Traffic control devices manual

Part 4: traffic control devices for general use – for intersections

NZ TRANSPORT AGENCY
WAKA KOTAHI

Te Kāwanatanga o Aotearoa
New Zealand Government

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NZ Transport Agency Waka Kotahi
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Preface

Background

The NZ Transport Agency Waka Kotahi (NZTA) *Traffic control devices manual* (TCD Manual) provides guidance on industry good practice, including, where necessary, practice mandated by law. The structure of the TCD Manual comprises 10 parts as well as three supporting specifications documents and two documents for definitions and references. The suite of documents comprising the TCD Manual is shown in Table A.

Each part has been developed under the guidance of a representative working group of practitioners experienced in, and having specific knowledge about, the subject. The working group practitioners are representative of the intended users of the TCD Manual. Interested practitioners and affected organisations were given the opportunity to comment on drafts and have their input incorporated appropriately in the final document.

The working group for TCD Manual Part 4 included representatives of local government (4 members), NZTA (4 members) and industry (3 members). Drafting of the document was completed by the contracted authors, WSP.

The TCD Manual will only be published electronically and will be available on the NZTA website.

Relationships with other documents

The Traffic control devices manual will support and reference:

- New Zealand legislation and, in particular, the Land Transport Act 1998 and rules made pursuant to that act, including the Land Transport (Road User) Rule 2004, the Land Transport Rule: Traffic Control Devices 2004, and the Land Transport Rule: Setting of Speed Limits 2022;
- General policies contained in Austroads Guides (in particular, the Guides to Traffic Management, Road Design and Road Safety) by providing detailed guidance to meet specific requirements of New Zealand law and practices;
- New Zealand and, as appropriate, Australian Standards; and
- Codes of practice, guidelines and published standards of various authorities.

Each part will attempt to provide a broad coverage of the subject but avoid duplicating major elements of referenced documents, preferring to direct readers to the source.

The Traffic control devices manual will, on completion, replace the NZTA (formerly Transit New Zealand and Land Transport New Zealand's) publication Manual of Traffic Signs and Markings (MOTSAM).

Table A: Planned structure of Traffic control devices manual[1]

Part	Title	Outline of content – may vary as the TCD Manual develops
	Sign specifications	Detailed descriptions of traffic signs including dimensions, colour and layout
	Traffic signal specifications	Detailed descriptions of permitted traffic signal displays and dimensions and colours of signal aspects
	Marking specifications	Detailed descriptions of markings, including dimensions, colours and layout
1	General requirements for signs	Purposes of traffic signs and their legal foundation Materials and construction General design principles – size, lettering, legends Installation – location, mounting heights, etc.
2	Direction, service and general guidance signs	Route signing, including state highways, regional roads, bypasses, detours, scenic routes, etc. Street name signing, including design and location Services signing policy, application and design Tourist signing General information signs, for example public amenities, features
3	Advertising signs	Design and location principles Policies for billboards and other forms of roadside advertising
4	Traffic control devices for general use - for intersections	Treatments for intersections, including options for traffic control, advance-warning, etc.
5	Traffic control devices for general use - between intersections	Treatments between intersections, including delineation, curves, passing facilities, steep grades, etc.
6	Speed management (Now Speed Management Guide)	Published as the Speed management guide and Speed management toolbox; content includes: Safe System approach to speed Signs and markings for speed limits Temporary and variable speed limits Local area traffic management
7	Parking Control (formerly Part 13 of the TCD Manual)	Legal framework - implications and responsibilities Design considerations and elements Linear and zone parking treatments Parking furniture, for example meters, vending machines
8	Code of practice for temporary traffic management	Code of practice for temporary traffic management (COPTTM) and local body supplement
9	Level crossings	Responsibilities for level crossings Risk assessment (ALCAM) Signs, markings and other design considerations for active or passive controls and for pedestrians, cycles, heavy motor vehicles

[1] https://www.nzta.govt.nz/resources/traffic-control-devices-manual

		Types of control - passive or active
10	Motorways and expressways	Specific signing and marking requirements for motorways and expressways
13	Parking control	Refer to content described under Part 7 of the TCD Manual above. The next version of Part 13 of the TCD Manual will be renumbered as Part 7.
	Definitions	Definitions of terms used throughout the TCD Manual
	References	All documents referenced throughout the TCD Manual

Record of amendments

Amendment number	Description of change	Effective date	Updated by

Contents

List of Appendices

1. Introduction

1.1. Purpose

Part 4 Traffic control devices for general use – for intersections, is one of the suite of documents prepared by the NZTA that comprise the Traffic control devices manual (the TCD Manual). The TCD Manual provides guidance on industry best practice on the use of traffic control devices (as defined in Section 1.3). In particular, it provides specifications, form, layout and dimensions of traffic control devices for use in New Zealand, which are mandated by legislation, such as the Land Transport Rule: Traffic Control Devices (2004) Rule 54002/2004 (TCD Rule).

The TCD Manual outlines the legal framework and responsibilities for the design and installation of traffic control devices, including the general principles behind their use at the time the document has been drafted.

It should not be used in substitution for professional advice as to compliance with relevant central and local government requirements. Specific terminology is used within the document to determine whether an aspect or statement made is a requirement under law or good practice; the terms are:

- **must:** indicates something that is mandatory or required by law;
- **should:** indicates a recommendation to meet best industry practice; and
- **may:** indicates something that is optional and may be considered for use.

This Manual describes devices to be used for intersections. However, the guidance in other parts of the TCD Manual is also likely to still be relevant for some situations.

The TCD Manual Part 4 (this Manual) is applicable to all NZ roads independent of ownership or management. Road Controlling Authorities (RCAs) should implement the requirements and guidance of this Manual in the design, operation and maintenance of their roading networks.

1.2. Relationship to other documents

TCD Manual Part 4 is one of a suite of documents that describe and define the manner in which traffic control devices must, should, or may be used on the road network. While this Manual endeavours to avoid contradiction with other documents, in the event there is contradiction, preference should be given to reference sources in the following descending priority order:

- Legislation, such as acts of Parliament;
- Legislative instruments arising from Legislation, such as land transport rules;
- Standards, with priority given to New Zealand standards;
- New Zealand manuals, with preference given to manuals that apply nationally above manuals that apply locally (for example, within a specific district);
- Road controlling authority specifications, with preference given to specifications that apply nationally above specifications that apply locally; and
- Guidance documents, with preference given to national guidance above local guidance.

The references in this Manual to other documents were current at the time this Manual was prepared. However, practitioners should ensure that the latest version of rules, standards, and guidelines are used when confirming the accuracy of any references to those documents in this Manual.

Noting that the list is not exhaustive and the order in which documents is listed should not be regarded as legal advice, the sources listed below provide an example of the order of preference for compliance with reference documents:

1. Land Transport Act 1998;
2. Land Transport Rules including, but not limited to, Traffic Control Devices 2004, Rule 54002/2004;
3. NZ Standards and joint Australian and New Zealand standards;
4. Traffic Control Devices (TCD) Manual, with preference given to newer parts of the TCD Manual over older parts of the TCD Manual;

5. NZTA specifications;
6. Road and Traffic Standard (RTS) Series documents not superseded by the TCD Manual. In particular, RTS 14; and
7. Various guides including the following:
    a. NZTA Cycling network guidance;
    b. NZTA Pedestrian network guidance;
    c. NZTA Public transport design guidance; and
    d. Austroads guides, with preference given to newer parts over older parts.

1.3. Definition of traffic control device (TCD)

The Land Transport Rule: Traffic Control Devices 2004 (TCD Rule), specifies that "Traffic control device:

(a) means a device used on a road for the purpose of traffic control; and

(b) includes any:

(i) sign, signal, or notice; or

(ii) traffic calming device; or

(iii) marking or road surface treatment […]".

Unless explicitly stated otherwise, all markings described in this Manual must be white.

When identifying the signs used in this Manual, the sign codes from Schedule 1 of the TCD Rule have been used. Signs codes that do not discriminate between a left or right facing sign symbol have the suffix (L) or (R) added to the end of the sign code; where (L) corresponds to the left facing sign symbol and (R) corresponds to the right facing sign symbol.

In this Manual, reference to "rural" relates to roads where the speed limit is 80 km/h or more.

Further definitions of terms used within this Manual are provided in the TCD Manual definitions list.

1.4. Scope

The document incorporates links to several appropriate policies, standards and guidelines. It forms part of the Traffic control devices manual, which provides best industry practice for the use of traffic control devices. This document should be read and applied in conjunction with legislation, standards, and industry best practice guidance including, but not limited to, the following:

- Legislative requirements, particularly the Land Transport Rule: Traffic Control Devices 2004 (TCD Rule) and the Land Transport (Road User) Rule 2004 (Road User Rule), including any subsequent amendments;
- New Zealand and Australian standards, particularly AS 1742.2 Manual of uniform traffic control devices Part 2 Traffic control devices for general use; and
- Guidelines, particularly the Austroads Guide to Traffic Management, Guide to Road Design, and Guide to Road Safety.

Where markings and signs relate to specific types of roads users, relevant comment has been included and reference made to other parts of the TCD Manual as appropriate.

This Manual provides guidance to traffic and transport practitioners on the use and application of traffic control devices for general use for intersections. The subjects covered are:

- Intersection form;
- Uncontrolled intersections;
- Priority controlled intersections;
- Roundabouts;
- Signalised intersections;
- Grade separated intersections;
- Cycle path crossings;
- Direction signs;
- Lane use guidance;
- Other intersection signs;
- Traffic islands;
- Vertical deflection devices;
- Left turn slip lanes;
- Right turn lanes and right turn bays;
- Flush medians;
- Seagull intersections;
- Regulation of movements at intersections;
- U-turn facilities; and
- Special vehicle lanes.

1.5. Engineering judgement

This Manual provides rules, standards and guidance on the use and application of traffic control devices for general use for intersections. As noted in Section 3.3 of the TCD Rule, traffic control devices must comply with the requirements of the TCD Rule and there is no latitude for practitioners to amend devices except as allowed for in the Rule. However, practitioners should always apply sound engineering judgement in the use and installation of traffic signs and markings to ensure they will be effective at any particular site. For instance, the roadway geometry at a site may require some modification to the image or message on a sign face to clearly convey an important message such as the geometric configuration of an intersection, or a sign may have to be installed at a more appropriate location than the location specified in this Manual. In such instances, engineering judgement should be applied and any departures from best practice should be documented with the reasons. Similarly, there may be occasions where coloured surfacing may or should be used to enhance the road surface contrast for traffic control devices; for example, it may be appropriate to improve the contrast between pedestrian crossing (zebra) markings and the road surface; in that regard, NZTA has produced guidance regarding Coloured Surfacing Principles. Notwithstanding that, engineering judgement is not a basis for not complying with the requirements of the TCD Rule.

In addition, although Part 5 of the TCD Manual specifically covers the use of traffic control devices between intersections and Part 4 of the TCD Manual covers the use of traffic control devices for intersections, if a portion of the road network is at an intersection but a particular network feature functions as being between intersections (and vice versa), engineering judgement should be applied to determine the most appropriate TCD measures to apply.

Whilst this Manual provides guidance it should be noted however, that good markings and signs will not overcome fundamental deficiencies in the road (for example insufficient roadway width or worn roadway surfaces).

The diagrams in this Manual provide examples of the application of various traffic control devices. However, in order to provide clarity regarding the use of specific devices, the diagrams do not include all traffic control devices and / or all specific features of intersections that should be included in designs for real world applications that include the specific devices. The diagrams are not intended to be typical layouts or templates; many of the diagrams in this Manual are not drawn at a conventional scale, therefore, they are not suitable for copying directly into design drawings. When the traffic control devices illustrated in diagrams in this Manual are included in designs, practitioners should apply engineering judgement and consider: (i) whether the devices are appropriate for the site specific context; (ii) whether other devices and / or specific features should be included; and (iii) how the interaction between different devices and / or features may influence the design.

1.6. Road safety objectives

In New Zealand the Safe System approach to road safety has been adopted.

The Safe System follows four key principles:

- Human beings make mistakes and crashes are inevitable;
- The human body has a limited ability to withstand crash forces;
- System designers and system users must all share responsibility for managing crash forces to a level that does not result in death or serious injury; and
- It will take a whole-of-system approach to implement the Safe System in New Zealand.

In addition to the four key principles, the Safe System approach has four key pillars; these are:

- Safe roads and roadsides;
- Safe speeds;
- Safe vehicles; and
- Safe road use.

In relation to the use of traffic control devices, road controlling authorities (RCAs) should pay particular attention to providing safe roads and roadsides that are predictable and forgiving of mistakes. While the use of traffic control devices for intersections described in this Manual illustrate best practice, not all of the configurations shown are aligned fully with the Safe System approach. For example, this Manual illustrates priority controlled crossroads and T-intersections, however, from a Safe System perspective, a roundabout is typically regarded as a safer form of intersection control.

Further information on the Safe System and the use of other high-risk guides to determine treatment philosophies and types of tools that can be used can be found at www.nzta.govt.nz.

1.7. One network framework

The One Network Framework (ONF) is a tool to help establish priority uses, performance measures and potential interventions for each road and street type. The ONF recognises that streets not only keep people and goods moving, they are also places for people to live, work, and enjoy. The ONF is designed to contribute to improving road safety and building more vibrant and liveable communities. It recognises the value of integrated land-use and transport planning for creating greater liveability and increased economic prosperity, as well as acknowledging the distinct geographical challenges and diversity of our New Zealand's land transport network. The ONF introduces a "movement and place" approach to allow better consideration of surrounding land use, community well-being, economic activity and growth aspirations for the future. A matrix approach is applied to establish the contribution of movement and place functions to streets and portions of streets from which urban and rural Street Families are identified. There are seven urban Street Families and five rural Street Families. Additional information regarding development of the One Network Framework can be found here.

1.8. Climate change

In relation to climate change, NZTA notes that "Transport, primarily land transport, is the second largest source of greenhouse gas emissions in Aotearoa New Zealand (about 17% of our emissions) and our fastest growing source of domestic emissions. Climate change is expected to be the most significant influencer on the land transport system over the coming decade.

Our climate change action focuses on reducing greenhouse gas emissions, adapting to a changing climate and reducing harm to the environment from land transport activities.

NZTA will:

- deliver and contribute to actions in Aotearoa New Zealand's first emissions reduction plan
- deliver and contribute to actions in the national adaptation plan, and
- meet the requirements of the Carbon Neutral Government Programme."

Practitioners designing transport solutions that involve the use of traffic control devices should consider methods that will minimise the greenhouse gas emissions associated with the installation, maintenance, and / or removal of those traffic control devices. With regard to traffic control devices, emissions can be reduced through the use of materials that minimise the need for maintenance activities. For example, the use of long-life marking materials will reduce emissions because of the reduced frequency with which vehicles, plant, and equipment are required for maintenance activities.

While this Manual does not include advice on the manner in which greenhouse gas emissions can be reduced, practitioners are encouraged to identify methods for the application of traffic control devices that reduce such emissions.

1.9. Safety by design and safety for road workers

In addition to minimising greenhouse gas emissions, safety for road workers and road users may be improved through the use of materials that minimise the need for maintenance activities. For example, the use of long-life marking materials will:

- Reduce overall risks for road users and road workers when the markings are marked, maintained, and / or removed because the total time required for working on the road is reduced; and
- Reduce overall material use because of the reduced frequency with which reinstatement of markings is required.

While this Manual does not include advice on the manner in which traffic control devices can be safely installed, maintained, and / or removed, practitioners are encouraged to apply safety by design principles and identify methods for the application of traffic control devices that improve safety for road workers and road users.

1.10. General requirements for traffic control devices

Section 3.1 of the TCD Rule specifies general safety requirements for traffic control devices. Those requirements include that "Traffic control devices, whether used singly or in combination, must contribute to the safe and effective control of traffic, and must:

(a) be safe and appropriate for the road, its environment or the use of the road; and […]

(d) be placed so as to:

(i) be visible to road users; and

(ii) be legible to road users, if of a type that includes written words or symbols; and

(iii) allow adequate time for the intended response from road users; and […]

(f) be maintained in good repair."

Ensuring traffic control devices are safe and appropriate for the road, its environment and the use of the road, and maintaining them in good repair is the responsibility of:

- Designers;

- Maintenance personnel; and
- Road controlling authority engineering staff.

Matters to be considered when selecting, designing, installing, and maintaining traffic control devices include the following:

- Markings:
  - Safe and appropriate for the location in which they are marked;
  - Level of fading is not excessive;
  - Retain adequate retroreflectivity; and
  - Visible to road users.
- Signs and other traffic control devices:
  - Safe and appropriate for the location in which they are installed;
  - Visible to road users;
  - Provide sufficient advance warning where required;
  - Level of fading is not excessive;
  - Retain adequate retroreflectivity;
  - Legends on any signs and devices remain legible; and
  - Not obscured by vegetation or permanent facilities (such as street furniture, utility poles, and other traffic control devices).

2. Form

2.1. Definition

2.1.1. Definition of an intersection

The Road User Rule (Part 1: Preliminary provisions) defines an intersection as "(a) in relation to 2 or more intersecting or meeting roadways, means that area contained within the prolongation or connection of the lateral boundary lines of each roadway; […]". The TCD Rule defines "Roadway" as "[…] that portion of the road used or reasonably usable for the time being for vehicular traffic in general." For the purposes of this Manual, where reference is made to an intersection it describes the functional portions of the road network (that is, the roadways) available to road users at locations where roadways intersect. Therefore, an intersection as described in this Manual will ordinarily occupy a greater area of land than an intersection defined in accordance with the Road User Rule. The TCD Rule uses the term "junction" in several places to name traffic control devices associated with intersections, therefore, this Manual refers to the term "junction" when quoting from the TCD Rule.

2.1.2. T-intersections

T-intersections have three approaching roadways, with one leg generally being a side road and the other two legs comprising the main road. The roads at a T-intersection typically intersect at an angle close to a right angle.

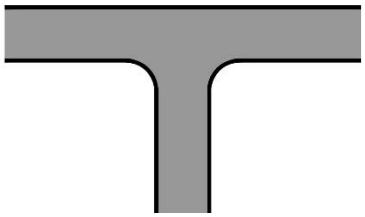


Figure 2-1: T-intersection

2.1.3. Y-intersections

Y-intersections have three approaching roadways, with one leg generally being a side road and the other two legs comprising the main road. At a Y-intersection the roads intersect at an oblique or acute angle rather than close to a right angle as is the case with a T-intersection.

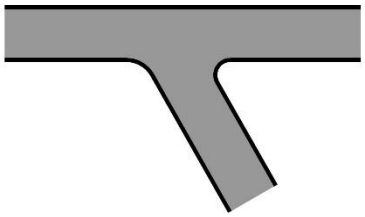


Figure 2-2: Y-intersection

2.1.4. Crossroads intersections

A crossroads intersection has four approaching roadways that typically intersect at close to right angles. Crossroads intersections must be subject to priority, roundabout, or signal control (TCD Rule Subsection 10.1).

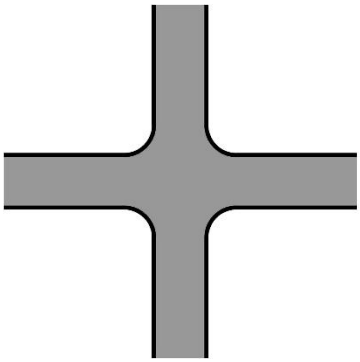


Figure 2-3: Crossroads intersection

2.1.5. Staggered T-intersections

At a staggered T-intersection, two side roads each form a T-intersection with a main road, however, the separation between the two T-intersections is such that the configuration performs as a single intersection.

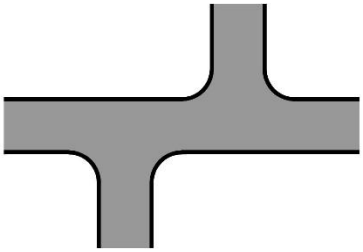


Figure 2-4: Staggered T-intersection

2.1.6. Non-standard priority intersection

For non-standard priority intersections, a turning movement (or turning movements) is given priority over straight through movements. For example, in Figure 2-5, if the priority route is for movements between the western and southern legs of the intersection and movements approaching from the eastern leg were required to give-way, this would constitute a non-standard priority intersection.

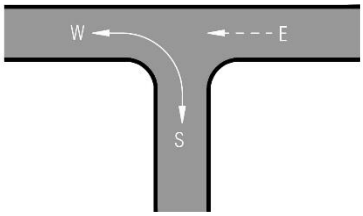


Figure 2-5: Non-standard priority intersection

2.1.7. Multi-leg intersections

At multi-leg intersections, four or more roads intersect, however, they do not intersect in a manner where the intersection could be defined as a crossroads intersection. Figure 2-6 below illustrates a multi-leg intersection.

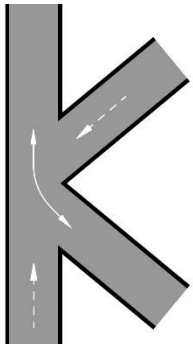


Figure 2-6: Multi-leg intersection

2.1.8. Cycle path crossings

The point at which a cycle path intersects with a roadway should be treated as an intersection of two roadways and the requirements for that intersection are as described in this Manual.

Figure 2-7 illustrates the intersection of a cycle path with a roadway where movement along the cycle path has priority over movement along the roadway.

Figure 2-7: Intersection of a cycle path with a roadway, Matai Street East, Christchurch

2.2. Control

This Manual includes guidance on the following forms of intersection control:

- Uncontrolled intersections, where no formal control is provided and road users must apply the give-way rules.
- Priority controlled intersections, where the priority at the intersection is controlled by give-way and / or stop signs. Priority controlled intersections do not include roundabouts.
- Roundabouts, with one or more marked lanes or lines of traffic, all of which are for the use of vehicles travelling in a clockwise direction around a central traffic island.
- Signalised intersections, where the movement of traffic on one or more approaches is controlled by traffic signals. However, a signalised intersection may have some movements (for example, a left turn slip lane) subject to priority control.
- Grade separated intersections, where roads do not directly intersect, and may include ramps or link roads to provide access between the roads.

3. Uncontrolled Intersections

3.1. General

At uncontrolled intersections, if the RCA has not specified a form of sign or signal control the driver must apply the road user rules to determine priority. That is, at an "uncontrolled" intersection there are operational controls in accordance with the Road User Rule, there are not controls in accordance with the TCD Rule. Generally uncontrolled intersections are only suitable at T-intersections where low traffic volume roads meet. Consideration should be given to the nature of the intersection and whether the intersection should be controlled. The Austroads Guide to Traffic Management Part 6 provides information regarding assessment of intersection control options. The Guide notes that from a Safe System perspective, stop or give-way control is preferred to intersection control based on road rules only, such as occurs at an uncontrolled intersection.

3.2. Markings

3.2.1. Centre-lines

If a centre-line is marked on an approach to an uncontrolled intersection, the centre-line should be marked as described in Table 3-1.

Table 3-1: Centre-line specifications at uncontrolled intersections

Application	Specification
Colour	White
Width (minimum)	100 mm
Length (typical)	30 m (urban) 50 m (rural)
Dash (typical)	Continuous

Centre-lines on the side road approach should terminate 1.5 m clear of the left-hand edge of the nearest through lane or at the prolongation of the kerb line if kerb is present. Centre-lines on the main road should have a gap of at least 12 m at the intersection between the lengths of continuous centre-line marked on each approach. The layout for these markings is given in Figure 3-1 and Figure 3-2.

Centre-lines are not required at uncontrolled intersections; however, if a centre-line is marked on any approach to the intersection, centre-lines should be marked on all approaches.

3.2.2. Edgelines

Edgelines may be marked at uncontrolled intersections as specified in Table 3-2 and as illustrated in Figure 3-1 and Figure 3-2. If edgelines are not marked on any approach, then it is not necessary to mark any edgelines at the intersection.

Table 3-2: Edgeline specifications at uncontrolled intersections

Application	Specification
Colour	White
Width (typical)	100 mm
Dash (typical)	Continuous

Where edgelines are marked on adjacent approaches to an uncontrolled intersection, a radius should be marked to connect the edgelines. The marked radius should indicate the approximate turning path to be followed by the design vehicle for that intersection.

3.2.3. Continuity edgelines

Where edgelines are marked on the approaches to an uncontrolled intersection, a continuity edgeline should be marked across the intersection of the side road as illustrated in Figure 3-1 and Figure 3-2. Continuity edgelines should be marked as described in Table 3-3.

Table 3-3: Continuity edgelines at uncontrolled intersections

Application	Urban	Rural
Colour	White	White
Width (typical)	100 mm or 150 mm	200 mm
Dash (typical)	1 m	1 m
Gap	3 m (maximum)[1]	3 m (typical)

Note 1: Continuity edgeline gap.

Gap may be 1.5 m, 2.0 m, or 3.0 m depending on individual road controlling authority guidelines, however, the standard widths and gaps adopted should be consistent throughout a road controlling authority area.

3.2.4. No-stopping lines

No-stopping lines may be marked at an uncontrolled intersection if the RCA considers it is necessary to reinforce the prohibition of parking at intersections and / or extend the length over which parking is prohibited in the vicinity of intersections.

Clause 12.2 of the TCD Rule requires they are marked by:

(1) "[…] a broken yellow line that:

(a) must be not less than 100 mm wide;

(b) consists of painted strips not longer than 1 m and separated by gaps not longer than 2 m;

(c) if there is a kerb, is not more than 1 m from the adjacent kerb of the roadway to indicate that the stopping of vehicles is prohibited on that side of the roadway;

(d) if there is no kerb, is located to indicate that the stopping of vehicles is prohibited if any part of a vehicle stopped on that side of the road is closer to the centre of the road than the broken yellow line."

Refer to the TCD Manual Part 13 for guidance on controlling the parking and stopping of vehicles.

3.3. Signs

For information on installing street name signs and guide signs at intersections, refer to Part 2 of the TCD Manual.

3.3.1. Advance warning signs

Where an RCA considers that advance warning of an uncontrolled intersection would be beneficial, the signs in Table 3-4 should be used.

Table 3-4: Signs at uncontrolled T and Y intersections

Code	Sign	Policy and Use
W11-3.1 T-junction uncontrolled		W11-3.1 signs should be installed on the approaches to a T-intersection where there is no traffic control and the RCA considers that due to restricted sight distance and / or a large volume of turning or crossing traffic, a hazardous situation exists. Consideration should also be given to installing a headway sign opposite the intersection. W11-3.1 signs should not be installed on the approaches to an intersection where advance directional signing is employed (refer to Part 2 of the TCD Manual). For sign location, refer to Note 1.
W11-4.1 (L) Side road junction uncontrolled (on left)		W11-4.1 (L)/(R) signs should be installed on the approaches to a side road intersection where there is no traffic control and the RCA considers that, due to restricted sight distance and / or a large volume of turning or crossing traffic, a hazardous situation exists. W11-4.1 (L)/(R) signs should not be installed on the approaches to an intersection where advance directional signing is employed (refer to Part 2 of the TCD Manual). For sign location, refer to Note 1.
W11-4.1 (R) Side road junction uncontrolled (on right)		
W11-5.1 Y junction uncontrolled		W11-5.1 signs should be installed on the approaches to a Y intersection where there is no traffic control and the RCA considers that, due to restricted sight distance combined with a large volume of turning or crossing traffic, a hazardous situation exists. It is important that, given the nature of these intersections and confusion around the layout, a check is undertaken as to whether a control should be installed (Section 4.1). W11-5.1 signs should not be installed on the approaches to an intersection where advance directional signing is employed (refer to Part 2 of the TCD Manual). For sign location, refer to Note 1.

Note 1: Sight distance and location requirements.

The advance warning signs described in in Table 3-4 above should be installed where they are:

a. Clearly visible to approaching drivers for at least the distances described in the table below.

b. Located in advance of the intersection by at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

3.3.2. Headway signs

At uncontrolled intersections, headway signs should be installed for the approach where the backdrop of an intersection is not clearly visible to approaching drivers and there is a risk they will over-run the intersection. If headway signs are used, they should be installed in line with the guidance in Section 4.3.4 of this Manual.

3.4. Pedestrians at uncontrolled intersections

Where there is demand for pedestrian crossing movements at an uncontrolled intersection, an RCA may install pedestrian facilities. Guidance on traffic control devices for pedestrian facilities is available in the TCD Manual Part 5. Designers should take care to ensure that closely spaced pedestrian facilities and intersections do not reduce the legibility of the road layout for road users.

3.5. Cycling facilities at uncontrolled intersections

Traffic control devices for cycling facilities at uncontrolled intersections should match those for priority controlled intersections; refer to Section 4.11 of this Manual.

3.6. Example layouts

Example layouts for uncontrolled urban and rural intersections are shown in Figure 3-1, Figure 3-2, and Figure 3-3. These figures do not include all traffic control devices and / or all specific features of intersections that should be included in designs for real world applications. When the traffic control devices illustrated in this Manual are included in designs, practitioners should apply engineering judgement and consider: (i) whether the devices are appropriate for the site specific context; (ii) whether other devices and / or specific features should be included; and (iii) how the interaction between different devices and / or features may affect the design. The diagrams are not intended to be comprehensive typical layouts or design templates; many of the diagrams in this Manual are not drawn at a conventional scale, therefore, they are not suitable for copying directly into design drawings.

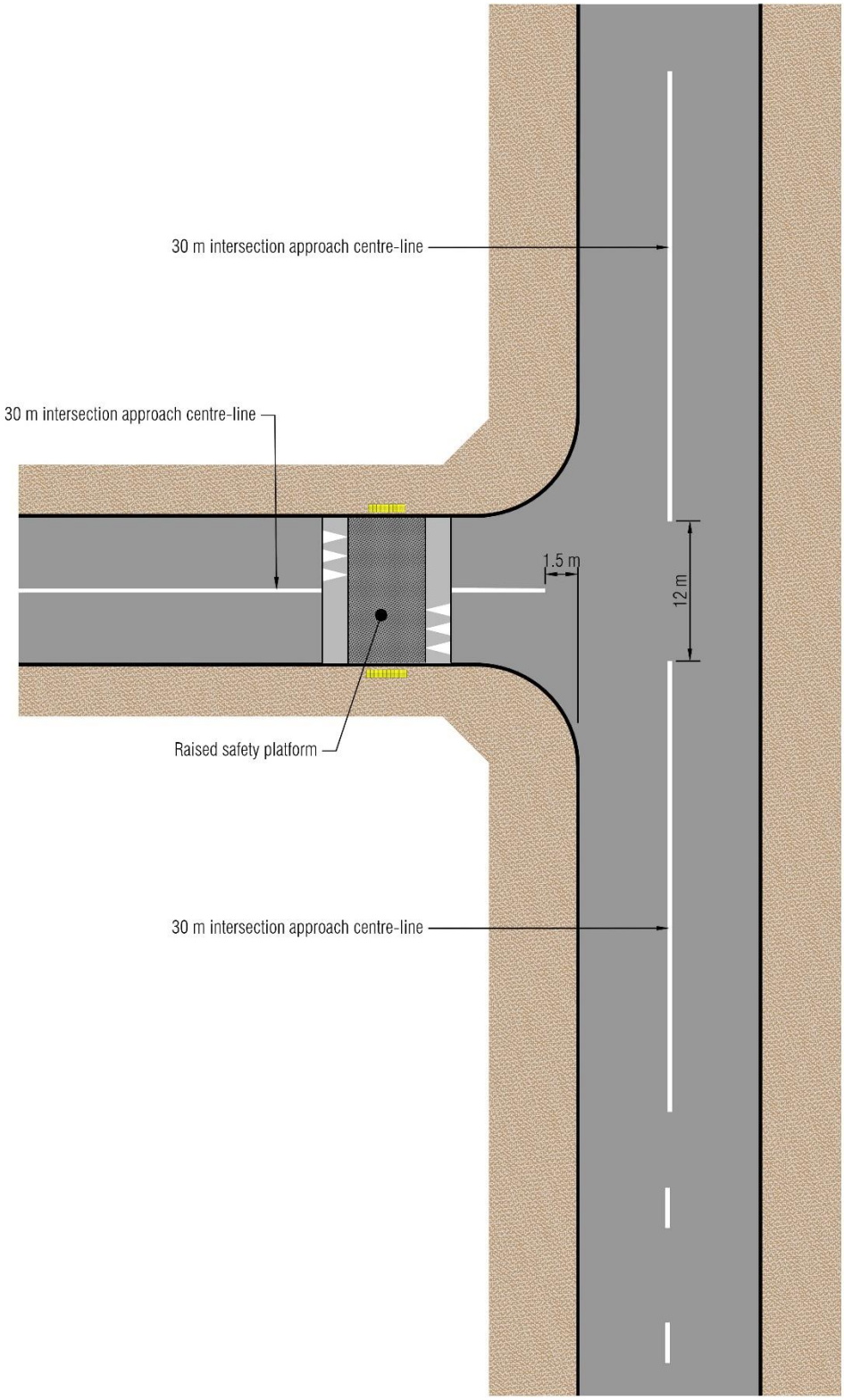


Figure 3-1: Markings for urban uncontrolled intersections

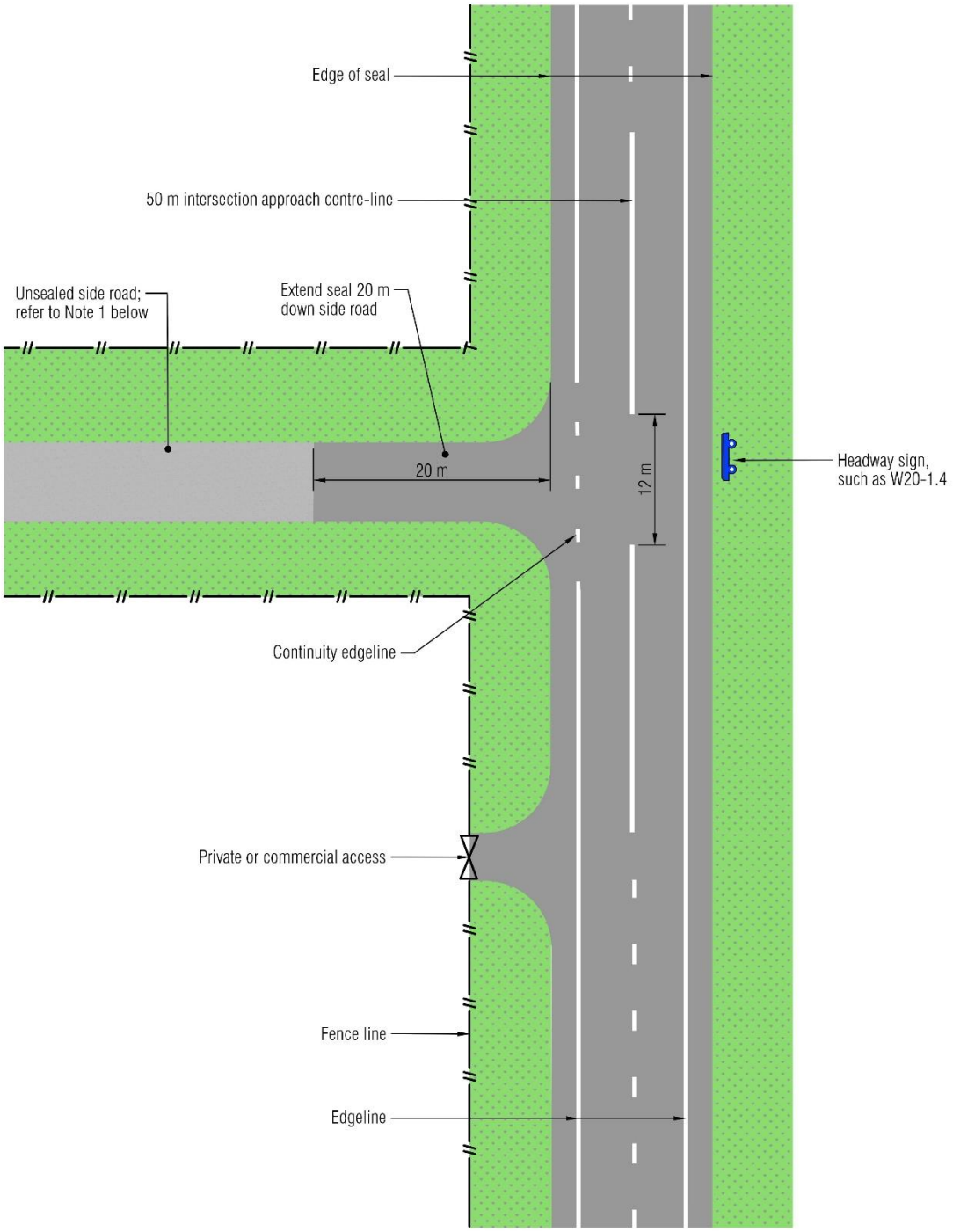


Figure 3-2: Markings for uncontrolled intersection rural intersections with an unsealed side road

Note 1:

Loose material on the surface of sealed roads can be hazardous, particularly at intersections located on curves. To prevent this material from an unsealed road migrating on to the main road, the side road should be sealed for at least 20 m from the edge of the main road. This would then provide greater latitude for installing a Gravel Road warning sign (W14-7.3 and W14-7.4) on the departure side of the side road as well as providing for installation of a side road control at some stage in the future. In addition, consideration should be given to the skid resistance of the approach to the intersection and whether the length of sealing down the side road should be extended to accommodate safe stopping distance for the types of vehicles likely to be approaching the main road from the unsealed side road.

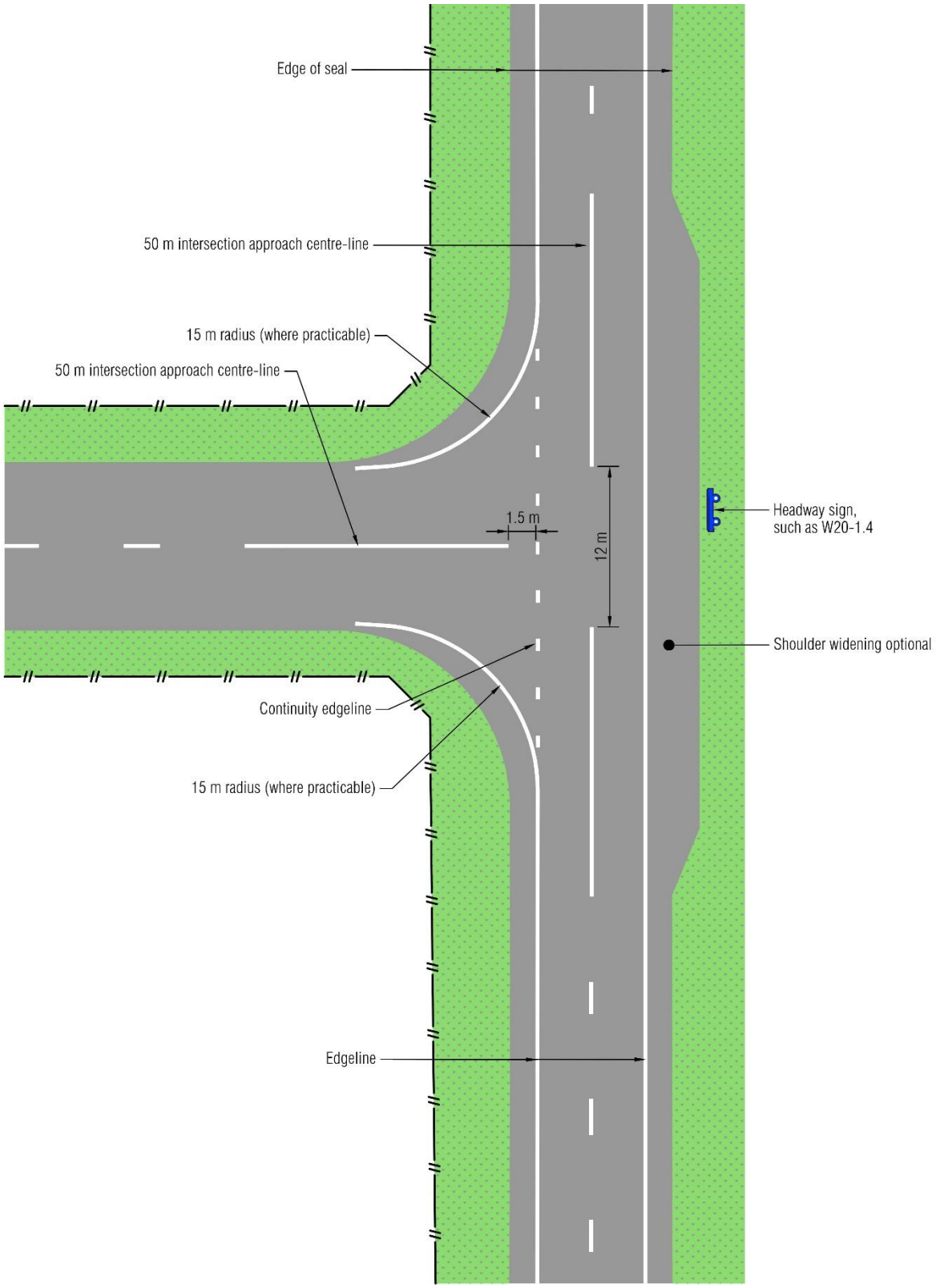


Figure 3-3: Markings for rural uncontrolled intersections with a sealed side road

3.7. Unsealed uncontrolled intersections

Watch this space: this Manual will be updated in future to include specific advice regarding traffic control devices for uncontrolled intersections where the roadway surface on all approaches is unsealed.

4. Priority Controlled Intersections

Priority controlled intersections are intersections at which at least one approach is subject to give-way or stop control.

4.1. When to use priority control

Priority controls are used to allocate (or reinforce) priority to traffic on one or more of the intersecting roads at an intersection. An intersection that has four or more approaching roadways must be controlled by: stop or give-way signs; or a roundabout; or traffic signals.

Installing give-way or stop control signs should also be coordinated to ensure:

- Sight distance or other intersection use functions are not affected by street furniture or vegetation;
- Where practicable, traffic control types used are the same on all controlled approaches (that is, if you have a stop control on one controlled approach, there should be a stop control on any other controlled approaches at the intersection);
- The give-way or stop control signs themselves are not obscured (for example, by other signs, buildings, fences, street furniture and / or vegetation);
- Supports used are minimised to reduce street furniture clutter; and
- Signs and supports are located sufficiently clear of kerbs to avoid being struck by road users and / or their vehicles.

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

4.1.1. Give-way control

A give-way control:

- Should be provided:
  - At any intersection where it is necessary to clarify which road users have priority;
  - For safety reasons where it is desirable to reinforce the normal application of the normal priority rule;
  - Where it is otherwise desirable to override the application of the normal priority rule; and;
  - On side roads where there is a special vehicle lane on the main road (unless a threshold treatment with a raised platform has been installed).
- Is not required if the normal priority rule operates satisfactorily.

4.1.2. Stop control

A stop control:

- Should be provided:
  - Where, at a point 9 m from the limit line, on a controlled approach to the intersection a lack of visibility means that a driver could not see a vehicle on an uncontrolled approach at a distance (in metres) of 1.2 times the numeric value of the 85th percentile speed (in km/h) of vehicles on the uncontrolled approach(es). This criterion applies to all vehicles (including cycles) on all uncontrolled approaches.
- Should not be provided:
  - Where the sight distance is adequate for give-way control;
  - Where the provision of stop control would violate driver expectation;
  - To establish or reinforce a road hierarchy; or;
  - As a routine response to an actual or perceived safety problem.
- May be provided:

– Where every roadway approaching an intersection is controlled by stop signs, refer to Section 4.9 of this Manual.

Inappropriate use of stop control can reduce the effectiveness of stop controlled approaches used correctly in other locations. Where the above problems occur, additional devices such as central islands with duplicated signs, kerb buildouts or threshold treatments may be required. The NZTA High-risk Rural Roads Guide and / or the Austroads Guide to Road Safety Part 2: Safe Roads should be used to identify appropriate treatments.

4.2. Markings

In general, all markings should be reflectorised unless otherwise specified. Example layouts and dimensions are provided in Section 4.13 of this Manual.

4.2.1. Give-way control

(a) Legislation

Clause 10.3(1) of the TCD Rule states:

(1) "If an intersection is controlled by a give-way sign, the sign must be installed in accordance with section 4 [of the TCD Rule] and, unless the road surface makes this impracticable, the following must be marked on the roadway:

(a) a limit line that consists of a white line that is not less than 300 mm wide; and

(b) not more than 20 m before the limit line, a triangular give-way symbol that complies with Schedule 2 [of the TCD Rule]."

(b) Application

Unless the road surface makes it impracticable, an M6-2 Give-way triangle symbol must be marked on the roadway in each give-way controlled lane approaching an intersection. The approach side of the symbol must not be more than 20 m before the limit line and the departure side of the triangle should be no less than 2 m from the limit line. The minimum dimensions for a Give-way triangle symbol are illustrated in Figure 4-1 and Table 4-1 describes the best practice dimensions that should be used for marking the triangle symbols.

Clause 5.4(3) of the TCD Rule allows for the longitudinal dimensions of a marking, which includes the triangle symbol, to be increased provided that, from the viewpoint of a driver approaching the marking, the lateral dimensions of the symbol are retained, and all longitudinal dimensions are increased in the same proportion. Although the width of the angled lines of the Give-way triangle symbol has both a longitudinal and lateral component, increasing the length of the symbol only has a minor effect on the width of the angled lines. Practitioners should not make changes to the width of the angled lines to accommodate different triangle lengths; that is, the width of the angled line should remain as 150 mm.

Table 4-1: Marking of Give-way triangle symbols

Application	Urban	Rural
Colour	White	White
Width (mandatory)	1.25 m	1.25 m
Length (typical)	4.0 m	6.0 m
Length (minimum)	2.5 m	2.5 m
Lateral location (typical)	In the lateral centre of each give-way controlled lane	In the lateral centre of each give-way controlled lane

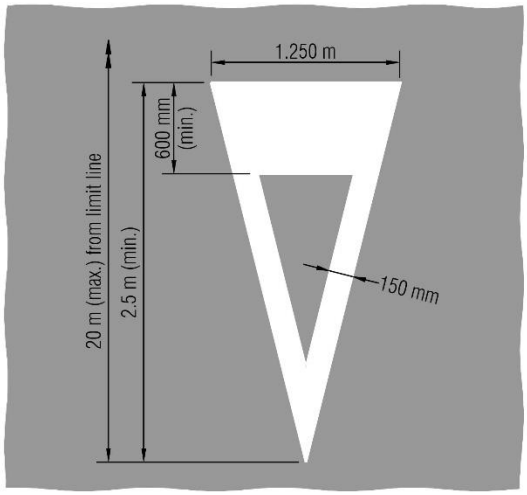


Figure 4-1: Triangular give-way symbol dimensions (M6-2 of the TCD Rule)

Limit lines, centre-lines, edgelines and continuity edgelines marked at approaches to intersections subject to give-way control should be marked as described in Sections 4.2.3 to 4.2.6.

Example layouts and dimensions of give-way controlled intersections are provided in Section 4.13.1 of this Manual. For:

- Urban intersections without edgelines on the main road, refer to Figure 4-13;
- Urban intersections with edgelines on the main road, refer to Figure 4-14;
- Rural intersections where the side road AADT is less than 30, refer to Figure 4-15; and
- Rural intersections where the side road AADT is greater than 30, refer to Figure 4-16.

4.2.2. Stop control

(a) Legislation

Clause 10.2 of the TCD Rule states:

> "If an intersection is controlled by a stop sign, the sign must be installed in accordance with section 4 [of the TCD Rule] and, unless the road surface makes this impracticable, the following must be marked on the roadway:
>
> (a) a limit line that consists of a yellow line that is not less than 300 mm wide; and
>
> (b) not more than 10 m before the limit line, the word 'stop' in white capital letters at least 2 m high."

(b) Application

Unless the road surface makes it impracticable, an M6-1 "STOP" word message must be marked on the roadway in each stop controlled lane approaching an intersection. The approach side of the word message must not be more than 10 m before the limit line and the departure side of the word message should be no less than 2 m from the limit line. The minimum dimensions for a "STOP" word message are illustrated in Figure 4-2; these dimensions are in accordance with the letter dimensions specified in Section 10.3 of this Manual. Table 4-2 describes the best practice dimensions that should be used for marking the "STOP" word message.

Clause 5.4(3) of the TCD Rule allows for the longitudinal dimensions of a marking, which includes the "STOP" word message, to be increased provided that, from the viewpoint of a driver approaching the marking, the lateral dimensions of each letter are marked in accordance with Section 10.3.2 of this Manual. The longitudinal dimensions of the word "STOP" may be increased provided they are increased in the same proportion. Although the width of the angled portion of the "S" symbol has both a longitudinal and lateral component, increasing the length of the letter only has a minor effect on the width of the angled

line. Practitioners should not make changes to the width of the angled portion to accommodate increased word lengths; that is, the width of the angled portion of the "S" symbol should remain as 200 mm.

Table 4-2: Marking of "STOP" word message

Application	Urban	Rural
Colour	White	White
Length (typical)	2.4 m	3.6 m
Location (lateral)	In the lateral centre of each stop controlled lane	In the lateral centre of each stop controlled lane
Height (vertical dimension) of horizontal strokes of the letters (typical)	400 mm	600 mm

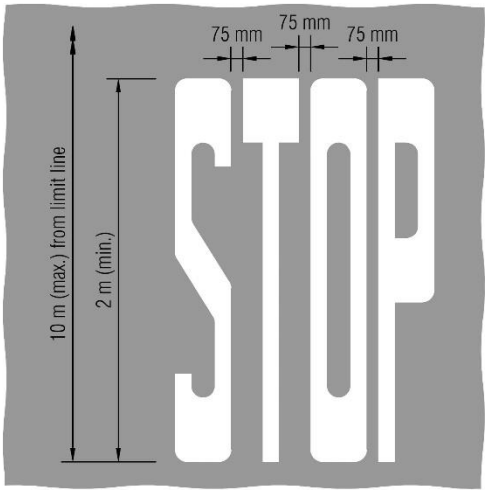


Figure 4-2: "STOP" word message dimensions (M6-1 of the TCD Rule)

Limit lines, centre-lines, edgelines and continuity edgelines marked at stop controlled approaches to intersections should be marked as described in Sections 4.2.3 to 4.2.6.

Example layouts and dimensions of stop controlled intersections are provided in Section 4.13 of this Manual. For:

- Urban intersections, refer to Figure 4-17; and
- Rural intersections, refer to Figure 4-18.

4.2.3. Limit lines

Limit lines for controlled approaches to intersections must be at least 300 mm wide. Table 4-3 below describes the width at which limit lines should be marked.

Table 4-3: Limit line specifications at controlled approaches

Application	Give-way control	Stop control
Colour	White	Yellow
Width (minimum)	300 mm	300 mm
Width (typical urban)	300 mm	300 mm
Width (typical rural)	450 mm	450 mm
Dash	Continuous	Continuous

Limit lines should not be skewed more than 30° from a line normal to the direction of the approach lanes, however, where appropriate, may be marked parallel to the tangent of the centre-line of the main road at the intersection. Consideration should be given to the orientation of the limit line on controlled approaches to intersections to ensure that traffic approaching the intersection is not in the blind spot(s) of road users waiting at the limit line to turn right or proceed straight ahead.

If continuity edgelines are marked across the approach that is subject to control, the limit line should be marked 1.5 m back from the continuity edgeline. Where no edgelines are marked, the limit line on the approach subject to control should be marked 1.5 m back from the prolongation of the kerb or edge of seal; refer to the example layouts provided in Section 4.13 of this Manual.

Limit lines should also be located to ensure that:

- From a position 1.5 m behind the limit line and 1.1 m above the road surface, there is adequate visibility (such as safe intersection sight distance as described in the Austroads Guide to Road Design Part 4A) to approaching traffic, and
- A stationary vehicle at the limit line does not conflict with the paths of other vehicles using the intersection.

4.2.4. Centre-lines

If a centre-line is marked on an uncontrolled approach to a controlled intersection, the centre-line at the intersection should be marked as described in Table 4-4 and illustrated in the layouts provided in Section 4.13. Centre-lines on the main road should have a gap of at least 12 m at the intersection between the lengths of continuous centre-line marked on each main road approach.

Table 4-4: Centre-lines at controlled intersections

Application	Specification
Colour	White
Width (minimum)	100 mm
Length (typical)	30 m (urban) 50 m (rural)
Dash (typical)	Continuous

Unless it is impracticable to do so, a centre-line should be provided on the controlled approach and should terminate at the limit line. This centre-line should be marked as described in Table 4-4. Example layouts for these markings are provided in Section 4.13.

If the centre-line on any approach to the intersection is a flush median, practitioners should follow the guidance in Section 15.3 of this Manual.

4.2.5. Edgelines

If an edgeline is marked on an approach to a controlled intersection, the edgeline should also be marked at the intersection. Edgelines on the approaches to controlled intersections should be marked as described in Table 4-5.

Table 4-5: Edgelines at controlled intersections

Application	Specification
Colour	White
Width (typical)	100 mm
Dash (typical)	Continuous

Where edgelines are marked on adjacent approaches to an uncontrolled intersection, a radius should be marked where they meet. The radius should mark the desired turning path.

Example layouts for these markings are provided in Section 4.13 of this Manual.

4.2.6. Continuity lines

Where edgelines exist on the main road approaches to a controlled intersection and taper in and out of roads subject to priority control, continuity edgelines should be marked across the approach that is subject to control at the prolongation of the edgeline on the main road as illustrated in Section 4.13.1 and 4.13.2. Continuity edgelines should be marked as described in Table 4-6.

Table 4-6: Continuity edgeline specifications at controlled intersections

Application	Urban	Rural
Colour	White	White
Width (typical)	100 mm or 150 mm	200 mm
Dash (typical)	1 m	1 m
Gap	3 m (maximum); refer to Note 1	3 m (typical)

Note 1: Continuity edgeline gap length.

Gap may vary from 1.5 m to 3 m depending on individual road controlling authority guidelines, however, the standard widths and gaps adopted should be consistent throughout a road controlling authority area.

Continuity edgelines should not be used to replace an edgeline across private and commercial entrances, except where:

- Parallel parking is marked using the edgeline without providing individual parking spaces; or
- The volume of traffic using the entrance is high enough to warrant full intersection markings.

4.2.7. No-stopping lines

No-stopping lines may be marked at a priority controlled intersection if the RCA considers it is necessary to reinforce the prohibition of parking at the intersection and / or extend the length over which parking is prohibited in the vicinity of the intersection. They should be marked similar to as described for uncontrolled intersections in Section 3.2.4.

4.3. Signs

For information on installing street name signs at intersections, refer to Part 2 of the TCD Manual.

4.3.1. Give-way control

A summary of the types of give-way control signs and their uses are provided in Table 4-7. For more detailed colour specifications and dimensions of these signs, refer to the NZTA TCD Manual Sign specifications website.

Table 4-7: Summary of signs used for give-way controlled intersections

Code	Sign	Policy and Use
R2-2 Give-way		R2-2 signs must be installed at intersections subject to give-way control as described in Section 4.1.1. No other signs may be attached to either the R2-2 sign or its support, except in the following situations: • At intersections where it is intended that the R2-2 sign applies to traffic proceeding in a specific direction. For example, at a Y-intersection, either an R2-2.1, R2-2.2, R2-2.3, or R2-2.4 supplementary sign may be added below the R2-2 sign; and • When the other sign is an R3-13 single disc or R3-13.1 twin disc sign facing the opposing traffic. R2-2 signs are normally installed on the left-hand side of the approach at an intersection, unless visibility is restricted, or it is impracticable for a sign to be installed on the left-hand side. The sign should be positioned at the intersection so that: • The front of the sign is only visible to road users on the controlled approach; • The reverse of the sign is visible to traffic on other controlled approaches; • Road users on uncontrolled approaches can observe there is a priority control applied to the controlled approaches; and • It is closer than 9 m to the edge of seal of the main road. If the give-way controlled approach to the intersection has a traffic island between opposing lanes, an additional sign should be installed on the island. If the give-way controlled approach to the intersection has a left-turn lane separated from the other approach lanes by a traffic island, an additional R2-2 sign should be installed on this island. If control of the separate left turn lane is not intended, an R2-2 sign should not be installed to the left of this lane. Refer to Note 1 for sight distance requirements and to Note 2 for size requirements. Where the Note 1 sight distance cannot be achieved, advance warning should be provided using a W10-2 sign.
R2-2.1 Give-way – supplementary – 'locality' traffic		These signs may be used for intersections where it is intended that the give-way control of an R2-2 sign applies to traffic proceeding in a specific direction. In this case, the R2-2.1, R2-2.2, R2-2.3 or R2-2.4 supplementary sign may be installed below the R2-2 sign. Where there is a clearly understood destination on the route of traffic required to give-way, an R2-2.1, R2-2.2, R2-2.3 or R2-2.4 sign should be used to clarify the movement controlled by the R2-2 sign. • The size specified for the R2-2.1 is 900 x 600 mm (minimum).
R2-2.2 Give-way – supplementary – straight-ahead traffic		

Code	Sign	Policy and Use
R2-2.3 Give-way – supplementary – right-turning traffic		• Only one size is specified for each of the supplementary signs, R2-2.2, R2-2.3 and R2-2.4, which is 900 x 800 mm. This size should be used regardless of the size adopted for the main R2-2 sign.
R2-2.4 Give-way – supplementary – left-turning traffic		
R2-2.5 Give-way – supplementary – to cyclists		R2-2.5 and R2-2.6 reinforces the requirement for drivers to give-way to cyclists and pedestrians crossing the road on a priority controlled shared path, in accordance with clause 11.4(5) of the TCD Rule.
R2-2.6 Give-way – supplementary – to cyclists and pedestrians		
R2-9.1 Turning traffic give-way to cyclists		R2-9.1 is a supplementary sign that reinforces the requirement for drivers to give-way to cyclists on a cycle path when turning at a give-way or stop sign, or traffic signals, in accordance with clause 3.2 or 4.1 of the Land Transport (Road User) Rule 2004.
R2-9.2 Straight ahead traffic give-way to cyclists		R2-9.2 is a supplementary sign that reinforces the requirement for drivers to give-way to cyclists on a cycle path when proceeding straight ahead from a give-way or stop sign, in accordance with clause 4.1 of the Land Transport (Road User) Rule 2004.

