Part 2 Traffic Control Devices for General Use

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First Issue 1st August, 2003
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Queensland Government

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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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CONTENTS

DEPARTMENT OF TRANSPORT AND MAIN ROADS
Queensland

Manual of Uniform Traffic Control Devices

PART 2 – TRAFFIC CONTROL DEVICES FOR GENERAL USE

SECTION 1. SCOPE AND INTRODUCTION

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
Guide to Traffic Management - Part 3: Traffic Studies and Analysis, 2008

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

Indicates the existence of an option.

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

Indicates that a statement is mandatory.

1.4.7 Should

Indicates a recommendation.

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:

AS 1743, AS 1744, AS/NZS 1906.1, AS/NZS 1906.2, AS 1906.3, AS/NZS 2009, AS 4049 Series.

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 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, channelizing 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 2.1 SIGNS FOR STOP, GIVE-WAY AND ROUNDABOUT CONTROL, AND THE REGULATION OF MOVEMENTS

Sign type	Sign number(s)	Size, mm	Reference
STOP	R1-1A R1-1B	600 x 600 750 x 750	Clause 2.5.5
GIVE WAY	R1-2A R1-2B	750 height 900 height	Clause 2.5.5
Roundabout Control	R1-3A R1-3B	750 height 900 height	Clause 2.6.2
ONE WAY	R2-2A (L or R) R2-2B (L or R)	450 x 600 600 x 800	Clause 2.8.2
KEEP LEFT KEEP RIGHT	R2-3 (L) R2-3 (R)	A 450 x 600 B 600 x 800	Clause 2.8.2
NO ENTRY No U-Turn No Left (Right) Turn	R2-4 R2-5 R2-6(L or R)	A 450 x 600 B 600 x 800 C 750 x 700 D 900 x 900	Clause 2.8.4 Clause 2.8.5 Clause 2.8.5
No Turns	R2-7A R2-7B	450 x 600 600 x 800	Clause 2.8.5
LEFT LANE MUST TURN LEFT RIGHT LANE MUST TURN RIGHT	R2-9 (L) R2-9 (R)	A 450 x 750 B 600 x 1000	Clause 2.8.6
All Traffic Turn	R2-14A (L or R) R2-14B (L or R)	600 x 800 900 x 1200	Clause 2.8.7
NO HOOK TURN BY BICYCLES	R2-22	750 x 700	Clause 2.8.8
Pedestrians Prohibited	R6-15A R6-15B	300 x 300 450 x 450	Clause 2.8.9

Table 2.1 SIGNS FOR STOP, GIVE-WAY AND ROUNDABOUT CONTROL, AND THE REGULATION OF MOVEMENTS (cont.)

Sign type	Sign number(s)	Size, mm	Reference
Time of Operation module	R9-1-1A	450 x 300	Clause 2.8.10
	R9-1-1B	600 x 400	
	R9-1-1C	900 x 600	
	R9-1-1D	1200 x 800	
	R9-1-2A	450 x 450	
	R9-1-2B	600 x 600	
	R9-1-2C	900 x 900	
	R9-1-2D	1200 x 1200	
BUSES EXCEPTED BICYCLES EXCEPTED AUTHORISED VEHICLES EXCEPTED NEXT x m (km)	R9-2 R9-3 R9-4 R9-7-2	A 450 x 300 B 600 x 400 C 750 x 500	Clause 2.8.10
AT ... (street name)	R9-8A	450 x 450	Clause 2.8.10
	R9-8B	600 x 600	
	R9-8C	750 x 750	
SERVICE ROAD ENTRY	G9-71A	600 x 750	Clause 2.8.11
LEFT TURN FROM SERVICE ROAD ONLY	G9-72A	1200 x 1000	Clause 2.8.11

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:

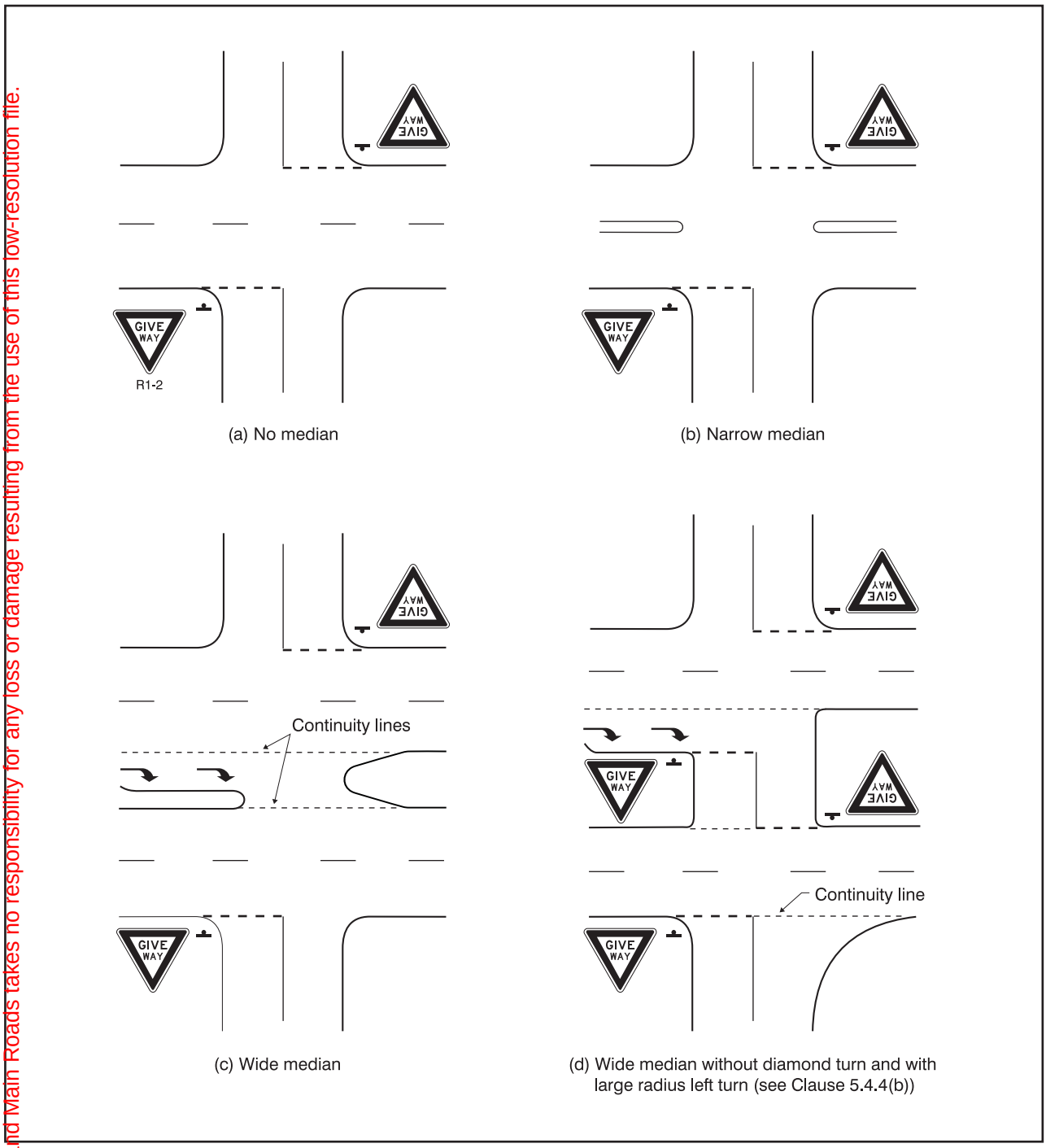
(a) The Give Way Sign Ahead (W3-2) sign shall be used in advance of a GIVE WAY sign in accordance with Clause 2.9.3(b).

(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.

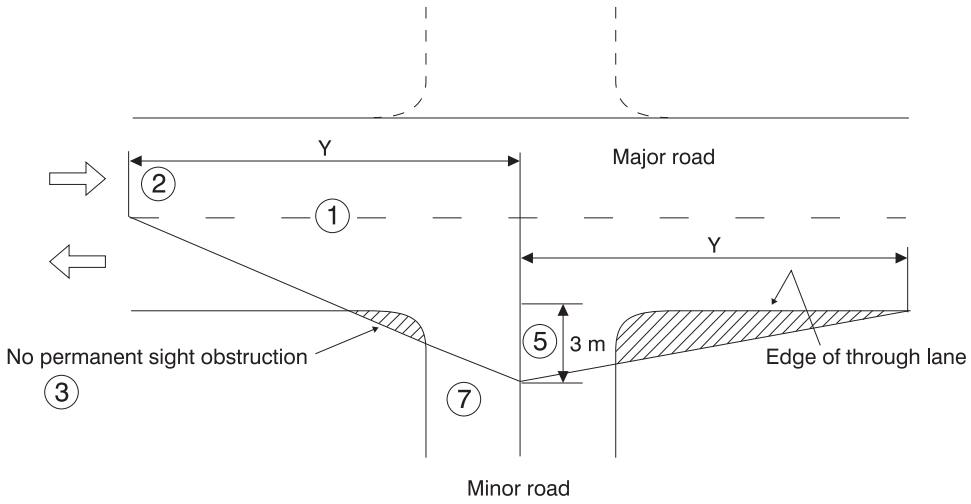


NOTES:

1 Any dividing lines or lane lines on the the main road, except barrier lines, shall be carried through the intersection. No marking should be painted across uncontrolled side roads. Edge or continuity lines should be discontinued across such intersections.

