sufficient to delineate the median end (see Clause 4.6.7).
6 Bidirectional Hazard markers may be required on splitter islands if additional night-time delineation is needed.
7 Hazard markers on the curve are required only if the curve cannot readily be seen by approaching drivers.

Figure 2.7 LARGE ROUNDABOUT
NOTES:

1 Signs W2-7A and D4-1-2 may not be required in local streets, but should be used where there is poor visibility to the roundabout from one or more approaches.

2 Sign R1-3 should be placed on the side of the approach that will make it as conspicuous as possible to approaching drivers.

3 Sign R2-3A may not be necessary where traffic is clearly required to pass to the left of the island or where a Roundabout (R1-3) sign is located in the island.

4 Landscaping in the central island should not be high enough to restrict visibility across the island.

Figure 2.8  LOCAL STREET ROUNDABOUT
NOTES:

1. The minimum treatment at the one-way street exit is the provision of ONE WAY (R2-2 (L or R)) signs visible to all directions from which a potential wrong way vehicle could approach, together with at least one NO ENTRY (R2-4) sign (see Clauses 2.8.2 and 2.8.4).

2. No Right Turn (R2-6(R)) sign is provided at signalised intersections, or if the cross road is divided (see Clause 2.8.5).

3. No Left Turn (R2-6(L)) signs may be required if the ONE WAY signs are difficult to see under some conditions, or if the one-way street is wide.

4. Some pavement arrows may be omitted (see Figure 5.9).

**Figure 2.9 JUNCTION WITH A ONE WAY STREET**
NOTES:

1 For arrow spacing in the trap lane, see Clause 5.5.2.3. The length of the trap lane will depend on the queue length to be accommodated.

2 The panel at the bottom of the G9-43-4 sign is required if there is an intermediate intersection along the trap lane. Alternative legends such as AT HIGH ST, 300 m may be more appropriate.

3 The R2-9(R) signs are provided at spacings not exceeding 100 m along the length of the continuity line.

4 An extra R2-9(R) sign may be required in advance of this point if earlier advice of the start of the trap lane is required. It may have either a location plate, R9-8, or a distance plate, G9-78 (see Clause 2.8.10(c)).

Figure 2.10  TRAP LANE AT URBAN INTERSECTION
SECTION 3. TREATMENTS AT EXPRESSWAY INTERCHANGES AND TERMINALS

3.1 SCOPE
This Section specifies requirements for regulatory, warning and general information signs and other devices required to control and guide traffic at expressway type interchanges and terminals. It includes ramp terminal intersections but not intersections at grade elsewhere on an expressway. Direction signs and route numbering for expressways are specified in Part 15 of the Manual.

3.2 GENERAL
The general types of devices used at expressway interchanges and terminals, their purpose and the way in which they are applied parallel the requirements and guidance given in Clauses 2.2, 2.3 and 2.4 for non-expressway intersections. Typical interchange and terminal treatments are illustrated in Clause 3.8. Intersections at grade on an expressway not associated with an interchange or ramp terminal shall be treated in accordance with Section 2.

3.3 INTERSECTION CONTROL AT RAMP TERMINALS
Control of intersections of ramp terminals and cross streets shall be as specified for nonexpressway intersections as follows:
(a) Control by GIVE WAY and STOP signs, see Clause 2.5.
(b) Roundabout control, see Clause 2.6.
(c) Control by traffic signals, see Clause 2.7 and Part 14 of the Manual.

3.4 CONTROL OF MOVEMENT AND TRAFFIC ACCESS AT RAMP TERMINALS
3.4.1 General
Signs for the regulation of turning movements, the inhibiting of wrong way movements on ramps and the control of classes of traffic entering an expressway are listed in Table 3.1.

3.4.2 Signs for wrong way movement control
Signs to inhibit use of exit ramps at interchanges and expressway terminals by wrong-way drivers are as follows:
(a) NO ENTRY (R2-4), WRONG WAY (GE9-15)

The NO ENTRY SIGN shall be placed at the end of the exit ramp so that it is readily visible to potential wrong-way drivers before they enter the ramp in the wrong direction.

The WRONG WAY sign shall be used in conjunction with this sign in this application.
Table 3.1  SIGNS FOR THE CONTROL OF MOVEMENT AND ACCESS AT RAMP TERMINALS

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign number</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO ENTRY</td>
<td>R2-4</td>
<td>See Table 2.1</td>
</tr>
<tr>
<td>No Left Turn</td>
<td>R2-6(L)</td>
<td>See Table 2.1</td>
</tr>
<tr>
<td>No Right Turn</td>
<td>R2-6(R)</td>
<td>See Table 2.1</td>
</tr>
<tr>
<td>NO PEDESTRIANS (…etc) BEYOND THIS POINT</td>
<td>R6-13</td>
<td>1800 x 2910</td>
</tr>
<tr>
<td>START FREEWAY</td>
<td>R6-19 A</td>
<td>1200 x 600</td>
</tr>
<tr>
<td></td>
<td>R6-19 B</td>
<td>1800 x 900</td>
</tr>
<tr>
<td>END FREEWAY</td>
<td>R6-21 A</td>
<td>900 x 450</td>
</tr>
<tr>
<td></td>
<td>R6-21 B</td>
<td>1800 x 900</td>
</tr>
<tr>
<td>WRONG WAY</td>
<td>GE9-15 AA*</td>
<td>450 x 300</td>
</tr>
<tr>
<td></td>
<td>GE9-15 A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>GE9-15 B</td>
<td>750 x 500</td>
</tr>
<tr>
<td>PROHIBITED ON FREEWAY</td>
<td>GE6-2</td>
<td>1200 x 1500 (typical)</td>
</tr>
<tr>
<td>WRONG WAY, GO BACK</td>
<td>G9-69</td>
<td>2300 x 1470</td>
</tr>
</tbody>
</table>

* The GE9-15AA sign is for use with the R2-4A NO ENTRY sign.

(b)  *No Left Turn (R2-6(L)), No Right Turn (R2-6(R))*

Each crossroad approach to the end of an expressway exit ramp from which there could potentially be a wrong-way turn into the exit ramp shall have the No Left Turn or No Right Turn sign, as appropriate, placed in advance of the wrong-way turn.

Use of these signs shall be in addition to the requirements of Item(a).

(c)  *WRONG WAY, GO BACK (G9-69)*

This sign shall be placed part way along each expressway exit ramp to be clearly visible to any traffic entering the ramp in the wrong direction. It is typically located 100 to 200 m from the ramp terminal and shall be located to cover potential movements from all wrong-way access points into the ramp.

The sign should be placed on both sides of a two-lane ramp.
3.4.3 Signs for the regulatory control of expressway use and access

Signs to control the use of the expressway in accordance with specific regulatory controls are as follows:

(a) **Classes of Traffic Prohibition (R6-13, GE6-2)**

Sign No. R6-13 shall be placed at the beginning of an entrance ramp where the named classes of traffic are to be prohibited from entering the expressway. It shall be visible to the named classes of traffic prior to entry into the ramp. It may need to be duplicated to cover separate entry points into the ramp if a single sign is inadequate.

Sign No. GE6-2 may be provided in advance of the turn into the entrance ramp to advise the named classes of traffic of the prohibition at a point from which they can conveniently take an alternative route.

Prohibited classes of traffic may vary at different locations but at any one location these two signs shall display the same named classes.

On urban freeways the sign GE6-Q01 shall be used instead of sign GE6-2, where the word ‘TRACTORS’ replaces ‘AGRICULTURAL MACHINERY’.

NOTE: The term ‘freeway’ is used on these signs in conformity with the Australian Road Rules. It may be changed to other descriptions of facilities in accordance with state regulations.

(b) **START FREEWAY (R6-19), FREEWAY ENTRANCE (R6-20), END FREEWAY (R6-21)**

These signs shall be used at the beginning or end of an expressway or expressway ramp as appropriate to legally define the extent of an expressway that has been designated as a freeway (see Note) so as to give effect to requirements or restrictions that are legally imposed on expressway traffic, e.g. prohibiting certain classes of traffic or prohibiting stopping on the expressway. They also advise road users of the beginning and end of expressway travelling conditions.

NOTE: The term ‘freeway’ is used on these signs in conformity with the Australian Road Rules. It may be changed to other descriptions of facilities in accordance with state regulations.

(c) **Bicycle signs**

Signs for the control of bicycle traffic on expressway type facilities are specified in Part 9 of the Manual.

3.5 SIGNS FOR TRAFFIC ON EXPRESSWAYS AT AND NEAR INTERCHANGES

Signs to control and guide traffic entering or leaving the main roadway of an expressway via an entrance or exit ramp are listed in Table 3.2.

Signs for this purpose are used as follows:
(a) **ONE WAY (R2-2)**

The ONE WAY sign may be placed in the expressway median at or near the point where an entrance ramp first joins the expressway main roadway if there is concern that a driver might make a U-turn beyond the end of the ramp and travel on the expressway in the wrong direction.

![ONE WAY Sign](image)

Table 3.2 **SIGNS FOR THE CONTROL AND GUIDANCE OF TRAFFIC ENTERING OR LEAVING THE EXPRESSWAY**

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign number</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE WAY</td>
<td>R2-2 A</td>
<td>450 x 600</td>
</tr>
<tr>
<td></td>
<td>R2-2 B</td>
<td>600 x 800</td>
</tr>
<tr>
<td>LEFT LANE MUST EXIT</td>
<td>R2-19</td>
<td>800 x 1200</td>
</tr>
<tr>
<td>EMERGENCY STOPPING LANE ONLY</td>
<td>R5-58 C (L or R)</td>
<td>1500 x 1100</td>
</tr>
<tr>
<td>Merging Traffic</td>
<td>W5-34 C (L or R)</td>
<td>900 x 900</td>
</tr>
<tr>
<td></td>
<td>W5-34 D (L or R)</td>
<td>1200 x 1200</td>
</tr>
<tr>
<td>Added Lane (symbolic)</td>
<td>W5-35 C (L or R)</td>
<td>900 x 900</td>
</tr>
<tr>
<td></td>
<td>W5-35 D (L or R)</td>
<td>1200 x 1200</td>
</tr>
<tr>
<td>ADDED LANE</td>
<td>W8-26 C</td>
<td>900 x 600</td>
</tr>
<tr>
<td></td>
<td>W8-26 D</td>
<td>1200 x 900</td>
</tr>
<tr>
<td>NO STOPPING ON FREEWAY</td>
<td>G9-70</td>
<td>1400 x 1400</td>
</tr>
<tr>
<td>EXIT SPEED x km/h</td>
<td>W1-9-1</td>
<td>1400 x 1800</td>
</tr>
<tr>
<td>EXIT SPEED x km/h with curve symbol</td>
<td>W1-9-2(L, R)</td>
<td>1400 x 2400</td>
</tr>
<tr>
<td>with turn symbol</td>
<td>W1-9-3(L, R)</td>
<td>1400 x 2400</td>
</tr>
<tr>
<td>with reverse curve symbol</td>
<td>W1-9-4(L, R)</td>
<td>1400 x 2400</td>
</tr>
<tr>
<td>with hairpin bend symbol</td>
<td>W1-9-5(L, R)</td>
<td>1400 x 2400</td>
</tr>
</tbody>
</table>

(b) **LEFT LANE MUST EXIT (R2-19)**

This sign shall be used to supplement pavement arrows on an exclusive exit (trap) lane on the expressway, typically at a two-lane exit.

![LEFT LANE MUST EXIT Sign](image)

(c) **EMERGENCY STOPPING LANE ONLY (R5-58(L, R))**

This sign shall be placed just beyond the end of each entrance ramp taper or at the point at the start of an expressway where the emergency stopping lane is first developed. If it is necessary to designate a sealed median shoulder as an emergency stopping lane also, the sign shall be repeated on the right side of the roadway.

The R version of this sign shall be used on the left side of the roadway and where needed, the L version on the right side.

Where there are long distances between successive entrance ramps the sign should be repeated along the expressway at intervals of approximately 1 km, urban or up to 5 km, rural.

![Emergency Stopping Lane Only Sign](image)
(d) **Merge and no-merge signs**

The following signs shall be used where it is appropriate to warn traffic both on the expressway and about to enter via an entrance ramp that they are approaching either a merge or an added-lane situation:

(i) **Merging Traffic (W5-34)**

   The Merging Traffic sign shall be used where traffic entering the expressway from an entrance ramp is required to merge with through traffic. This sign shall be placed in the merge nose area so that the one sign is visible to both streams.

   **NOTE:** *(R)* version of this sign is available for use at right hand entry ramps.

(ii) **Added Lane (symbolic) (W5-35), ADDED LANE (W8-26)**

   This assembly shall be used in lieu of the Merging Traffic (W5-34) sign where the entrance ramp leads directly into an added expressway lane where no immediate merge is required. The two signs shall always be used as an assembly.

   It is recommended that this sign assembly be used only where the parallel portion of the added lane is at least 500 m long.

   Where a left turn slip lane from a cross street into an entrance ramp directs traffic into a separate lane on the ramp, the assembly maybe used on the slip lane with the W5-35 (L) sign rotated through 90°.

   **NOTE:** *(R)* version of this sign is available for use at right hand entry ramps.

(e) **EXIT SPEED x km/h (W1-9)**

   The EXIT SPEED sign (W1-9-1) shall be used to warn drivers leaving the expressway of a short ramp, where there is a stop or low speed condition at the end of the ramp.

   Where there are substandard curves or a loop on the ramp the following EXIT SPEED signs shall be used:

   (i) **W1-9-2 (L, R)** - Curve symbol (illustrated).

   (ii) **W1-9-3 (L, R)** - Turn symbol.

   (iii) **W1-9-4 (L, R)** - Reverse Curve symbol.

   (iv) **W1-9-5 (L, R)** - Hairpin Bend (Loop) symbol.

   The determination of advisory speeds is specified in Clause 4.4.6.

   On long ramps, curve, turn, reverse curve or hairpin bend warning signs in the 1 Series, with Advisory Speed signs, (see Clause 4.4.7) may be used in lieu of the above, where the sign can be placed at the required advance warning distance from the curve but cannot be seen by drivers on the expressway.

   Signs showing advisory speeds and Speed Restriction signs that show different speed values shall not be placed where both are visible at the one time or otherwise so close that they might appear to be conveying contradictory messages.
(f) **NO STOPPING ON FREEWAY (G9-70)**

This sign may be used if required to remind road users of legal requirements prohibiting stopping on the expressway.

**NOTE:** This sign has no inherent legal significance. Its purpose is to remind drivers of underlying legislative requirements.

(g) **EXIT (GE2-3)** For use of this sign, refer to Part 15 of the Manual.

### 3.6 ADVANCE SIGNS FOR EXPRESSWAY TERMINALS

Advance signs for expressway terminals are listed in Table 3.3.

**Table 3.3 ADVANCE SIGNS FOR EXPRESSWAY TERMINALS**

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign number</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>END FREEWAY 2 km</td>
<td>GE6-9</td>
<td>2300 x 1500</td>
</tr>
<tr>
<td>END FREEWAY 1 km</td>
<td>GE6-10</td>
<td>2300 x 1500</td>
</tr>
<tr>
<td>REDUCE SPEED NOW</td>
<td>GE9-3</td>
<td>2600 x 2000</td>
</tr>
</tbody>
</table>

These signs are used as follows:

(a) **END FREEWAY 2 km (GE6-9), END FREEWAY 1 km (GE6-10)**

These signs shall be used to give advance notice of the end of the expressway where there is a significant change in traffic conditions, e.g. a significant speed reduction.

They may also be used to indicate the end of expressway conditions where traffic can continue at speed beyond the expressway end.

**NOTE:** See note to Clause 3.4.3(b).

(b) **REDUCE SPEED NOW (GE9-3)**

This sign shall be used in advance of an expressway terminal at which there is a possible stop condition or a reduction in speed of more than 30 km/h. It shall be placed 200 to 300 m in advance of either the stop condition or the point where the speed reduction occurs.

### 3.7 PAVEMENT MARKINGS ON EXPRESSWAYS AND AT ENTRANCE AND EXIT RAMPS

Pavement marking elements are specified in Section 5 as follows:

(a) Lane and edge lines on through roadways and ramps, see Clauses 5.3.4 and 5.3.5.

(b) Exit and entrance ramp nose markings, see Clause 5.7.2.

(c) Expressway exit lane arrows, see Clause 5.7.3.

(d) Step-out markings at beginning of exit ramps, see Clause 5.7.5.
Signs and markings layouts at single and two-lane entrances and exits are specified in Figures 3.3, 3.4, 3.5 and 5.28.

3.8 SIGNS AND PAVEMENT MARKINGS AT INTERCHANGES AND TERMINALS

Typical requirements for regulatory, warning and general information signs at expressway type interchanges and terminals are illustrated in Figures 3.1, 3.2, 3.6 and 5.28. Direction sign requirements for the situations illustrated in these Figures are illustrated in Part 15 of the Manual.
NOTES:

1 EXIT SPEED - used only if required (see Clause 3.5(e)).
2 Sign R6-13 may need to be located closer to the crossroad and duplicated if necessary to permit the prohibited classes of traffic to read the sign in time to take appropriate action. In addition, the advance information sign PROHIBITED ON FREEWAY (GE6-2) may be erected on the approaches to the local road/expressway on-ramp intersection (see Clause 3.4.3(a)).
3 Signs R5-58 may be required near this location if stopping on the expressway and/or excessive blocking of the right lane is a problem.
4 See Figure 3.3 for pavement marking details at ramp noses.
5 See Figure 3.2 where crossroad is divided, i.e. adapt treatment from urban case.
6 Signs R2-4 and GE9-15 must be sited and angled to cover all potential wrong-way turning movements.
7 The R2-2 sign may be used if U-Turns beyond the end of the ramp are likely to be a problem.

Figure 3.1  TYPICAL RURAL INTERCHANGE
Figure 3.2  TYPICAL URBAN CROSS STREET WITH RAMP TREATMENT
NOTES:
1 For detail see Figure 5.28.
2 Lane line markings on expressways and ramps are shown in Figure 5.15.
3 Alternative 'step-out' line for use at exit ramps where indicated in Clause 5.7.5.
4 Alternative marking for added freeway lane, see also Clause 3.5(d)(ii).
5 Lane change signing should be provided where length of full width acceleration lane exceeds 300 m.

Figure 3.3 SINGLE LANE EXITS AND ENTRANCES
NOTES:

1. Edge line and nose marking details as shown in Figure 3.3.
2. Retroreflective raised pavement markers (RRPMs) at 12 m spacing.
3. Pavement arrows in trap lane and adjacent lane are spaced at 50 m. Minimum of 7 sets of arrows normally provided. They may be supplemented or replaced by a minimum of three LEFT LANE MUST EXIT signs, (R2-19). For detailed design and positioning of these arrows, see Clause 5.7.3.
4. Merge is signed as a lane change, general case, see Clause 4.7.2 (b).
5. Special purpose broken line, see Figure 5.1 (9 m line, 3 m gap).

Figure 3.4  TWO-LANE EXITS AND ENTRANCES
NOTES:

1. LEFT LANE MUST EXIT, R2-19, signs are placed at 100 m maximum spacing.
2. Continuity line delineates the trap lane for 800 m minimum.
3. Pavement arrows in the trap lane and adjacent lane are spaced at 50 m. For detailed design and positioning, see Clause 5.7.3.
4. Special purpose broken line, see Figure 5.1 (9 m line, 3 m gap).

Figure 3.5  TRAP LANES AT EXPRESSWAY EXITS
NOTES:

1. Crossroad signing is adapted from Figure 3.1 (rural) or Figure 3.2 (urban).
2. Signs GE9-3 and GE6-10 may need to be duplicated in the median or overhead mounted, where the expressway has three or more lanes.
3. The prohibition sign (R6-13) should be located so that it can be read before entering the ramp. A similar sign will be required for northbound traffic at the last intersection before reaching the start of the expressway.

Figure 3.6  FIGURE 3.6 EXPRESSWAY TERMINALS
SECTION 4. TREATMENT BETWEEN INTERSECTIONS

4.1 SCOPE
This Section specifies the signs and devices to be used for the control of traffic between intersections and sets out the principles for their installation together with typical applications.

All pavement markings and other pavement based delineation devices referred to in this Section are described in detail in Section 5.

4.2 PAVEMENT MARKINGS AND DELINEATION

4.2.1 General
Requirements and recommendations for the use of dividing lines, lane lines, edge lines, and guide posts (with delineators) on rural and urban roads, divided and undivided, are given in Clause 4.2.2. Descriptions and uses of the pavement markings and the use of raised pavement markers to augment lines are given in Clauses 5.3 and 5.6.

4.2.2 General treatment

4.2.2.1 Rural road – undivided
(a) Sealed pavements less than 5.5 m wide. Guide posts with delineators are normally the only devices used on undivided rural roads with pavements less than 5.5 m wide. Where used, guide posts shall be provided at, or near, the edge of the road formation at a constant distance (generally between 1.2 m and 3.0 m) from the pavement edge. The minimum clearance between opposite guide posts shall be 7.0 m. The longitudinal spacing of guide posts is given in Clause 4.2.4.4.

Dividing lines are not normally used, except that if the sight distance conditions for a no-overtaking zone are met (see Clause 5.3.3) a single continuous dividing line may be used (see Clause 5.3.2.2(c)). Edge lines shall not be used on two-way roadways, except for guidance through width transitions in accordance with Clause 5.3.5(c).

(b) Sealed pavements between 5.5 m and 6.8 m wide. Where the pavement is between 5.5 m and 6.8 m wide, guide posts with delineators shall be provided at, or near, the edge of formation and at a constant distance (generally between 1.2 m and 3.0 m) from the pavement edge. The longitudinal spacing of guide posts is given in Clause 4.2.4.4.

A dividing line is used in accordance with the requirements and recommendations of Clause 5.3.2. Edge lines are not normally used except where one or more of the following conditions apply –
(i) alignment is poor.
(ii) frequent fogs occur.
(iii) contrast between the pavement and shoulder is insufficient, e.g. sealed shoulders.
(iv) roadside hazards occur close to the pavement edge, e.g. trees.

Edge lines shall not be used unless -
(A) a dividing line is also marked; and
(B) the lane widths within the edge lines are at least 3.0 m or if there is a high proportion of heavy vehicle traffic, 3.2 m.

Exceptions to the above requirements are at a local pavement narrowing where edge lines may be continued across a narrow bridge (see Clause 4.6.2.1(b) and Figure 4.10) or at a one-lane roadway or bridge on a two-lane road (see Clause 4.6.2.2 and Figures 4.11, 4.12 and 4.13) or through the width transition at the narrowing of a two-lane road as shown in Figure 4.17.

(c) Sealed pavements 6.8 m wide or greater. Where the pavement is 6.8 m wide or greater, guide posts shall be used on undivided rural roads at, or near, the edge of formation and at a constant distance (generally between 1.2 m and 3.0 m) from the pavement edge. The longitudinal spacing of guide posts is given in Clause 4.2.4.4.

Dividing lines are used in accordance with the requirements and recommendations of Clause 5.3.2. Edge lines are normally required but shall not be used unless a dividing line is also used.

(d) Roads with sealed shoulders. Edge lines shall be provided at the edge of the running lane.

A different coloured aggregate from that used on the travelled part of the pavement may be used to provide contrast and to discourage driving on the shoulder.
Diagonal markings may be required on the shoulder if frequent use of the shoulder as a running lane creates a problem (see Clause 5.5.1.3).

4.2.2.2 Rural roads – divided, including rural expressways
Lane lines (see Clause 5.3.4) and edge lines (see Clause 5.3.5) shall be marked. Postmounted delineation shall be provided in accordance with Clause 4.2.4 and 4.2.5.

4.2.2.3 Urban roads – undivided
(a) Two-lane unkerbed roads. Dividing lines are marked in accordance with Clause 5.3.2. Guide posts and delineators may also be used. Dividing lines are not normally required on local streets. Edge lines shall not be marked unless a dividing line is also marked and lane widths in accordance with Clause 4.2.2.1(b) (B) are provided.
(b) Two-lane kerbed roads. A dividing line is provided on kerbed roads in accordance with the requirements and recommendations of Clause 5.3.2, if the pavement width available for moving traffic is 6.8 m or greater. Dividing lines may be provided on roads of a lesser width where there is a prohibition on parking, or if the parking demand is very low, provided that the pavement width between kerbs is at least 6.8 m.
(c) Multi-lane unkerbed roads. A dividing line shall be provided in accordance with Clause 5.3.2. Where used, the form of dividing line specified in Clause 5.3.2.3, for multi-lane undivided roads shall be used. Lane lines shall be used on roads which provide for two or more moving lanes of traffic in any one direction at any time of day (see Clause 5.3.4).
(d) Multi-lane kerbed roads. Lane lines and a dividing line shall be provided in accordance with Item (c). This should include the marking of kerbside lanes as running lanes except where parking is permitted at all times and is frequent during most of the day, in which case the kerbside lane may be separated from the running lanes by an edge line, if necessary for guidance of moving traffic.

4.2.2.4 Urban roads – divided and one-way roadways
Lane lines shall be provided in accordance with Clause 4.2.2.3(c) or Clause 4.2.2.3(d) as appropriate. Edge lines, if provided, shall be placed on both edges of an unkerbed one-way roadway. Edge lines are not required on a kerbed roadway if the kerbs provide adequate edge delineation.

4.2.3 No-overtaking zones – barrier lines
On horizontal and vertical curves on two-way sealed pavements where the overtaking sight distance is substandard, barrier lines shall be marked to create ‘no-overtaking’ zones where required in accordance with Clause 5.3.3.

Barrier lines may also be required on the approaches to certain mid-block features, including medians and other central roadway obstructions, and on undivided approaches to intersections in some circumstances. These situations are covered elsewhere in this Manual.

4.2.4 Guide posts
4.2.4.1 General
Guide posts are used to mark the edge of the road formation in the absence of other features, such as guard fence or bridge rail, which also perform this function. They assist the road user by indicating the alignment of the road ahead, especially at horizontal and vertical curves, and under some circumstances, by providing a gauge with which to assess available sight distance. Where provided, in accordance with Clause 4.2.2 they shall be designed and installed as given in the Clauses below.

4.2.4.2 Design and construction of guide posts
The minimum requirement for a guide post shall be a white post 1000 ±100 mm high and 100 mm minimum wide facing oncoming traffic, double sided on a two-way roadway.

A delineator (see Clause 4.2.5) shall be mounted on each white face displayed towards oncoming traffic, in both directions on a two-way road.

Guide posts shall be constructed so that they do not constitute a hazard if struck by a vehicle.

4.2.4.3 Siting and alignment
Guide posts shall be placed at or near the edge of formation and wherever practicable, the distance from the pavement edge shall be constant, generally between 1.2 m and 3.0 m.
Taking into account the effect of super-elevation and irregularities in shoulder contours, posts should be set so that their tops are on a smooth grade.

4.2.4.4 Spacing

The spacing of guide posts is as follows:

(a) **On straight sections.** The nominal spacing of guide posts on a straight section of road shall be 150 m, with the posts in pairs, one each side of the formation. This spacing may be reduced to 75 m in areas subject to frequent fogs.

   The nominal spacing of guide posts may be increased to 300 m if all of the following conditions are met:
   
   (i) The traffic volume is less than 1500 vpd.
   
   (ii) The road consists mainly of long straights or long curves of radius greater than 2000 m in flat terrain.
   
   (iii) A minimum of two pairs of delineators are visible at all times.

(b) **On curves.** The spacing shall be as given in Table 4.1, except that spacings shown in excess of 75 m may be reduced to 75 m in areas subject to frequent fogs.

(c) **On curve transitions.** Where curves include spiral transitions, guide post spacing throughout the curve shall be in accordance with spacing required for the circular portion of the curve. The first posts on the curve for each direction of travel shall be located at the point where the curve just noticeably starts to deviate from the alignment of the straight (i.e. the beginning of the curve or, if identified on road alignment plans, the TS point or for non-transitioned curves, the TC point).

(d) **In cuttings.** Guide posts shall normally be continued through cuttings.

(e) **At crests.** On crests having a straight alignment, posts shall be arranged so that the delineators on at least two pairs are visible at all times to a driver, excluding any posts which are less than 40 m ahead of the driver. Where a horizontal curve occurs on or just beyond a crest, this need apply only to posts on the outside of the curve. The requirements of Items (b) or (c), or both, shall apply.