Code	Sign	Policy and Use
W10-2 Give-way ahead		W10-2 signs should be erected in advance of an R2-2 sign where the R2-2 sign is not clearly visible to approaching drivers over the sight distances described in Note 1. The signs should be erected on both sides of the road in a position where they are visible to approaching drivers over the distances described in Note 1 and in advance of the R2-2 signs by the distances described in Note 1. W10-2 signs may also be installed for a limited period for education purposes, or where in the opinion of the RCA compliance with the R2-2 sign would substantially improve. Where a W10-2 sign is installed, it should be supplemented by a W10-1.1 sign to indicate the distance between the sign and the intersection; the distance should be rounded to the nearest 50 m. The size selected for a W10-2 sign should be in accordance with Note 3.
W10-1.1 Distance ahead supplementary		
A43-8.1 Advanced contra-flow cycle facility		The A43-8.1 sign may be erected on the approach to an intersection to inform road users that cyclists are permitted to travel in either direction on the cycle facility that crosses at the intersection.

Note 1: Sight distance and location requirements.

a. The regulatory signs described in Table 4-7 above should be installed where they are clearly visible to approaching drivers for at least the sight distances described in the table below.

b. The advance warning sign described in Table 4-7 above should be installed where it is:

(i) Clearly visible to approaching drivers for at least the distances described in the table below.

(ii) Located in advance of the intersection by at least the distances described in the table below.

c. The cyclist information sign described in Table 4-7 above should be installed where it is clearly visible to approaching drivers for at least the sight distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

Note 2: R2-2 Give way sign size requirements.

The R2-2 Give way sign should be at least the minimum sizes shown in the table below, where the left-hand dimension describes the width of the base of the triangle and the dimension of each of the sloping sides, and the right-hand dimension describes the height of the triangle.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	865 x 750 mm
60 km/h to 80 km/h	1040 x 900 mm
90 km/h to 110 km/h	1390 x 1200 mm

Note 3: W10-2 Advance warning sign size requirements.

The W10-2 Advanced warning sign should be at least the sizes shown in the table below; the sign must not be smaller than 600 x 600 mm.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	600 x 600 mm
60 km/h to 80 km/h	750 x 750 mm
90 km/h to 110 km/h	900 x 900 mm

4.3.2. Stop control

A summary of the types of stop control signs and their use is provided in Table 4-8. For more detailed colour specifications and dimensions of these signs, refer to the NZTA TCD Manual Sign specifications website.

Table 4-8: Summary of signs for stop control

Code	Sign	Policy and Use
R2-1 Stop		R2-1 signs must be installed at intersections subject to stop control. No other sign may be attached to either the R2-1 sign or its support except an R3-13 single disc or R3-13.1 twin disc sign facing the opposing traffic. R2-1 signs should be installed on the left-hand side of the approach at an intersection, unless visibility is restricted, or it is impracticable for the sign to be installed on this left-hand side. The sign should be positioned at the intersection so that: • The front of the sign is only visible to road users on the controlled approach; • The reverse of the sign is visible to traffic on other controlled approaches; • Road users on uncontrolled approaches can observe there is a priority control applied to the controlled approaches; and • It is closer than 9 m to the edge of seal of the main road.

Code	Sign	Policy and Use
		If the stop controlled approach to the intersection has a traffic island between opposing lanes, an additional sign should be installed on the island. If the stop controlled approach to the intersection has a left-turn lane separated from the other approach lanes by a traffic island, an additional R2-1 sign should be installed on this island. If control of the separate left turn lane is not intended, an R2-1 sign should not be installed to the left of this lane. Refer to Note 1 for advanced sight distance and to Note 2 for size requirements. Where this distance cannot be achieved, advance warning should be provided by a W10-1 sign.
R2-9.1 Turning traffic give-way to cyclists		R2-9.1 is a supplementary sign that reinforces the requirement for drivers to give-way to cyclists on a cycle path when turning is at a give-way sign, stop sign, or traffic signals, in accordance with clause 4.1 or 3.2 (respectively) of the Land Transport (Road User) Rule 2004.
R2-9.2 Straight ahead traffic give-way to cyclists		R2-9.2 is a supplementary sign that reinforces the requirement for drivers to give-way to cyclists on a cycle path when proceeding straight ahead from a give-way or stop sign, in accordance with clause 4.1 of the Land Transport (Road User) Rule 2004.
W10-1 Stop ahead		W10-1 signs should be erected in advance of an R2-1 sign where the R2-1 sign is not clearly visible to approaching drivers over the sight distances described in Note 1. The signs should be erected on both sides of the road in a position where they are visible to approaching drivers over the distances described in Note 1 and in advance of the R2-1 signs by the distances described in Note 1. W10-1 signs may also be installed for a limited period, for educational purposes or where in the opinion of the RCA compliance with the R2-1 would substantially improve. Where a W10-1 sign is installed, it should be supplemented by a W10-1.1 sign to indicate the distance between the sign and the intersection; the distance should be rounded to the nearest 50 m. The size selected for a W10-1 sign should be in accordance with Note 3.
W10-1.1 Distance ahead supplementary		

Note 1: Sight distance and location requirements.

a. The regulatory signs described in Table 4-8 above should be installed where they are clearly visible to approaching drivers for at least the sight distances described in the table below.

b. The advance warning sign described in Table 4-8 above should be installed where it is:

(i) Clearly visible to approaching drivers for at least the distances described in the table below.

(ii) Located in advance of the intersection by at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

Note 2: R2-1 Stop sign size requirements.

The R2-1 Stop sign should be at least the minimum sizes shown in the table below; the sign must not be smaller than an octagon 750 mm wide.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	Octagon 750 mm wide
60 km/h to 80 km/h	Octagon 900 mm wide
90 km/h to 110 km/h	Octagon 1200 mm wide

Note 3: W10-1 Advance warning sign size requirements.

The W10-1 Advance warning sign should be at least the minimum sizes shown in the table below; the sign must not be smaller than 600 x 600 mm.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	600 x 600 mm
60 km/h to 80 km/h	750 x 750 mm
90 km/h to 110 km/h	900 x 900 mm

4.3.3. Advance warning signs

Where an RCA considers that advance warning of a controlled intersection would be beneficial, the signs in Table 4-9 should be used if the intersection has three legs and the signs in Table 4-10 should be used if the intersection has four legs. The signs include arrowheads and wider lines on some legs to indicate the route through the intersection that has priority; these signs should only be used at priority controlled intersections.

Table 4-9: Advance warning signs for priority controlled intersections with three legs

Code	Sign	Policy and Use
W11-3 (L) T-junction controlled (priority turns left)		A road controlling authority must install a permanent warning sign on the priority approach to intersections where it considers special care or reduced speed is appropriate. This may be due to: • Restricted sight distance; • A large volume of turning or crossing traffic; and / or • A form of priority control different to what road users are likely to expect. These advance warning signs should not be installed on the: • Controlled approach to a priority road; nor • Approaches to an intersection controlled by traffic signals nor on the approaches to a roundabout, nor generally on the approach to an intersection where advance directional signing is employed. These advance warning signs should be located in advance of the intersection by at least the distance specified in Note 1; they should also be clearly visible to approaching drivers over the distances described in Note 1. Refer to Note 2 for the sign size requirements.
W11-3 (R) T- junction controlled (priority turns right)		
W11-4 (L) Side road junction – controlled (left)		
W11-4 (R) Side road junction – controlled (right)		
W11-5 (L) Y-junction – controlled (left)		
W11-5 (R) Y-junction – controlled (right)		
W11-3.2 Intersection sign supplementary – concealed		A W11-3.2 sign may be installed under a W11-3, W11-4 or W11-5 sign where, in the opinion of the RCA, the sight distance for priority traffic at the intersection is so low as to constitute a hazard to road users.

Code	Sign	Policy and Use
A11-4 Advance direction – map		Advance direction signs, such as the A11-4 may be used instead of the other signs in this table where an RCA considers that additional route guidance is beneficial. A 11-4 map signs should be provided on all approaches to intersections between state highways and must show a symbolic map of the geometric intersection. Refer to Section 10.4 of this Manual for more detail regarding this sign.

Note 1: Sight distance and location requirements.

The advance warning signs described in Table 4-9 above should be installed where they are:

a. Clearly visible to approaching drivers for at least the distances described in the table below.

b. Located in advance of the intersection by at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

Note 2: Advance warning sign size requirements.

Advanced warning sign should be at least the sizes shown in the table below; the sign must not be smaller than 600 x 600 mm.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	600 x 600 mm
60 km/h to 80 km/h	750 x 750 mm
90 km/h to 110 km/h	900 x 900 mm

Table 4-10: Advance warning signs for priority controlled intersections with four legs

Code	Sign	Policy and Use
W11-2 Crossroads junction controlled – priority route ahead		A road controlling authority must install a permanent warning sign on the priority approach to intersections where it considers special care or reduced speed is appropriate. This may be due to: • Restricted sight distance; • A large volume of turning or crossing traffic; and / or • A form of priority control different to what road users are likely to expect. W11-2 signs should be used when the straight ahead traffic has priority, and the W11-2.1 (L)/(R) signs should be used when the left/right turning traffic has priority. These advance warning signs should not be installed on the: • Controlled approach to a priority road; nor • Approaches to an intersection controlled by traffic signals nor on the approaches to a roundabout, nor generally on the approach to an intersection where advance direction signing is employed. These advance warning signs should be located in advance of the intersection by at least the distance specified in Note 1; they should also be clearly visible to approaching drivers over the distances described in Note 1. Refer to Note 2 for the sign size requirements.
W11-2.1 (L) Crossroads junction controlled – priority route turns (left)		
W11-2.1 (R) Crossroads junction controlled – priority route turns (right)		

Note 1: Sight distance and location requirements.

The advance warning signs described in Table 4-10 above should be installed where they are:

a. Clearly visible to approaching drivers for at least the distances described in the table below.

b. Located in advance of the intersection by at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

Note 2: Advance warning sign size requirements.

Advanced warning sign should be at least the sizes shown in the table below; the sign must not be smaller than 600 x 600 mm.

Speed Limit	Min. Size

≤30 km/h to 50 km/h	600 x 600 mm
60 km/h to 80 km/h	750 x 750 mm
90 km/h to 110 km/h	900 x 900 mm

4.3.4. Intersection speed zones

Intersection Speed Zones (ISZs) are a specific type of variable speed limit designed to slow traffic on the main road approaches to an intersection where vehicles are turning or crossing into or out of the side roads. Traffic Note 62 details the guidelines and requirements for ISZs.

The associated Gazette Notice provides specific information regarding the requirements for R1-2.2 Rural Intersection Speed Zone Variable Speed Limit signs. From a traffic control devices perspective, the key points to note in relation to ISZs include the following:

- The Setting of Speed Limits Rule requires (Clause 4.9(1)) that "The Agency (as RCA) or a territorial authority may set a variable speed limit only if it is satisfied that […] (b) a variable speed limit is necessary to address or manage one or more of the following […] (iv) a crash risk posed by turning or crossing traffic: […]". That is, there are very specific and limited requirements in relation to establishing ISZs.
- Only applicable at rural intersections with speed limits of 80 km/h or more on the main road, where safety benefits would accrue from a lower speed limit being activated when a vehicle is about to turn into or out of the intersecting side road;
- They are not a replacement for good intersection design. Usual intersection design and other road safety considerations should be addressed before an ISZ is considered;
- They can be an alternative to transformational remediation, such as a roundabout; and
- Are a speed limit change, therefore, the requirements of the Setting of Speed Limits Rule must be met.

The R1-2.2 signs for ISZs comprise an electronic variable speed limit sign with an appropriate supplementary warning sign as detailed in Table 4-11.

Table 4-11: intersection speed zone variable speed limit signs

Code	Sign	Policy and Use
R1-2.2 Rural Intersection Speed Zone Variable Speed Limit	 	A road controlling authority may install an R1-2.2 Rural Intersection Speed Zone Variable Speed Limit on the main road approaches to a priority controlled rural intersection where the road controlling authority considers that safety benefits would accrue from a lower speed limit being activated when a vehicle is about to turn into or out of an intersecting side road. The permanent warning sign positioned below the R1-2.1 Variable speed sign must be a W11-2 or W11-2.1 or W11-3 or W11-4 or W11-5 permanent warning sign. Because the sign is a speed limit change, it must meet the requirements of the Setting of Speed Limits Rule, which includes consultation, and speed management plan certification, and submitting to the National Speed Limits Register. The requirements of the Land Transport Rule: Setting of Speed Limits, including those contained in the Gazette Notice must be complied with for the installation of R1-2.2 signs. Those requirements are collectively described in Traffic Note 62.

4.3.5. Headway signs

Headway chevron boards and headway direction signs, as shown in Table 4-12, should be used to further highlight the location of an intersection where the backdrop of the intersection is not clearly visible to approaching drivers and there is a risk they will over-run the intersection.

The use of sight rails is no longer recognised as industry best practice.

Table 4-12: Headway signs for controlled intersections

Code	Sign	Policy and Use
W20-1.4 Chevron sight board – at T-junction, black on yellow		Headway chevron signs installed at the head of T, Y, and staggered T-intersections should be: • Located where the backdrop to the intersection is not clearly visible to approaching drivers; and / or • Used where other warning devices are failing to prevent crashes that involve vehicles over-running the intersection; and • Installed 3.0 m clear of the left edge of the through traffic lane and positioned with its centre offset to the left of the side road centre-line, directly in front of approaching drivers or in a position that maximises visibility to the sign for approaching drivers. The W20-1.4 sign should be used in preference to the W20-1.2 sign and should be used for any new installations and where existing signs require replacement. The minimum length of a W20-1.4 sign is 3000 mm. This sign size is most suitable for the head of T-intersections in urban speed limit areas but should be increased in size proportionally to suit rural speed limit areas.
A13-3 Intersection direction – arrow board two directions		Intersection direction signs should be installed at the head of T or Y intersections and should be installed 3.0 m clear of the left edge of the through traffic lane. They should be positioned with the centre of the sign offset to the left of the side road centre-line, directly in front of approaching drivers or in a position that maximises visibility to the sign for an approaching driver. Where the approach is straight, the sign may provide the delineation usually provided by a chevron board. Where a headway direction sign is used, a chevron sight board (W20-1.4) sign may still be used. This can be useful where the green sign provides low contrast against a green background.

Code	Sign	Policy and Use
A13-1 Intersection direction – arrow board		A13-1 and A13-2 Intersection direction arrow board / arrow signs should be installed at the head of intersections where road users may only turn left. They should be installed either: • 3.0 m clear of the left edge of the through traffic lane; • In a median island on the through road if one is provided (R3-12 signs should only be installed in median islands); or • On a splitter island on the controlled approach. They should be positioned with the centre of the sign offset to the left of the side road centre-line, directly in front of approaching drivers or in a position that maximises visibility to the sign for an approaching driver. At these intersections, a chevron sight board (W20-1.4) sign should not be installed as they can provide misleading guidance that road users may turn right.
A13-2 Intersection direction – arrow		

Figure 4-3: Example of Chevron sight board at T-intersection, black on yellow (W20-1.4) at head of intersection

Figure 4-4: Example of Intersection direction sign arrow board two directions (A13-3) at head of intersection, with a W20-1.4 below

In some cases, it may also be appropriate for street name signs to be installed to advise drivers of the specific name of the road or roads that join at the intersection. Table 4-13 provides information regarding the use of Street name signs.

Table 4-13: Specifications for street name signs

Code	Sign	Policy and Use
A14-1 Street name	PINE ROAD >	Section 7 of the TCD Manual Part 2 provides guidance on the use of street name signs for intersections, including their use for advance warning of the side road.

4.3.6. Signs and markings at intersections with continuous median barrier

Signs should be provided facing the side road approach to intersections where the main road is divided by a continuous median barrier. Headway sign options for side road approaches to undivided main roads do not highlight to road users that they must turn left from the side road approach, therefore, an R3-8 Turn left sign should be located immediately adjacent to the median barrier, facing traffic approaching on the side road, to direct road users to turn left at the intersection.

Other signs such as A13-1 Intersection direction – arrow board, A13-2 Intersection direction – arrow, or A14-1 Street name (refer to Table 4-13) may also be used to complement the R3-8. The important criterion is that road users must be directed to the left.

As described in Section 10 of this Manual, Clause 7.12 of the TCD Rule states:

(3) "A lane that may be used only by road users who are travelling straight ahead or turning in a specific direction must be clearly indicated by:

(a) at least one lane-usage arrow marked within the lane that complies with the relevant specifications in Schedule 2 [of the TCD Rule, also refer to Figure 10-1 of this Manual]; or

(b) at least one sign provided above the lane that complies with the relevant requirements in Schedule 1 [of the TCD Rule, also refer to Section 10.2 of this Manual]."

Therefore, where there is a continuous median barrier and a right turn from the side road would position a road user so that they are travelling in the opposing lane, the TCD Rule requires that the side road approach to the intersection must have a left turn lane use arrow (refer to Section 10.1 of this Manual). The only exception to this requirement is at an intersection where there is a gap in the median barrier, such as would occur at a seagull intersection (refer to Section 17 of this Manual).

Figure 4-5 below illustrates the configuration of signs and markings that should be used on the side road approach to a main road that has a continuous median barrier.

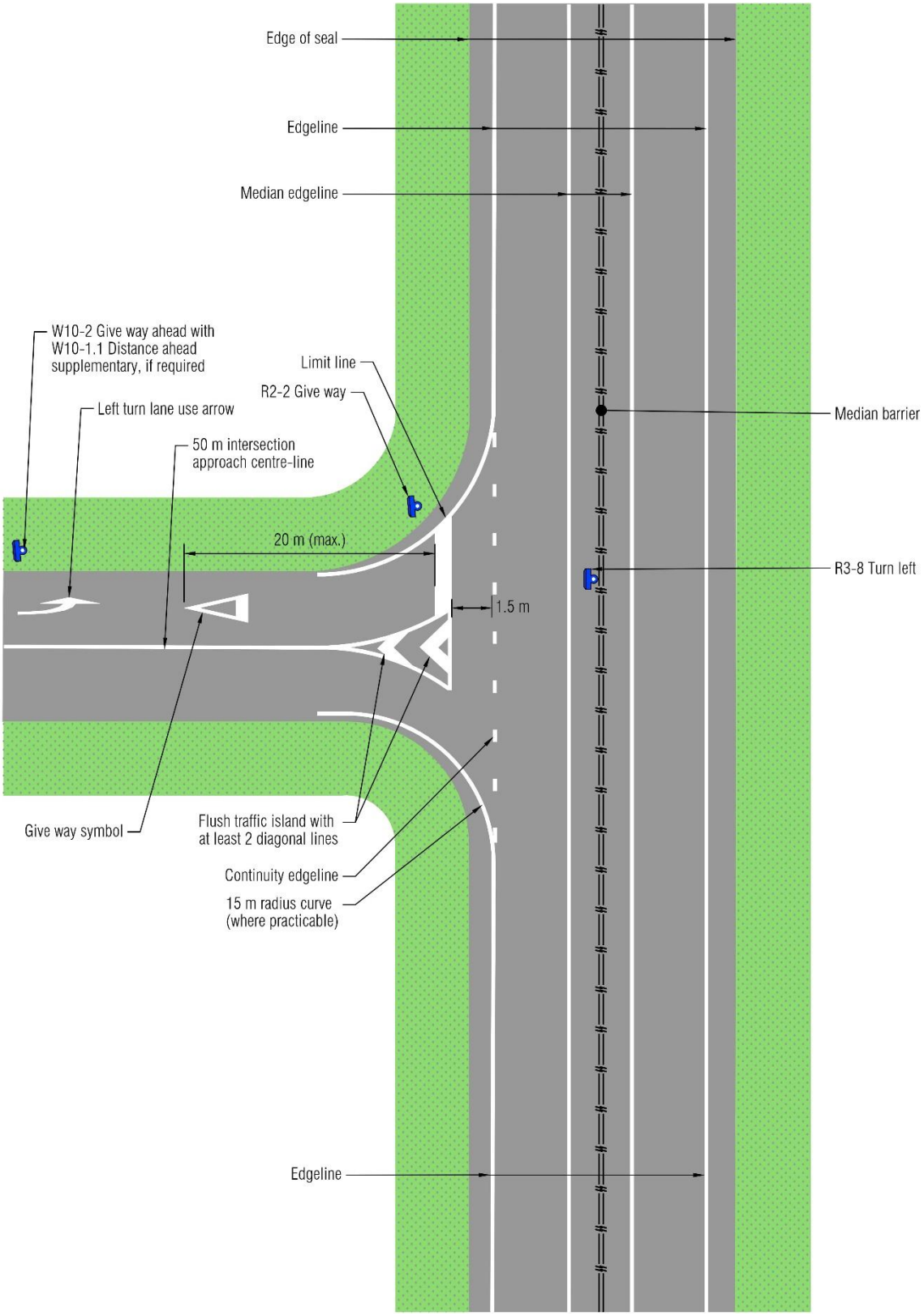


Figure 4-5: Signs and markings for side road intersection where main road has median barrier

For those intersections where advance warning of the presence of the intersection is required on the side road, W10-2 Give-way ahead or W10-1 Stop ahead signs, as described in Sections 4.3.1 and 4.3.2 of this Manual (respectively), should be used.

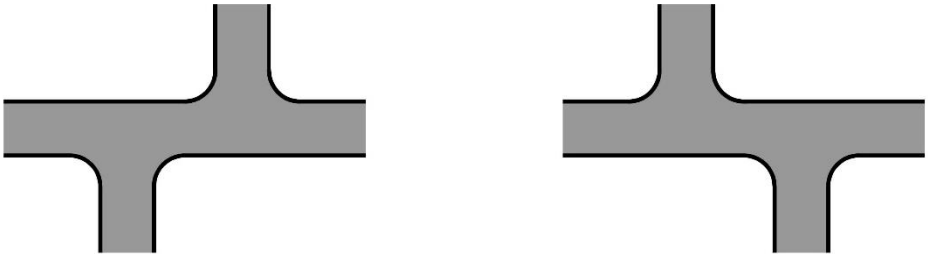
4.4. Staggered T-intersections

As described in Section 2.1.5 of this Manual, at a staggered T-intersection, two side roads each form a T-intersection with a main road, however, the separation between the two T-intersections is such that the configuration performs as a single intersection.

Staggered T-intersections are defined by the order in which turning movements are undertaken by drivers crossing the main road from the side roads:

- A left-right staggered T-intersection, and
- A right-left staggered T-intersection.

At a left-right staggered T-intersection, drivers crossing the main road from the side roads are required to initially turn left from the side road approach onto the main road and then to turn right from the main road onto the second side road, and vice versa for a right-left staggered T-intersection.



(a) Right-left staggered T-intersection (b) Left-right staggered T-intersection

Figure 4-6: Staggered T-intersections

Refer to Section 2.2.7 of the Austroads Guide to Traffic Management Part 6 for more information on the use of left-right or right-left staggered T-intersections.

4.4.1. Markings

Where no flush median or right turn bays are needed (for example, where there are low turning volumes) the staggered T-intersection may be marked as two T-intersections.

(a) Left-right staggered T-intersection

At left-right staggered T-intersections with right-turn bays on the main road, the right-turn bays are located "tail-to-tail". If the separation between the two side roads is sufficient, the right turn bays into each side road should be marked as described in Section 15.2. If the separation between the two side roads or the width of the roadway of the main road is insufficient to mark the right turn bays as described in Section 15.2, the minimum dimensions as illustrated in Figure 4-19 should be used. If these minimum dimensions cannot be provided, a flush median should be marked in the centre of the main road to provide for right turning movements instead of right turn bays as illustrated in Figure 4-20.

If there are significant volumes of turning traffic between the two side roads and there is sufficient width of roadway, an RCA may provide right turn lanes for both directions on the main road as illustrated in Figure 4-21.

For example layouts of left-right staggered T-intersections, refer to Section 4.13.

(b) Right-left staggered T-intersection

At right-left staggered T-intersections with right-turn bays on the main road, the right turn bays are located "head-to-head". If the separation between the two side roads is sufficient to mark a flush median with two or more diagonal lines between the two "head-to-head" right turn bays, a flush median should be marked as shown in Section 4.13. If not, a flush median should not be marked between the two "head-to-head" right turn bays.

Refer to Section 4.13 for example layouts of right-left staggered T-intersections.

4.4.2. Signs

For staggered T-intersections, a modified version of the W11-4 side road intersection advance warning signs provided in Table 4-9 should be installed on the priority approaches to the intersection in a similar location to that specified in Section 4.3.3 of this Manual. The modified versions of the W11-4 side road intersection advance warning signs should show the presence of the staggered side roads to the right and left of the priority route.

With regard to the advance warning signs installed on the priority approaches to the intersection, engineering judgement should be used to determine whether the separation between the side roads is such that the intersection operates more like a crossroads intersection than a staggered T-intersection. If so, the crossroads advance warning signs should be installed as described in Table 4-10.

Advance warning signs for the controlled approaches to a staggered T-intersection should be installed as they would be on the controlled approach to a standard three-leg intersection. These include stop and give-way ahead signs (Sections 4.2.1 and 4.2.2 of this Manual) and headway signs (Section 4.3.5 of this Manual).

4.5. Crossroads intersections

As described in Section 4.1 of this Manual, crossroads intersections have four approaching roadways, therefore, if they are not subject to signal or roundabout control, they must be subject to priority control.

Stop controlled and give-way controlled approaches will occasionally be justified on opposite approaches of the same crossroads intersection according to the visibility criteria and the safe approach speeds. This situation can cause confusion for road users because it may result in the priority given to specific movements being the reverse of conventional intersection priority rules. This occurs because the normal priority rules state that traffic at a stop controlled approach must always give-way to traffic at a give-way controlled approach. Therefore, the use of different controls on opposite approaches should be avoided if possible.

If no alternative methods exist, the use of differing controls can be acceptable when a stop control is obviously needed on one approach due to limited visibility and give-way is appropriate for the opposite approach because there is adequate visibility.

4.5.1. Markings

In general, the markings on approach to crossroads intersections should be similar to those provided on approach to T-Intersections, however, there are situations where the markings and sign layout will need to be more carefully considered; for example, where there are head to head right turn bays.

4.5.2. Signs

For rural areas in particular, where crossroads intersections occur, permanent warning signs such as those described in Table 4-10 should be installed on the main road approaches to indicate the priority route. For example:

- A layout with an arrowhead indicates the route that has priority. Whether this be straight ahead, to the right or to the left. This indicates that the intersecting roadways are under stop or give-way control.

4.6. Non-standard priority intersections

Non-standard priority intersections are intersections where the route with priority is not straight and may be contrary to what road users would expect given the geometry of the roadway. Both intersections shown in Figure 4-7 are non-standard priority intersections.

Figure 4-7: Two non-standard priority intersections in New Plymouth (Image source: New Plymouth District Council)

4.6.1. General

Where the main route through the intersection does not follow a straight line and has a radius of less than 100 m, a centre-line to confirm route priority should be used. Where used, the centre-line to establish priority at intersections should be marked as described in Table 4-14.

Table 4-14: Priority centre-line (intersection)

Application	Specification
Colour	White
Width (minimum)	100 mm
Dash (typical)	1 m
Gap (typical)	1 m or 2 m

4.6.2. Multi-lane approaches

Where the main route through the intersection does not follow a straight line and has a radius of less than 100 m, intersection priority lane lines should be used to confirm route priority. Where used, lane lines through intersections should be marked as described in Table 4-15.

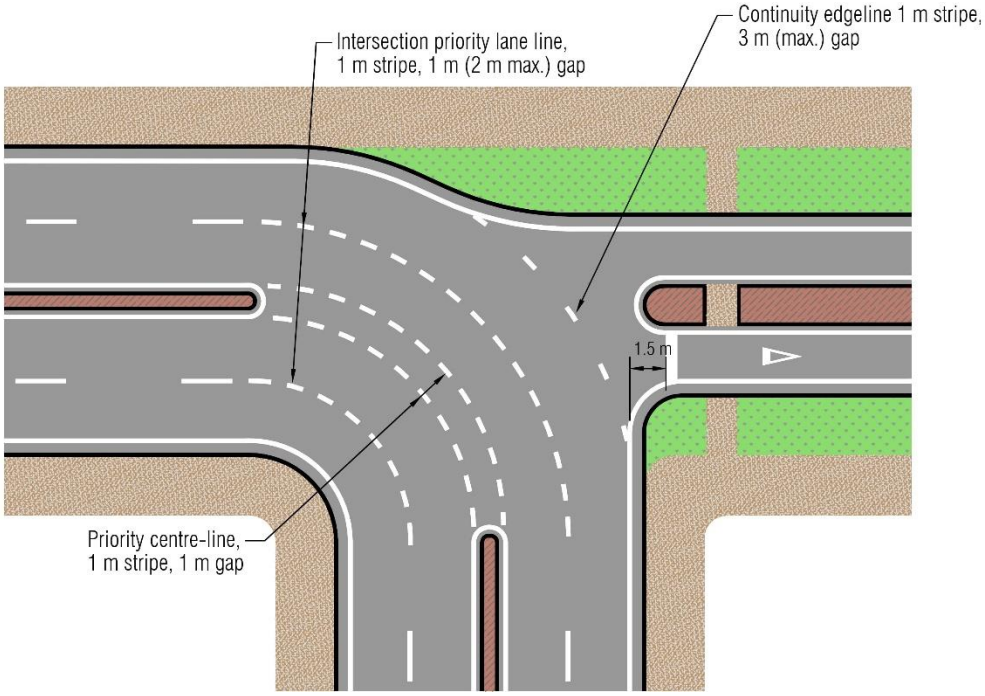


Figure 4-8: Lane lines marked through an intersection

Table 4-15: Priority intersection lane lines through intersections

Application	Specification
Colour	White
Width (minimum)	100 mm
Dash (typical)	1 m
Gap (typical)	1 m or 2 m

Raised pavement markers and / or advance warning signs may be used to supplement the lane markings at some intersections.

Continuity edgelines as described in Section 4.2.6 may also be marked to provide added delineation of the main route through the intersection. Refer to Section 4.13.5 for example layouts.

4.7. Multi-lane approaches

4.7.1. Limit lines

Where there are two or more traffic lanes that approach an intersection at an angle other than 90°, the limit line may need to be stepped and marked at right angles to each approach lane to allow drivers in the left lane to see past adjacent vehicles to their right.

Limit lines must be at least 300 mm wide and for rural intersections they should be 450 mm wide.

4.7.2. Lane lines

Lane lines on urban and rural, controlled, multi-lane approaches to intersections should be marked as described in Table 4-16. Refer to Section 4.13.5 for example layouts.

Table 4-16: Approach lane lines on multi-lane approaches

Application	Specification
Colour	White
Width (minimum)	100 mm
Length (typical)	15 m minimum, terminating at the limit line.
Dash (typical)	Continuous

Lane lines on the uncontrolled approaches to intersections should be marked as described in Section 2.6.2 of TCD Manual Part 5 and should commence and terminate clear of the intersection traffic turning paths. Except where they are used on the main routes through intersections that do not follow a straight line, as described in Section 4.6 of this Manual, lane lines should not be marked through intersections.

For guidance on the marking of lane lines at left or right turn lanes, refer to Sections 14 and 15 of this Manual.

4.7.3. Lane use arrows

For guidance on the application of lane use arrows on multi-lane approaches to intersections, refer to Section 10.1 of this Manual.

4.8. Intersections with both stop and give-way controls

Stop controlled and give-way controlled approaches will occasionally be justified on different approaches to the same intersection. However, this situation can cause confusion for road users and should be avoided if possible.

Where controls differ at these intersections it is important that approaching drivers understand what controls apply to which road users. Therefore, the shape of the sign should not be obscured for drivers not subject to the control.

If there are different controls on the approaches to an intersection, the stop and give-way signs on each controlled approach should be gated.

4.9. Intersections where all approaches are subject to priority control

As a general rule for intersections, priority of traffic relates to the function of the road. Priority at an intersection should ordinarily be given to the roads with the highest movement function (for example, transit corridors) rather than to the roads with a high place function (for example, civic spaces). For intersections where the roads all have the same function, but some of the intersecting roads have significantly different traffic volumes, it may be appropriate for priority to be given to the roads with the higher traffic volumes. Notwithstanding that, roads with the same function should ordinarily have equal priority, which is usually managed with the use of roundabouts or traffic signals. However, if neither roundabout nor traffic signal control is appropriate, and traffic speeds are low, the intersection control can also be achieved with all approaches to the intersection being subject to give-way or stop control, which requires drivers to use give-way rules and encourages them to have greater regard for giving way to other vehicles approaching the intersection.

Figure 4-9: Example of a four-way stop control

At all way four-way give-way or stop controlled intersections, RCAs should ensure that the hierarchy and road characteristics on each approach are similar. The control type (give-way or stop) should be selected based on the visibility criteria described in Section 4.1 of this Manual.

As with all intersections, the functionality of a four-way give-way or stop controlled intersection is reliant on road users following the give-way rules for intersections described in Part 4 of the Road User Rule; these include, but are not limited to:

- Drivers turning give-way to drivers that are not turning;
- Drivers turning right give-way to drivers turning left; and
- Drivers must give-way to any vehicle approaching from their right (except as noted above).

When selecting the control type, the RCA should consider whether all road users will be subject to the controls and the inter-visibility between road users on all approaches to the intersection. Section 8.2 of this Manual includes an example with an uncontrolled cycle path crossing of a leg of an intersection where all other road users are subject to a four-way stop control.

4.10. Pedestrian facilities

Where there is demand for pedestrian crossing movements at controlled intersections, an RCA should install pedestrian facilities. Guidance on traffic devices for pedestrian facilities is available in Section 7 of TCD Manual Part 5 and in the Pedestrian Network Guidance. Designers should take care to ensure that pedestrian facilities do not reduce the legibility of the road layout for road users.

The following pedestrian facilities may be used for priority controlled intersections to assist pedestrians to cross the roadway:

- Kerb let downs;
- Pedestrian refuges;
- Kerb buildouts;
- Raised crossing platforms;

- Pedestrian crossings (zebra) (refer to Section 4.10.1 of this Manual); and / or
- Signalised pedestrian crossings.

Tactile paving is a form of traffic control device used to direct visually impaired pedestrians to crossing facilities. Tactile paving should be included at all crossing points. Refer to Road and Traffic Standard 14 for guidance on tactile paving.

4.10.1. Pedestrian crossings (zebra)

Pedestrian crossings (zebra) must be at least 600 mm from the projected alignment of the intersecting kerb at intersections. However, the following matters should be considered:

- A limit line must be marked at 5 m minimum distance from the pedestrian crossing unless the road surface makes this impracticable;
- A W16-2 sign must be installed to face all approaching traffic;
- Drivers who stop for pedestrians may block the intersection; and
- Pedestrian crossing signs and markings will not apply to all drivers approaching the intersection.

The entire length of the pedestrian crossing must be visible to approaching drivers.

This Manual relates to traffic control devices “for intersections”, however, with regard to pedestrian crossings (zebra) consideration of the positioning of traffic control devices for the crossings should take account of whether the crossing is “at” an intersection. There is not a definitive distance from an intersection beyond which a pedestrian crossing (zebra) is regarded as not being at an intersection. The TCD Rule requirements for pedestrian crossings (zebra) do not change based on whether the crossing is at an intersection or between intersections. To accommodate a pedestrian crossing (zebra) at an intersection, provision should be made to accommodate all road user movements, including the length required for vehicles exiting an intersection to be able to queue at a pedestrian crossing (zebra) limit line without obstructing vehicle movements at the nearby intersection. Based on the Road User Rule (clause 11.3(1)) requirement that a pedestrian must not cross a roadway other than at a crossing location if that crossing location is within a distance of 20 m, a pedestrian crossing (zebra) located more than 20 m from an intersection may be regarded as being between intersections.

4.11. Cycling facilities

Provision of cycling facilities should take into account the risk to cyclists at intersections. In some cases, the cycling facilities for an intersection will be different to the facilities on either side of the intersection.

For guidance on transitioning between different facilities, refer to Section 8 of the TCD Manual Part 5 and the Cycling Network Guidance. For example layouts of cycle lanes at priority controlled intersections, refer to Section 4.13.5 of this Manual.

4.11.1. Cycle lanes

Cycle lanes are on-roadway facilities and may be continued through a priority controlled intersection as any other lane would. The TCD Rule defines a cycle lane as “[…] a longitudinal strip within a roadway designed for the passage of cycles.” However, it may be desirable to use traffic control devices, such as full width coloured surfacing treatment, to highlight the presence of cyclists at intersections or to encourage other road users to only cross a cycle lane at the most appropriate location.

Cycle lanes should not be marked to the left of the general traffic lane up to the limit line on a signalised approach to an intersection where there is the potential for left turning traffic and straight through cyclists to come into conflict. Consideration should be given to taking cyclists onto a cycle path that is separated from the roadway or to terminating the cycle lane in advance of the limit line. Sections 5.3.5 and 6.6 of this Manual provide guidance regarding the treatment of cycle lanes on approach to roundabouts and signalised intersections respectively.

“The dimensions of markings intended solely for pedestrians or cyclists may be decreased provided that the dimensions of each letter, numeral or symbol are decreased in approximately the same proportion” (clause 5.4(2A) of the TCD Rule). However, consideration to the legibility and maintenance of markings should be given when reducing them to less than 50% of the original; this applies to both the cyclist and pedestrian markings.

4.11.2. Cycle paths

The TCD Rule (Part 2) defines a cycle path as:

(a) "[…] part of the road that is physically separated from the roadway that is intended for the use of cyclists, but which may also be used by pedestrians; and

(b) includes a cycle track formed under section 332 of the Local Government Act 1974."

The Road User Rule (clause 4.4(1)) requires that "A driver entering or exiting a driveway must give-way to a road user on a foot-path, cycle path, or shared path […]". Therefore, there is an expectation that vehicles will cross cycle paths to enter and exit driveways; as a result, it is likely that gaps in the physical separation for cycle paths will be required to accommodate vehicle movements at driveways.

Because a cycle path is "[…] part of the road that is physically separated from the roadway that is intended for the use of cyclists […]" (TCD Rule, Definitions), a cycle path is not part of the roadway. However, cyclists using a cycle path are considered to cross the roadway of a side road. In addition to the physical separation, a cycle path should be designed and delineated with traffic control devices so that it is clearly intended for the use of cyclists. The third principle to consider in relation to defining a facility for cyclists as a cycle lane or a cycle path is whether the facility is part of the roadway, which requires it to be "that portion of the road used or reasonably usable for the time being for vehicular traffic in general." (TCD Rule, Part 2). Therefore, if the cycle facility is physically separated, clearly intended for use by cyclists, and not used or reasonably usable by vehicular traffic in general, then the cycle facility is a cycle path.

Where the alignment of a cycle path crosses the side road at an intersection, it should be clear to all road users whether the route followed by cyclists across the side road is a cycle lane or a cycle path. The cycle path may change to a cycle lane prior to the intersection (left of Figure 4-10) or be clearly shown as a cycle path crossing, with either path users or vehicles on the roadway controlled (right of Figure 4-10). Also refer to Section 8 of this Manual, which in Section 8.2 provides guidance on traffic control devices for a cycle path crossing where traffic on the roadway must give-way.

The NZTA Cycling Network Guidance and Technical note #2: Separated cycleways at side roads and driveways provide more information on how to accommodate cycle paths at priority controlled intersections. A separated cycleway (as described in the Technical Note) is a cycle path of the type illustrated on the left-hand side of Figure 4-10 below.

As a simple rule of thumb, if there is longitudinal physical separation between the facility provided for cyclists to travel along and the adjoining traffic lanes, such that it would be difficult for vehicular traffic in general to access the facility provided for cyclists, and the facility is clearly intended for use by cyclists, then the facility is defined as a cycle path.

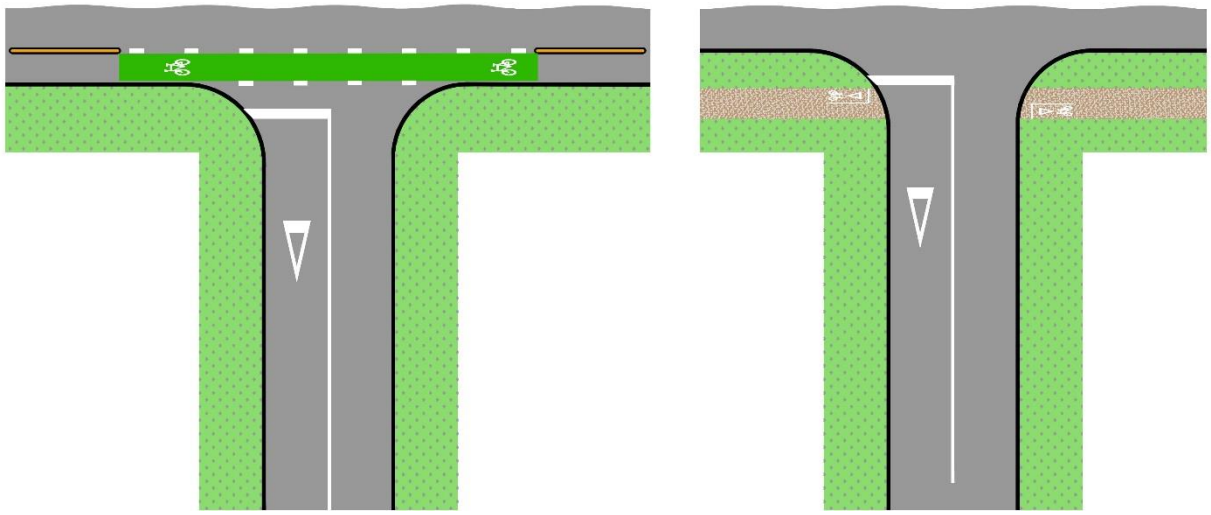


Figure 4-10: Example layout of cycle path between kerb lines on approach to and departure from an intersection, which becomes a cycle lane across the intersection (left) and an off-road cycle path at an intersection (right)

In the figure above, the roadside behind the kerb is illustrated using the light green colouring with grey dots that is ordinarily used in this Manual to indicate a rural environment. However, in this case, the environment in which the cycle paths are installed is most likely to be an urban environment. The green

roadside colouring represents grass or a similar roadside surface and has been used to provide contrast with the cycle paths.

4.11.3. Shared paths

Shared paths must be marked or signed in accordance with clause 11.4 of the TCD Rule, which states that:

(1) "For a shared path used by cycles, a road controlling authority:

(a) must install appropriate signs or markings that comply with Schedule 1 or Schedule 2 [of the TCD Rule], defining the class or classes of path user:

(i) at the start of the shared path; and

(ii) after each roadway or any other pathway with which it intersects; and

(b) must install signs or markings advising users that the shared path ends, unless signs or markings are installed to advise who may use any path that continues beyond the end of the shared path; and

(c) may install signs or markings at other intervals along the shared path.

(2) If pedestrians, cycles, wheeled recreational devices, or mobility devices are restricted to a specific side or part of a path, or where the path is separated for users travelling in different directions, a road controlling authority:

(a) must install signs or markings indicating the nature of the restriction:

(i) at the start of the restricted section of path; and

(ii) after each roadway or any other pathway with which it intersects; and

(b) must install signs or markings advising users that the restriction ends, unless signs or markings are installed to advise of any restriction or who may use any path that continues beyond the end of the restricted or separated section of path; and

(c) may install signs or markings at other intervals along the restricted section of the path.

(3) A road controlling authority may install on the same pole a combination of signs that relate to cycles, to pedestrians, to riders of wheeled recreational devices or to riders of mobility devices.

(4) A road controlling authority may install facilities for the parking, standing or storage of cycles, wheeled recreational devices or mobility devices on a footpath, footway, cycle path or shared path.

(5) When a cycle path or a shared path used by cycles crosses a roadway, a road controlling authority may, as appropriate, control either the movement of users of the path or traffic along the roadway by means of stop or give-way signs or by the installation of traffic signals, in the same manner as described in [clause] 10.5 [of the TCD Rule] for an intersection."

Example layouts for signs and markings for shared paths are shown in Figure 4-11 and Figure 4-12.

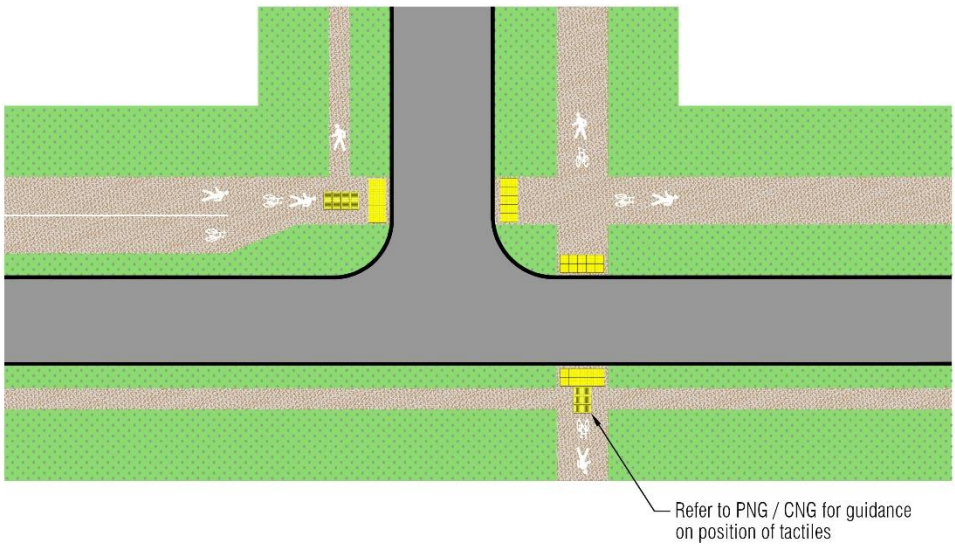


Figure 4-11: Example layout for uncontrolled or priority controlled intersections with shared paths using markings only

The symbols used for shared path markings are defined in Schedule 2 of the TCD Rule. The Rule also notes (clause 5.4(2A)) that the dimensions of the symbols intended solely for pedestrians or cyclists may be decreased. However, as noted in this Manual, they should not be less than 50% of the original size.

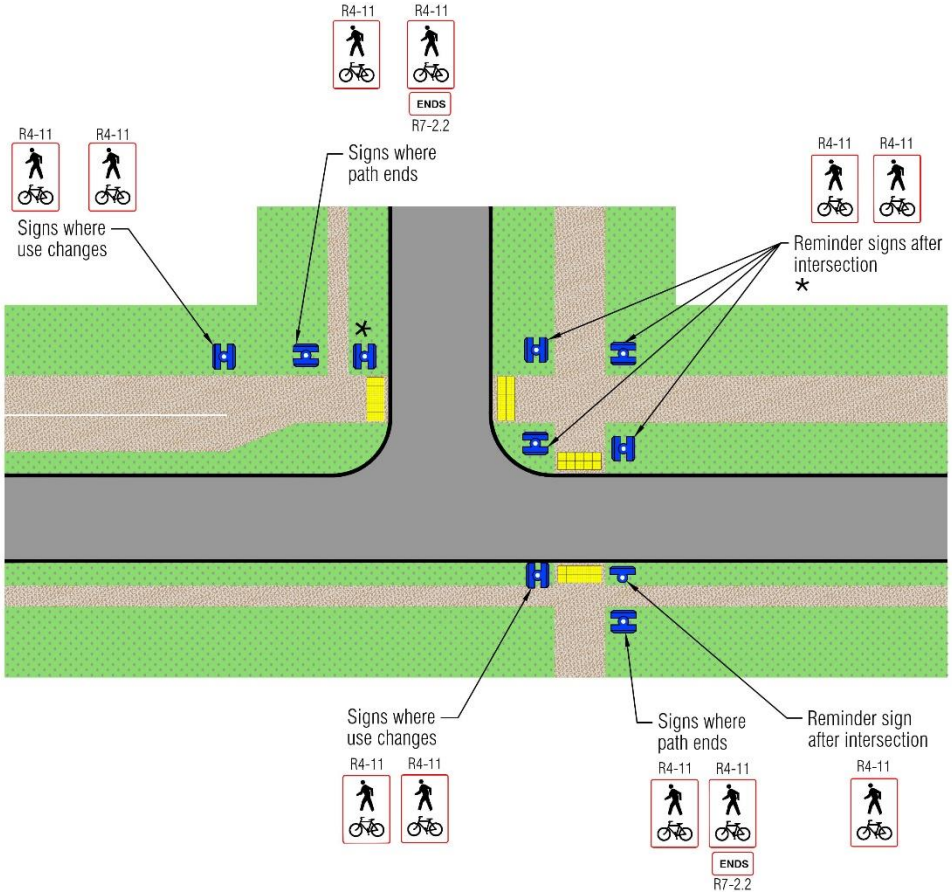


Figure 4-12: Example layouts for uncontrolled or priority controlled intersections with shared paths using signs only

4.11.4. Markings

At midblock locations, cycle lanes are marked with a continuous lane line on the right side and an edgeline on the left if the lane is not defined by a kerb or other vertical delineation device (refer to Section 9 of the TCD Manual Part 5). Where other traffic has to diverge or cross a cycle lane at side roads, the cycle lane should be defined by a dashed continuity edgeline and priority intersection lane line. Edgeline tapers should not cross the cycle lane or path but should stop at the left hand edge of the cycle lane or path as shown in Figure 4-26. However, at urban intersections (including property accesses) where approach speeds on the side road are low, the edgeline and cycle lane line may be continuous as shown in Figure 4-25 and Figure 4-26. Where cycle lanes cross low speed side roads and property accesses, the cycle lane should be defined as at midblock locations.

4.11.5. Property access

Where a property access intersects a road with a shared path or cycle path, it may be necessary to highlight the likely presence of cyclists. As traffic volumes using the access increase, the need to highlight the facility for cycling increases. Guidance for highlighting the conflict at property accesses is available in the High Use Driveway Treatment for Cycle Paths and Shared Paths Design guidance note. Devices that may be used include:

- Give-way control on the property access;
- Apple green full width coloured surfacing treatment;
- Special symbols M2-3C and M2-3D; and
- Vertical deflection devices.

4.12. Special vehicle lanes

Refer to Section 22 of this Manual.

4.13. Example intersection layouts

It is important to note that a particular intersection may require reference to more than one figure to obtain suitable guidance. The figures included in this section as example intersection layouts do not include all traffic control devices and / or all specific features of intersections that should be included in designs for real world applications, nor are the illustrations intended to provide design advice.

The exact layout of signs and markings at an intersection should be adjusted to suit the intersection design. Physical constraints such as road widths may affect the markings used, while curves and crests may affect the positioning of signs and dictate whether additional signs or delineation devices will be required. For example, Figure 4-16 illustrates a give-way controlled rural intersection with the edgelines extending along the side road; Figure 4-18 illustrates a stop controlled rural intersection, which is similar in form to Figure 4-16, however, the edgelines do not extend along the side road. This should not be taken to mean that give-way controlled rural side roads should have edgelines, but stop controlled rural side roads should not have edgelines. Based on the best practice described in this Manual, designers should determine the most appropriate combination of traffic control devices for each intersection.