2 For dimensions of linemarking, refer to Figures 4.1 and 4.2.

Figure 2.1 LOCATION OF GIVE WAY SIGNS AND ASSOCIATED PAVEMENT MARKINGS



Major road speed (km/h) (see Note 4)	Distance along major road: Y(m) (see Note 6)
40	20
50	30
60	40
70	55
80	65
90	80
100	95
110	115
120	140

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.

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)*

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 sliplane has an acceleration lane of adequate length to enable traffic to merge, a GIVE WAY sign shall not be used.

(b) *Stop (R1-1)*

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)*

R1-3

The Roundabout control sign shall be used on the immediate approach to roundabouts to indicate that traffic on the approach must give way to traffic within the roundabout. It shall be erected on all approaches, and shall be located as near as practicable to the associated giveway line (see Clause 5.4.3) at the entry point to the roundabout. It shall be placed on both sides of the roadway where the approach to the roundabout has two or more lanes.

(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 atintersections, see Part 14 of the Manual:

(a) GIVE WAY TO PEDESTRIANS (R2-10).

(b) U TURN PERMITTED (R2-15).

(c) TURN LEFT AT ANY TIME WITH CARE (R2-16).

(d) Hook Turn Only (R2-21).

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))

R2-2(L)

R2-2(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))

R2-3(L)

R2-3(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)

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)

R2-5

R2-6(L)

R2-6(R)

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 werepermitted.

Part-time turn prohibitions should normally be used where turns during peak periods cannotbe 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 aswitchable 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)

R2-9(L)

R2-9(R)

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)

R2-14(L)

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)

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)

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).

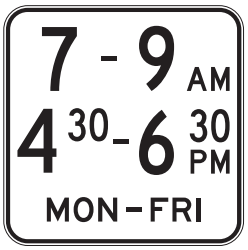
2.8.10 Supplementary plates

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

R9-1-1

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.



R9-1-2

(b) *Exception plates*

BUSES EXCEPTED (R9-2), BICYCLES EXCEPTED (R9-3), AUTHORISED VEHICLES EXCEPTED (R9-4)

R9-2

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.

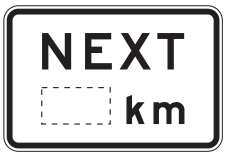
R9-3

Other supplementary plates used are BUSES TAXIS EXCEPTED (R9-Q01), TRUCKS EXCEPTED (R9-Q02) and POLICE EXCEPTED (R9-Q03).

R9-4

(c) *Distance and location plates*

NEXT x m (km) (R9-7), AT ... (street name) (R9-8), (distance) m (G9-78)



R9-7-2

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.

R9-8

G9-78

2.8.11 SERVICE ROAD ENTRY (G9-71), LEFT TURN FROM SERVICE ROAD ONLY (G9-72)

G9-71

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.

G9-72

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)

R2-Q02(R)

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 emphasize 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 2.2 WARNING SIGNS FOR GENERAL USE IN ADVANCE OF INTERSECTIONS - SIZE TABLE

Sign type	Sign number	Size, mm
Cross Road	W2-1	A 600 x 600 B 750 x 750 C 900 x 900 D 1200 x 1200
T-Intersection	W2-3	
Side Road Intersection	W2-4 (L or R)	
Roundabout Ahead	W2-7	
Staggered Side Road Intersection	W2-8 (L or R)	
Side road intersection on a curve	W2-9 (L or R)	
	W2-10 (L or R)	
	W2-15 (L or R)	
	W2-16 (L or R)	
Successive side road intersections -	W2-11 (L or R)	
on a curve	W2-12 (L or R)	
on a straight	W2-13 (L or R)	
T-Intersection beyond a curve	W2-14 (L or R)	
Stop Sign Ahead	W3-1	
Give Way sign Ahead	W3-2	
Signals Ahead	W3-3	
ISLAND	W4-5	
Merging Traffic	W5-34 (L or R)	
PREPARE TO STOP	W8-27B	750 x 375
	W8-27C	900 x 450
	W8-27D	1200 x 600
Modified intersection	W9-1 (L or R)	A 600 x 600
	W9-2 (L or R)	B 750 x 750
	W9-3 (L or R)	C 900 x 900

Table 2.3 STOPPING SIGHT DISTANCE ON LEVEL SEALED PAVEMENTS (see Note)

V85, km/h	Stopping sight distance, m
31-40	40
41-50	55
51-60	70
61-70	90
71-80	115
81-90	140
91-100	170
101-110	205
111-120	245
120-130	280

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 15of 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

Type of curve, bend or corner	On the major road		On the side road approach to a major road
	Where intersection warning is warranted (see Clause 2.9.2.1)	Where intersection warning is not warranted	
Where curve is substandard (see Clause 4.4.1)	W2-9, W2-10, W2-11, W2-12, W2-15, W2-16 With advisory speed sign	W1-1, W1-2, W1-3, W1-4, W1-5, W1-7 With advisory speed sign (W1 Series signs are shown in Clause 4.4.7)	W2-14
Where curve is not substandard but the road is obviously curved	W2-9, W2-10, W2-11, W2-12, W2-15, W2-16	Warning signs are not usually required (but see Clause 4.4.7.3)	W2-14
On a road that is straight or with a minor curve only	W2-1, W2-4, W2-8, W2-13	Warning signs are not required	W2-3 if warranted
Where the priority road goes around the corner at an intersection	W9-1, W9-2, W9-3	In very low speed streets, warning signs may not be required	Not applicable (see Clause 2.9.3 (b) and (c))

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

(a) 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.

(b) 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.

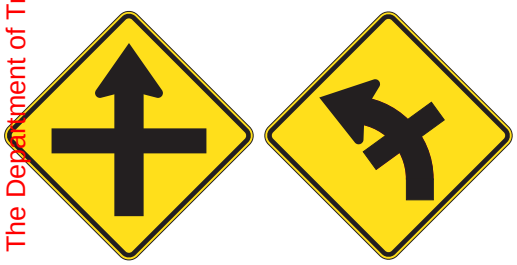
NOTE: Sign symbols in the W1 Series other than the W1-3 curve warning sign cannot be used as a basis for a multi-purpose curve/intersection warning sign symbol.

(c) 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)*

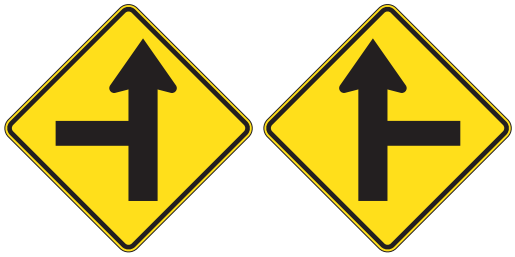


W2-1 W2-15(L)

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.

(b) *Side Road Intersection (W2-4)*



W2-4(L) W2-4(R)

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.

(c) *Staggered Side Road Intersection (W2-8)*

W2-8(L) W2-8(R)

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.

(d) *Roundabout Ahead (W2-7)* See Clause 2.9.3(a).

2.9.2.3 T-intersection signs

(a) *T-intersection, Straight Approach (W2-3)*

W2-3

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 warningof 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.