(f) **Bridges and culverts.** At bridges and culverts where guard fence, bridge rail or width markers are not provided and kerbing or headwall is at or inside the edge of formation, guide posts are erected as follows:

   (i) At structures 5 m or more in length in the direction of travel, four posts, one at each end of headwall or kerbing, plus additional pairs of posts at spacings of 10 m maximum for structures longer than 10 m.

   (ii) At structures less than 5 m in length in the direction of travel, two posts, one on each left-hand approach end of headwall or kerbing.

Where kerbing or headwall is outside the edge of formation, the additional posts specified in Items (i) or (ii) are not required. Only posts at the spacing specified elsewhere in this Clause, are provided.
### Table 4.1 SPACING OF GUIDE POSTS ON CURVES
(Including spacing of guard fence delineators)

<table>
<thead>
<tr>
<th>Curve radius (Note 1)</th>
<th>Spacing (Note 2) (metres)</th>
<th>On outside of curve</th>
<th>On inside of curve (Note 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100</td>
<td></td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>100 – 199</td>
<td></td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>200 – 299</td>
<td></td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>300 – 399</td>
<td></td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>400 – 599</td>
<td></td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>600 – 799</td>
<td></td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>800 – 1,199</td>
<td></td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>1,200 – 2,000</td>
<td></td>
<td>90 (Note 4)</td>
<td>90 (Note 4)</td>
</tr>
<tr>
<td>&gt;2,000               incl. straights</td>
<td></td>
<td>150 (Note 4)</td>
<td>150 (Note 4)</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Where the radius of an existing curve is not available from records, it may be determined approximately by measuring the middle ordinate offset from a chord of known length using either the edge of pavement or a marked longitudinal line as a guide.
2. On guard fence, spacing should be adjusted, if necessary, to the nearest multiple of post spacing.
3. Each post on the inside of a curve is placed opposite a post on the outside of the curve wherever practicable.
4. Spacing is reduced to 75 m in areas subject to fog. (See also Clause 4.2.4.4(a)).
5. The spacings given in this Table are based on approximations of the following formulae:
   - Curve radii up to 150 m: \( S = 0.03R + 5 \)
   - Curve radii 150 m to 2000 m: \( S = 0.06R \)
   where
   - \( S \) = spacing, in metres
   - \( R \) = curve radius, in metre

4.2.5 Delineators

4.2.5.1 General

Delineators are small retroreflectors or panels of retroreflective material which are attached to guide posts, guard fence, bridge end posts or similar supports, to provide a coherent pattern of delineation of the edges of the roadway as an aid to night driving.

4.2.5.2 Colour

The following colours shall be used for the purposes described:

(a) *White* – on the right side of two-way roadways.
(b) *Yellow* – on the right side of one-way roadways (including divided roads).
(c) *Red* – on the left side of the roadway.

4.2.5.3 Performance requirements

Requirements for delineators are specified in AS/NZS 1906.2.

4.2.5.4 Mounting locations

(a) *On guide posts.* Delineators shall be affixed to all guide posts. They shall be centrally placed on the post between 50 mm and 100 mm clear distance from the top of the post. In order to present a coherent line and pattern of delineators to the night driver, particular attention should be paid to the vertical and horizontal alignment of guide posts and to their spacing in accordance with Clause 4.2.4.4. No more than one delineator shall be displayed in any one direction on any guide post, guard fence post, bridge end post or other support. Extraneous delineators not conforming with the pattern, e.g. on trees or at private entrances, shall not be permitted. On small radius curves, if a delineator is more than about 15 degrees away from the normal to the line of sight of approaching drivers, it should be rotated, by use of brackets or other means, to more nearly face those drivers.
(b) **On guard fence, safety barrier or bridge rail.** Delineators shall be located and spaced as follows:

(i) **Fence, barrier or rail more than 4 m from edge of running lane** - no delineators shall be placed on any of these. Delineators shall be placed on guide posts located at the normal shoulder width from edge of running lane and at the spacing given in Clause 4.2.4.4.

(ii) **Fence, barrier or rail between 2 m and 4 m from edge of running lane** - delineators shall be placed on these to conform as nearly as practicable to the spacings of guide posts given in Clause 4.2.4.4 up to a maximum spacing of 20 m. At least one delineator shall be provided at each end of each length of fence, barrier or rail.

(iii) **Fence, barrier on rail closer than 2 m to edge of running lane** - delineators shall be placed on these at 4 m maximum spacing on curves of 100 m radius or less, or 8 m maximum spacing elsewhere.

Delineators are usually attached either to brackets set into the fold of the fence or to plates mounted on the fence posts or top of the barrier or rail so that they protrude above the top line of the fence. In the latter case, consideration should be given to the use of frangible mountings.

### 4.2.6 Snow poles

Snow poles are a special form of usually tall guidepost used to mark the edges of the road formation when hidden by snow. They are provided for the benefit of both normal traffic and snow clearing plant.

Snow poles shall be of adequate cross-section to be stable under prevailing snow drift conditions, but shall be at least 100 mm in diameter. The colour shall be orange, and they shall be of sufficient height to protrude at least 300 mm above the deepest likely snow drift at the pole location. They shall be constructed so that they do not constitute a hazard if struck by a vehicle.

Delineators shall be provided as for guideposts, except that an additional delineator facing in each direction may be placed on each post at a height at which it will be visible at night above the deepest prevailing snow drifts at that location.

### 4.3 PAVEMENT BARS

#### 4.3.1 General

Pavement bars are raised blocks that may be used to augment painted islands and painted median strips to discourage but not prohibit traffic movements across the islands or median strips.

#### 4.3.2 Design and installation

Typically pavement bars are 200 mm wide and 400 mm long. They shall have an approximately hemispherical cross-section with rounded ends. Their use shall be limited to the following:

(a) Where the 85th percentile approach speed is less than 75 km/h, the height of the bars shall be a maximum of 50 mm.

b) Where the 85th percentile approach speed exceeds 75 km/h pavement bars shall not be used. Raised retroreflective pavement markers arranged in transverse rows may be used instead (see Clause 5.6.5.2(f) and Figure 5.25).

Pavement bars shall be painted or otherwise coloured yellow and they shall be reflectorised. They shall be arranged perpendicular to the direction of travel so as to increase visual effect and minimise the possibility of loss of vehicular control if traversed.

#### 4.3.3 Uses

Typical uses of arrangements of pavement bars are to –

(a) control turning movements at intersections (see Figure 4.1).
NOTE: The 18 m length using 7 bars at 3 m spacings may be reduced to 9 m using 4 bars at 3 m spacings.

**Figure 4.1  PAVEMENT BARS FOR CONTROL OF TURNING MOVEMENTS AT INTERSECTIONS**

(b) lane control (see Figure 4.2).

NOTE: First two bars at 1.5 m spacing, thence 3 m spacing up to 45 m and 6 m spacing beyond that.

**Figure 4.2  PAVEMENT BARS FOR LANE CONTROL**

(c) supplementing barrier lines where frequent and hazardous infringements occur, except on substandard curves.

(d) replacing raised islands where these are undesirable or not considered effective because of the absence of street lighting or restricted pavement width.

(e) replacing a raised island where, but for limitation on minimum size, it would otherwise be used.

(f) approach treatment to a median or other central obstruction (see Figure 4.3).

NOTE: Measured from median end, bars at 3 m spacing for first 45 m, thence at 6 m spacing.

**Figure 4.3  PAVEMENT BARS AT A MEDIAN APPROACH**
(g) replacing a narrow median (see Figure 4.4).

![Diagram of pavement bars used as a median](image)

NOTE: All bars at 3 m spacing except those in tapered section.

**Figure 4.4 PAVEMENT BARS USED AS A MEDIAN**

(h) islands traversable by over-dimensional vehicles.

Pavement bars shall not be installed on two-way roadways less than 6.8 m in width, nor on substandard curves.

Installations of pavement bars should normally be outlined with single continuous lines. If the installation is in the form of a median separating opposing directions of traffic, the outline markings may consist of barrier lines.

### 4.4 TREATMENT OF SUBSTANDARD HORIZONTAL CURVES

#### 4.4.1 General

Horizontal curves shall be considered to be substandard if the advisory speed of the curve is at least 15 km/h less than the 85th percentile speed on the immediate preceding section of road. The advisory speed is the maximum speed at which a curve may be comfortably negotiated under good road and weather conditions (see Clause 4.4.6).

The treatment of substandard horizontal curves shall include one or more of the following devices:

(a) Guide posts with delineators (see Clause 4.4.2).

(b) Raised pavement markers on dividing lines and, where applicable, lane and edge lines (see Clause 4.4.3).

(c) Warning signs and advisory speed signs (see Clause 4.4.4(a) and Figure 4.5).

(d) Chevron Alignment markers (CAMs) (see Clause 4.4.4(b) and Figure 4.6).

Examples of the treatment of substandard horizontal curves are shown in Figures 4.7 and 4.8. Treatment of a length of winding road is shown in Figure 4.9.

Signs used at substandard horizontal curves are listed in Table 4.2.

The treatment of substandard curves at intersections is described in Clause 2.9.2.1.
### Table 4.2 SIGNS USED AT SUBSTANDARD HORIZONTAL CURVES – SIZE TABLE

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn</td>
<td>W1-1</td>
<td></td>
</tr>
<tr>
<td>Reverse Turn</td>
<td>W1-2</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td>Curve</td>
<td>W1-3</td>
<td>B 750 x 750</td>
</tr>
<tr>
<td>Reverse Curve</td>
<td>W1-4</td>
<td>C 900 x 900</td>
</tr>
<tr>
<td>Winding Road</td>
<td>W1-5</td>
<td>D 1200 x 1200</td>
</tr>
<tr>
<td>Hairpin Bend</td>
<td>W1-7</td>
<td></td>
</tr>
<tr>
<td>Tilting Truck x km/h</td>
<td>W1-8</td>
<td>1500 x 3000</td>
</tr>
<tr>
<td>Advisory Speed</td>
<td>W8-2</td>
<td>A 600 x 400</td>
</tr>
<tr>
<td>NEXT x km</td>
<td>W8-17-1</td>
<td>B 750 x 500</td>
</tr>
<tr>
<td>WINDING ROAD ENDS 3 km</td>
<td>G9-17A</td>
<td>C 900 x 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D 1200 x 800</td>
</tr>
<tr>
<td>Chevron Alignment marker</td>
<td>D4-6A</td>
<td>600 x 750</td>
</tr>
<tr>
<td></td>
<td>D4-6B</td>
<td>750 x 900</td>
</tr>
<tr>
<td></td>
<td>D4-6C</td>
<td>900 x 1100</td>
</tr>
</tbody>
</table>

NOTE: Certain signs in the Intersection (W2) Series may also be used at substandard curves, see Clause 4.4.7.3.

### 4.4.2 Guide posts with delineators

The use of guide posts is described in Clause 4.2.4 and their longitudinal spacing is given in Clause 4.2.4.4. Delineators shall be attached to guide posts and their use is described in Clause 4.2.5.

### 4.4.3 Pavement markings and raised retroreflective pavement markers

The use of raised retroreflective pavement markers on dividing lines, lane lines and edge lines is specified in Clause 5.6.5.2.

NOTE: Raised retroreflective pavement markers are of particular value in emphasising substandard curves, especially when placed on dividing lines on roads which do not have the markers elsewhere.

### 4.4.4 Warning signs, advisory speed signs and Chevron Alignment markers

On some local roads, drivers’ response to the road environment, terrain, geometry, and traffic volume and composition will normally reduce their expectation that the devices referred to in this Clause will be provided. These devices may not therefore be required on such roads, including residential streets in urban areas and very low volume rural roads.

Except as provided above, requirements for the use of these devices are specified as follows:

(a) **Warning signs and advisory speed signs.** Guides for the use of these signs is given in Figure 4.5. Requirements for the use of the individual turn and curve signs, together with reverse turn and curve, winding road and hairpin bend signs is given in Clause 3.4.8. Advisory speed signs (see Clause 3.4.8.7) with speed values determined in accordance with Clause 3.4.7 shall be used with these signs on sealed roads, except where indicated in Clause 3.4.6.

NOTE: Advisory speed signs are not used on unsealed roads (see Clause 4.4.7.1).

(b) **Chevron alignment markers (CAMs).** Requirements for these signs are given in Clause 4.4.7.11. Guidance on where they should be used is given in Figure 4.6. Their spacing on curves of various radii shall be as specified in Table 4.3 with a tolerance of ±10%.

Where it is necessary to emphasise warning of a particularly hazardous situation, use of a sign augmented with flashing lights, examples of which are shown in Appendix A, may be considered.
### Table 4.3 SPACING OF CHEVRON ALIGNMENT MARKERS (CAMs)

<table>
<thead>
<tr>
<th>Curve radius</th>
<th>CAM spacing (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85th percentile approach speed</td>
</tr>
<tr>
<td></td>
<td>Less than 80 km/h</td>
</tr>
<tr>
<td>&lt;50</td>
<td>10</td>
</tr>
<tr>
<td>50 – 99</td>
<td>12</td>
</tr>
<tr>
<td>100 – 149</td>
<td>18</td>
</tr>
<tr>
<td>150 – 199</td>
<td>24</td>
</tr>
<tr>
<td>200 – 249</td>
<td>30</td>
</tr>
<tr>
<td>250 – 300</td>
<td>36</td>
</tr>
<tr>
<td>&gt;300</td>
<td>40</td>
</tr>
</tbody>
</table>

* The spacings in this Table are subject to a tolerance of ±10%.

#### 4.4.5 Horizontal curves which are not substandard

At curves which do not meet the criteria in Clause 4.4.1 it is usually only necessary to provide the devices specified in Clause 4.2.2. There are occasions when the existence or direction of the curve may not be clear to approaching drivers, e.g. where a curve occurs just beyond a crest. In these instances, Curve warning signs, Chevron Alignment markers, or raised pavement markers should be provided.
NOTE: A, B, C and D indicate the size of the sign. B size is the minimum size recommended for arterial roads. Increase one size where either the sign is cantilevered over the roadway, there are two or more lanes in one direction or the sign is more than 6 m from edge of running lane.

Figure 4.5  GUIDE TO THE SIGNPOSTING OF SUBSTANDARD HORIZONTAL CURVES
NOTES:

1. CAMs should be provided at curves in this region in accordance with Clause 4.4.7.11.

2. Curves in this region will not normally require CAMs, but may be required where the existence or direction of the curve may not be clear to approaching drivers, e.g. where the curve is just beyond a crest, or the locality is subject to frequent fogs or other adverse weather conditions.

3. A and B indicate the size of sign. On multilane roads and expressways, the sign size should be increased to B and C respectively.

Figure 4.6  GUIDE FOR THE USE OF CHEVRON ALIGNMENT MARKERS (CAMs)
4.4.6 Advisory speeds

4.4.6.1 General

Warning signs in the Alignment Series when used for substandard curves (see Clause 4.4.1) shall be supplemented with Advisory Speed signs (W8-2) as indicated below. The advisory speed displayed is the desirable speed for comfortable travel for the driver and passengers when weather, traffic and road conditions are good. Where the advisory speed is equal to or greater than the legal speed limit it is not signed but the appropriate warning sign shall be displayed (see Clause 4.4.7).

Advisory Speed signs shall not be used on unsealed roads.

NOTE: It is not possible to ensure that a nominated speed value can be maintained on unsealed roads under all weather and maintenance conditions.

4.4.6.2 Determination of advisory speeds on curves

Advisory speeds shall be determined by the methods given in Appendix C. They are determined by matching the centripetal force, measured by the ball bank indicator or other suitable means, developed by a vehicle travelling around a curve, to the speed of travel producing that force.

NOTE: A range of ball bank angles and their corresponding advisory speeds is tabulated in Appendix C, Figure C2, Note 2.

4.4.6.3 Application of advisory speed signs (W8-2)

The following requirements and recommendations apply to the erection of Advisory Speed signs and their accompanying warning signs:

(a) Advisory Speeds shall be shown in multiples of 10 km/h.

(b) Advisory Speed signs shall always be accompanied by the appropriate warning sign.

(c) Where two closely spaced curves forming a reverse curve have a separating tangent length generally less than 120 m and one or both is substandard in accordance with Clause 3.4.1, then on each approach either the single sign Reverse Turn (W1-2) or Reverse Curve (W1-4) together with an Advisory Speed sign (W8-2) should be used. The advisory speed displayed shall be that of the slower curve. The Reverse Curve sign may be required at greater curve separations for higher speed curves, if separate signing of the second curve within the first curve is inappropriate in the particular case.

At some reverse curves a single Turn (W1-1) or Curve (W1-3) sign together with an Advisory Speed sign (W8-2) will be sufficient for both curves, provided that it can be safely assumed that the speed of a vehicle when emerging from the first curve will be less than the advisory speed of the second curve, and that the alignment of the second curve is adequately delineated for drivers when leaving the first curve.

(d) Where there is a series of more than two closely spaced curves, some or all of which are substandard in accordance with Clause 4.4.1 the Winding Road symbol sign (W1-5) should be used at the beginning of the series as set out in Clause 4.4.7.5. Normally, an additional Turn (W1-1) or Curve (W1-3) sign should be used to indicate the direction of the first substandard curve in the series and the Advisory Speed sign (W8-2) indicating the speed of that curve, should be used with this sign. However, if the series extends over a distance of 1 km or less, and the curves are of similar speed value and the alignment of the first curve is adequately delineated, the additional single Curve or Turn sign need not necessarily be used. In this case the Advisory Speed sign, indicating the speed of the slowest curve, should be placed below the Winding Road symbol sign (W1-5).

(e) Where there is a curve close to a single-lane bridge, major intersection or through a shopping centre, advisory speeds should not be displayed if in so doing drivers may be induced to travel through that adjacent situation at a speed which could be excessive and dangerous. Likewise, at a passive control level crossing, signs indicating a speed higher than the safe approach speed (having regard to the sight distance to approaching trains) shall not be used.
4.4.7 Signs

4.4.7.1 Turn (W1-1)

The Turn sign shall be used in advance of a substandard curve in accordance with Figure 3.5 (see Clause 3.4.4). The Advisory Speed sign (W8-2) shall be used in conjunction with this sign (see Clause 4.4.6) when in advance of a substandard curve.

4.4.7.2 Reverse turn (W1-2)

The Reverse Turn sign shall be used where two curves in opposite directions each warrant the use of Turn signs (W1-1) and are separated by a tangent length of less than 120 m. The sign may also be used where one of the two curves warrants a Curve sign (W1-3) only and it is impracticable to sign each curve separately.

The Advisory Speed sign (W8-2) shall be used in conjunction with this sign when in advance of one or more substandard curves and shall indicate the advisory speed of the curve with the lower speed value (see Clause 4.4.6.2).

4.4.7.3 Curve (W1-3)

The Curve sign shall be used in advance of a substandard curve in accordance with Figure 4.5 (see Clause 4.4.4). The Advisory Speed sign (W8-2) shall be used in conjunction with this sign where indicated in Figure 3.5 (see also Clause 4.4.6) when used in advance of a substandard curve.

It is also permissible to use this sign where, although the conditions specified in Clause 4.4.1 do not apply, the road geometry is such that the curve may not be readily perceived, e.g. where a crest precedes a horizontal curve (see Clause 4.4.7).

The following signs in the W2 Intersection Series may be used instead of the W1-3 sign where one or two side roads as depicted on these signs, require warning as specified in Clause 2.9.2:

<table>
<thead>
<tr>
<th>W2-9</th>
<th>W2-11</th>
<th>W2-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2-10</td>
<td>W2-12</td>
<td>W2-16</td>
</tr>
</tbody>
</table>

This usage is confined to those signs in the W2 Series that are based on the curve symbol used in the W1-3 sign. In all other cases, i.e. where turn, multiple curve/turn or hairpin bend signs are required, separate signs in the W1 and W2 Series shall be used.

The Advisory Speed sign (W8-2) shall be used in conjunction with these signs when used at substandard curves.

4.4.7.4 Reverse curve (W1-4)

The Reverse Curve sign shall be used where two curves in opposite directions, one or both of which is substandard (see Clause 3.4.1), are separated by a tangent length of less than 120 m.

The Advisory Speed sign (W8-2) shall be used in conjunction with this sign in accordance with Figure 4.5 (see Clause 4.4.4) when it is used in advance of one or more substandard curves, and shall indicate the advisory speed of the curve with the lower speed value (see Clause 4.4.6.2).

It is also permissible to use this sign where, although the conditions specified in Clause 4.4.1 do not apply, the road geometry is such that the curve may not be readily perceived, e.g. where a crest precedes a horizontal curve (see Clause 4.4.5).
4.4.7.5 Winding road (W1-5)

The Winding Road sign shall be used where there is a series of closely spaced curves some or all of which warrant the use of Turn (W1-1) or Curve (W1-3) signs.

Where the length of winding road is greater than 1 km, a NEXT x km supplementary plate (W8-17-1) (see Clause 4.4.7.8) shall be used in conjunction with this sign.

Where the section of winding road extends over a number of kilometres this sign may be repeated with appropriate changes to the supplementary distance plates.

A Turn sign (W1-1) or a Curve sign (W1-3) together with an Advisory Speed sign (W8-2), when this is required by the provisions of Clause 4.4.1, shall be used after sign W1-5 to indicate the direction and speed value of the first substandard curve (see also Clause 4.4.6). The exception to this rule is where, in a distance of 1 km or less, there is a series of three or more closely spaced curves of similar speed value and the alignment of the first curve is adequately delineated, in which case the Advisory Speed sign (W8-2) may be used with the W1-5 sign and additional Turn or Curve signs need not be used. The left (L) or right (R) version of this sign should be selected according to the direction of the first curve.

4.4.7.6 Hairpin bend (W1-7)

The Hairpin Bend sign shall be used where a Turn sign (W1-1) is warranted but the change of direction is so considerable that it amounts to a reversal of direction.

The Advisory Speed sign (W8-2) should be used in conjunction with this sign in accordance with the provisions of Figure 3.5 (see Clauses 4.4.4 and 4.4.6).

4.4.7.7 Advisory speed (W8-2)

The Advisory Speed sign shall be used only in conjunction with another warning sign to indicate the desirable speed in good weather, traffic and road conditions for comfortable travel through the hazard referred to on the warning sign (see Clause 4.4.6).

At horizontal curves the Advisory Speed sign shall be used with a sign in the Alignment Series W1, or with certain signs in the W2 Series specified in Clause 4.4.7.3, in accordance with Figure 4.5, i.e. when used in advance of a substandard curve (see Clause 4.4.4). Its use with the Winding Road sign (W1-5) is subject to the conditions specified in Clause 4.4.7.5.

The Advisory Speed sign shall be erected on the same post as, and below, the warning sign with which it is associated. The size code, A, B, C or D, shall be the same as for the warning sign with which it is mounted.

In no case shall such a sign be erected until the nominated speed has been determined by accepted traffic engineering procedures.

The values of the speeds to be shown on the signs shall be in increments of 10 km/h.

4.4.7.8 Next x km (W8-17-1)

The NEXT x km sign shall be used in conjunction with the Winding Road sign (W1-5) (see Clause 4.4.7.5) where the winding road exists for a distance greater than 1 km. The size code, A, B, C or D, shall be the same as for the warning sign with which it is mounted.
NOTES:
1 The first Chevron Alignment marker (CAM) in each direction of travel is located as follows:
   (a) Two-way roadway:
       (i) Left-hand curve - on prolongation of the dividing line.
       (ii) Right-hand curve - on prolongation of the left-hand edge line.
   (b) One-way roadway:
       (i) Left-hand curve - on prolongation of the right-hand edge line.
       (ii) Right-hand curve - on prolongation of the left-hand edge line.
   The last marker is placed at the end of the circular curve, and intermediate markers equispaced at the spacing shown in Table 4.3. A minimum of three markers are displayed to each approach direction. A minimum of two markers are to be visible on each approach to the curve (see Clause 4.4.7.11).
2 Raised retroreflective pavement markers should be used to supplement the dividing lines on pavement 6.8 m or wider (see Clause 4.4.7.11).
3 No-overtaking zones are marked if necessary (see Clause 5.3.3).
4 Guide posts with delineators, or delineators on guard fence or safety barrier, are provided on both sides of the curve at the spacings given in Clauses 4.2.4.4 and 4.2.5.4.
5 Advance signs may be duplicated on the right-hand side of the road.
6 Edge lines, should be provided on pavements 6.8 m or wider (see Clause 4.4.7.11) and may be supplemented with RRPMs (see Clause 5.6.5.2).

Figure 4.7  SUBSTANDARD HORIZONTAL CURVE WITH LARGE SPEED DEFICIENCY
NOTES:
1 On short curves a minimum of three markers in each direction are required.
2 Location of first and last marker for each direction of travel is as given in Note 1 to Figure 4.7.

Figure 4.8  SUBSTANDARD HORIZONTAL CURVE WITH SMALL SPEED DEFICIENCY
NOTES:

1 Each curve should be considered independently to determine whether it is substandard, having regard to the approach speed for that particular curve and its advisory speed.

2 A sign to indicate the first curve is normally required in addition to the W1-5 and W8-17-1 sign assembly (See Clause 4.4.7.5).

3 No curve warning sign is required for the direction shown. There is insufficient acceleration distance to render the curve substandard.

4 The advisory speed refers to the worst (second) curve in the pair.

5 This sign type is appropriate where a side road on a curve needs intersection warning.

Figure 4.9 TREATMENT FOR A LENGTH OF WINDING ROAD
4.4.7.9 Winding road ends x km (G9-17)

The WINDING ROAD ENDS x km sign may be used towards the end of a very long section of winding road as an indication or reminder to drivers that the substandard alignment will end in a relatively short distance. It shall be erected in association with the warning sign WINDING ROAD (W1-5) (see Clause 4.4.7.5) typically at a point 2 to 4 km from the end of the winding section.

4.4.7.10 Tilting truck (symbol) (W1-8)

The Tilting Truck sign shall be used where there is a history of trucks toppling even where all other required curve warning and delineation devices are provided. It is normally associated with, and placed in advance of a curve or turn warning sign. The following curve survey speed table is used to calculate the appropriate advisory speed to be used with the Tilting Truck sign (W1-8):

<table>
<thead>
<tr>
<th>Curve Survey Speed</th>
<th>Maximum Side Friction as a Function of ‘g’ 9.81m/s²</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40 km/h</td>
<td>0.20*</td>
</tr>
<tr>
<td>≤ 50 km/h</td>
<td>0.18</td>
</tr>
<tr>
<td>≤ 60 km/h</td>
<td>0.16</td>
</tr>
<tr>
<td>≤ 70 km/h</td>
<td>0.14</td>
</tr>
<tr>
<td>≤ 80 km/h</td>
<td>0.12</td>
</tr>
<tr>
<td>≤ 90 km/h</td>
<td>0.10</td>
</tr>
</tbody>
</table>

* A small percentage of abnormally high truck trailer combination, centre of mass load configurations, may have roll threshold close to this level.

The curve survey speed procedure to be adopted is the ball bank or electronic accelerometer methodology as outlined in Appendix E.

4.4.7.11 Chevron alignment markers (D4-6)

Chevron Alignment markers shall be used only to augment the delineation of substandard curves as recommended in Figure 4.6. They shall not be used for the delineation of islands or other obstructions, or for any other purpose.

Chevron Alignment markers should not be used on sealed two-lane roadways 6.8 m wide or wider unless edge lines together with raised retroreflective pavement markers on lane or dividing lines are also in place.

Spacing of markers is given in Table 4.3 and their location at the start and end of curves is illustrated in Figures 4.7 and 4.8. Where used, a minimum of three markers shall be used at any one curve and a minimum of two markers shall be visible from a point on each approach to a curve, a distance equivalent to 3 seconds of travel time in advance of the start of the curve. The spacing of markers may need to be decreased to meet this requirement.

The mounting height of Chevron Alignment markers shall not be more than 1.2 m to the underside of the sign. The mounting height above road pavement should be consistent throughout a curve.

4.5 TREATMENT OF SUBSTANDARD VERTICAL CURVES

4.5.1 General

Vertical curves may be substandard with regard to –
(a) stopping or overtaking sight distance (see Clause 4.5.2 for the treatment of substandard stopping sight distance, and Clause 4.2.3 for the treatment of no-overtaking zones); and
(b) excess vertical acceleration at dips and humps which may cause a hazardous situation or discomfort to the vehicle occupants (see Clause 4.5.3).

Signs listed in Table 4.4 are used at substandard vertical curves. For the spacing of guide posts and delineators on crests, see also Clause 4.2.4.4(e).