4.13.1. Give-way control

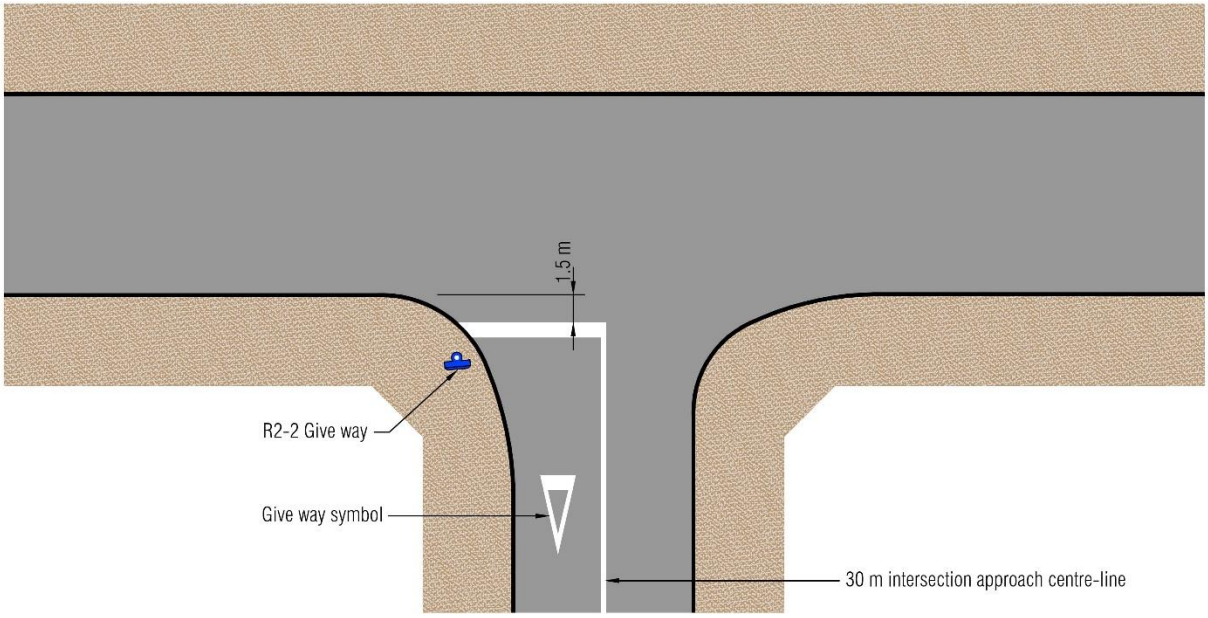


Figure 4-13: Markings for give-way controlled urban intersections – without edgelines

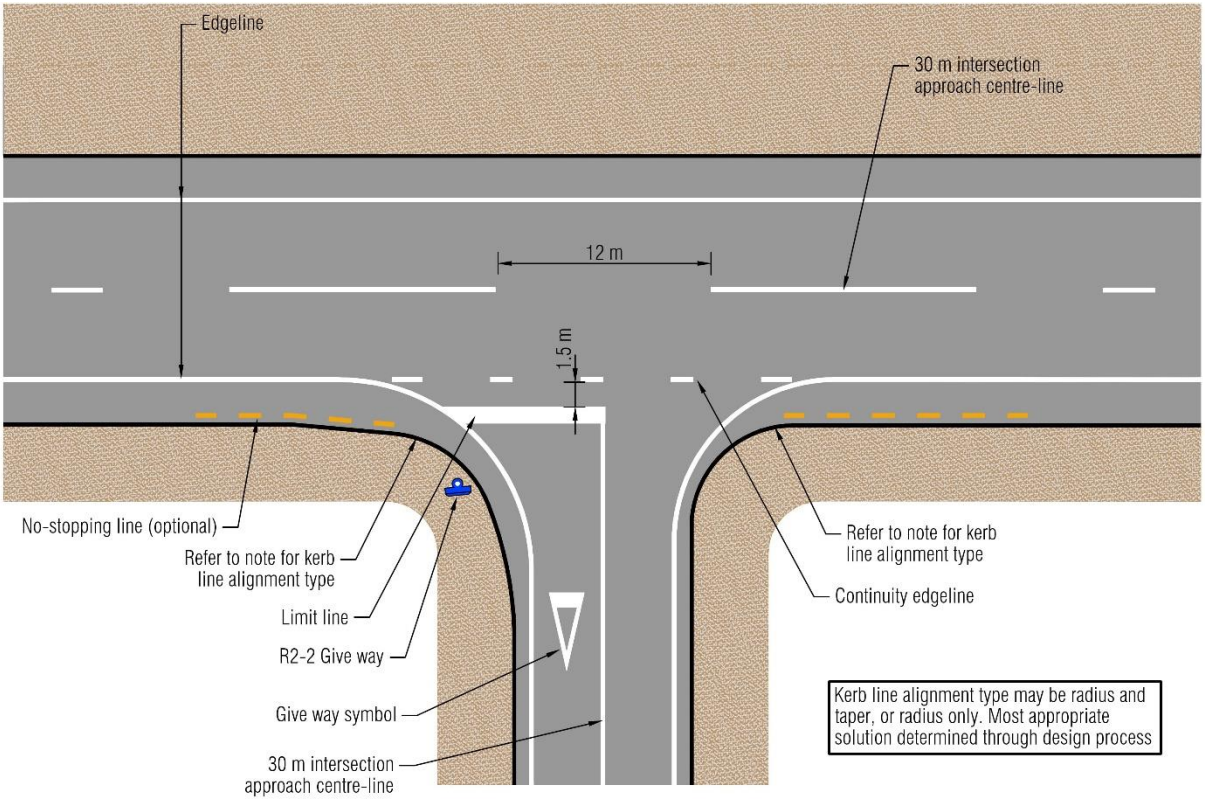


Figure 4-14: Markings for give-way controlled urban intersections – with edgelines

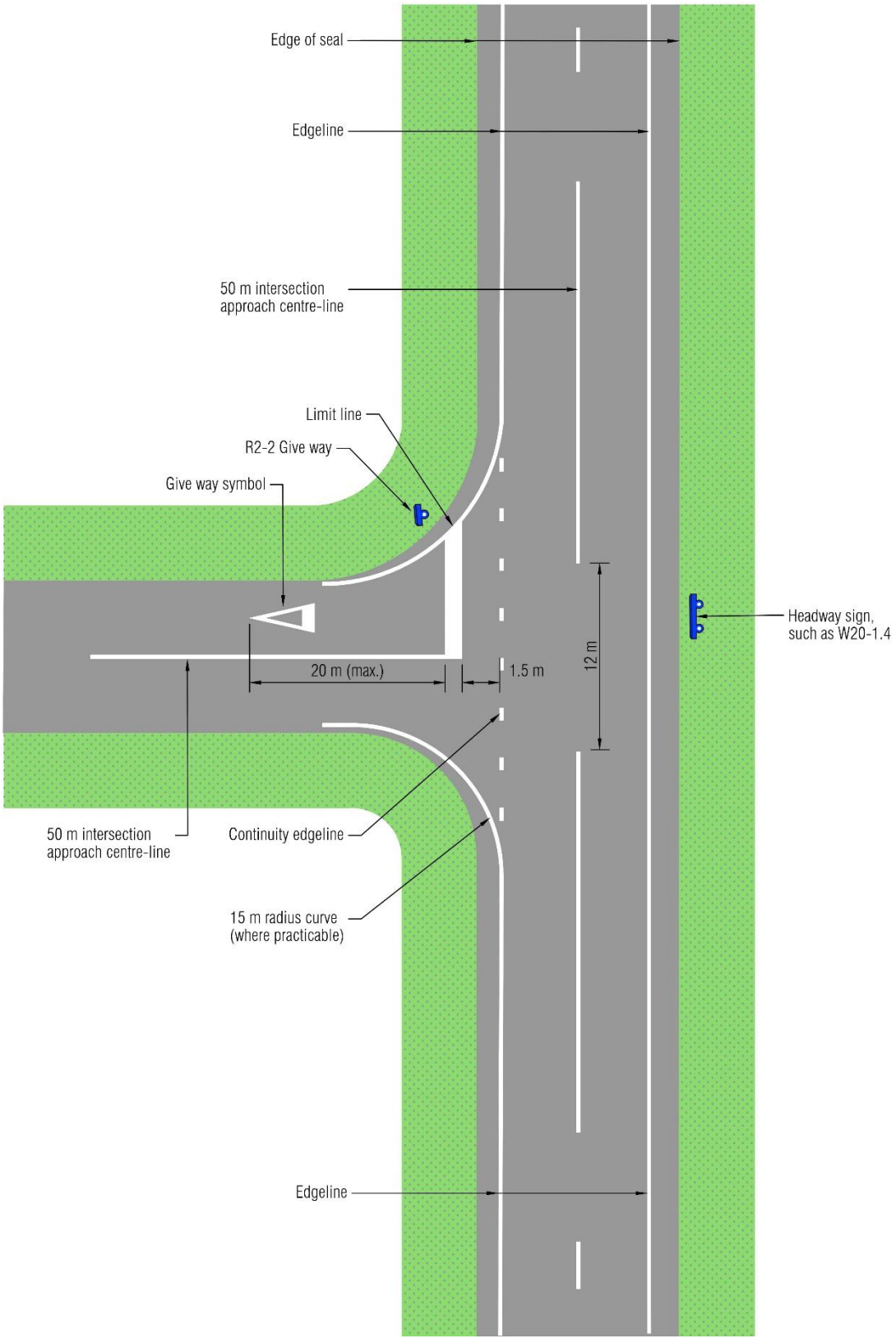


Figure 4-15: Markings for give-way controlled rural intersections – low-volume side road

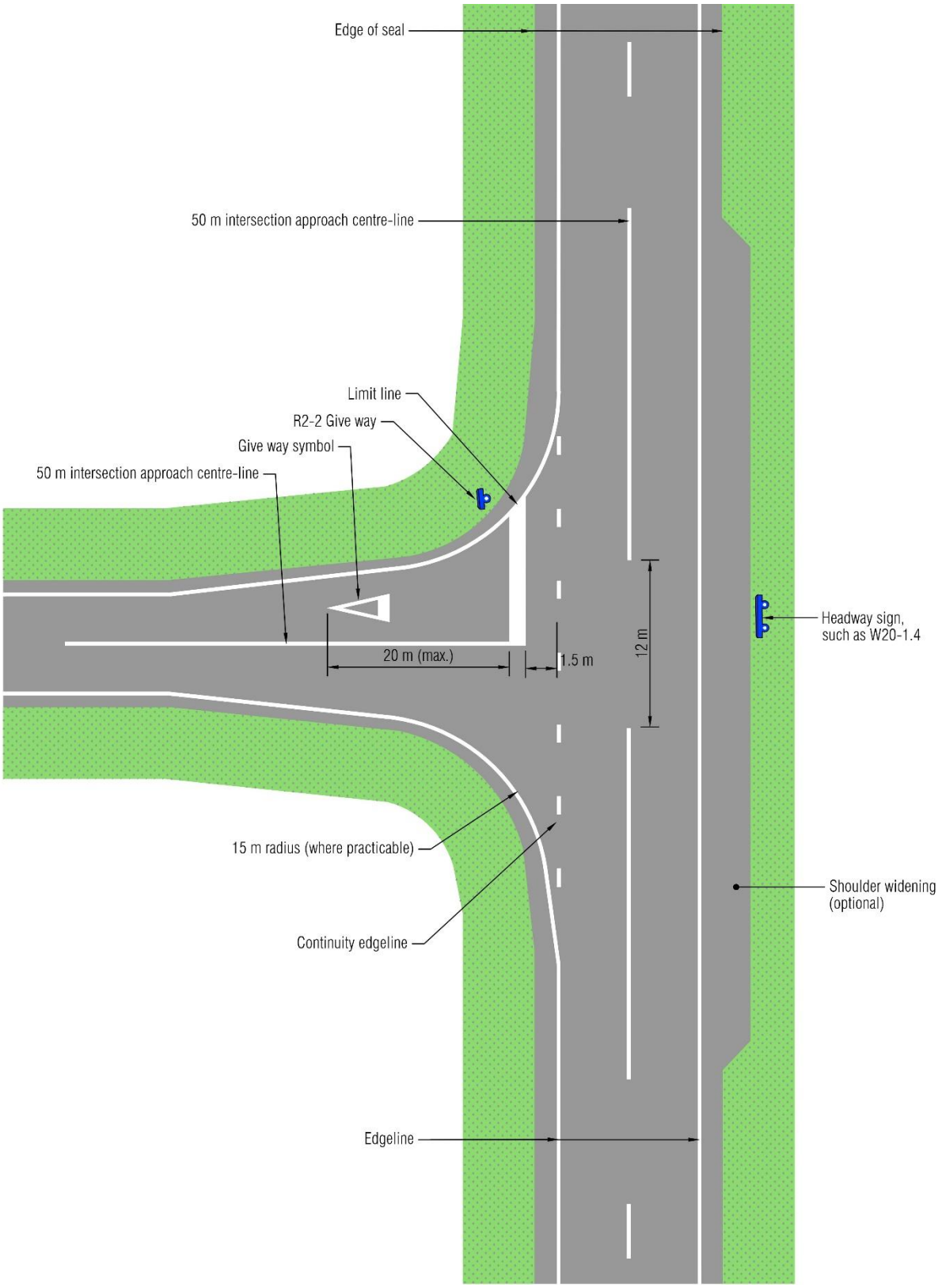
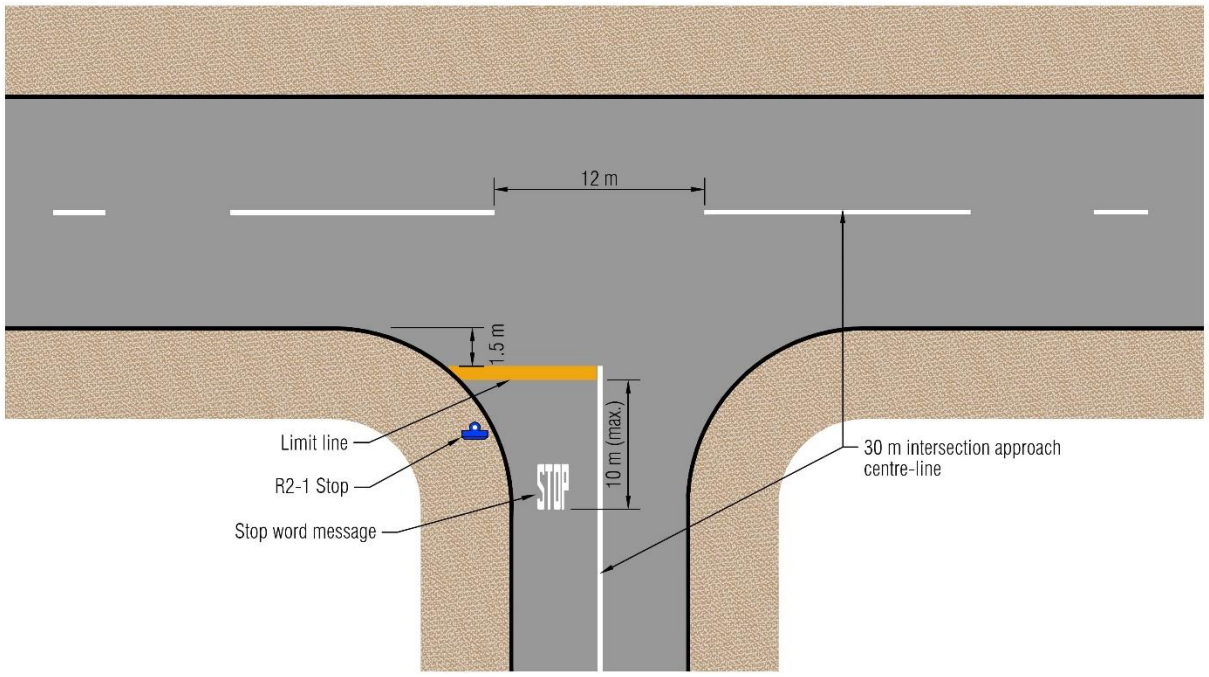
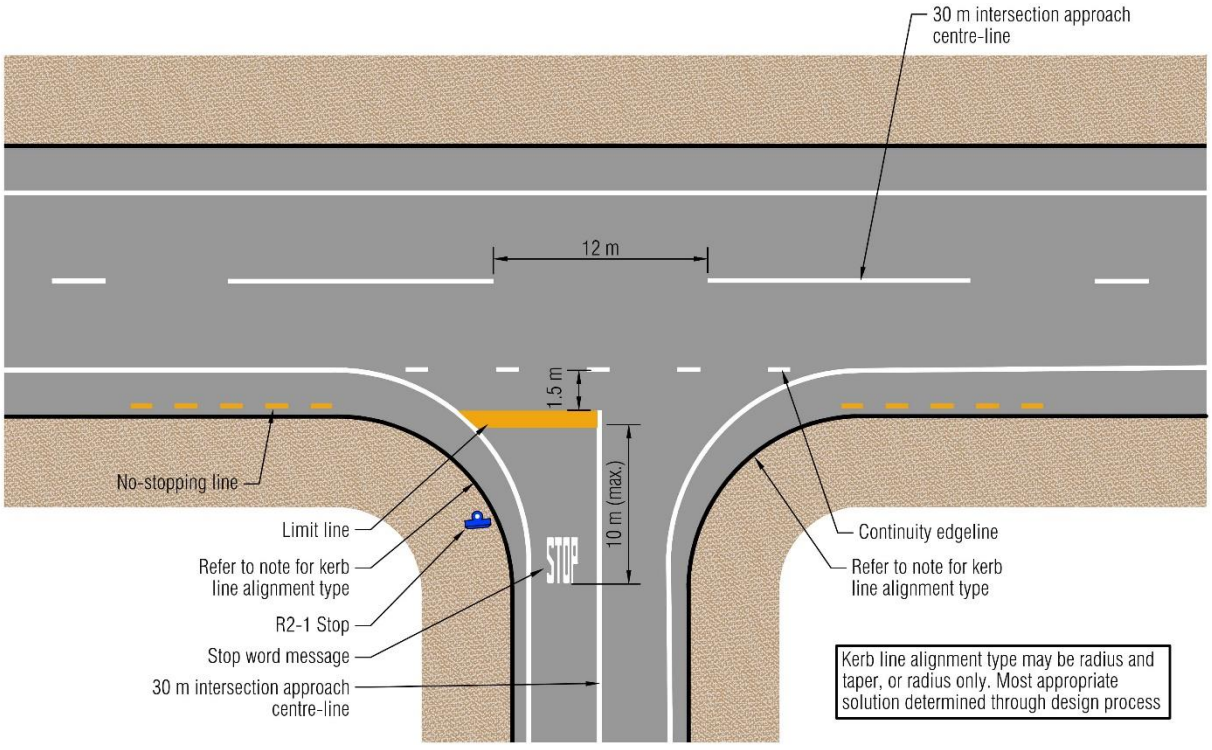


Figure 4-16: Markings for give-way controlled rural intersections – medium to high volume side road

4.13.2. Stop control



(a) Main road without edgeline



(b) Main road with edgeline

Figure 4-17: Markings for stop controlled urban intersections

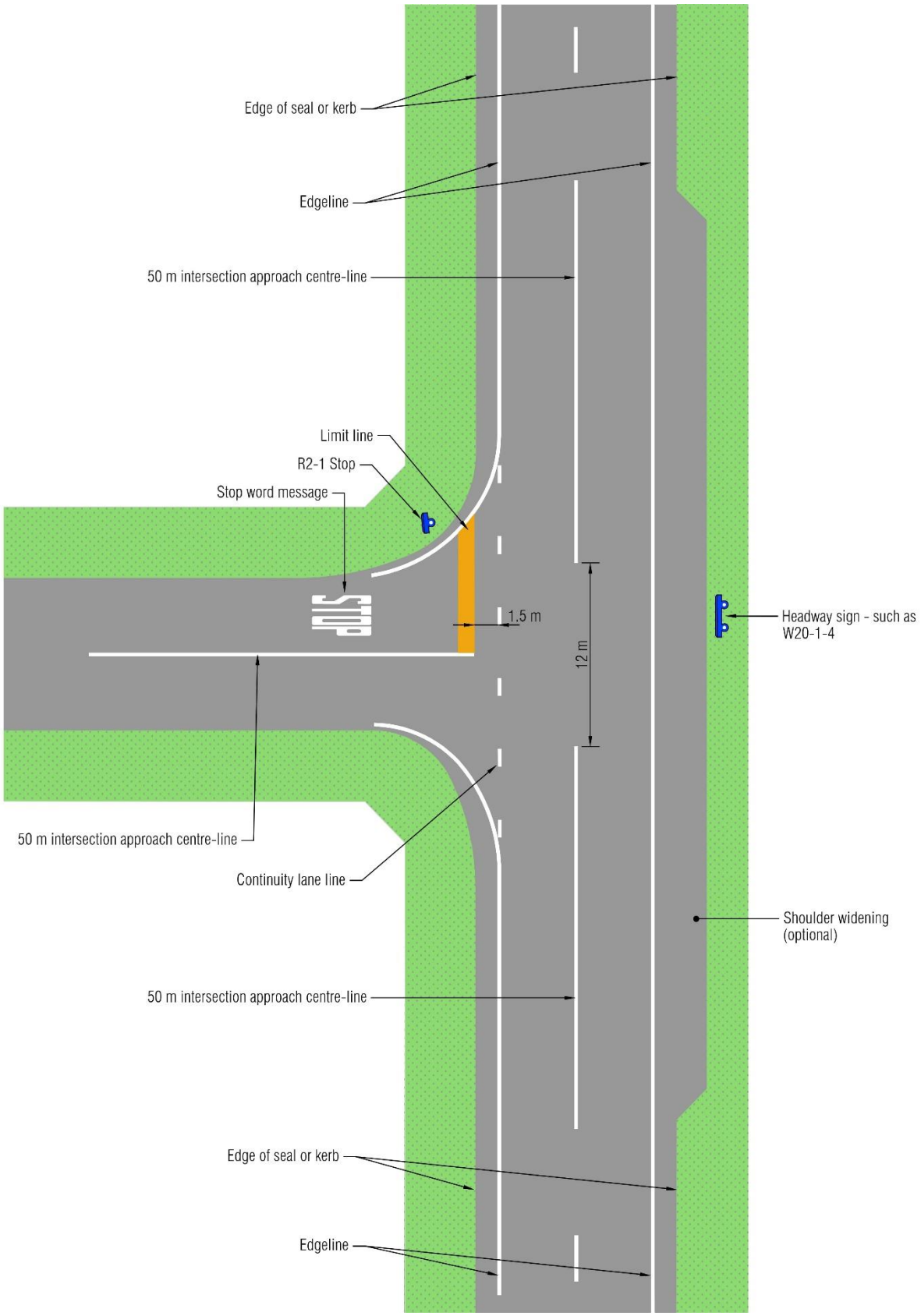


Figure 4-18: Markings for stop controlled rural intersections

4.13.3. Staggered T

Where no right turn bays or flush median are needed (for example where low turning volume flows occur) the intersection can be marked as per a typical T-intersection. Example layouts for left-right staggered T-intersections are shown in Figure 4-19 and Figure 4-20.

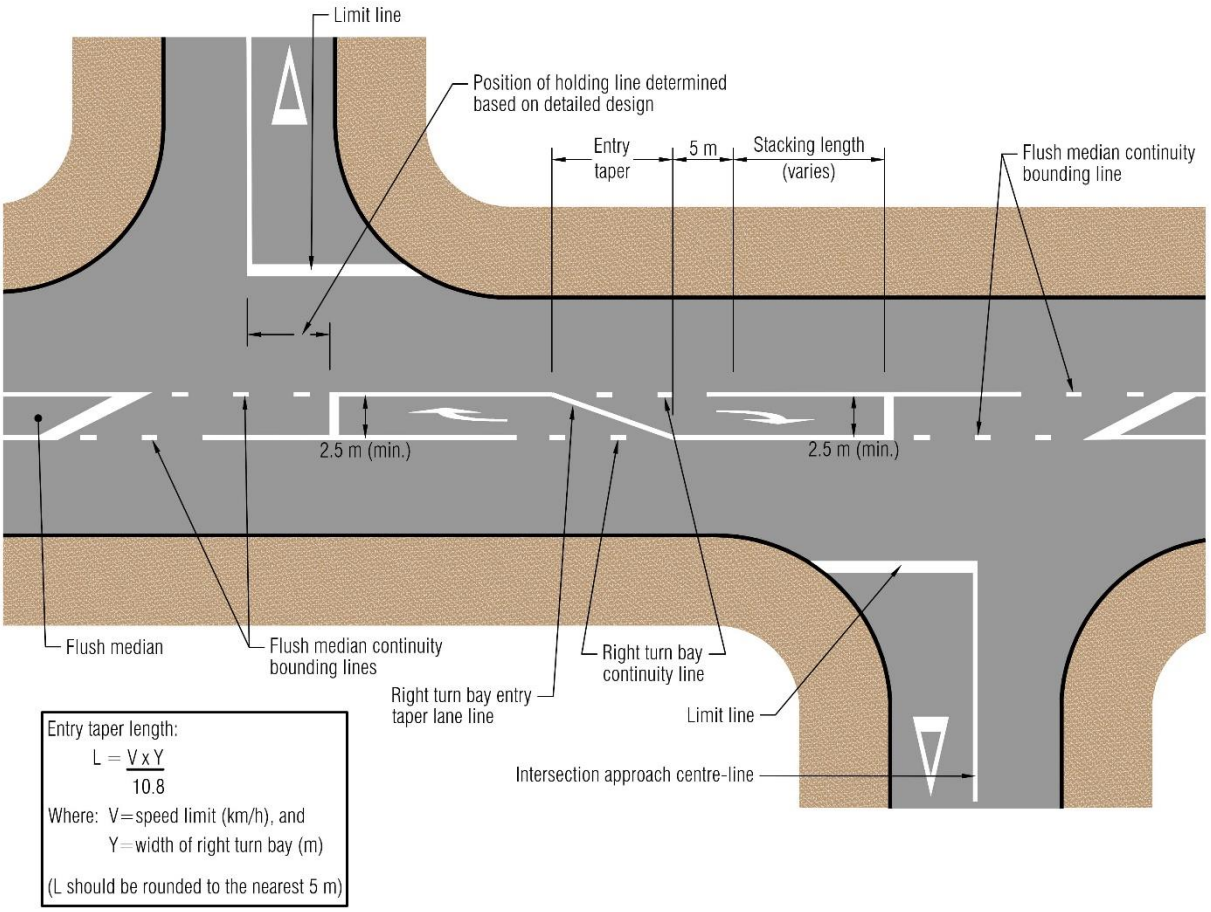


Figure 4-19: Left-right staggered T-intersections with right turn bays

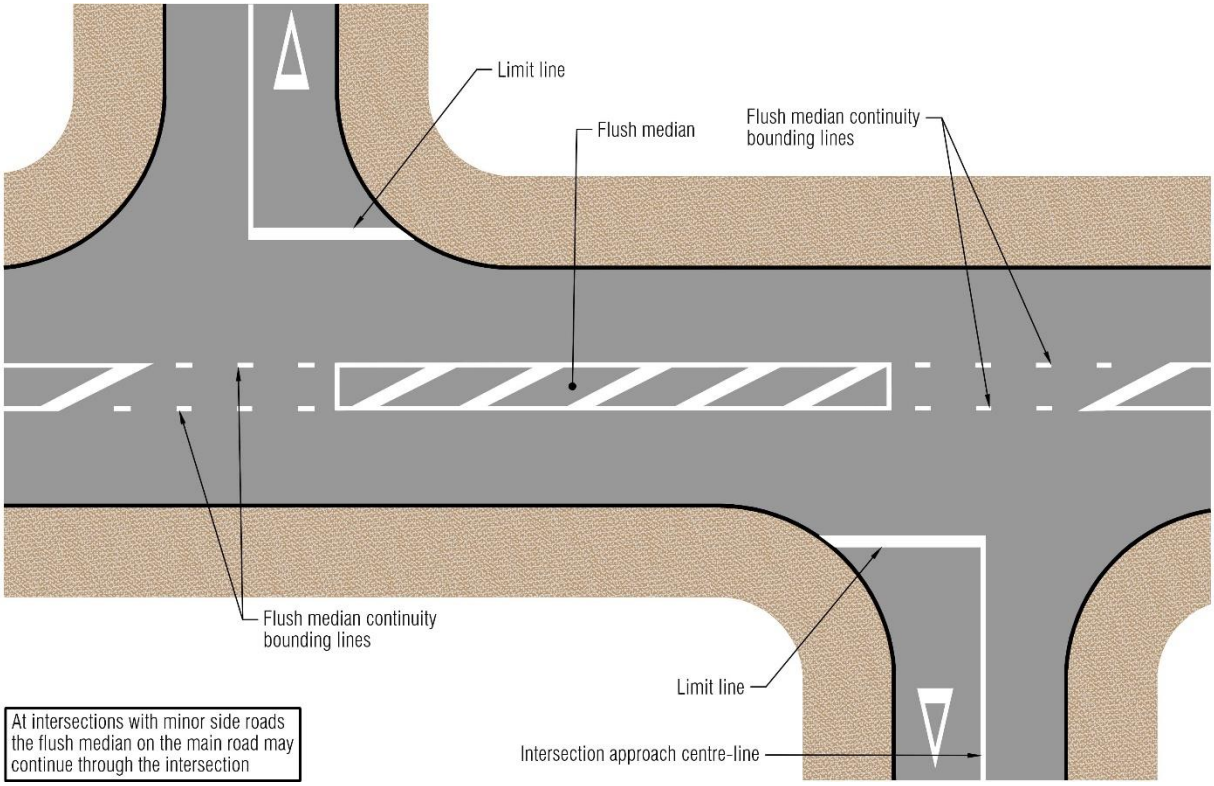


Figure 4-20: Example markings for left-right staggered T intersections with a flush median

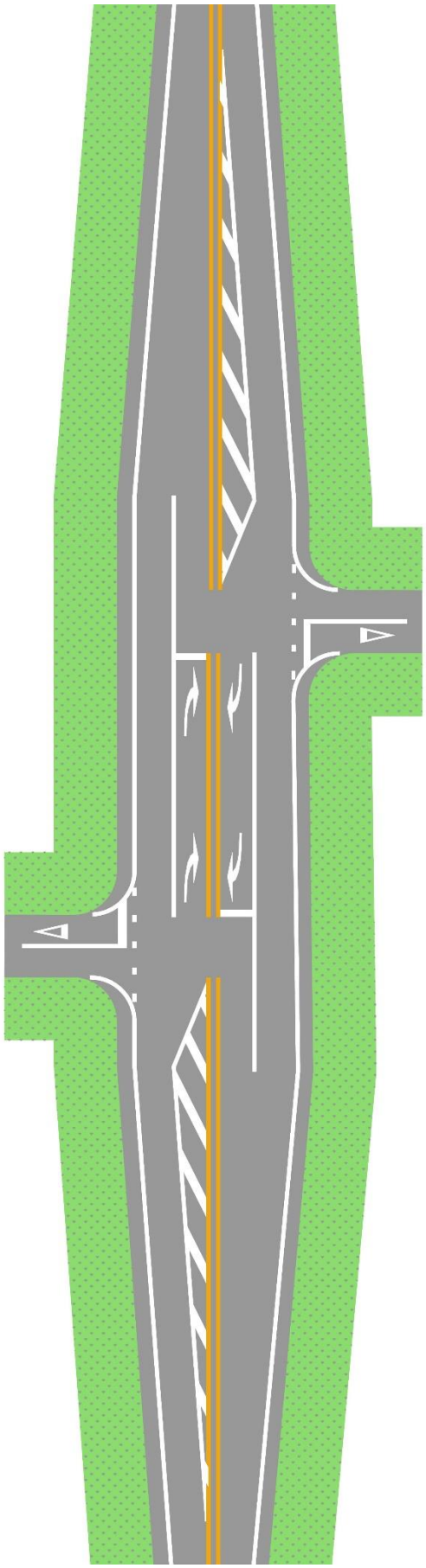
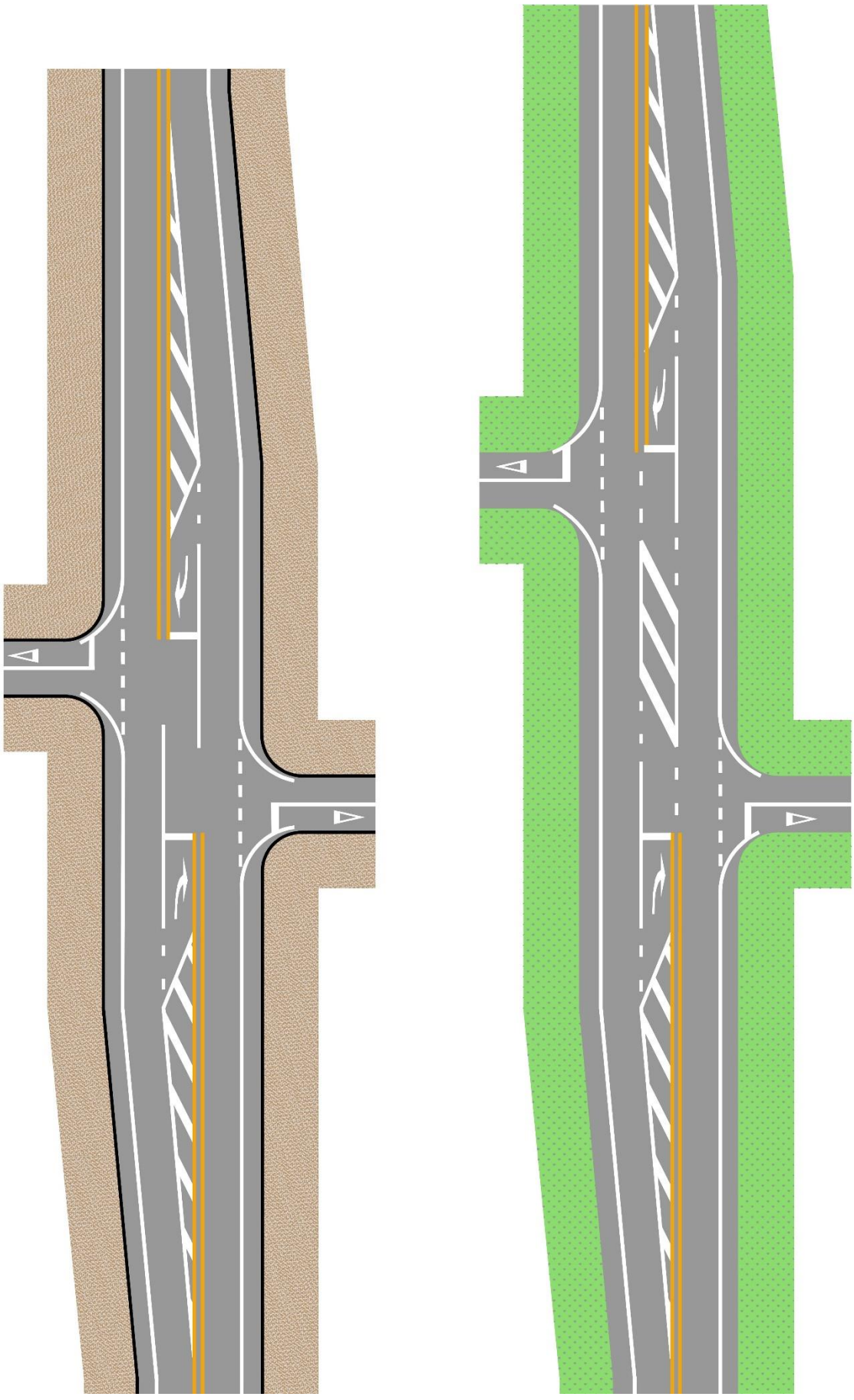


Figure 4-21: Left-right staggered T intersection with double right turn lanes – high turning volumes



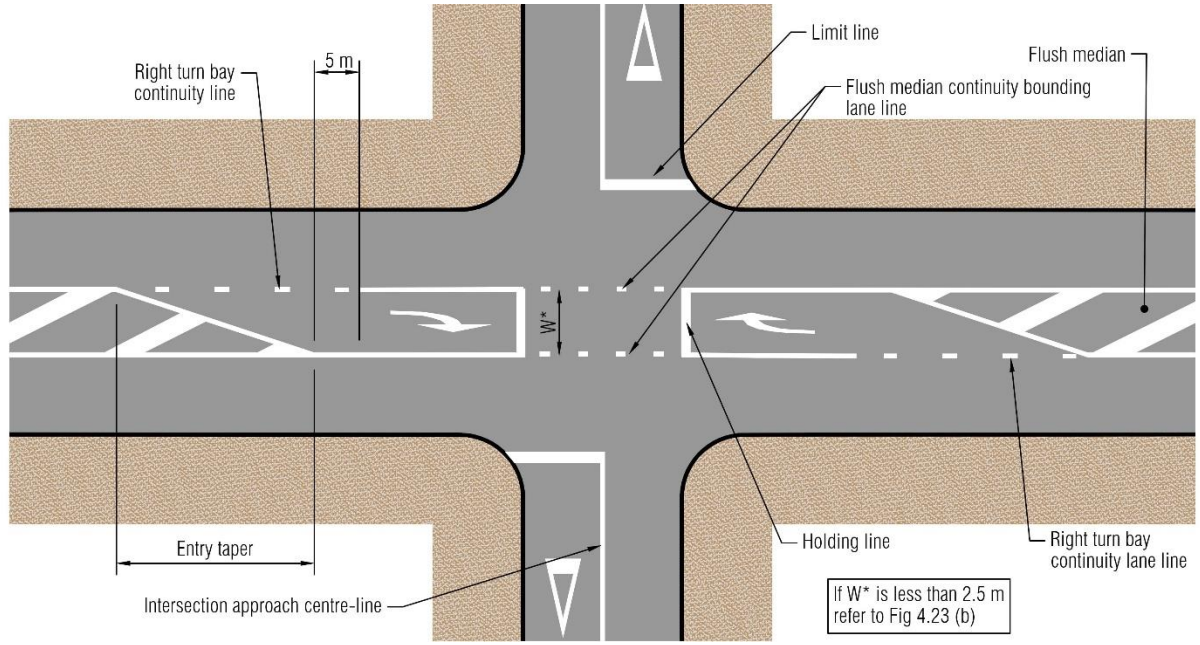
(a) Without flush median

(b) With flush median

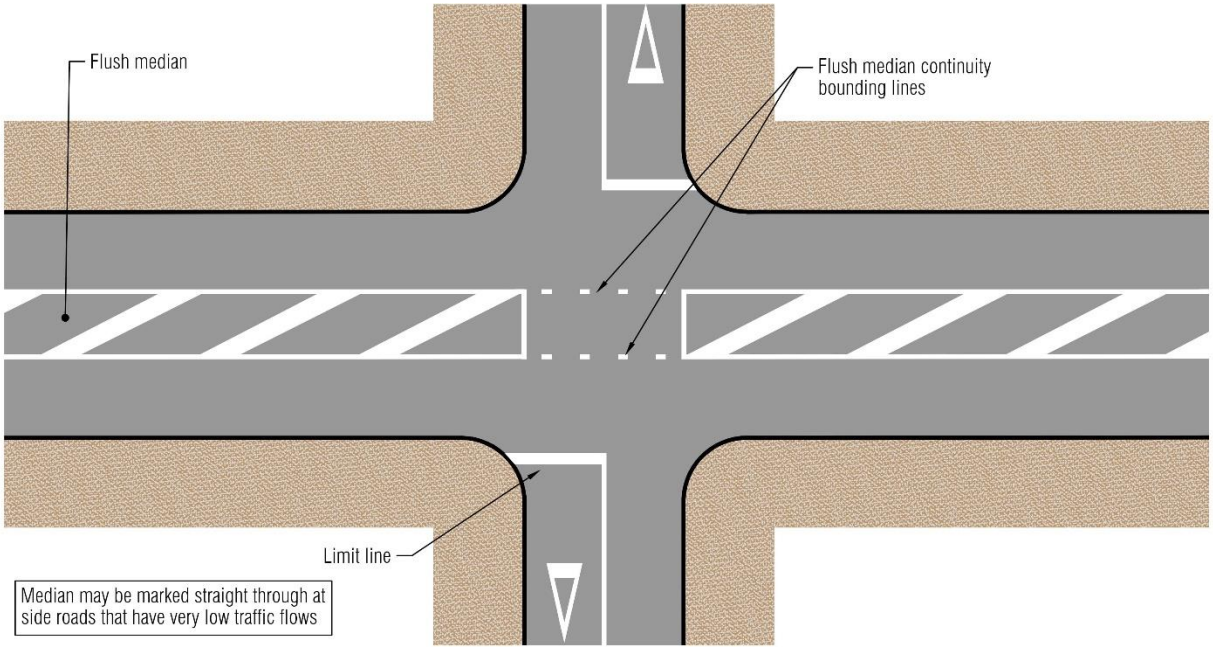
Figure 4-22: Example layout for right-left staggered T intersections

4.13.4. Crossroads intersections

Refer to example layouts for T-intersections for markings used at crossroads. Where marking configurations include other facilities such as right turn bays – refer to Section15 of this Manual. When there are head to head right turn bays that are not contained within a flush median, the hatched area on approach to the right turn bays will be similar to those illustrated in Figure 4-23(a) except that the width of the right turn bay will have been established by a diverge taper rather than being the continuation of the width of the flush median.



(a) With right turn bays



(b) Without right turn bays

Figure 4-23: Example markings for crossroads intersections with flush medians

Practitioners should not assume that treating rural crossroads intersections with the minimum level of traffic control devices specified by the Rule will manage risks to an acceptable level. While the use of traffic control devices for intersections described in this Manual illustrate best practice, not all of the intersection configurations shown are aligned fully with the Safe System approach. Therefore, based on the form of control identified as most suitable for any given intersection, practitioners should assess the

risks associated with that intersection taking into account crash history, traffic volumes, geometry and approach road alignment.

Subject to safety reviews to consider the efficacy of installed traffic control devices at intersections, practitioners may identify that it is appropriate to enhance the prominence of traffic control devices for an intersection through the use of enlarged signs and / or additional measures such as the following:

- Increasing the size of the R2-2 Give-way or R2-1 Stop signs.
- Increasing the width of the limit line to greater than the recommended widths (300 mm for urban and 450 mm for rural) and the use of long-life marking materials.
- R2-2 Give-way or R2-1 Stop signs on the right hand side of the approach as well as on the left-hand side.
- Gating the advance warning signs.
- In conjunction with the gating of the priority control signs, installation of a splitter island on the controlled approach(es) on which a gated priority control sign can be mounted.
- Give-way ahead (W10-2) or Stop ahead (W10-1) signs as described in Sections 4.3.1 and 4.3.2 respectively of this Manual.
- Complementing advance warning signs with message markings on the road surface to draw driver attention to the presence of a requirement that controls traffic. For example, on approach to a stop controlled intersection, a road controlling authority may determine it is necessary or desirable to include the words “stop ahead” on the road surface to draw the attention of road users to the stop control at the intersection (refer to Figure 4-24 for an example). Where words such as these are marked, they must be in accordance with clause 5.2(3) of the TCD Rule, and the M8-2 message markings described in the Rule (also refer to Figure 10-5 and Figure 10-6 of this Manual).

Figure 4-24: “Stop ahead” message marking to draw driver attention to stop control intersection ahead

The visibility and maintenance of traffic control devices at crossroads intersections has been repeatedly identified by Coroners as a contributing factor in fatal crashes. The importance of complying with TCD Rule requirements for ensuring traffic control devices are suitable for the location in which they are installed and that they are maintained in good repair (as specified in Section 1.10 of this Manual) cannot be overemphasised. Meeting those requirements is an ongoing and important responsibility for RCA engineering and maintenance teams.

4.13.5. Cycle lanes

The following figures are examples of best practice for the marking of cycle lanes where they pass side roads and property accesses. If a left-turn slip lane is installed, practitioners should also consider the guidance in Section 14 of this Manual.

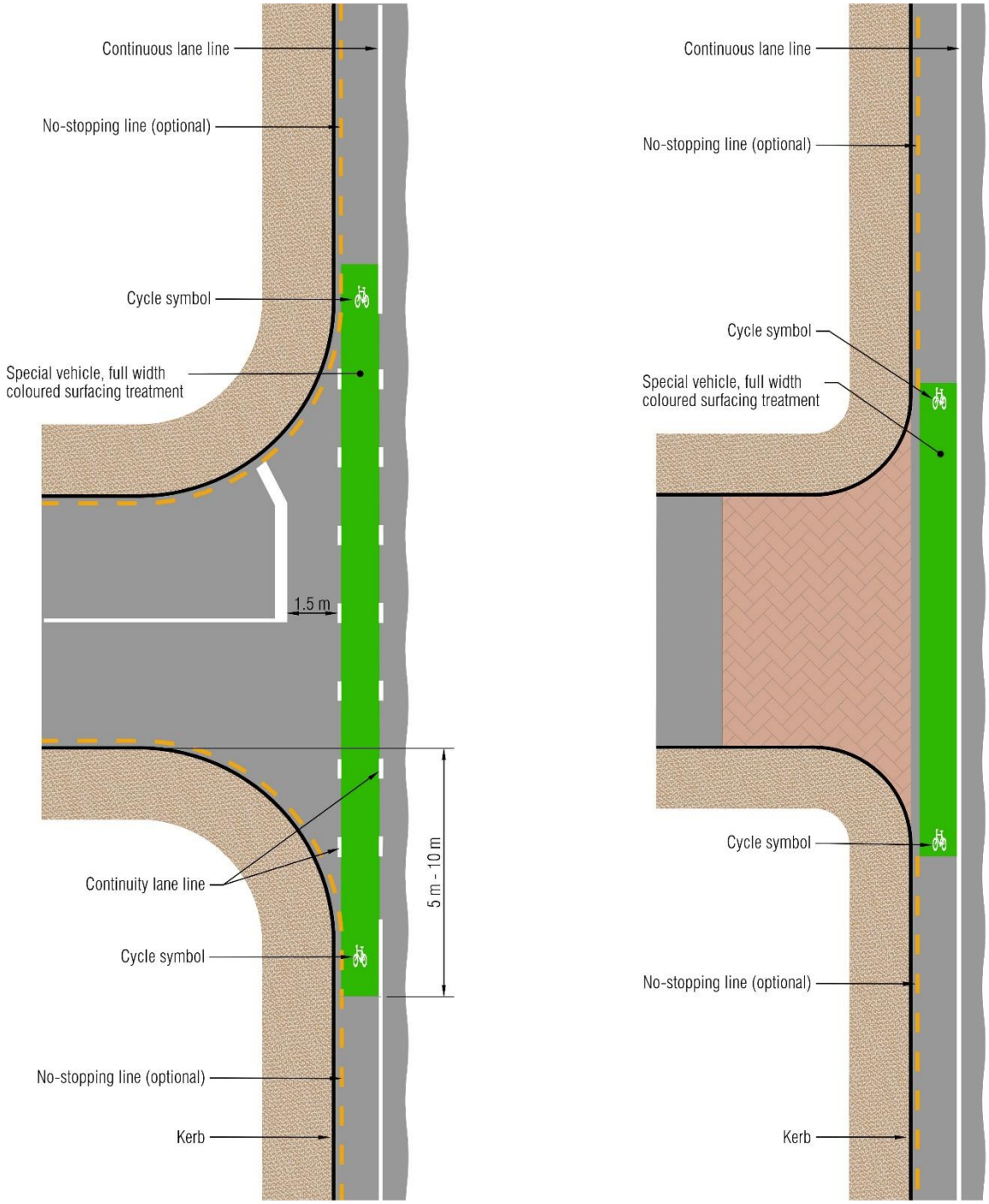


Figure 4-25: Markings for cycle lanes at intersections on roads without edgelines

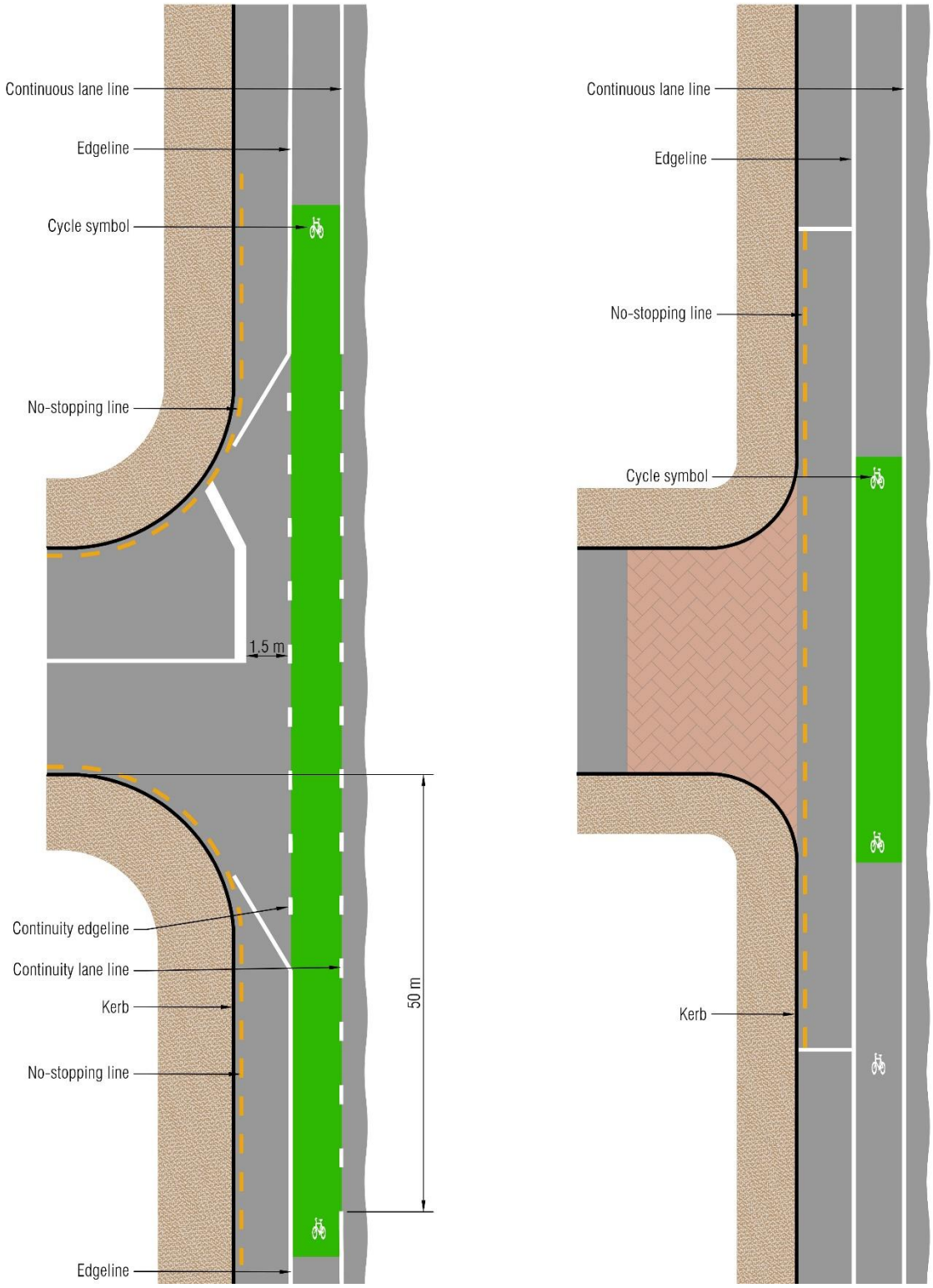


Figure 4-26: Markings for cycle lanes at intersections on roads with edgelines

4.13.6. Cycle paths

Refer to Section 8 of this Manual for guidance on cycle path crossings at priority controlled intersections.

4.14. Unsealed priority controlled intersections

Watch this space: this Manual will be updated in future to include specific advice regarding traffic control devices for priority controlled intersections where the roadway surface on all approaches is unsealed.

5. Roundabouts

A roundabout is an intersection with one or more marked lanes on approach to the roundabout and / or around the circulating carriageway. Road users travel in a clockwise direction around a central island of a roundabout.

Except for where this Manual recommends otherwise, roundabouts should be designed in accordance with the Austroads Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings Management (Austroads 2020) and the Guide to Road Design – Part 4B: Roundabouts (Austroads 2015), and, where applicable, individual RCA design standards. Consideration should be given to the movement of all road users (including pedestrians and cyclists) in the planning and design of roundabouts.

5.1. Legislation

Clause 10.4(1) of the TCD Rule states:

(1) "Subject to 10.4(2), if an intersection has a roundabout installed, each entry to the roundabout must have a limit line that consists of a white line that is not less than 300 mm wide and must be controlled by either:

(a) both:

(i) a 'give-way roundabout' sign that complies with Schedule 1 [of the TCD Rule]; and

(ii) a triangular give-way symbol that complies with Schedule 2 [of the TCD Rule], marked on the roadway not more than 20 m before the limit line; or

(b) roundabout metering signals that comply with section 6 [of the TCD Rule]; and

(i) a 'give-way roundabout' sign that complies with Schedule 1 [of the TCD Rule], and that has been mounted on a reflectorised, fluorescent yellow-green backing […] board that provides a border of at least 150 mm; and

(ii) a triangular give-way symbol that complies with Schedule 2 [of the TCD Rule], marked on the roadway not more than 20 m before the limit line; or

(c) traffic signals."

Clause 10.4(2) of the TCD Rule states:

(2) "If a single-lane roundabout and its approaches have safe and appropriate engineering measures installed to slow vehicles, and the measured mean operating speeds on the approaches and through the roundabout are 30 km/h or less, the roundabout may operate without the markings, signs or signals described in 10.4(1)."

5.2. Active road users at roundabouts

Generally, roundabouts with higher traffic speeds or multiple entry, circulating, or exit lanes are less safe for active road users. It is possible to design roundabouts that minimise risk and provide a high level of service for people walking or cycling. Cycle path networks around the outside of a roundabout (refer to Section 5.5 of this Manual) can improve safety and level of service for cycling at roundabouts.

The NZTA Cycling Network Guidance and Pedestrian Network Guidance should also be referred to when considering how pedestrians and cyclists are to be accommodated at roundabouts.

Reference should be made to the NZTA Road and Traffic Standard Series RTS 14 – Guidelines for facilities for blind and vision impaired pedestrians (2015), in particular, Section 5.7.2 Roundabouts.

5.3. Signs and markings

Information on general sign specifications/dimensions is included in TCD Manual Part 1.

5.3.1. Centre-lines

On each approach to a roundabout, centre-lines should be provided unless it is impracticable to do so. Centre-line markings should be marked in accordance with Section 6.2 of the TCD Manual Part 5. A median island should be constructed on each approach. However, where a roundabout has a small central traffic island, it may not be possible to accommodate all turning movements if median islands are constructed.

For diagrams showing example markings for centre-lines at roundabouts, refer to Section 5.10.

5.3.2. Edgelines

Where there are kerb buildouts, continuous edgelines should be marked for a minimum of 30 m in urban areas and 50 m in rural areas in advance of all roundabouts.

For locations where no edgeline exists along a route in advance of a roundabout, the edgeline may taper to the road edge and be marked with diagonal shoulder markings such as those specified in the TCD Manual Part 5.

However, where a roundabout is expected to be used by cyclists and the shoulder could otherwise be mistaken for a cycle lane, the edgeline should be terminated 30 m before the limit line.

5.3.3. Limit lines

Limit lines on the approaches to roundabouts should generally be marked parallel to the circulating carriageway. Where there are two or more traffic lanes on an approach to a roundabout the limit line may need to be stepped and marked at approximately right angles to each approach lane, so drivers in the left lane can see past adjacent vehicles on their right. Designers should consider the position of limit lines based on the competing need to (1) provide adequate sight distance to the right for road users approaching the roundabout (so that visibility to the right is not obstructed by the road user's vehicle or the angle of observation requires significant rotation of the road user's head) against the need to (2) minimise the angle between entering and circulating road users to minimise the relative speed and angle between entering and circulating vehicles. Refer to Figure 5-2(b) for examples of stepped and unstepped limit lines.

Limit lines must be at least 300 mm wide and for rural intersections they should be 450 mm wide.

5.3.4. Give-way symbol

Except where the road surface makes it impracticable or no markings are required in line with clause 10.4(2) of the TCD Rule, a triangular give-way symbol must be marked on the road in each lane approaching a roundabout. The approach side of the give-way symbol must not be more than 20 m before the limit line and the departure side of the give-way symbol should be no less than 2 m from the limit line. The give-way symbol must be marked as illustrated in Figure 5-1 and should be marked as described in Table 5-1.

The longitudinal dimensions of the triangular give-way symbol may be increased provided that, from the viewpoint of a driver approaching the mark, the lateral dimensions of the symbol are retained, and all longitudinal dimensions are increased in the same proportion. Although the width of the angled lines of the triangular give-way symbol have both a longitudinal and lateral component, increasing the length of the symbol only has a minor effect on the width of the angled lines. Practitioners should not make changes to the width of the angled lines to accommodate different triangle lengths; that is, the width of the angled line should remain as 150 mm.

Table 5-1: Marking of triangular give-way symbols

Application	Urban	Rural
Colour	White	White
Longitudinal dimension (typical)	4.0 m	6.0 m
Location (lateral)	In the lateral centre of each give-way controlled lane	In the lateral centre of each give-way controlled lane

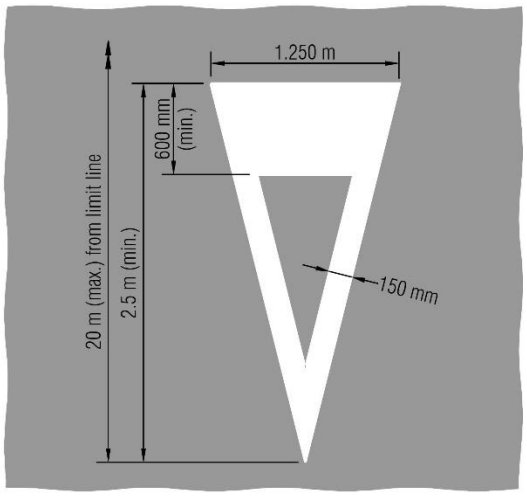


Figure 5-1: Triangular give-way symbol dimensions (M6-2 of the TCD Rule)

For all roads the triangular give-way symbol must be marked in white and be a minimum 2.5 m high.

5.3.5. Cycle facilities

Cycle lanes should not be marked around roundabouts; the NZTA Cycling Network Guidance (CNG) notes that injury crash rates for cyclists at roundabouts are typically higher than at other intersection types. RCAs may provide off-road circulating paths for cyclists (refer to Section 5.6 of this Manual). In this case, where cyclists are expected to transition to an off-road path, a cycle lane may terminate closer than 30 m from the limit line. Where cyclists are expected to ride on the roadway in a roundabout, cycle lanes on approaches to roundabouts should be terminated at least 30 m in advance of the limit lines, to encourage cyclists to transition into the general traffic lanes.

Cycle lanes can be marked on the left hand side of the departure legs of roundabouts. The principles of marking cycle lanes on the approaches to and departures from roundabouts are illustrated in Figure 5-2.

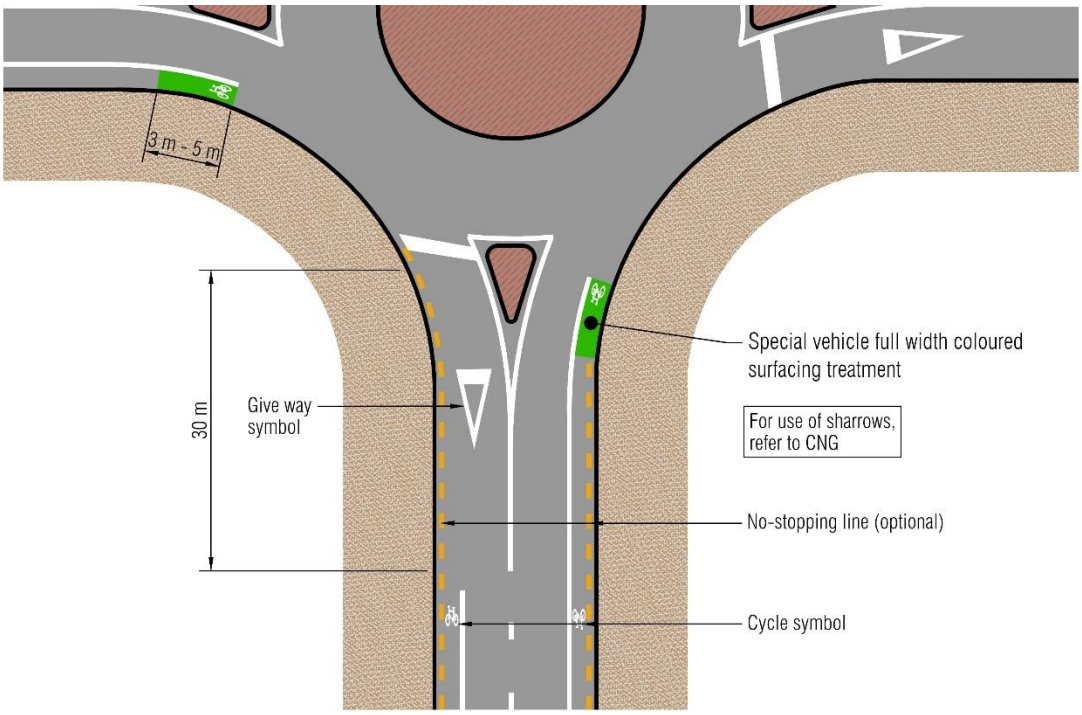
Further discussion on the reasons for not marking cycle lanes in roundabouts and methods of designing cycle-friendly roundabouts are given in the Cycling Network Guidance.

Sharrow markings are a useful tool to communicate to both cyclists and motor vehicle drivers that cyclists are expected to share the general traffic lane by taking the same position in the lane as a motor vehicle would to prevent motor vehicles from passing them, including on the approaches to single-lane, low-volume low-speed roundabouts. For guidance on the use of Sharrows, refer to the TCD Manual Part 5 and the NZTA Sharrow Markings Best practice guidance note.