(b) *T-intersection Beyond a Curve (W2-14)*

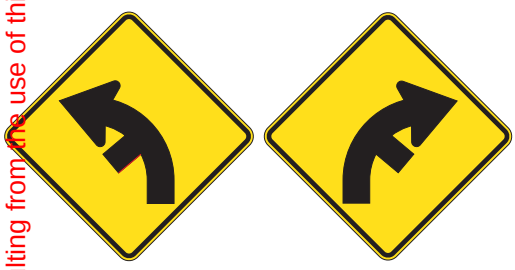
W2-14(L) W2-14(R)

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)

W2-9(L) W2-9(R)



W2-10(L) W2-10(R)

W2-16(L) W2-16(R)

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)

W2-11(L) W2-11(R)

W2-12(L) W2-12(R)

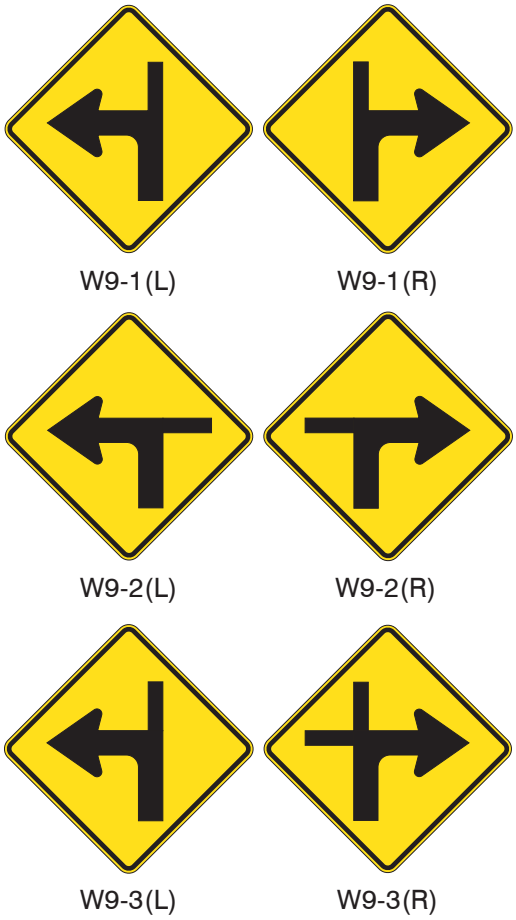
W2-13(L) W2-13(R)

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)



W9-1(L) W9-1(R)

W9-2(L) W9-2(R)

W9-3(L) W9-3(R)

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)*

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)*

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 Tintersection warning sign W2-3 (see Clause 2.9.2.3(a)) has been used.

(c) *Stop Sign Ahead (W3-1)*

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)*

W3-3

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)

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)

W5-34(L)

W5-34(R)

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 (seeClause 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 channelizing 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 15of 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 –

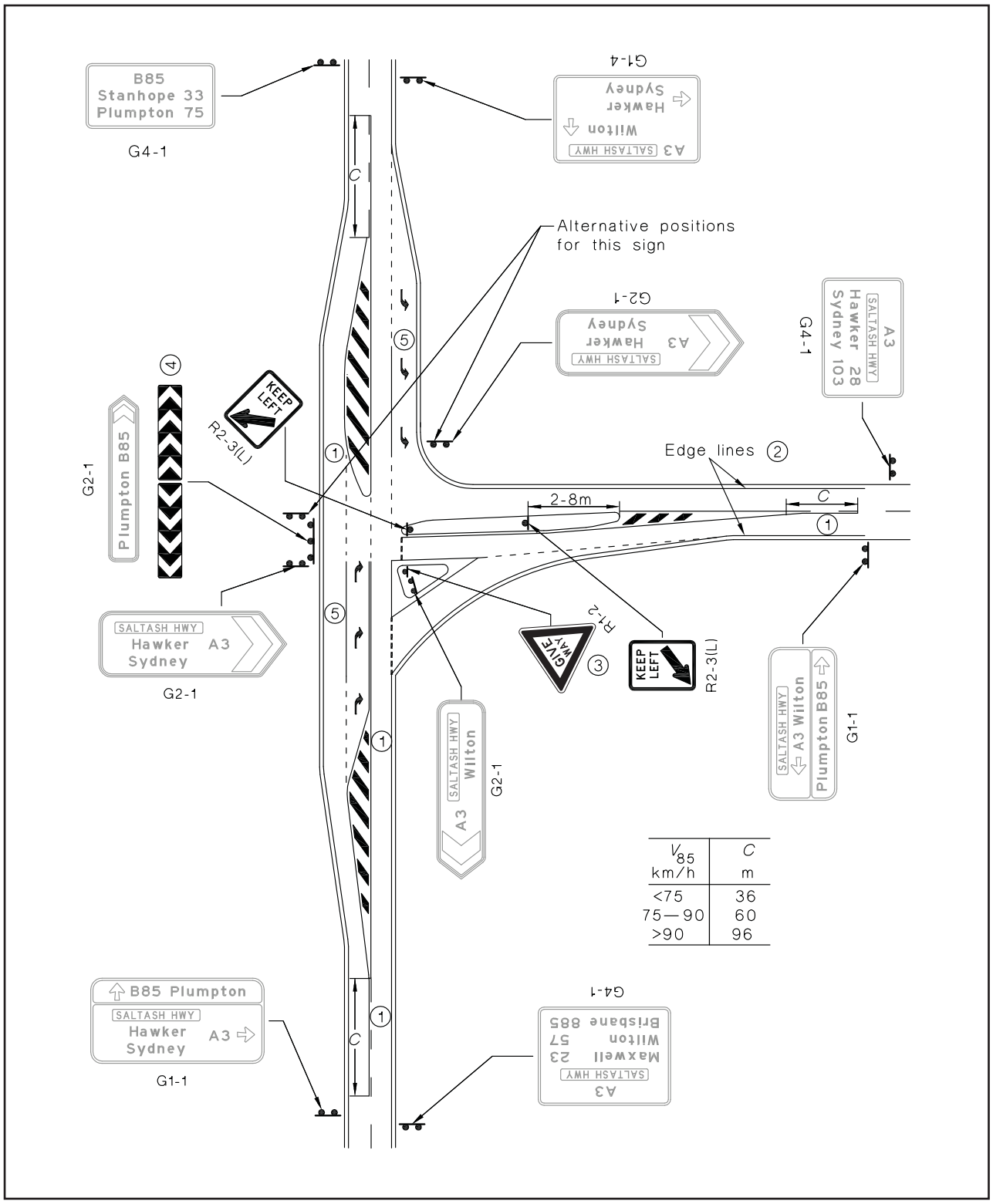
(a) intersection sight distance at critical locations is not affected;

(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 4.6.5.2 for location and spacing. Barrier lines are extended if sight conditions on any approach so require.

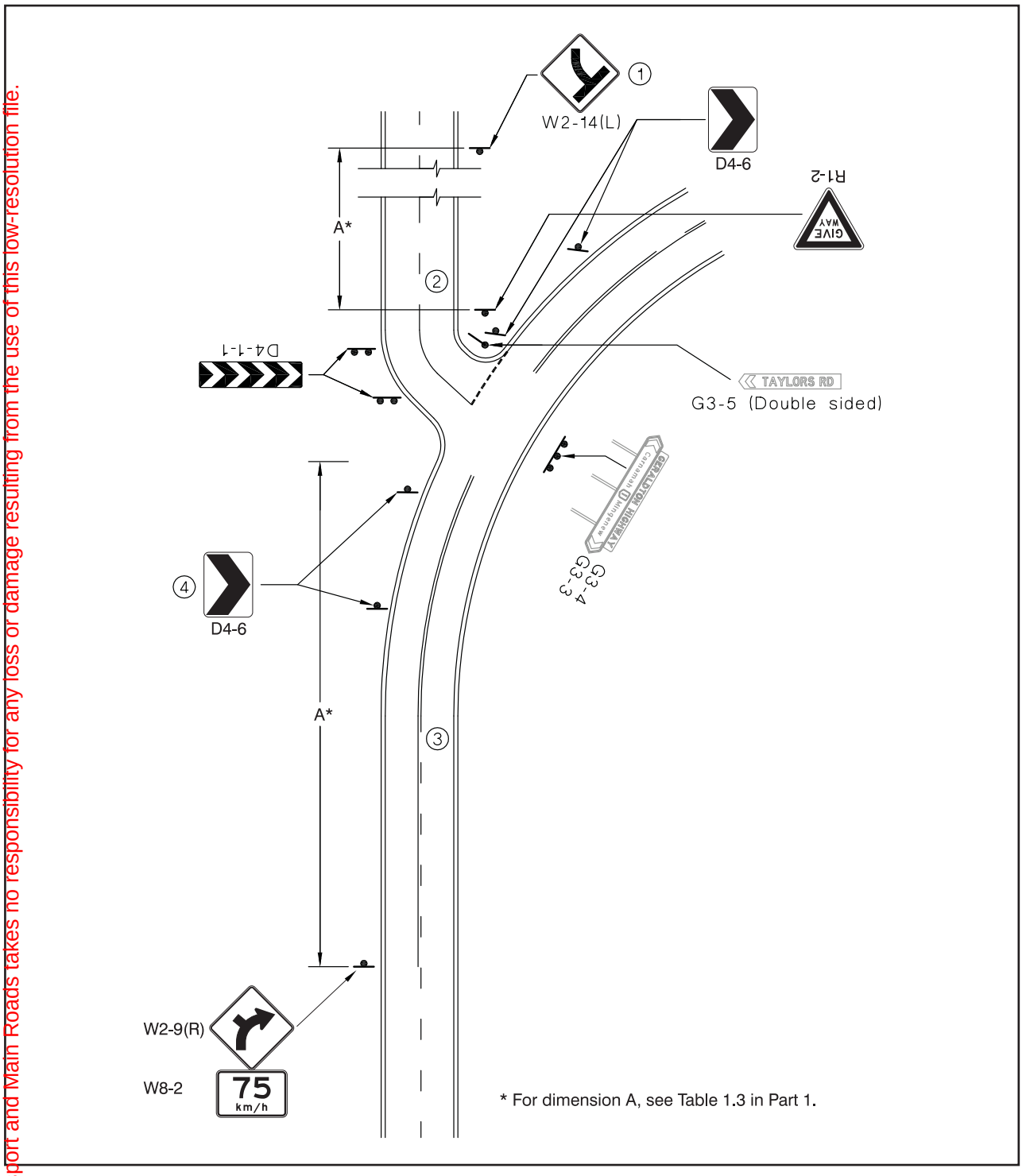
2 Where the route is not edge lined continuously and edge lines are provided through the intersection they should be continued to the end of approach barrier line.