4.5.2 Substandard stopping sight distance

Vertical curves with substandard stopping sight distance may be treated with the CREST sign (W5-11) (see Clause 4.5.4.1). Pavement widening should also be considered.
### Table 4.4 SIGNS USED AT SUBSTANDARD VERTICAL CURVES – SIZE TABLE

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREST</td>
<td>W5-11</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td></td>
<td>W5-9</td>
<td>B 750 x 750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 900 x 900</td>
</tr>
<tr>
<td>DIP</td>
<td>W5-10A</td>
<td>600 x 600</td>
</tr>
<tr>
<td></td>
<td>W5-10B</td>
<td>750 x 750</td>
</tr>
<tr>
<td></td>
<td>W5-10C</td>
<td>900 x 600</td>
</tr>
<tr>
<td>Road Hump</td>
<td>W5-10A</td>
<td>600 x 600</td>
</tr>
<tr>
<td></td>
<td>W5-10B</td>
<td>750 x 750</td>
</tr>
<tr>
<td></td>
<td>W5-10C</td>
<td>900 x 600</td>
</tr>
<tr>
<td>Advisory Speed</td>
<td>W8-2A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>W8-2B</td>
<td>750 x 500</td>
</tr>
<tr>
<td></td>
<td>W8-2C</td>
<td>900 x 600</td>
</tr>
</tbody>
</table>

### 4.5.3 Dips and crests

For a vehicle travelling at the 85th percentile speed, the signs DIP (W5-9) and CREST (W5-11) shall be used where any sharp depression or rise in the profile of the road is sufficient to cause –

(a) a hazardous situation;
(b) considerable discomfort to the vehicle occupants;
(c) shifting of the cargo; or
(d) deflection of a vehicle from its course;

Signs may be supplemented by Advisory Speed signs (W8-2) (see Clause 4.5.4.4). The advisory speed to be shown on the sign should be determined by the method given in Appendix D, or any other method capable of measuring to a similar comfort criterion.

Where the vertical curve is particularly severe, reduction of the spacing of guideposts and the use of reflective pavement markers may be considered.

### 4.5.4 Signs

#### 4.5.4.1 CREST (W5-11)

The CREST sign shall be used at vertical curves on roads where a no-overtaking zone is warranted, but it is not practicable to mark a barrier line, or where the stopping sight distance is substandard.

#### 4.5.4.2 DIP (W5-9)

The DIP sign shall be used to warn of any sharp depression in the road profile (see Clause 4.5.3).

The DIP sign shall not be used alone to indicate a water hazard. It may be used in association with a FORD (W5-6) or FLOODWAY (W5-7) sign if the sharpness of the depression warrants it (see Clauses 4.10.3 and 4.10.4).

An Advisory Speed sign (W8-2) may be used with this sign to indicate the comfortable crossing speed (see Clause 4.5.4.4).

#### 4.5.4.3 Road hump (W5-10)

The Road Hump sign (W5-10) shall be used where there is a sharp rise in the road profile (see Clause 4.5.3).

An Advisory Speed sign (W8-2) may be used with this sign at road humps to indicate the comfortable crossing speed (see Clause 4.5.4.4).

**NOTE:** The use of this sign at road humps installed for traffic control purposes is given in Part 13 of the Manual. The recommended advisory speed for this use is 20 km/h.
### 4.5.4.4 Advisory speed (W8-2)

The Advisory Speed sign shall be used only in conjunction with another warning sign to indicate the desirable speed in good weather, traffic and road conditions for comfortable travel through the hazard referred to on the warning sign. At vertical curves the Advisory Speed sign shall be used only with the DIP (W5-9), Road Hump (W5-10) or LOW LEVEL BRIDGE (W5-8) (Clause 4.10.6.5) signs.

The Advisory Speed sign shall be erected on the same post as, and below, the warning sign with which it is associated. The size code, A, B or C, shall be the same as for the warning sign with which it is mounted.

In no case shall the Advisory Speed sign be used with the above signs until the nominated speed has been determined by accepted traffic engineering procedures. (A recommended procedure is given in Appendix D.)

Advisory speed signs shall not be used on unsealed roads.

NOTE: It is not possible to ensure that a nominated speed value can be maintained on unsealed roads under all weather and maintenance conditions.

### 4.6 TREATMENT OF APPROACHES TO STRUCTURES AND OBSTRUCTIONS

#### 4.6.1 General

Treatments for the approaches to bridges, subways and minor structures, e.g. gates, grids culverts and traffic islands are specified in Clauses 4.6.2 to 4.6.5 and include provision of one or more of the following measures:

(a) Guide posts (see Clause 4.2.4).
(b) Pavement markings (see Section 5).
(c) Signs.
(d) Traffic signals (see Part 14 of this Manual).

The signs and devices used on the approaches to structures and obstructions are listed in Table 4.5.

The way in which these signs and devices are used is specified in Clauses 4.6.6 and 4.6.7.

#### Table 4.5 SIGNS FOR USE ON APPROACHES TO STRUCTURES AND OBSTRUCTIONS – SIZE TABLE

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIVE WAY</td>
<td>R1-2A</td>
<td>750 (vertical ht)</td>
</tr>
<tr>
<td></td>
<td>R1-2B</td>
<td>900 (vertical ht)</td>
</tr>
<tr>
<td></td>
<td>R1-2C</td>
<td>1200 (vertical ht)</td>
</tr>
<tr>
<td>Speed Restriction</td>
<td>R4-1A</td>
<td>450 x 600</td>
</tr>
<tr>
<td></td>
<td>R4-1B</td>
<td>600 x 800</td>
</tr>
<tr>
<td></td>
<td>R4-1C</td>
<td>900 x 1200</td>
</tr>
<tr>
<td>NO OVERTAKING OR PASSING</td>
<td>R6-1A</td>
<td>750 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-1B</td>
<td>1200 x 1440</td>
</tr>
<tr>
<td>NO OVERTAKING ON BRIDGE</td>
<td>R6-2A</td>
<td>750 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-2B</td>
<td>1200 x 1440</td>
</tr>
<tr>
<td>BRIDGE LOAD LIMIT x t gross</td>
<td>R6-3A</td>
<td>600 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-3B</td>
<td>900 x 1350</td>
</tr>
<tr>
<td>GROSS LOAD LIMIT x t</td>
<td>R6-4A</td>
<td>600 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-4B</td>
<td>900 x 1350</td>
</tr>
<tr>
<td>LOW CLEARANCE x m</td>
<td>R6-11</td>
<td>1950 x 600</td>
</tr>
<tr>
<td>Sign type</td>
<td>Sign Number</td>
<td>Size (mm)</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>CLEARANCE x m</td>
<td>R6-12</td>
<td>1500 x 600</td>
</tr>
<tr>
<td>BRIDGE LOAD LIMIT PER AXLE GROUP</td>
<td>R6-17</td>
<td>1200 x 750</td>
</tr>
<tr>
<td>OVERALL LENGTH LIMIT x m</td>
<td>R6-33A</td>
<td>800 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-33B</td>
<td>1200 x 1350</td>
</tr>
<tr>
<td>LEFT (RIGHT) LANE</td>
<td>R7-6-1</td>
<td>1400 x 400</td>
</tr>
<tr>
<td>KERB LANE</td>
<td>R7-6-2</td>
<td>1400 x 400</td>
</tr>
<tr>
<td>CENTRE LANE</td>
<td>R7-6-3</td>
<td>1600 x 400</td>
</tr>
<tr>
<td>THIS LANE</td>
<td>R7-6-4</td>
<td>1600 x 400</td>
</tr>
<tr>
<td>END</td>
<td>R7-4C</td>
<td>600 x 200</td>
</tr>
<tr>
<td></td>
<td>R7-4D</td>
<td>900 x 300</td>
</tr>
<tr>
<td>NEXT x m</td>
<td>R9-6-1B</td>
<td>1000 x 200</td>
</tr>
<tr>
<td></td>
<td>R9-6-2B</td>
<td>600 x 400</td>
</tr>
<tr>
<td>NEXT x km</td>
<td>R9-7-1B</td>
<td>1000 x 200</td>
</tr>
<tr>
<td></td>
<td>R9-7-2B</td>
<td>600 x 400</td>
</tr>
<tr>
<td>ONE LANE</td>
<td>R9-9A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>R9-9B</td>
<td>750 x 500</td>
</tr>
<tr>
<td>LOW BRIDGE AHEAD x m HIGH VEHICLES DETOUR</td>
<td>G9-3</td>
<td>1700 x 900</td>
</tr>
<tr>
<td>LOAD LIMIT ON BRIDGE x t GROSS, HEAVY VEHICLES DETOUR</td>
<td>G9-4</td>
<td>1700 x 900</td>
</tr>
<tr>
<td>DETOUR FOR HIGH VEHICLES</td>
<td>G9-5-1</td>
<td>1300 x 350</td>
</tr>
<tr>
<td>DETOUR FOR HEAVY VEHICLES</td>
<td>G9-5-2</td>
<td>1400 x 350</td>
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<td>DETOUR FOR HEAVY VEHICLES</td>
<td>G9-5-2-Q01</td>
<td>1800 x 450</td>
</tr>
<tr>
<td>DETOUR FOR LONG VEHICLES</td>
<td>G9-5-3</td>
<td>300 x 350</td>
</tr>
<tr>
<td>DETOUR FOR WIDE VEHICLES</td>
<td>G9-5-4</td>
<td>300 x 350</td>
</tr>
<tr>
<td>ON BRIDGE</td>
<td>G9-49A</td>
<td>450 x 300</td>
</tr>
<tr>
<td></td>
<td>G9-49B</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>G9-49C</td>
<td>900 x 600</td>
</tr>
<tr>
<td>LENGTH LIMIT AHEAD x m OVERALL, LONG VEHICLES DETOUR</td>
<td>G9-75</td>
<td>2100 x 900</td>
</tr>
<tr>
<td>NARROW BRIDGE AHEAD x m, WIDE VEHICLES DETOUR</td>
<td>G9-76</td>
<td>1700 x 900</td>
</tr>
<tr>
<td>WIDE VEHICLES DETOUR</td>
<td>W3-2</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td></td>
<td>W4-1</td>
<td>B 750 x 750</td>
</tr>
<tr>
<td></td>
<td>W4-5</td>
<td>C 900 x 900</td>
</tr>
<tr>
<td></td>
<td>W4-8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-16</td>
<td></td>
</tr>
<tr>
<td>ONE LANE</td>
<td>W8-16A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>W8-16B</td>
<td>750 x 500</td>
</tr>
<tr>
<td></td>
<td>W8-16C</td>
<td>900 x 600</td>
</tr>
<tr>
<td>Unidirectional Hazard marker **</td>
<td>D4-1-1A</td>
<td>1600 x 400</td>
</tr>
<tr>
<td></td>
<td>D4-1-1B</td>
<td>3200 x 800</td>
</tr>
<tr>
<td></td>
<td>D4-1-1-Q01A</td>
<td>2000 x 400</td>
</tr>
<tr>
<td></td>
<td>D4-1-1-Q01B</td>
<td>3000 x 600</td>
</tr>
<tr>
<td></td>
<td>D4-1-2A</td>
<td>450 x 450</td>
</tr>
<tr>
<td></td>
<td>D4-1-2B</td>
<td>600 x 600</td>
</tr>
<tr>
<td></td>
<td>D4-1-2-Q01</td>
<td>380 x 380</td>
</tr>
<tr>
<td>Bidirectional Hazard marker **</td>
<td>D4-2-2A</td>
<td>300 x 750</td>
</tr>
<tr>
<td></td>
<td>D4-2-2B</td>
<td>400 x 1000</td>
</tr>
<tr>
<td></td>
<td>D4-2-2-Q01A</td>
<td>450 x 600</td>
</tr>
<tr>
<td></td>
<td>D4-2-2-Q01B</td>
<td>900 x 1200</td>
</tr>
<tr>
<td></td>
<td>D4-2-3A</td>
<td>1600 x 400</td>
</tr>
<tr>
<td></td>
<td>D4-2-3B</td>
<td>3200 x 800</td>
</tr>
<tr>
<td>Width marker **</td>
<td>D4-3A</td>
<td>225 x 450</td>
</tr>
<tr>
<td></td>
<td>D4-3B</td>
<td>450 x 900</td>
</tr>
<tr>
<td>Obstruction marker **</td>
<td>D4-5</td>
<td>1800 x 450</td>
</tr>
</tbody>
</table>

* The 'A' size W4-8 sign is not used.
4.6.2 Bridges

4.6.2.1 Bridges with more than one lane

(a) **Full formation width or greater.** Where the full formation width is provided on a bridge, no special treatment is warranted, i.e. pavement markings and delineation provided on the approach pavement shall be continued across the bridge. An exception is where the width between the kerbs is less than 8.6 m in which case the treatment specified in Item (b) shall be used.

(b) **Less than formation width.** At bridges less than the full formation width, including those where there is a reduction in pavement width, the treatment is illustrated in Figure 4.10, and shall be as follows:

(i) Edge lines shall be provided on the bridge and in advance of the bridge as shown in Figure 4.10, if practicable.

(ii) Bridge width markers shall be provided in accordance with Clause 4.6.7.2(c) at or near the bridge abutments on each approach to delineate the width of the bridge.

(iii) The Narrow Bridge sign (W4-1) shall be provided where the conditions in Clause 4.6.6.3(a) apply. On two-way roadways the NO OVERTAKING ON BRIDGE sign (R6-2) shall also be provided where the conditions in Clause 4.6.6.1(c) apply.

Raised reflective pavement markers should be considered for use in accordance with Clause 5.6.5.3 on the dividing line on approach to, and across the bridge, and on edge lines on each approach.

4.6.2.2 One-lane bridges on two-way roadways

One-lane bridges are those where the width between bridge kerbs is either less than 5.0 m, or less than 5.5 m if the proportion of trucks and buses is greater than one third of the traffic using the bridge, or the approach alignment is poor.

Treatment depends on traffic volumes, bridge length, visibility, grade and the possible need to regulate driver action by signs or signals.

Treatment for one-lane bridges on two-way roadways without use of traffic signals shall be as follows:

(a) **Bridges 60 m or more in length**

(i) Edge lines and bridge width markers shall be provided as specified in Clause 4.6.2.1(b). The maximum width between edge lines shall be 4.0 m.

(ii) On each approach the Narrow Bridge sign (W4-1) shall be provided in conjunction with the ONE LANE sign (W8-16) followed by the NO OVERTAKING OR PASSING sign (R6-1) (see Figure 4.11).

(iii) Where it is desired to indicate which direction of traffic is to give way, the NO OVERTAKING OR PASSING sign (R6-1) shall be used only on one approach. The GIVE WAY sign (R1-2) (see Clause 2.5.4(a)) shall be used on the other approach (see Figure 4.12), the Give Way Sign Ahead sign (W3-2) may also be used (see Clause 2.9.3(b)).

Priority is usually given to the approach with the lesser sight distance, i.e. the one on which the driver is less able to see whether a suitable crossing gap is available in the opposing traffic stream, but on steep grades it may be desirable to give the downgrade traffic priority over the upgrade traffic or, where traffic on one approach is markedly faster than on the other, it may be desirable to give the faster approach priority.

(b) **Bridges less than 60 m in length.** On bridges less than about 60 m long, the treatments given in Items (a)(i) and (a)(ii) are usually adequate. The treatment given in Item (a)(iii) is not required unless traffic volumes are high or both points of entry to the bridge are not visible from each approach.

NOTE: High traffic volumes in this case could be regarded as in excess of 200 vpd.

4.6.2.3 Signalisation of one-lane bridges

Signalised control of traffic flow may be used on one-lane bridges. The main factors influencing a decision regarding the installation are –

(a) length of the bridge;

(b) sight distance between drivers approaching the bridge in opposing directions;

(c) 85th percentile speed of vehicles on the bridge approaches and on the bridge itself; and
(d) volume and distribution of traffic throughout the day and proportion of heavy vehicles.

A typical treatment of signs and signals is shown in Figure 4.13. The types of traffic signals which should be used for particular situations are detailed as follows:

(i) The following treatments are generally appropriate on bridges where the distance between stop lines is up to 200 m and the surface conditions permit all vehicles to maintain an average speed of 30 km/h:

(A) Where vehicle volumes are low and approximately equal in each direction: Fixed time signals with a fixed ‘all red’ period.

(B) Where vehicle volumes are low and opposing flows are significantly different: Vehicle-actuated signals with a fixed ‘all red’ period.

(C) Where vehicle volumes are medium with little variation in opposing flows, and only small variations in travel time over the controlled length: Vehicle-actuated signals with a fixed ‘all red’ period.

(ii) Vehicle-actuated signals with variable ‘all red’ periods are suitable for use on bridges where the distance between stop lines is greater than 200 m or where there are –

(A) high or near-capacity vehicle volumes;

(B) medium vehicle volumes and the opposing flow is significantly different; or

(C) large variations in travel time over the controlled length.

In these cases detectors should be placed at intervals along the controlled length, e.g. every 60 m, to detect the passage of the last vehicle in a platoon and to extend the period accordingly.

NOTE: As a guide, low volumes could be taken as less than 50% of the calculated hourly capacity of the one-lane section (both directions) in the peak hour, medium volumes as between 50% and 75% and high or near-capacity volumes, greater than 75%.

For temporary installations, e.g. where works are in progress on a bridge, additional warning signs may be required (see Part 3 of this Manual).

4.6.2.4 Load and speed limitations

A bridge with a load limit shall have on its approaches the sign BRIDGE LOAD LIMIT x t GROSS (R6-3) or the BRIDGE LOAD LIMIT (PER AXLE GROUP) sign (R6-17) (see Clause 4.6.6.1(d)). For the signs to be used on a section of road on which an overall length limit has been imposed, or a load limit other than at a bridge, see Clause 4.6.6.1(e). Wherever practicable, an appropriate detour should be provided.

In advance of the intersection where a detour for heavy, long or wide vehicles begins, the appropriate detour sign from Clause 4.6.6.2(a) shall be erected to advise of the restriction and the detour. The appropriate detour position sign from Clause 4.6.6.2(b) shall be erected at the intersection of the through road and the detour to indicate the commencement of the detour and elsewhere along the detour, if required, to indicate any changes in the direction of the route. These signs shall be placed similarly to those for height limit detours shown in Figure 4.14.

4.6.2.5 Speed limitations

Where it is necessary to limit vehicle speeds on a bridge by regulatory means, a speed zone signposted in accordance with the ‘signs for bridges’ provisions of Part .4 of the Manual shall be created. The Speed Restriction (R4-1) sign at the beginning of the zone shall have the supplementary plate ON BRIDGE (G9-49) mounted below it (see Clause 4.6.6.4) in this application.

4.6.3 Subways and underpasses

4.6.3.1 General

Generally, the treatment of subways and underpasses is similar to that of bridges except that the sign Road Narrows (W4-3) should be substituted for the sign Narrow Bridge (W4-1) if the conditions in Clause 4.7.4(a) apply.

4.6.3.2 Height restrictions

Height restrictions are applied as follows:

(a) Vertical clearances less than 4.6 m. Where the safe vertical clearance to the structure, rounded down to the nearest 0.1 m below the measured clearance, is less than 4.6 m the LOW CLEARANCE x m sign (R6-11) shall be erected in accordance with Clause 4.6.6.1(f).

The warning sign LOW CLEARANCE x m (W4-8) shall be erected in advance of the subway or underpass in accordance with Clause 4.6.6.3(c).
Where a detour is provided, the advance detour sign G9-3 shall be erected in advance of the intersection at which it begins, to advise of the height restriction and the detour (see Clause 4.6.6.2(a)). The Detour sign G9-5-1 shall be erected at the intersection of the through road and the detour to indicate the start of the detour and elsewhere along the detour, if required, to indicate any changes in the direction of the route (see Clause 4.6.6.2(b)).

A typical signing treatment is shown in Figure 4.14.

Where there are significant differences in the clearances over each lane on a multi-lane road, separate signs over each lane shall be provided. The lane indication signs R7-6-1 to R7-6-4 (see Clause 4.6.6.1(i)) shall be used in this case.

Consideration should also be given to the provision of a low clearance warning gauge in advance of the height restriction. The obstruction marker (D4-5) should be used on the gauge or obstruction (see Clause 4.6.7.2(d)).

(b) **Vertical clearances of 4.6 m or more but less than 5.4 m.** Where the safe vertical clearance to the structure, rounded down to the nearest 0.1 m below the measured clearance, is 4.6 m or more, but is less than 5.4 m, the sign **CLEARANCE x m (R6-12)** (see Clause 4.6.6.1(g)) shall be erected over the subway or, if this is not practicable, adjacent to it to provide reassurance of the clearance available. Advance warning and detour signs are not normally required in this case.

(c) **Vertical clearances of 5.4 m or more but less than 6.2 m.** Where the safe vertical clearance to the structure, rounded down to the nearest 0.1 m below the measured clearance, is 5.4 m or more, but is less than 6.2 m, the sign **CLEARANCE x m (R6-12)** (see Clause 4.6.6.1(g)) may be erected over the subway. Advance warning and detour signs are not normally required in this case.

### 4.6.4 Gates, grids and culverts

#### 4.6.4.1 Gates

Advance warning of a gate on a road shall be provided by the sign GATE (W5-14). Width markers may also be necessary if the gate clearance is less than formation width (see Clause 4.6.7.2(c)).

#### 4.6.4.2 Grids

The sign GRID (W5-16) shall be used to warn of a stock grid on a road.

If the grid is less than formation width, width markers shall be provided in accordance with Clause 4.6.7.2(c). Edge lines shall be used to indicate any transition in pavement width.

If the grid is less than 5.0 m wide, in addition to the above, the sign **NO OVERTAKING OR PASSING (R6-1)** shall be erected 80 m to 250 m in advance of the grid (see Table D1) and warning signs GRID (W5-16) and **ONE LANE (W8-16)** placed in advance of the sign R6-1.

#### 4.6.4.3 Culverts

Guide posts with delineators shall be provided in accordance with Clause 4.2.4.4(f). Width markers (D4-3) shall be used as well as the guide posts, in accordance with Clause 4.6.7.2(c).

#### 4.6.4.4 Isolated pavement width restrictions

Restrictions in pavement width at isolated locations by immovable physical obstructions shall be provided with visual delineation with or without physical protection according to the degree of encroachment of the obstruction. The following are recommended:

(a) A vertical obstruction marker (see Clause 4.6.7.2(d)) where the obstruction does not encroach upon the road shoulder.

(b) Safety barrier, edge lining and a vertical obstruction marker where the obstruction is on the road shoulder but does not cause a narrowing of the road pavement.

(c) Where an obstruction causes a reduction in pavement width, safety barrier in conjunction with a transition edge line and, if the conditions of Clause 4.7.4(a) apply, the sign Road Narrows (W4-3).

### 4.6.5 Obstructions within the roadway

Treatment for an obstruction within the roadway is given in Figure 4.15. On the approach to the median, the barrier line may be extended to the left side of the median nose.

Signs that may be warranted are KEEP LEFT (RIGHT) (R2-3(L or R)) (see Clause 2.8.3); Road Narrows (W4-3) (see Clause 4.7.5.3); bi-directional Hazard marker (see Clause 4.6.7.2(b)); Width markers (see Clause 4.6.7.2(c)); and Vertical Obstruction markers (see Clause 4.6.7.2(d)). The signs shall be used in accordance with the relevant clause indicated for each sign.
NOTES:

1 Width markers (D4-3) are required in accordance with Clause 4.6.7.2(c).

2 The use of the R6-2 and W4-1 signs is given in Clauses 4.6.6.1(c) and 4.6.6.3(a) respectively.

3 The arrangement for one-lane bridges (Figure 4.11 or 4.12) is required where the width conditions given in Clause 4.6.2.2 apply.

Figure 4.10 NARROW BRIDGE
NOTE: A one-lane bridge is one that meets the width limitations specified in Clause 4.6.2.2. The maximum width between edge lines is 4.0 m.

Figure 4.11 ONE-LANE BRIDGE
NOTES:
1. The approach on which this treatment is used, should be selected in accordance with the priorities recommended in Clause 4.6.2.2(a)(iii). The other approach is treated as shown in Figure 4.11.
2. Used only if sight distance to R1-2 is less than the lower limit given for Dimension A.
3. A one-lane bridge is one that meets the width limitations specified in Clause 4.6.2.2. The maximum width between edge lines is 4.0 m.

Figure 4.12  ONE-LANE BRIDGE WITH GIVE WAY SIGN
NOTES:
1. The STOP HERE ON SIGNAL (R6-6) sign is required if the position at which the vehicle must stop is not readily apparent (see Clause 4.10.6.7).
2. A one-lane bridge is one that meets the width limitations specified in Clause 4.6.2.2. The maximum width between edge lines is 4.0 m.

Figure 4.13 ONE-LANE BRIDGE WITH SIGNAL CONTROL
NOTES:

1 If an Advance Direction sign is not provided, locate the G9-3 sign here.

2 Width markers (D4-3) or Obstruction markers (D4-5), or both, if required (see Clause 4.6.7.2).

3 If an advance overhead load gauge structure is in place, Distance A should be measured from the gauge.

Figure 4.14  TYPICAL TREATMENT AT A LOW BRIDGE AND HIGH VEHICLE DETOUR
Figure 4.15  OBSTRUCTION WITHIN THE ROADWAY

An additional width marker D4-3(L) is used if there is also an obstruction on the left.

* For Dimension A, see Table 1.3 in Part 1.
4.6.6 Signs for approaches to structures and obstructions

4.6.6.1 Regulatory signs

(a) Give way (R1-2)

The GIVE WAY sign may be used as specified in Clause 4.6.2.2(a) to control opposing traffic movements on a one-lane roadway as described in Item (b). If used it shall be placed at one end of the one-lane section, as close as practicable to the point where traffic is required to hold to let oncoming traffic clear (see Figure 4.12). The sign NO OVERTAKING OR PASSING (R6-1) shall be placed at the other end of the one-lane section.

(b) No overtaking or passing (R6-1)

The NO OVERTAKING OR PASSING sign may be used to control opposing traffic movement on one-lane roadways having a width between kerbs or vertical obstructions of less than 5 m. It may also be used where the width is less than 5.5 m, if heavy vehicles constitute more than one-third of the traffic or if the approach alignment is poor.

If used, the sign shall be erected at or on the immediate approaches to the one-lane roadway. It may be used again at the end of the single lane, with the END sign, R7-4, mounted below it if it is not clear where the restriction ends. It shall be supplemented by suitable advance warning signs on both approaches, e.g. Narrow Bridge (W4-1) (see Clause 4.6.6.3(a)) used in conjunction with the ONE LANE supplementary plate (W8-16).

This sign shall not be used on an approach to a one-lane bridge where on that approach a GIVE WAY sign (R1-2) is used but in this case shall be used on the opposite approach.

On the long single lane sections the distance plate NEXT x m, R9-6, or NEXT x km, R9-7, may be used below the sign.

(c) No overtaking on bridge (R6-2)

The NO OVERTAKING ON BRIDGE sign shall be erected at or on the immediate approaches to narrow bridges on two-way roadways having –

(i) a width of 5 m to 5.5 m between kerbs or vertical obstructions; or

(ii) a width of 5.5 m to 6 m between kerbs or vertical obstructions in cases of high speed traffic, heavily trafficked roads or roads with large numbers of trucks.

The advance warning sign Narrow Bridge (W4-1) (see Clause 4.6.6.3(a)) shall be used with this sign.
The BRIDGE LOAD LIMIT x t GROSS sign or the BRIDGE LOAD LIMIT (PER AXLE GROUP) signs shall be used to indicate the maximum permissible gross load or axle group load in tonnes on a bridge and shall be erected at, or on the immediate approaches to, the bridge.

Detour signs shall be erected before and at an appropriate intersection or side track in advance of the bridge to divert overweight vehicles (see Clauses 4.6.2.4 and 4.6.6.2).

The GROSS LOAD LIMIT x t sign or the OVERALL LENGTH LIMIT x m sign shall be used to indicate the maximum permissible gross load in tonnes or the maximum permissible overall length in metres of a vehicle or vehicle train on any section of road. They shall be erected on the immediate approaches to the restricted section.

Detour signs shall be erected before and at an appropriate intersection in advance of the section to divert overweight or overlength vehicles (see Clauses 4.6.2.4 and 4.6.6.2).