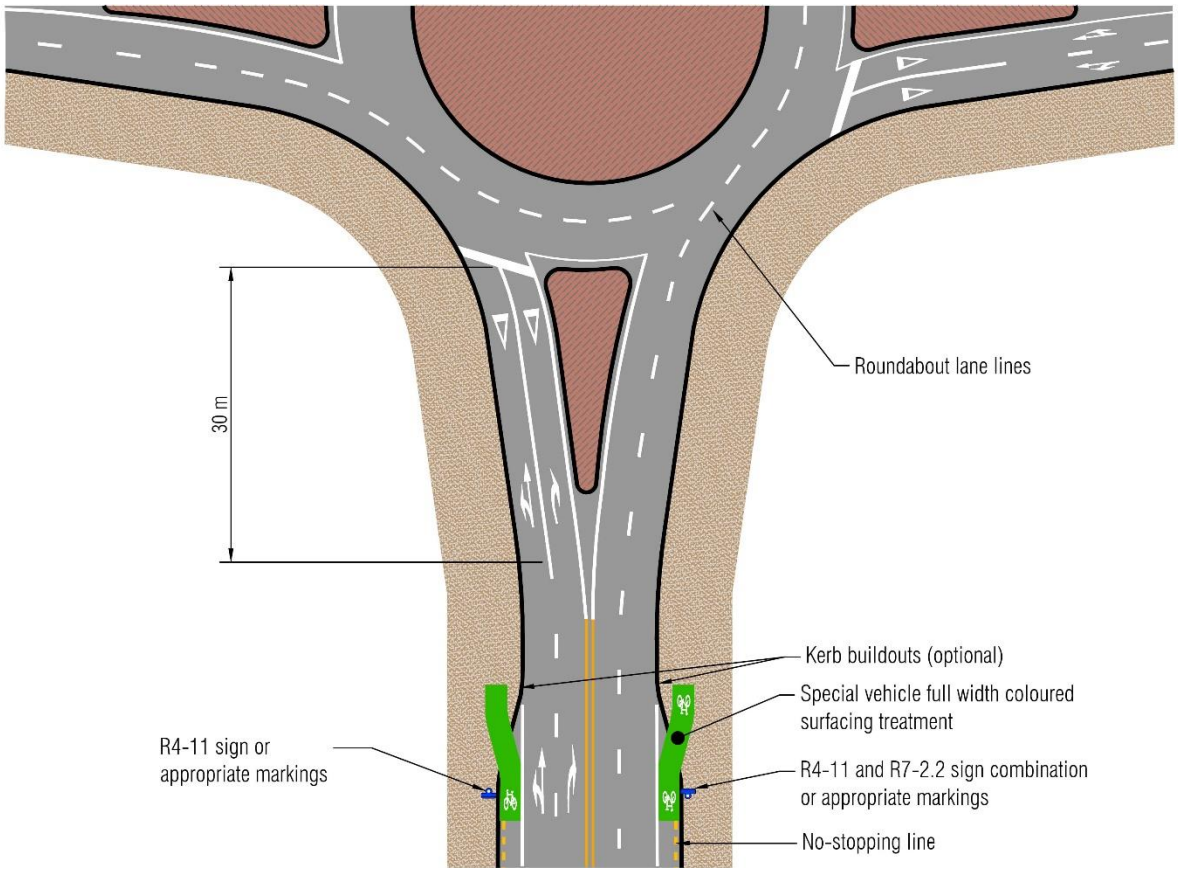
Where cycles and motor vehicles will be sharing the lane on approach to a roundabout, consideration should be given to installing a W16-7 Cyclists with W16-7.2 Cyclists ahead supplementary sign – Merging sign combination to highlight for motor vehicle drivers that cyclists are likely to be travelling in the same lane as them. The sign combination is illustrated in Table 5-3.

5.3.6. No-stopping lines

No-stopping lines may be marked at roundabouts if the RCA considers it is necessary to reinforce the prohibition of parking at the intersection and / or extend the length over which parking is prohibited in the vicinity of the intersection. They should be marked as described for uncontrolled intersections in Section 3.2.4 of this Manual.



(a) Single lane roundabout



(b) Multi-lane roundabout

Figure 5-2: Markings for cycle lanes on approaches to and departures from roundabouts

Note 1: Sharrow markings.

For guidance on the use of sharrows at roundabout refer to the NZTA Sharrow Markings: Best practice guidance note.

5.3.7. Markings at multi-lane roundabouts

Clause 10.4(5) of the TCD Rule states that:

(5) "If a section of the roadway around a roundabout, or an exit from that section of roadway, has more than one lane for motor vehicles, a road controlling authority must mark lane lines to direct the flow of traffic."

The 'Alberta' marking method involves the placement of roundabout lane lines within the circulating roadway of a roundabout to separate vehicles and guide drivers through the intersection. 'Alberta' roundabout lane lines combined with clearly marked approach lanes, direction arrows and appropriate signs used on multi-lane roundabouts will give motorists every opportunity to negotiate these roundabouts without conflicting with other circulating traffic.

Guidelines for the design and marking of multi-lane roundabouts are available in Austroads Guide to Road Design Part 4B.

(a) Circulating and exit lane

RCAs must mark roundabout lane lines on each section of circulating roadway and on any exit from that section of roadway that has more than one lane to direct drivers into the correct exit lanes.

Roundabout lane lines should be marked across the extent of the throat islands and matched smoothly into the lane lines on the exit legs of roundabouts. The marking provides delineation for drivers of vehicles exiting multi-lane roundabouts and also legally defines that the driver of a vehicle to the left of the roundabout lane line is changing lanes when they are continuing on the roundabout past the next exit.

Spiral markings should be marked using a 1 m dash with a gap of 1 m; the gap can be increased up to a maximum of 2 m. Spiral markings are most akin to continuity lane lines and recent experience suggests this form is effective.

Table 5-2: Roundabout lane lines and spiral marking form

	Dash (Length x Width)	Gap (m)
Roundabout lane lines (typical)	3 m x 100 mm	3
Spiral markings (typical)	1 m x 200 mm	1

(b) Lane use arrows

Where there is more than one lane on an approach to a roundabout, directional lane arrows must be used to direct drivers into the correct lane. For specification of the lane arrows and other TCDs providing lane guidance, refer to Section 10.

5.3.8. Retroreflective raised pavement markers

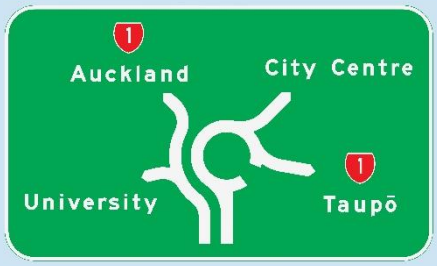
At and on approach to or exit from roundabouts, it may be appropriate to mark retroreflective raised pavement markers (RRPMs) on edgelines, lane lines, and centre-lines. Where marked, RRPMs should be in accordance with the guidance in Section 2.8 of TCD Manual Part 5.

5.3.9. Signs used on the approaches to roundabouts

The types of signs used on the approaches to roundabouts are outlined in Table 5-3. Note that if a roundabout has appropriate engineering measures installed to slow vehicles and the measured mean operating speeds on the approaches and through the roundabout are less than 30 km/h the roundabout may operate without signs.

Table 5-3: Signs for approaches to roundabouts

Code	Sign	Policy and Use
R2-3 Give-way roundabout		If an intersection is controlled by a roundabout each entry to the roundabout must be controlled by an R2-3 Give-way roundabout sign except where a single-lane roundabout and its approaches have safe and appropriate engineering measures installed to slow vehicles, and the measured mean operating speeds on the approaches and through the roundabout are 30 km/h or less. R2-3 signs should normally be installed on the left-hand side of each approach to a roundabout. The back of the sign should be visible to traffic on the roundabout and the sign should be closer than 9 m to the edge of the circulating roadway. If an approach has a traffic/splitter island between opposing lanes an additional R2-3 sign should be installed on the island. Refer to Section 5.6 of this Manual for example layouts of these intersections. Refer to Note 2 for information regarding sign sizes. Refer to Note 1 for information regarding sight distances for signs; where these distances cannot be achieved, advance warning of the R2-3 sign should be provided by the installation of a W11-1 warning sign.
W10-5 Advance warning roundabout		A W10-5 sign should be installed on approaches to a roundabout where the RCA considers that approaching drivers need additional warning of the likelihood of the need to stop because of queues.
W11-1 Roundabout		W11-1 signs should be installed in advance of roundabouts where traffic is required to circulate around a central island unless advance map type signs are installed. Refer to Note 3 for information regarding sign sizes. Signs should be installed where they are visible to approaching drivers over the distances described in Note 1 and in advance of the R2-3 signs by the distances described in Note 1.

Code	Sign	Policy and Use
W16-7 Cyclists		A W16-7 sign alerts will that there are likely to be cyclists ahead; the W16-7.2 supplementary sign informs motor vehicle drivers that the cyclists ahead are likely to be merging into the flow of traffic at a roundabout or at a location where dedicated cycle infrastructure discontinues. The sign combination, in conjunction with sharrow markings, highlights for motor vehicle drivers the need to share the lane on approach to the roundabout with cyclists. Refer to Note 3 for information regarding sign sizes. Signs should be installed where they are visible to approaching drivers over the distances described in Note 1 and in advance of the R2-3 signs by the distances described in Note 1. However, they should also be positioned in advance of the first sharrow marking on approach to the roundabout by the distances described in Note 1 and so there is adequate spacing between other signs on approach to the roundabout.
W16-7.2 Cyclists ahead supplementary sign – Merging		
A11-4 Advance direction – map		Where an RCA considers that advanced direction guidance would be beneficial, advance direction signs may be installed. These may replace the W11-1 sign. A11-4 map signs should be provided on all approaches to intersections between state highways and must show a symbolic map of the intersection. Refer to Section 10.4 of this Manual for more detail regarding this sign
A11-4 Advance direction – map		

Note 1: Sight distance and location requirements.

a. The regulatory sign described in Table 5-3 above should be installed where it is clearly visible to approaching drivers for at least the sight distances described in the table below.

b. The advance warning signs described in Table 5-3 above should be installed where they are:

(i) Clearly visible to approaching drivers for at least the distances described in the table below.

(ii) Located in advance of the intersection by at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

Note 2: R2-3 Give way roundabout sign size requirements.

The sign should be at least the minimum size shown in the table below, where the left-hand dimension describes the width of the base of the triangle and the dimension of each of the sloping sides, and the right-hand dimension describes the height of the triangle.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	865 x 750 mm
60 km/h to 80 km/h	1040 x 900 mm
90 km/h to 110 km/h	1390 x 1200 mm

Note 3: Advanced warning sign size requirements.

The sign should be at least the minimum size shown in the table below.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	600 x 600 mm
60 km/h to 80 km/h	750 x 750 mm
90 km/h to 110 km/h	900 x 900 mm

5.3.10. Signs used at roundabouts

If a roundabout has appropriate engineering measures installed to slow vehicles and the measured mean operating speeds on the approaches and through the roundabout are less than 30 km/h the roundabout may operate without signs (refer to Section 5.1 of this Manual).

To warn drivers of the need to manoeuvre around the central island of a roundabout, chevron sight boards, intersection direction signs, or street name plates should be located on the central island, as indicated in Figure 5-4. Care should be taken to ensure that the sight boards are not, or do not become, hidden by vegetation, or any other object located on the central island. In some cases, cobbles or solid surfacing can be used in front of the signs so that the vegetation does not obscure the sign.

Chevron sight boards (refer to Table 5-4) are desirable at roundabouts because they emphasise both the central island and the change in travel direction drivers are required to make to enter the roundabout. However, where the chevron boards in Table 5-4 are impracticable, such as locations where a fully traversable central traffic island is installed, headway intersection signs (refer to Section 4.3.4 of this Manual) may be used instead and would be located similar to as described in Section 4.3.4 for priority controlled intersections. Generally, headway intersection signs can only be installed for one approach to a roundabout.

Table 5-4: Signs on the central traffic island of a roundabout

Code	Sign	Policy and Use
W20-1.1 Chevron sight board – roundabout, white on black		Chevron sight boards should be used to highlight the presence of the central island to approaching users. However, where operating speeds are very low they may not be necessary. The yellow and black sign should be used for all new installations. The size of the sign should be appropriate to the approach speed and only use a small version in low speed environments. The minimum sizes are: • W20-1.1: 1600 mm x 400 mm • W20-1.3: 1200 mm x 450 mm These dimensions should however be increased proportionally if it is considered appropriate for a given situation, for example for rural roundabouts it is preferred that chevron symbols are bigger and the sign size should be increased to 2400 x 900 mm. A chevron sight board should be placed on the central island in the direct projected vision of an approaching driver. The position is aligned with the approach to the roundabout, not the drivers' position at the limit line of the roundabout. Mounting height may be varied to suit the location. Chevron sight boards should be located in line with approaching traffic.
W20-1.3 Chevron sight board – roundabout, black on yellow		
A13-1 Intersection direction – arrow board		On small roundabouts in urban areas a larger than normal, but low mounted, intersection direction/guide sign (ID-1, ID-2, ID-3) and / or a street name sign (SN-1) may replace or supplement the chevron sight board. Further information on intersection and advance direction signs can be found in Section 7 of the TCD Manual Part 2.

5.3.11. Signs used on the exit from roundabouts

It is desirable to install appropriate delineation to highlight exit splitter islands at roundabouts. A street name sign or destination sign may be installed on an exit splitter island such that it can be seen by circulating traffic. This sign will provide delineation of the exit island and improve wayfinding for drivers (refer to Table 5-5 for an example). Such signs should be installed on any roundabouts with more than four legs, closely spaced exits, or non-circular central traffic islands, or high circulating radii.

Table 5-5: Signs at the exit from a roundabout

Code	Sign	Policy and Use
A13-1 Intersection direction – arrow board		Intersection direction signs (ID-1, ID-2, ID-3) and / or a street name sign (SN-1) may be used to help road users select the appropriate exit at a roundabout. The size of the sign should be appropriate to the approach speed. Intersection direction signs may be installed on the central island (in place of a roundabout chevron board) or on the splitter island of the appropriate exit as shown in Further information on intersection and advance direction signs can be found in Section 7 of the TCD Manual Part 2.

5.4. Pedestrian facilities at roundabouts

It should be expected that pedestrians are using the road network at all urban roundabouts and some rural roundabouts and that they may need to cross every leg of the roundabout. Guidance for pedestrian facilities is provided in Section 7 of the TCD Manual Part 5 and design guidance can be found in the NZTA Pedestrian Network Guidance.

5.4.1. Pedestrian crossings (zebra)

RCAs may install pedestrian crossings (zebra) near roundabouts, and there is no required setback from the intersection. However, the following matters should be considered:

- A limit line must be marked at 5 m minimum distance from the pedestrian crossing if practicable;
- A W16-2 sign must be installed to face all approaching traffic;
- Drivers who stop for pedestrians may block the intersection;
- Pedestrian crossing signs and markings will not apply to all drivers approaching the intersection; and
- The entire length of the pedestrian crossing must be visible to approaching drivers. In this regard, the Road User Rule (Clause 10.1(3) notes that "[…] if a pedestrian crossing is interrupted by a raised traffic island, the parts of the crossing that are situated on different sides of that traffic island must be regarded as separate pedestrian crossings." The TCD Rule requires (Clause 3.1(c)) that traffic control devices must "convey a clear and consistent message to road users […]". Therefore, for all pedestrian crossings (zebra), including those near roundabouts, it must be clear to road users on the roadway and to pedestrians whether the crossing is a single crossing of the full width of the roadway or whether it is subdivided into two parts through the use of a refuge island.

Further guidance for pedestrian crossings (zebra) is provided in Section 7 of the TCD Manual Part 5 and the Pedestrian Network Guidance.

An example layout of pedestrian crossings (zebra) is shown in Figure 5-3.

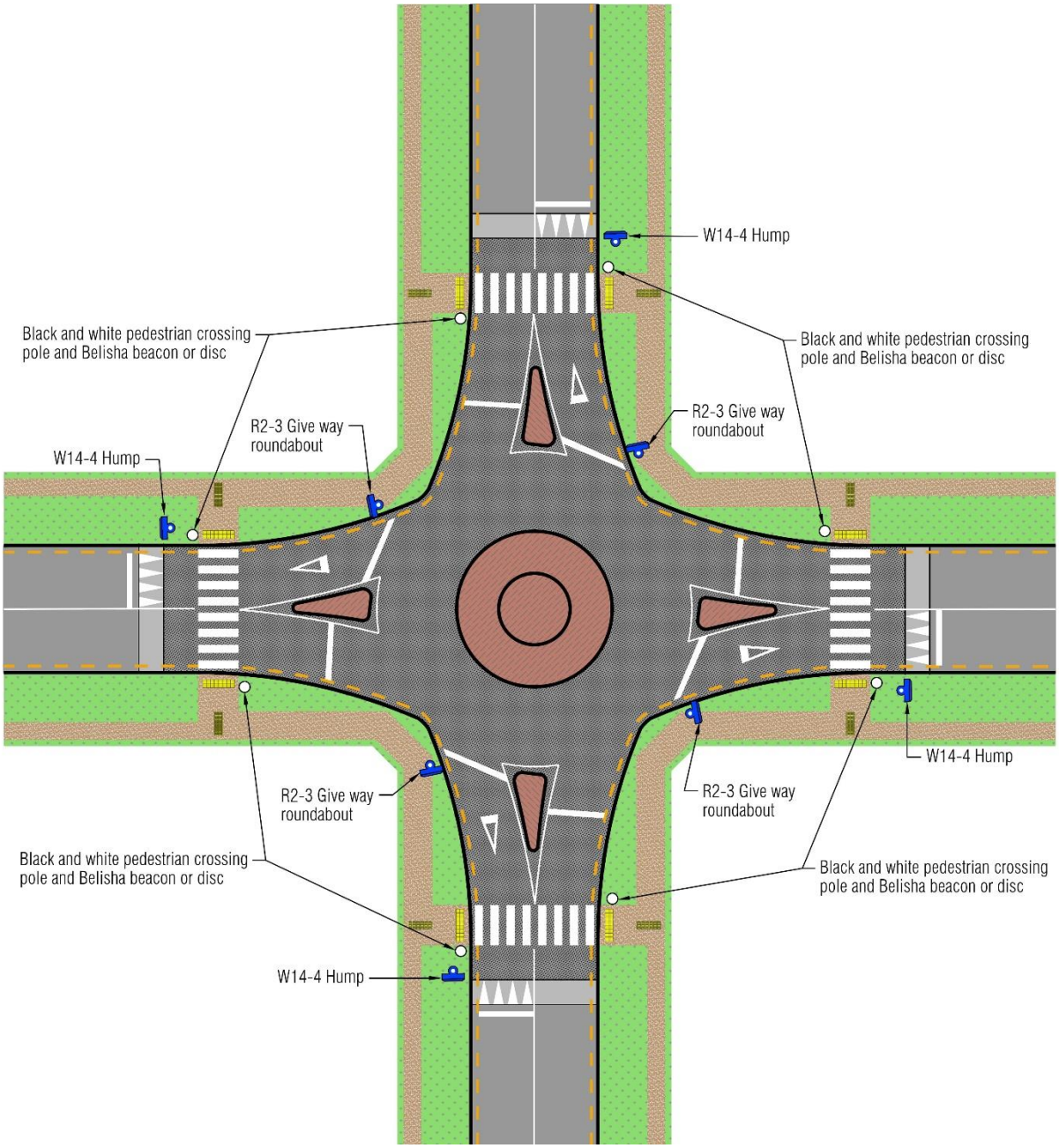


Figure 5-3: Example layout of pedestrian crossing (zebra) at a roundabout

The pedestrian crossings (zebra) illustrated in Figure 5-3 are interrupted by flush traffic islands, however, because the islands are not raised traffic islands, each crossing is a single crossing. Practitioners should ensure that the design of the splitter islands on the approaches to the roundabout do not create the potential for motorised road users exiting the roundabout to conclude that the pedestrian crossings (zebra) on the legs of the roundabout are interrupted by the splitter island. That is, the design of the splitter islands must ensure the messages provided to road users are "clear and consistent".

5.4.2. Signalised pedestrian crossings

Guidance for signalised pedestrian crossings is provided in Section 7 of the TCD Manual Part 5. To reduce the likelihood of a driver mistakenly thinking the green signal gives them priority to enter a roundabout, where a signalised pedestrian crossing is provided on approach to a roundabout, the limit line for the signalised crossing and the limit line for the roundabout should be at least 30 m apart. Because signalised pedestrian crossings at roundabouts can act as a form of roundabout metering, the guidance in Section 5.6.4 of this Manual should also be followed.

5.5. Cycle paths and shared paths at roundabouts

A circulating cycle path or shared path may be installed around a roundabout to improve the level of service and safety for cycling. General guidance for cycling facilities is provided in Section 8 of the TCD Manual Part 5 and in the NZTA Cycling Network Guidance (CNG).

5.5.1. Crossing points

The TCD Rule, clause 11.4(5) states "When a cycle path or a shared path used by cycles crosses a roadway, a road controlling authority may, as appropriate, control either the movement of users of the path or traffic along the roadway by means of stop or give-way signs or by the installation of traffic signals […]".

Refer to Section 8 of this Manual for guidance of traffic control devices at these crossings. In addition, the following considerations should be made:

- A crossing point further away from the roundabout is generally safer for users crossing at that location. However, designers should consider:
  - Whether the detour will lead users to cross informally closer to the roundabout, or lead cyclists to remain on the roadway thereby negating the benefit; and
  - Whether the increased travel time is acceptable.
- At roundabouts, the curved alignment of the roadway and large number of potential conflicts can make it difficult for drivers and path users to observe each other.
  - Where traffic on the roadway is given priority, this can contribute to poor gap selection by users seeking to cross the roadway; and
  - Where priority is given to path users, this can contribute to motorists failing to give priority to path users.

This can be exacerbated by multiple circulating or exiting lanes. Wherever possible path users should only be required to cross one lane at a time and traffic speeds should be reduced.

5.6. Roundabout metering signals

5.6.1. General

For general legislation requirements refer to Section 5.1 of this Manual. Metering is a method for controlling the flow of traffic on a roadway entering a roundabout. The intent is to manage the entering flow of traffic on that roadway because otherwise it may periodically:

- Receive a disproportionate level of priority, causing major delays on one or more other entering roads;
- Cause queues on another leg across a nearby level crossing which must be cleared for an approaching rail vehicle;

- Hinder the passage of emergency vehicles through the roundabout; or
- Impose delays on public transport movements through the roundabout and seriously impacting on service reliability.

To reduce the likelihood of a driver mistakenly thinking the green signal gives them priority to enter a roundabout, clause 6.4(14) of the TCD Rule requires that the limit line for the signals and the roundabout must be at least 30 m apart.

5.6.2. Legislation

Section 6.4(13) of the TCD Rule defines the specific provisions in relation to the basis on which roundabout metering may be considered:

(13) "Roundabout metering signals, with displays complying with one of the displays in Schedule 3 [of the TCD Rule], may be used to control the traffic from one or more of the approaches to a roundabout, if:

(a) excessive queuing and delays are experienced on one or more approaches to the roundabout; or

(b) it is necessary to clear one of the approaches of a roundabout to allow a rail vehicle or an emergency vehicle to proceed safely; or

(c) it is necessary in order to increase the efficiency or safety of public transport services."

5.6.3. Operation

Roundabout metering signals comprise a standard set of signals that must be at least 30 m in advance of the roundabout on the approach road for which control is required. The signal display is normally green but, when critical queue lengths occur and / or a rail vehicle, emergency vehicle or public transport vehicle is detected on a specific leg of the roundabout, the signal changes through yellow to red in the normal sequence.

When the signal changes to green or is resting on green, drivers proceed to the roundabout and apply normal roundabout give way rules.

Watch this space: NZTA have trialled two aspect signals for roundabout metering. More information on this trial can be found in the Gazette notice.

5.6.4. Use of pedestrian signals

In some cases, roundabout metering has been achieved with the use of a mid-block pedestrian traffic signals on approach to a roundabout. In this case, the TCD Rule (clause 6.4(15)) requires the pedestrian traffic signals to be able to operate as two crossings (that is, a central pedestrian refuge is provided, and each half of the roadway is separately controlled). While traffic on the approach to the roundabout may be stopped to allow the roundabout to operate more efficiently, traffic on the exit from of the roundabout should be stopped only when a pedestrian is crossing.

While a cyclist riding their bicycle is not permitted to use a pedestrian crossing, they are permitted to use the crossing if they are walking with their bicycle. However, as described in Sections 6.7 and 8.3 of this Manual, facilities can be installed that permit cyclists to cross in parallel with pedestrians. For situations where roundabout metering is proposed to also accommodate the movement of pedestrians and cyclists across a roadway, reference should be made to those sections of this Manual.

5.6.5. Traffic signs

The signs to be used at roundabouts with metering signals are shown in Table 5-6.

Table 5-6: Signs for roundabouts with metering signals

Code	Sign	Policy and Use
R2-3 Give-way roundabout		To reduce the likelihood of a driver mistakenly thinking the green signal gives them priority to enter a roundabout, it is necessary to stress the requirement to give-way. Clause 10.4(b)(i) of the TCD Rule states that the standard give-way roundabout sign must be mounted on a reflectorised, fluorescent yellow-green backing board that provides a border of at least 150 mm.
R2-6 Stop on red signal		R2-6 signs may be installed to reinforce the requirement to stop at temporary or part time traffic signals. When used at traffic signals, R2-6 signs should be mounted on the primary traffic signal pole immediately below the traffic signal head.

5.7. Bypass lanes

For information regarding the application of bypass lanes for roundabouts refer to the guidance on left turn slip lanes in Section 14 of this Manual.

5.8. Central traffic island

The Road User Rule (Part 1) and the TCD Rule (Part 2) define a roundabout as "[…] an intersection […] for the use of vehicles travelling in a clockwise direction around a central traffic island." Therefore, whether it is raised or marked on the road surface a roundabout must have a central traffic island.

5.9. Signalised roundabouts

If appropriate intersection selection procedures are used (refer to Section 2 of the Guide to Traffic Management, Austroads), it will rarely be necessary to supplement a roundabout with traffic signals. However, if an existing roundabout is performing poorly in terms of delay on several approaches the benefits that might be derived from signalisation should be investigated through traffic analysis. Full signalisation and partial signalisation (that is, control of one or more entries) may be considered. Signalised roundabouts can also have particular safety advantages (compared to standard roundabouts) for on-road cyclists by reducing circulating speeds. More information on designing for pedestrians and cyclists at signalised roundabouts will be provided in the NZTA Pedestrian Network Guidance and Cycling Network Guidance.

On each leg subject to signal control the signals must control both entering traffic and circulating traffic. For full signalisation to be successful, the roundabout must be sufficiently large to accommodate any necessary queuing in the circulating roadway, or be of such a size that it can be operated without excessive lost time. A decision to fully signalise a roundabout should be based on traffic analyses to establish the performance of the signalised roundabout compared to other options (for example replacement with a conventional signalised layout). (Refer to Part 3 of the Guide to Traffic Management, Austroads).

5.10. Example intersection layouts

The following figures depict example layouts and best practice for approach markings and exit lanes for multi-lane roundabouts. The figures included in this section as example intersection layouts do not include all traffic control devices and / or all specific features of intersections that should be included in designs for real world applications. Many of the diagrams in this Manual are not drawn at a conventional scale, therefore, they are not suitable for copying directly into design drawings.

These figures are not intended as a replacement for Austroads and other design guides for the construction of roundabouts. The treatments depicted in the example layouts provide a basis for laying out traffic control devices for roundabouts. While these examples illustrate straight limit lines, these lines may be stepped as described in Section 5.3.3 of this Manual.

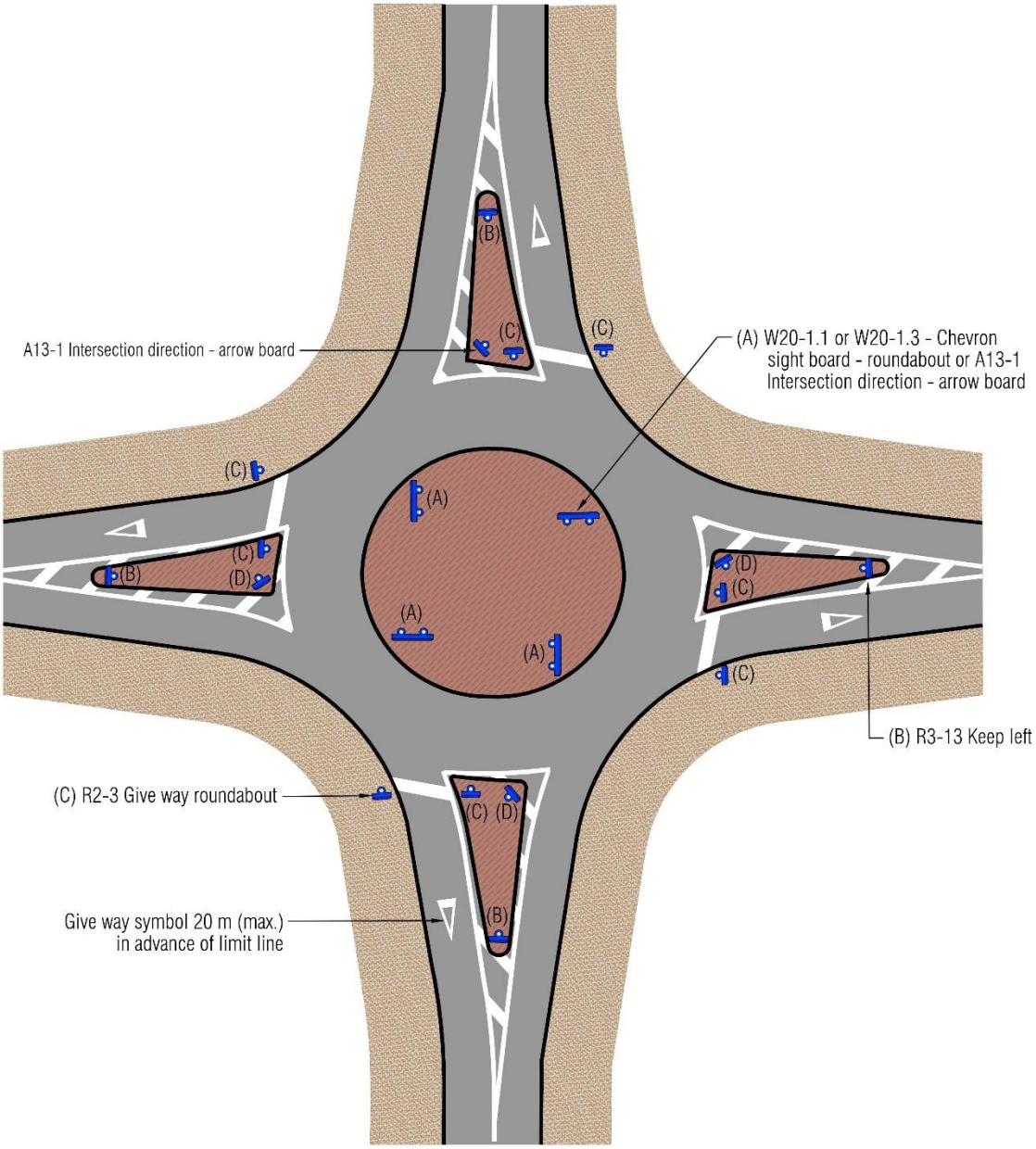


Figure 5-4: Example layout of signs at a roundabout

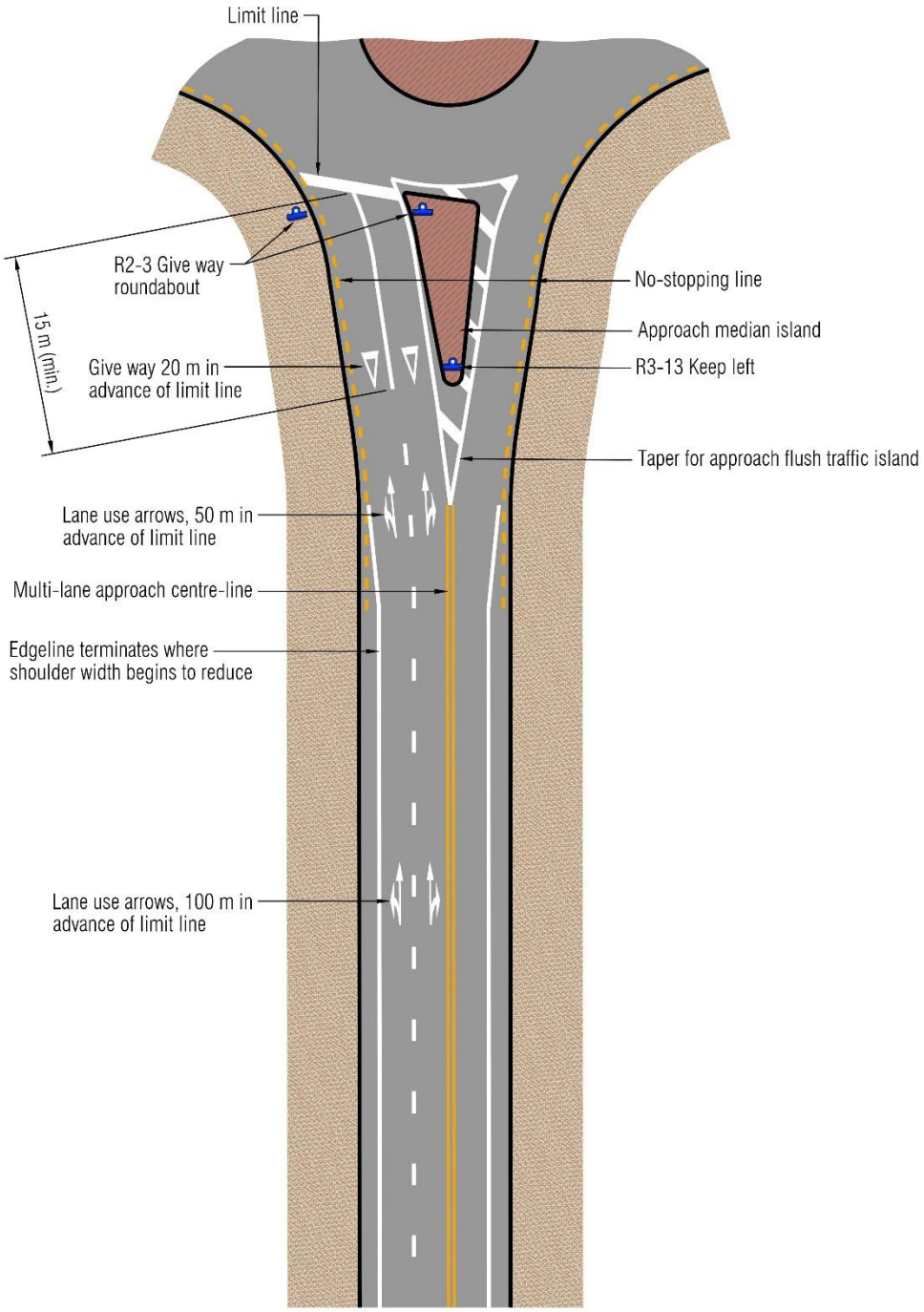


Figure 5-5: Markings for multi-lane approaches to roundabouts

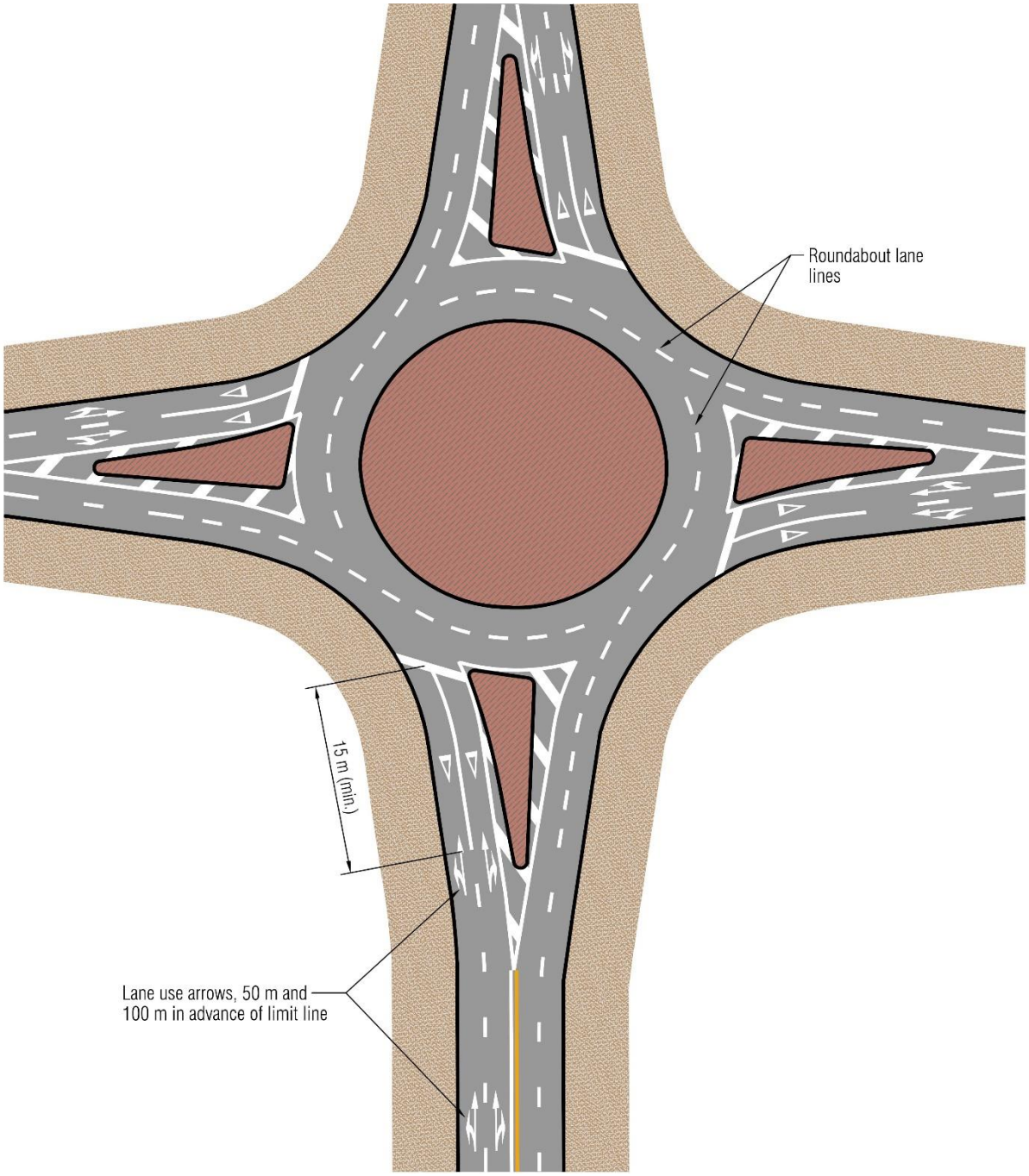


Figure 5-6: Exit markings at multiple lane roundabout

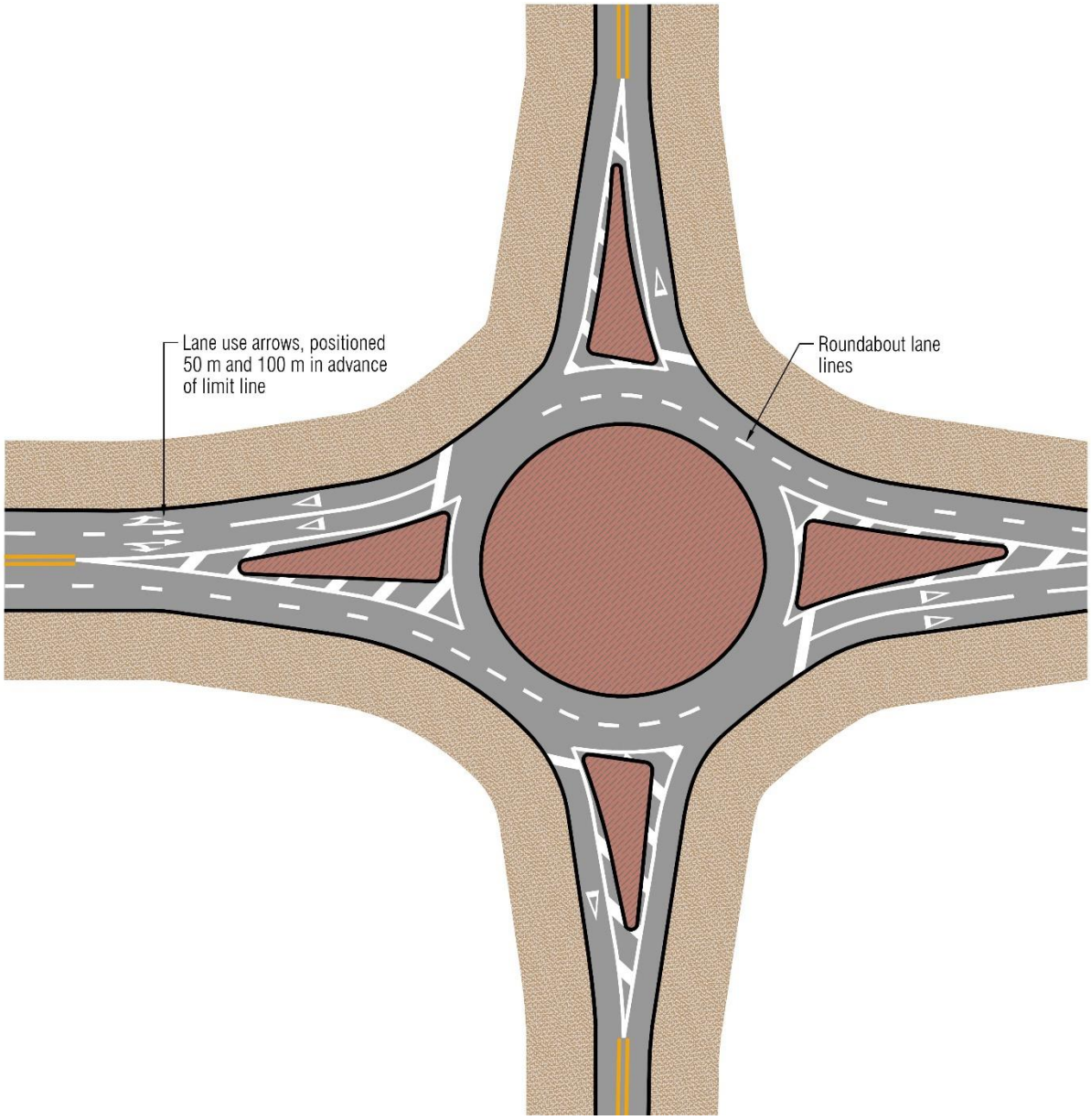


Figure 5-7: Exit markings at 2/1 lane roundabout

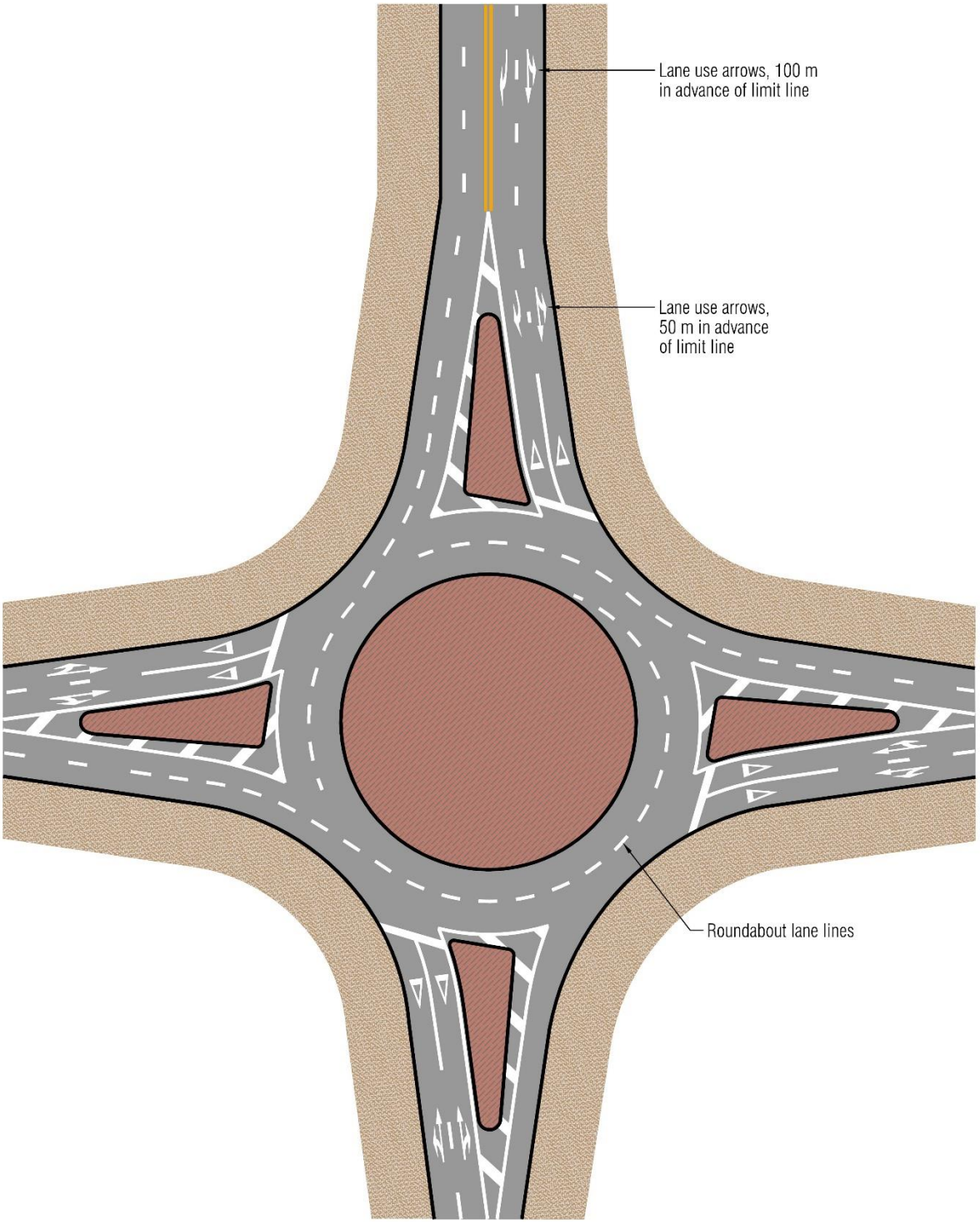


Figure 5-8: Spiral lane marking for multiple lane roundabout

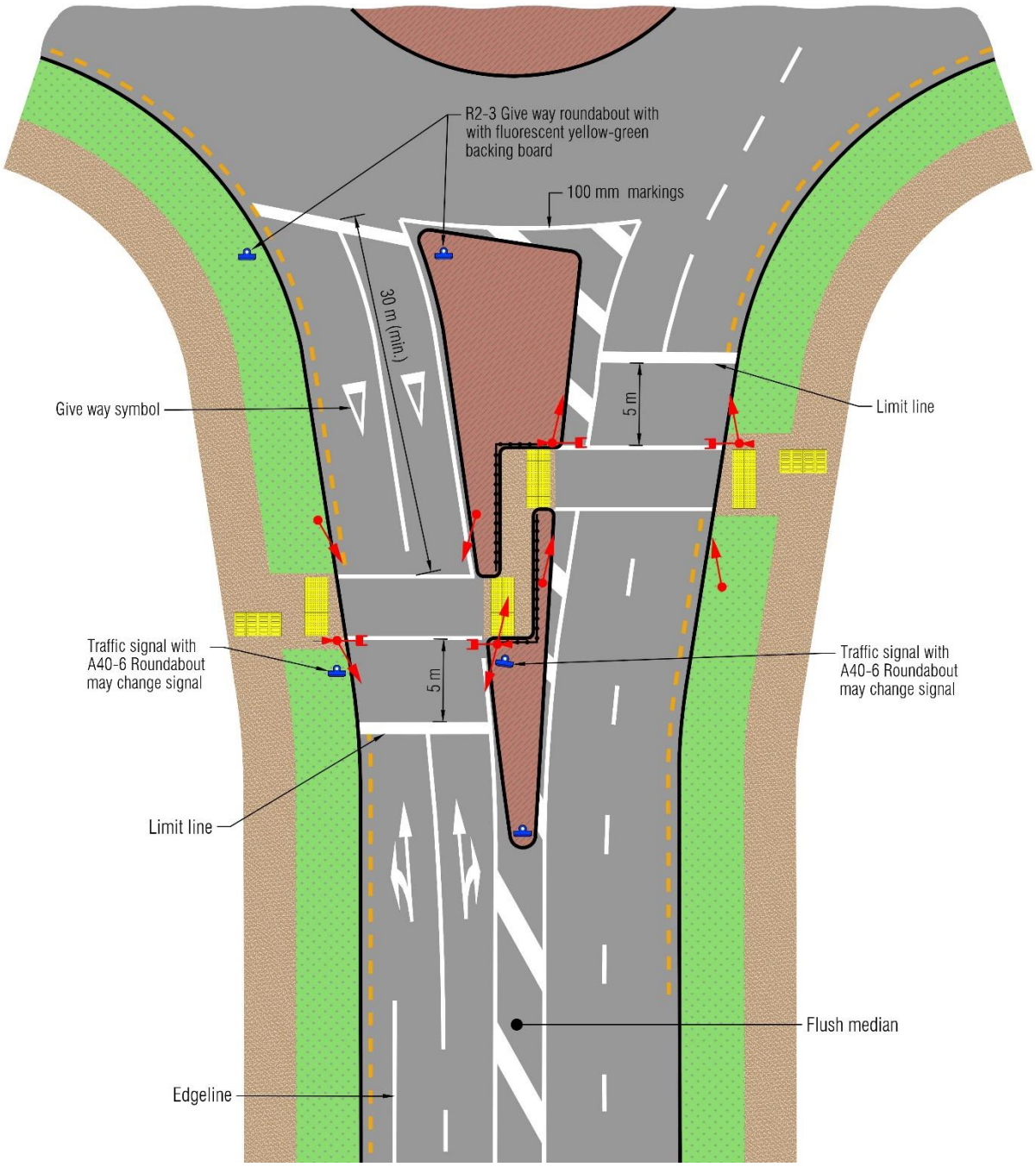


Figure 5-9: Roundabout metering signals incorporating a signalised pedestrian crossing

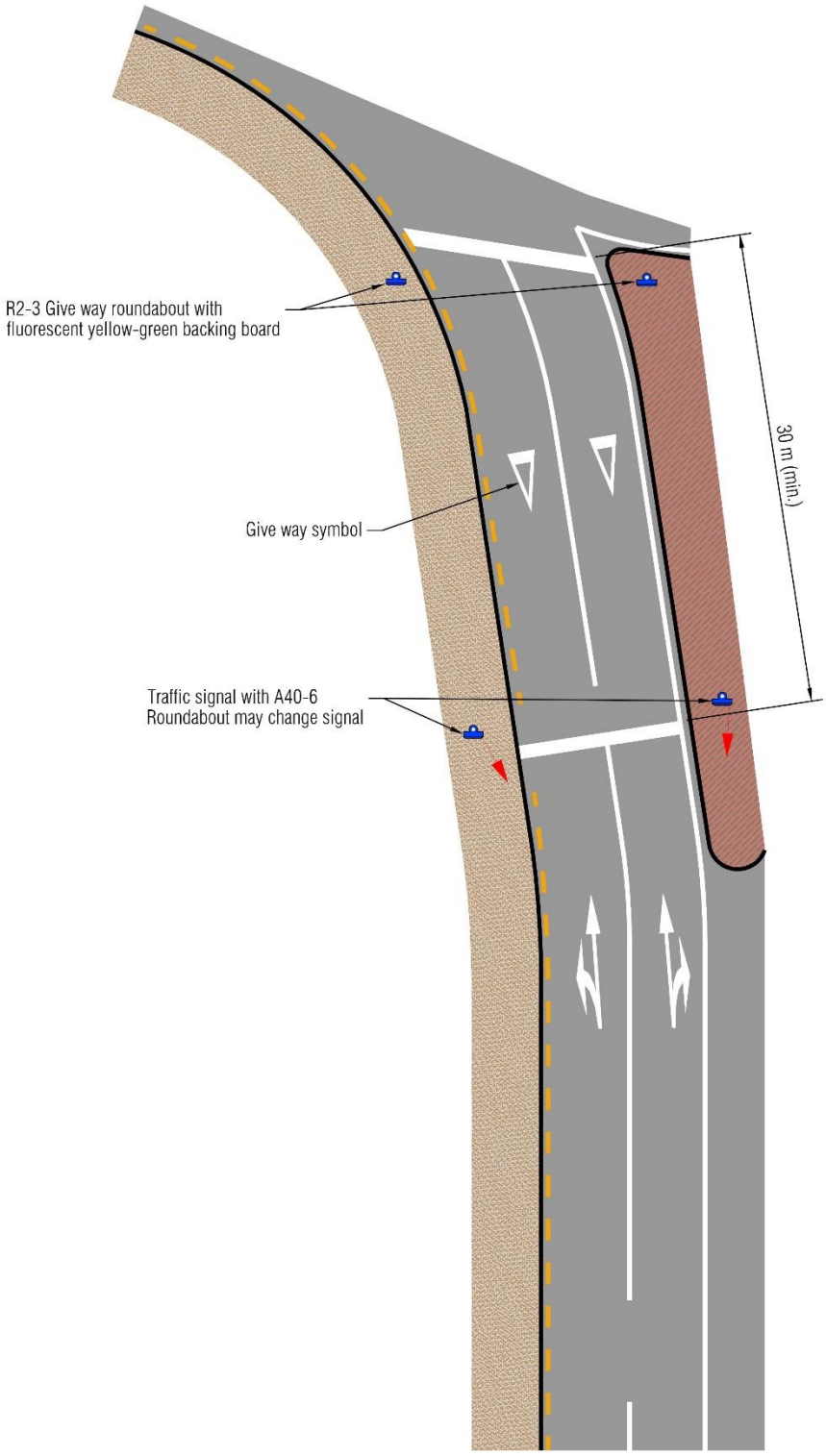


Figure 5-10: Roundabout metering signals

6. Signalised Intersections

Intersections are signalised either to address a road safety or a traffic/transportation operational and efficiency issue. Signalised intersections on major arterial roads usually require through lanes, turn lanes and / or combined through and turn lanes to ensure that the intersecting routes have adequate capacity as a result of the various intersecting traffic movements that must share time. The Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings (Austroads 2013) provides information on the traffic management aspects of signalised intersections, for example:

Section 2 of the Austroads guide includes traffic management considerations in the selection of traffic signals as the preferred method of control and provides general guidance on the signalisation of intersections.

Section 5 of the Austroads guide provides discussion on road space allocation, lane management, signal phasing and timings, signal coordination and traffic detection. It also provides guidance on road user requirements at signalised intersections.

Additional information can be found in the NZTA P43 Specification for Traffic Signals.

Railway level crossings may be controlled by standard traffic signals where the signals incorporate control of movements for an intersection, pedestrian crossing, or cycle crossing. The signals should be linked to the level crossing to avoid green signals directing road users across the railway as a train passes.

For information on signs and markings for standard 3 colour signal controlled railway level crossings, refer to Section 6.4 of the TCD Manual Part 9.

6.1. Legislation

Clause 6.2(1) of the TCD Rule governs the provision of traffic signals and requires that:

(1) "At an area controlled by traffic signals, a road controlling authority must install markings and traffic signals as described in 6.2(1A) for:

- (a) each roadway approach to the area controlled; and
- (b) any driveway approach to the area controlled where the road controlling authority considers this necessary for the safe or efficient operation of the area controlled."

(1A) "For each approach, defined in 6.2(1) [of the TCD Rule], to the area controlled by traffic signals, the road controlling authority must install:

- (a) if practicable, a limit line in accordance with 6.3(3) [of the TCD Rule] to define the place where vehicles are required to stop in advance of the area controlled; and
- (b) a traffic signal in a position that is visible to road users approaching the area controlled either:
  - (i) adjacent to, and as close as practicable to the end of, the limit line where marked; or
  - (ii) where there is no limit line, at the point of entry to the area controlled; and
- (c) except for temporary traffic signals and flashing red traffic signals, at least one supplementary steady traffic signal in a position that is visible to road users stopped:
  - (i) at the limit line where marked; or
  - (ii) where there is no limit line, at the point of entry to the area controlled."

The poles on which traffic signals for intersections are mounted must comply with Clause 6.3(4) of the TCD Rule, which requires:

(4) "A steady traffic signal display, other than a temporary traffic signal or a pedestrian display, must be mounted on:

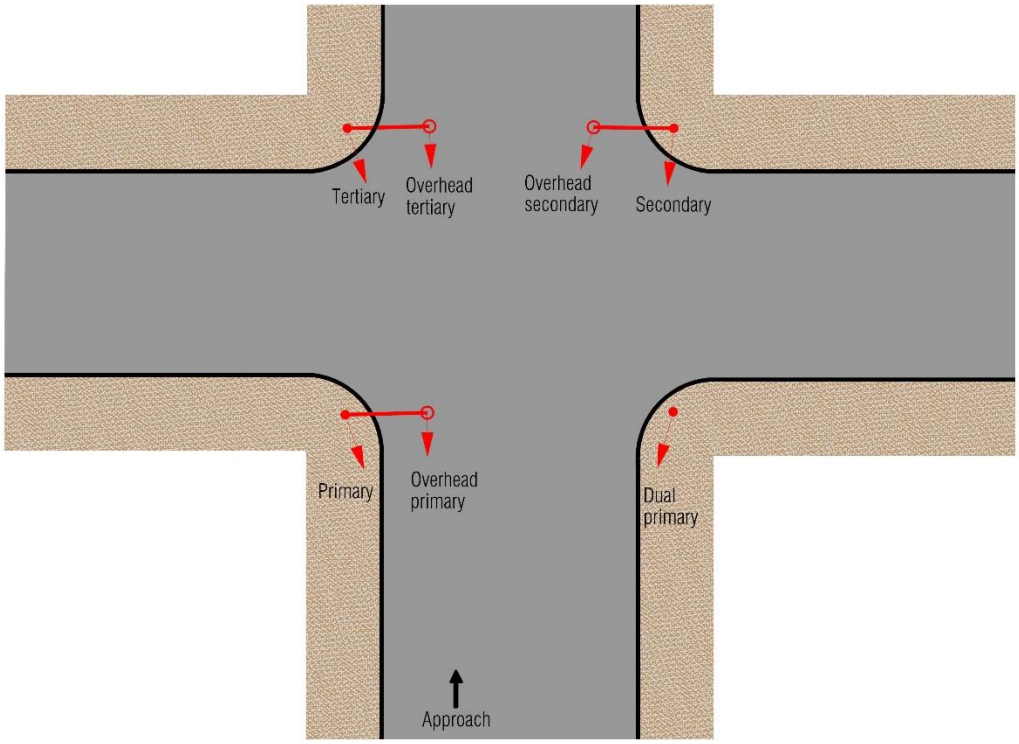
(a) an unpainted pole or structure; or

(b) a yellow or grey painted pole."