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 2.6.

2 For use of the side road separation line, see Clause 5.3.10(a)(iv).

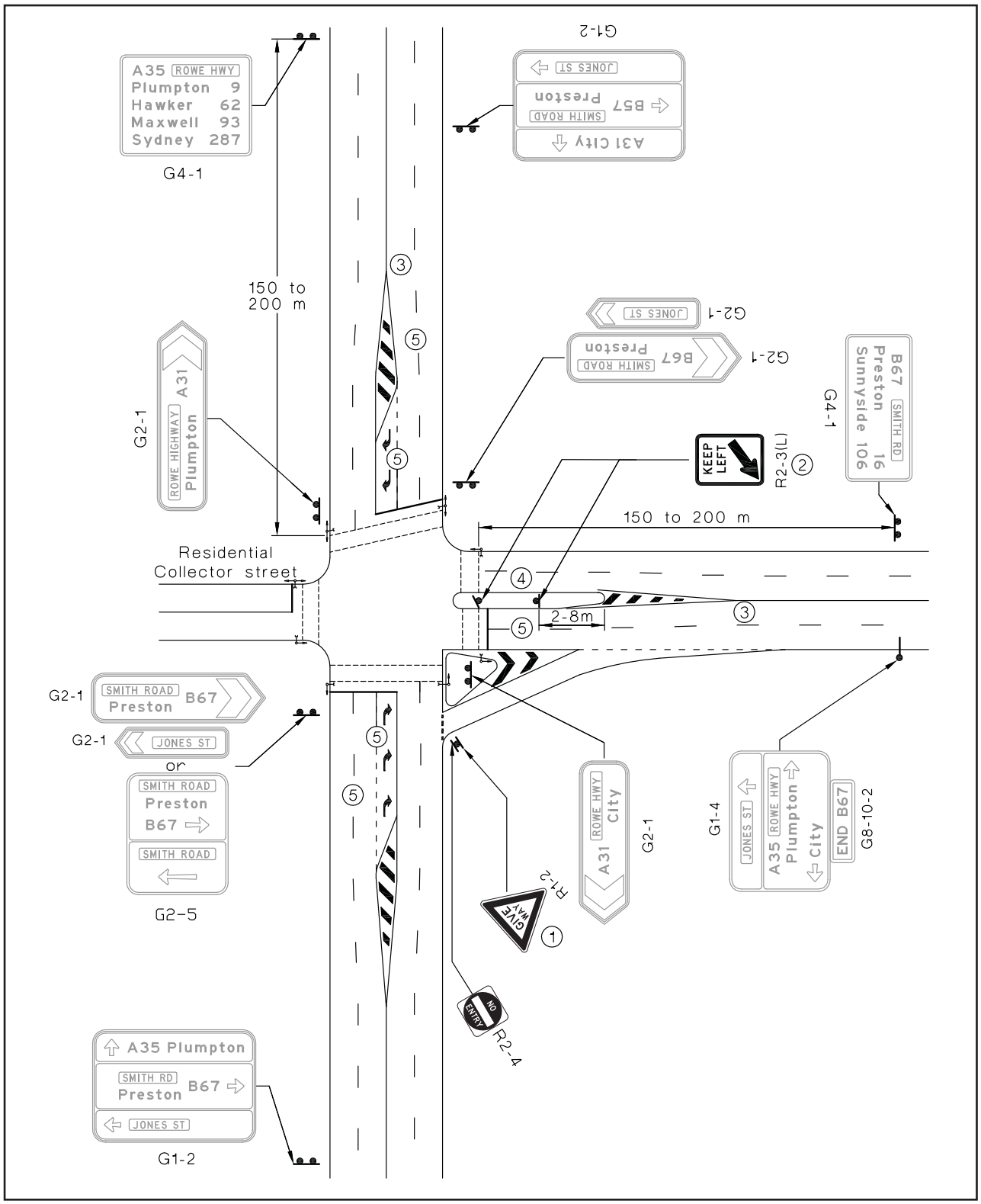
3 Barrier lines may be supplemented with RRPMs if night time delineation of the intersection is likely to be a problem and the remainder of the route is not treated continuously with RRPMs.

4 If the curve is substandard, Chevron Alignment markers (CAMs) (D4-6), are placed as shown in accordance with Clause 3.4.9. 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 2.6.

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 2.5.4.

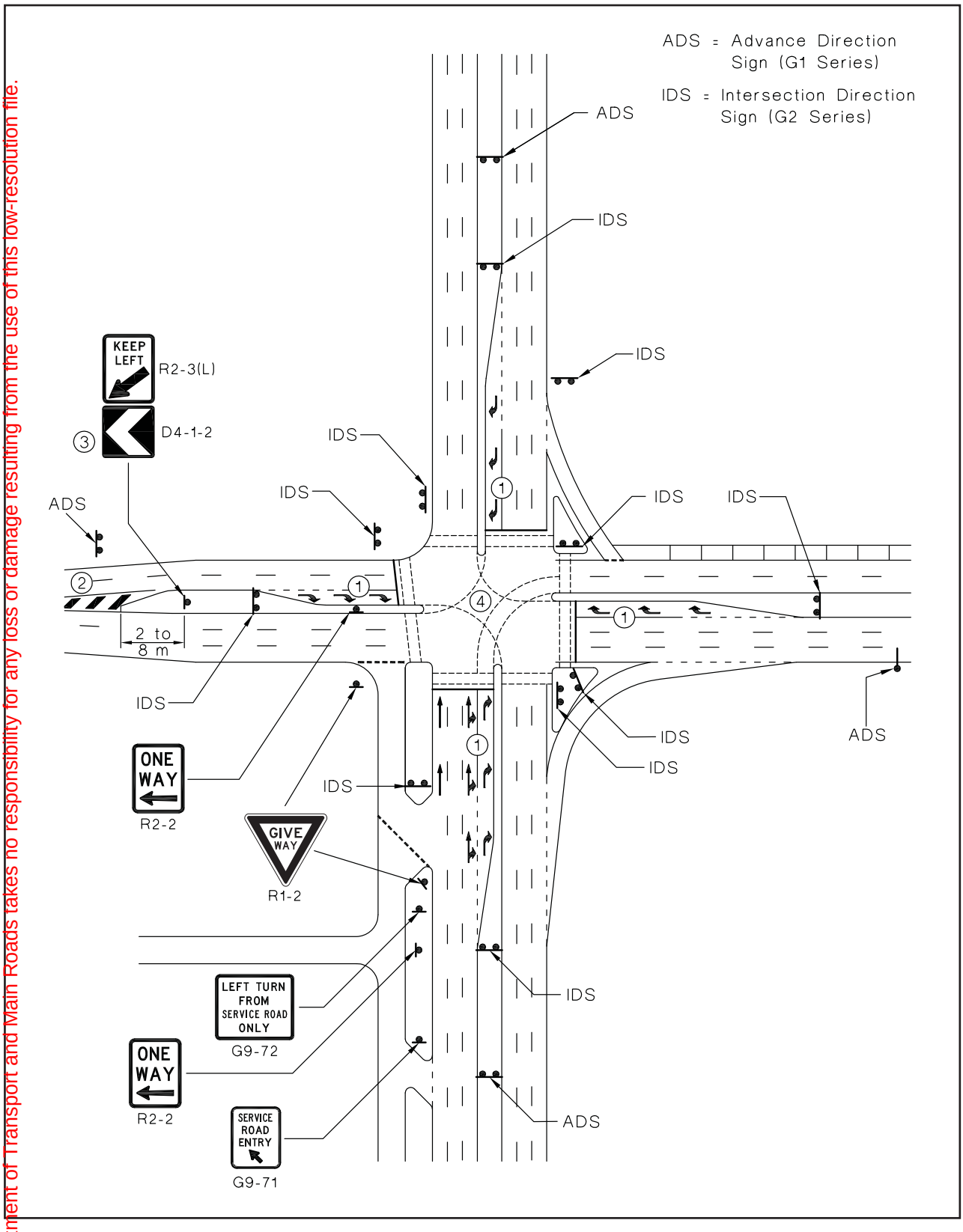
2 The sign is mounted on the signal post where practicable, and angled towards right-turning traffic.