The END supplementary plate shall be used in conjunction with a regulatory sign in this Series (e.g. the NO OVERTAKING OR PASSING (R6-1 sign) to indicate the end of the restriction. The NEXT ... supplementary plate may be used with a regulatory sign at the beginning of a long single lane section to indicate the length over which the restriction applies.
Low clearance x m (R6-11)

The LOW CLEARANCE x m sign shall be erected on all bridges, underpasses and other structures where the safe vertical clearance above the road pavement is less than 4.6 m. The sign shall be attached to or located adjacent to the structure and over the centre of the roadway to face approaching traffic. The sign shall show a clearance in metres to the nearest 0.1 m below the measured clearance. The measurement shall include any additional clearance required for long wheelbase vehicles.

The supplementary signs LEFT (RIGHT, KERB, CENTRE, THIS) LANE (R7-6-1 to R7-6-4) may be used in conjunction with this sign (see Item (i)).

The warning sign LOW CLEARANCE x m (W4-8) (see Clause 4.6.6.3(c)) shall be located in advance of the structure.

Signing of suitable detours for high vehicles shall be provided (see Clause 4.6.6.2(a)).

Clearance x m (R6-12)

The CLEARANCE x m sign shall be erected on structures where the safe vertical clearance is above 4.6 m but equal to or less than 5.4 m. The sign shall show a safe clearance in metres to the nearest 0.1 m below the measured clearance. The sign may be erected on structures where the safe vertical clearance is above 5.4 m but less than 6.2 m.

The supplementary signs LEFT (RIGHT, KERB, CENTRE, THIS) LANE (R7-6-1 to R7-6-4) may be mounted below this sign (see Item (i)).

Left (right) lane (R7-6-1), Kerb lane (R7-6-2), Centre lane (R7-6-3) This lane (R7-6-4)

These signs shall be placed below the LOW CLEARANCE (R6-11) or the CLEARANCE (R6-12) sign where required to indicate that the clearance applies to a particular lane.

ONE LANE (R9-9)

The ONE LANE sign shall be used in conjunction with a GIVE WAY (R1-2) sign when used at the beginning of a one-lane bridge or other roadway.

4.6.6.2 Detour signs

(a) LOW BRIDGE AHEAD x m, HIGH VEHICLES DETOUR (G9-3)
LOAD LIMIT ON BRIDGE AHEAD x t, HEAVY VEHICLES DETOUR (G9-4)
OVERALL LENGTH LIMIT AHEAD x m, LONG VEHICLES DETOUR (G9-75)
NARROW BRIDGE AHEAD x m, WIDE VEHICLES DETOUR (G9-76)

These signs shall be erected at locations where high, heavy, long or wide vehicles are required to detour. They shall be erected in advance of a intersection with a detour.
DETOUR FOR HIGH, HEAVY, LONG, WIDE VEHICLES (G9-5-1, G9-5-2, G9-5-3, G9-5-4)

The appropriate DETOUR FOR ... VEHICLES sign shall be erected at an intersection with a detour where the named classes of vehicle cannot use the through route.

4.6.6.3 Warning signs

Warning signs for use on the approaches to structures and obstructions are as follows:

NOTE: Where it is necessary to emphasise warning of a particularly hazardous situation, use of a sign augmented with flashing lights as recommended in Appendix E, may be considered.

(a) Narrow bridge (W4-1)

The Narrow Bridge sign should be used on the approaches to bridges on two-way roadways having a width between kerbs of –

(i) 5 m up to and including 5.5 m;
(ii) 5.5 m up to and including 6 m in cases of high speed traffic, heavily trafficked roads or roads with large numbers of trucks; or
(iii) less than that of the approach pavement regardless of its width.

The regulatory sign NO OVERTAKING ON BRIDGE (R6-2) is required on bridges meeting the widths given in Items (i) and (ii) (see Clause 4.6.6.1(c)).

The Narrow Bridge sign shall be used in conjunction with the ONE LANE sign (W8-16) on the approaches to road bridges having a width between kerbs of less than 5 m or less than 5.5 m if commercial vehicles constitute more than one-third of the traffic using the bridge or if the approach alignment is poor. Appropriate regulatory signs shall be used in conjunction with these signs at one-lane bridges, e.g. GIVE WAY (R1-2) or NO OVERTAKING OR PASSING (R6-1) (see Clauses 4.6.6.1(a) and (b)).

(b) Island (W4-5)

For use of this sign refer to Clause 2.9.4.
The warning sign LOW CLEARANCE x m shall be used in advance of all bridges, underpasses and other structures where the regulatory LOW CLEARANCE x m (R6-11) sign is to be located on or adjacent to the structure, (see Clause 4.6.6.1(g)). Both signs shall show the same clearance.

In locating this sign, the needs of a driver of a large vehicle who may have to stop at a safe turning area in advance of the structure should be taken into account.

Detour signs G9-3 and G9-5-1 should be erected at appropriate intersections in the locality or where necessary, more remotely from the site to divert overheight vehicles (see Clause 4.6.6.2).

The GATE sign shall be used to warn of a gate that may be closing the road ahead.

The GRID sign shall be used to warn of a stock grid on the road.

This sign should be used in conjunction with the ONE LANE sign (W8-16) where the roadway width over a stock grid is less than 5 m or where the roadway width over the stock grid is less than 5.5 m and the approach alignment is poor or commercial vehicles constitute more than one-third of the traffic using the grid.

The ONE LANE sign shall be used in conjunction with the Narrow Bridge sign (W4-1) (see Clause 4.6.6.3(a)) or the GRID sign (W5-16) (see Clause 4.6.6.3(f)) where indicated in these clauses.

Appropriate regulatory signs should be used in conjunction with this sign, e.g. GIVE WAY (R1-2) (see Clause 4.6.6.1(a)) or NO OVERTAKING OR PASSING (R6-1) (see Clause 4.6.6.1(b)).

4.6.6.4 Speed limits on bridges

Where it is required to impose a permanent speed limit on a bridge, a speed zone shall be signposted in accordance with Part 4 of this Manual (see Part 3 of this Manual for temporary speed zoning). The signs used are as follows:

(a) Speed restriction (R4-1)
4.6.7 Hazard markers

4.6.7.1 General

Hazard markers are rectangular in shape and generally consist of a series of alternate black and white bands. The bands may consist of either diagonal stripes where only a target is required, or chevrons where directional, as well as target properties are desirable.

For the shapes illustrated, both the size of the board and the number and spacing of the bands or chevrons may be varied to suit visibility requirements.

4.6.7.2 Types of hazard markers

(a) Unidirectional hazard marker (D4-1-1, D4-1-2 and D4-Q02)

Unidirectional Hazard markers (D4-1-1, D4-1-2) shall be used at road hazards where it is necessary to emphasise to approaching traffic the direction to be taken if the marker appears in the driver’s line of approach. The direction is indicated by chevrons, which may point to the left or right as required.

Typical uses of this marker are –
(i) to indicate an abrupt narrowing of the pavement;
(ii) to delineate an exposed median end or other roadway obstruction where all traffic must pass to one side; or
(iii) to indicate vehicle paths at intersections.

The Unidirectional Hazard marker should not be used:
(A) In lieu of Width markers erected to delineate both sides of the roadway as specified in Item (c).
(B) In lieu of the Chevron Alignment marker used to delineate sub-standard curves as specified in Clause 4.4.7.11.

The D4-1-2-Q01 hazard marker is used to delineate a guardrail terminal where all traffic must pass to one side.

(b) Bidirectional hazard markers (D4-2-2 and D4-2-3)

Bidirectional Hazard markers may be used to delineate the nose of an island or other obstruction where traffic may pass the obstruction to either side.
Except as noted below, width markers shall be erected in pairs, one either side of the formation at points where the formation narrows over structures such as culverts, bridge piers or end posts.

They shall be used where the clearance from the normal pavement width to the vertical obstruction is –

(i) 600 mm, or less, for a pavement 7.4 m wide;
(ii) 1 m, or less, for a pavement 6.2 m wide; or
(iii) 1.2 m, or less, for a pavement 5.6 m wide.

Width markers should generally be erected with their inner edges on the line of a vertical obstruction. Where there are wide kerbs or footways on the structure the markers shall be erected so that they indicate the width of the pavement between kerbs.

At railway level crossings, Width markers are used in conjunction with the signs RAILWAY (G9-32) and CROSSING (G9-33) (see Part 7 of this Manual).

Width markers may also be erected singly on utility poles, central bridge piers or other vertical obstructions which are so close to the roadway as to be a hazard. Dimensional proportions of the markers may be varied to fit the particular obstruction.

Obstruction markers may be used to delineate obstructions within or above the road. Typical uses of these markers are –

(i) to highlight road closures, either mid-block or at the end of a cul-de-sac; and
(ii) to delineate vertical clearance above the road where height restrictions exist, i.e. overhead structures requiring the display of a sign LOW CLEARANCE x m (R6-11) (see Clause 4.6.6.1(g)).

Obstruction markers may be used to delineate obstructions within or above the road. Typical uses of these markers are –

(i) to highlight road closures, either mid-block or at the end of a cul-de-sac; and
(ii) to delineate vertical clearance above the road where height restrictions exist, i.e. overhead structures requiring the display of a sign LOW CLEARANCE x m (R6-11) (see Clause 4.6.6.1(g)).

For use of hazard markers as T-intersection sight boards, see Clause 2.11.2.

### 4.7 CHANGES IN PAVEMENT WIDTH

#### 4.7.1 General

Narrowing of pavement width may involve a reduction in width of a roadway, with or without a reduction in the number of lanes, or a transition from a divided to an undivided road, also with or without a reduction in the number of lanes.

The signs listed in Table 4.6 are used on the approaches to a change in pavement width including lane reductions.

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Narrows</td>
<td>W4-3</td>
<td></td>
</tr>
<tr>
<td>Divided Road</td>
<td>W4-4</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td>ISLAND</td>
<td>W4-5</td>
<td>B 750 x 750</td>
</tr>
<tr>
<td>End Divided Road</td>
<td>W4-6</td>
<td>C 900 x 900</td>
</tr>
<tr>
<td>LEFT LANE ENDS</td>
<td>W4-9*</td>
<td></td>
</tr>
<tr>
<td>Two Way Traffic</td>
<td>W4-11</td>
<td></td>
</tr>
<tr>
<td>(Distance) x m</td>
<td>W8-5A</td>
<td>600 x 200</td>
</tr>
<tr>
<td>(for use with W Series signs)</td>
<td>W8-5B</td>
<td>750 x 250</td>
</tr>
<tr>
<td></td>
<td>W8-5C</td>
<td>900 x 300</td>
</tr>
</tbody>
</table>

D4-3(L)

D4-3(R)

D4-5

D4-3(L)

D4-3(R)

D4-5

D4-5
### Table 4.6 (continued)

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERGE RIGHT (yellow)</td>
<td>W8-15B</td>
<td>750 x 500</td>
</tr>
<tr>
<td>(Supplementary plate)</td>
<td>W8-15C</td>
<td>900 x 600</td>
</tr>
<tr>
<td>KEEP LEFT</td>
<td>R2-3A(L)</td>
<td>450 x 600</td>
</tr>
<tr>
<td></td>
<td>R2-3B(L)</td>
<td>600 x 800</td>
</tr>
<tr>
<td>FORM 1 LANE</td>
<td>G9-15</td>
<td>A 600 x 800</td>
</tr>
<tr>
<td>FORM x LANES</td>
<td>G9-16</td>
<td>B 900 x 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 1200 x 1600</td>
</tr>
<tr>
<td>(Distance) x m</td>
<td>G9-78A</td>
<td>600 x 200</td>
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<tr>
<td>(for use with G Series signs)</td>
<td>G9-78B</td>
<td>900 x 300</td>
</tr>
<tr>
<td></td>
<td>G9-78C</td>
<td>1200 x 400</td>
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<tr>
<td>MERGE RIGHT (white)</td>
<td>G9-73A</td>
<td>900 x 900</td>
</tr>
<tr>
<td></td>
<td>G9-73B</td>
<td>1200 x 1200</td>
</tr>
</tbody>
</table>

* No A size in W4-9 is used.

#### 4.7.2 General treatments at lane reductions (merges)

Where there is to be a reduction in the number of lanes by means of a merge, each merge shall have signs and pavement markings appropriate to either a zip-merge or a lane change manoeuvre.

(a) **Zip-merges**

The layout for a zip-merge is shown in Figure 4.16(a). The absence of any line in the area where the merge takes place invokes the zip-merge rule whereby any vehicle behind another vehicle in an adjacent stream, is required to give way to that vehicle during the merge even though its distance ahead may be less than the length of either vehicle.

NOTE: * At time of publication of this Part of the Manual this term was synonymous with the term ‘merge’ in the Australian Road Rules.

The zip-merge treatment shall be used where the 85th percentile speed is 80 km/h or less.

This arrangement shall be used on climbing lanes.

The addition of a continuity line to a zip merge treatment which changes the merge treatment to a lane change/general case merge shall be limited to situations where drivers may have difficulty anticipating the merge ahead or require the increased direction assistance a continuity line can provide, e.g. because the merge is partially hidden by a crest or around a curve. If a continuity line is provided all signing and linemarking must conform with the requirements of a lane change/general case merge.

The signs shown in Figure 3.16 (a) shall be used as follows:

(i) Short length of added lane, e.g. at a localised flaring:

(A) 60 km/h or lower speed zone - signs are not required but if used they shall be as for Item (B).

(B) 70 or 80 km/h speed zone - FORM 1(2) LANE(S), G9-15 or G9-16 signs only, shall be placed at the beginning of the taper.

(ii) Runout of a long lane:

(A) 60 km/h or lower speed zone - FORM 1 (2) LANE(S), G9-15 or G9-16 position signs only, shall be placed at the beginning of the taper.

(B) 70 or 80 km/h speed zone - position sign as above shall be provided along with advanced signs G9-15 or G9-16, with distance plates 200 m, G9-78, mounted under them.

(b) **Lane change/general case**

The layout of a merge requiring a lane change manoeuvre is shown in Figure 4.16 (b). The continuity line in the merge area is legally a lane line and hence, in any move across it, the obligation is on the driver crossing the line to find a safe gap in the adjacent traffic stream.

This arrangement shall be used where the 85th percentile speed is greater than 80 km/h.

This arrangement shall be used on overtaking lanes on two-lane rural roads.

(c) **Lane change/expressway type entry ramp**

The layout and signposting at expressway type entry ramps is shown in Figure 3.3.
4.7.3 Narrowing of a roadway
4.7.3.1 Narrowing of two-lane road
Where a reduction in pavement width occurs on a two-lane road, treatment depends on the final pavement width as follows:
(a) If less than 5.5 m, the treatment shall be as shown in Figure 4.17(a).
(b) If 5.5 m or greater, the treatment shall be as shown in Figure 4.17(b).
4.7.3.2 Transition from four-lane road to two-lane road (both undivided)
Where a four-lane undivided road changes to a two-lane road, the treatment should be as shown in Figure 4.18.
4.7.4 Transition of divided road to undivided road
The treatments required at the transition from a four-lane divided road to a four-lane undivided road and to a two-lane road shall be as shown in Figures 4.19 and 4.20. On the approach to the median, the barrier line may be extended to the left side of the median nose.
Where there is considerable change in alignment at the start of the divided road, consideration should be given to the erection of one or more Directional Hazard markers in association with the sign KEEP LEFT (R2-3).
4.7.5 Signs for lane reductions and approaches to changes in pavement width
4.7.5.1 Signs for zip-merge
The following signs shall be used in accordance with Clause 4.7.2(a) where there is a reduction in the number of lanes by means of a zip-merge:
FORM 1 LANE (G9-15)
FORM x LANES (G9-16)
Distance x m (G9-78)

![FORM 1 LANE (G9-15)](image1)
![FORM 2 LANES (G9-16)](image2)
![Distance x m (G9-78)](image3)

The Distance supplementary plate (G9-78) is added to the G9-15 or G9-16 sign when it is required as an advance sign. The distance on the sign may be varied to suit site conditions or traffic speeds. Signs AFTER SIGNALS, AFTER ROUNDABOUT may be used instead of the Distance supplementary plate.
4.7.5.2 Signs for lane changes
The following signs shall be used in accordance with Clause 4.7.2(b) where there is a reduction in the number of lanes by means of a lane change:
LEFT LANE ENDS (W4-9)
MERGE RIGHT (W8-15)
Distance x m (W8-5)
MERGE RIGHT (G9-73)
4.7.5.3 Road narrows (W4-3)

The Road Narrows sign shall be used where a reduction of the pavement width may constitute a hazard. Recommended conditions for its use are as follows:

(i) On a two-lane roadway where –
   (A) there is a reduction in pavement width of 1.2 m or more; or
   (B) the pavement is reduced to 4.5 m or less.
(ii) On any roadway where the width of any lane is reduced by 600 mm or more in the direction of travel concerned.

This sign shall not be used for conditions where the End Divided Road (W4-6) sign (see Clause 4.7.5.4(c)) is applicable, or on a multi-lane road, including a roadway of a divided road where there is a reduction in the number of lanes.

4.7.5.4 Signs at the beginning and end of divided roads

The following signs shall be used:

(a)  Divided road (W4-4)

The Divided Road sign shall be used to give warning of the approach to a divided road where the median is more than 300 m in length.

(b)  Island (W4-5)

For the use of this sign refer to Clause 2.9.4.
NOTES:

1 The FORM 2 LANES sign applies if this illustration is one side of the divided road.

2 Lane change arrows are always used in Figure (b). They are not used in Figure (a).

Figure 4.16 TREATMENTS AT LANE REDUCTIONS (MERGES)
NOTE: Guide posts are at a constant distance from the edge line, minimum 1.2 m, and at 10 m to 15 m longitudinal spacing throughout the transition.

Figure 4.17  NARROWING OF TWO-LANE ROAD
NOTES:

1. Guide posts at 10 m to 15 m on the lane reduction transition side. Wider spacings may be used on the other side of the transition.

2. The lane reduction is treated either as a zip-merge in accordance with Clause 4.7.2(a) or a lane change in accordance with Clause 4.7.2(b). In the zip-merge case, both the lane change arrows and the continuity line are omitted. In the lane change case the lane change arrows are used always.

3. M and D are the merge and diverge distances calculated from traffic speeds and lane widths in accordance with road design practice.

4. If this is the start of an overtaking lane, see Clause 4.8, the signs and pavement markings shown in Figure 4.21 will be required.

Figure 4.18  TRANSITION FROM FOUR-LANE TO TWO-LANE ROAD

<table>
<thead>
<tr>
<th>$V_{es}$ km/h</th>
<th>C m</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 75</td>
<td>36</td>
</tr>
<tr>
<td>75-90</td>
<td>60</td>
</tr>
<tr>
<td>&gt; 90</td>
<td>96</td>
</tr>
</tbody>
</table>

* For Dimension A, see Table 1.3 in Part 1.
Figure 4.19 TRANSITION FROM FOUR-LANE DIVIDED TO FOUR-LANE UNDIVIDED ROAD
NOTES:

1 The lane reduction is treated either as a zip-merge in accordance with Clause 4.7.2(a) or a lane change in accordance with Clause 4.7.2(b). In the zip-merge case both the lane change arrows and the continuity line are omitted. In the lane change case the lane change arrows are always used.

2 Additional signs to further remind road users of the change to two-way conditions may be required, see Clause 4.7.5.4(d).

3 M and D are the required merge and diverge distances calculated in accordance with road design practice.

Figure 4.20 TRANSITION FROM FOUR-LANE DIVIDED TO TWO-LANE UNDIVIDED ROAD
The End Divided Road sign shall be used at the end of a section of divided road as a warning of two-way traffic ahead.

The sign should, where necessary, be followed by the Two-way Traffic sign (W4-11) (see Clause 3.7.4.(e)).

NOTE: Sign W4-6 is Sign W4-4 inverted.

The Two-way sign (W4-11) shall be used just beyond the end of a divided road or other one-way roadway in any situation where there is a risk that road users will fail to perceive that they are no longer on a divided road and need to be warned that they are about to enter or have entered a road with two-way traffic. It may be used in conjunction with the End Divided Road sign (W4-6) where a two-way roadway is the extension of a one-way roadway.

The sign shall be erected on both sides of the road at such locations and repeater signs placed at further distances along the two-way section as necessary.

It may be used on any other roadway where, because of the road conditions, it is not clear whether a particular roadway carries traffic in one or both directions.

NOTE: For the use of the Two-way sign (R2-11) see Clause 4.13.2.

For the use of this sign refer to Clause 2.8.3.

4.8 CLIMBING AND OVERTAKING LANES, AND TURNOUTS

4.8.1 General

Climbing and overtaking lanes, and turnouts are provided and marked as follows:

(a) Overtaking lanes. These are provided on two-lane, two-way roads at long or steep grades or elsewhere where it is necessary or desirable to provide for traffic to pass slower moving vehicles. Overtaking lanes are designed as shown in Figure 4.21 to encourage all traffic in the first instance to travel in the added left-hand lane, leaving the centre lane for overtaking vehicles only.

(b) Climbing lanes. These are provided on multilane roads, i.e. two or more lanes in one direction, at long or steep grades to minimise reductions in capacity due to slow moving vehicles. Climbing lanes shall be marked as shown in Figure 4.22(a) to encourage only the slow-moving vehicles to use the added left-hand lane.

(c) Turnouts. These are provided only on low speed roads, 85th percentile speed 60 km/h or less, where it is desirable to provide for traffic to pass slower moving vehicles, but due to geometric, topographical or other constraints a full length climbing or overtaking lane cannot be provided. They are generally not more than 150 m in length overall including 50 m entry and exit tapers and shall have a layout and pavement markings as shown in Figure 4.22(b).

The signs listed in Table 4.7 are used for climbing and overtaking lanes and turnouts.
### Table 4.7 SIGNS FOR CLIMBING AND OVERTAKING LANES AND TURNOUTS – SIZE TABLE

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEEP LEFT UNLESS OVERTAKING</td>
<td>R6-29B</td>
<td>1800 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-29C</td>
<td>2400 x 1200</td>
</tr>
<tr>
<td>END KEEP LEFT UNLESS OVERTAKING</td>
<td>R6-32</td>
<td>1200 x 800</td>
</tr>
<tr>
<td>Lane allocation</td>
<td>W4-10B</td>
<td>750 x 750</td>
</tr>
<tr>
<td></td>
<td>W4-10C</td>
<td>900 x 900</td>
</tr>
<tr>
<td>SLOW VEHICLE LANE AHEAD</td>
<td>G9-10</td>
<td>900 x 900</td>
</tr>
<tr>
<td>SLOW VEHICLE LANE x km AHEAD</td>
<td>G9-11</td>
<td>900 x 1100</td>
</tr>
<tr>
<td>SLOW VEHICLES USE LEFT LANE</td>
<td>G9-12</td>
<td>950 x 1100</td>
</tr>
<tr>
<td>OVERTAKING LANE x m AHEAD</td>
<td>G9-37</td>
<td>2600 x 1300</td>
</tr>
<tr>
<td>OVERTAKING LANE x km AHEAD</td>
<td>G9-38</td>
<td>2600 x 1300</td>
</tr>
<tr>
<td>SLOW VEHICLE TURNOUT x m</td>
<td>G9-50A</td>
<td>900 x 900</td>
</tr>
<tr>
<td></td>
<td>G9-50B</td>
<td>1200 x 1200</td>
</tr>
<tr>
<td>SLOW VEHICLE TURNOUT</td>
<td>G9-51A</td>
<td>900 x 1000</td>
</tr>
<tr>
<td></td>
<td>G9-51B</td>
<td>1200 x 1330</td>
</tr>
<tr>
<td>SLOWER VEHICLES USE TURNOUTS</td>
<td>G9-77</td>
<td>1800 x 750</td>
</tr>
<tr>
<td>NEXT x km</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4.8.2 Signs for climbing and overtaking lanes

The warning and traffic instruction signs required at climbing lanes, overtaking lanes and turnouts are as follows:

(a) *Zip-merge and lane change signs*

Refer to Clauses 4.7.5.1 and 4.7.5.2.

(b) *Lane allocation (W4-10)*

The Lane Allocation sign should be used on undivided roads to warn drivers they are approaching or have entered a section of roadway which has an extra lane for traffic travelling in the opposite direction (see Figure 4.21).
NOTES:

1. A double barrier line is required if the warrants for a no-overtaking zone are met in the single-lane direction. It should also be considered if the overtaking lane section is on curved alignment even though overtaking sight distance is available.

2. For erection where left lane is more than 1 km long. This sign is erected 500 m in advance of the G9-73 sign.

3. Merge arrows are optional (see Clause 5.5.2.4).

4. M and D are the required merge and diverge distances calculated in accordance with road design practice.

Figure 4.21  OVERTAKING LANES ON TWO-LANE RURAL ROADS
NOTES:
1 For use where the left lane is more than 1 km long.
2 The slow vehicle turnout can be used on any low speed road, divided or undivided where \( V_{85} \) is 60 km/h or less.
3 Use G9-11 where advance information is desirable i.e. where overtaking opportunities are reduced for some distance in advance of lane (generally 2 km, maximum 5 km).
4 M and D are the required merge and diverge distances calculated in accordance with road design practice.

Figure 4.22  TYPICAL TREATMENT FOR CLIMBING LANES AND TURNOUTS
(c) Slow vehicle lane ahead (G9-10), Slow vehicle lane x km ahead (G9-11)

The SLOW VEHICLE LANE AHEAD sign shall be used to give advance warning of a climbing lane (see Clause 4.8.1(b)). It should be placed on the left side of the road approximately 100 m in advance of the climbing lane. Where it is desirable to give advance information at a greater distance, the alternative sign SLOW VEHICLE LANE x km AHEAD may be used with an appropriate distance shown.

(d) Slow vehicles use left lane (G9-12)

The SLOW VEHICLES USE LEFT LANE sign shall be erected on the left side of a road at the beginning of the taper leading to a climbing lane (see Clause 4.8.1(b)).

(e) Overtaking lane x m ahead (G9-37), Overtaking lane x km ahead (G9-38)

The OVERTAKING LANE x m AHEAD sign may be used to give advance warning of an overtaking lane (see Clause 4.8.1(a)). It should be placed on the left side of the road approximately 300 m in advance of the start of the taper leading to the extra lane.

Where it is desirable to give long distance advance information the legend may be altered to OVERTAKING LANE x km AHEAD (G9-38) with the appropriate distance shown.

(f) Keep left unless overtaking (R6-29)

The KEEP LEFT UNLESS OVERTAKING sign shall be erected at the start of an overtaking lane section on the left side of the road at the beginning of the taper leading to the added left-hand lane (see Clause 5.8.1(a)).

Near the end of the overtaking lane a lane change in accordance with Clause 4.7.5.2 shall be provided at the lane drop as shown in Figure 5.22.

See also Clause 4.15.5 regarding the regulatory use of this sign on multi-lane roads generally.
4.8.3 Signs for turnouts

SLOW VEHICLE TURNOUT x m (G9-50)

SLOW VEHICLE TURNOUT (G9-51)

SLOWER VEHICLES USE TURNOUTS NEXT x km (G9-77)

Signs G9-50 and G9-51 shall be used at up to 300 m in advance of, and at the beginning of the taper leading to a turnout (see Clause 4.8.1(c)). The sign G9-77 may be used to give advance warning of a series of turnouts.
4.9 STEEP GRADES AND SAFETY RAMPS

4.9.1 General
The signing of steep downgrades may take one of the following forms, as illustrated in Figure 4.24.

- Type 1 – Short steep descent (see Figure 4.24(a)).
- Type 2 – Steep descent (see Figure 4.24(b)).
- Type 3 – Long steep descent (see Figure 4.24(c)).

Guides for the use of these treatments is given in Figure 4.25.

NOTE: These signs may not be necessary or appropriate in residential street applications.

Safety ramps may be provided on steep descents to allow runaway vehicles to be brought safely to a stop. Wherever practicable they should be located on the left side of the roadway. Adequate advance advice and directions to its entry point are essential to the effectiveness of a safety ramp. Advance information at successive points covering the entire length of the steep grade above the safety ramp should be considered. Safety ramp signing is illustrated in Figure 4.26. An arrester bed is sometimes used instead of a safety ramp. The requirements for signing and delineation of the entry are similar to those for the safety ramp.

At upgrades in excess of 10%, advance warning should be provided where the length of grade exceeds 100 m (see Clause 4.9.3(a)). Where the length of grade exceeds 1000 m, additional warning should be provided (see Clauses 4.9.3(b) and 4.9.3(c)).

The signs listed in Table 4.8, are used for steep grades (up and down) and safety ramps.

4.9.2 Signs for steep descents
The signs are to be used as follows:

(a) **Steep Descent (W5-12)**

The Steep Descent sign shall be used in advance of short steep descents as indicated in Figure 4.25. It is used as illustrated in Figure 4.24(a).