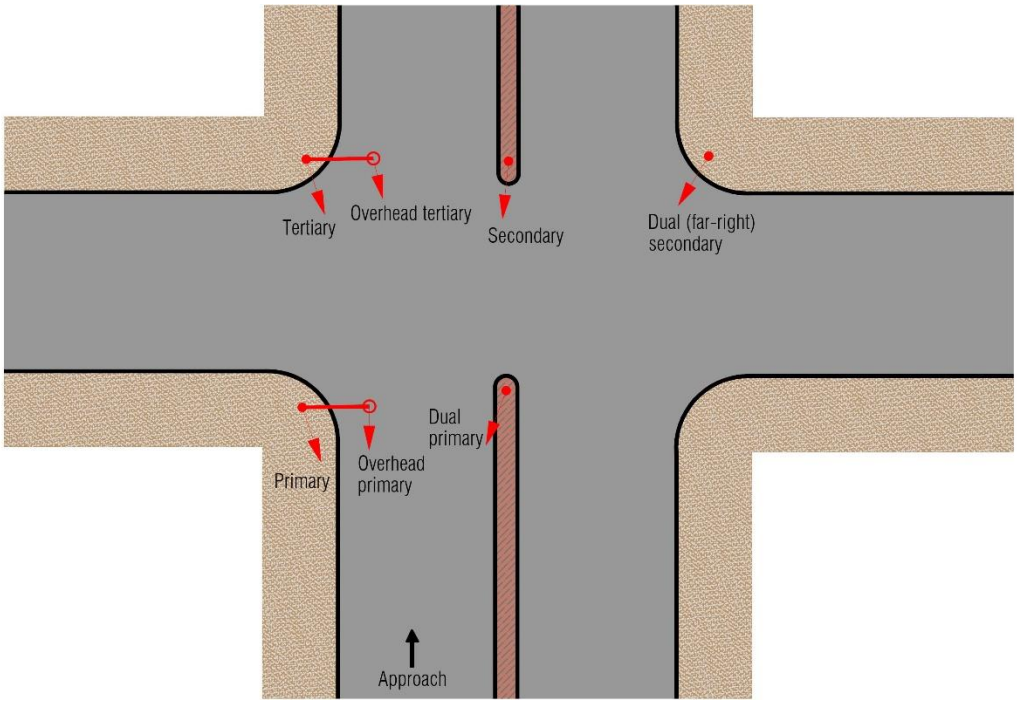
6.2. Signal face designations

A signalised intersection consists of various signal designations for different scenarios. Signal face designations for various scenarios using traffic signals are shown in Figure 6-1 and Figure 6-2; however these are only an example to show the type and position of the post and not all types of designations may be needed.

For further information on signal face placement where other islands may occur (such as slip lanes) refer to Austroads Design Guides and for information on traffic signals specifications refer to the NZTA P43 Specification for Traffic Signals.



(a) Undivided road approach at a crossroads intersection



(b) Divided road approach at a crossroads intersection

Figure 6-1: Signal face designations for crossroads intersections

Note: Refer to Austroads, Guide to Road Design Part 4A: Unsignalised and signalised intersections for further guidance.

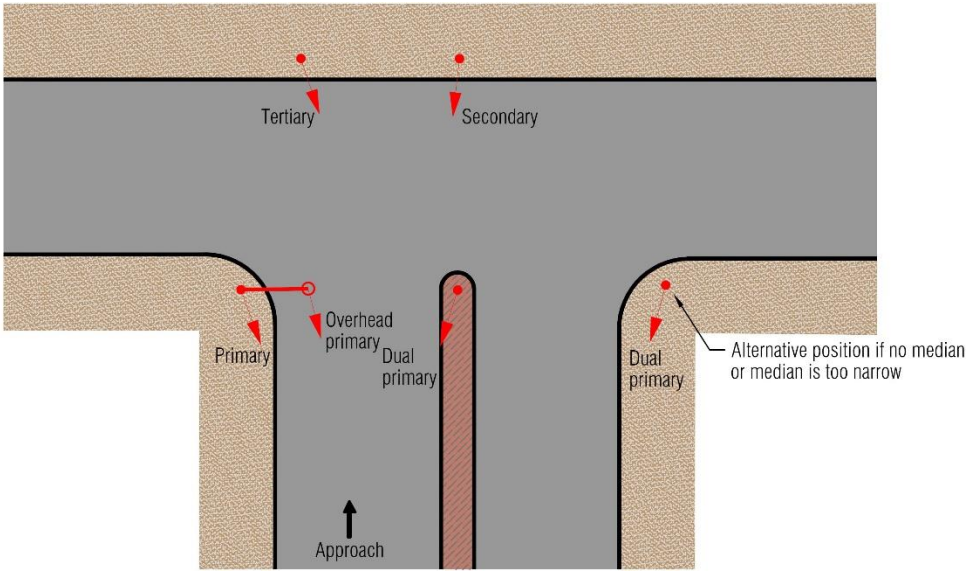


Figure 6-2: Signal face designations for T intersections

6.3. Signals

Signals used by RCAs must comply with Schedule 3 of the TCD Rule and the display must be one of those shown in Schedule 3 of the TCD Rule.

Assemblies consist of aspects grouped into columns, such as those shown in Figure 6-3.

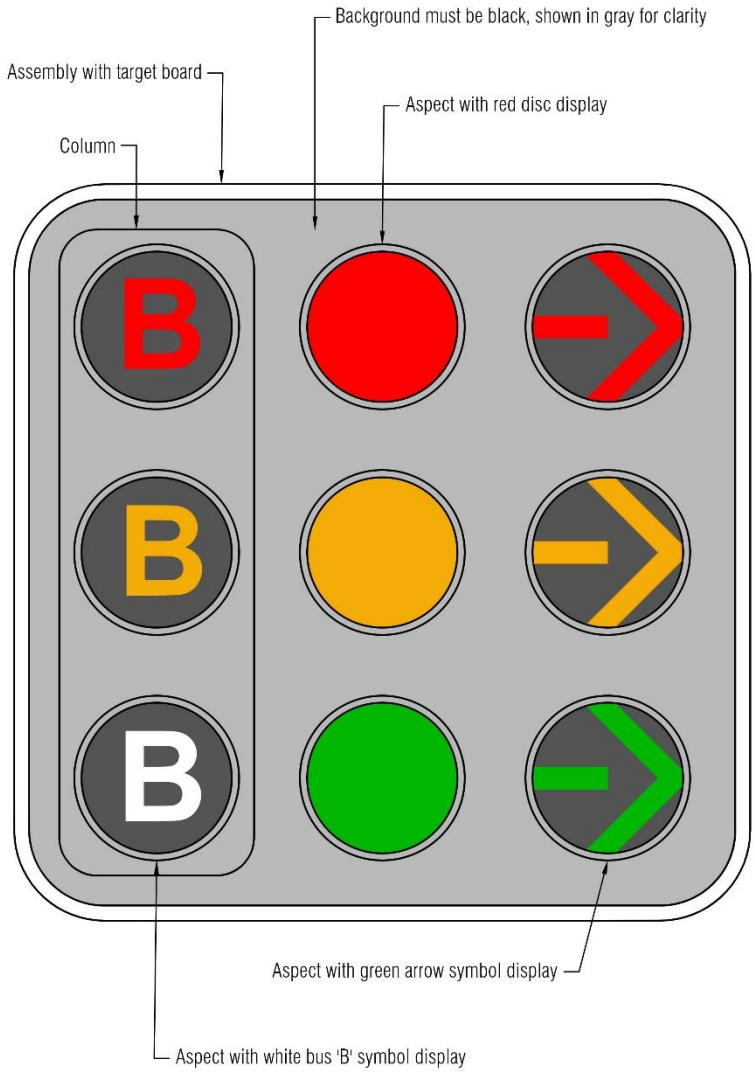


Figure 6-3: Terminology used to describe traffic signals

The following aspects may be used in conjunction with or instead of the disc aspects:

- A red, yellow, and / or green arrow for traffic intending to travel in the direction indicated by the arrow;
- A red, yellow, and / or white “B” aspect for buses or any vehicles permitted to use a bus lane;
- A red, yellow, and / or white “T” aspect for light rail vehicles; and / or
- A red, yellow, and / or green cycle symbol aspect for cyclists.

Where an assembly includes multiple aspects that may apply to a road user, designers should consider which aspects override each other.

6.3.1. Pedestrian traffic signals

Pedestrian traffic signals for an intersection must only be installed in conjunction with vehicle traffic signals and must be installed so they clearly indicate to pedestrians when they can enter the roadway.

According to clause 6.6 of the TCD Rule,

(3) “Pedestrian traffic signals must comprise the following:

(a) a green walking human figure signal; and

(b) a red standing human figure signal placed immediately above the green human figure signal.”

(3A) "A countdown pedestrian signal, comprising a white or yellow display (conforming to the description in Schedule 3) showing the number of seconds remaining in the pedestrian clearance period, may only be installed beside pedestrian traffic signals at: […]

(b) intersections where all of the approaches to the area controlled by traffic signals are controlled by red signals at the same time while pedestrians are permitted to cross."

These signals, including minimum dimensions, are shown in Figure 6-4 to Figure 6-8 (inclusive) below.

An RCA must not mark a pedestrian crossing (zebra) across any lane controlled by traffic signals (refer to clause 8.2(1) of the TCD Rule).

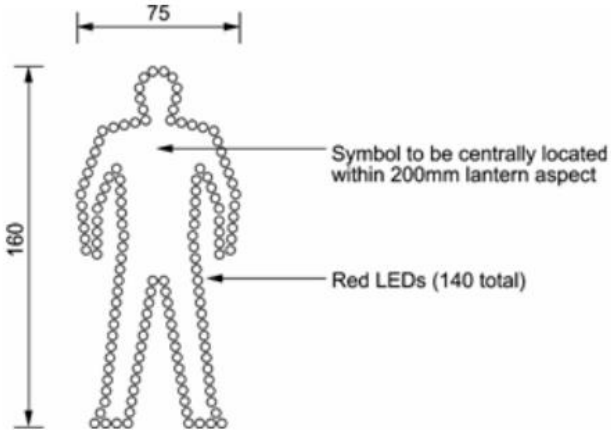


Figure 6-4: The S3-1.1 red Pedestrian 'standing human' symbol (LED)

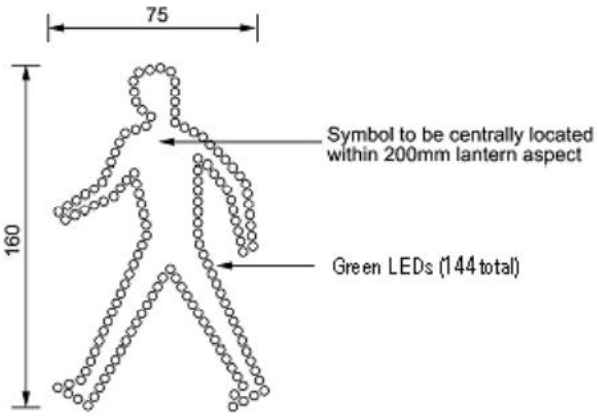


Figure 6-5: The S3-2.1 green Pedestrian 'walking human' symbol (LED)

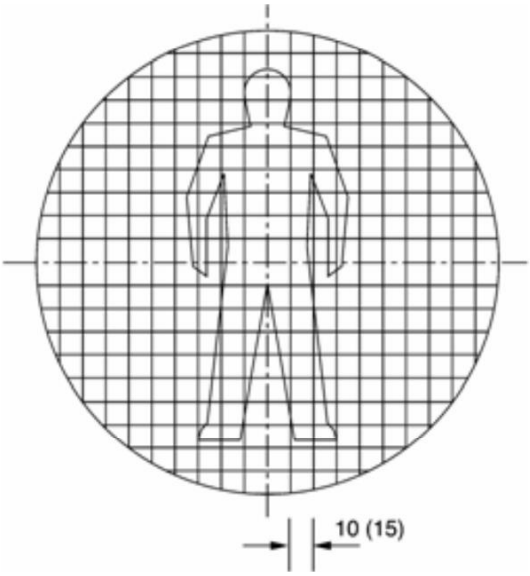


Figure 6-6: The S3-1 red Pedestrian 'standing human' symbol

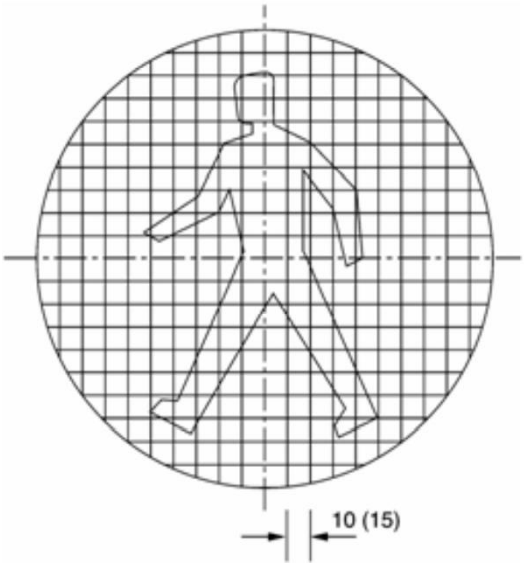


Figure 6-7: The S3-2 green Pedestrian 'walking human' symbol

A countdown pedestrian signal comprising a white or yellow display showing the number of seconds remaining in the pedestrian clearance period may only be installed where all of the roadway approaches to the intersection are controlled and held by red signals at the same time (clause 6.6(3A) of the TCD Rule) and must be displayed in conjunction with a flashing red standing human figure (clause 6.6(3B)).

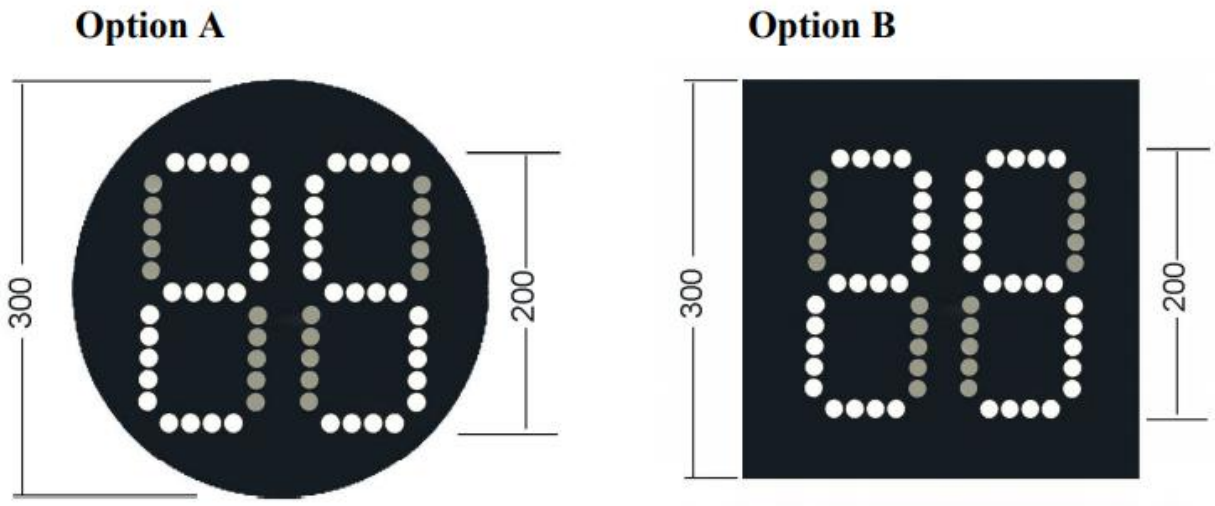


Figure 6-8: S3-3 Countdown signal displays

(a) Requirements for blind and vision impaired pedestrians

Where pedestrian crossing facilities are provided at signalised intersections, guidance for visually impaired pedestrians should be provided. Guidance should include tactile paving to direct visually impaired pedestrians to crossing facilities and audible tactile traffic signals (ATTS) to display signals to visually impaired pedestrians.

The following documents should be referenced for requirements for Blind and Vision impaired pedestrians:

- NZTA RTS 14 – Guidelines for facilities for blind and vision impaired pedestrians should be used when designing intersections.
- NZTA Pedestrian Network Guidance.

6.3.2. Signals for special vehicle lanes

At a signalised intersection, signals may be installed to control cycle paths and / or special vehicle lanes, including tram lanes, bus lanes, and cycle lanes. Where they are provided, such signals control all vehicles using the cycle path or special vehicle lane.

6.4. Markings at signalised intersections

General requirements for markings are outlined in Part 1 of the TCD Manual.

6.4.1. Limit lines

Clause 6.3(3) of the TCD Rule requires that "Where an area of road is controlled by traffic signals, unless the road surface makes it impracticable, a road controlling authority must mark, in accordance with section 5 [of the TCD Rule], [a limit line] on a roadway under its control […]"

Limit lines at traffic signals must be white and should be marked perpendicular to the approach centre-lines unless site constraints make this impractical.

Limit lines should be marked as follows:

- Cycle lanes (including advanced stop boxes and advanced stop lines): A continuous 100 mm wide white dash. See Section 6.6.4 of this Manual for further information on these facilities.
- Other lanes: A continuous 300 mm wide white line.

Limit lines should be located at least 1.8 m clear of the nearest intersecting traffic lane of the intersecting road or 1 m clear of the nearest pedestrian crosswalk line, except cycle lane limit lines which should be at least 200 mm clear of the nearest crosswalk line. The primary traffic signal head must be as close as practicable to the limit line. For limit line placement in relation to cycle lanes and advanced stop boxes and advanced stop lines refer to Section 6.6.4 of this Manual.

Limit lines for traffic signals must be at least 300 mm wide and for any situations where traffic signals are installed at a rural intersection the limit lines should be 450 mm wide.

6.4.2. Edgelines

Edgelines should not be marked across the signalised approaches to a signalised intersection.

Where motorised traffic has to diverge or cross a cycle lane on the approach to an intersection (for example where a left turn lane forms to the left of a cycle lane) continuity lane lines should be marked instead of an edgeline.

6.4.3. Continuity lines

Continuity lane lines for straight through movements should not be marked through signalised intersections. Where guidance for turning movements is required for complex signalised intersections, signalised intersection lane lines may be marked (refer to Section 6.4.7).

6.4.4. Lane lines

Approach lane lines on urban and rural multi-lane legs of a signalised intersection should be a 100 mm wide white continuous line that is 15 m long and that terminates at the limit line, (see Figure 6-24).

6.4.5. Centre-lines

A continuous centre-line should be marked for 30 m on all urban approaches to signalised intersections and 50 m for all rural approaches to signalised intersections and should terminate at the limit line. Where audio tactile pavement marking (ATPM) is included on the centre-line markings on approach to an intersection, ATPM should be marked on the continuous centre-line markings for the intersection. However, ATPM is not typically marked in urban areas and in areas where there is likely to be frequent tracking of vehicles across the marking.

6.4.6. Lane use arrows

Lane use arrows as described in Section 10.1 of this Manual, are marked at traffic signal controlled intersections to indicate the movements designated for that lane.

Lane use arrows are used:

- To restrict the movements available from a lane; and
- Should be marked where traffic approaches in more than one lane.

Lane use arrows must conform to M7-1 of Schedule 2 of the *Land Transport Rule: Traffic Control Devices.* Where a traffic lane becomes a mandatory turn lane, lane use arrows must be marked in the lane and may be marked in the other lanes.

Lane use arrows should be marked approximately 10 m from the limit line or turning point. Additional lane use arrows should be considered for the approach to turning lanes so that approaching road users have guidance into the correct lane. Any intermediate sets of lane use arrows should be placed at about 80 m spacing, however distances may be varied to suit individual situations.

Care should be taken when marking lane arrows to avoid confusion as to which side road it refers, especially when other side roads are closely spaced, or busy private access ways are present close to the intersection.

6.4.7. Signalised intersection lane lines

Signalised intersection lane lines indicate the course to be followed by turning traffic and assist in separating traffic, refer to Figure 6-9. These lines may be used within major or complex traffic signal controlled intersections, however, their use should be limited to situations where road users may otherwise have difficulty discerning the path they should follow for their turning movement through the intersection. Signalised intersection lane lines should be white and 100 mm wide with a 1 m dash and a 1 m gap. The gap may be increased to 2 m if it is deemed necessary by the RCA.

The use of signalised intersection lane lines should be limited, however, they may be necessary for specific locations where any of the following conditions are met:

- Opposing right turn movements turn at the same time;
- The geometry of the intersection does not make the appropriate turning path clear to drivers;
- Multiple lanes are available for turning movements; and / or
- The RCA wishes to direct turning drivers into a lane other than the closest available lane.

Signalised intersection lane lines may be marked on the left or right side of the turning lane in order to provide the appropriate guidance to drivers. When used to avoid conflict between opposing right turn movements, signalised intersection lane lines provide clearance of 1-2 m.

Signalised intersection lane lines should not be carried through pedestrian crosswalk areas.

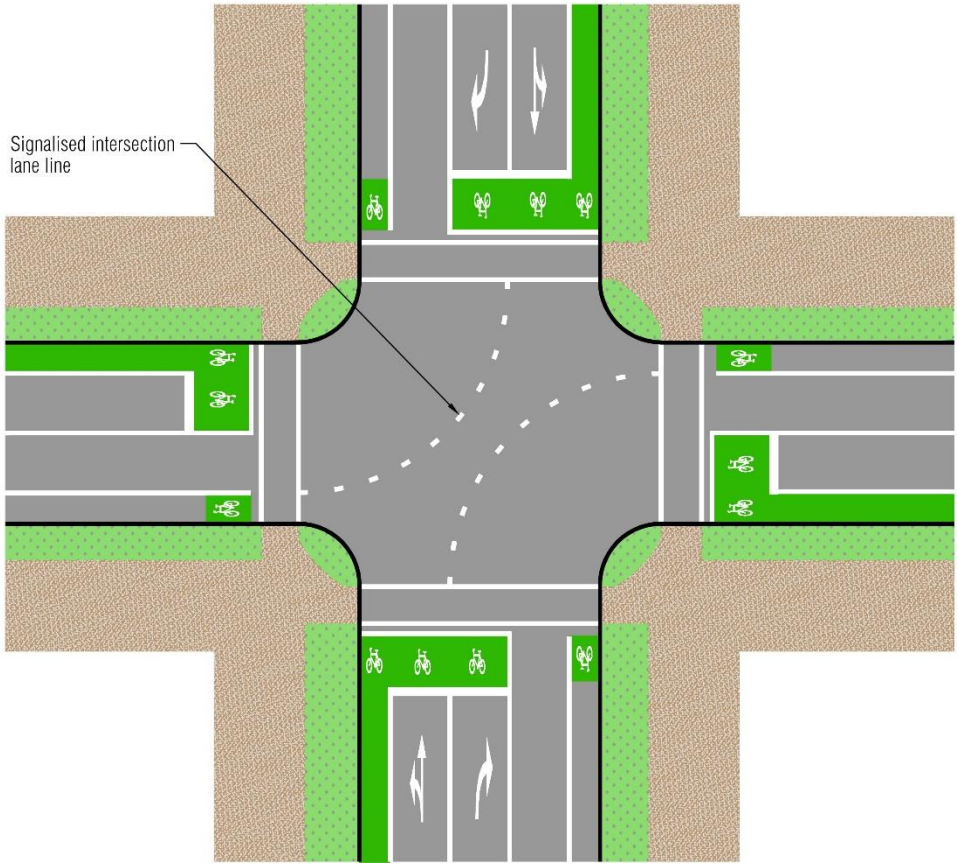


Figure 6-9: Example application of signalised intersection lane lines for concurrent opposing right turns

6.4.8. Crosswalk lines

Crosswalk lines or markings to guide the movement of pedestrians must be marked at intersections controlled by pedestrian traffic signals.

Crosswalk lines must be white and at least 100 mm wide. They should be continuous across the full width of the roadway. The crosswalk should be at least 2.5 m wide and must be at least 1.8 m wide. The width between crosswalk lines is usually determined by the widths of the adjoining footpaths and the number of pedestrians using the crossing.

The outside crosswalk line should be inset at least 600 mm from the projected edge of the kerb of the intersection, as shown in diagrams in this Manual including Figure 6-10.

The limit line for vehicles should be no closer than 1 m to the nearest crosswalk line (except advanced limit lines for cycle or advanced stop boxes which should be at least 200 mm clear of the nearest crosswalk line).

No longitudinal lines, that is edgelines, centre-lines or signalised intersection lane lines, should continue through the crosswalk area.

Where the intersection is controlled by a Barnes Dance, which allows pedestrians to cross safely on the diagonal at an intersection:

Crosswalk lines should be marked as “starters” for the diagonal crossing as shown in Figure 6-10; these are typically 0.5 m – 1.5 m long.

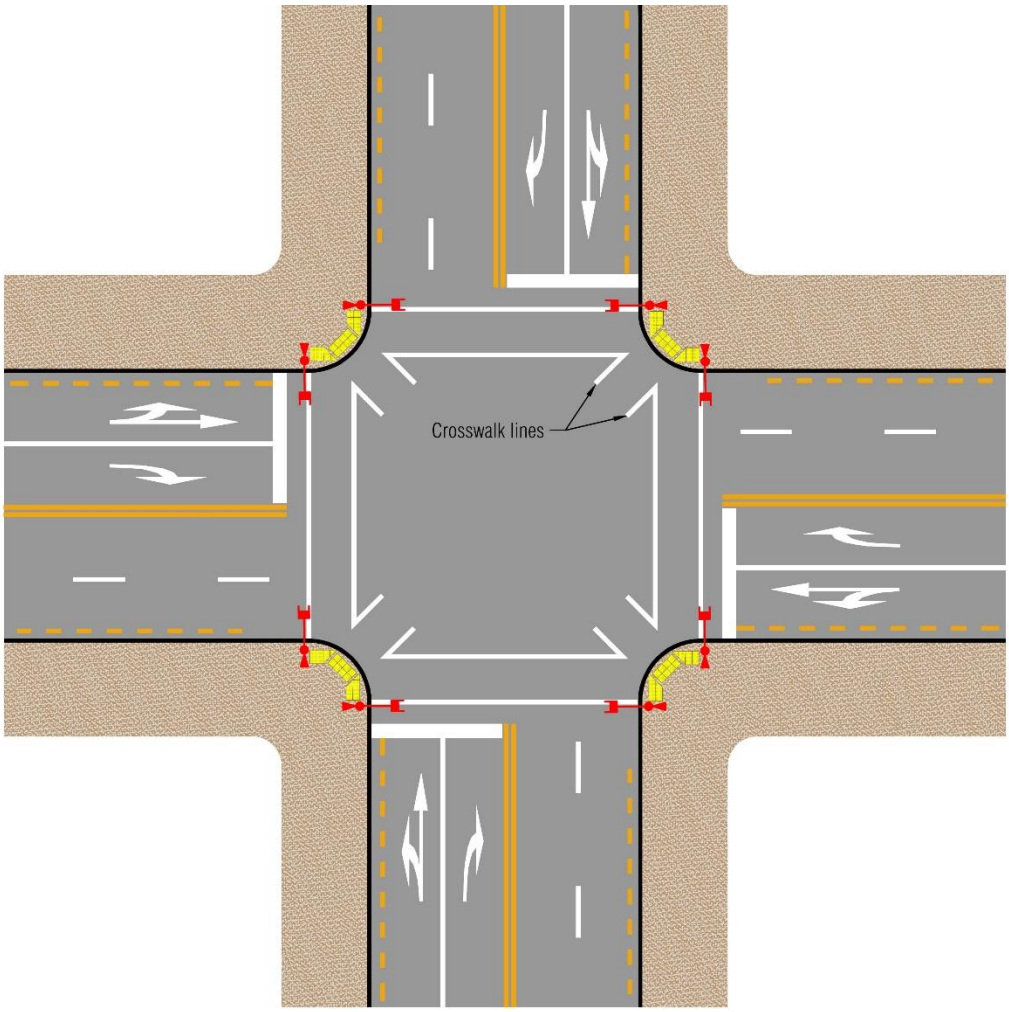


Figure 6-10: Crosswalk lines at Barnes Dance crossings

6.4.9. Cycle facilities

Further detail on markings for cycle facilities at signalised intersections is contained in Section 6.6.

6.4.10. No-stopping lines

No-stopping lines may be marked at signalised intersections if the RCA considers it is necessary to reinforce the prohibition of parking at the intersection and / or extend the length over which parking is prohibited in the vicinity of the intersection. They should be marked similar to as described for uncontrolled intersections in Section 3.2.4.

6.5. Traffic signs

A summary of traffic signs that can be used at signalised intersections is shown in Table 6-1.

Signs used at roundabout metering signal sites have been excluded, and further information on the requirements for these intersections can be found in Section 5.6 of this Manual.

Table 6-1: Signalised intersection signs

Code	Sign	Policy and Use
R2-9 Turning traffic give-way to pedestrians		R2-9, R2-9.1, and R2-9.2 signs may be installed at a signalised intersection to reinforce the requirement for turning traffic to give way to pedestrians and / or cyclists at traffic signals. In particular, installation of the sign should be considered where problems have been experienced and / or are expected with turning vehicles failing to give way to pedestrians and / or cyclists using crossings and cycle paths at signalised intersections. These signs should be installed on the traffic signal poles below the traffic signal head and oriented to face approaching drivers. Refer to Note 1 for information regarding sight distances to the sign.
R2-9.1 Turning traffic give way to cyclists		
R2-9.2 Straight ahead traffic give way to cyclists		
W10-4 Traffic signals ahead		W10-4 signs should be installed in advance of an intersection controlled by traffic signals on all approaches with a speed limit over 50 km/h. They may also be installed within an urban area with a speed limit of 50 km/h or less where, in the opinion of the RCA, high approach speeds or inadequate visibility of the signal heads create a hazardous situation. When the approach is a one-way road, signs should be installed on both sides of the roadway. The sign(s) should be located in a position where they are visible to approaching drivers over the distances described in Note 1. The distance between the W10-4 sign(s) and the corresponding limit line should be at least that shown in Note 1. Refer to Note 2 for the minimum size requirements.

<table>
<tr><th>Code</th><th>Sign</th><th>Policy and Use</th></tr>
<tr><td>W10-5
Advance warning traffic signals</td><td>  </td><td rowspan="4">A combination sign and signal to warn of the likelihood of the need to stop because of queues or a traffic signal ahead. Consisting of a W10-4 traffic signal ahead sign with a 200 mm diameter yellow circle aspect signal above and below supplemented by a W10-5.1, 5.2 or 5.3 sign as required.

The signals should be activated by a suitable controller so that they flash at appropriate times to provide the necessary warning for approaching drivers, having regard to the likely length of queues or the presence of a red signal.

Signs may be installed in advance of an intersection controlled by traffic signals where in the opinion of the RCA:

• The road alignment does not provide sufficient stopping sight distance to the end of the likely maximum length queue, and the existing road alignment cannot reasonably be altered to overcome the deficiency; and / or
• Standard warning signs have proven insufficient to address a safety problem there.

No other sign may be attached to a W10-5 sign or its support.

The sign should be located where it is clearly visible to approaching drivers over the distances described in Note 1. Refer to Note 2 for the minimum size requirements for W10-5.

The sign should normally be installed on the left-hand side of the road but where approaching drivers' sight distance is restricted; the sign may be installed on the right-hand side of the road. Where two approach lanes exist, signs should be gated; that is there should be a sign on drivers' left and on drivers' right.

The sign should be installed in advance of the end of the likely maximum queue length by at least the distance described in Note 1.

When these signs are installed both left and right, that is, they are gated, then the lights must be arranged to flash in synchronization top lights together then bottom lights together</td></tr>
<tr><td>W10-5.1
Prepare to stop</td><td>  </td></tr>
<tr><td>W10-5.2
Hidden queue</td><td>  </td></tr>
<tr><td>W10-5.3
Queued vehicles</td><td>  </td></tr>
<tr><td>A40-2
Turn left at any time with care</td><td>  </td><td>An A40-2 sign should be used at signalised intersections where a free flow left turn slip lane is provided to allow turning traffic to bypass a traffic signal.

A40-2 signs should normally be mounted on the left hand side of the roadway at the beginning of, or just within, the left turn slip lane. Signs may also be located on raised islands which separate through and left turning traffic, but they must be orientated so they face only the traffic approaching and using the left turn slip lane (refer to Figure 14-8).The sign should be visible to approaching drivers over the distances described in Note 1.</td></tr>
</table>

Note 1: Sight distance and location requirements.

a. The regulatory signs described in Table 6-1 above should be installed where they are clearly visible to approaching drivers for at least the sight distances described in the table below.

b. The advance warning signs described in Table 6-1 above should be installed where they are:

(i) Clearly visible to approaching drivers for at least the distances described in the table below.

(ii) Located in advance of the intersection by at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

Note 2: Advanced warning sign size requirements.

Signs should be at least the size shown in the table below.

Speed Limit	Min. Size
≤30 km/h to 50 km/h	600 x 600 mm
60 km/h to 80 km/h	750 x 750 mm
90 km/h to 110 km/h	900 x 900 mm

6.6. Providing for cycling at signalised intersections

People choosing to travel by cycle generally have similar origins and destinations as those who travel by motor vehicle and will therefore often choose routes that involve signalised intersections. Signalised intersections should provide the space and operational conditions to support cycling as a viable mode of transport. Cycle paths or shared paths may be provided as an alternative to on-roadway cycling facilities; these paths often have to be connected with and incorporated into the functional layouts of signalised intersections.

The provision of facilities for cycling at signalised intersections does not necessarily need to be consistent with the facilities provided along midblock sections of the intersecting roads. Intersections generally pose a higher level of risk to cyclists and a higher level of service may be appropriate.

The needs of cyclists in terms of detection, signal phasing, signal timing and road space should be considered at signalised intersections.

The NZTA Cycling Network Guidance provides design guidance for providing for cycling at signalised intersections. Also refer to Section 8 of the TCD Manual Part 5 for information on signs and markings for cycle lanes, cycle paths, and shared paths.

6.6.1. Cycle symbol

Cycle symbols as defined in Section 8 of the TCD Manual Part 5 must be marked at the recommencement of cycle lanes after each intersection (clause 11.2(1) of the TCD Rule). They should be marked in other locations as required including in advanced stop boxes, advanced stop lines and hook turn boxes.

The M2-3 symbol must be marked in accordance with Schedule 2 of the TCD Rule. The cycle symbol (refer Figure 6-11) must be white and should be marked using the recommended scale factors in Table 6-2.

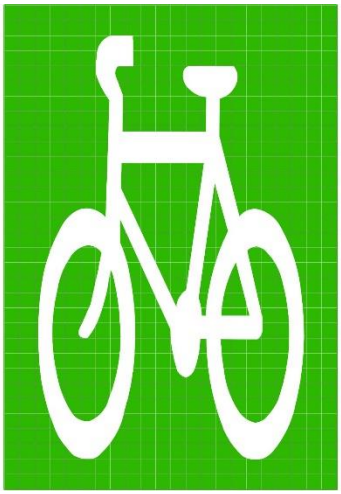


Figure 6-11: M2-3 symbol for cycle lanes, cycle paths, and shared paths

Table 6-2: Cycle Symbol Marking Scale Factors for Intersection facilities

Facility type(s)	Scale of square	Cycle Symbol Width	Cycle Symbol Height
Advanced Stop Line (ASL) for cycle lanes where speed limit is up to 60 km/h (typical)	60 mm	1080 mm	1680 mm
Hook turn box (typical)	60 mm	1080 mm	1680 mm
ASL for narrow cycle lanes where speed limit is up to 60 km/h (typical)	40 mm	720 mm	1120 mm
ASL for cycle lane where speed limit is greater than 60 km/h (typical)	80 mm	1440 mm	2240 mm
Advanced Stop Box (ASB) (typical)	80 mm	1440 mm	2240 mm
Large hook turn box (typical)	80 mm	1440 mm	2240 mm
Small hook turn box (typical)	40 mm	720 mm	1120 mm

6.6.2. Cycle lane transitions from midblock layout

It is important to consider the transition between provision for cycling in the midblock environment for approaching and departing from signalised intersections. The transition for cyclists should be considered even where no dedicated facilities are provided in the midblock.

- Cycle lane lines (whether solid or dashed) and edgelines should define a continuous travelling path along cycle lanes for cycling up to the limit line.
- It should be clear to road users where motorists may cross a cycle lane (and therefore must give-way to cyclists using the lane) or where cyclists and motorists are expected to mix.
  - Where motorised traffic has to diverge or cross a cycle lane on the approach to an intersection (for example where a left turn lane forms to the left of a cycle lane) continuity lane lines should be marked instead of a continuous lane line. The Road User Rule (Clause 2.3(4)(b)) permits a driver to "[…] drive wholly or partly in […] the lane for the minimum length necessary [… but] for no more than a maximum length of 50 m […]". Therefore, the continuity line should be marked for a length of no more than 50 m to define clearly for drivers the maximum length over which they may drive wholly or partly within the cycle lane.

Coloured surfacing and other delineation may be marked to delineate transition points where motor vehicles and cyclists cross paths (see Section 8 of this Manual). Guidance in relation to coloured surfacing is provided in the NZTA Coloured surfacing principles: design guidance note Apple green full width coloured surfacing treatment should be used for cycle lanes.

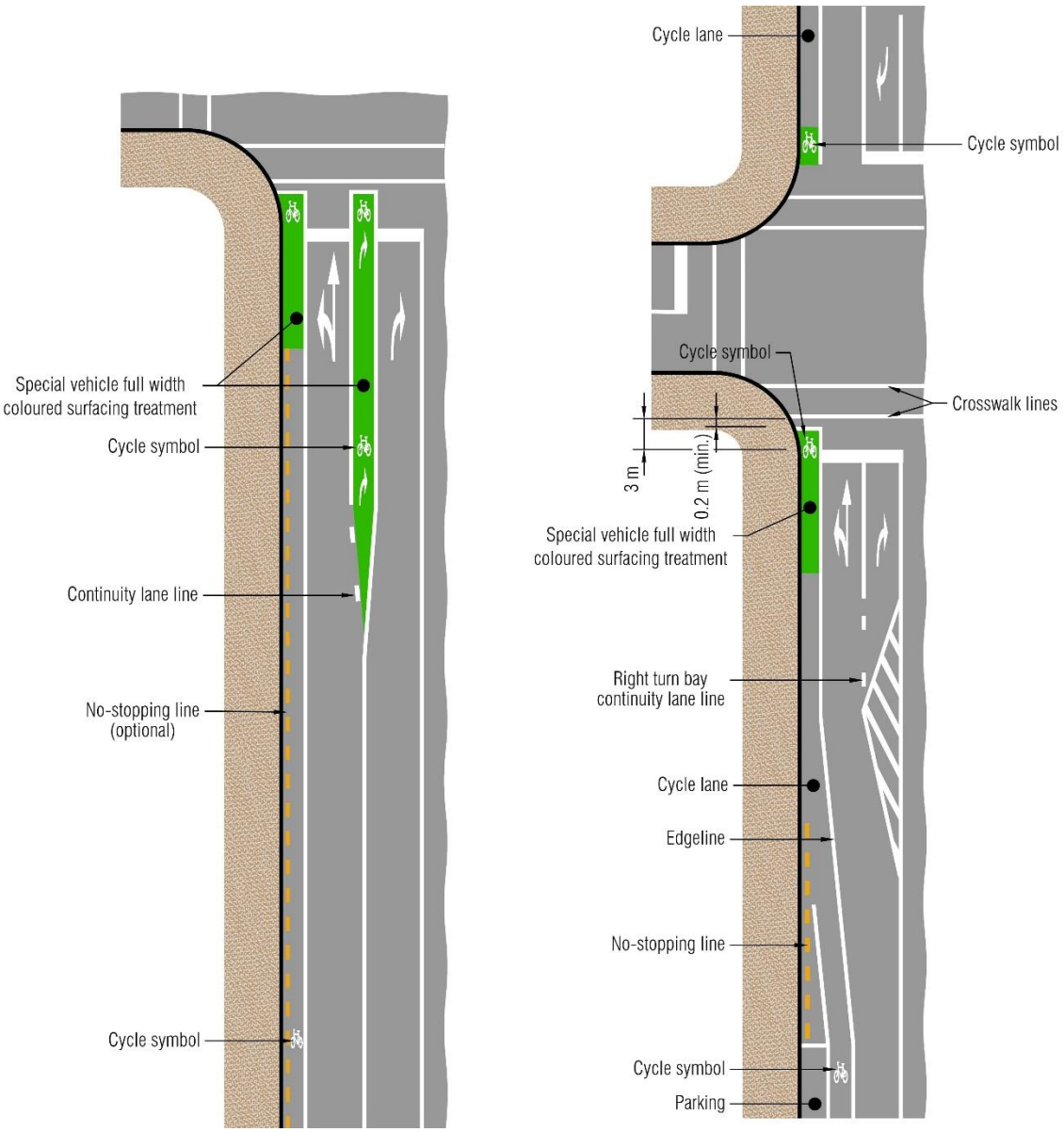
Figure 6-12: Cycle lane leading up to an intersection

Figure 6-13, Figure 6-14 and Figure 6-15 show appropriate transitions of cycle provision between midblock and intersection locations. Deliberate space should be provided to allow for safe merging and turning manoeuvres between cyclists and motorists. Any tapers on cycle lanes at transitions to the left can be a minimum of 1:10. Where a cycle lane tapers to the right (and an adjacent traffic lane is required to diverge as result), the following equation should be used for determining the length of the taper:

$$L = \frac{V * Y}{2.16}$$

Where:

L = length of taper
V = speed limit (km/h)
Y = lateral shift (m)

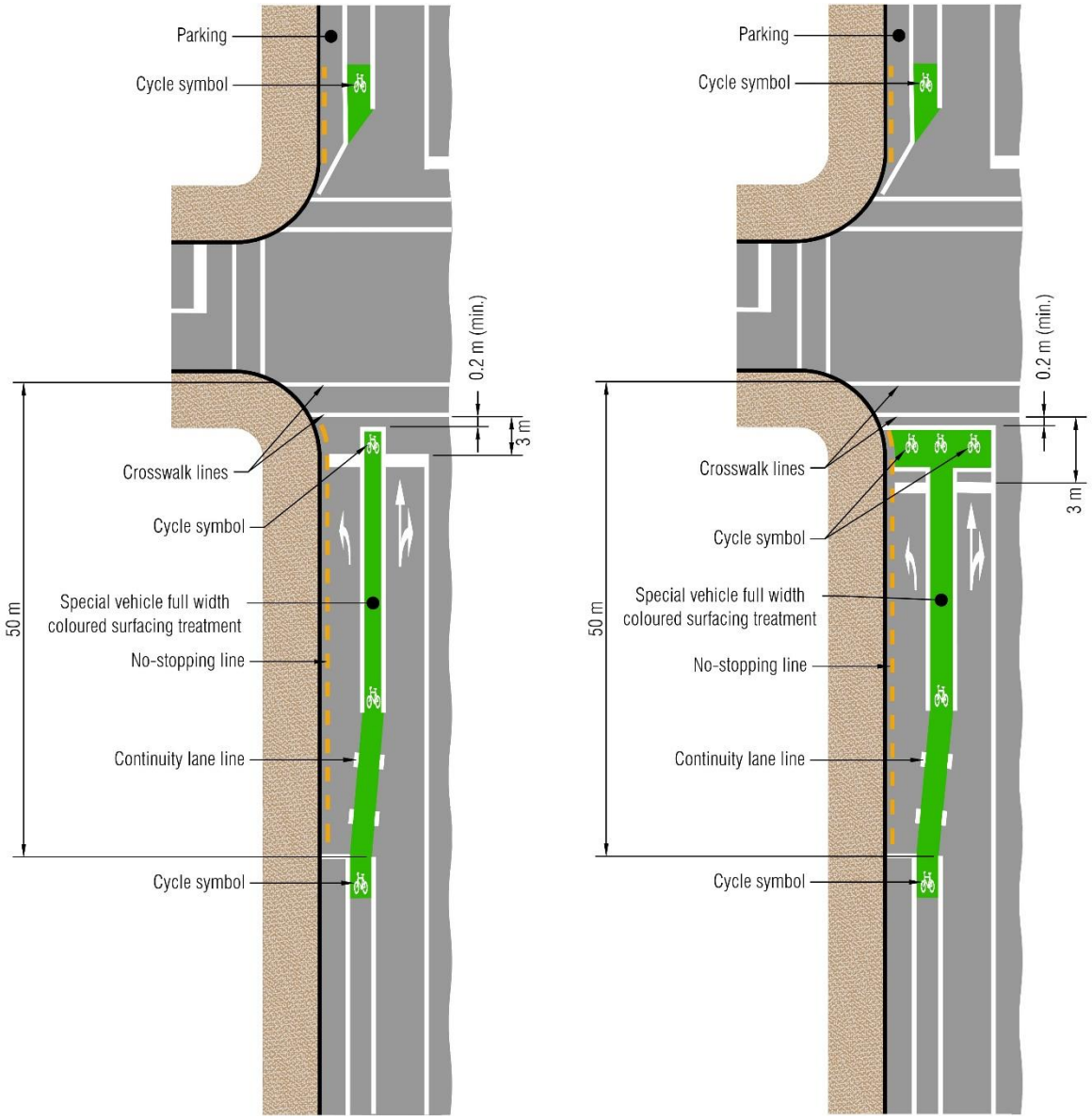


(a) Additional cycle lane at intersection to assist turning cyclists

(b) Cycle lane next to parking changing to kerbside at intersections with advanced stop line

Figure 6-13: Markings for cycle lanes on approaches to signalised intersections

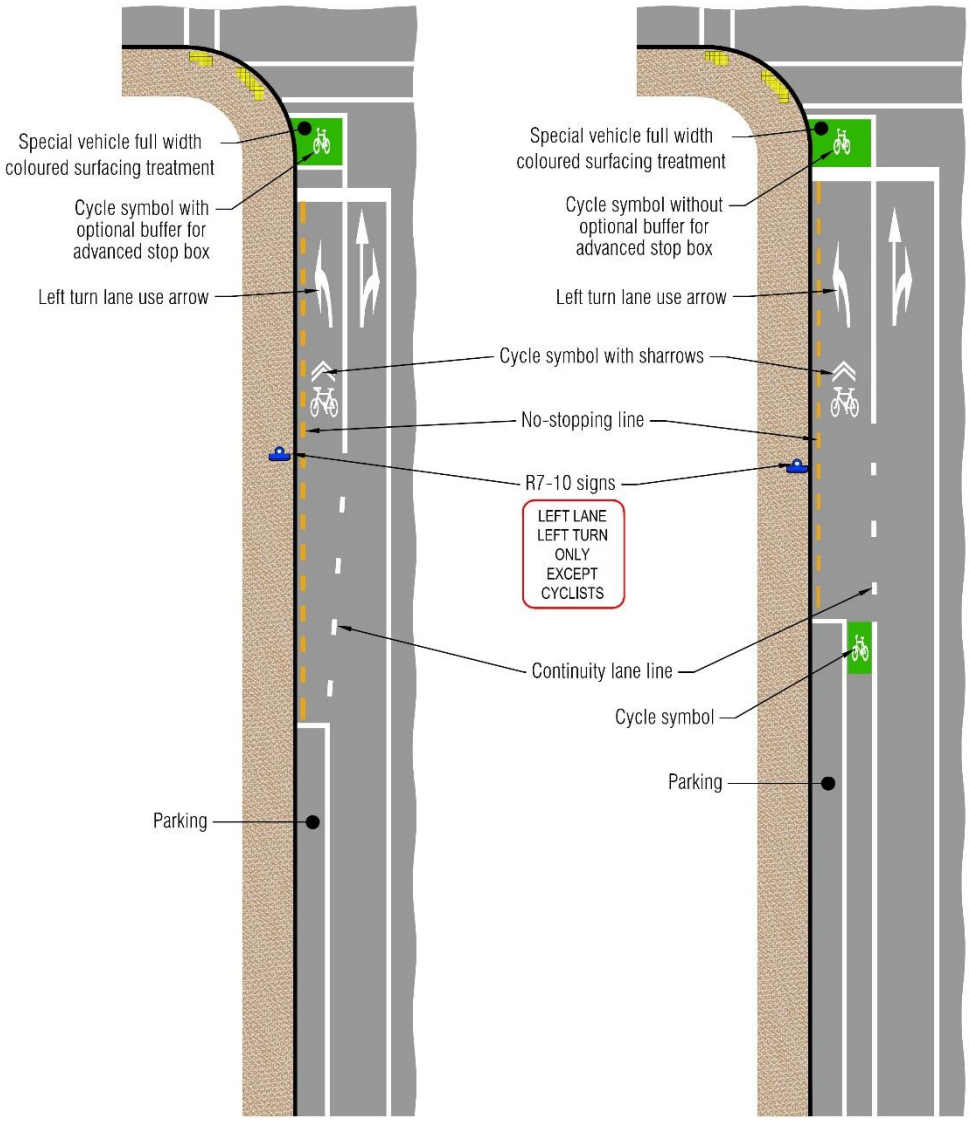
Lane use arrows for cycle lanes must be in accordance with M7-1 of Schedule 2 of the TCD Rule, except that they may be scaled to a reduced size, refer to Section 0 of this Manual for further guidance.



(a) Cycle lane next to parking changing to central lane at intersection

(b) Cycle lane next to parking changing to central lane at intersection

Figure 6-14: Markings for cycle lanes on approaches to signalised intersections



(a) No cycle lane but advanced stop box provided in front of unmarked kerbside lane

(b) Cycle lane terminates into unmarked narrow kerbside lane

Figure 6-15: Markings for cycle lanes on approaches to signalised intersections

An R7-10 General regulatory sign, such as the one illustrated in Figure 6-15, should only be considered for situations where a standard regulatory sign (or a TCD Rule compliant sign combination) is not able to adequately advise road users of the restriction(s). An R7-10 General regulatory sign may not be used as an alternative to a standard regulatory sign, nor as an English translation of a symbolic sign. The R7-10 General regulatory sign is a rectangular sign with black text on a white background and a red border.

Because cyclists are permitted to go straight ahead from the left-hand lane, as illustrated in Figure 6-15, it is critical that there is not a dedicated left turn phase at the signals.

6.6.3. Cycle lanes at intersection approaches

Cycle lanes should continue to the intersection and terminate with an advanced stop box or advanced stop line ahead of the general traffic lane limit lines (refer to Section 6.6.4 of this Manual).

An exclusive cycle turn lane may be marked as detailed in Figure 6-13(a).

In general, because of the potential for conflict between cyclists and other road users cycle facilities should not be situated adjacent to the left hand kerb (or edge of road) and to the left of an exclusive left turn lane. However, in the case of cycle paths in particular, it may not be possible to avoid this. Wherever a facility that provides for cyclists travelling straight ahead is situated to the left of a traffic lane that provides for left turning vehicles (that is, an exclusive lane or a shared left turn and through lane), careful consideration should be given to the signal phasing; this is discussed in Sections 6.6.4 and 6.6.5

To discourage motorists from driving in cycle lanes on approaches to intersections, cycle lanes may be physically separated from the adjacent general traffic lane so that they become cycle paths; refer to Part 5 of the TCD Manual for more information on physical separation of facilities for cyclists, such as cycle paths that are defined by intermittent separation.

Additional cycle lanes may be provided to assist cyclists in making turning movements. In accordance with clause 5.4(2A) of the TCD Rule, "The dimensions of markings intended solely for pedestrians or cyclists may be decreased provided that the dimensions of each letter, numeral or symbol are decreased in approximately the same proportion". However, the dimensions of markings should be not less than half of those described in M7-1 of Schedule 2 of the TCD Rule.

6.6.4. Waiting infrastructure

Waiting infrastructure for cyclists at intersections includes advanced stop boxes, advanced stop lines, and hook turn boxes. These features are defined as cycle storage areas under the TCD Rule.

(a) Advanced stop boxes

Advanced stop boxes (ASBs) allow cyclists to queue at signalised intersections in front of motor vehicles during the red phase; this makes cyclists more visible to motorists and allows cyclists a head start at the start of the green phase. ASBs across adjacent traffic lanes can also benefit cyclists by allowing them to change lanes during the red phase.

Whilst it is generally preferable to have an approach cycle lane leading into an ASB, this is not necessarily required in all cases and it can be advantageous to provide at least an ASB even without an approach cycle lane. Buffered ASBs should be considered as the first possible treatment type for any new ASBs. It is strongly recommended that a buffered ASB be considered over a standard ASB treatment at locations that have an annual average daily traffic (AADT) count of 300 or more heavy vehicles. Refer to the NZTA Buffered advance stop box: design guidance note for further guidance on buffers.

ASBs can be provided for movements where no departure cycle lane is available so that cyclists arriving during the red phase can wait at the head of the traffic queue and be more visible to motorists.

Intersection layout and signal phasing should be considered together to ensure a safe and logical arrangement. ASBs should not be placed where cyclists waiting in them would conflict with the vehicle movement from the lane in front of which the ASB is located. Figure 6-15 below illustrates the change in configuration for ASBs depending on the turning movement designation for the lanes on approach to the ASB.

Table 6-3: Specific design requirements for individual ASBs

Parameter	Description/Use
Length	The minimum length of an ASB (that is, the distance from the ASB limit line to limit line of the general traffic lane behind the ASB) should be 3 m; this should be increased to 4 m in locations where large heavy vehicles are present. When a crosswalk is not at a right angle, the length of an ASB should be measured as shown in Figure 6-15.
Width	An ASB should ordinarily be the same width as the general traffic lane behind it; however, for an ASB placed in front of the rightmost traffic lane, it may be necessary to reduce this width based on tracking paths of vehicles turning into the intersection leg on which the ASB is located.
Buffer	A buffer should be left between the limit line for general traffic and the ASB; especially for intersections with a high proportion and / or number of heavy vehicles. The length of the buffer should be 1.5 m; however, the total length of the buffer and the ASB should be at least 4.5 m.
Line style	The limit line of an ASB should be a 100 mm wide, white continuous line. The boundaries of an ASB should also be marked with a 100 mm wide, white continuous line.
Colour	Apple green full width coloured surfacing treatment should be used in ASBs to highlight their presence; refer to NZTA Coloured surfacing principles: design guidance note for details of the colour.

Parameter	Description/Use
	Apple green full width coloured surfacing treatment should also be used in the cycle lanes on approach to the ASB.
Markings	A cycle symbol, the same size as that used for a cycle lane in a location with a 70 km/h or greater speed limit should be marked in an ASB. This should be oriented in the direction of through travel from the intersection approach leg on which the ASB is located.

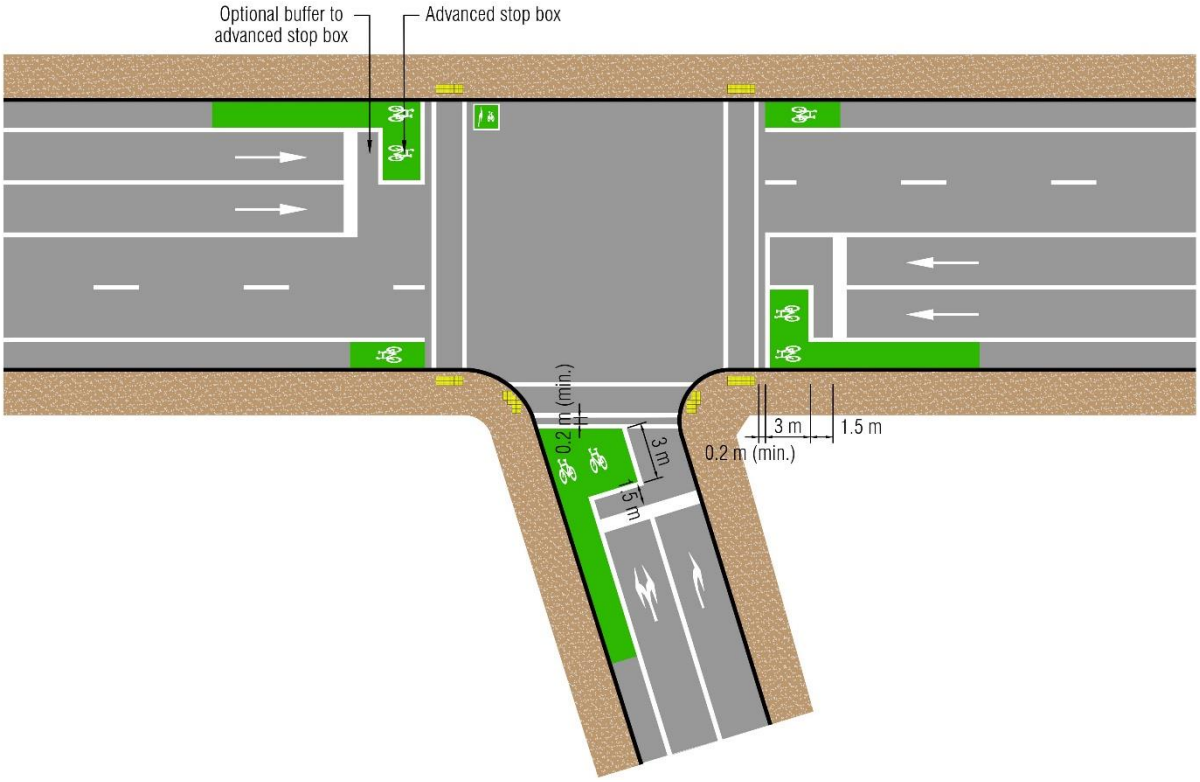


Figure 6-16: Example layouts and dimensions for advanced stop boxes with buffer

Placement considerations:

- There should be a gap of at least 200 mm between an ASB limit line and the nearest pedestrian crosswalk line.
- The limit line of an ASB in front of a right turn lane may need to be set back further from the pedestrian crosswalk lines to suit swept path turning requirements. Alternatively, the ASB may be reduced in width, for example, so that it extends across half the width of the right turn lane. Where it is difficult for cyclists to use ASBs to turn right (for example, two or more lanes need to be crossed to get into the right position), it is impractical to mark a right turn ASB in the intersection layout, or it is intended to provide for less confident cyclists, then a hook turn box is the preferred method of providing for right turning cyclists (refer to subsection (c) below).
- The maximum distance between the limit line for motor vehicles and the primary signal should not exceed 5 m.
- Further guidance on the configuration of buffered ASBs is provided in the NZTA Buffered advance stop box: design guidance note.