3 Dividing lines and island outline markings may be augmented with RRPMs. For layout and spacing see Clause 4.6.5.2.

4 The need for a Hazard marker should be considered if R2-3 is not sufficient to delineate the median end (see Clause 3.6.7).

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 4.3.10(a)(iii)).

Figure 2.5 MAJOR URBAN INTERSECTION WITH SIGNALS



NOTES:

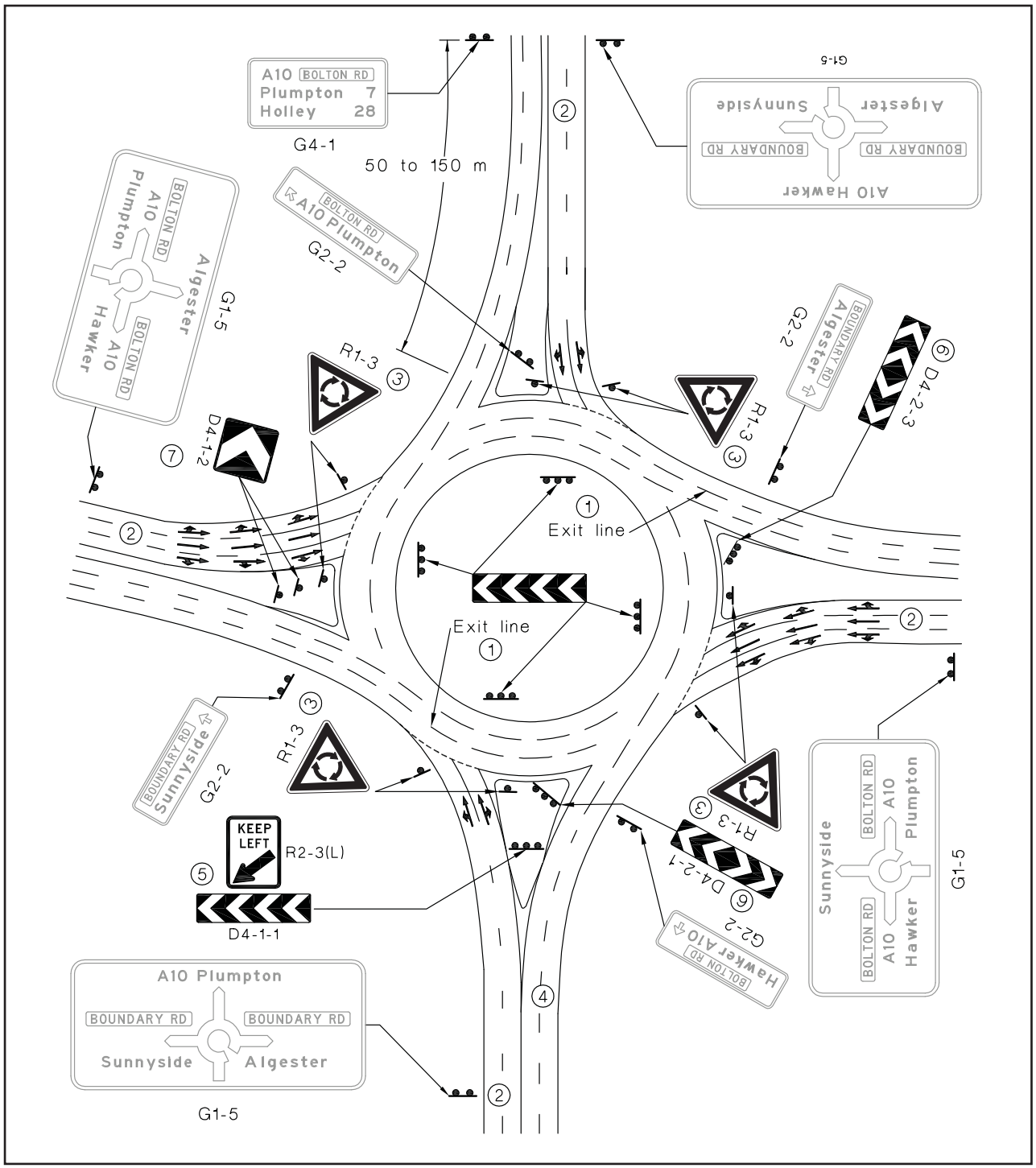
1 10 m to 12 m long unbroken lines may be used where lane discipline on the approach is a problem and adequate length remains for turning traffic to enter the right lane (see Clause 4.3.10(a)(iii)).

2 Island outline markings may be augmented with RRPMs. For layout and spacing see Clause 4.6.5.2.

3 A Hazard marker may be required if the sign alone is not sufficient to delineate the median end (see Clause 3.6.7).

4 Turn lines may be omitted where the path to be followed is obvious to drivers under all conditions (see Clause 4.3.7).

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 5.3.10(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.

3 Sign R1-3 is required on both sides of each approach at a multi-lane approach, see Clause 2.6.2(a).

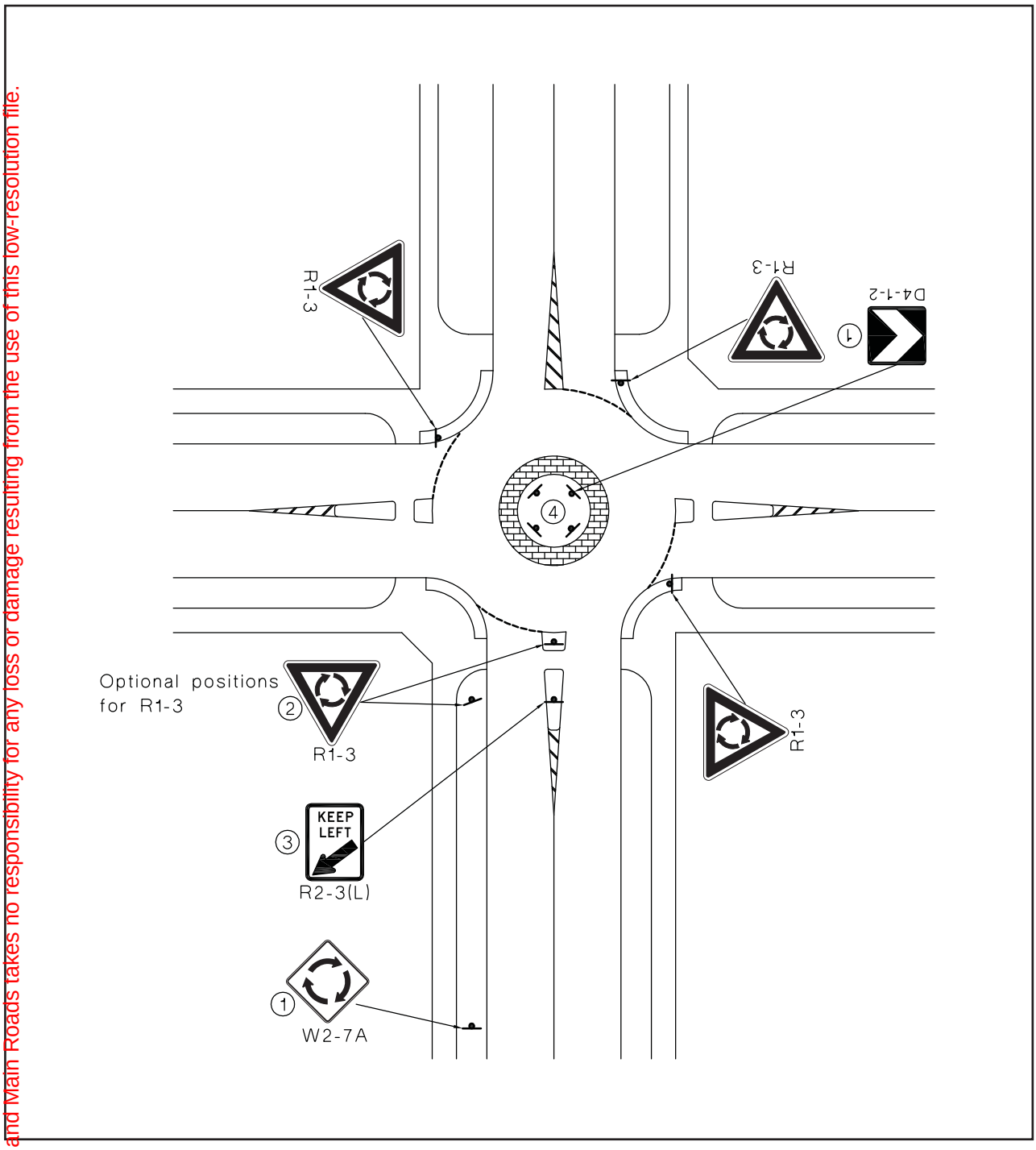
4 Island outline markings may be augmented by RRPMs. For layout see Figure 4.24.