The supplementary plate NEXT x km shall be used in conjunction with this sign if the length of the steep descent is 1 km or more.

The sign with supplementary plate NEXT x km shall also be used as a repeater sign on long steep descents as illustrated in Figure 4.24(c).

(b) **TRUCKS AND BUSES MUST USE LOW GEAR (R6-22)**

*END TRUCK AND BUS LOW GEAR AREA (R6-23)*

*NEXT x m (R9-6)*

*NEXT x km (R9-7)*

The TRUCKS AND BUSES MUST USE LOW GEAR sign shall be used at steep and very steep descents as shown in Figures 4.24(b) and (c).

To prescribe the legal extent of the control, either the END TRUCK AND BUS LOW SPEED AREA sign shall be placed at the end of the control or a NEXT Distance plate, R9-6 or R9-7, shall be placed below the R6-22 sign at the beginning.

The widths of the distance plates R9-6-1 and R9-7-1 may be varied to suit the sign with which they are to be used.
<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO STOPPING</td>
<td>R5-35B (L, R, D)</td>
<td>450 x 600</td>
</tr>
<tr>
<td>TRUCKS AND BUSES LOW GEAR</td>
<td>R6-22A</td>
<td>1200 x 1000</td>
</tr>
<tr>
<td></td>
<td>R6-22B</td>
<td>1440 x 1200</td>
</tr>
<tr>
<td></td>
<td>R6-22C</td>
<td>1800 x 1500</td>
</tr>
<tr>
<td>END TRUCKS AND BUSES LOW GEAR</td>
<td>R6-23A</td>
<td>1000 x 800</td>
</tr>
<tr>
<td></td>
<td>R6-23B</td>
<td>1500 x 1200</td>
</tr>
<tr>
<td>NEXT x m</td>
<td>R9-6-1</td>
<td>A 750 x 150*</td>
</tr>
<tr>
<td>NEXT x (km)</td>
<td>R9-7-1</td>
<td>B 1000 x 200*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 1200 x 240*</td>
</tr>
<tr>
<td>SAFETY RAMP x km</td>
<td>G9-24-1A</td>
<td>2200 x 800</td>
</tr>
<tr>
<td></td>
<td>G9-24-1B</td>
<td>4400 x 1600</td>
</tr>
<tr>
<td></td>
<td>G9-24-2A</td>
<td>1500 x 1200</td>
</tr>
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<td></td>
<td>G9-24-2B</td>
<td>3000 x 2400</td>
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<tr>
<td>SAFETY RAMP x m</td>
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<td></td>
<td>G9-25-1B</td>
<td>4400 x 1600</td>
</tr>
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<td></td>
<td>G9-25-2A</td>
<td>1500 x 1200</td>
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<td></td>
<td>G9-25-2B</td>
<td>3000 x 2400</td>
</tr>
<tr>
<td>SAFETY</td>
<td>G9-27A</td>
<td>2000 x 750</td>
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<td></td>
<td>G9-27B</td>
<td>3000 x 1125</td>
</tr>
<tr>
<td>RAMP</td>
<td>G9-28A</td>
<td>1600 x 750</td>
</tr>
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<td>G9-28B</td>
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</tr>
<tr>
<td>SAFETY RAMP (L or R)</td>
<td>G9-36-1</td>
<td>4500 x 750</td>
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<tr>
<td></td>
<td>G9-36-2</td>
<td>2200 x 2000</td>
</tr>
<tr>
<td>VERY STEEP CLIMB x km AHEAD, NOT SUITABLE FOR...</td>
<td>G9-46</td>
<td>2800 x 1800</td>
</tr>
<tr>
<td>VERY STEEP CLIMB NEXT x km</td>
<td>G9-47</td>
<td>3000 x 1800</td>
</tr>
<tr>
<td>ALTERNATIVE ROUTE FOR ...</td>
<td>G9-52</td>
<td>2400 x 400</td>
</tr>
<tr>
<td>VERY STEEP DESCENT x km AHEAD, NOT SUITABLE FOR ...</td>
<td>G9-53</td>
<td>2800 x 1800</td>
</tr>
<tr>
<td>ON RIGHT</td>
<td>G9-80-1A</td>
<td>1800 x 450</td>
</tr>
<tr>
<td></td>
<td>G9-80-1B</td>
<td>3600 x 900</td>
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<td>G9-80-2A</td>
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<td>G9-80-2B</td>
<td>3000 x 1600</td>
</tr>
<tr>
<td>STEEP DESCENT</td>
<td>G9-82</td>
<td>3000 x 1400</td>
</tr>
<tr>
<td>LONG STEEP DESCENT NEXT x km</td>
<td>G9-83</td>
<td>3000 x 1800</td>
</tr>
<tr>
<td>Steep Descent</td>
<td>W5-12A</td>
<td>600 x 600</td>
</tr>
<tr>
<td></td>
<td>W5-12B</td>
<td>750 x 750</td>
</tr>
<tr>
<td></td>
<td>W5-12C</td>
<td>900 x 900</td>
</tr>
<tr>
<td>Steep Climb</td>
<td>W5-13A</td>
<td>600 x 600</td>
</tr>
<tr>
<td></td>
<td>W5-13B</td>
<td>750 x 750</td>
</tr>
<tr>
<td></td>
<td>W5-13C</td>
<td>900 x 900</td>
</tr>
<tr>
<td>NEXT x km</td>
<td>W8-17-1A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>W8-17-1B</td>
<td>750 x 500</td>
</tr>
<tr>
<td></td>
<td>W8-17-1C</td>
<td>900 x 600</td>
</tr>
</tbody>
</table>

* The widths of these signs may be varied to suit the sign with which they are to be used.
(c) **NEXT x km (W8-17-1)**

The NEXT x km sign should be used in conjunction with the Steep Descent sign (W5-12), as illustrated in Figures 4.24(a) and (c).

(d) **VERY STEEP DESCENT x. km AHEAD, NOT SUITABLE FOR ... (G9-53)**

The VERY STEEP DESCENT x km AHEAD, NOT SUITABLE FOR ... sign shall be used as illustrated in Figures 4.24(b) and (c) where certain classes of vehicle, which would encounter difficulty at a very steep descent or be unable to negotiate the descent, need to be warned in time to take an alternative route or turn back. The sign should, wherever practicable, be placed in advance of any suitable detour or alternative route intersection, or, failing this, at a location where vehicles can turn around before reaching the steep descent.

NOTE: Use of this sign does not obviate the need to impose low gear use requirements on trucks and buses, see Item (b).

(e) **STEEP DESCENT (G9-82)**

The STEEP DESCENT sign shall be used in advance of steep descents as indicated in Figure 4.25. It is used as illustrated in Figure 4.24(b). Signs imposing low gear use requirements on trucks and buses, see Item (b), shall be used in conjunction with this sign.

(f) **LONG STEEP DESCENT, NEXT x km (G9-83)**

The LONG STEEP DESCENT NEXT x km sign shall be used in advance of long steep descents as indicated in Figure 4.25. It is used as illustrated in Figure 4.24(c).

Signs imposing low gear use requirements on trucks and buses, see Item (b), shall be used in conjunction with this sign. An example of a diagrammatic sign which may be used as an alternative to this sign is shown in Figure 4.23. It is appropriate where the grade eases at one or more locations during the descent.

Figure 4.23  EXAMPLE OF A DIAGRAMMATIC STEEP DESCENT SIGN
(g) **ALTERNATIVE ROUTE FOR ... (G9-52)**

The ALTERNATIVE ROUTE FOR ... sign should be used in conjunction with the G9-53 sign at the turnoff to the alternative route for the named vehicle types.

(h) **Flashing light enhancement**

Where it is necessary to emphasise warning of a particularly hazardous situation, use of signs W5-12, G9-82 or G9-83 augmented with flashing lights, examples of which are illustrated at Appendix E, may be considered.

### 4.9.3 Signs for steep upgrades

The signs are to be used are as follows:

(a) **Steep Climb (W5-13)**

The Steep Climb sign should be used in advance of steep upgrades of 10% or more, and generally at least 100 m in length.

(b) **VERY STEEP CLIMB x km AHEAD, NOT SUITABLE FOR ... (G9-46)**

The VERY STEEP CLIMB x km AHEAD, NOT SUITABLE FOR ... sign should be used in advance of long steep climbs, generally in excess of 10% grade and 1 km in length, to advise drivers of certain classes of vehicles that they may experience difficulty in negotiating a steep upgrade. Signing of alternative routes for the vehicle types named on the sign, should be considered.

(c) **VERY STEEP CLIMB NEXT x km (G9-47)**

The VERY STEEP CLIMB NEXT x km sign may be placed at the beginning of a long steep climb (see Clause 4.9.3.2(b)) and elsewhere along its length as a repeater sign as needed, e.g. beyond intersections. An alternative diagrammatic sign based on the design illustrated in Figure 4.23 may also be considered.

### 4.9.4 Signs for safety ramps

The signs used are as follows:

SAFETY RAMP x km (G9-24) SAFETY (G9-27)

SAFETY RAMP x m (G9-25) RAMP (G9-28)

ON RIGHT (G9-80-1) SAFETY RAMP (G9-36)

ON RIGHT (G9-80-2) No Stopping (R5-35)(L, R, D)

At the commencement of the descent and immediately following signs warning of the steep descent (see Clause 4.9.2) an advisory sign SAFETY RAMP x km (G9-24) shall be erected 200 m to 400 m beyond the last warning sign.

Depending upon the length of the grade and particular circumstances it may be desirable to repeat the G9-24 sign at intervals with the appropriate distance indicated. There should be a G9-24 sign 1 km from the start of the safety ramp. Approximately 300 m from the start of the safety ramp there should be an advisory sign SAFETY RAMP x m (G9-25).

Parking and stopping shall be restricted on the approach to and at, the safety ramp by imposing a no-stopping
restriction for 60 m in advance of the safety ramp using No Stopping (R5-35) signs.

At the safety ramp the SAFETY sign (G9-27) shall be erected on the left and the RAMP sign (G9-28) on the right of the ramp entrance facing approaching traffic, except that a single SAFETY RAMP sign (G9-36) shall be erected in lieu where it better suits the layout and alignment of the approach to the safety ramp.

Safety ramps should be located on the left as illustrated in Figure 4.26. In the event that a safety ramp on the right is required, the ON RIGHT (G9-80) supplementary plate shall be attached to the advance signs G9-24 and G9-25.

NOTE: Right hand safety ramps are only applicable where it has not been practical to provide a ramp on the left. The risks associated with a right hand safety ramp need to be carefully assessed.

Where an arrester bed is provided in lieu of a safety ramp the legend ARRESTER BED should be substituted for SAFETY RAMP on all relevant signs for downhill traffic.
NOTES:
1 The R9-6-1 and R6-23 signs are alternatives, see Clause 4.9.2(b).
2 The G9-53 and G9-52 are for use where it is desired and practicable to discourage certain classes of vehicle from using the steep descent, see Clause 4.9.2(d) and (f).

Figure 4.24 STEEP DESCENT
NOTES:

1 Short steep descent (see Figure 4.24(a)).
2 Steep descent (see Figure 4.24(b)).
3 Long steep descent (see Figure 4.24(c)).

Figure 4.25  GUIDE FOR THE TREATMENT OF STEEP DESCENTS
NOTES:

1 Night time delineation of the safety ramp should not visually overshadow that on the through roadway to the extent that drivers might be inadvertently drawn into the safety ramp.

2 Use of the single sign or the pair of signs will depend upon the layout and alignment of approach to the safety ramp.

3 Double barrier lines should be used if sight distance restricted.

**Figure 4.26 SAFETY RAMPS**
4.10 WATER CROSSINGS

4.10.1 General

The following water crossings are dealt with in this Clause:

(a) *Ferries and opening bridges*

   Situations where traffic must be brought to a stop by means of a road block barrier when the ferry is not loading or the bridge is open.

(b) *Fords*

   Locations where water flows over the road except during prolonged dry periods but the road through the water is trafficable with care when depth indicators so indicate.

(c) *Floodways*

   Sections of road over which water may flow for short periods in times of flood but the road remains trafficable with care. Temporary signs WATER OVER ROAD, T2-13 (see Clause 4.11.3.1), shall be used as soon as practicable after water begins to cover the road.

(d) *Low level bridges*

   Locations where there is an abrupt descent on the approach to a bridge that is substantially lower than the approach road, and which may be liable to flooding.

   NOTE: Partial or complete road closure in accordance with Part 3 of the Manual may be required if flooding affects safe passage of traffic.

The signs used for water crossings are listed in Table 4.9.

<table>
<thead>
<tr>
<th>Table 4.9 SIGNS FOR WATER CROSSINGS – SIZE TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sign type</strong></td>
</tr>
<tr>
<td>NEXT x km</td>
</tr>
<tr>
<td>FERRY</td>
</tr>
<tr>
<td>OPENING BRIDGE</td>
</tr>
<tr>
<td>FORD</td>
</tr>
<tr>
<td>FLOODWAY</td>
</tr>
<tr>
<td>LOW LEVEL BRIDGE</td>
</tr>
<tr>
<td>ON SIDE ROAD (L or R)</td>
</tr>
<tr>
<td>(Distance) x m</td>
</tr>
<tr>
<td>NEXT x km</td>
</tr>
<tr>
<td>STOP banner</td>
</tr>
<tr>
<td>STOP HERE ON RED SIGNAL</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>ROAD SUBJECT TO FLOODING</td>
</tr>
<tr>
<td>INDICATORS SHOW DEPTH</td>
</tr>
<tr>
<td>Depth Indicator</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

4.10.2 Ferries and opening bridges

The treatment comprises use of the FERRY (W5-1) or OPENING BRIDGE (W5-2) as specified in Clauses 4.10.6.1 and 4.10.6.2 together with a road block barrier, see Clause 4.11.1.

4.10.3 Fords

The treatment at fords shall comprise the FORD (W5-6) sign located sufficiently far in advance of the ford to enable vehicles to stop before entering the water. Distant advance signs using the distance plate (W8-5), e.g. 500 m, may also be required. Depth Indicators (G9-22) and the sign ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21) (see Clauses 4.10.6.9 and 4.10.6.10) shall be used at fords.
4.10.4 Floodways

The treatment at floodways shall comprise one of the following:

(a) At an isolated single floodway the sign FLOODWAY (W5-7-1) shall be located in advance of the highest point floodwaters would be expected to reach. Depth indicators (G9-22) and the sign ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21) (see Clauses 4.10.6.9 and 4.10.6.10) shall be located near the floodway.

(b) Where on a floodplain there are a number of floodways at intervals not exceeding 2 km, the sign assembly FLOODWAYS, NEXT x km (W5-7-2, W8-17-1) shall be located in advance of the first floodway as in Item (a) and may be repeated as necessary if there are a large number of floodways along the section. At each location where the assembly is used, the sign ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21) shall be used in conjunction with it. Depth indicators shall be placed at every floodway.

The use of floodway signs is illustrated in Figure 4.27.

At times of flood, the temporary sign WATER OVER ROAD (T2-13) (see Clause 4.11.3.1) may also be displayed on the approaches to the flooded section if it is trafficable, or ROAD CLOSED (T2-4) (see Clause 4.11.3.6) if it is not trafficable.

4.10.5 Low level bridges

The treatment at low level bridges shall comprise the sign LOW LEVEL BRIDGE (W5-8) located sufficiently far in advance to enable vehicles to slow down to the comfortable speed of negotiation of the dip to the bridge. The Advisory Speed sign (W8-2) (see Clause 4.5.4.4) may be used in conjunction with this sign.

If the low level bridge is liable to flooding, Depth Indicators (G9-22) and the sign ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-23) (see Clauses 4.10.6.9 and 4.10.6.10) shall be used. At times of flooding, the temporary sign WATER OVER ROAD (T2-13) (see Clause 4.11.3.1) may also be displayed on the approaches if the bridge is trafficable, or ROAD CLOSED (T2-4) (see Clause 4.11.3.6) if it is not trafficable.

4.10.6 Signs for water crossings

4.10.6.1 FERRY (W5-1)

The FERRY sign shall be used to give warning of the approach to a ferry landing.

If desirable, additional prior warning of the approach to the landing may be given by using a FERRY sign in conjunction with a distance indication, (Distance) x m (W8-5) (see Clause 4.8.2.1(c)).

Where the ferry landing is located on a side road and the normal distance requirements for placement of the sign cannot be met, the sign may be erected on the through road and supplemented by the ON SIDE ROAD sign (W8-3) (see Clause 4.10.6.6).

4.10.6.2 OPENING BRIDGE (W5-2)

The OPENING BRIDGE sign shall be used on the approaches to a bridge having an opening span.

Where desirable, additional prior warning of the approach to an opening bridge may be given by using an OPENING BRIDGE sign in conjunction with a distance indication, (Distance) x m (W8-5) (see Clause 4.10.6.11).
Figure 4.27  FLOODWAYS

* For Dimensions A and B, see Table 1.3 in Part 1.
4.10.6.3 FORD (W5-6)

The FORD sign shall be used to warn of a ford as described in Clause 4.10.1(b).

Depth Indicators (G9-22) and the sign ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21) shall be used with this sign (see Clauses 4.10.6.9 and 4.10.6.10).

4.10.6.4 FLOODWAY (W5-7-1) FLOODWAYS (W5-7-2)

The FLOODWAY sign shall be used to warn of a floodway as described in Clause 4.10.4.

Depth Indicators (G9-22) and the sign ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21) shall be used with this sign (see Clauses 4.10.6.9 and 4.10.6.10).

The FLOODWAYS (W5-7-2) sign may be used in conjunction with the NEXT x km (W8-17-1) sign (see Clause 4.10.6.12) to warn of a number of floodways on the road at spacings not exceeding 2 km (see Clause 4.10.4(b)).

4.10.6.5 LOW LEVEL BRIDGE (W5-8)

The LOW LEVEL BRIDGE sign shall be used to warn of an abrupt descent from the normal approach road level to a bridge at a lower road level. It is used in accordance with the requirements and recommendations of Clause 4.10.5.

4.10.6.6 ON SIDE ROAD (W8-3)

The ON SIDE ROAD sign shall be used as a supplement to the FERRY sign (W5-1) (see Clause 4.10.6.1) to warn of a ferry on a side road in proximity to the through road, where the normal distance requirements for placement of the sign on the side road cannot be met.

The ON SIDE ROAD sign shall be erected on the same post as, and below, the warning sign with which it is associated.

4.10.6.7 STOP HERE ON RED SIGNAL (R6-6)

The STOP HERE ON RED SIGNAL sign shall be used near the signals located at opening and one-lane bridges, and in any other situation where a vehicle is required to stop at a red signal and the position at which the vehicle must stop is not readily apparent.
4.10.6.8 STOP banner (R6-8)

The STOP banner shall be used to stop traffic approaching a ferry landing, opening bridge or other obstruction where at times, all traffic must stop until the sign is removed from display. Where a road block barrier (see Clause 4.11.1) is installed, the STOP banner shall be affixed to the centre of the boom to face approaching traffic.

4.10.6.9 ROAD SUBJECT TO FLOODING INDICATORS SHOW DEPTH (G9-21)

The ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH sign shall be erected on the left side of the road on which Depth Indicators (G9-22) are used, to advise drivers that the road ahead may be covered by floodwaters. A similar sign, ROAD SUBJECT TO SNOW, INDICATORS SHOW DEPTH, may be used at appropriate locations.

4.10.6.10 Depth indicator (G9-22)

Depth Indicators shall be used where floodwaters across the road are likely to rise to an unfordable depth.

The G9-22-1 indicator shall be used at all fords, floodways and low level bridges. It shall be displayed so as to be clearly visible to drivers before reaching the flooded part of the road. Where necessary, separate indicators should be provided on each approach. The zero mark should be set at the lowest pavement level on the section of road liable to flooding.

Where flood depths in excess of 1.5 m or 3.5 m are expected, the G9-22-2 and G9-22-3 indicators shall be erected on progressively higher ground.

4.10.6.11 (Distance) x m (W8-5)

The (Distance) x m sign shall be used in conjunction with a warning sign to give additional prior warning of the hazard.

4.10.6.12 NEXT x km (W8-17-1)

The NEXT x km sign shall be used to indicate a number of similar hazards over a specified distance. It is typically used with the FLOODWAYS (W5-7-2) sign and GRAVEL ROAD (W5-19) sign.

4.10.6.13 NEXT x km (R9-7-1)

This sign may be used with the ROAD SUBJECT TO FLOODING ... (G9-21) sign to indicate more than one floodway ahead.
4.11 PHYSICAL OBSTRUCTIONS AND HAZARDS

4.11.1 Road block barriers

4.11.1.1 Application

Road block barriers may be used wherever temporary closure of the road to vehicular traffic is required due to some physical obstruction or hazard on the roadway ahead, e.g. a ferry or opening bridge, or where there is a legal requirement for all vehicles to stop, e.g. for animal, plant or fruit quarantine checks. They should not be installed if devices such as traffic signals, regulatory signs or hand banners are shown to be effective and adequate.

4.11.1.2 Construction and location

Barriers shall be of light construction so that they are not likely to be a hazard if struck by a vehicle. They shall be located and delineated so that traffic approaching at normal speeds can detect their presence in time to stop. Appropriate advance warning signs shall be used. Where booms are used they should, when lowered, extend horizontally from the left edge of the pavement to at least the centre of a two-way roadway, or at least three-quarters of the width of a one-way roadway.

4.11.1.3 Associated device and marking

The boom shall be finished in alternate stripes of contrasting colour, one or both colours being reflectorised and a STOP banner (R6-8B) (see Clause 4.10.6.8) fixed to it.

In addition, information signs may be erected. Typical examples are shown in Figure 4.28.

![Figure 4.28 EXAMPLES OF QUARANTINE STATION SIGNS](image)

4.11.2 Hazard warning signs

4.11.2.1 General

The signs in this series warn road users of hazardous road conditions which are not covered by specific treatments elsewhere in the Manual. The signs are listed in Table 4.10.
<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROAD ENDS</td>
<td>W5-18</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td>GRAVEL ROAD</td>
<td>W5-19</td>
<td></td>
</tr>
<tr>
<td>Slippery</td>
<td>W5-20</td>
<td></td>
</tr>
<tr>
<td>Trucks Crossing or Entering</td>
<td>W5-22</td>
<td></td>
</tr>
<tr>
<td>Kangaroos</td>
<td>W5-29</td>
<td></td>
</tr>
<tr>
<td>Aircraft</td>
<td>W5-30</td>
<td></td>
</tr>
<tr>
<td>FIRE STATION</td>
<td>W5-36</td>
<td></td>
</tr>
<tr>
<td>AMBULANCE STATION</td>
<td>W5-37</td>
<td></td>
</tr>
<tr>
<td>Stock</td>
<td>W5-38</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td>Tram</td>
<td>W5-41</td>
<td>B 750 x 750</td>
</tr>
<tr>
<td>Fallen rocks</td>
<td>W5-42(L,R)</td>
<td>C 900 x 900</td>
</tr>
<tr>
<td>UNEVEN SURFACE</td>
<td>W5-43</td>
<td></td>
</tr>
<tr>
<td>Camel</td>
<td>W5-44</td>
<td></td>
</tr>
<tr>
<td>Emu</td>
<td>W5-45</td>
<td></td>
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<tr>
<td>Wild horse</td>
<td>W5-46</td>
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<td>Koala</td>
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<td>Wombat</td>
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<td>WILD ANIMALS</td>
<td>W5-49</td>
<td></td>
</tr>
<tr>
<td>FARM MACHINERY</td>
<td>W5-50</td>
<td></td>
</tr>
<tr>
<td>WHEN WET</td>
<td>W8-7</td>
<td>A 600 x 400</td>
</tr>
<tr>
<td>WHEN FROSTY</td>
<td>W8-8</td>
<td>B 750 x 500</td>
</tr>
<tr>
<td>UNDER SNOW</td>
<td>W8-9</td>
<td>C 900 x 600</td>
</tr>
<tr>
<td>BOGGY WHEN WET</td>
<td>W8-21</td>
<td></td>
</tr>
<tr>
<td>ON BRIDGE WHEN FROSTY</td>
<td>W8-29A</td>
<td>600 x 750</td>
</tr>
<tr>
<td></td>
<td>W8-29B</td>
<td>750 x 937</td>
</tr>
<tr>
<td></td>
<td>W8-29C</td>
<td>900 x 1125</td>
</tr>
<tr>
<td>(Distance) x m</td>
<td>W8-5A</td>
<td>600 x 200</td>
</tr>
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<td></td>
<td>W8-5B</td>
<td>750 x 250</td>
</tr>
<tr>
<td></td>
<td>W8-5C</td>
<td>900 x 300</td>
</tr>
<tr>
<td>NEXT x km</td>
<td>W8-17-1A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>W8-17-1B</td>
<td>750 x 500</td>
</tr>
<tr>
<td></td>
<td>W8-17-1C</td>
<td>900 x 600</td>
</tr>
<tr>
<td>REDUCE SPEED</td>
<td>G9-9A</td>
<td>1500 x 750</td>
</tr>
<tr>
<td></td>
<td>G9-9B</td>
<td>1800 x 900</td>
</tr>
<tr>
<td>NO THROUGH ROAD</td>
<td>G9-18A</td>
<td>600 x 400</td>
</tr>
<tr>
<td></td>
<td>G9-18B</td>
<td>900 x 600</td>
</tr>
<tr>
<td>ROAD CLOSED</td>
<td>G9-20</td>
<td>900 x 550</td>
</tr>
<tr>
<td>Stock AHEAD</td>
<td>T1-19A</td>
<td>900 x 600</td>
</tr>
<tr>
<td></td>
<td>T1-19B</td>
<td>1200 x 900</td>
</tr>
<tr>
<td>TRAFFIC HAZARD</td>
<td>T1-10</td>
<td>1200 x 600</td>
</tr>
<tr>
<td>NEW ROUNDABOUT</td>
<td>T1-21</td>
<td>1800 x 600</td>
</tr>
<tr>
<td>CHANGED SIGNALS</td>
<td>T1-22</td>
<td>1200 x 600</td>
</tr>
<tr>
<td>CHANGED TRAFFIC CONDITIONS</td>
<td>T1-23</td>
<td>1800 x 900</td>
</tr>
<tr>
<td>CHANGED TRAFFIC CONDITIONS</td>
<td>T1-23-Q01</td>
<td>900 x 600</td>
</tr>
<tr>
<td>CHANGED INTERSECTION</td>
<td>T1-33</td>
<td>1800 x 600</td>
</tr>
<tr>
<td>CHANGED LINE MARKING</td>
<td>T1-Q14</td>
<td>1800 x 900</td>
</tr>
</tbody>
</table>
Table 4.10 SIGNS FOR HAZARDOUS ROAD CONDITIONS – SIZE TABLE (cont.)

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROAD CLOSED</td>
<td>T2-4-Q01</td>
<td>1800 x 300</td>
</tr>
<tr>
<td>WATER OVER ROAD</td>
<td>T2-13A</td>
<td>900 x 600</td>
</tr>
<tr>
<td></td>
<td>T2-13B</td>
<td>1200 x 900</td>
</tr>
<tr>
<td>Trucks crossing or entering</td>
<td>T2-25</td>
<td>900 x 600</td>
</tr>
<tr>
<td>SMOKE HAZARD</td>
<td>T4-6A</td>
<td>900 x 600</td>
</tr>
<tr>
<td></td>
<td>T4-6B</td>
<td>1200 x 900</td>
</tr>
<tr>
<td>SCHOOL BUS</td>
<td>T6-4</td>
<td>Variable</td>
</tr>
<tr>
<td>Give way to buses</td>
<td>R6-31</td>
<td>450 x 450</td>
</tr>
</tbody>
</table>

4.11.2.2 ROAD ENDS (W5-18)

The ROAD ENDS sign shall be used to warn of the end of a road where, because of visibility or grades, drivers need prior warning so that they may stop in time.

4.11.2.3 GRAVEL ROAD (W5-19)

The GRAVEL ROAD sign shall be used to warn road users at the approach to a section of unsealed road.

This sign should be used in conjunction with a NEXT x km supplementary plate (W8-17-1) (see Clause 4.10.6.12) where the gravel road extends for only a short distance, typically 5 km or less. It may also be used in conjunction with a BOGGY WHEN WET supplementary plate (W8-21) (see Clause 4.11.2.11).

The sign shall not be used on a sealed road in advance of a turnoff to an unsealed road.