ASBs should not:

- Extend across more than two adjacent lanes in either direction from a cycle lane; or
- Extend across more than two adjacent lanes if no approach cycle lane is provided.

Note that, in some locations it would be advantageous for cyclists to be able to proceed straight ahead from an exclusive left turn lane to ensure they remain to the left of through traffic, however, unless specific provision is made to permit cyclists to proceed straight ahead (such as illustrated in Figure 6-15) cyclists would be in breach of the Road User Rule. Therefore, the left-hand lane on approach to the signals should either be unmarked, so that cyclists can proceed straight ahead from an ASB placed in front of it, or provision should be made to permit cyclists to proceed straight ahead from the left turn lane. In any case, the phasing of traffic signals should be designed to ensure that a vehicle is not permitted to turn left when a cyclist is intending to travel straight ahead from the ASB.

(b) Advanced stop lines

Advanced stop lines (ASLs) extend a cycle lane on an intersection approach further than adjacent general traffic lanes; this makes cyclists more visible to motorists and gives them a head start when the green phase commences.

Wherever cycle lanes are provided at an intersection, advanced stop lines or advanced stop boxes (see Section 6.6.4) should be provided, including at midblock signals and adjacent to exclusive through lanes. Refer to Table 6-4 for design requirements for ASLs.

Table 6-4: Specific design requirements for individual ASLs

Feature	Description
Size	An ASL should be positioned 3 m beyond the limit line for the general traffic lane. This may be reduced to 2.5 m if drivers can only turn into driveways or kerbside parking beyond the intersection. This length beyond the limit line for the general traffic should be increased to 4 m in locations where large numbers of heavy vehicles are present.
Line style	The ASL should be marked in accordance with the specifications of cycle lane limit lines, that is, 100 mm wide, white solid line.
Colour	The ASL marking is white; as noted above. Apple green full width coloured surfacing treatment should be used in the cycle lane for the full length of road up to the ASL to highlight the presence of cyclists, especially for kerbside cycle lanes adjacent to general traffic lanes that involve left turning vehicles or for additional cycle lanes that provide for right turning (or straight ahead) cyclists.
Markings	A cycle symbol should be marked in the cycle lane near the ASL.

Placement considerations: There should be a gap of at least 200 mm between an ASL limit line and the nearest crosswalk line.

Phasing considerations:

- Intersection layout and signal phasing must be considered together to ensure a safe and logical arrangement. ASLs should not be placed where turning vehicles are likely to overrun the cycle lane, for example a kerbside ASL placed next to any lane with a lead left turn.

(c) Hook turn facilities

Hook turns are a way for cyclists to turn right in two stages. As shown in Figure 6-17, the first stage involves travelling straight through the intersection, to access the hook turn box located on the far side; this is done in parallel with adjacent "northbound" through traffic. The cyclist then waits in the hook turn box until the green phase is given to traffic on the intersecting road, at which point the cyclist can travel parallel with this eastbound traffic straight through the intersection.

A hook turn facility assists cyclists to make hook turns by designating space for them to do so without conflicting with opposing or adjacent through traffic.

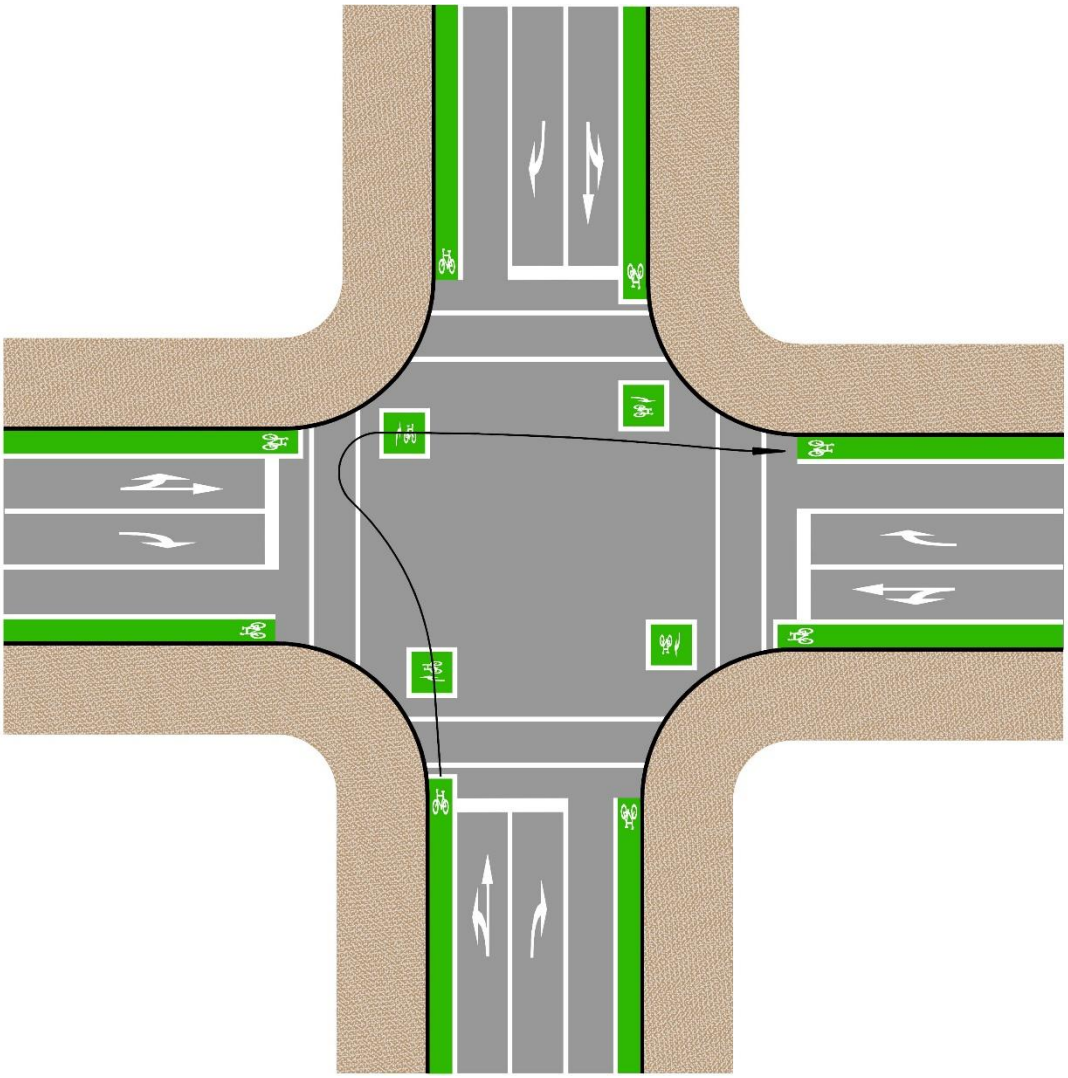


Figure 6-17: Route followed by cyclist performing hook turn

Hook turn boxes are particularly useful at busy multi-lane signalised intersections where it may be difficult or daunting for some cyclists to access the right turn lane or, once in the correct approach position, to undertake the right turn through the intersection. They can also be useful to allow right turn movements from roadways with cycle paths between the kerb lines or shared paths where cyclists may face difficulty moving to the centre of the road to turn right or to allow cyclists to make a right turn where it is prohibited for other traffic. Hook turn boxes provide a higher level of service to people who are less confident riding a bicycle through busy intersections.

Table 6-5: Specific design requirements for individual hook turn boxes

Part	Title
Size	The size of a hook turn box depends on the space available and the required number of bicycles to be accommodated at any one time. A minimum area of 3 square metres should be provided, with each of the edges being at least 1.5 m long.
Line style	The border of a hook turn box should follow the specifications of cycle lane limit lines, that is, a 100 mm wide, white solid line.
Colour	Apple green full width coloured surfacing treatment should be used in hook turn boxes to highlight their presence; refer to NZTA Coloured surfacing principles: design guidance note for details of the colour.
Markings	A cycle symbol and directional arrow should be marked within the hook turn box, as shown in Figure 6-18. Note that the arrow is 30% of the standard turn arrow size and the cycle symbol is that for a 50 km/h road (see Table 6-2). The cycle symbol and the arrow should be aligned with the direction of travel from which the cyclists access the box (that is, the "northbound" approach in the figure); this is done to avoid cyclists travelling straight through from the adjacent approach (that is, the "eastbound" approach in the figure) confusing the box with an advanced stop box.

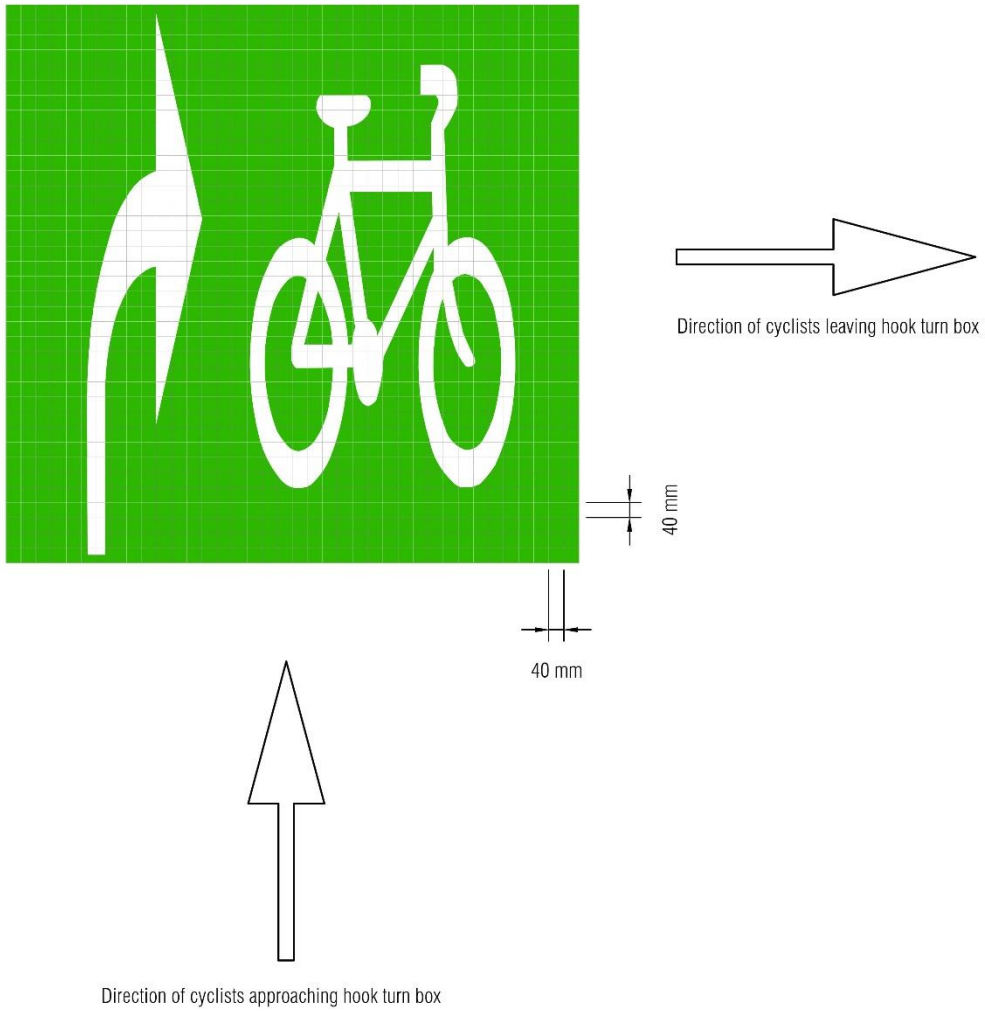


Figure 6-18: Hook Turn Stencil

The signs shown in Table 6-6 may be used to highlight the presence of hook turn facilities and should be used wherever the facility is obscured on approach to the intersection.

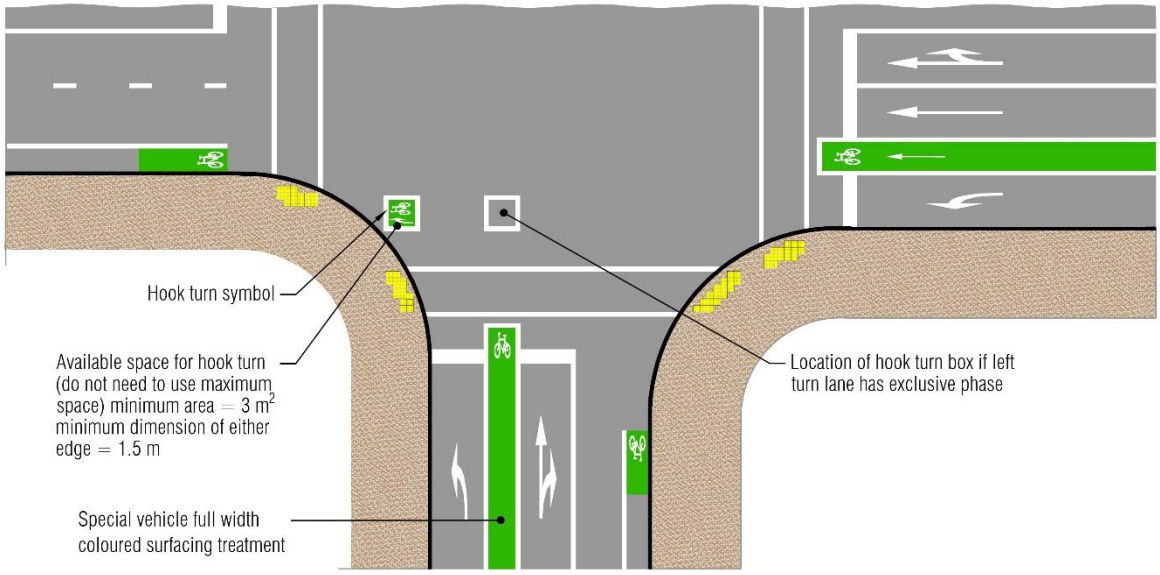
Table 6-6: Signs available for use with hook turn facilities

Code	Sign	Policy and Use
A43-5 Hook turn		The A43-5 sign is used to inform cyclists that hook turn facilities are provided. The sign may be used on any approach to an intersection where hook turn boxes are available. The sign should be used where: • When the geometry of the road obscures the hook turn facilities from cyclists' view. • When physical protection of cycle facilities or multiple lanes of through traffic make it challenging for cyclists to make a conventional right turn. The sign should be located 25 m in advance of an intersection.

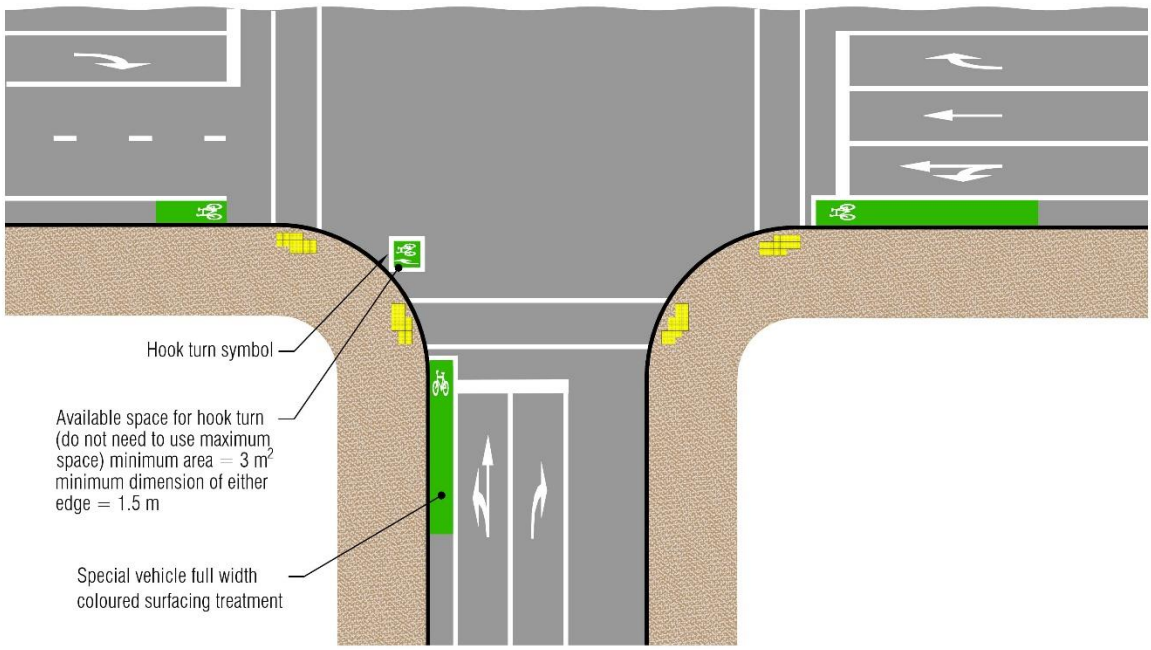
Design layout and phasing considerations:

- There should be a gap of at least 200 mm between a hook turn box and the nearest pedestrian crosswalk line.

The layout for a hook turn box within an intersection depends on the phasing and configuration of the two relevant approaches relating to the two movements of the hook turn manoeuvre, and in particular the location of the cycle lanes on these approaches. It must be ensured that cyclists waiting in the hook turn box do not impede the travel of through cyclists and are not put into the path of any motor vehicle or pedestrian movements.



(a) In front of an exclusive left-turn lane



(b) In front of a kerbside cycle lane

Figure 6-19: Markings for hook turn boxes at signalised intersections

Additional information regarding hook turn facilities is available on the NZTA Cycling network guidance website.

(d) Cycle loop detection marking

Where specific cycle detection has been installed at an intersection, an RCA should mark M2-3F Cycle loop detection markings to indicate to cyclists the most sensitive area of the detection loop to trigger the cycle signals. M2-3F markings may be marked in advanced stop boxes, on approach to advanced stop lines, or hook turn boxes and must be marked as shown in Figure 6-20.

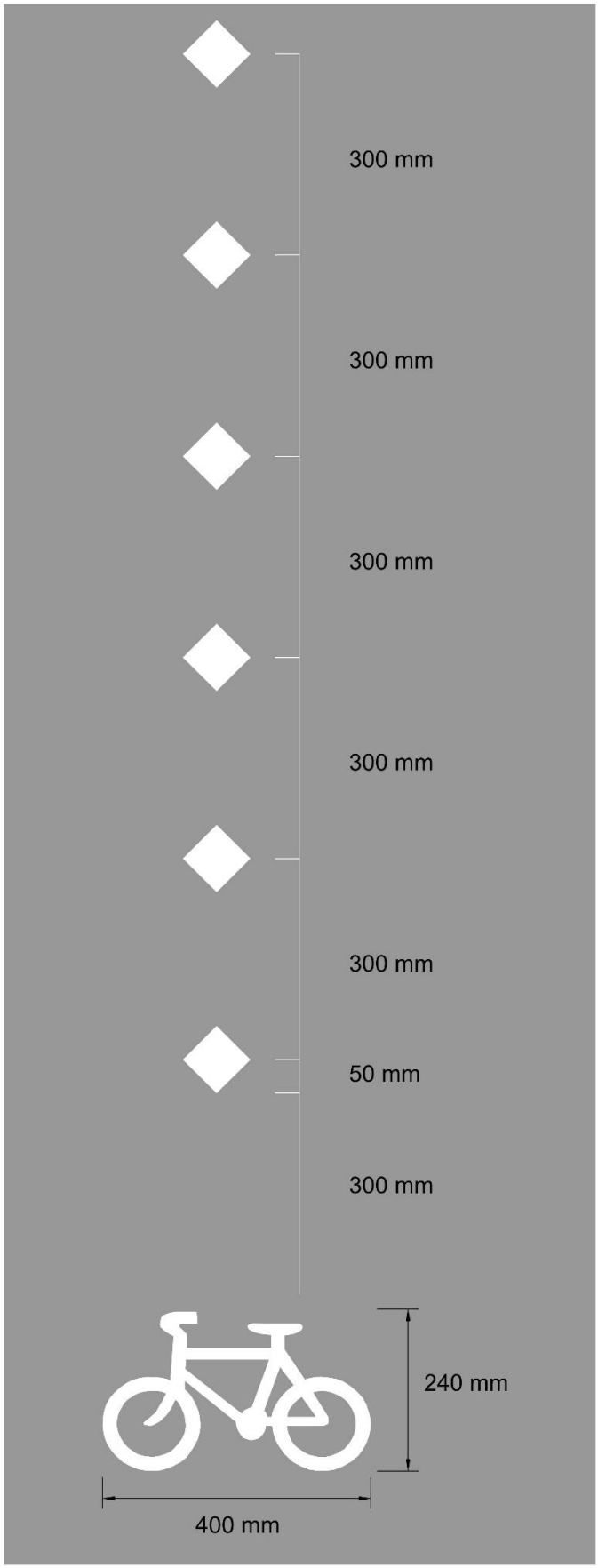


Figure 6-20: M2-3F Cycle loop detection marking specifications

6.6.5. Phasing options to improve cycling

Specific signals for cyclists may be used at signalised intersections to improve the level of service and safety for cycling. These may include:

- Protected (exclusive) movements for cyclists (that is, where cyclists can move at a different time or in a different direction to adjacent motor vehicle traffic);
- Head starts for cyclists (that is, where the green cycle signal is displayed in advance of the green signal for general traffic); and / or
- All-red extensions for cyclists.

6.6.6. Cycle lanes at intersection departures

Where there is a cycle lane on approach to an intersection, the cycle lane should continue on the departure side of the intersection. The RCA must mark a cycle symbol in the cycle lane after the intersection.

6.6.7. Cycle paths at intersections

Where a signalised intersection is located on a road where cycling is accommodated on cycle path(s) or shared path(s) cyclists may be transitioned to a cycle lane and use the intersection treatments described above. Or the cycle path can continue up to the intersection.

Signalised cycle path crossings of a leg of a signalised intersection must be controlled by a three-aspect signal display similar to the configuration illustrated in Figure 6-22 and Figure 6-23 of this Manual, which comprises an S2-3 Cycle symbol on each display of the three aspect traffic signals. Figure 6-21 illustrates a two-way cycle path at a signalised crossroads intersection. For the intersection configuration illustrated it is critical for cyclists to have a dedicated signal phase so that cyclist movements across the northern leg of the intersection do not come into conflict with through or turning movements from the traffic lanes on any of the other approaches to the intersection. As far as practicable, designers should endeavour to minimise the potential for conflict between the various turning and through movements at all intersections.

Watch this space: NZTA is trialling directional cycle traffic signal displays that incorporate an arrow in the same signal aspect with the cycle symbol. More information on this trial can be found in the gazette notice.

Refer to Part 5 of the TCD Manual for guidance for markings and signs for cycle lanes, cycle paths, and shared paths. Refer to Section 6.6.4 of this Manual for guidance on signs and markings for hook turns.

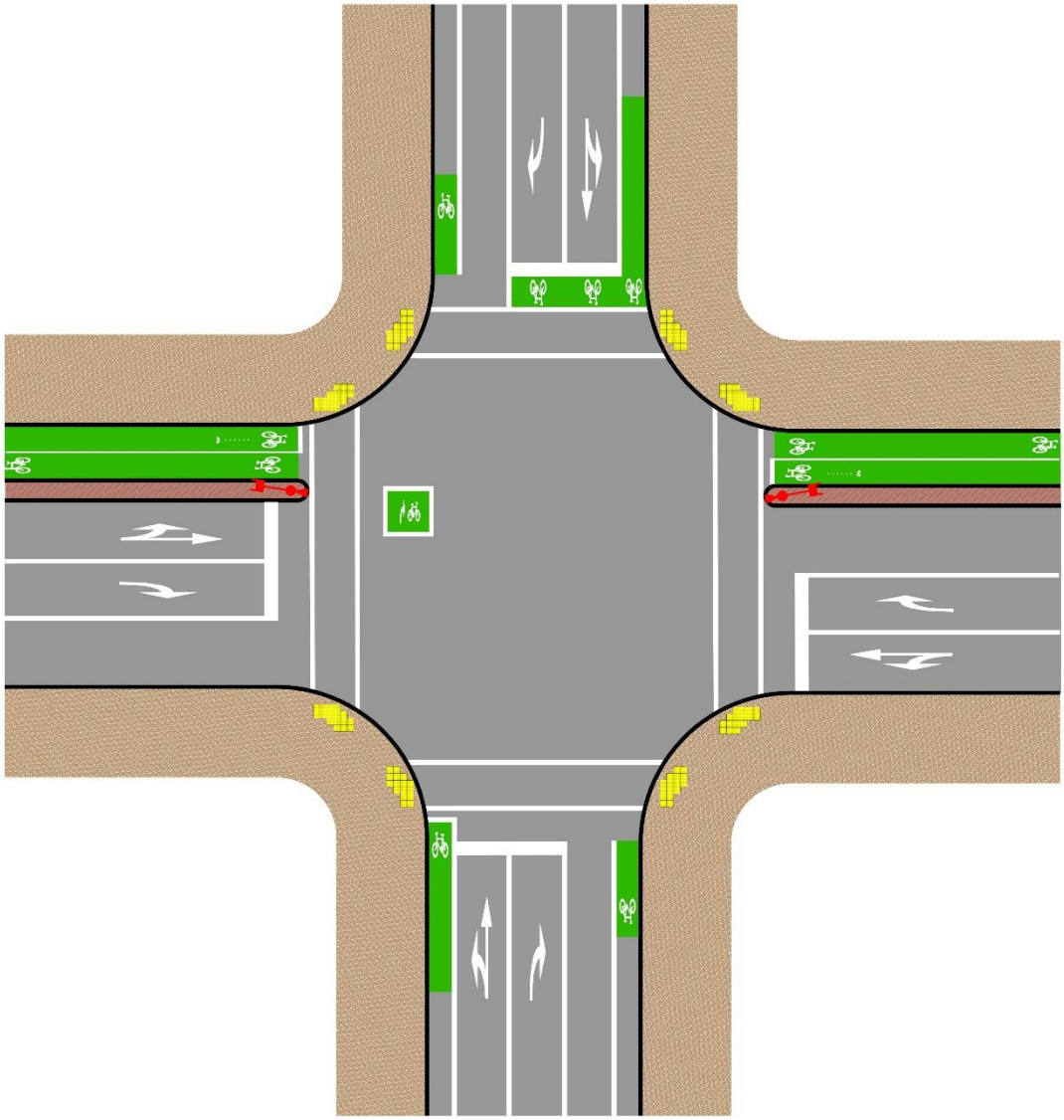


Figure 6-21: Cycle lane and cycle path approaches to signalised intersections

6.7. Providing for shared paths at signalised intersections

Pedestrians and cyclists crossing a leg of a signalised intersection can be accommodated as described in Section 6.3.1 and Section 6.3.2 of this Manual.

Shared paths that cross a leg of a signalised intersection may be configured as separated paths or as shared paths where there is no delineation to separate pedestrian and cyclist movements. As described in Section 8 of this Manual, specific signals for shared paths at signalised intersections are to be developed. In the interim, individual signal displays for pedestrians and cyclists are displayed at the same time to indicate when pedestrians and cyclists on the shared path can cross the leg for the intersection. Examples of those signal displays are shown in Figure 6-22 and Figure 6-23.

Figure 6-22: Green signal phase for shared path crossing

Figure 6-23: Red signal phase for shared path crossing

Where cyclist and pedestrian paths at a signalised intersection are separated on either side of the intersection, they should not be merged into a combined shared path for crossing the legs of the intersection. Similarly, where a shared path on approach to and departure from the intersection is a combined path, it should remain as a combined path for crossing the legs of the intersection.

6.8. Special vehicle lanes

For guidance on the provision of special vehicle lanes at signalised intersections, refer to Section 22 of this Manual.

6.9. Example layouts for signalised intersections

The following figures are examples of layouts for signalised intersections.

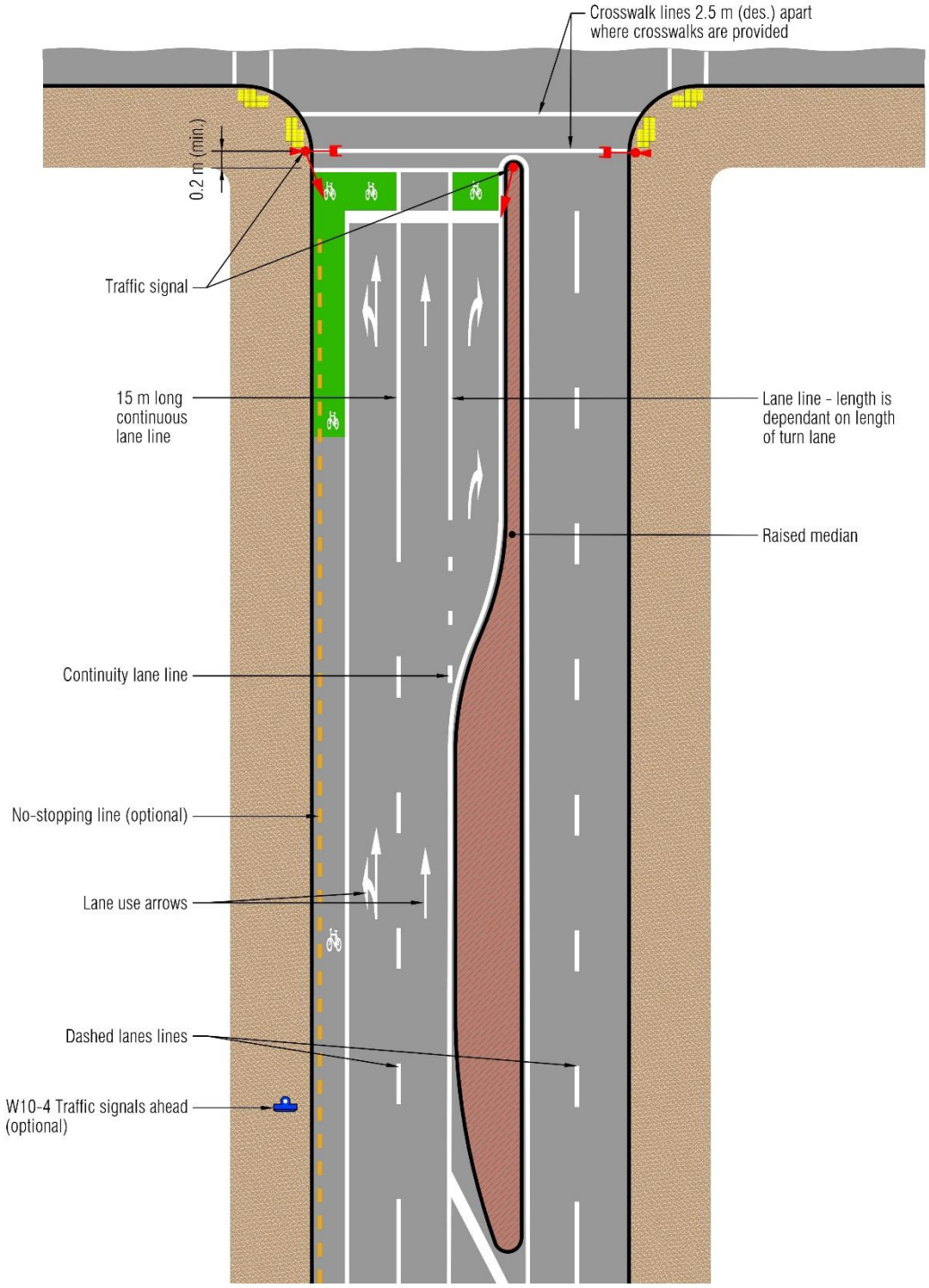


Figure 6-24: Example layout of traffic control devices for the approach to a signalised intersection with solid median

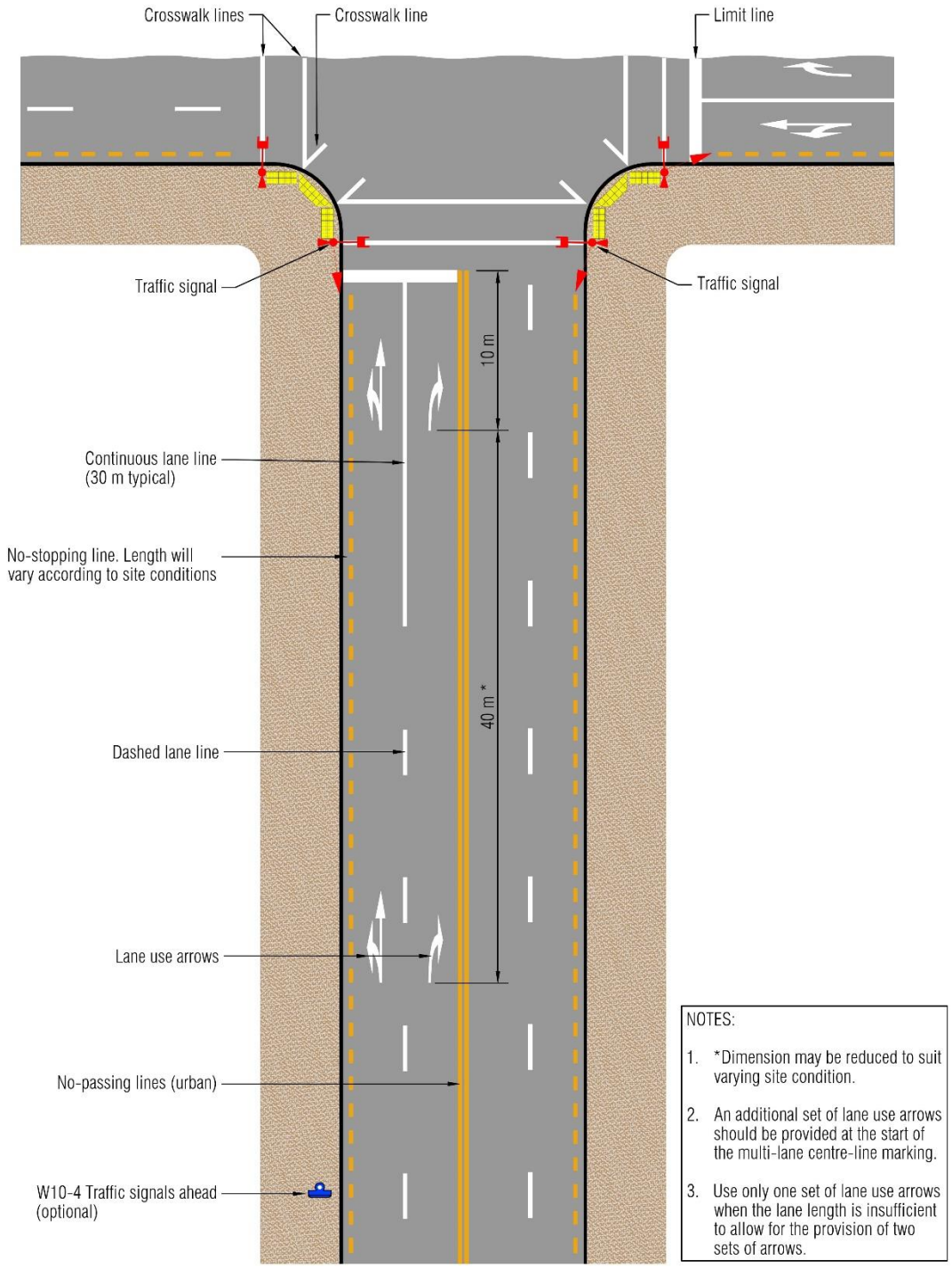


Figure 6-25: Example layout of traffic control devices for the approach to a multi-lane signalised intersection

7. Interchanges and Grade Separated Intersections

The definitions section of the TCD Manual notes that an interchange is “A junction that typically uses grade separation, and one or more ramps, to permit traffic on at least one road to pass through the junction by passing over or under other traffic streams.” Interchanges are common on Motorways and Expressways, and reference should be made to the Part 10 of the TCD Manual for information regarding the application of traffic control devices for interchanges. However, grade separated intersections, which are not necessarily interchanges, can be useful at other locations, such as where the local topography makes an at grade intersection impractical.

Where one roadway passes over another, this does not meet the definition of an intersection because the roadways do not physically intersect with each other. However, parts of the connections between any such roadways may constitute an intersection and guidance for them is provided in this section.

7.1. Form

There are two common forms of grade separated interchanges and intersections:

- Grade separated intersection with link road(s). In the example below, the east-west and north-south roadways do not physically intersect and neither of these roadways is an expressway or motorway. However, other roadways provide the connection between the grade separated roadways and the treatments for those intersections are defined in this Manual.

Figure 7-1: Grade separated intersection with link road(s) (Image source: LINZ)

- Grade separated intersection with on ramps and / or off ramps. In the example below, the east-west roadway is a divided urban arterial, with on and off ramps providing connection between those roadways and the intersecting north-south roadway. Treatments for the physical intersections shown below are defined in this Manual.

Figure 7-2: Grade separated intersection with on ramps and / or off ramps (Image source: LINZ)

7.2. Other considerations

7.2.1. General

Grade separated interchanges and intersections typically contain features that are common at at-grade intersections for interchanges. When designing a grade separated interchange or intersection designers should carefully consider which category each element of the intersection meets and design them accordingly.

7.2.2. Wayfinding

Grade separated intersections (and on occasion, grade separated interchanges) may not be intuitive for road users to navigate as they may need to turn left to access destinations that they can see to their right (or vice versa) or travel past their destination before turning back to reach it. Signs and markings should make it clear to road users how they are expected to reach their destinations.

7.2.3. Active road users

Grade separated intersections can also be unintuitive for active road users to navigate. In addition to the factors affecting general wayfinding, it can be unclear to active road users where they need to cross a roadway to continue their journey. Where active road users are permitted to travel through interchanges, specific provisions are required, which are not included in this Manual; reference should be made to Part 10 of the TCD Manual.

Additionally, when links are available to active road users that are not available to other road users, this can be disorientating. Designers should include dedicated wayfinding signs for active road users.

8. Cycle Path Crossings

Clause 11.4(5) of the TCD Rule states that "When a cycle path or a shared path used by cycles crosses a roadway, a road controlling authority may, as appropriate, control either the movement of users of the path or traffic along the roadway by means of stop or give-way signs or by the installation of traffic signals, in the same manner as described in 10.5 [of the TCD Rule] for an intersection."

In accordance with clause 5.4(2A) of the TCD Rule, "The dimensions of markings intended solely for pedestrians or cyclists may be decreased provided that the dimensions of each letter, numeral or symbol are decreased in approximately the same proportion". However, the dimensions of markings should not be less than half of those described in Schedule 2 of the TCD Rule.

For design guidance, refer to the NZTA Cycling Network Guidance.

8.1. Cycle path users controlled

Where the movement of cycle path users is controlled, many of the design considerations for pedestrian crossings also apply (refer to Section 7 of the TCD Manual Part 5). However, longer storage space may be required to accommodate bicycles (particularly at median refuges). To accommodate a cargo bike, tandem or trailer bike, the storage space should be 2.5 - 3.0 metres long. The width of any crossing facility should also allow two cycles with trailers to cross concurrently in opposing directions. Holding rails may be provided where cyclists are required to give-way.

Where movements along a cycle path across a roadway are controlled, signs, signals and / or markings as appropriate must be used to indicate the control(s) that apply to path users at the crossing location. If used on the cycle path, give-way signs, limit lines, and triangular symbols should be used in accordance with the guidance in Section 4 of this Manual.

8.2. Traffic on roadway controlled

A cycle path may cross the roadway independently or in parallel with a pedestrian crossing (zebra); for such cycle path crossings, traffic on the roadway must be controlled by a stop or give-way sign installed to face approaching traffic on the roadway. On each approach to be controlled, the following should be marked:

- A limit line 5 m back from the cycle path crossing in yellow or white as relevant to the form of control; and
- A STOP word message (M6-1) or triangular give-way symbol (M6-2) as relevant to the form of control.

However, in either case, consideration should be given to the need to use the supplementary signs (shown in Table 8-1) to reinforce the requirement for traffic on the roadway to give way. The regulatory supplementary signs in Table 8-1 should be used to reinforce this requirement and the path may be given an apple green full width coloured surfacing treatment (refer to the NZTA Coloured surfacing principles: design guidance note for details of the colour).

Table 8-1: Additional signs for cycle path crossings

Code	Sign	Policy and Use
R2-9.1 Turning traffic give way to cyclists		R2-9.1 reinforces requirement to give way to cyclists on a cycle path when turning at a give-way sign, stop sign or traffic signals, in accordance with clause 3.2 or 4.1 of the Land Transport (Road User) Rule 2004. This sign may supplement R2-1 or R2-2 signs or traffic signals and should be installed on the same pole.
R2-9.2 Straight ahead traffic give way to cyclists		R2-9.2 reinforces requirements to give way to cyclists on a cycle path when proceeding straight ahead from a give-way or stop sign, in accordance with clause 4.1 of the Land Transport (Road User) Rule 2004. This sign may supplement R2-1 (stop) or R2-2 (give-way) signs and should be installed on the same pole.
A43-7 Cyclists watch for traffic		A43-7 should be used at cycle path crossings where traffic on the road is controlled. The sign should be, located to face approaching cyclists. The sign may be located at the crossing or at a location in advance of the crossing where the crossing is clearly visible to approaching cyclists. This sign must not be mounted on the same pole as a regulatory sign or traffic signal.

Figure 8-1 illustrates a four-way stop controlled intersection with an uncontrolled cycle path crossing of one leg of the intersection. Figure 8-2 below illustrates the eastbound approach to an intersection similar to the one shown in Figure 8-1.

Drivers on the roadway at the intersection illustrated in the Figure 8-1 example are required to give way to other road users on the roadway in accordance with the stop control and give way rules for turning movements. They are also required to give way to cyclists on the cycle path. For example, “eastbound” road users turning left and “westbound” road users turning right should be able to observe cyclists travelling in both directions on the cycle path so that the turning drivers can give-way to the cyclists on the uncontrolled approach to the crossing of the “northern” leg of the intersection. Similarly, “southbound” road users should be able to observe cyclists on the cycle path and vehicles approaching on the other three legs of the intersection. The selection of intersection control type and the positioning of traffic control devices will influence the ability of road users to meet their obligations for giving way to other road users.

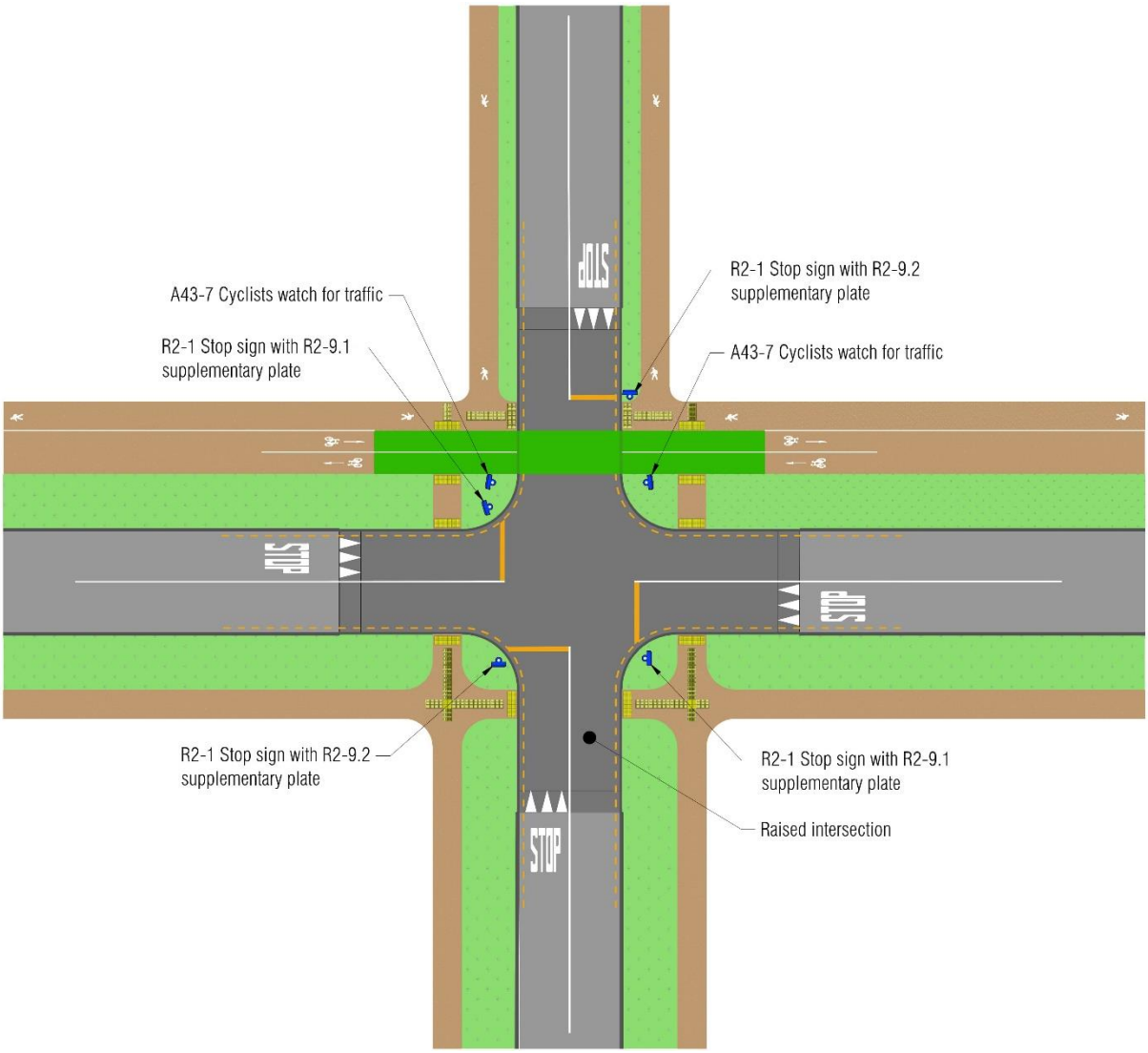


Figure 8-1: Uncontrolled cycle path crossing at four-way stop controlled intersection

Figure 8-2 below is an example of the eastbound approach to an intersection similar to the one illustrated in Figure 8-1 above.

Figure 8-2: Example of an uncontrolled cycle path crossing at four-way stop controlled intersection

8.3. Signalised intersections

Where the movement of cyclists on a path and traffic on a roadway is controlled by signals, the guidance for signalised pedestrian crossings (refer to Part 5 of the TCD Manual) should be applied. For signalised crossings it is common for pedestrians and cyclists to cross at the same location. Signalised crossings can take various forms including:

- Cyclist-only crossings;
- Pedestrian and cyclist shared crossings – a single crossing that is shared by pedestrians and cyclists across the roadway; and
- Pedestrian and cyclist segregated crossings – a crossing with delineated space for pedestrians and cyclists separately across the roadway[2].

8.3.1. Signals

For the signals that control the movement of traffic on the roadway, applicable signals described in Section 6.3 of this Manual may be used and the guidance in that section should be applied. For the signals that control the movement of cycles on the path, the cycle signal (S2-3) in Schedule 2 of the TCD Rule should be used. An example of an assembly of signals is shown in Figure 8-3.

Figure 8-3: Cycle signal display (on right) where cycle path and signalised pedestrian crossing (left) cross the roadway at an intersection

At pedestrian and cyclist shared or segregated crossings a separate pedestrian display should be used.

Watch this space: The NZTA is considering the potential for shared signals that would control the movement of pedestrians and cyclists.

8.3.2. Markings

Transverse lines should be marked (as illustrated in Figure 8-3), and the principles described in Section 7.6 of the TCD Manual Part 5 should be applied, to provide guidance for cyclists crossing the intersecting road. At shared crossing locations crosswalk lines must be provided as described in Section 7.6 of the TCD Manual Part 5. For pedestrian and cyclist segregated crossings, crosswalk lines must be marked to guide the movement of pedestrians and cycle path crossing lines should be marked to guide the movement of cyclists and to separate the crossings.

Cycle and pedestrian symbol markings should be marked on the path(s) on the approaches to the crossings to clearly indicate which crossing is for which user group. Pedestrian and cycle symbol markings must not be marked on the roadway at crossings.

9. Direction Signs

Clause 4.2(10) of the TCD Rule states “A road controlling authority must install and maintain signs, as it considers necessary or desirable, to inform road users of destinations, routes, street names, distances, the names of localities or other information of value to road users” Direction signs are the primary traffic control devices used to achieve this.

Refer to Sections 4-6 of the TCD Manual Part 2 for guidance on direction signs for intersections.

10. Lane Use Guidance

Where multiple lanes are provided on the approach to an intersection, traffic control devices should be used to guide drivers to use the correct lanes. The devices available include:

- Lane use arrow markings;
- Overhead lane use arrow signs;
- Overhead directional guidance;
- Map type signs; and
- Destination marking.

A minimum treatment of lane use arrow markings should always be used on multi-lane approaches. Other guidance may be used and should be considered where an intersection is more complex, where the layout is not intuitive to drivers, or where intersections are closely spaced.

If lane use guidance is used, then the markings or signs must show all movements that may be made from the lane to which they apply.

10.1. Lane use arrow marking

10.1.1. Legislation

Clause 7.12(3) of the TCD Rule states:

(3) “A lane that may be used only by road users who are travelling straight ahead or turning in a specific direction must be clearly indicated by:

(a) at least one lane-usage arrow marked within the lane that complies with the relevant specifications in Schedule 2 [of the TCD Rule, also refer to Figure 10-1]; or

(b) at least one sign provided above the lane that complies with the relevant requirements in Schedule 1 [of the TCD Rule, also refer to Section 10.2].”

10.1.2. Use

Lane use arrows are used on approaches to intersections to direct road users into the correct lane for their intended manoeuvre. They should be used for lane use definition and no other purpose, other than those situations where they are used as keep left reminders as described in the Section 13 of the TCD Manual Part 5.

Care must be taken when locating lane use arrows relative to intersections, and any other side roads or entrances, to avoid giving misleading directions to drivers.

Where a traffic lane approaching an intersection becomes a mandatory turn lane, lane use arrows must be marked in the mandatory turn lane. On multi-lane approaches to intersections, where all movements are subject to priority and / or signal control, lane use arrows should be marked in all lanes. The arrows should be approximately 10 m from the limit line or turning point for urban intersections and 20 m from the limit line or turning point for rural intersections. Any additional sets of arrows should be marked at approximately 80 m spacings, however, distance may be varied to suit individual situations.

All lane use arrows on urban roads should be marked as described in Table 10-1.

Table 10-1: Lane use arrows on urban roads

Application	Specification
Colour	White
Width	As specified in Figure 10-1
Length	As specified in Figure 10-1

All lane use arrows on rural roads should be marked as described in Table 10-2.

Table 10-2: Lane use arrows on rural roads

Application	Specification
Colour	White
Width	As specified in Figure 10-1
Length	Longitudinal dimensions increased as permitted in clause M7-1 of the TCD Rule. Typically 1.5 times longer than shown in Figure 10-1

Where lane use arrows are provided exclusively for use by cyclists, then in accordance with clause 5.4(2A) of the TCD Rule, "The dimensions of markings intended solely for pedestrians or cyclists may be decreased provided that the dimensions of each letter, numeral or symbol are decreased in approximately the same proportion". However, the dimensions of markings should be not less than half of those described in Schedule 2 of the TCD Rule.

10.1.3. Specification

Lane use arrows must be marked in accordance with specification in Schedule 2 of the Traffic Control Devices Rule, as shown in Figure 10-1. In relation to lane use arrows, the TCD Rule (M7-2) also notes:

- Right turn arrows are to be reversed to create arrows to indicate left turns.
- The longitudinal dimensions of arrows may be increased in proportion for use in locations where there is higher speed traffic.
- Any arrows may be combined with shaft length varied as necessary.

However, the Rule does not give specific guidance regarding the variation of shaft lengths. Therefore, when combining arrows, practitioners are recommended to allow a separation of at least 800 mm between the nearest vertices of the adjacent portions of the combined arrowheads, as illustrated in Figure 10-2.

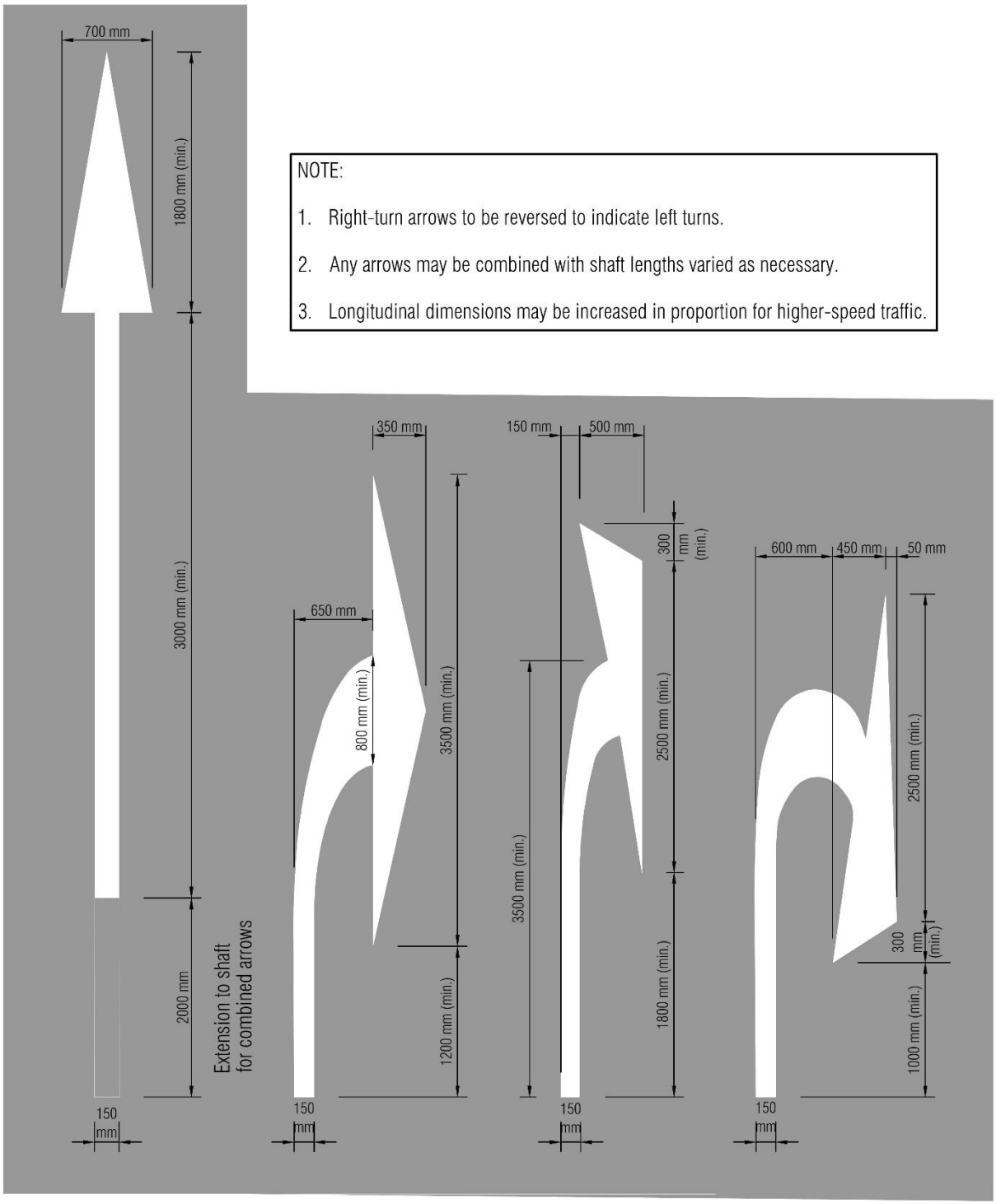


Figure 10-1: Lane use arrow markings

Watch this space: The arrows illustrated in Figure 10-1 incorporate the dimensions from the TCD Rule. However, Rule amendments will be considered to refine these dimensions to better allow for some combinations of different arrow types.