5 The need for a Hazard marker should be considered if R2-3 is not sufficient to delineate the median end (see Clause 3.6.7).

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.

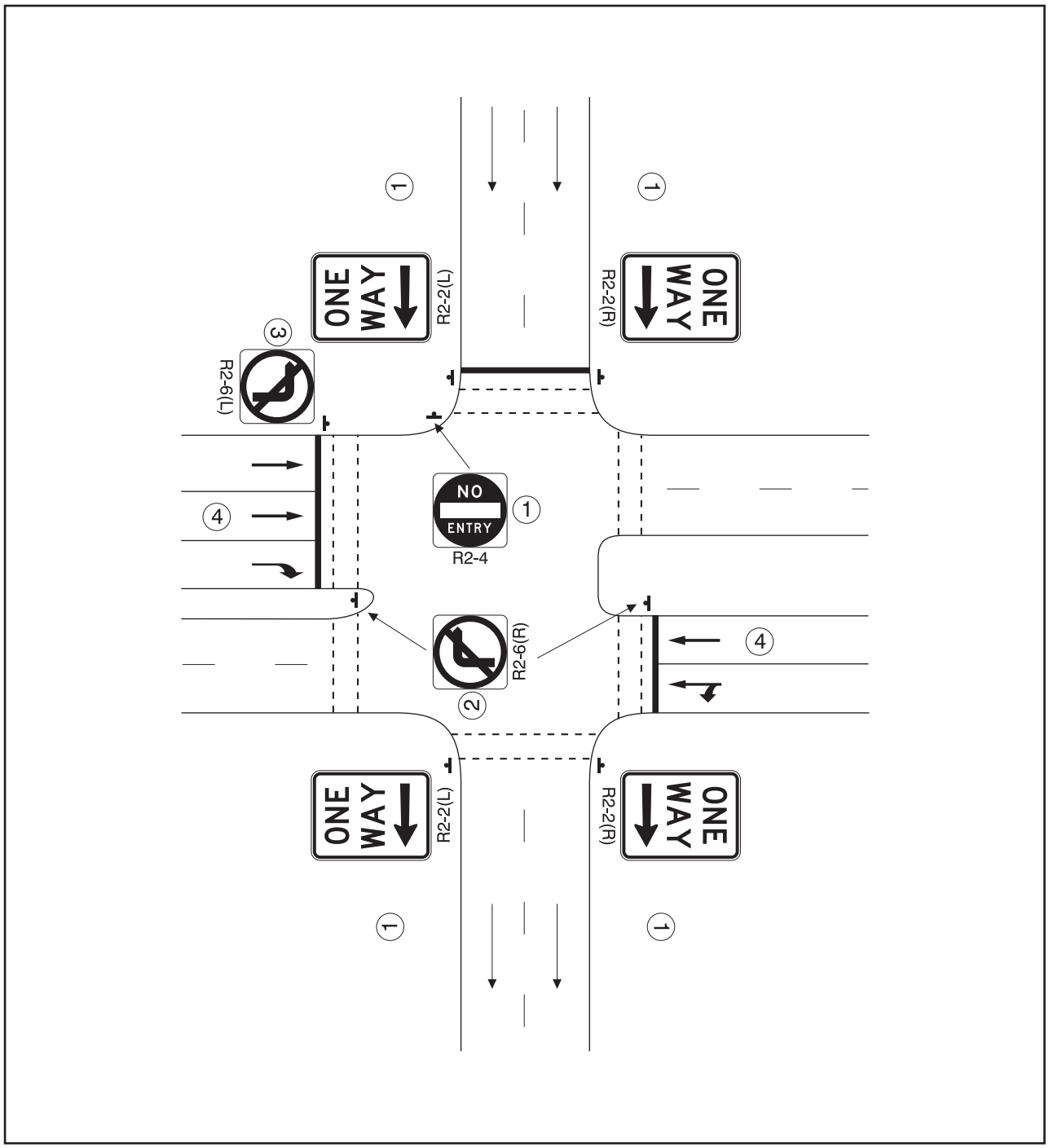
Figure 2.7 LARGE ROUNDABOUT



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:

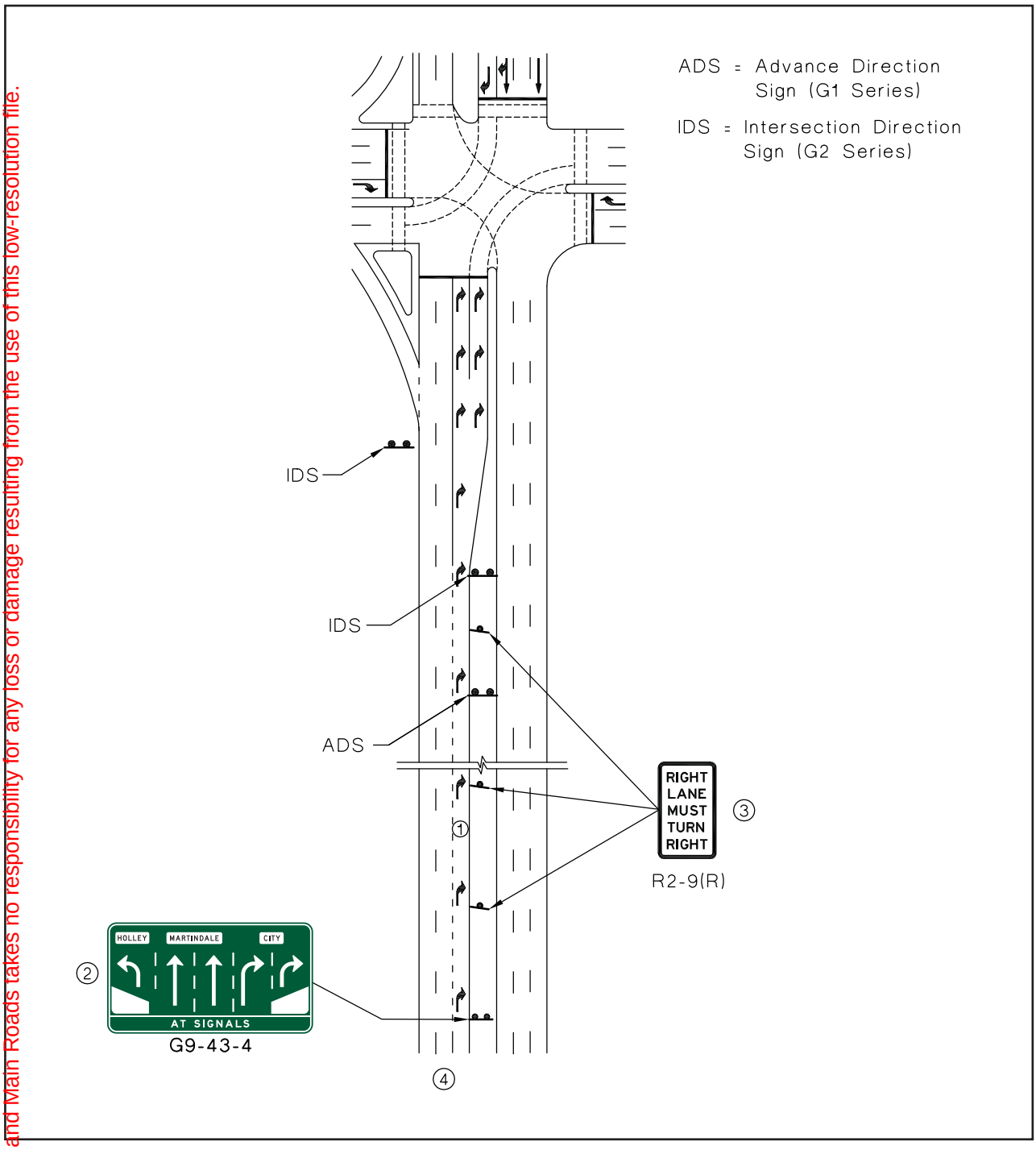
1 The minimum treatment at the one-way street exit is the provision of ONE WAY (R2-2 (L or R)) signs visible to all directions from which a potential wrong way vehicle could approach, together with at least one NO ENTRY (R2-4) sign (see Clauses 2.8.4 and 2.8.5).