4.11.2.4 Slippery (W5-20)

The Slippery sign shall be used to warn of a section of pavement on which the skid resistance has been reduced to an unexpectedly low level. Its use shall be restricted as follows:

(a) Except as specified below, it shall be limited to use as a temporary measure only pending appropriate restoration of the pavement surface. The exceptions are -

   (i) signs in advance of a bridge deck or similar which may be affected by frost and which is not amenable to skid resistance restoration; and
   (ii) pavements on which black ice is likely to form.

(b) The sign shall not be used on slippery surfaces where drivers would expect them to be slippery in the normal course, e.g. unsealed roads, pavements under snow.

(c) The sign shall be removed as soon as the skid resistance of the pavement under all likely weather conditions, has been restored to an acceptable level.

The relevant supplementary plates in Clause 4.11.2.10 shall be used with the sign.

On a long length of slippery road the sign should be repeated at intervals of not more than 3 km.

NOTE: An acceptable minimum skid resistance value should be established and wherever practicable measurements taken at doubtful sites to determine whether slippery signs should be used.
4.11.2.5 Trucks (crossing or entering) (W5-22)

The Trucks (Crossing or Entering) sign shall be used where it is necessary to warn of the frequent movement of trucks to or from an adjoining property.

If the truck movements are occasional or seasonal the sign T2-25, displayed as a temporary sign, shall be used instead.

4.11.2.6 Stock (W5-38)

The Stock sign shall be used if there is a need to warn of the unexpected presence of wandering stock in the road reserve. The NEXT x km (W8-17-1) supplementary plate should be used in conjunction with this sign (see Clause 4.11.2.15) when used for this purpose.

It may also be used as part of an active signal system at a stock crossing.

Except as indicated above, this sign shall not be used for situations where stock is crossing or droving along a road under control. The Stock Ahead (T1-19) sign (see Clause 4.11.3.4) shall be used for this purpose.

Where there is likely to be wandering stock on an unfenced road, e.g. on outback pastoral leases, a W5-Q10 sign shown in Figure 4.29 may be used in lieu of the Stock sign. The sign, if used, shall be placed at the beginning of the section of road concerned and repeated as necessary. The first and any other sign located close to a grid shall be located 100 to 150 m beyond the grid.

FIGURE 4.29 UNFENCED ROAD WATCH FOR WANDERING ANIMALS (W5-Q10) SIGN

4.11.2.7 Hazardous wildlife

- Kangaroo (W5-29)
- Camel (W5-44)
- Emu (W5-45)
- Wild horse (W5-46)
- Koala (W5-47)
- Wombat (W5-48)
- WILD ANIMALS (W5-49)
Hazardous wildlife signs shall be used to warn road users of the unexpected presence of wild animals on the road which may be a hazard to road users. Signs shall be used only where hazardous wild animal activity is most likely to occur. Distance plates shall not be used with these signs except for short distances over which animal activity is known to be continuous.

Where there are several types of animal that may be a hazard at a particular location, the sign WILD ANIMALS may be used. If there are only two animals of significant hazard, instead of using the WILD ANIMALS sign, they may both be depicted on the one sign. The alternative of signing only the animal of greatest threat may be sufficient within a localised area even though other kinds may be a potential hazard. See also Clause 4.11.2.6 regarding wandering stock within the road reserve and on unfenced roads.

NOTE: This Standard does not specify symbolic warning signs for small animals. The efficacy of warning signs to protect small animals that may wander onto the road is at least doubtful. Appendix E illustrates a series of signs that may be used to alert road users to the presence of wildlife in the vicinity.

4.11.2.8 Aircraft (W5-30)

The Aircraft sign may be used in the vicinity of an airfield to warn that aircraft may fly over the road at a low altitude.
4.11.2.9 FIRE STATION (W5-36), AMBULANCE STATION (W5-37)

These signs shall be used in advance of the entrance to a fire station or ambulance station to warn traffic in time to avoid an emergency vehicle that may exit suddenly from the station.

4.11.2.10 WHEN WET (W8-7), WHEN FROSTY (W8-8), UNDER SNOW (W8-9), ON BRIDGE WHEN FROSTY (W8-29)

The WHEN WET, WHEN FROSTY and UNDER SNOW signs shall be placed below the Slippery sign (W5-20) where it is desired to indicate specific conditions (see Clause 4.11.2.4). The sign ON BRIDGE WHEN FROSTY shall be used to indicate that the bridge deck may be slippery but not the approach road.

Other legends may be used as required.

4.11.2.11 BOGGY WHEN WET (W8-21)

The BOGGY WHEN WET sign shall be used as appropriate in conjunction with the GRAVEL ROAD sign (W5-19) (See Clause 4.11.2.3), and the NEXT x km supplementary plate (W8-17-1) (see Clause 4.11.2.13).
4.11.2.12 (Distance) x m (W8-5)

The (Distance) x m sign shall be used in conjunction with a warning sign where an indication of distances of less than 1 km to the hazard is desirable. Distances should be indicated as follows:
- 0 to 500 m - to the nearest 50 m
- 501 to 900 m - to the nearest 100 m

4.11.2.13 NEXT x km (W8-17-1)

The NEXT x km sign shall be used in conjunction with the Stock sign (W5-38) (see Clause 4.11.2.6), where the hazard exists for a distance of 1 km or more. The distance shall be shown to the nearest 1 km.

4.11.2.14 REDUCE SPEED (G9-9)

The REDUCE SPEED sign may be erected at sites where the approach speed of traffic is high and the majority of drivers must slow down and may be required to stop. Where used, it shall be erected in conjunction with the appropriate standard warning sign so that the reason for the reduction in speed is apparent to a driver.

REDUCE SPEED signs shall not be erected instead of other standard warning devices and signs, and generally should not be erected unless the other devices have proved to be, or are likely to be ineffective. They should not be regarded as a cure for every high-speed traffic situation; indiscriminate and frequent use will destroy the impact which the sign, properly used, has on approaching drivers.

REDUCE SPEED signs should be erected 60 to 120 m in advance of the appropriate warning sign so that both signs are visible at the same time to an approaching driver.

4.11.2.15 ROAD CLOSED (G9-20)

The ROAD CLOSED sign shall be erected in the centre of a road that is closed to vehicular traffic. It should be erected in conjunction with a permanent barrier across the roadway.

Partial or complete road closures in accordance with Part 3 of the Manual may be required if a road is temporarily closed to approaching through traffic.

4.11.2.16 NO THROUGH ROAD (G9-18)

The NO THROUGH ROAD sign shall be used to advise traffic not to enter a dead-end local road in error and should face drivers likely to turn into the road.

NOTE: A NO THROUGH ROAD sign (G5-10) designed to be used in conjunction with street name signs, is specified in Part 5 of the Manual.

4.11.2.17 Tram (W5-41)

This sign shall be used to warn of the possible unexpected appearance or presence of a tram, e.g. when entering a street from its own right of way or parked at a terminus.
4.11.2.18 Fallen rocks (W5-42)

This sign shall be used to warn of locations where there may be a hazard from rocks that have fallen onto the roadway. The right hand version of this sign would not be required where the potential rock fall would not affect drivers passing to the left of it.

4.11.2.19 UNEVEN SURFACE (W5-43)

This sign shall be used to warn of the unexpected onset of road conditions on sealed roads with significantly reduced riding qualities. It shall not be used on unsealed roads.

4.11.2.20 Farm machinery (W5-50)

The Farm Machinery sign shall be used on roads where the presence of slow moving or overwidth farm machinery would be an unexpected hazard.

4.11.3 Warning signs for temporary or part time hazards

4.11.3.1 Water over road (T2-13)

The WATER OVER ROAD sign shall be used to indicate that the road is trafficable with care although there is water over the road.

3.11.3.2 Smoke hazard (T4-6)

The SMOKE HAZARD sign shall be used to warn traffic of the possible loss of visibility due to smoke from roadside burning off, sugar cane fires or any other cause.
4.11.3.3 Vehicle mounted signs

(a) **Give Way to Buses (R6-31)**

This sign shall be displayed on the rear of public buses to indicate that following traffic is required to give way to the bus as it drives from a bus stop into the following stream of traffic.

![Give Way to Buses (R6-31)](image)

(b) **SCHOOL BUS (T6-4)**

The SCHOOL BUS sign shall be attached to passenger carrying vehicles when they are primarily engaged in the transport of school children to or from school, and shall be displayed only when the vehicle is in use for such purpose.

![SCHOOL BUS (T6-4)](image)

(c) **Other vehicle mounted signs**

Signs shall be used as necessary to indicate the special loads being carried or the specialised nature of work being undertaken by service vehicles that could create a hazard to traffic whilst so engaged. The design of these signs shall conform with that of other signs in the T series, i.e. black legend on yellow background. Sign design principles to ensure adequate legibility and reading time should be observed.

Vehicle mounted signs associated with works on roads are specified in Part 3 of this Manual. Where excess dimension loads are being carried, or where the nature of the vehicle could create a hazard to traffic, specific vehicle mounted signs shown below are displayed on appropriate vehicles. These vehicles may require a permit under the Transport Operations (Road Use Management) Act.

NOTE: In addition to the signs prescribed below, certain other requirements for special vehicles are prescribed in the Transport Operations (Road Use Management) Act. Details of other vehicle marker plates are included in AS4001 – Motor Vehicles – Rear Marker Plates.

(i) **ROAD TRAIN (T6-Q01)**

The ROAD TRAIN sign (T6-Q01) shall be affixed to the front of the hauling unit and to the rear of the rearmost trailer of all road trains.

The sign shall consist of a yellow reflectorised background not less than 1200 mm long and 250 mm wide with the legend ROAD TRAIN in black letters not less than 180 mm high.

The warning sign at the front of the vehicle shall be mounted so that it is not below the bumper bar of the hauling unit. The rearmost warning sign is to be mounted a maximum of three metres above the ground.

(ii) **OVERSIZE LOAD AHEAD (T6-Q04)**

Excess dimension vehicles or vehicles carrying excess dimension loads may be required to be escorted by a pilot vehicle/s. Signing is required for pilot vehicles. Sign T6-Q04 (double-sided) is required to be mounted on the roof of the pilot vehicle/s.

Both faces of the sign shall consist of a yellow reflectorised background 1200 mm long and 600 mm wide with the legend OVERSIZE and LOAD AHEAD in black letters not less than 200 mm high and 100 mm high, respectively.

(iii) **OVERSIZE (T6-Q03)**

The excess dimension vehicle shall display the OVERSIZE (T6-Q03) sign affixed to the front of the hauling unit and at the rear of the vehicle (or load).
The sign shall consist of a yellow reflectorised background not less than 1200 mm long and 450 mm wide with the legend in black letters not less than 200 mm high.

The warning sign shall be mounted so that it is not below the bumper bar or, if there is no bumper bar, at least 500 mm above ground level.

**4.11.3.4 Stock AHEAD (T1-19)**

The Stock AHEAD sign shall be used as a temporary sign where stock is being driven across or along a road under the control of a person other than where an active signalling device has been installed. It may be displayed on either a moveable stand or as a fixed folding type sign. In either case it shall only be displayed when stock under control is either on or about to enter the roadway.

**4.11.3.5 Changed traffic conditions signs**

The following signs should be used to warn regular users of a route that changes to traffic conditions have been made. They shall be displayed for a limited period only, after the change has been made:

(a) NEW ROUNDABOUT (T1-21)
(b) CHANGED SIGNALS (T1-22)
(c) CHANGED TRAFFIC CONDITIONS (T1-23, T1-23-Q01)
(d) CHANGED INTERSECTION (T1-33)
(e) CHANGED LINE MARKING (T1-Q14)

The CHANGED TRAFFIC CONDITIONS sign shall be used only when none of the other three signs apply.

**4.11.3.6 ROAD CLOSED (T2-4)**

The ROAD CLOSED sign should be used at any temporary closure of the road due to the presence of blockages such as non-trafficable flood waters, fallen trees or accidents.

A NO ENTRY sign may be used with the ROAD CLOSED sign.

**3.11.3.7 TRAFFIC HAZARD (T1-10)**

The sign TRAFFIC HAZARD is for emergency use only, and may be used whenever any unexpected event causes a traffic hazard. Should the hazard remain for any appreciable time, this sign shall be replaced as soon as possible, generally within 24 h, by signs more appropriate to conditions imposed on traffic. In addition, other signs and devices may be needed to define the hazard limits and to guide traffic, particularly where hazard is not readily evident.
4.11.4 Miscellaneous installations

4.11.4.1 Truck checking stations and weighbridges
Truck checking stations and weighbridges are set up on roads to assist in the enforcement of vehicle mass and dimension regulations. A typical treatment is shown in Figure 4.30.

4.11.4.2 Traffic survey interview stations
The main points to be considered in establishing a traffic survey interview station are the provision of adequate sight distance to the interview station, the installation of suitable signs and lighting at night, and adequate provision for bypassed traffic.
NOTES:
1  Similar signs as for other approach.
2  Alternative position for gore sign. In this case, the arrow would be altered to 45° angle.
3  Use of this sign may be considered where visibility of the exit from the checking station is restricted.

Figure 4.30  TYPICAL TREATMENT AT A TRUCK CHECKING STATION
4.11.4.3 Signs

The temporary warning signs used for traffic survey interview stations and similar road blocks are listed in Table 4.11.

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAFFIC SURVEY x m</td>
<td>T1-14</td>
<td>1200 x 900</td>
</tr>
<tr>
<td>TRAFFIC SURVEY</td>
<td>T2-22</td>
<td>1200 x 600</td>
</tr>
<tr>
<td>PREPARE TO STOP</td>
<td>T1-18</td>
<td>1200 x 900</td>
</tr>
</tbody>
</table>

The above signs are used as follows:

(a) **TRAFFIC SURVEY x m (T1-14)**

The TRAFFIC SURVEY x m sign shall be used to give advance warning of a traffic survey interview station at which traffic may be required to stop. Other signs which should be used in conjunction with this sign are TRAFFIC SURVEY (T2-22) and PREPARE TO STOP (T1-18).

The sign should be placed 200 to 400 m in advance of the traffic survey interview station.

(b) **TRAFFIC SURVEY (T2-22)**

The TRAFFIC SURVEY sign shall be used to indicate the location of a traffic survey interview station. Advance signs which should be placed prior to this sign are TRAFFIC SURVEY x m (T1-14) and PREPARE TO STOP (T1-18).

(c) **PREPARE TO STOP (T1-18)**

The PREPARE TO STOP sign shall be used in conjunction with other signs in advance of toll stations, traffic survey interview stations and may be used in advance of other vehicle road blocks, such as animal plant and fruit inspection stations, particularly where sight distance is restricted.

It should be placed on the left side of the road 100 m to 200 m in advance of the station.
4.11.5 Other special purpose signs

4.11.5.1 Tabulation of signs

The signs listed in Table 4.12 are used to warn road users of special conditions along a road which may not be apparent or would be unexpected.

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRIFT SAND</td>
<td>W5-Q04</td>
<td>A 600 x 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 750 x 750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C 900 x 900</td>
</tr>
<tr>
<td>SOFT EDGES</td>
<td>W5-Q05</td>
<td></td>
</tr>
<tr>
<td>CANE HAULING AHEAD</td>
<td>W5-Q07</td>
<td>1100 x 900</td>
</tr>
<tr>
<td>SUGAR CANE AREA</td>
<td>G9-Q03</td>
<td>2400 x 1200</td>
</tr>
</tbody>
</table>

4.11.5.2 CANE HAULING AHEAD (W5-Q07)

The CANE HAULING AHEAD flag shall be used to warn drivers of sections of road along which cane hauling takes place. When used on roads under the control of the Department of Transport and Main Roads, an undertaking to display the flags at the appropriate time is required. The flag shall only be displayed when cane hauling is actually in progress.

This flag should be erected in areas where the SUGAR CANE AREA sign (G9-Q03) has been installed to give advance notice of a sugar growing area.

4.11.5.3 DRIFT SAND (W5-Q04)

The DRIFT SAND sign is used to warn of the hazard caused by sand which may have drifted on to the pavement.

4.11.5.4 SOFT EDGES (W5-Q05)

The SOFT EDGES sign is used to warn of the hazard caused by soft edges adjacent to the pavement.
4.12 VARIABLE USE LANE SIGNS

Signs whose purpose is to vary the movements which may be legally made from a lane on an intersection approach at different times during the day shall comprise white upward pointing straight or curved arrows or combination arrows on a black rectangular background. The change from one pattern to another over each lane may be achieved by fibre-optics or other electronic means within the one display unit, as shown in Figure 4.31, or alternatively, may comprise two internally illuminated hidden message signs side by side over each lane.

Variable use lane signs shall be suspended above the lane to which they refer. It will almost always be necessary to place a sign over every lane on the approach even though not all will be variable. Pavement arrows shall not be used with these signs.

A safe procedure for changing from one display to the next shall be developed.

Overhead lane control signals for controlling reversible flow lanes are specified in Part 14 of the Manual.

![Figure 4.31 EXAMPLES OF VARIABLE LANE USE SIGNS](image-url)
4.13 MISCELLANEOUS SIGNS

4.13.1 General

Signs in this miscellaneous series are listed in Table 4.13.

<table>
<thead>
<tr>
<th>Sign type</th>
<th>Sign Number</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-way</td>
<td>R2-11A</td>
<td>450 x 600</td>
</tr>
<tr>
<td></td>
<td>R2-11B</td>
<td>600 x 800</td>
</tr>
<tr>
<td>One-way (repeater)</td>
<td>R2-17A</td>
<td>450 x 800</td>
</tr>
<tr>
<td></td>
<td>R2-17B</td>
<td>600 x 1067</td>
</tr>
<tr>
<td></td>
<td>R2-17C</td>
<td>900 x 1600</td>
</tr>
<tr>
<td>Median Turning Lane</td>
<td>R6-30A</td>
<td>600 x 1200</td>
</tr>
<tr>
<td></td>
<td>R6-30B</td>
<td>900 x 1800</td>
</tr>
<tr>
<td>BUSES MUST ENTER</td>
<td>R6-18A</td>
<td>600 x 700</td>
</tr>
<tr>
<td></td>
<td>R6-18B</td>
<td>900 x 1050</td>
</tr>
<tr>
<td></td>
<td>R6-18C</td>
<td>1200 x 1400</td>
</tr>
<tr>
<td>TRUCKS MUST ENTER</td>
<td>R6-27A</td>
<td>600 x 700</td>
</tr>
<tr>
<td></td>
<td>R6-27B</td>
<td>900 x 1050</td>
</tr>
<tr>
<td></td>
<td>R6-27C</td>
<td>1200 x 1400</td>
</tr>
<tr>
<td>KEEP LEFT UNLESS OVERTAKING</td>
<td>R6-29A</td>
<td>1200 x 600</td>
</tr>
<tr>
<td></td>
<td>R6-29B</td>
<td>1800 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-29C</td>
<td>2400 x 1200</td>
</tr>
<tr>
<td>END KEEP LEFT UNLESS OVERTAKING</td>
<td>R6-32A</td>
<td>1200 x 800</td>
</tr>
<tr>
<td>TRUCKS USE LEFT LANE</td>
<td>R6-28A</td>
<td>900 x 900</td>
</tr>
<tr>
<td></td>
<td>R6-28B</td>
<td>1200 x 1200</td>
</tr>
<tr>
<td></td>
<td>R6-28C</td>
<td>1800 x 1800</td>
</tr>
<tr>
<td>END</td>
<td>R7-4C</td>
<td>600 x 200</td>
</tr>
<tr>
<td></td>
<td>R7-4D</td>
<td>900 x 300</td>
</tr>
<tr>
<td></td>
<td>R7-4E</td>
<td>1200 x 400</td>
</tr>
<tr>
<td>Emergency Median Crossing marker</td>
<td>GE9-23A</td>
<td>450 x 450</td>
</tr>
</tbody>
</table>

4.13.2 Two-way (R2-11)

The Two-way sign shall be used as follows:

(a) On carriageways such as service roads where traffic laws and regulations would normally prescribe that such carriageways are one-way, but two-way operation is desirable or necessary.

(b) As a temporary measure where a carriageway designed or normally used for one-way traffic is being used for two-way traffic.

This sign shall only be used where traffic laws and regulations require its use. In all other situations sign W4-11 (see Clause 4.7.5.4(d)) should be used.

4.13.3 ONE WAY (Repeater) (R2-17)

The ONE WAY (Repeater) sign may be used on long one-way streets or roadways to remind drivers that they are on a one-way roadway. This sign shall not be used less than 50 m in advance of an intersection on an arterial road or 20 m on a local road.
4.13.4 MEDIAN TURNING LANE (R6-30)

THE MEDIAN TURNING LANE sign shall be used where a turning lane, bay or series of bays, is to be designated by means of a sign. It may be used in conjunction with or as an alternative to pairs of opposing right turn pavement arrows. When used, the signs shall be placed in a prominent position on the approach to the turning bay in each direction of travel.

NOTE: It is recommended that pavement arrows always be used to designate a median turning bay regardless of whether or not the signs are used.

4.13.5 KEEP LEFT UNLESS OVERTAKING (R6-29)
END KEEP LEFT UNLESS OVERTAKING (R6-32)

These signs shall be used on a multi-lane roadway to enforce or advise of a legal requirement to use the right hand lane for overtaking only, as follows:

(a) Speed limit 80 km/h or less

Where the R6-29 sign is displayed there is a legal requirement for traffic to use the right lane for overtaking only (with exceptions associated with turning traffic). If the requirement is to terminate before the end of the multi-lane road is reached, the END ... (R6-32) sign shall be used.

NOTE: In the absence of the above signs the keep left unless overtaking rule does not apply if the speed limit is 80 km/h or less.

(b) Speed limit greater than 80 km/h

The requirement to use the right lane only for overtaking applies regardless of the existence of signs. The R6-29 sign should not therefore be used for this purpose.

NOTE: This does not apply to use of the R6-29 sign at the beginning of an overtaking lane (see Clause 4.8.2(f)). It is always used in this case regardless of the speed limit.

4.13.6 TRUCKS USE LEFT LANE (R6-28), END (R7-4)

The TRUCKS USE LEFT LANE sign shall be used to indicate a mandatory requirement for trucks to use a slow vehicle lane. If it is necessary to terminate this requirement prior to the end of the lane, the END (R7-4) sign shall be used in conjunction with this sign to mark the termination.
4.13.7 Emergency Median Crossing (GE9-23)

This sign shall be used where it is required to indicate an emergency median crossing, usually on an expressway type road. It may need to be accompanied by a sign restricting use of the crossing to specified users.

4.13.8 Checking station entry signs

BUSES MUST ENTER (R6-18)
TRUCKS MUST ENTER (R6-27)

These signs shall be used at the entrance to heavy vehicle checking stations to direct trucks or buses, or both, to enter the checking station. Advance signs indicating the distance to the checking station and intersection direction signs indicating the entry point shall also be used in conjunction with these signs.

4.14 USE OF FLASHING LIGHTS WITH WARNING SIGNS

Warning signs that need to attract special attention because of the extreme severity of the hazard to which they refer or lack of adequate sight distance to the hazard, or a combination of the two, need to attract special attention, may be augmented with flashing lights. Recommended sign assemblies are described in Appendix A.
SECTION 5. PAVEMENT MARKINGS AND DEVICES

5.1 SCOPE
This Section specifies the lines, patterns, symbols, letters and numerals and markers used in or on road pavements and kerbs or adjacent to the road, for the purpose of guiding traffic.

NOTE: Raised islands or medians are not defined as pavement markings, although their surfaces may be marked.

Requirements for longitudinal pavement markings on sealed pavements of various cross-sections are included also in Clause 4.2.2.

5.2 GENERAL PRINCIPLES

5.2.1 Purpose
A system of clear and effective pavement markings is essential for the proper guidance and control of vehicles and pedestrians.

Pavement markings may simply guide traffic or give advance warning, or they may impose restrictions which are supported by traffic regulations. They may act as a supplement to other road devices, but they are often the only effective means of conveying certain regulations and warnings to drivers.

It is essential to check their use against the traffic laws and regulations before they are installed or removed, to avoid possible conflict or confusion.

5.2.2 Removal of markings
Markings required on account of particular road conditions or to impose restrictions shall be removed or obliterated if those conditions cease to exist or the restrictions are withdrawn. Steps should be taken to ensure that marking removal does not leave a change in surface texture that could be mistaken for a marking or that covering material does not produce a slippery surface. Substantial changes to pavement markings may require pavement resurfacing.

5.2.3 Limitations
Pavement markings have the following limitations:
(a) They may not be clearly visible if the road is wet or dusty, e.g. near an edge or a median.
(b) They are subject to traffic wear and usually require frequent maintenance.
(c) They can be obscured by traffic.
(d) Their effect on skid resistance requires careful choice of materials and precludes the use of large marked surface areas. Markings within a traffic lane may be a hazard to motorcycles and should, where practicable, be avoided on curves.

In spite of these limitations they have the advantage under favourable conditions of conveying information to drivers without diverting their attention from the road.

5.2.4 Types of markings
The following types of markings are described in this section:

(a) Longitudinal lines
   Dividing lines .................................................................Clause 5.3.2
   Barrier lines ................................................................Clause 5.3.3
   Lane lines ...................................................................Clause 5.3.4
   Edge lines .....................................................................Clause 5.3.5
   Continuity lines ..............................................................Clause 5.3.6
   Turn lines .................................................................Clause 5.3.7
   Outline markings ............................................................Clause 5.3.9
   Longitudinal lines at intersections .................................Clause 5.3.9

(b) Transverse lines
   Stop lines ..................................................................Clause 5.4.2
   Give-way lines ..............................................................Clause 5.4.3
   Markings at STOP and GIVE WAY signs .......................Clause 5.4.4
Pedestrian crosswalk lines ..............................................................................................................Clause 5.4.5

(c) Other markings
Diagonal and chevron markings ........................................................................................................Clause 5.5.1
Messages on pavements including words, numerals and arrows ..................................................Clause 5.5.2
Marking of parking and loading areas ...........................................................................................See Part 11
Kerb markings ......................................................................................................................................Clause 5.5.3

(d) Raised pavement markers ...........................................................................................................Clause 5.6

5.2.5 Pavement marking materials and reflectorisation
Pavement marking materials of various kinds are specified in AS 4049 (Series).
All longitudinal lines, chevrons and diagonal markings having application at night shall be
reflectorised. Reflectorisation should also be considered for other markings where an adequate level of
skid resistance can be maintained. Glass beads for use in the reflectorisation of pavement markings
are specified in AS/NZS 2009.

5.2.6 Colours
Except as specified below the colour of pavement markings shall be white.
Yellow markings shall be restricted to the following uses:
(a) Parking spaces whose use is restricted to certain user classes, see Part 11.
(b) Edge lining to indicate no stopping.
(c) Tram lane lines.
(d) Longitudinal lines in snow areas except for the edge line where stopping is to be permitted.
Black may be used in the gaps of a broken pavement line to heighten contrast where a light coloured
pavement does not allow adequate line definition to be obtained. This does not establish black as a
standard colour.
Where yellow is used, the colour shall be Golden Yellow, Colour No. Y14 in AS 2700. The colour coding
for RRPMs differs from that for pavement markings (see Clause 5.6.2).

5.2.7 Size of markings
The size, spacing and pattern of longitudinal lines are shown in Figure 5.1.

5.2.8 Profile line marking
Longitudinal lines may be installed as profile markings in the form of regularly spaced ribs added to a
uniform thickness line. Profile markings provide an audible warning when vehicles run over the lines
and aid wet night visibility.

5.3 LONGITUDINAL LINES

5.3.1 General
A longitudinal line shall consist of a continuous or a broken line, or a combination of both, marked
generally parallel to the direction of travel. Where warranted, longitudinal lines shall be used as
described below.
The pattern and dimensions of longitudinal lines are shown in Figure 5.1.

5.3.2 Dividing lines

5.3.2.1 General
A dividing line is used to separate opposing traffic movements on undivided (two-way) roads. It need
not be in the geometric centre of the roadway. Where crossing of the line must be prohibited in one or
both directions, a barrier line shall be used (see Clause 5.3.3).

5.3.2.2 Two-lane, two-way roads
A dividing line shall take one of the following forms:
(a) A single broken line when provided on sealed pavements 5.5 m or more wide and where the
guides given in Clause 5.3.2.4 are met.
(b) A barrier (double) line where crossing of the line must be prohibited in one or both directions, e.g.
at a no-overtaking zone, or when entering or leaving the roadway (see Clause 5.3.3).
(c) A single continuous barrier line as an alternative to a double barrier line but where the line may be crossed by traffic entering or leaving the roadway (see Clause 5.3.3.2).