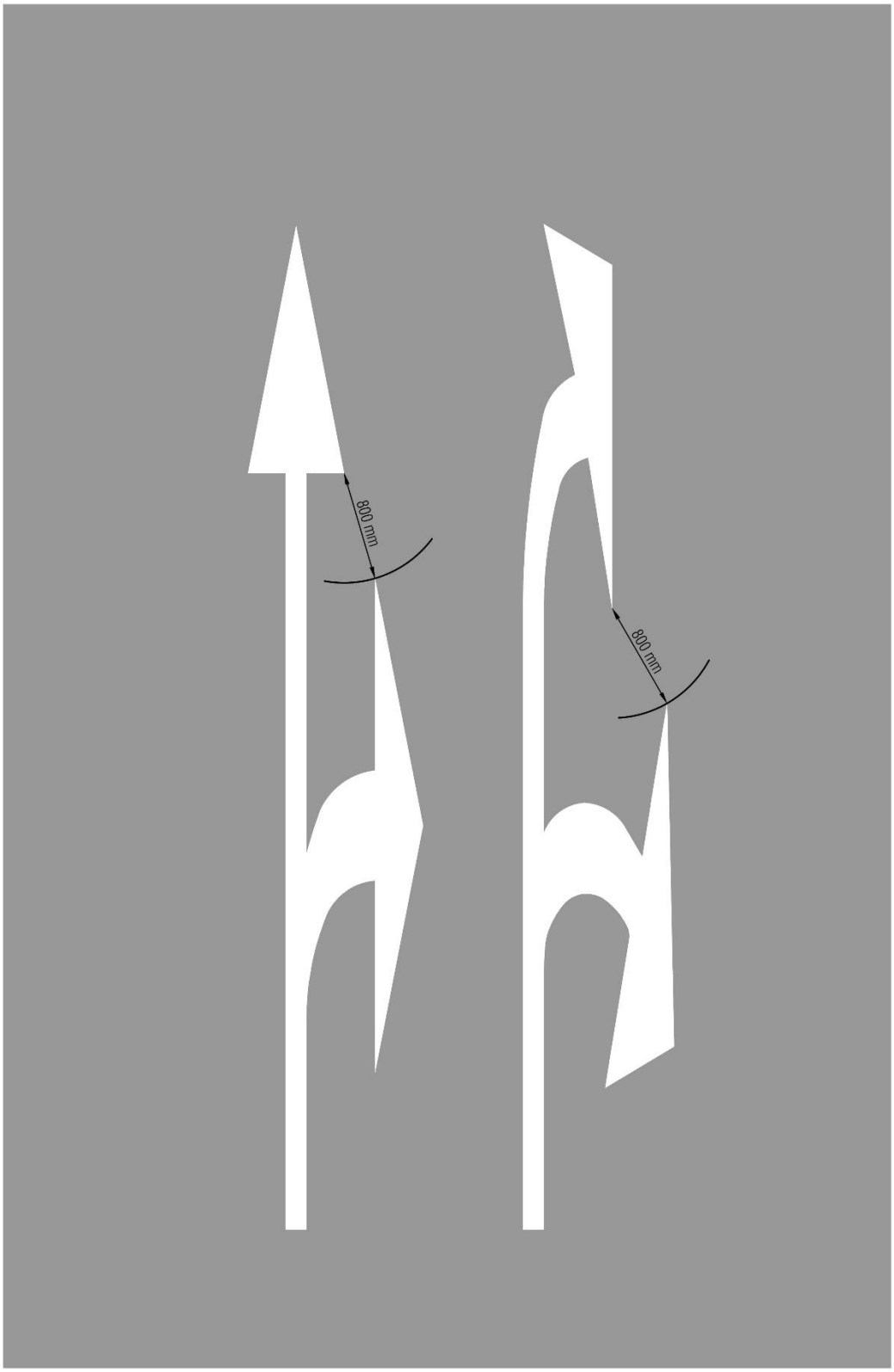


Figure 10-2: Combined lane use arrow markings

10.2. Overhead lane use arrow signs

10.2.1. Legislation

Clause 7.12(3) of the TCD Rule states:

(3) "A lane that may be used only by road users who are travelling straight ahead or turning in a specific direction must be clearly indicated by:

(a) at least one lane-usage arrow marked within the lane that complies with the relevant specifications in Schedule 2 [of the TCD Rule, also refer to Figure 10-1]; or

(b) at least one sign provided above the lane that complies with the relevant requirements in Schedule 1 [of the TCD Rule]."

10.2.2. Use

Overhead lane use signs, as illustrated in Figure 10-3, should be installed overhead in advance of an intersection that has a multi-lane approach on which lane use arrows (refer Section 10.1) are marked and where the arrows are not easily seen soon enough to promote correct lane use.

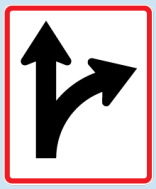
A separate R4 Lane use sign should be provided for each lane and must indicate the same directions as the respective M7-1 lane arrow(s) marked on the roadway.

Figure 10-3: Overhead lane use arrows

10.2.3. Specification

Refer to Table 10-3 below for the overhead lane use signs to be used in conjunction with the lane use arrow markings.

Table 10-3: Overhead lane use arrow specification

Code	Sign	Policy and Use
R4-1 (L) Overhead lane use arrows – left turn		No other signs may be attached to the supports or the suspension supports. For further information on lane use controls refer to Section 0 of this Manual. Each sign should be located approximately 15 m in advance of the intersection and above the centre of its respective lane with a vertical clearance between the bottom of the sign and the highest point on the road surface immediately under the sign of at least: • 5.4 m in all situations; and • 6.0 m on an official over dimension route.
R4-1 (R) Overhead lane use arrows – right turn		
R4-2 Overhead lane use arrows – straight ahead		
R4-3 (L) Overhead lane use arrows – combination (left)		
R4-3 (R) Overhead lane use arrows – combination (right)		

10.3. Destination marking

10.3.1. Use

Destination markings are alpha-numerical markings on the road that describe a destination available to drivers in that lane. Common variants include terms such as “EXIT ONLY” and “SH1 S”, however, where destination markings are used the actual text is to be determined based on the actual destination. Destination markings may be used on approach to any intersection. They should be considered where intersections on a multi-lane road are closely spaced and it is impracticable to install overhead signs. However, consideration should be given to whether destination markings have the potential to adversely affect the surface friction of the roadway; particularly for two wheeled vehicles on curved portions of roadway. Consideration should also be given to whether any proposed destination markings will be visible if there is the potential for queued vehicles to obstruct the markings.

10.3.2. Specification

Destination markings must be marked in accordance with specification in Schedule 2 of the Traffic Control Devices Rule, as shown in Figure 10-5 and Figure 10-6.

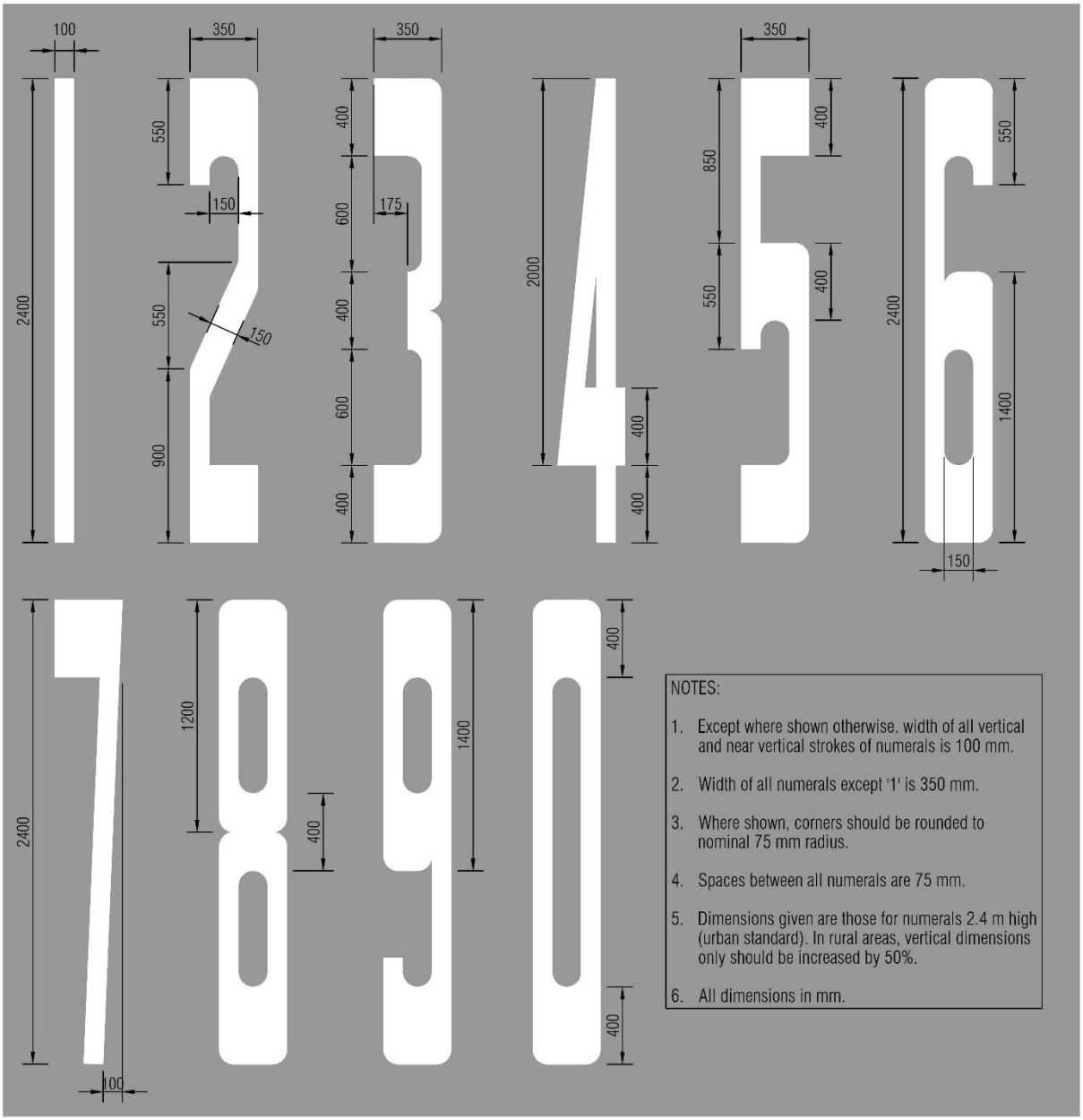


Figure 10-4: Numbers for message markings

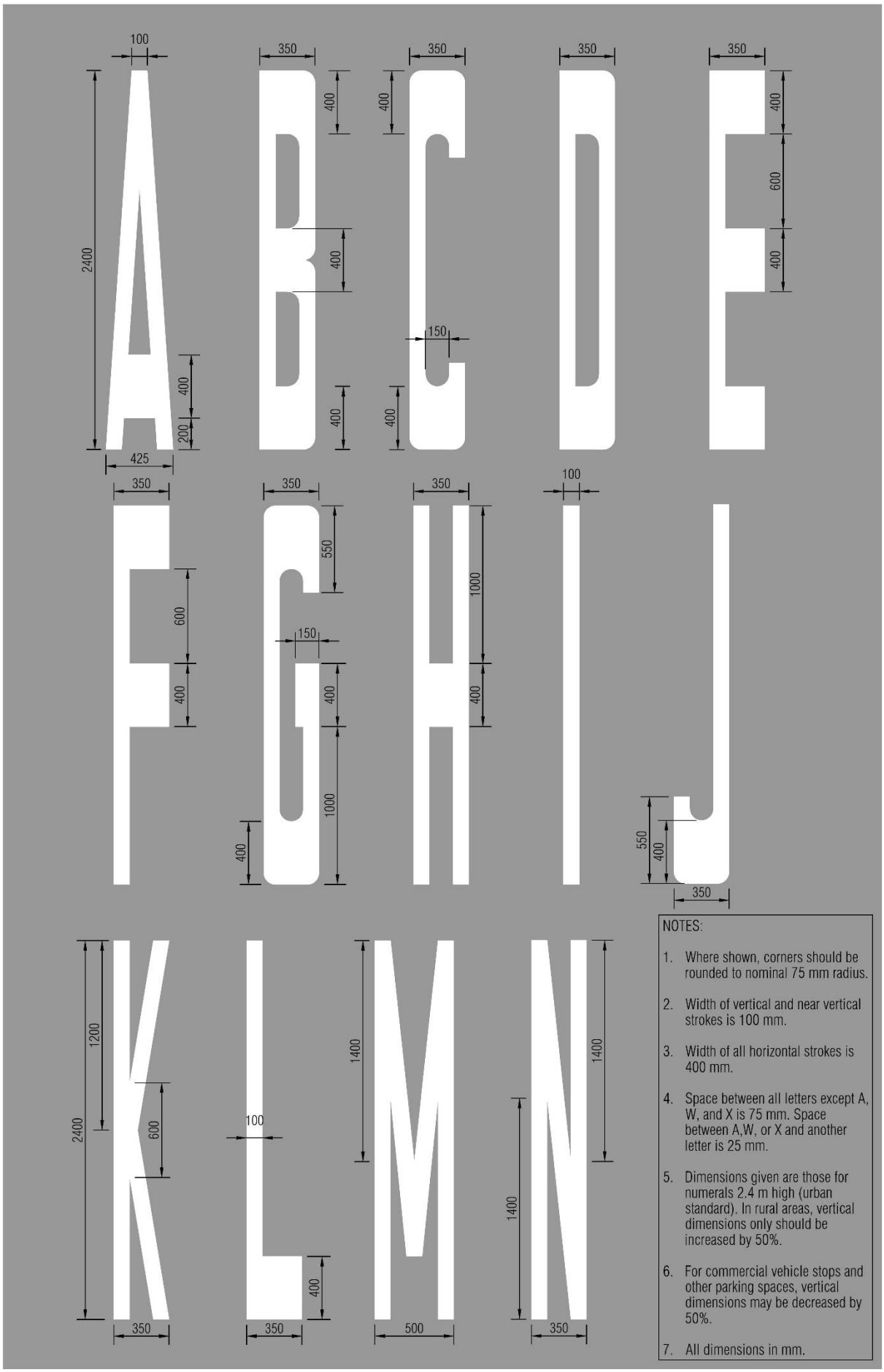


Figure 10-5: Letters for message markings – A to N

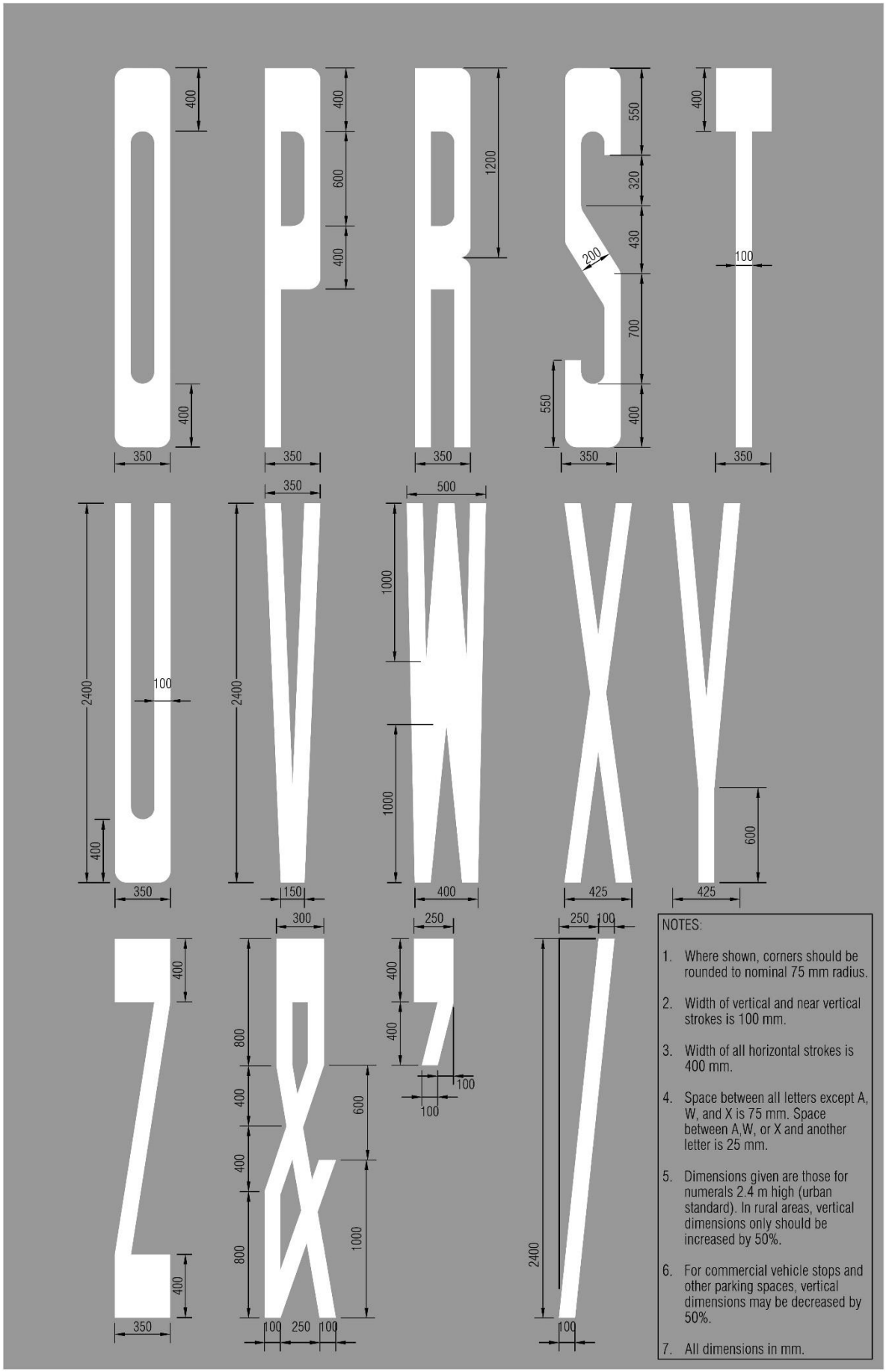


Figure 10-6: Letters for message markings – O to Z

10.4. Direction signs

Guidance on advance direction signs and intersection directions signs is available in the TCD Manual Part 2. The specific signs that may be used to provide lane use guidance are:

- Advance lane designation signs (Section 4.9 of the TCD Manual Part 2); and
- Stack and map type advance intersection signs (Section 4.8.2 of the TCD Manual Part 2).

11. Intersection Advisory Signs

Advisory signs specifically intended for use in advance of intersections include those listed in Table 11-1 below and described in this section. Further information on advisory signs is included in the TCD Manual Parts 1 and 2.

Table 11-1: Summary of advisory signs used for intersections

Code	Sign	Policy and Use
A40-1 No exit		An A40-1 sign should be installed on each cul-de-sac road just beyond the intersection where: • One or more of the roads at an intersection is a cul-de-sac and it does not have a street name sign with a supplementary panel containing the words NO EXIT; or • Where such a sign is installed, and it cannot be seen from one or more of the approaches. The sign should be located on the left-hand side of the roadway as close as possible to the intersection so that it is clearly visible to approaching drivers over the distances described in Note 1. In order to achieve these sight distances, it may be necessary to install a sign on the right-hand side of the cul-de-sac roadway rather than the left-hand side.
A40-1.1 No exit except pedestrians and cyclists		An A40-1.1 sign is an advisory sign that may be used to supplement an A14 Street name sign and advise road users that the road does not provide an exit for motor vehicles, but pedestrians and cyclists can exit the road using a pathway that connects to another road. The A40-1.1 should be installed below the A14 Street name sign on the same post or pole as the A14. Refer to Part 2 of the TCD Manual for information regarding the most appropriate location for installation of a street name sign.
A45-1 Heavy vehicle bypass ahead '[distance]' m		A45-1 signs should be installed in advance of an intersection where the road ahead is subject to weight restrictions and particularly where the restriction is on a bridge approached by difficult alignment where it may be difficult for a heavy motor vehicle to be turned around. The distance value on the sign and the position of the sign in advance of the intersection should be the distances described in Note 1. Further details regarding Heavy Traffic Bypass signs can also be found in the Part 2 of the TCD Manual. A45-1 signs should be used in conjunction with A45-2 direction signs. The sign should be located where it is clearly visible to approaching drivers over the distances described in Note 1.

Code	Sign	Policy and Use
A45-2 Heavy vehicle bypass direction		A45-2 signs should be installed on the approach to an intersection signed by an A45-1 sign. Where the heavy traffic bypass is mandatory for all heavy vehicles by virtue of RCA bylaw or other legal restriction, additional regulatory signs are required in support of the restriction. The sign should be located where it is clearly visible to approaching drivers over the distances described in Note 1. The signs should also be in advance of the intersection by 15 to 30 m.

Note 1: Sight distance and location requirements.

a. The signs described in Table 11-1 above should be installed where they are clearly visible to approaching drivers for at least the distances described in the table below.

b. The sign described in Table 11-1 above should be located in advance of the intersection by the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

12. Traffic Islands

Traffic islands are defined in the TCD Rule as "[…] a defined area within a roadway, which may be flush with the roadway or raised, and from which vehicular traffic is intended to be excluded". In this document, traffic islands that separate opposing traffic are referred to as median islands and traffic islands that separate two diverging streams of traffic are referred to as diverge islands.

12.1. Flush traffic islands

Traffic islands at intersections; particularly intersections in urban areas, are normally raised traffic islands. However, there are situations where raised islands could be hazardous, obstruct access, or restrict manoeuvring of some large vehicles; in these situations, flush (marked) traffic islands may be used. Where raised traffic islands are impractical and marking of flush traffic islands is proposed, consideration should be given to the intended purpose of the flush traffic islands. They should not be used at locations where provision has been made for pedestrian movements across a roadway.

With regard to the requirements for flush traffic islands Clause 7.7(4) of the TCD Rule states:

(4) "A flush traffic island must have:

(a) its area defined by continuous white lines; and

(b) a pattern of white diagonal lines or chevron stripes in the area within the edgelines, if the size of the island allows or requires this."

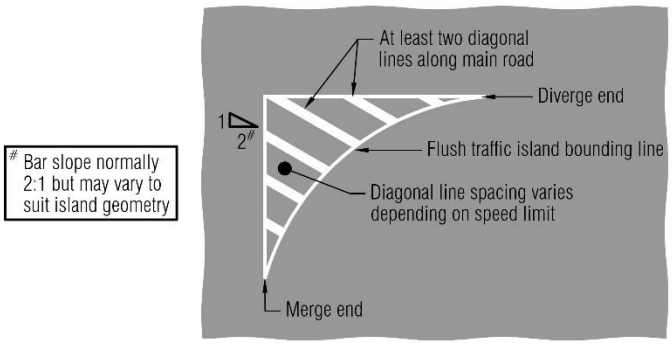
Flush traffic islands indicate areas of roadway not intended for normal traffic use and should be marked in accordance with Table 12-1 and Figure 12-1.

Table 12-1: Flush traffic island markings

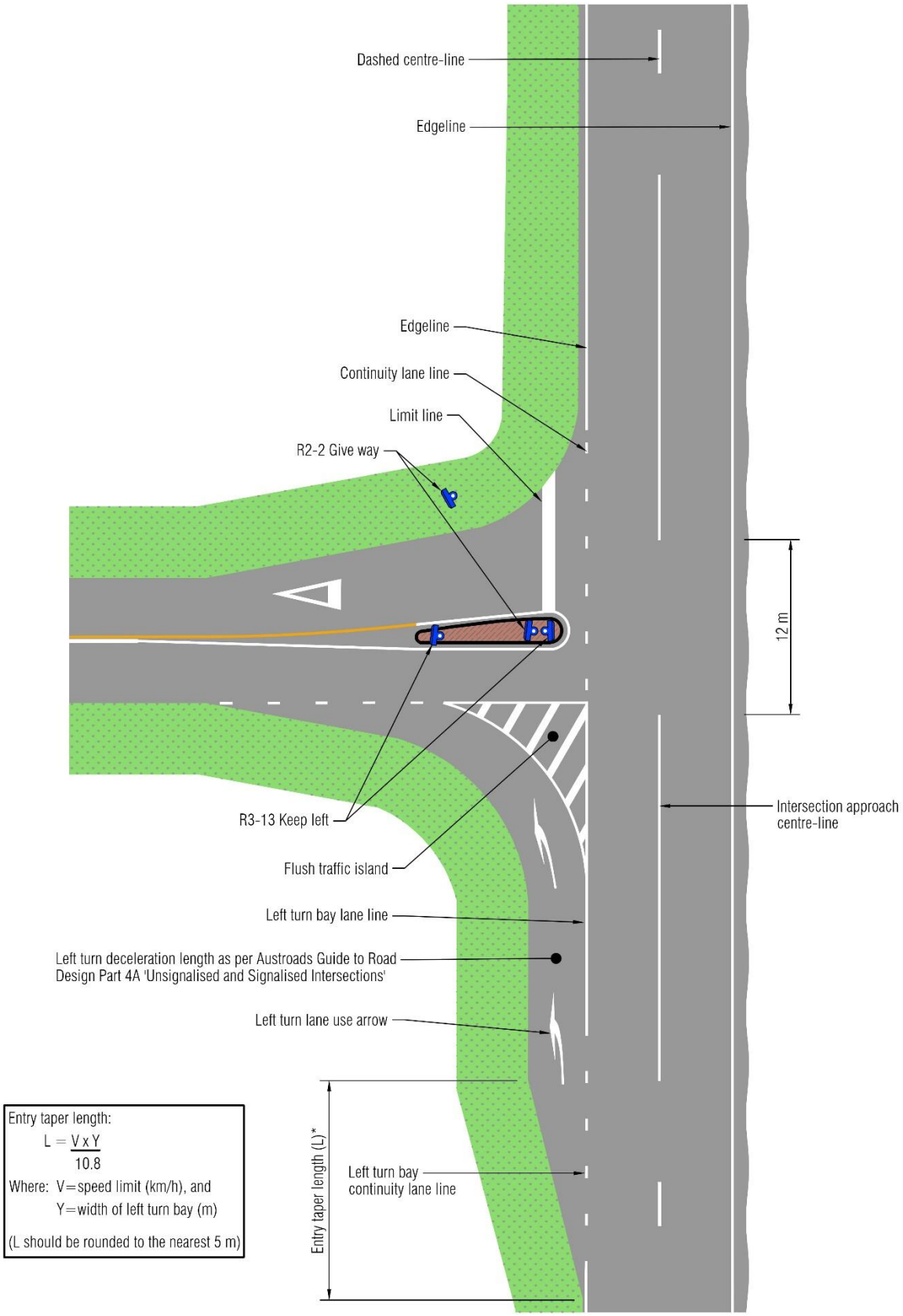
	Speed limit range (km/h)		
	30 - 50	60 - 80	90 - 110
Colour	White	White	White
Border (typical); defined as flush traffic island bounding line	100 mm	200 mm	300 mm desirable (200 mm minimum)
Diagonal line width (typical) (measured at right angles to bar length)	600 mm	900 mm	1200 mm
Diagonal line slope (typical); refer to Note 1	2:1	2:1	2:1
Diagonal line spacing	4 m	7 m	10 m

Note 1: Diagonal line slope may be varied to suit geometric layout of island.

Diagonal line spacing varies depending on the speed limit, however, a minimum of two diagonal lines should meet the length of the flush traffic island bounding line along the main road. The diagonal line spacing is the distance between the commencement of one diagonal line and the commencement of the next diagonal line.



(a) Flush traffic island detail



(b) Flush traffic island at priority controlled intersection

Figure 12-1: Flush traffic islands

12.2. Raised traffic islands

For guidance on the use of traffic control devices at traffic islands, refer to Part 5 of the TCD Manual. Among the criteria for raised traffic islands described in Part 5, practitioners should note that for raised traffic islands, including those for intersections, the TCD Rule requires (clause 7.7(2)) that:

(2) "When providing a raised traffic island, a road controlling authority must:

(a) install, on the traffic island, reflectorised traffic signs […] to guide drivers around the traffic island; and

(b) place markings or delineators on the roadway beside the traffic island to inform drivers of the presence and extent of the traffic island."

The TCD Rule requirements are illustrated in Figure 12-1(b) by the signs on and markings around the raised traffic island on the side road approach to the main road.

13. Vertical Deflection Devices

Vertical deflection devices are local traffic calming devices that use vertical deflection to slow motor-vehicle traffic to encourage slower speeds and improve road safety. These devices include:

- Raised safety platforms;
- Speed humps; and
- Speed cushions.

Guidelines to assist with the selection, application, and design of vertical deflection devices are in the NZTA Speed Management Guide toolbox.

This Manual describes the signs and markings to be used for raised safety platforms for intersections; information regarding traffic control devices for speed humps and speed cushions is included in Part 5 of the TCD Manual.

Any vertical deflection device must be illuminated or have retroreflective delineators or retroreflective signs installed so that the device is visible (TCD Rule clause 7.9(3)), however, they may have a combination of these devices. The following sections provide guidance on how signs and markings for vertical deflection devices should be applied for intersections.

13.1. Markings

13.1.1. Hump ramp markings

Where a vertical deflection device is installed, the face visible to approaching drivers should be marked with hump ramp markings, which are triangles that should be marked as specified in Table 13-1.

Table 13-1: Hump ramp markings

Application	Specification
Colour	White
Width (typical)	750 mm
Height (typical)	From the base of the ramp to the apex of a sinusoidal device or to the top of the ramp for a platform, table, or cushion, but no greater than 1850 mm.

Refer to Part 5 of the TCD Manual for guidance on hump ramp markings. For hump ramp markings for intersections, the following guiding principles should be applied:

- Hump ramp markings should be positioned evenly across the width of each approach lane and each triangular marking should be fully contained within the lane to which it applies.
- Continuity lines at intersections should continue over vertical deflection devices.
- The limit line should be visible to approaching drivers and should not be obscured by any vertical deflection device.
- Hump ramp markings should not be positioned so that the marking either overlaps or is directly against a limit line, crosswalk line and / or advanced stop box.

13.1.2. Centre-line

Where a vertical deflection device is used for an intersection a centre-line should be marked in advance of the device in accordance with the section of this Manual relevant to the intersection control.

However, where a centre-line is to be marked for a vertical deflection device the centre-line should commence no less than 30 m in advance of the bottom of the ramp.

When a raised safety platform facilitates the movement of pedestrians across a road, the centre-line should terminate at the base of the ramp. For a vertical deflection device that does not facilitate pedestrian movement, the centre-line should continue across the vertical deflection device, as illustrated in Part 5 of the TCD Manual.

13.1.3. Lane lines

Where more than one lane is available for traffic travelling in the same direction on either a one-way or a two-way road, the lanes should be separated with lane line markings as described in Sections 3.2.1, 4.2.4, 0, and 6.4.5 of this Manual and typically three hump ramp markings should be used in each lane. However, depending on lane width, it may be appropriate for there to be two or four hump ramp markings in each lane. Care should be taken to ensure that it is evident to road users which line marks the division between opposing streams of traffic; refer to Section 2.4.1 of the TCD Manual Part 5.

If one or more lanes on approach to a vertical deflection device are special vehicle lanes and the lane line is interrupted to accommodate the device, care should be taken to ensure road users are aware of the restrictions on lane use beyond the vertical deflection device.

13.1.4. Edgelines

Refer to Section 14.1.1 (d) of the TCD Manual Part 5 for applications of edgelines at vertical deflection devices.

13.1.5. Limit lines

Limit lines should not be marked on either the approach or departure ramp of a vertical deflection device.

13.2. Signs

A vertical deflection device may be signed using the signs shown in Table 13-2. If signs are used, they should be placed so as to not visually obstruct traffic signals or other intersection control signs.

Table 13-2: Vertical deflection device signs

Code	Sign	Policy and Use
W14-4 Hump		This sign may be used for any vertical deflection device. The sign should be located immediately in advance of the hump and located where it is clearly visible to approaching drivers over the distances described in Note 1.

13.3. Raised safety platforms on side roads

Where raised safety platforms are installed on side roads it is recommended that:

- The number of hump ramp markings should suit the width of the approach lane. Refer to section 14.1.1 (a), Table 14-2 of the TCD Manual Part 5 for spacing of hump ramp markings.
- Centre-lines and lane lines should be marked in accordance with Sections 3.2 and 4.2 of this Manual.
- There is sufficient length of roadway between the limit line for the intersection and the bottom edge of the ramp for the raised safety platform so that a design vehicle (at least 6 m length) can stop clear of the ramp when waiting to give way at the intersection.
- The design of the raised safety platform and the ramps do not obstruct visibility to the limit line and markings associated with the priority control at the intersection.

Refer to Section 4.2.3 of this Manual for the placement of limit lines.

An example is shown in Figure 13-1, below.

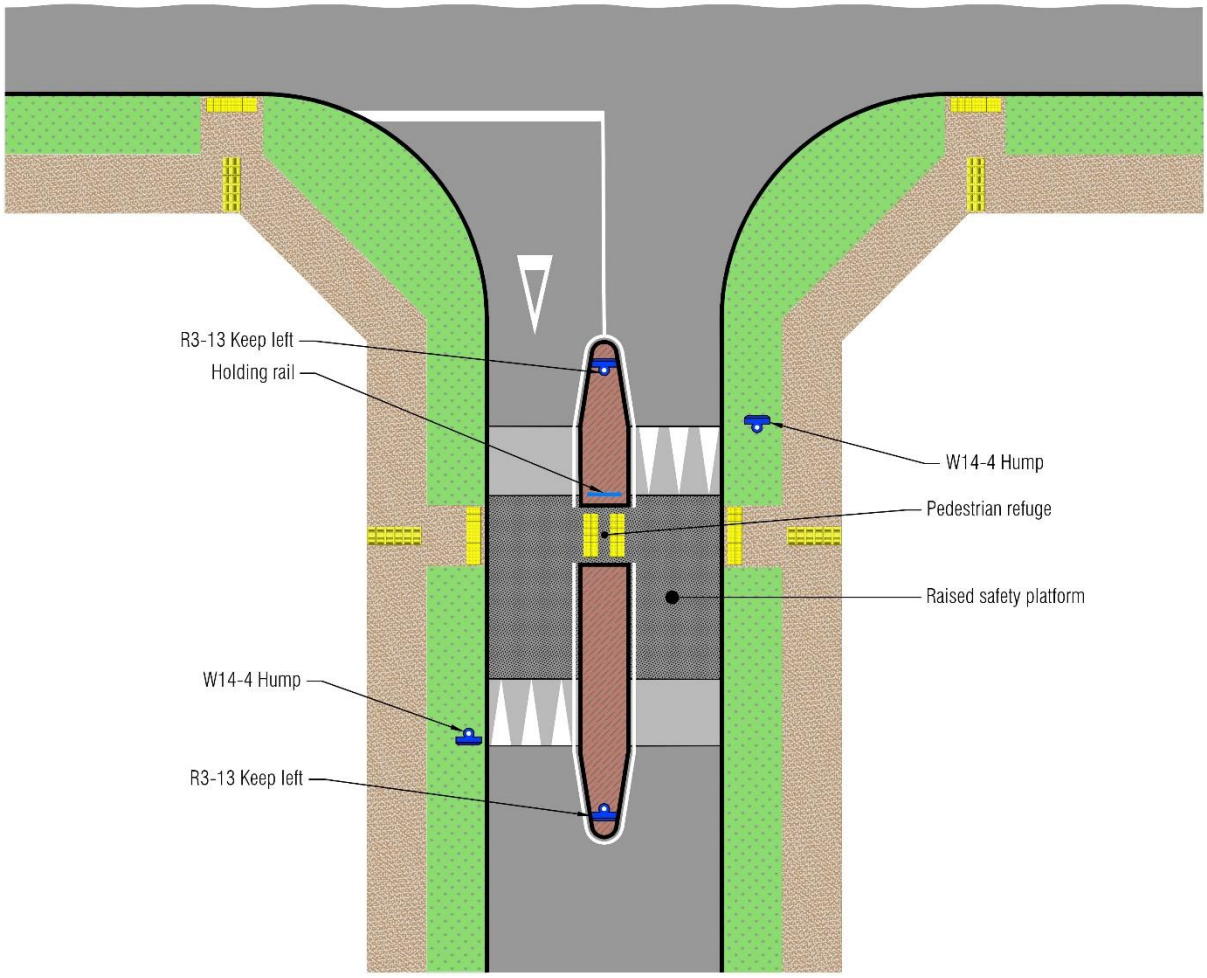


Figure 13-1: Example layout of raised safety platform across a side road

13.4. Raised uncontrolled or priority controlled intersections

A raised intersection comprises a raised safety platform that spans the intersection and the roads on each approach to the intersection. Raised uncontrolled or priority controlled intersections should have traffic control devices installed in accordance with the guidance in Section 3 or 4 (respectively) of this Manual and have hump ramp markings marked as per Section 13.1.1 of this Manual. In any case, they must be illuminated or have retroreflective delineators or retroreflective signs installed so that the device is visible. (TCD Rule clause 7.9(3)). Where a side road is subject to a stop or give way control, the "STOP" or triangular give-way symbol marking should be placed either:

- Prior to the beginning of the ramp (preferred); or
- On the platform, prior to the limit line. Refer to Sections 4.2.1 and 4.2.2 of this Manual for the application of the give-way symbol and "STOP".

The design of the raised intersection should include sufficient length of roadway to allow the driver of a design length vehicle to be able to wait at the intersection to give way to other road users without the vehicle being positioned on a ramp of the raised intersection. The length of roadway provided on the platform will depend on the types of vehicles using the intersection, however, the minimum length provided should be 6 m to accommodate a design length car. The design of the ramp on approach to the raised intersection should also ensure that neither the ramp nor the platform obstruct visibility to the limit line or any other markings for approaching road users.

An example is shown in Figure 13-2.

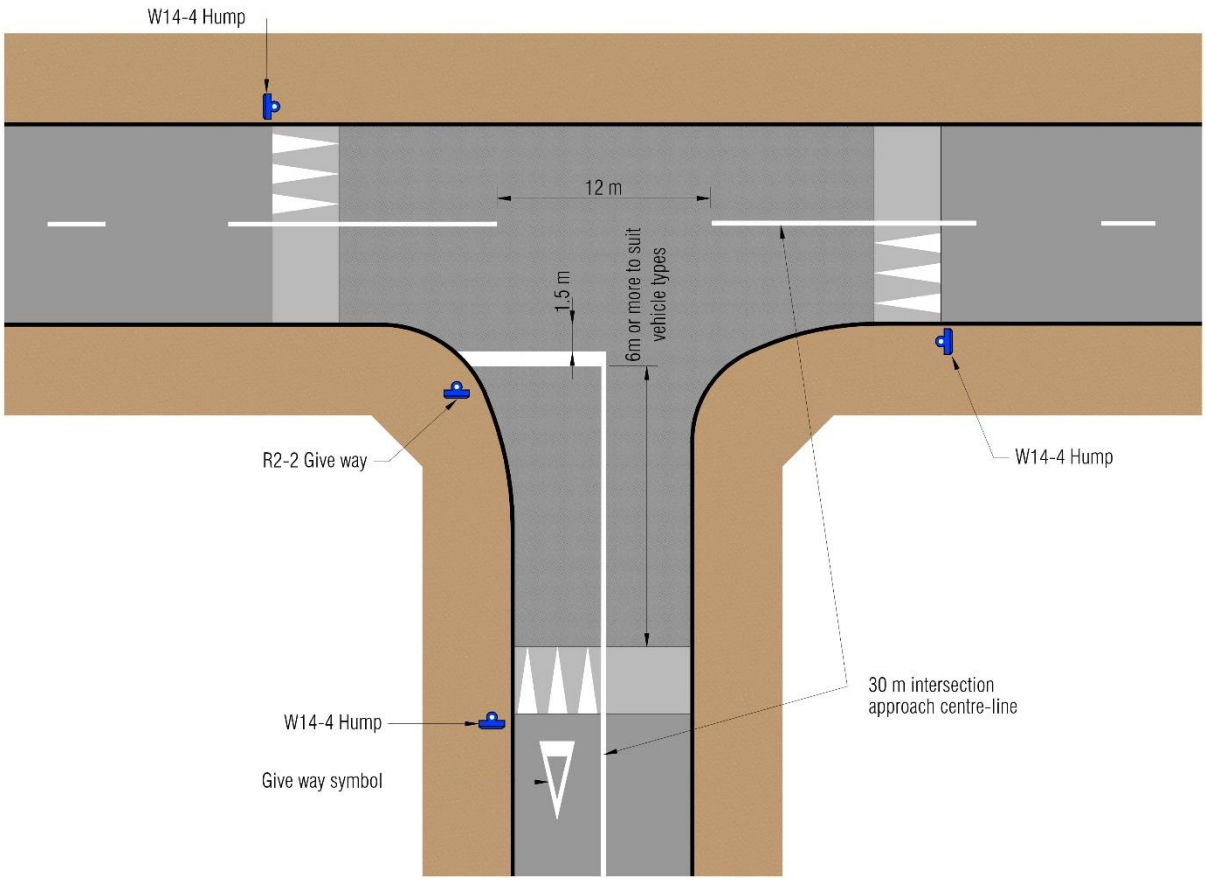


Figure 13-2: Example layout of raised give way controlled intersection

13.5. Vertical deflection devices at roundabouts

At roundabouts, vertical deflection devices may be:

- Positioned on the approach and / or exit lanes; or
- Positioned to raise the entire roundabout including the immediate lengths of the approach and exit lanes.

Hump ramp markings should be marked as per Section 13.1.1 of this Manual.

Refer to previous sections of this Manual for hump ramp marking positioning relative to other markings.

Where a raised pedestrian crossing (zebra) is placed in conjunction with the raised safety platform for the roundabout, refer to Section 14.1.4 of the TCD Manual Part 5 for the application of markings.

An example is shown in Figure 13-3 below.

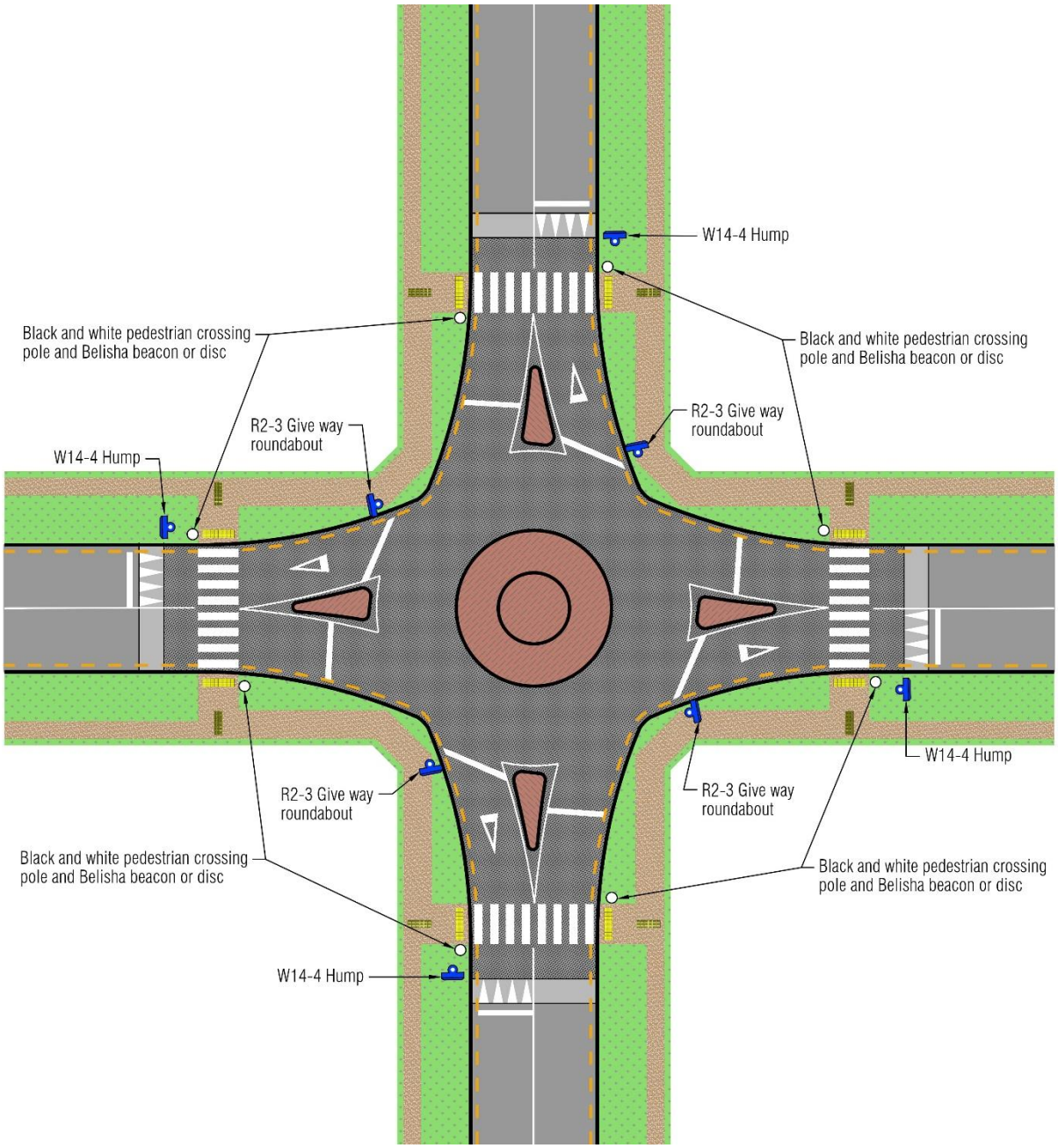


Figure 13-3: General layout for roundabouts with raised safety platform and pedestrian crossings (zebra)

13.6. Raised signalised intersections

At signalised intersections, vertical deflection devices may be:

- Positioned on the approach and / or departure lanes; or
- Positioned to raise the entire intersection including the immediate lengths of the approach and departure lanes.

Raised safety platforms (RSPs) may be installed on all legs of a signalised intersection, however, if pedestrians will be using the signalised intersection, the RSPs should extend across the approach to and departure from the intersection. This in turn creates potential issues for departure movements from the intersection. Therefore, where practicable, raising the intersection itself is preferred over RSPs on intersection approaches.

Limit lines should be marked in accordance with Section 4.2.3 of this Manual. If not, motorists may misinterpret where to come to a stop and potentially not trigger signal detector loops or block crosswalks.

Where hump ramp markings are marked after the limit line and the lane lines end, the hump ramp markings should be positioned evenly across the width of each aligned approach lane. An example is shown in Figure 13-4.

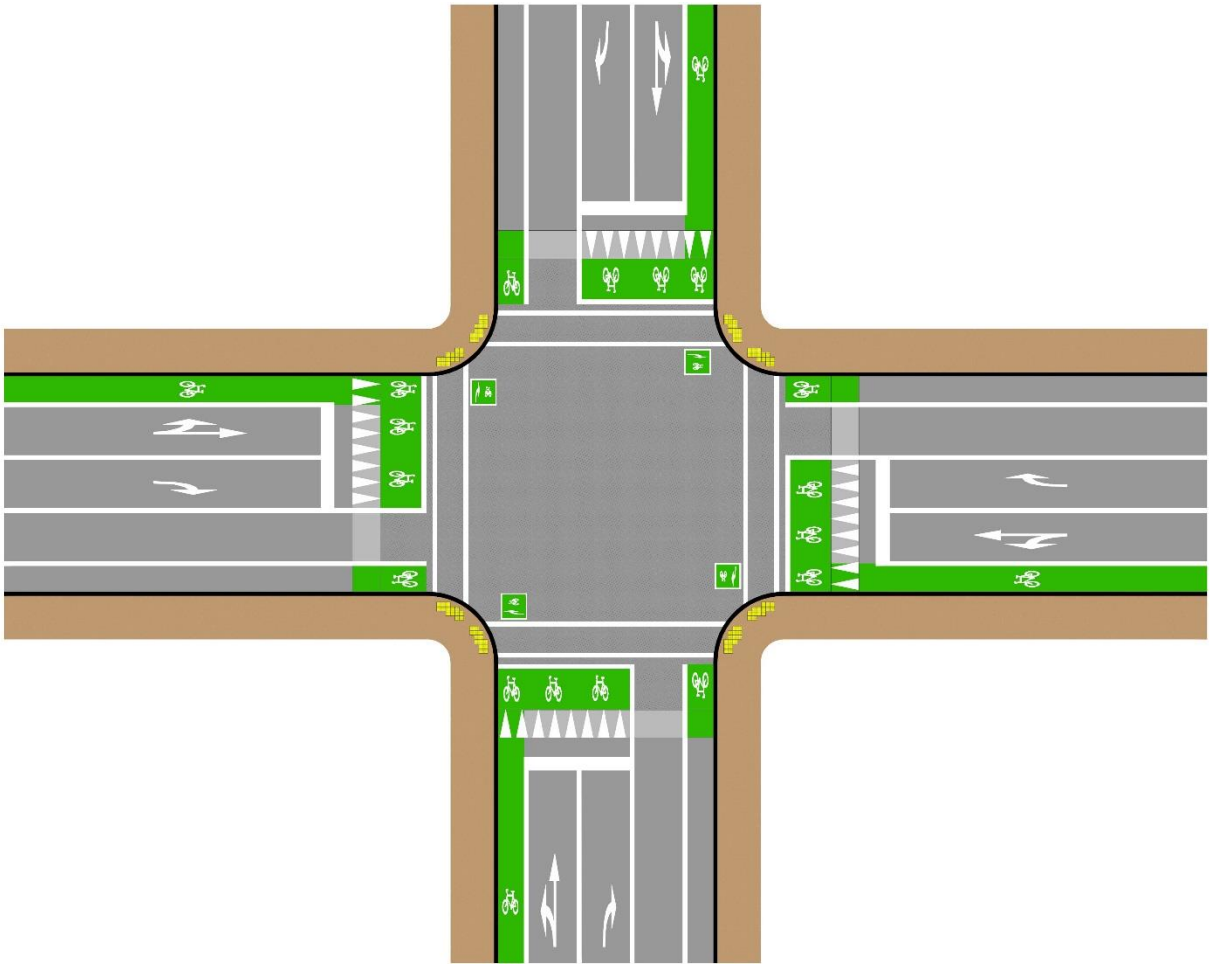


Figure 13-4: Example layouts for raised safety platforms at signalised intersections

14. Left Turn Lanes, Bays, and Slip Lanes

Left turn lanes are lanes provided exclusively for use by left turning vehicles on a controlled approach to an intersection. A left turn lane is ordinarily parallel with and subject to the same controls as through traffic movements on the approach.

Left turn bays are areas of a roadway provided primarily for use by left turning vehicles on an uncontrolled approach to an intersection.

Left turn slip lanes are lanes provided exclusively for use by left turning vehicles on the controlled approach to an intersection where the left turning traffic is separated from through traffic and is not necessarily subject to the same form of control as the through traffic.

There are significant similarities in the traffic control devices used for left turn bays and left turn slip lanes, therefore, to simplify this Manual, reference is generally made to the term “left turn slip lanes” except where traffic control devices are suitable only for left turn bays.

A left turn slip lane is a lane separated from an adjacent lane by a marked or raised triangular island. Slip lanes are provided at an intersection to improve safety, minimise delays to through vehicles or to ease the turning movement where the angle of the intersection would result in an otherwise difficult movement.

Bypass lanes at roundabouts may be considered as a special case of left turn slip lane.

14.1. Design considerations

There are two types of left turn slip lanes:

- Free flow slip lane characterised by an exclusive merge/acceleration lane (Figure 14-6 is an example); and
- High entry angle slip lane characterised by the lack of an exclusive merge/acceleration lane (Figure 14-7 is an example).

Slip lanes may be used at the following locations:

- Priority controlled intersections:
  - On the priority approach; or
  - On the controlled approach.
- Signalised intersections;
- Roundabouts; and
- Grade separated intersections.

Reference should be made to the Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections for the design of deceleration lanes, acceleration lanes and traffic islands.

Free flow left turn slip lanes should only be used where the acceleration and merge lengths meet or exceed lengths recommended is Section 5 of Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections. Otherwise, high entry angle left turn slip lanes should be used.

Reference should be made to the NZTA Cycling Network Guidance when considering how to accommodate cyclists at slip lanes. In particular, care should be taken when designing slip lanes on cycle routes. Where a cycle lane passes a left turn slip lane apple green full width coloured surfacing treatment is recommended across the conflict area, as per Figure 14-4.

Reference should also be made to the NZTA Pedestrian Network Guidance when considering how to accommodate pedestrians at left turn slip lanes. Where pedestrians are present, they may need to cross slip lanes or walk along the side of the roadway (such as on foot paths) in the vicinity of left turn slip lanes to complete their journeys. As noted in Section 0 below, it is important that other road users are aware of the potential for pedestrians to be walking in the vicinity of left turn slip lanes and the locations at which they are likely to cross the road.

14.1.1. Free flow slip lane

At a free flow slip lane, left turning traffic diverges away from through traffic on approach and merges with traffic on the intersecting road on departure. The traffic control devices used should make the expected behaviour obvious to drivers.

Free flow slip lanes can allow turning drivers to make turns without needing to significantly reduce their speed. Where pedestrians cross the slip lane this can result in unacceptable safety risk as collision speeds can be above the Safe System threshold. Where pedestrians cross the slip lane consideration should be given to providing pedestrian facilities that slow traffic or a high-entry angle slip lane should be used instead.

At free flow slip lanes, turning drivers diverge to the left on approach and on departure merge from the left with traffic on the intersecting road. This can result in conflict with cyclists, especially where turning speeds are higher than the travel speed of cyclists. Markings and signs should be used to highlight this conflict and, where necessary, provide safe routes for cyclists to pass through the intersection.

14.1.2. High entry slip lane

At a high entry slip lane, left turning traffic diverges away from through traffic on approach and joins the intersecting road on departure subject to priority or signal control. While a high entry left turn slip lane on the approach to a traffic signal controlled intersection may also be traffic signal controlled, slip lanes are normally priority controlled. In any case, the traffic control devices used should make the expected behaviour obvious to drivers.

Examples of high entry angle slip lanes with varying controls for the intersection are:

- Traffic signal controlled intersection with priority controlled slip lane Figure 14-4; and
- Priority controlled intersection with priority controlled slip lane Figure 14-7.

R2-2 Give Way control should generally be used for high entry angle slip lanes without signal control on the slip lane. When the visibility does not meet the safe approach speed criteria (Section 5) then stop control should be used. Refer to Section 4 of this Manual for information on stop and give way controls.

Where a slip lane is provided on the priority approach to a priority controlled intersection, it can create confusion as to whether drivers turning left or right into the side road are required to give way.

Traffic signal control of the slip lane may be used as an alternative to priority control at suitable locations. However, it is critical that the traffic signals for the slip lane are located where it is clear to drivers on the slip lane that those signals control the movement of drivers on the slip lane. There should not be any potential for confusion between the traffic signal control on the slip lane itself and the traffic signal control at the intersection with which the slip lane is associated. In this regard, if the traffic signals for the left turn slip lane are too close to the traffic signals for the intersection there is potential for drivers to overlook or become confused by the traffic signals for the slip lane.

14.1.3. Form of control

The form of control (if any) on a left turn slip lane depends on a wide range of variables that are considered when the slip lane is designed. Signs and markings should not be used in a manner that creates the potential to confuse road users or that contravenes the principles of the Road User Rule. Designers should begin their consideration of the most appropriate configuration of traffic control devices for a left turn slip lane based on the following principles:

1. If no island is separating left turn and through traffic at intersection, there should not be any controls on the left turn (refer to Figure 14-1 for an example).
2. If a flush traffic island is separating left turn and through traffic at intersection, there should not be any controls on the left turn (refer to Figure 14-5 for an example).
3. If a solid island is separating left turn and through traffic at intersection, then give way controls should be placed on the left turn movement (refer to Figure 14-7 for an example).

However, the considerations listed above are principles only; each intersection should be designed so that the controls applied to the various road user movements at the intersection are safe and clear for road users.

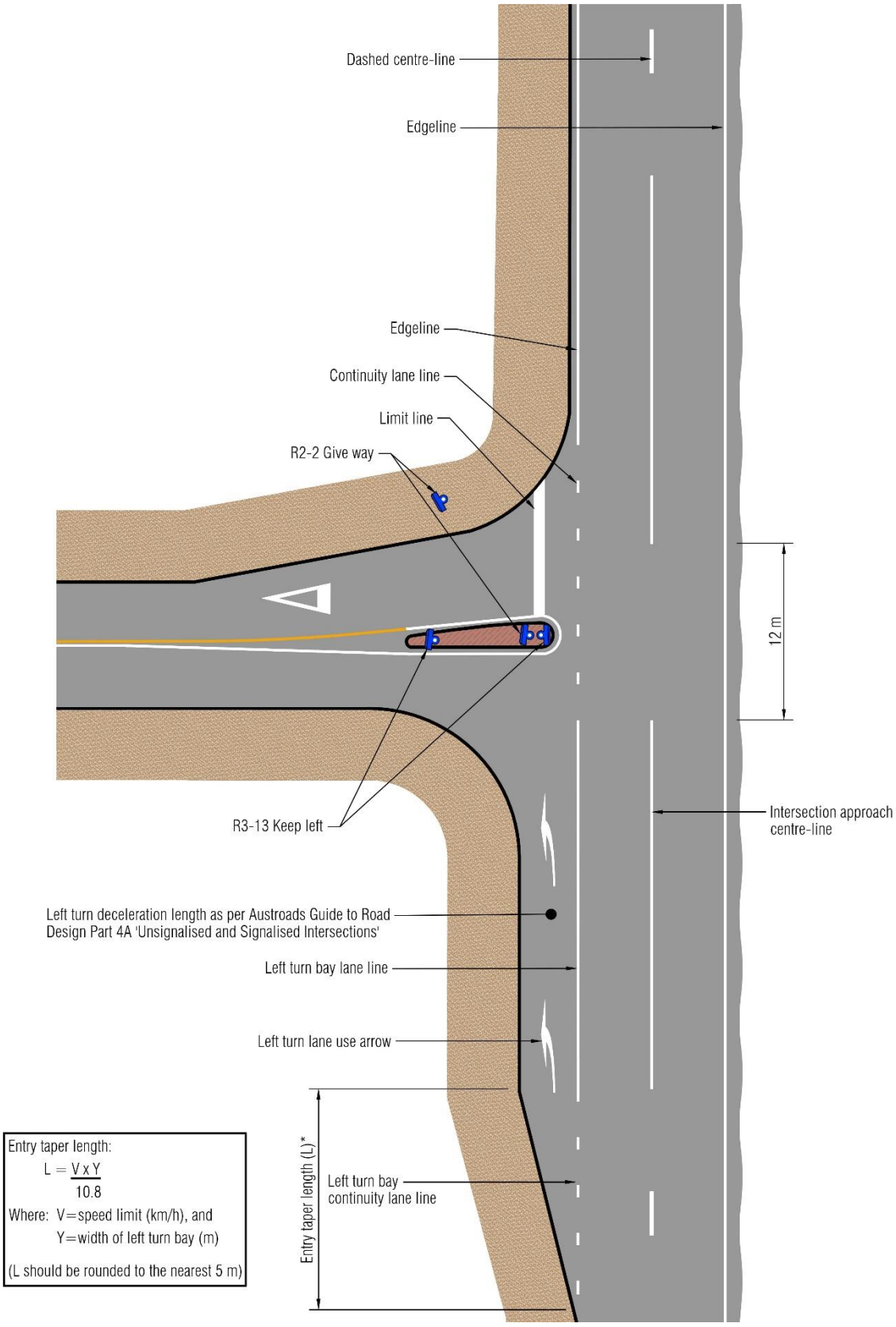


Figure 14-1: Left turn bay on uncontrolled approach to priority controlled intersection, without separation of left turn from through lane

14.2. Marking

14.2.1. Lane and continuity markings

The left turn bay lane line separating a through lane from a left turn slip lane should comprise a continuity lane line followed by a continuous left turn bay lane line. Where the length of the deceleration part of the left turn slip lane is greater than 50 m a continuous lane line should be marked from the end of the entry taper to the commencement of the triangular island (Figure 14-6). Continuity lane lines and continuous lane lines should be marked as described in Table 14-1. Where a cycle lane crosses a left turn slip lane, the cycle lane line and edgeline should be marked as continuity lines, as per Figure 14-4.