2 No Right Turn (R2-6(R)) sign is provided at signalised intersections, or if the cross road is divided (see Clause 2.8.2).

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 4.9).

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)*

R2-4

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

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

*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))*

R2-6(L)

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)*

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.

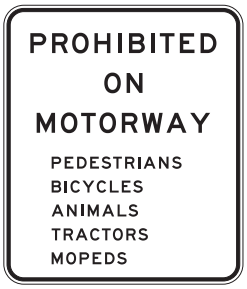
3.4.3 Signs for the regulatory control of expressway use and access

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)*

R6-13

GE6-2



GE6-Q01

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)*

R6-19

R6-20

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)*

R2-2(L)

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.

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

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

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

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.

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

R5-58(L)

R5-58(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.

(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)**

W1-2(L)

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)*

W5-35(L)

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)*

W1-9-1

W1-9-2(L)

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)*

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

Sign type	Sign number	Size, mm
END FREEWAY 2 km	GE6-9	2300 x 1500
END FREEWAY 1 km	GE6-10	2300 x 1500
REDUCE SPEED NOW	GE9-3	2600 x 2000

These signs are used as follows:

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

GE6-9

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)

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 ramp nose markings, see Clause 5.7.2.

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

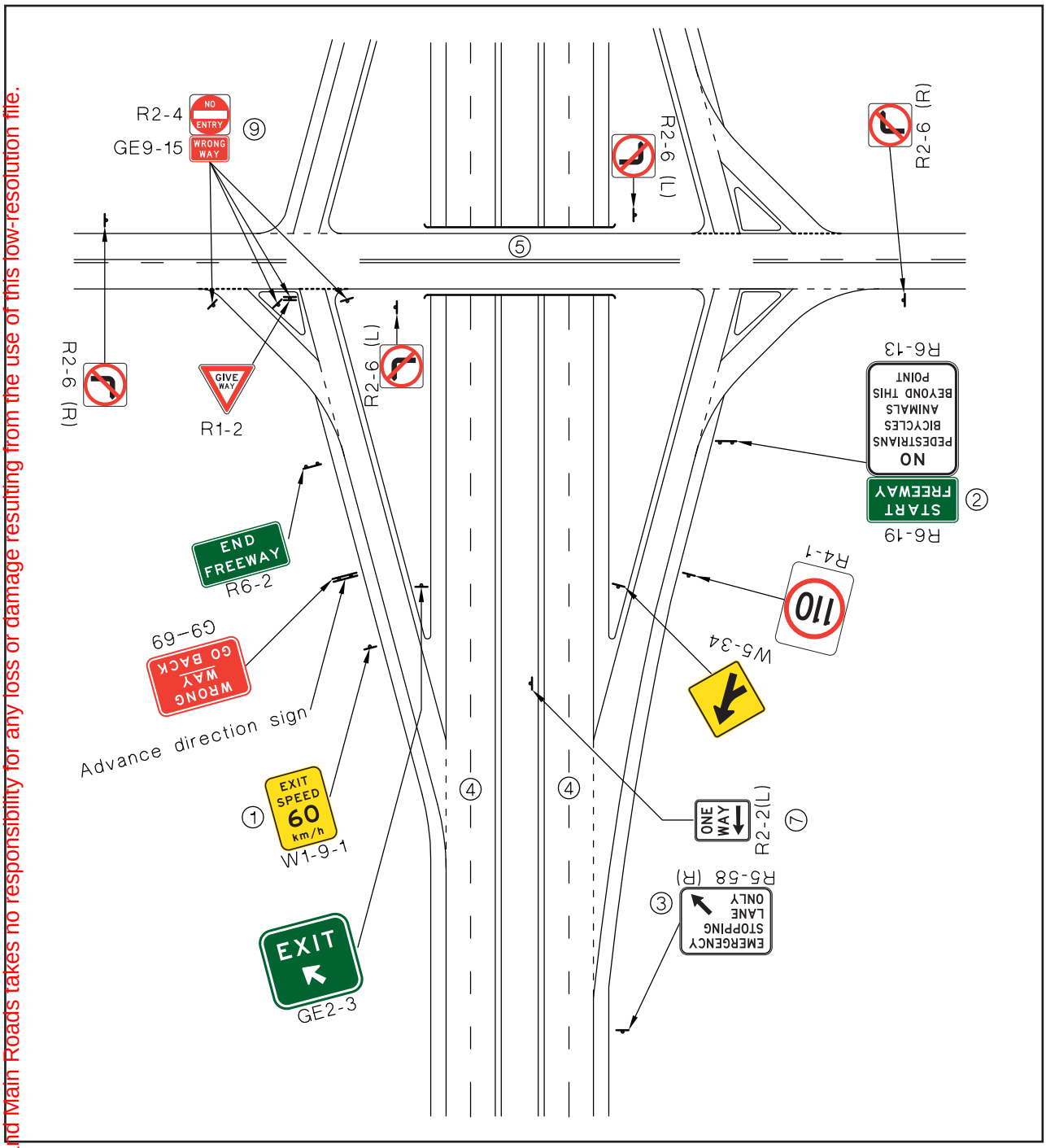
(d) Step-out markings at beginning of exit ramps, see Clause 5.7.4.

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 and 3.6.

Signs and markings layouts at single and two-lane entrances and exits are specified in Figures 3.3, 3.4 and 3.5.