5.3.2.3 Multi-lane roads
On undivided multi-lane roads having lane lines provided for one or both directions of traffic, a dividing line shall be provided as a dividing line of the type specified in Figure 5.1 for multi-lane undivided roads.

NOTE: A double two-way barrier line may be used to restrict turning movements.

5.3.2.4 Guides for the use of dividing lines
Dividing line markings should be used on sealed pavements 5.5 m or more wide if the traffic volume is in excess of the following:
(a) On rural roads: 300 vehicles, AADT
(b) On urban roads: 2500 vehicles, AADT

Irrespective of the above guidelines, marking of other continuous or isolated sections may be desirable under the following conditions:
(i) Frequent horizontal or vertical curves.
(ii) Substandard curves.
(iii) Areas which are subject to fog.
(iv) Minor road approaches to intersections with STOP or GIVE WAY signs.
(v) Curves or crests in residential streets.
(vi) Accident record indicates the need.
(vii) Continuity of an arterial road.
(viii) Heavy night traffic or tourist traffic.

The special purpose dividing line should be used for Items (iv) and (v).

5.3.3 Barrier lines

5.3.3.1 General
A barrier line is a dividing line which replaces the single dividing line to prohibit crossing movements from one or both directions, as described below:

(a) Single barrier line. See Clause 5.3.2.2(c).
(b) Double one-way barrier lines. A double one-way barrier line is continuous line beside a broken line. Overtaking across the lines are permitted from the broken line side but not from the continuous line side. Turning movements are permitted from both sides.
(c) Double two-way barrier lines. A double two-way barrier line comprises two continuous lines side by side. Movements across the lines, or to the right of the lines, for the purpose of overtaking or turning in either direction are prohibited.

5.3.3.2 No-overtaking zones
Barrier lines shall be used to create no-overtaking zones in rural areas where there is restricted overtaking sight distance due to horizontal or vertical curves, or both, or where a hazardous condition exists, e.g. at approaches to major intersections or intersections and mid-block central roadway obstructions. Requirements for the provision of no-overtaking zones are as follows:

(a) Roads 5.5 m or more wide. Vertical and horizontal curves on which the overtaking sight distance falls below that shown in Column 2 of Table 5.1 shall be marked as no-overtaking zones.
(b) Roads less than 5.5 m wide. Barrier lines may be marked if the conditions above occur, but the sealed roadway should preferably be widened to at least 5.5 m over the section containing the barrier lines.

If it is not practicable to mark the no-overtaking zone at vertical curves, the CREST warning sign (W5-11) (see Clause 4.5.4.1) should be erected.
(c) Two-lane bridges. Barrier lines shall not normally be marked on two-lane bridges, unless the warrant in Item (a) indicates that a no-overtaking zone is required and the width is 5.5 m or greater between kerbs.

Gaps in double barrier lines in rural areas may be provided for turning traffic where there is adequate sight distance to oncoming traffic as follows:
(i) At intersections - min. 1 gap; max. 2 gaps
(ii) At private entrances - min. 1 gap
where a gap is the module length.

A single continuous dividing line shall be used instead of a barrier line only in urban areas and where it is necessary to permit crossing of the line by traffic entering or leaving the roadway.

NOTE: General use of single continuous barrier lines to form no-overtaking zones is discouraged on safety grounds as they do not have the impact and better understood meaning of the double barrier line. Furthermore they are not able to indicate places where crossing the line is permitted in one direction of travel but not the other.
**LONGITUDINAL LINES**

1. Dividing lines
   - (a) Two-lane roads
     - Non Freeway: 100 mm
     - Freeway: 150 mm
   - (b) Multilane roads
     - Non Freeway: 150 mm
     - Freeway: 150 mm

2. Barrier lines
   - (a) Single
     - Non Freeway: 80 mm
     - Freeway: 80 mm
   - (b) One direction
     - Non Freeway: 80 mm
     - Freeway: 80 mm
   - (c) Both directions
     - Non Freeway: 80 mm
     - Freeway: 80 mm

3. Lane lines
   - (a) Broken
     - Non Freeway: 100 mm
     - Freeway: 150 mm
   - (b) Special purpose - broken, including exit lines at roundabouts
     - Non Freeway: 100 mm
     - Freeway: 150 mm
   - (c) Continuous
     - Non Freeway: 100 mm
     - Freeway: 150 mm

4. Edge lines
   - (including transition lines)
     - Non Freeway: 150 mm
     - Freeway: 150 mm

5. Continuity lines
   - 1 m 3 m 1 m 3 m 1 m 3 m 1 m
     - Non Freeway: 200 mm
     - Freeway: 200 mm

6. Turn lines
   - 600 mm stripe and gap
     - Non Freeway: 100 mm

7. Outline markings
   - Non Freeway: 150 mm
     - Freeway: 150 mm

**TRANSVERSE LINES**

8. Stop lines
   - 600 mm stripe and gap
     - Non Freeway: 300 mm
     - Freeway: 300 mm

9. Give way lines
   - Non Freeway: 300 mm
     - Freeway: 300 mm

* This width may be reduced to 100 mm on rural roads with unsealed shoulders and on urban roads with a 60 km/h or lower speed zone.

---

**Figure 5.1 LONGITUDINAL AND TRANSVERSE LINE TYPES**
5.3.3.3 Location and setting out

The method for locating and setting out barrier lines is shown in Figure 5.2, and the steps to use are as follows (see also Clauses 5.3.3.4 and 5.3.3.5):

(a) As the point $A_E$ approaches the curve, overtaking sight distance progressively decreases.

(b) Where the overtaking sight distance $A_E B_E$ (Column 2 of Table 5.1) reaches the minimum for the 85th percentile speed selected (Column 1 of Table 5.1), a barrier line should commence at $C_E$, the barrier line distance (Column 3 of Table 45.1) from $B_E$.

(c) After further eastward travel from $C_E$, the minimum overtaking sight distance is regained at $B_W$ and the barrier line is terminated.

**NOTES:**

1. For convenience, overtaking sight distance is measured along the centre-line. It is not worth taking account of the slight difference between left-hand and right-hand curves, i.e. for a left-hand curve the overtaking vehicle is on the outside of the curve, and for a right-hand curve it is on the inside.

2. The marking of vertical curves is similar to that for horizontal curves.

**Figure 5.2 METHOD FOR LOCATING A NO-OVERTAKING ZONE ON AN ISOLATED CURVE**
Table 5.1 REQUIREMENTS FOR ESTABLISHMENT OF NO-OVERTAKING ZONES

<table>
<thead>
<tr>
<th>V₈₅</th>
<th>Minimum overtaking sight distance* (1.1 m to 1.1 m)</th>
<th>Barrier line distance†</th>
</tr>
</thead>
<tbody>
<tr>
<td>km/h</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td>0 to 40</td>
<td>120</td>
<td>120 (10)</td>
</tr>
<tr>
<td>41 to 50</td>
<td>150</td>
<td>120 (10)</td>
</tr>
<tr>
<td>51 to 60</td>
<td>180</td>
<td>120 (10)</td>
</tr>
<tr>
<td>61 to 70</td>
<td>210</td>
<td>144 (12)</td>
</tr>
<tr>
<td>71 to 80</td>
<td>240</td>
<td>168 (14)</td>
</tr>
<tr>
<td>81 to 90</td>
<td>270</td>
<td>192 (16)</td>
</tr>
<tr>
<td>91 to 100</td>
<td>300</td>
<td>216 (18)</td>
</tr>
<tr>
<td>101 to 110</td>
<td>330</td>
<td>240 (20)</td>
</tr>
<tr>
<td>&gt;110</td>
<td>360</td>
<td>264 (22)</td>
</tr>
</tbody>
</table>

* Overtaking at crests or curves is permitted if the overtaking sight distance between two points 1.1 m (driver eye height) above the centre-line does not fall below the minimum overtaking sight distance. This is based on what is assumed to be a typical overtaking manoeuvre, i.e. a vehicle travelling at the 85th percentile speed overtakes a slower vehicle and is opposed by an oncoming vehicle also travelling at the 85th percentile speed.

† The number of 12 m modules corresponding to this distance is shown in brackets. For example, the barrier line distance for 80 km/h approximates 14 x 12 m (the linemarking module).

5.3.3.4 Modification of barrier line requirements

The application of the method specified in Clause 5.3.3.3 will, in some instances, result in too short a length of barrier line or too short a distance between barrier lines for passing to be accomplished. If this occurs, the barrier line should be either eliminated or lengthened, depending on the circumstances.

Some typical instances and suggested modifications are as follows:

(a) Where only a short length of road (see Column 2 of Table 5.2) has substandard overtaking sight distance, barrier lines should not be marked, e.g. within a short sag (floodway, ford) in an otherwise level road.

(b) Where a barrier line marked in accordance with Clause 5.3.3.3 is very short, it will not have sufficient visual impact and will not give the impression of continuity. The distance Cₑ Bₘ of Figure 5.2 in some circumstances will be less than the minimum length of barrier line (Column 3 of Table 5.2) and in rare situations Cₑ will occur after Bₘ. In these cases the minimum length of barrier line (Column 3 of Table 5.2) should be marked to terminate at the point Bₘ at which minimum overtaking sight distance (Column 2 of Table 5.1) is regained.

(c) Where the distance between the end of one barrier line and the start of the succeeding barrier line restricting overtaking in the same direction is equal to or below the minimum (see Column 4 of Table 5.2), the barrier line should be joined to form one continuous line. For example, this may occur on a short straight between two curves in opposite directions.
Table 5.2  MINIMUM CONDITIONS TO MODIFY STANDARD BARRIER LINE REQUIREMENTS

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{85} km/h</td>
<td>Minimum length of road with overtaking sight distance below minimum m</td>
<td>Minimum length of barrier line m</td>
<td>Minimum distance between barrier lines m</td>
</tr>
<tr>
<td>0 to 40</td>
<td>20</td>
<td>87 (8)</td>
<td>165 (13)</td>
</tr>
<tr>
<td>41 to 50</td>
<td>25</td>
<td>87 (8)</td>
<td>165 (13)</td>
</tr>
<tr>
<td>51 to 60</td>
<td>30</td>
<td>99 (9)</td>
<td>165 (13)</td>
</tr>
<tr>
<td>61 to 70</td>
<td>35</td>
<td>111 (10)</td>
<td>165 (13)</td>
</tr>
<tr>
<td>71 to 80</td>
<td>40</td>
<td>123 (11)</td>
<td>189 (15)</td>
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<td>81 to 90</td>
<td>45</td>
<td>135 (12)</td>
<td>213 (17)</td>
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<tr>
<td>91 to 100</td>
<td>50</td>
<td>147 (13)</td>
<td>237 (19)</td>
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<tr>
<td>101 to 110</td>
<td>55</td>
<td>159 (14)</td>
<td>261 (21)</td>
</tr>
<tr>
<td>&gt;110</td>
<td>60</td>
<td>171 (15)</td>
<td>285 (23)</td>
</tr>
</tbody>
</table>

5.3.3.5 Checking marked barrier lines

Barrier lines marked strictly in accordance with Clauses 5.3.3.3 and 5.3.3.4 will occasionally produce no-overtaking zones which err on the safe side and may be too restrictive.

To check this, the road should be traversed at about the 85th percentile speed when marking is complete. At this speed all barrier lines should appear reasonable and not unduly restrictive. Particular attention should be given to sections of steep or winding alignment where little opportunity remains for overtaking. If the markings are considered too restrictive, the barrier lines should be reviewed as follows:

(a) Check that the appropriate 85th percentile approach speed was used at each sight distance restriction. For example, while the 85th percentile approach speed to a section of winding alignment may be 100 km/h, the first curve may so reduce vehicle speeds that the approach speed to subsequent curves may be as low as 40 km/h.

(b) See if short gaps can be left in the barrier line to allow cars to overtake slow-moving trucks. These gaps should, desirably, be not less than 100 m long. If necessary, the barrier line distance should be reduced to permit overtaking opportunities at the safest places consistent with shoulder width, roadside obstacles and other potential hazards, as well as sight distance.

5.3.4 Lane lines

A lane line shall be used to separate lanes of traffic moving in the same direction. It is normally a broken line, but a continuous line may be used where it is desired to discourage lane changing or to improve lane delineation through sharp curves or lateral lane shifts.

5.3.5 Edge lines

Edge lines are used as follows:

(a) General delineation

Edge lines are used where specified or recommended in Clause 4.2.2 to provide a continuous guide to the driver and to discourage traffic from travelling on shoulders, thereby making driving safer and more comfortable, particularly at night.

Where used for this purpose they shall be placed on both sides of the sealed surface of the roadway as follows:

(i) Sealed shoulder - at edge of traffic lane.

(ii) Unsealed shoulder - 75 mm clear of edge of seal.
(iii) Kerbed pavement—300 mm clear of face of kerb.

(b) Lane boundaries
   Edge lines may be used to define the boundaries between moving traffic lanes and parking lanes.

(c) Guidance past objects and through width transitions
   Short lengths of edge line or a local widening of a continuing edge line may be used to guide traffic past an object that is close enough to the road to constitute a hazard, or to transition the road past a traffic island or at a narrowing of the pavement.

   Where used to deflect traffic at a pavement narrowing, the length (L) of the edge lined transition shall be determined as follows:
   \[ L = 0.5 \times V \times W \]
   where
   \[ V = 85^{th} \text{ percentile speed, in kilometres per hour} \]
   \[ W = \text{lateral offset, in metres} \]

Examples of such transitioning are shown in Figure 4.17.

5.3.6 Continuity lines
   A continuity line may be used to indicate the edge of that portion of a roadway assigned to through traffic, and where it is intended that the line be crossed by traffic turning at an intersection, or lane changing when entering or leaving an added lane at its start or finish.

   Its use to delineate trap lanes is shown in Figures 2.10 and 3.5.

   NOTE: Where a zip-merge is required (see Clause 4.7.2(a)), the continuity line is omitted.

5.3.7 Turn lines
   For use of turn lines at intersections with signals to indicate the proper course to be followed by turning vehicles, see Part 14. Turn lines should generally be used only at intersections with traffic signals.

5.3.8 Outline markings
   The outline marking of splays, medians, islands, safety bars and shoulders shall be a single continuous line.

5.3.9 Longitudinal lines at intersections and roundabouts
   Use of longitudinal lines at, and on the approaches to intersections and roundabouts shall be as follows:

(a) Dividing, barrier and lane lines
   These lines shall be used as follows:

   (i) At minor side roads with or without STOP or GIVE WAY sign control, these lines, where existing on the major road approach, shall be carried through the intersection, except that a gap shall be left in a double barrier line for turning or crossing traffic see Clause 5.3.3.2.

   (ii) At signalised intersections, the lines shall be discontinued at the stop line on each approach.

   (iii) Where lane changing just in advance of the intersection is a problem and needs to be prohibited, the last 10 m to 12 m of lane line on the approach shall be continuous.

   (iv) On an intersection approach controlled by STOP or GIVE WAY signs or across which is marked a give-way line, a dividing line terminating at the stop or give-way line comprising either -

   (A) a single continuous dividing line 10 m to 12 m in length; or

   (B) a special purpose broken dividing line (see Figure 5.1) up to 30 m in length unless a single continuous line is required for another purpose, e.g. to control overtaking; shall be marked wherever the sealed pavement width or width between kerbs is at least 6 m over the length of the line. It shall also be provided at lesser widths if the rest of the approach road is dividing line marked, or if there is a crest or curve on the immediate approach. The marking may need to be extended in the latter case.
Exit lines shall be marked at multilane roundabouts, except where geometric restrictions prohibit their safe use or where combinations of single lane exits and high turning traffic volumes can lead to operational difficulties. A typical example is shown in Figure 2.7.

Exit lines shall -
(A) comprise a special purpose lane line (see Figure 5.1);
(B) have a minimum of three segments marked per exit line;
(C) commence from a line drawn tangentially from the central island to the splitter island exit edge line at the previous exit; and
(D) extend far enough into the roundabout exit to provide satisfactory guidance for exiting vehicles.

(b) Edge lines
Where edge lines are used they shall be discontinued through a major intersection or past intersecting roads or streets which have STOP or GIVE WAY signs. If the intersection is wide, a continuity line should be used.

5.4 TRANSVERSE LINES

5.4.1 General
Transverse lines should be wider than longitudinal lines to compensate for the low angle at which they are viewed.

5.4.2 Give-way lines
A give-way line shall comprise a broken line a minimum of 300 mm wide with line segments 600 mm long separated by 600 mm gaps. It shall be placed in a similar position to that specified for a stop line. The give-way line shall be used as follows:
(a) To indicate the safe position for a vehicle to be held at a GIVE WAY sign at an intersection.
(b) At a roundabout, to indicate the safe position for a vehicle to be held before entering. The line shall be placed across the entering road along the edge of the circulating roadway (see Figures 2.7 and 2.8). Markings shall not be placed across the exits from a roundabout.

It may be used to indicate the safe position for a vehicle to be held at a T-intersection or in any other location where a driver is legally required to give way to an intersecting or conflicting traffic stream.

5.4.3 Stop lines
A stop line is a continuous line that shall be marked across the traffic lanes approaching a traffic control device at which traffic is required to stop. It shall extend from the left-hand edge of pavement to the dividing line, median, or in the case of a one-way street, to the right-hand edge of pavement. It shall only be used in conjunction with another device which legally requires a driver to stop under prescribed conditions, and indicates the point behind which vehicles must stop when required.

At STOP signs where visibility is often restricted, the driver’s line of sight both to left and right, the needs of pedestrians and the clearance from traffic in the intersecting road shall be considered when positioning the stop line. It shall be a minimum of 300 mm wide at a STOP sign and shall be parallel to the line of the intersecting road.

The use of stop lines at signalised intersections, railway crossings and at mid-block pedestrian crossings is given in Parts 14, 7 and 10 respectively.

5.4.4 Positioning of lines at STOP and GIVE WAY signs
The stop and give-way lines to be used with STOP and GIVE WAY signs shall be as illustrated in Figure 5.3. Figure 2.1 shows the use of the GIVE WAY signs and the associated markings on roads of various widths with and without a median. The use of STOP signs and associated lines shall be similar. Requirements and recommendations for these pavement markings are as follows:
(a) The minimum pavement marking associated with STOP and GIVE WAY signs shall be a stop or give-way line (see Clauses 5.4.2 and 5.4.3) normally placed in prolongation of the kerb line or edge line, but may be set back if there is a problem of vehicles over-running the line, or if it is desired to hold vehicles back some distance from the intersecting roadway.
(b) If the intersection is wide, e.g. two lanes entering with a large radius kerb return, a continuity line should be used across the right hand side of the approach.
5.4.5 Pedestrian crosswalk lines
Crosswalk lines shall only be used in conjunction with intersection or mid-block signals.
The use and positioning of crosswalk lines at intersection and mid-block signals are given in Parts 14 and 10 respectively.
For requirements for pedestrian crossing (zebra) and children’s crossing markings, see Part 10.

NOTE:
1. Dividing line marked in accordance with Clause 5.3.9(a)(iv).
DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN

Figure 5.3 PAVEMENT MARKINGS AT STOP AND GIVE WAY SIGNS
5.5 OTHER MARKINGS

5.5.1 Diagonal and chevron markings

5.5.1.1 General
Wide diagonal or chevron markings may be applied to areas of pavement which are not intended for use by moving vehicles.

They define splayed island approaches to obstructions, sealed shoulders, painted islands and medians and areas separating exit ramps from the main freeway traffic lanes (see Clause 5.7.2). They are also used to indicate escape areas, if required.

Diagonal markings are used when all traffic must pass to one side of the marking, and chevron markings when traffic may pass to either side of the marking.

5.5.1.2 Markings on splayed approaches

The markings of splayed approaches to islands or obstructions shall be parallel bars or chevrons as shown in Figure 5.4(a) and (b).

The bars shall be a minimum of 1.0 m wide measured normal to the bar with a gap between bars measured parallel to the road centre line of three to five times the width of the bar.

The angle between the bars or chevrons and the approach line should be 45 degrees maximum. On approaches where the 85th percentile speed is 90 km/h or greater, the angle may be reduced to 30 degrees (i.e. 60 degrees included angle between sides of a chevron).

The outline should be supplemented by raised pavement markers, especially where street lighting is below standard or absent.

5.5.1.3 Diagonal markings on shoulders

If a marking on sections of sealed shoulder is required to discourage vehicular encroachment, it shall comprise bars having a minimum width of 1.0 m measured normal to the marking and with a gap between bars, measured parallel to the road centre-line of five to twenty times the width of the bar (see Figure 5.5).

5.5.1.4 Painted islands and median strips

Painted islands and median strips shall be defined by outlining areas of pavement with lines. The interior may be either sealed with an aggregate of contrasting colour or texture, or consist of diagonal or chevron markings (see Figures 5.6 (a), (b) and (c)). The outline should be supplemented by raised pavement markers, especially where street lighting is substandard or absent.

Typical uses of painted islands include -
(a) islands of substandard size in urban areas;
(b) channelising islands at rural intersections where operating speeds are high, or road lighting is absent or inadequate;
(c) narrow medians;
(d) part-time safety zones; and
(e) narrow lane separators.

The island may be surrounded by double two-way barrier line if all crossing movements are to be prohibited.

The width and spacing of diagonal markings when used inside painted islands and median strips is shown in Figure 5.6.

5.5.2 Messages on pavements

5.5.2.1 General

Words, numerals and symbols may be marked on pavements to convey guiding, warning or regulatory messages to drivers. They shall be elongated in the direction of traffic movement to make them legible at the maximum distance.

NOTE: The benefit obtainable with increasing elongation diminishes if the distortion ratio exceeds about 8:1.

5.5.2.2 Words and numerals

The length of letters and numerals shall be 2.5 m where the speed limit is up to 80 km/h and 5.0 m at higher speed limits. The shape of letters and numerals shall be as shown in Figure 5.7.
Figure 5.4  SPLAYED APPROACH

(a) Traffic to left side only

(b) Traffic to either side

LEGEND:

- Angle $A = 45^\circ$ or $30^\circ$
- See Clause 5.5.1.2
- $B = 1.0$ m min.
- $S = 3B$ to $5B$
- $W = 150$ mm

Figure 5.5  SHOULDERs

LEGEND:

- $B = 1.0$ m min.
- $S = 5B$ to $20B$
- $W = 150$ mm
A message should, if possible, be confined to one line. Where two or more lines are required they should be designed as follows:

(a) Where the 85th percentile speed is greater than 80 km/h, a separation of four times the character height shall be used, and the message arranged to read sequentially, i.e. with the first word nearest to the driver.

(b) At speeds lower than in Item (a), the separation between lines shall be from one-half to one times the character height and the message arranged to read from top to bottom.

Word messages commonly used on road pavements are as follows:

- BUS LANE and BL, TRANSIT LANE and TL - see Part 12
- RAIL X - see Part 7
- KEEP CLEAR - see Clause 4.5.2.6
NOTES:

The grid width X is constant at 100 mm, but the grid height Y may vary as follows:

Y = 62.5 mm where the speed limit is up to 80 km/h;
Y = 125 mm at higher speed limits

Figure 5.7 PAVEMENT LETTERS AND NUMERALS
5.5.2.3 Intersection arrows

Intersection pavement arrows give a positive indication of the paths vehicles must follow at intersections. They are legally enforceable. The choice of and need for intersection pavement arrow markings shall be determined as set out in Figure 5.9. This is based on the following requirements:

(a) Where all the manoeuvres that are permitted by traffic legislation are to be allowed from a marked traffic lane, arrow markings need not be provided.

(b) If all the manoeuvres that are permitted by traffic legislation are not to be allowed from a marked traffic lane, those manoeuvres which are to be allowed shall be marked with pavement arrows.

(c) Where any arrow is required in a lane, all manoeuvres that are to be permitted from that lane shall be marked with pavement arrows.

(d) Notwithstanding the provisions in Item (a) where it is considered desirable for safety or other considerations to mark arrows indicating the legally permitted manoeuvres from that lane, e.g. to emphasise that a turn is not permitted from a lane adjacent to an exclusive right turn lane by marking with a straight ahead arrow, these arrow markings may be provided. However, such markings should be restricted to those found to be necessary after observance of performance in the field.

Pavement arrows shall be marked in each lane of a multi-lane approach to a roundabout with two or more lanes to indicate the movements permitted from each lane.

If a lane on the approach to an intersection or roundabout is to be designated by means of arrows as above, arrows shall be placed in that lane as follows:

(i) Arrow nearest a stop or give-way line - 6 m clear distance back from the line.

(ii) Arrows in a through lane from upstream - at least two additional arrows at a head-to-head spacing of 15 m to 50 m.

(iii) Arrows in a developed lane at least 36 m long (excluding taper) - at least two additional arrows, the first with its head at the point where the fully developed lane first begins and the second or subsequent arrows equispaced at 15 to 50 m head-to-head between the first and last arrows.

(iv) Arrows in a developed lane less than 36 m long (excluding taper) - one additional arrow only or in a very short lanes, less than 20 m, no additional arrows, i.e. one arrow only in the lane.

(v) Provision of a single arrow in accordance with Item (iv) shall comprise the one arrow nearest to the stop or give-way line only, 6 m clear distance back from the line.

At intersections where queues of vehicles are likely to occur, e.g. at traffic signals, pavement arrows should commence sufficiently in advance of the intersection so that waiting vehicles will not obscure them. Where this is not practicable, or where additional information for road users on lane designation (e.g. ‘trap’ lanes) is required, signs adjacent to or over the appropriate lanes should be installed to supplement the pavement arrows.

Where a turning lane is provided to cater exclusively for U-turns, and it is essential to distinguish it from a right turning lane before or after, the U-turn arrow may be used. If the distinction is not needed, a right turn arrow will usually be sufficient.

Where two separate successive turns in the same direction may be made from a single turning lane, the sequential turns arrow may be used in advance of the first turn. The use of this marking is the exception, rather than the rule.

Standard designs for pavement arrows shall be as shown in Figures 5.10 and 5.11. They are elongated similarly to letters or numerals in order to increase their recognition distance.

5.5.2.4 Lane change arrows

Lane change arrows shall be provided at lane reductions (merges) typically as illustrated in Figures 4.16, 4.18 and 4.20 in all situations where a lane change rather than a zip-merge is provided for, see Clause 4.7.2 and Figure 4.16.

Lane change arrows shall conform to the designs in Figure 5.12, the urban type to be used where the 85th percentile speed is 80 km/h or less, and the rural type where it is more than 80 km/h.

Three arrows shall be used in each case. They shall be equispaced between the advance merge sign and the start of the lane change taper.

Lane change arrows shall not be used in the zip-merge case described in Clause 4.7.2(a).

5.5.2.5 Expressway exit lane arrows

The use of the exit lane arrows shown in Figure 5.13 is specified in Clause 5.7.3. Their use is further illustrated in Figure 3.4.
5.5.2.6 Keep clear marking

A keep clear marking as shown in Figure 4.8 when used to control the blocking of entrances and exits at side streets or property access points by queued traffic, shall only be used in the following situations:

(a) To allow emergency vehicle access from its depot or station.
(b) Where a blockage would create a safety problem elsewhere in the system, e.g. vehicles stopping to turn right into a driveway causing a blockage at a nearby intersection.

The marking shall not be used primarily for the purpose of facilitating access/egress to a side street or driveway.

NOTE: A single message covering two lanes may be adequate. The words may be made wider to suit.

Figure 5.8 KEEP CLEAR MARKING

5.5.3 Kerb markings

Kerbs of medians and traffic islands may be marked white and reflectorised if added visibility is required.
<table>
<thead>
<tr>
<th>No</th>
<th>Description of requirements</th>
<th>Two lane</th>
<th>Three lane</th>
<th>Four lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legal manoeuvres if lane unmarked</td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
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<tr>
<td>2</td>
<td>Legal manoeuvres if left lane only marked</td>
<td><img src="image4" alt="Diagram" /></td>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
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<tr>
<td>3</td>
<td>Legal manoeuvres if right lane only marked</td>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
<td><img src="image9" alt="Diagram" /></td>
</tr>
<tr>
<td>4</td>
<td>Markings for two exclusive left turn lanes</td>
<td><img src="image10" alt="Diagram" /></td>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
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<tr>
<td>5</td>
<td>Markings for two exclusive right turn lanes</td>
<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
<td><img src="image15" alt="Diagram" /></td>
</tr>
<tr>
<td>6</td>
<td>Markings for shared left turn and through from lane adjacent to left turn lane</td>
<td><img src="image16" alt="Diagram" /></td>
<td><img src="image17" alt="Diagram" /></td>
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<td>Markings for shared right turn and through from lane adjacent to right turn lane</td>
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<td>8</td>
<td>Markings for shared left turn and through from lane adjacent to two exclusive left turn lanes</td>
<td><img src="image22" alt="Diagram" /></td>
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<tr>
<td>9</td>
<td>Markings for shared right turn and through from lane adjacent to two exclusive right turn lanes</td>
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<td><img src="image31" alt="Diagram" /></td>
<td><img src="image32" alt="Diagram" /></td>
<td><img src="image33" alt="Diagram" /></td>
</tr>
</tbody>
</table>
NOTES:

1 Minimum length of arrow:
   (a) Straight ahead arrow and combined arrow = 6 m.
   (b) Turn arrow = 4 m.

2 The width of grid squares is constant at 100 mm. The height of the grid squares is 100 mm minimum.

Figure 5.10  INTERSECTION PAVEMENT ARROWS – COMMON TYPES
NOTES:

1. Minimum length of arrow:
   (a) Double turn arrow = 4 m.
   (b) U-turn arrow = 5 m.
   (c) Sequential turns and 45° turn arrows = 6 m.

2. The width of grid squares is constant at 100 mm. The height of the grid squares is 100 mm minimum.

Figure 5.11  INTERSECTION PAVEMENT ARROWS – SPECIAL TYPES
NOTES:

1 Dimension D should be approximately 0.6 times the width of the lane.

2 When installing arrows it is recommended that the head be laid first.

DIMENSIONS IN MILLIMETRES

Figure 5.12  MERGE PAVEMENT ARROWS
Figure 5.13 EXPRESSWAY EXIT LANE ARROWS

(a) Exclusive (trap) lane

(b) Shared through and exit lane

DIMENSIONS IN MILLIMETRES
5.6 RAISED PAVEMENT MARKERS

5.6.1 General

Raised pavement markers are of the following types:

(a) Retroreflective raised pavement markers (RRPM), see Clause 5.6.2.
(b) Non-retroreflective raised pavement markers (NRPM), see Clause 5.6.3.
(c) Internally illuminated pavement markers, see Clause 5.6.4.

Symbols used on plans to represent raised pavement markers are given in Table 5.4.

5.6.2 Retroreflective raised pavement markers (RRPM)

RRPMs are used to augment painted lines, stripes and chevrons when it is deemed necessary or desirable to improve their visual properties. As devices which are considered to be at same level as the road surface RRPMs are intended to be trafficable when placed within a painted island or median strip. RRPMs generally provide more effective and durable pavement markings than painted lines because -

(a) they are not generally obscured at night under wet conditions;
(b) they provide an audible and tactile signal when traversed by vehicle wheels; and
(c) they are conspicuous in all conditions.

Physical and performance requirements for pavement markers are specified in AS 1906.3.

In deciding whether to use markers, the following factors should be taken into account:

(i) Operational effectiveness.
(ii) Ease of installation.
(iii) Self-cleansing properties under traffic.
(iv) Effects of noise in or near residential areas.

The colour specified for RRPMs in various usages is shown in Table 5.3.

RRPMs shall not be displayed towards oncoming traffic on the right-hand edge lines on undivided roads.

5.6.3 Non-retroreflective raised pavement markers (NRPMs)

NRPMs shall be white. Their use in moving traffic situations is confined to lane guidance through intersections, see Clause 5.6.5.4.

5.6.4 Internally illuminated

The application of internally illuminated raised pavement markers in respect of colour, positioning and spacing shall be the same as for RRPMs. If used in a continuously operating mode they shall also have retroreflective elements meeting the photometric requirements of AS 1906.3. If used in a switching mode they shall not be retroreflective. The markers shall not be used in a flashing mode.

NOTE: Users should satisfy themselves that the photometric performance of the self-illuminating feature of such devices is adequate for their purposes.
Table 5.3 COLOUR OF RETROREFLECTIVE RAISED PAVEMENT MARKERS TO AUGMENT PAINTED LINES

<table>
<thead>
<tr>
<th>Application</th>
<th>RRPM colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividing lines</td>
<td>Yellow</td>
</tr>
<tr>
<td>Lane lines</td>
<td>White</td>
</tr>
<tr>
<td>Right hand edge line, divided road and one-way road</td>
<td>Yellow</td>
</tr>
<tr>
<td>Left hand edge line, divided road and one-way road</td>
<td>Red</td>
</tr>
<tr>
<td>Left hand edge line, 2-way road</td>
<td>Red</td>
</tr>
<tr>
<td>Small* channelising island outline, painted or raised – all sides</td>
<td>White</td>
</tr>
<tr>
<td>Median island outline, painted or raised – all sides</td>
<td>Yellow</td>
</tr>
<tr>
<td>Roadway diverge outline, including expressway exit nose, and approach end of large island</td>
<td>Yellow</td>
</tr>
<tr>
<td>- left† side</td>
<td>Red</td>
</tr>
<tr>
<td>- right† side</td>
<td></td>
</tr>
<tr>
<td>Step-out markings at expressway exit ramps</td>
<td>Green</td>
</tr>
</tbody>
</table>

* A small island should generally be regarded as one with no side, including approach and departure markings, longer than 12 metres.
† Left or right when viewed in the direction of travel.

Table 5.4 SYMBOLS FOR RAISED PAVEMENT MARKERS

<table>
<thead>
<tr>
<th>Marker or term</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-retroreflective raised pavement marker</td>
<td>○</td>
</tr>
<tr>
<td>Retroreflective raised pavement marker:</td>
<td></td>
</tr>
<tr>
<td>Unidirectional – White</td>
<td>□</td>
</tr>
<tr>
<td>- Yellow</td>
<td>◊</td>
</tr>
<tr>
<td>- Red</td>
<td>◊</td>
</tr>
<tr>
<td>- Green</td>
<td>◊</td>
</tr>
<tr>
<td>Bidirectional – White</td>
<td>□</td>
</tr>
<tr>
<td>- Yellow</td>
<td>◊</td>
</tr>
</tbody>
</table>

5.6.5 Application of raised pavement markers

5.6.5.1 Positioning of markers

Markers are generally located in gaps in the painted broken lines. The gap for placing markers should be sufficient to accommodate a margin for error in remarking operations.

For applications with continuous lines such as barrier lines and traffic islands, the marker shall be placed 25 mm to 50 mm from the line as shown in Figure 5.14.

On sharp curves, RRPMs augmenting painted edge lines, lane lines and painted median/island approaches shall be orientated so that the full retro-reflective effect is realised on approach. This is achieved by aiming the reflective face in the direction of approaching traffic rather than tangentially to the curve.
5.6.5.2 Augmenting painted lines

The use of RRPMs in augmenting pavement markings shall be as illustrated in Figures 5.15 to 5.26. The positioning of RRPMs in relation to the painted lines, is specified in Clause 5.6.5.1.

The normal spacing between RRPMs, dimension $N$ shown on the following treatment diagrams, is the distance indicated in Table 5.5 for the particular situation.

### Table 5.5 NORMAL SPACING ($N$) BETWEEN RRPMs

<table>
<thead>
<tr>
<th>Situation</th>
<th>Dimension $N$, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlit roads generally, lane lines and dividing lines</td>
<td>24</td>
</tr>
<tr>
<td>Substandard curves or curves 400 m radius or less</td>
<td></td>
</tr>
<tr>
<td>Dividing (barrier) lines on approaches to median ends</td>
<td></td>
</tr>
<tr>
<td>Roads with street lighting meeting AS 1158.1.1 (except that 24 m</td>
<td>12</td>
</tr>
<tr>
<td>spacing for lane lines may be sufficient in many cases)</td>
<td></td>
</tr>
<tr>
<td>Short length of special purpose dividing or lane line, exit lines at</td>
<td></td>
</tr>
<tr>
<td>roundabouts</td>
<td></td>
</tr>
<tr>
<td>Dividing lines on all multilane undivided roads</td>
<td></td>
</tr>
<tr>
<td>Lines outlining traffic islands, median and separator ends, and other</td>
<td>4 min, 12 max*</td>
</tr>
<tr>
<td>devices</td>
<td></td>
</tr>
<tr>
<td>Markers on edge lines including outlines of painted median strips and</td>
<td>24 preferred, 36 max</td>
</tr>
<tr>
<td>separators</td>
<td></td>
</tr>
<tr>
<td>Dividing and lane lines on intersection approaches (minimum – one and</td>
<td>12</td>
</tr>
<tr>
<td>marker at each end of the line)</td>
<td></td>
</tr>
</tbody>
</table>

* Shown on Figures 5.22 to 5.24 and 5.26 at the preferred dimension, 6 m.
(a) Lane lines

Figure 5.15 BROKEN LANE LINES

Figure 5.16 CONTINUOUS LANE LINES

(b) Dividing lines

Figure 5.17 BROKEN DIVIDING LINE

Figure 5.18 CONTINUOUS DIVIDING LINE
(c) **Barrier lines**

![Barrier Lines](image)

**Figure 5.19 BARRIER LINES**

(d) **Edge lines**

Except on single lane roadways, e.g. freeway ramps, RRPMs shall not be used to supplement edge lines unless they are also used, at the same location, to supplement dividing, barrier or lane lines (see Figure 5.20). They should not generally be used on edge lines where the shoulder is not sealed as they are likely to be removed or covered in grading operations, but if used they should be placed inside the edge line. Provision of RRPMs on edge lines on rural roads is optional but important in locations subject to fog or other adverse visibility conditions, or at points of special hazard, e.g. approaches to bridges with sub-standard shoulder width (see Figure 5.21).

RRPMs should generally be placed outside the painted line to prolong their effective life and to increase the apparent lane width. However, if sealed shoulders (forming part of an identified cycle network) or bicycle lanes are less than 1.5 m wide then RRPMs shall be placed to the right of the line.

NOTE: The preferred spacing on edge lines is 24 m and the maximum, 36 m (see Table 5.5).

![Edge Lines](image)

**Figure 5.20 EDGE LINES ON A TWO-LANE TWO-WAY ROAD**

![Edge Lines](image)

**Figure 5.21 EDGE LINES ON A MULTILANE ONE-WAY ROADWAY**
(e) Continuity lines
RRPMs should not be used on continuity lines, as they may inhibit rather than encourage the correct lane-changing manoeuvre. However they may be required if the line is on a curve or is of excessive length such as along a weaving section, and extra delineation of the lane-change area is needed. The spacing in this case shall be 24 m.

(f) Traffic islands, medians and other devices
The configurations shown are intended to illustrate the use of RRPMs only and should not be taken as a guide to the lengths or sizes of the facilities described. If the island outline or bicycle lane line is less than 1.5 m from the face of kerb then RRPMs shall be placed to the right of the line. RRPMs should not be placed where outlines are less than 1 m from the kerb face and approaches to the island meet desirable delineation requirements.
Figure 5.24  APPROACH TO (OR DEPARTURE FROM) MEDIAN ISLAND (TWO-WAY FLOW)

NOTE: Spacing shown is indicative only.

Figure 5.25  PAINTED MEDIAN STRIPS

NOTE: Diagonal rows of RRPMs within the marked median are intended to be additional to the RRPMs on the outlines.
5.6.5.4 Lane guidance through intersections

A treatment of the type illustrated in Figure 5.27 comprising the placement of NRPMs within an intersection to guide non-turning traffic may be considered where it is apparent that such traffic would have difficulty in finding the correct lane on the departure side. The treatment is normally applicable only to wide signalised intersections on multilane roads. Typical situations where the treatment may be required are:

(a) lanes on opposite sides of the intersection offset by half a lane width or more, e.g. the north-south leg of Figure 5.27;

(b) drivers required to steer a curved course through the intersection, e.g. the east-west leg of Figure 5.27;

(c) highly skewed intersections where the travel distance within the intersection is excessive; or

(d) other features such as tram lines or adverse vertical geometry which may make the course difficult to follow.
Where applied, the treatment shall be completed for all through lanes on all legs even though the problem may exist for one intersecting road only. Markers should normally be omitted from within the area bounded by turn lines when these are marked, but may be required if inadequate, confusing or incorrect guidance would result, for example, where a curved path is to be followed.

It is essential that these treatments be maintained at a high level so that confusing patterns will not be created by an excessive number of missing markers. The expected high cost of maintenance should be taken into account when considering the need for treatment.

As an alternative to NRPMs, short dashes of thermoplastic material may be used, provided they are at least as visible as NRPMs under all viewing conditions.

Figure 5.27  LANE GUIDANCE THROUGH INTERSECTIONS USING NRPMs
5.7 PAVEMENT MARKINGS AT ENTRANCE AND EXIT RAMPS

5.7.1 Entrance and exit ramp layouts
Examples of pavement markings at single lane entrances and exits are shown in Section 3, Figure 3.3 and at two lane exits in Figure 3.4.

5.7.2 Exit ramp nose marking
Exit ramp nose marking is illustrated in Figure 5.28.

![Figure 5.28 EXIT RAMP NOSE MARKING](image)

5.7.3 Expressway exit lane arrows
Expressway exit lane arrows shall be used on main expressway roadways where there is a ‘trap’ lane which is one from which all traffic must exit. Because the indicated movement is such a small angular divergence from the through path, the use of conventional turn arrows is not recommended. Use of slightly inclined straight ahead arrows as illustrated in Figure 5.29 is preferred. The shape of these arrows is specified in Clause 5.5.2.5.

Where arrows are used in the trap lane, a combination arrow shall be placed in the next lane to the right, adjacent to each trap lane arrow, indicating that the second lane is a shared exit and through lane. The recommended spacing is 50 m head to head.

NOTE: For best visual effect the arrow inclination should not exceed 15°.

![Figure 5.29 EXPRESSWAY EXIT LANE ARROWS IN A ‘TRAP’ LANE AND AN ADJACENT ‘OPTIONAL’ LANE](image)
5.7.4 Exit ramp marking
The marking shown in Figure 5.30 is the normal exit ramp marking. To delineate the approach to and entrance of an off-ramp, green uni-directional RRPMs are used in association with the edge line.

5.7.5 ‘Step-out’ marking
The step-out marking shown in Figure 5.31 is used as illustrated in Figure 3.3 as an alternative to the normal exit ramp marking if visibility to the pavement along the ramp taper is poor (e.g. at a crest or left hand curve) or there is evidence of drivers inadvertently taking the exit. Green RRPMs may be used with step-out markings as illustrated.
APPENDIX A
USE OF FLASHING LIGHTS WITH WARNING SIGNS

Warning signs which, because of the extreme severity of the hazard to which they refer or lack of adequate sight distance to the hazard, or a combination of the two, need to attract special attention, may be augmented with flashing lights.

Assemblies typically comprise a diamond shaped warning sign on a yellow rectangular background, with two alternately flashing yellow lights located above the sign, generally as illustrated in Figure A1. Any supplementary plate in the W8 series normally used in conjunction with the particular sign, may be added as appropriate.

Figure A1  EXAMPLES OF WARNING SIGNS WITH FLASHING LIGHTS

The lights should each meet the relevant requirements of AS 2144 for 200 mm diameter traffic signal lanterns. The recommended flash rate of each light is 40 to 60 flashes per minute with an on-time of 40 to 60%.
APPENDIX B

DETERMINATION OF LETTER SIZES FOR SIGNS

B1 SCOPE
This Appendix sets out a method of determining the size of letters to be used on signs requiring individual design.

B2 PROCEDURE

Determine the capital letter sizes using the following equation*:

\[ H = 0.14 NV + 11.4S \]

where
- \( H \) = capital letter height in millimetres, including height of initial capitals used with lower case letters
- \( N \) = number of words on the sign
- \( V \) = approach speed in kilometres per hour
- \( S \) = lateral offset of the sign in metres, measured from the centre of the sign to the centre of the traffic lane

The formula applies to words made up of Series E Mod. capitals and lower case letters, e.g. on direction signs, on side-mounted signs in rural areas. For other conditions the formula should be modified as follows:

(a) For other letter Series increase \( H \) by the following factors:
   - Series C – 50%, Series D – 24%, Series E – 7%.
(b) For signs in urban areas increase \( H \) by 25% (conspicuousness adjustment for urban environments).
(c) For overhead signs, \( S \) used in formula should be vertical offset of centre of sign from driver’s eye height multiplied by 2.

Where an overhead sign is at the side of the road and more than 3 m from the edge of the pavement, it may be necessary to calculate the equivalent lateral distance \( S_{EL} \) from the formula:

\[ S_{EL} = (S_L^2 + 4S_V^2)^{1/2} \]

where
- \( S_L \) = lateral offset of the sign in metres, as for Equation B1
- \( S_V \) = vertical distance of the centre of the sign above the driver’s eye in metres, (distance above road surface, minus 1.2 m)

The value \( S_{EL} \) is then substituted for \( S \) in Equation B1.

To facilitate sign design and manufacture it will usually be necessary to adopt the standard letter size given in AS 1744, nearest to the size calculated.

* The derivation of this equation is given in Austroads, Guide to Traffic Engineering Practice, Part 10: Traffic Control and Communication Devices.
APPENDIX C
DETERMINATION OF ADVISORY SPEEDS ON HORIZONTAL CURVES

C1 SCOPE
This Appendix describes methods to be used for the determination of advisory speeds on horizontal curves using either the ball bank indicator method or by using other means, e.g. Vericom data.

C2 PRINCIPLE
The advisory speed for a curve is obtained by measuring the centripetal force exerted on a vehicle when travelling around the curve at a particular speed, and from that information, determining the travel speed at which the centripetal force would be at a predetermined acceptable maximum.

NOTE: Advisory speed signing is not permitted on unsealed roads only (see Clause 4.4.6.1).

C3 BALL BANK INDICATOR METHOD

C3.1 Equipment
The ball bank indicator in its original form comprises a sealed cylindrical glass tube curved into the arc of a circle and placed against a scale graduated in degrees of curvature of the tube, see Figure C1. The tube is filled with a damping liquid and contains a moving metal ball. The tube is mounted transversely in a medium size car or station wagon on or near the dashboard and in a perpendicular plane. As the vehicle is driven around a curve the centripetal force acting on the vehicle is measured in degrees of deflection of the ball, left or right, from the centre or zero position. This measurement is known conventionally as the ‘ball bank’ angle.

![Figure C1 - BALL BANK INDICATOR](image)

Devices capable of measuring the ball bank angle by other means including indirect means and including those capable of automatic recording and analysis of results will meet the requirements of this Standard. Instruments should be capable of providing a ball bank angle reading accurate to ±0.5 degrees.

C3.2 Procedure
The following survey procedure relates to the original ball bank indicator as described in Paragraph C3.1. Steps may be omitted as appropriate depending on the facility for automatic recording and analysis provided by the instrument used.

(a) Calibrate the vehicle speedometer by driving the vehicle at constant speed over an accurately measured distance and noting the variation between indicated and true speed. Repeat this step three to four times at approximately equal increments of speed so as to provide coverage of the range of speeds likely to be used in the survey. Calibration to ±1 km/h will be adequate for this survey.

(b) Level the instrument by parking the vehicle on a flat surface with driver and observers aboard and adjusting the ball to the zero mark. Turn the vehicle through 180° and if the ball is no longer at zero, reset the ball to a point equal to half the error.
(c) Survey the curve by driving the survey vehicle at a constant speed around the curve as nearly parallel to the road centre-line as possible. For convenience in using the graph in Figure C2, drive at a speed as near as possible to a multiple of 10 km/h. Drive on the correct side of the road avoiding sudden steering corrections while in the curve. Record the ball bank reading, $B$ (degrees) and the speedometer reading $V$ (km/h) in the central untransitioned portion of the curve. Both instruments should be steady at this point with the ball at or near its maximum deflection for the curve.

(d) Adjust the indicated speed according to the variation found in Step (a) to determine the true speed, $V_0$ and plot the ball-bank angle against the speed on Figure C2.

(e) If the plotted point does not lie within the shaded band in Figure C2, repeat Steps (c) and (d) at 10 km/h increments or decrements until the plotted point lies within that band. Read off the advisory speed $V_A$ at that point.

(f) Where the road has two or more lanes in one direction, measure the advisory speed for each lane separately and report the lowest value.

NOTES:

1. The example shows an observed reading of 12 degrees at a survey speed of 70 km/h. The advisory speed is 66 km/h.

2. The graph is based on the matching of ball bank angle to advisory speed as shown in the following Table:

<table>
<thead>
<tr>
<th>Ball bank angle degrees</th>
<th>6.0</th>
<th>6.5</th>
<th>9.0</th>
<th>9.5</th>
<th>10.0</th>
<th>10.5</th>
<th>11.0</th>
<th>11.5</th>
<th>12.0</th>
<th>12.5</th>
<th>13.0</th>
<th>13.5</th>
<th>14.0</th>
<th>14.5</th>
<th>15.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisory speed km/h</td>
<td>95</td>
<td>90</td>
<td>85</td>
<td>80</td>
<td>75</td>
<td>70</td>
<td>65</td>
<td>60</td>
<td>55</td>
<td>50</td>
<td>45</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>25</td>
</tr>
</tbody>
</table>

Figure C2  DETERMINATION OF ADVISORY SPEED ON A HORIZONTAL CURVE FROM BALL BANK INDICATOR READING AND LATERAL ACCELERATION INSTRUMENT
C4 ELECTRONIC ACCELEROMETER METHOD

C4.1 Equipment (Vericom 4000)

Accelerometers can accurately measure the lateral inertial force generated by a vehicle travelling through a horizontal curve. The measured unit output is a function of the acceleration of gravity (9.81 m/s²). The accelerometer (Vericom 4000) is mounted centrally to the longitudinal axis of the test vehicle on the windscreen (using the mounting system supplied by the manufacturer, as depicted in Figure C3).

![Figure C3](image)

C4.2 Set Up Procedure

The following set up and levelling procedure applies to the Vericom 4000 model accelerometer instrument. It is recommended the instrument be calibrated before each test activity as outlined in the device instruction manual.

(a) The test vehicle should be parked on a level surface with driver and operator in the vehicle. A digital smart level may be utilised to check the vehicle setup platform.

(b) The accelerometer instrument has a lateral and longitudinal axis bubble level that can be used to achieve appropriate pre test level accuracy.

(c) The preferred levelling method is to utilise the active digital instrument display.

1. **Important** - the instrument zeroing setting must be **turned off** to conduct a valid test.

2. Through the tools key select the monitor mode in G-Force and do not save to memory for the levelling procedure. The resulting tri axis (Gx, Gy and Gz) active screen display allows manual adjustment to level the instrument.

3. Ensure the Gy and Gx active display is as close to a zero display as possible. Levelling accuracy sensitivity of **less than 1% (Gy = 0.01)** display is considered adequate for a valid test survey.

C4.3 Test Survey Procedure

The test survey procedure relates to the Vericom 4000 model accelerometer instrument. If a different model electronic accelerometer is used, the test run procedure may require modification for that particular instrument.

(a) The GPS system supplied by the instrument manufacturer should be connected in accordance with the instruction manual and utilised for each survey to ensure test run speed recording.

(b) The curve survey methodology should replicate the ball bank procedure in terms of test speed multiples and direction.
C4.4 Survey Data Analysis

The software provided with the instrument (Profile 4) is used to graph the data collected for each survey test run (refer to Figure C4). The following procedure should be used to ensure consistent lateral acceleration Gy interpretation.

(a) Select Gy as the vertical graph axis display and GPS speed as the secondary graph unit display.

(b) Select the chart average cursors and move them to span the nominated curve apex with a recommended general minimum data set spread of 2 seconds. This process smoothes out short duration road roughness data noise and irregular driver steer input data peaks, similar to the fluid inside a conventional ball bank device.

(c) When analysing same direction but different speed curve survey runs, the recommended data comparison is to align the travelled curve apex distance. Early curve entry and late curve exit transition data should not be included in the data set spread.

(d) An example of a like for like curve apex travel distance data set comparison is as follows:
   1. First curve run at 50 km/h with a selected 2.5 second data set = 35 m
   2. Second curve run at 60 km/h with a 2.1 second data set = 35 m
   3. Third curve run at 40 km/h with a 3.1 second data spread = 35 m

(e) The software generated lateral friction demand number is a smoothed peak average of the lateral acceleration experienced by the test vehicle at the test speed, through an equivalent curve apex travel distance. A negative Gy value represents a left curve and a positive Gy value indicates a right curve.

(f) The interpreted lateral friction demand value is applied to the ball bank curve advisory speed chart to deduce the appropriate curve advisory speed value, inline with the conventional ball bank procedure.

![Figure C4 PROFILE 4 CURVE SURVEY DATA GRAPH DISPLAY](image)

C5 ADVISORY SPEED ADJUSTMENT

To determine the advisory speed to be shown on Advisory Speed signs, the speed obtained from the above methods shall be adjusted, as necessary, to a multiple of 10 km/h by rounding four units up or five units down.
C6 REPORT
The advisory speed to be shown on Advisory Speed signs shall be reported for each curve measured, for each direction of travel, and where more than one advisory speed was measured in a particular direction, the adjusted speed corresponding to the lowest measured value.
APPENDIX D
DETERMINATION OF ADVISORY SPEEDS ON VERTICAL CURVES

D1 SCOPE
This Appendix describes a method which may be used for determining the advisory speed on sharp vertical curves, i.e. at dips and humps.

D2 PRINCIPLE
The advisory speed is first estimated from measurements of the length of the curve and the total grade change. It is then checked by driving over the curve at the estimated speed.

D3 METHOD
Referring to Figure D1, proceed as follows:

(a) Measure the horizontal length \( L \) (metres) of the vertical curve.
(b) Measure the grade (percent) at each end of the vertical curve.
(c) Calculate the total algebraic grade change, \( A \) (percent), and hence find the ratio \( A/L \).
(d) From Table D1, find an initial estimate for the advisory speed to the nearest 1 km/h. The Table is based on a maximum tolerable vertical acceleration of 0.1 g (approximately 1 m/sec/sec).
(e) Drive over the vertical curve in a passenger car of common make, at least twice in each direction at the estimated speed.
(f) Assess the suitability of the test speed on the basis of suspension bottoming, handling and passenger comfort.
(g) If the estimated speed is unsatisfactory, increase or decrease the test speed by 10 km/h as required and repeat Steps (e) and (f).

NOTE: In addition to geometry of the vertical curve, factors which affect advisory speed include pavement surface condition, horizontal alignment and, in a dip, the likelihood of encountering water or drift sand.
<table>
<thead>
<tr>
<th>A/L</th>
<th>Advisory speed km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.15</td>
<td>N/A</td>
</tr>
<tr>
<td>0.15-0.16</td>
<td>95</td>
</tr>
<tr>
<td>0.16-0.17</td>
<td>90</td>
</tr>
<tr>
<td>0.18-0.19</td>
<td>85</td>
</tr>
<tr>
<td>0.20-0.22</td>
<td>80</td>
</tr>
<tr>
<td>0.23-0.26</td>
<td>75</td>
</tr>
<tr>
<td>0.27-0.30</td>
<td>70</td>
</tr>
<tr>
<td>0.31-0.35</td>
<td>65</td>
</tr>
<tr>
<td>0.36-0.42</td>
<td>60</td>
</tr>
<tr>
<td>0.43-0.51</td>
<td>55</td>
</tr>
<tr>
<td>0.52-0.63</td>
<td>50</td>
</tr>
<tr>
<td>0.64-0.80</td>
<td>45</td>
</tr>
<tr>
<td>0.81-1.05</td>
<td>40</td>
</tr>
<tr>
<td>1.06-1.42</td>
<td>35</td>
</tr>
<tr>
<td>&gt;1.42</td>
<td>30</td>
</tr>
</tbody>
</table>

(h) To obtain the advisory speed to be shown on signs, adjust the speed to a multiple of 10 km/h by rounding four up or five down.
This Appendix specifies warning signs for wildlife only for those kinds of animal that would constitute, by virtue of their size, an injury risk to occupants of motor vehicles and motor cycles if struck on the road, e.g. kangaroos and wandering stock.

The efficacy of signs of the type specified in Clause 4.11.2.7 in preventing the road kill of small animals is considered doubtful.

Signs aimed at creating a general awareness of wildlife in an area such as those shown below are suggested as a more meaningful approach to the problem of protecting small animals. It is envisaged that these signs could be displayed up to two at any one location.

FIGURE E1  WILDLIFE AWARENESS SIGNS