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

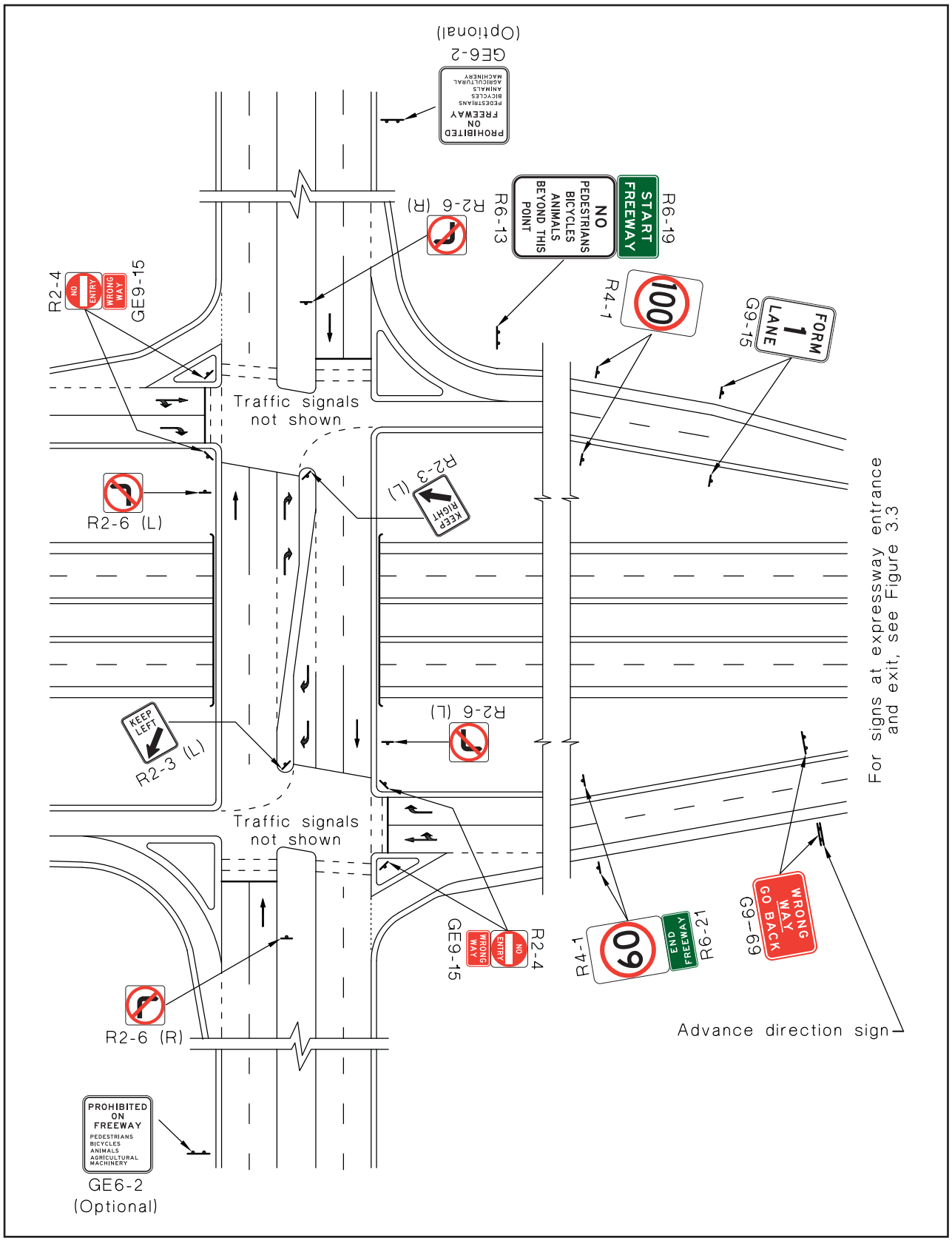
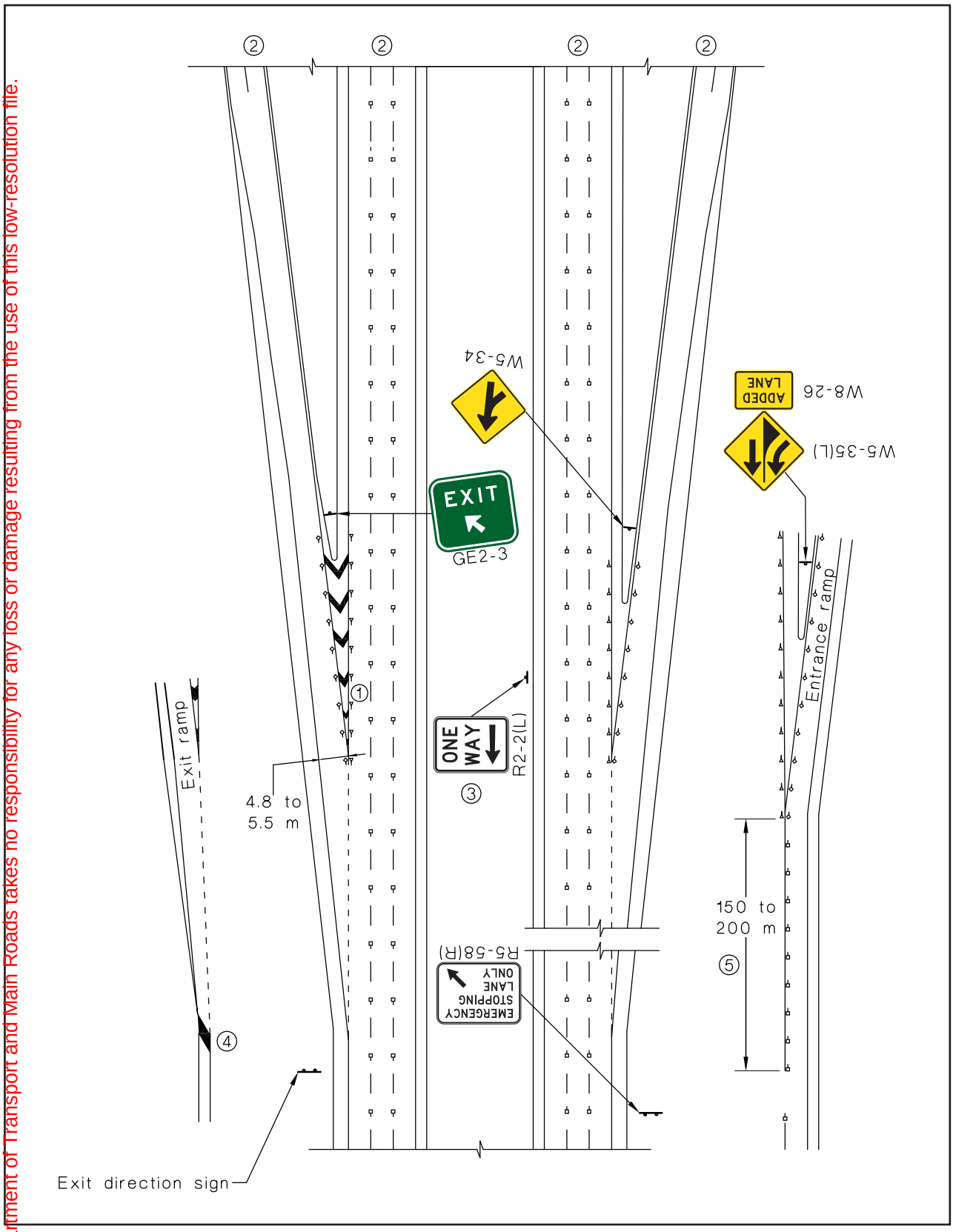


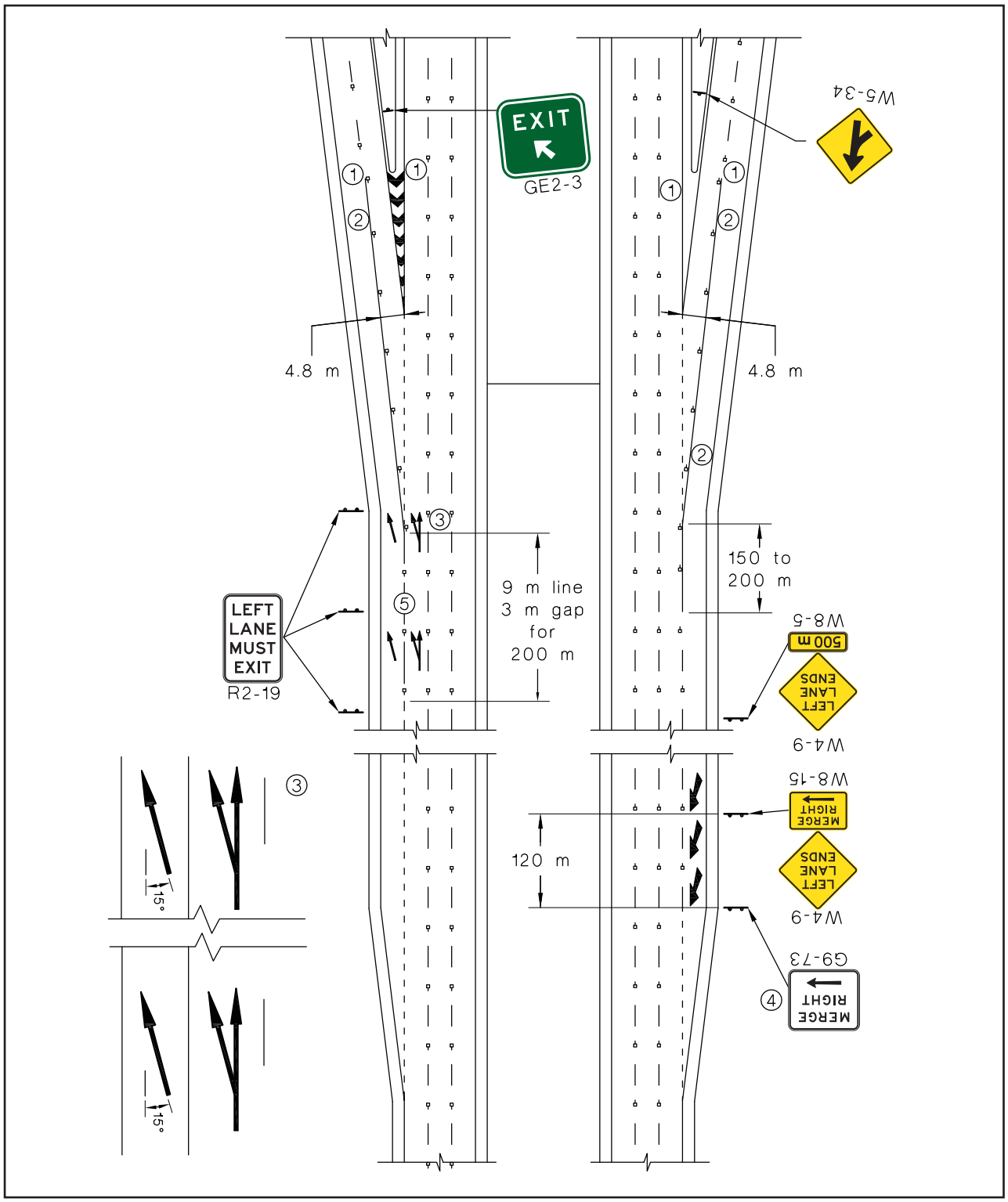
Figure 3.2 TYPICAL URBAN CROSS STREET WITH RAMP TREATMENT



NOTES:

1 For detail see Figure 5.28.
2 Lane line markings on expressways and ramps are shown in Figure 5.15.
3 The R2-2 sign may be used if U-Turns beyond the end of the ramp are likely to be a problem.
4 Alternative 'step-out' line for use at exit ramps where indicated in Clause 5.7.4.
5 Alternative marking for added freeway lane, see also Clause 3.5(d)(ii).
6. 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