Table 14-1: Summary of slip lane continuity and lane line marking requirements

Application	Continuity lane line	Continuous lane line
Colour	White	White
Width (typical)	Urban: 100 to 150 mm Rural: 200 mm	Urban: 100 to 150 mm Rural: 200 mm
Dash (typical)	1 m	Continuous, length to suit intersection layout
Gap (typical)	Urban: 1.5 – 3 m (depending on individual RCA requirements) Rural: 3 m	n/a

14.2.2. Lane use arrows

Lane use arrows as described in Section 10.1 of this Manual and illustrated in this section of this Manual should be marked for left turn lanes, bays, and slip lanes.

At least one and, if space permits, preferably two arrows should be marked in each left turn slip lane. The minimum separation between the tip of the first arrow encountered by road users and the tail of the subsequent arrow should be not less than 20 m.

14.2.3. Traffic islands

Traffic islands at intersections are normally kerbed. For guidance on the use of traffic control devices at raised traffic islands, refer to Section 10.1 of this Manual.

14.2.4. Flush traffic islands

Slip lanes with flush islands to separate the through traffic typically should have not have traffic controls applied to the left turning traffic.

Flush traffic islands should not be used on left turn lanes at traffic signal controlled intersections and are less desirable than raised islands in all other situations as they do not provide a safe place for pedestrians to wait before or after crossing a left turn slip lane.

For guidance on markings at flush traffic islands, refer to Section 12.1 of this Manual.

14.3. Signs

The signs in Table 14-2 should be used at slip lanes.

Table 14-2: Signs for left turn slip lanes

Code	Sign	Policy and Use
R2-1 Stop		For the priority controlled left turn slip lane an R2-1 or R2-2 sign with associated markings should be located on the left hand side of the roadway as near as practicable to the roadway and the limit line. An additional R2-1 or R2-2 should be installed on the raised traffic island.
R2-2 Give-way		Refer to Note 1 for sight distance to sign. Refer to Table 4-7 and Table 4-8 for size requirements.
W11-6 Merging traffic		A W11-6 sign should be used to indicate that traffic will be merging at the end of a slip lane. The sign should be located in advance of the start of the merge taper and should be located to be visible over the distances described in Note 1 to drivers not required to merge and may be visible to drivers required to merge. The sign may be gated to achieve this.
W11-6.1 Merging traffic		A W11-6.1 sign should be used to indicate that traffic will be merging at the end of a slip lane. The sign should be located in advance of the end of the slip lane and should be located to be visible over the distances described in Note 1 to all drivers approaching the location at which the merge commences. The sign may be gated to achieve this.
W14-1 Diverge		A W14-1 sign may be installed where traffic lanes carrying traffic in the same direction diverge and pass to each side of a hazard such as a kerbed traffic island, bridge support or similar substantial obstruction. When determining whether a W14-1 sign is suitable for a particular location consideration should be given to the potential for the sign to obstruct visibility. The hazard around which traffic diverges may require additional delineation to highlight its location to road users; refer to Section 6.2 of Part 5 of the TCD Manual for additional information. Refer to Section 5.2.2 of Part 1 of the TCD Manual for sign size requirements. The sign should be installed either: • As close as possible to the end of the traffic island (in front of other hazards; as illustrated in Figure 14-2), normally 0.5 m set back from the bull nose; or • About 5 m behind the bull nose of the island (in conjunction with marking the bull nose white) in situations where the sign is likely to be struck by vehicles approaching the diverge point.

Code	Sign	Policy and Use
		The sign should be clearly visible to approaching drivers over the distances described in Note 1. Mounting height of the sign must be such as to not present an obstruction to driver visibility, particularly across traffic islands at intersections. In such situations the signs should not be mounted higher than 150 mm above the surface of the island. No grass or ground cover planting should be allowed to obscure signs and, to avoid this, the island surface should be suitably paved in the vicinity.
A40-2 Turn left at any time with care		An A40-2 sign should be used at signalised intersections where a free flow left turn slip lane is provided to allow turning traffic to bypass a traffic signal. A40-2 signs must not be used where a slip lane is subject to priority or signal control. A40-2 signs should normally be mounted on the left hand side of the roadway at the beginning of, or just within, the left turn slip lane. Signs may also be located on raised traffic islands which separate through and left turning traffic, but they must be located so they face only the traffic approaching and using the left turn slip lane. The sign should be visible to approaching drivers over the distances described in Note 1.

Note 1: Sight distance and location requirements.

a. Sign should be clearly visible to approaching drivers for at least the distances described in the table below.

b. The W11-6 and W11-6.1 signs described in Table 14-2 above should be located in advance of the merge location by the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)	Distance in advance (m)
≤30	1.5	20	30
40	1.5	25	40
50	1.5	30	50
60	2.0	50	80
70	2.0	60	100
80	2.0	70	120
90	2.5	95	160
≥100	2.5	105	180

14.4. Pedestrians

Where slip lanes are installed, pedestrians will often have to cross the slip lane to continue with their journey. Because of the manner in which slip lanes function for motorised road users, slip lanes are not recommended where pedestrian and / or cyclist routes cross the slip lane. However, for intersections where there are slip lanes and pedestrian movements are expected, pedestrian facilities should be provided to make crossing easier and safer. The PNG includes guidance regarding pedestrian facilities for left turn slip lanes The following criteria should be taken into account for left turn slip lanes and reference should also be made to the NZTA PNG guidance:

- For signalised intersections, the first consideration should be whether it is appropriate for there to be a slip lane where there is a moderate to high pedestrian and / or cyclist demand. It may be more appropriate to design a left turn lane into the signalised intersection; notwithstanding that, the points below apply for pedestrian facilities on left turn slip lanes.
- Pedestrian facilities should always be provided across slip lanes where pedestrian movements are expected; such as occurs where there are foot paths on each side of the intersection.
- If the slip lane is signalised, then pedestrian traffic signals should be installed as shown in Figure 14-2.
- Pedestrian crosswalk lines must only be marked when a pedestrian phase is provided on a signal controlled slip lane.
- Where pedestrian crossings (zebra) are installed across a left turn slip lane, standard pedestrian crossing (zebra) signs and markings must be provided as shown in Figure 14-3.
- Pedestrian crossings (zebra) are usually not appropriate on free flow slip lanes as motorised road users may be pre-occupied with the potential for conflict with other vehicles and may fail to give way to pedestrians.
- While there are potential safety implications with pedestrian crossings (zebra) on free flow slip lanes, where speed limits and vehicle operating speeds are low, the risk to pedestrians is reduced. Therefore, consideration of pedestrian crossings (zebra) should take into account potential impact speeds in the event of a collision between a motor vehicle and a pedestrian.
- Pedestrian movements across the slip lane should be prioritised over vehicle movements along the slip lane; irrespective of whether that priority is provided by a pedestrian crossing (zebra) or a pedestrian phase for the signals.
- Other pedestrian crossing facilities, including raised safety platforms, may also be installed on slip lanes. Refer to Section 7 of the TCD Manual Part 5 for further guidance on pedestrian crossing facilities.
- Tactile paving should be included at all crossing points to direct visually impaired pedestrians to the crossing facility. Refer to Road and Traffic Standard 14 for guidance on facilities for blind and visually impaired pedestrians.

  As with all pedestrian facilities, the size of any refuge between the left turn slip lane and the through traffic lanes should be large enough to accommodate pedestrian demand and provide space for pedestrians to wait safely and comfortably.

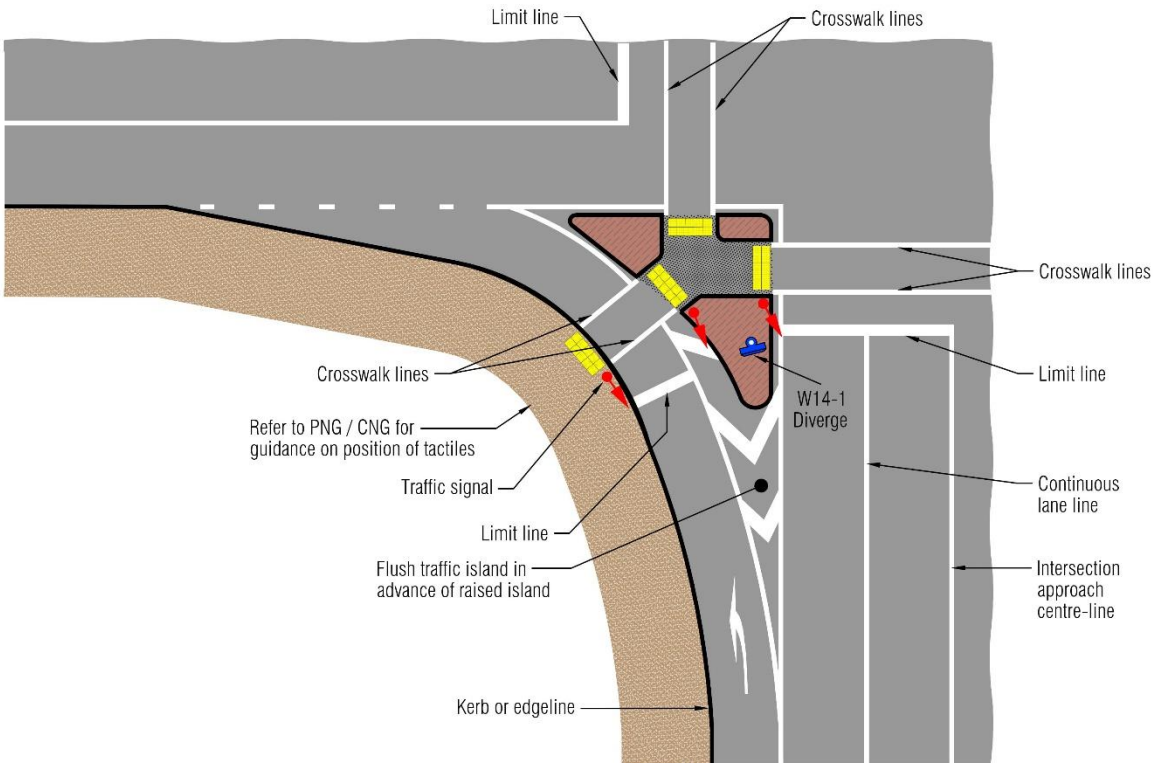


Figure 14-2: Example layout for left turn slip lane with signal control of the slip lane

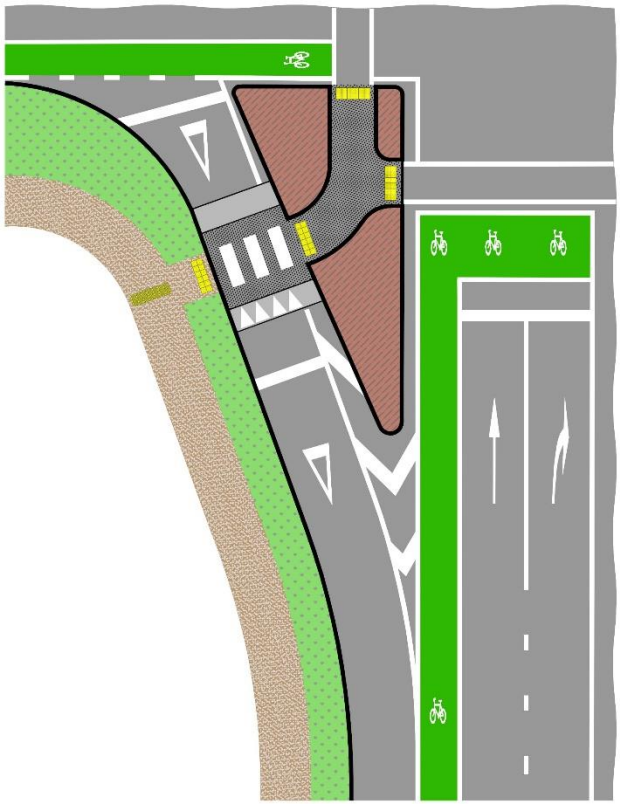


Figure 14-3: Pedestrian crossing (zebra) in left turn lane

14.5. Cycle crossing facilities on left turn slip lanes

Where a cycle path or shared path is present on the approach to a slip lane, it may be necessary for cyclists to cross the slip lane. In this case the same considerations that apply to pedestrian crossings (Section 14.4 of this Manual) apply. It is also important to ensure that it is clear whether traffic on the slip lane or crossing cyclists have priority; the guidance on cycle crossings in Section 8 of this Manual should also be followed.

Cycle crossing facilities may also be useful for on-road cyclists at free flow slip lanes. Refer to the NZTA Cycling Network Guidance for guidance.

14.6. Cycle lanes

Where slip lanes are installed on roads with cycle lanes, turning traffic will need to diverge across the cycle lane. Traffic control devices should be used to make drivers and cyclists aware of this conflict and minimise the associated risks (refer to Figure 14-3). Consideration should be given to the effects of the combined width of a cycle lane and any adjacent lane, refer to the NZTA Cycling Network Guidance for further guidance.

Continuity lane lines and edgelines and apple green full width coloured surfacing treatment should be used to delineate the cycle lane through the diverge. Where the slip lane is preceded by a left turn lane, the cycle lane line and edgeline should be marked as continuous white lines beyond the continuity lines. Vertical delineation measures such as delineator posts or raised traffic islands may also be used to delineate the cycle lane from the left turn lane or general traffic lane. This layout also reduces the length of cycle lane where cyclists are in conflict with other road users.

Free flow slip lanes should not be used where a cycle lane is present on the departure leg.

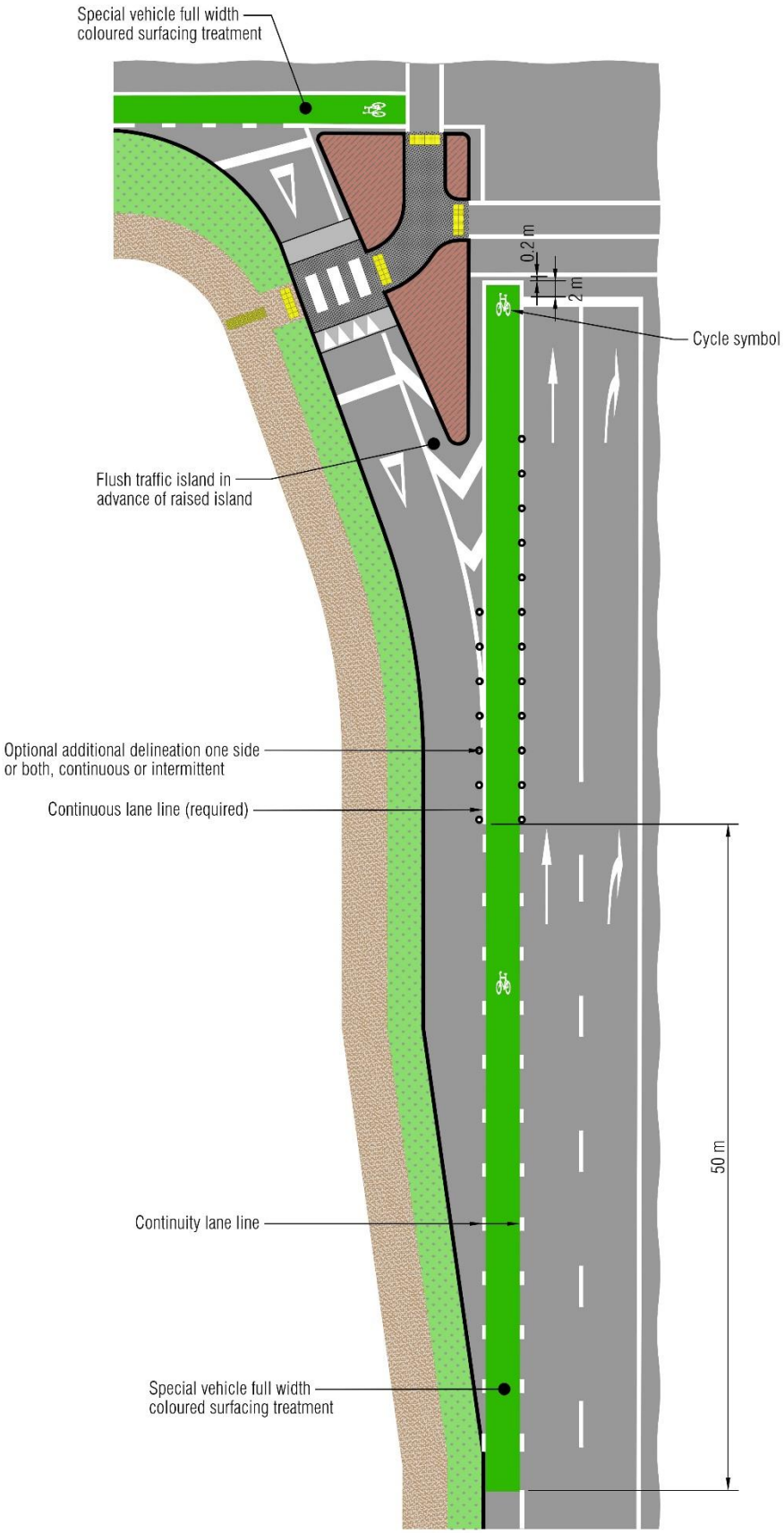


Figure 14-4: Markings for cycle lanes at approaches to signalised intersection with left turn lane

14.7. Example intersection layouts

The following figures are example arrangements showing the configuration of traffic control devices for left turn lanes, slip lanes, and bays where there are raised traffic islands.

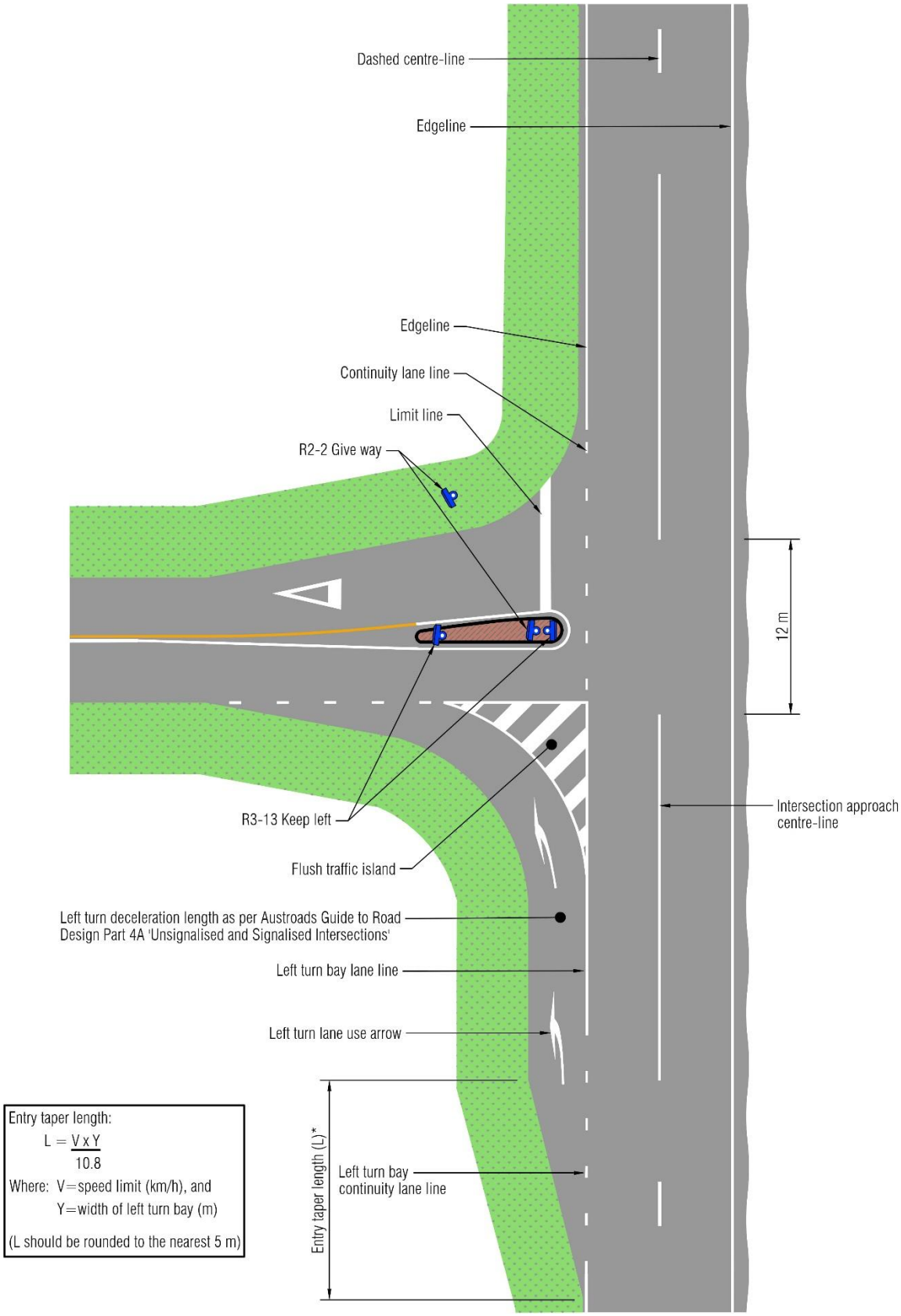


Figure 14-5: Left turn bay on uncontrolled approach to priority controlled intersection

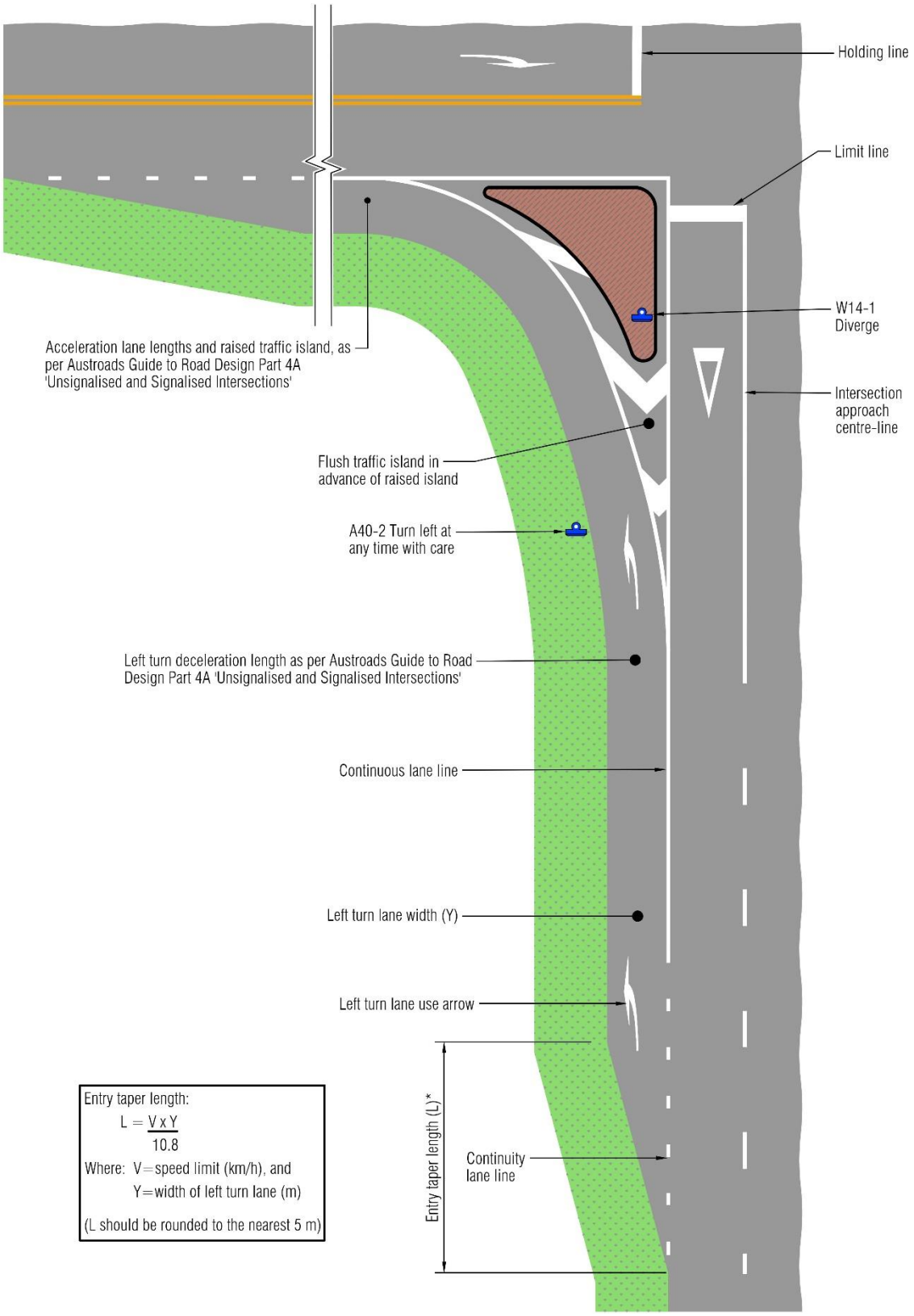


Figure 14-6: Low entry angle left turn slip lane at priority controlled intersection

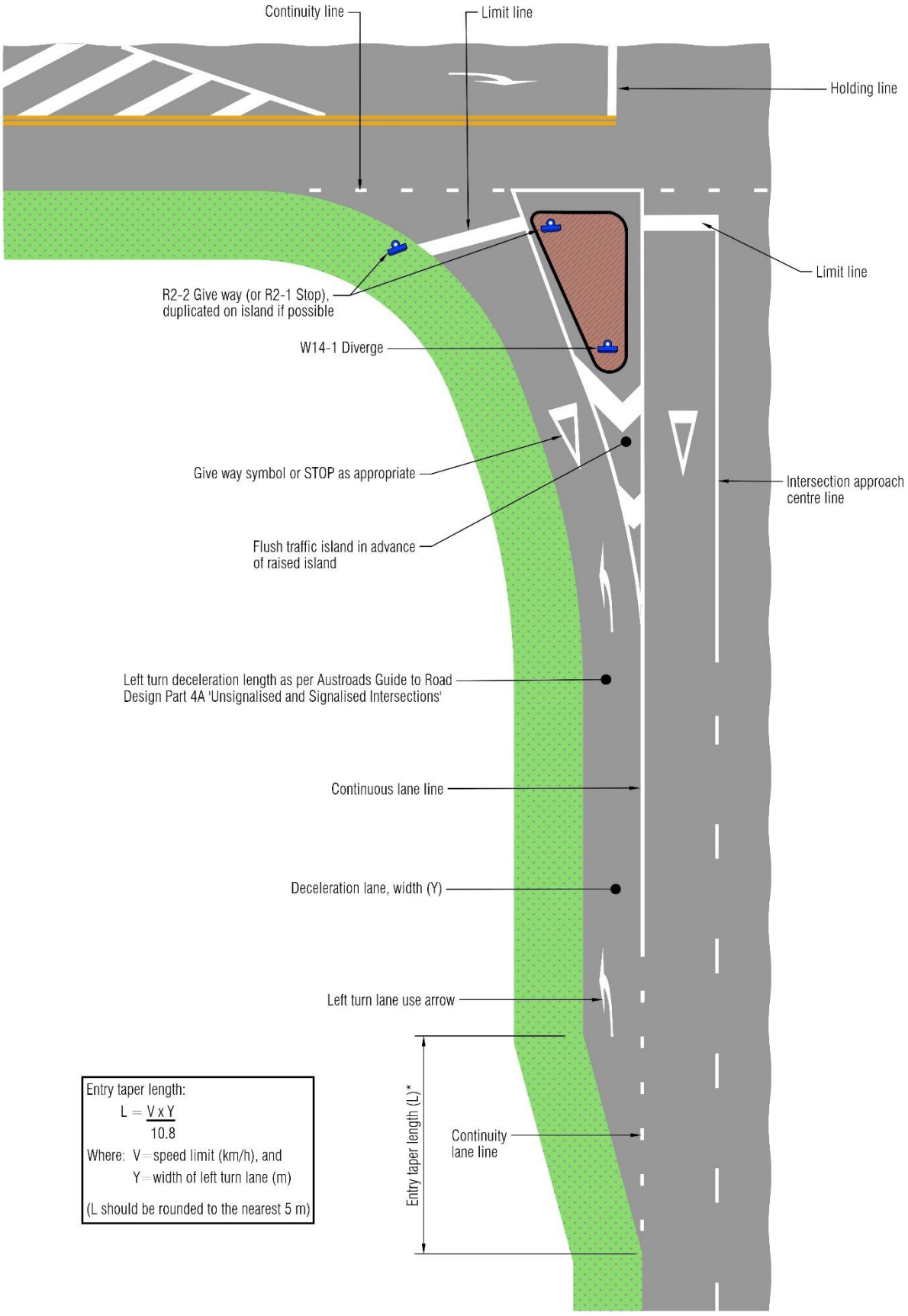


Figure 14-7: Markings for give way controlled left turn lane with a raised traffic island

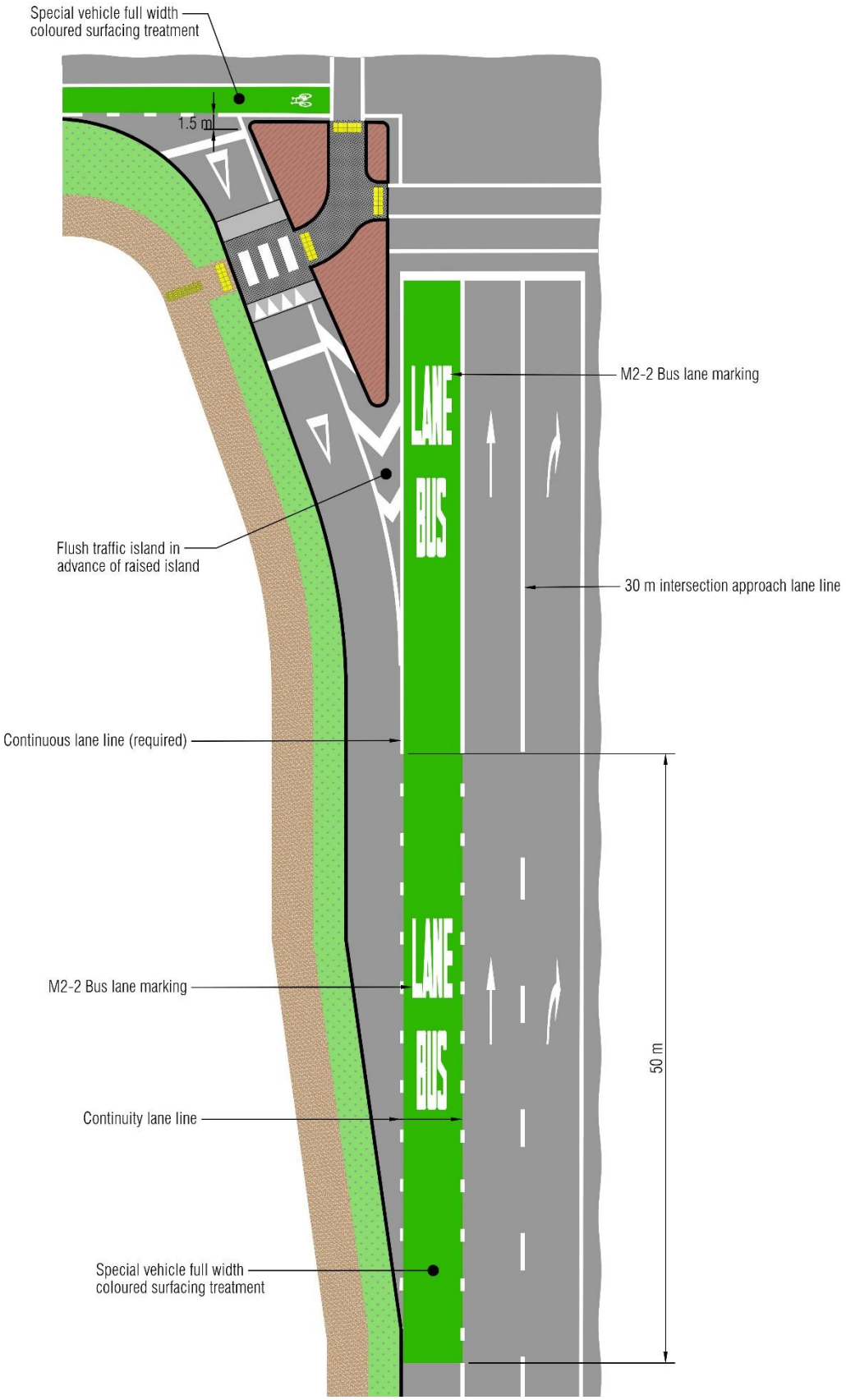


Figure 14-8: Markings for special vehicle lane on approach to intersection with left turn lane

15. Right Turn Lanes and Right Turn Bays

Right turn lanes are lanes provided exclusively for use by right turning vehicles on a controlled approach to an intersection. Right turn bays are areas of a roadway provided for use by right turning vehicles on an uncontrolled approach to an intersection.

An RCA may mark a right turn lane or right turn bay on a roadway if the RCA considers that there would be safety or efficiency benefits in separating turning traffic from through traffic (refer to TCD Rule clause 7.8(1)). They may be provided for intersections where it is desirable to provide an adequate storage area for right turning vehicles clear of the through lanes. The provision of two right turn bays on the uncontrolled approaches to a crossroads will increase crossing distance for traffic and their use needs to be carefully considered with regards to other movements at the intersection.

A right turn bay can result in less hesitation by drivers of following through vehicles, gives protection to the right turn queue, and reduces the potential for a rear end type crash which is especially desirable in high speed rural areas.

Where a right turn bay is provided, an adequate diverge taper should be provided until the full width of the right turn bay is established. The diverge taper should incorporate white diagonal markings, which must be bounded by a centre-line or traffic island to the right, and dashed continuity line, edgeline, or traffic island to the left.

On higher speed roads or major arterial roads, an adequate deceleration length should also be provided. Refer to Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections, for the design of right turn lanes/bays including deceleration lengths.

Where pedestrians are likely to cross the road, designers should consider the extra crossing distance created by the provision of a right turn lane or right turn bay and the potential for pedestrians to wait in the right turn lane or bay while making a two stage crossing. Guidance on pedestrian facilities at intersections is available in the NZTA Pedestrian Network Guidance.

Guidance on cycling facilities at intersections is available in the NZTA Cycling Network Guidance. Right turns lanes and bays may be provided exclusively for cyclists.

Where necessary, the stacking length for a right turn lane or bay should be increased above the minimum to safely accommodate the number and type of turning vehicles using the intersection.

15.1. Markings

15.1.1. Lane lines

The lane line separating a through lane from a right turn lane or bay should be marked as follows:

Table 15-1: Summary of markings for right turn lanes and bays in raised medians

Application	Continuity lane line	Continuous lane line
Colour	White	White
Width (typical)	Urban: 100 to 150 mm Rural: 200 mm	Urban: 100 to 150 mm Rural: 200 mm
Dash (typical)	1 m	Continuous, length to suit intersection layout
Gap (typical)	Urban: 1.5 – 3.0 m Rural: 3.0 m	-
Length (typical)	30 m (generally)	-

The lane line may be supplemented with white mono directional retroreflective raised pavement markers at 20 m centres (centre of every 2nd gap).

15.1.2. Lane use arrows

Where a right turn lane or bay is installed, clause 7.12(3) of the TCD Rule applies:

(3) "A lane that may be used only by road users who are travelling straight ahead or turning in a specific direction must be clearly indicated by:

(a) at least one lane-usage arrow marked within the lane that complies with the relevant specifications in Schedule 2 [of the TCD Rule]; or

(b) at least one sign provided above the lane that complies with the relevant requirements in Schedule 1 [of the TCD Rule]."

Lane use arrows must be marked in accordance with Section 10.1 of this Manual.

At least one arrow must be marked in all right turn lanes and bays unless a sign is provided above the lane showing the required direction for turning from that lane. Where there is sufficient stacking length, a minimum of two arrows should be marked in each right turn lane. The first arrow should be marked as early as possible in any right turn lane or bay.

15.1.3. Limit and holding lines

Limit lines must be marked in right turn lanes as shown in Figure 15-2(a).

A holding line should be marked at the terminal of right turn bays to indicate the point where a vehicle should stop. The holding line at right turn bays should be marked at right angles to the centre-line. The holding line should meet the specifications in Table 15-2.

Table 15-2: Criteria for holding lines for right turn bays and right turn lanes

Application	Urban	Rural
Colour	White	White
Width (typical)	200 mm (typical)	300 mm (typical)
Dash (typical)	Continuous	Continuous

15.1.4. Diverge, merge, and entry tapers

On approach to a right turn lane or bay, where through traffic is moved laterally to accommodate the width of the right turn lane or bay, the through traffic lane(s) should be moved laterally with a diverge taper at a maximum rate of lateral movement of 0.6 m/s. Entry taper lengths for right turn lanes and bays in solid medians should be determined based on a rate of lateral movement of 3.0 m/s for traffic entering the right turn lane or bay. The length of merge, diverge, and entry tapers for flush right turn bays can be calculated using the equations in Figure 15-3 and Figure 15-5.

For right turn lanes and bays that are not contained within a raised median, the associated diverge and entry tapers should be marked as shown in Table 15-3.

Table 15-3: Specifications for right turn lanes and bays without raised medians

Application	Speed limit range (km/h)		
	30 - 50	60 - 80	90 - 110
Colour	White	White	White
Right turn bay diverge taper lane line	100 mm	100 mm	100 mm
Diagonal marking width (measured at right angles to the marking length)	600 mm	900 mm	1200 mm
Diagonal marking slope	2:1	2:1	2:1
Diagonal marking spacing	8 m	14 m	20 m
Width of right turn lane / bay	≥ 3.0 m (desirable) 2.5 m (minimum)	≥ 3.0 m (desirable) 2.5 m (minimum)	≥ 3.0 m (desirable) 2.5 m (minimum)

Application	Speed limit range (km/h)		
	30 - 50	60 - 80	90 - 110
Stacking length (sufficient to accommodate design queue length, but minimum of one design turning vehicle)	10 m (typical minimum)	20 m (typical minimum)	20 m (typical minimum)

15.1.5. Urban alternative

Where there is insufficient space available to mark a full right turn bay in an urban area, an alternative urban right turn bay may be marked as shown in Figure 15-4. Additionally, the centre-line may be replaced with a 150 mm wide continuous white centre-line (Refer to Section 2.4 of the TCD Manual Part 5).

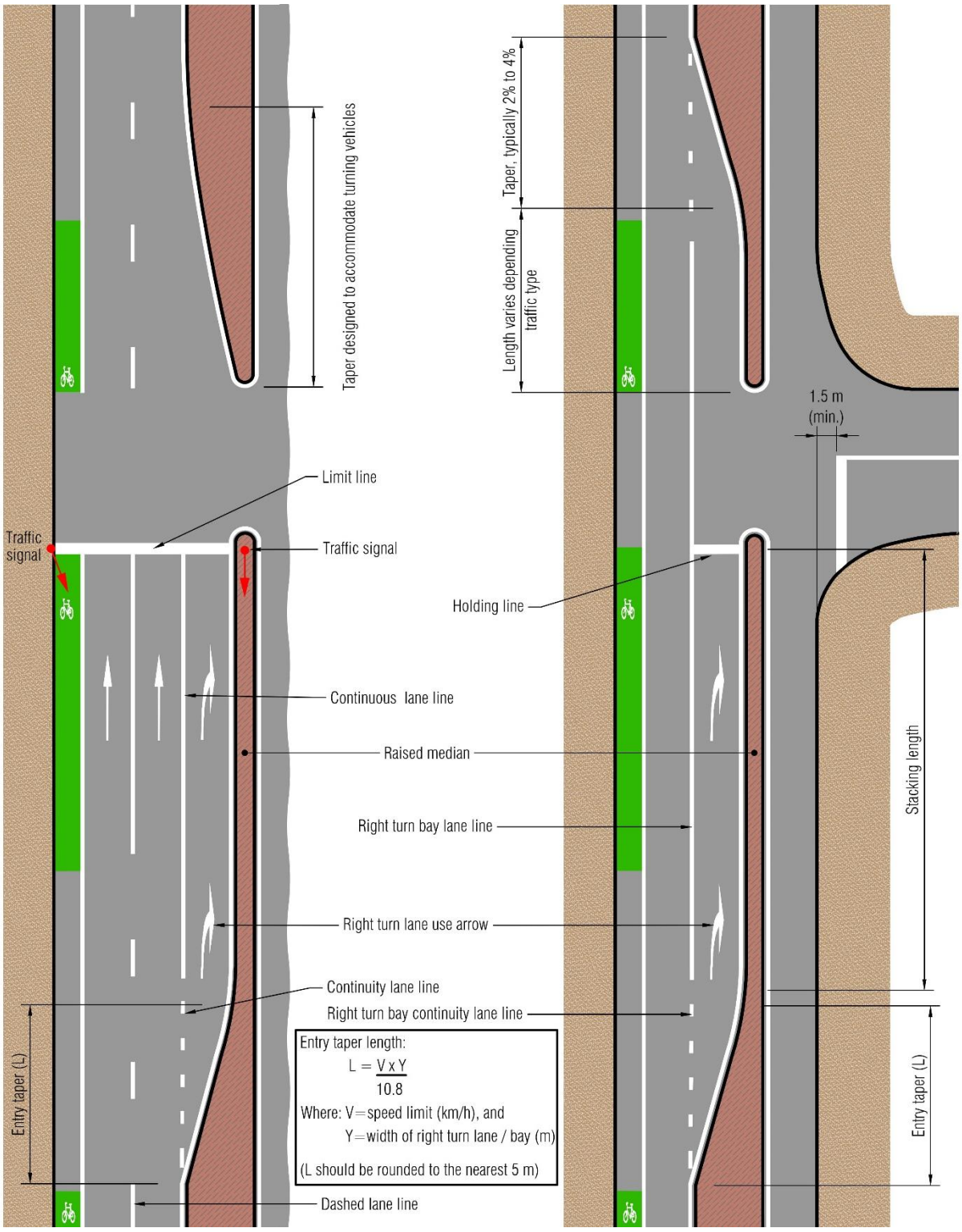
15.1.6. Markings for cyclists

If a right turn lane or bay is provided exclusively for use by cyclists, then in accordance with clause 5.4(2A) of the TCD Rule, "The dimensions of markings intended solely for pedestrians or cyclists may be decreased provided that the dimensions of each letter, numeral or symbol are decreased in approximately the same proportion". However, the dimensions of markings should be not less than half of those described in Schedule 2 of the TCD Rule.

In some cases, a cycle path approach to an intersection may provide an exclusive turning facility for cyclists. The example shown in Figure 15-1 accommodates cyclists turning right from the cycle path onto an intersecting roadway. The path is neither a right turn lane nor a right turn bay because the cycle path is separated from the roadway.

Figure 15-1: Cycle path on approach to signalised intersection where only cyclists are permitted to turn right

15.2. Example layouts



(a) Signal controlled intersection (b) Priority controlled intersection

Figure 15-2: Right turn lane (a) and bay (b) in median islands

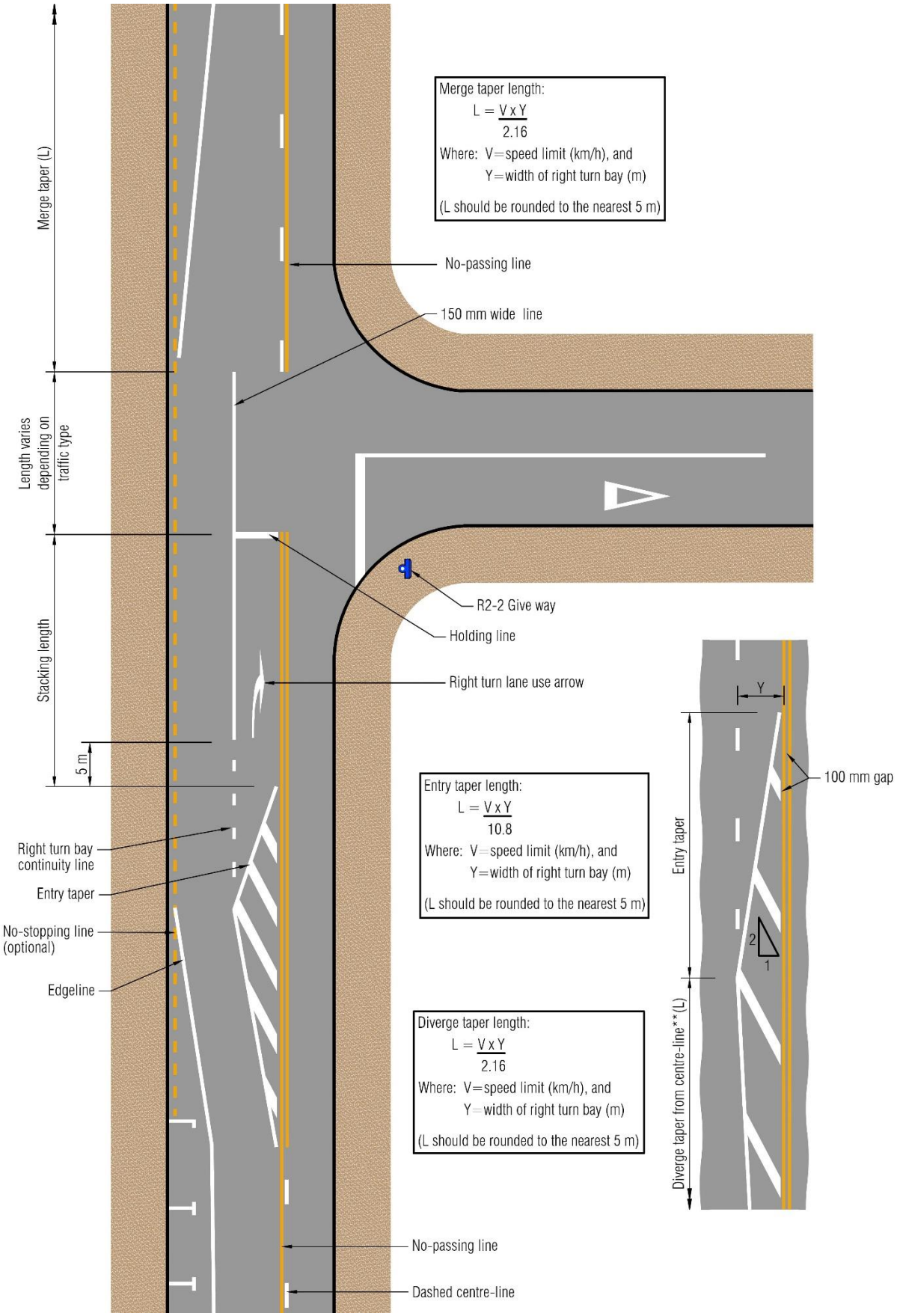


Figure 15-3: Markings for right turn bays in urban areas

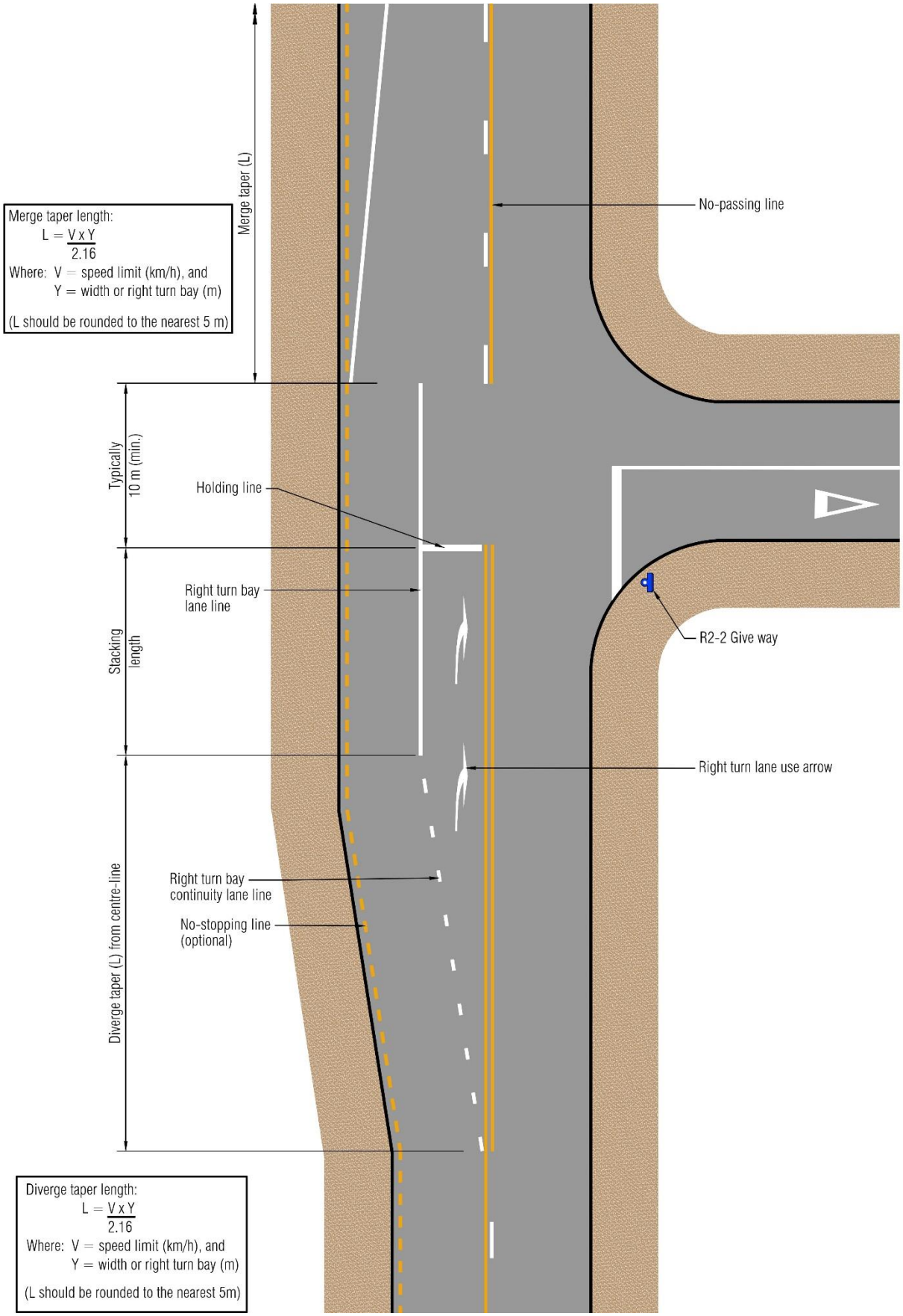


Figure 15-4: Alternative markings for right turn bays in urban areas

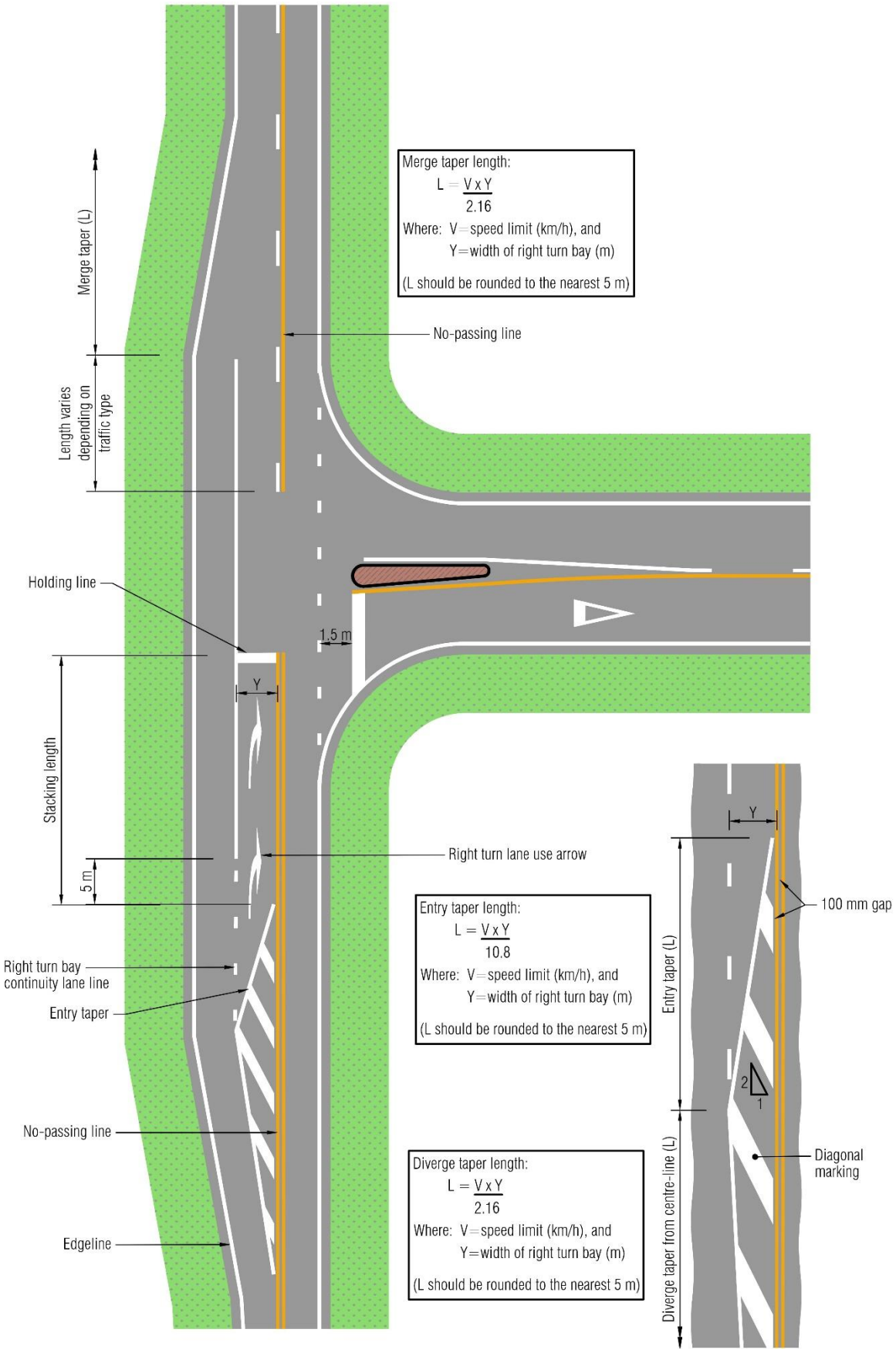


Figure 15-5: Markings for right turn bays in rural areas

15.3. Design notes for example diagrams

The example diagrams above show the configuration of markings for right turn lanes and right turn bays however, the diagrams are not intended to provide practitioners with design advice. The following matters should be taken into account when incorporating traffic control device markings with the design of right turn lanes and right turn bays.

15.3.1. Stacking length

The TCD Rule defines a turn bay as "[…] an area of roadway that is reserved for vehicles making, or waiting to make, a turn." However, the TCD Rule does not define a minimum stacking length; it will be dependent on the type and volume of traffic turning right from the lane or bay. Traffic modelling may be required to determine the stacking length.

In all cases, the minimum stacking length should be sufficient to accommodate the largest type of vehicle ordinarily expected to be using the right turn lane or right turn bay. As a guide, 10 m should be adopted as the minimum because that length will accommodate a heavy vehicle such as a refuse truck.

15.3.2. Figure 15-2 (a): Right turn lane in median island at signal controlled intersection

The right turn lane entry taper should be based on a lateral shift rate of 3.0 m/s.

Vehicles turning right onto the main road will be controlled by the signals at the intersection. The length of the angled portion of the solid median on the "northern" side of the intersection should be designed based on the swept path required to accommodate the design vehicles turning right from the side road.

15.3.3. Figure 15-2(b): Right turn bay in median island at priority controlled intersection

The right turn bay entry taper should be based on a lateral shift rate of 3.0 m/s.

The stacking length on the main road for vehicles exiting the side road should be sufficient to accommodate the largest type of vehicle ordinarily expected to be turning from the side road. As a guide, 10 m should be adopted as a minimum.

The section of road to accommodate vehicles turning right from the side road is not an acceleration lane, but rather is an area where turning vehicles can wait until the "northbound" through traffic lane is clear before accelerating within the "northbound" lane. The length of the taper should typically be 2% to 4%, but in any case it should be sufficient to accommodate the swept path of the largest type of vehicle expected to be turning from the side road so that the design vehicle can join the through lane without encroaching onto the solid median or into the cycle lane or other design features (such as a parking area).

15.3.4. Figure 15-3: Markings for right turn bays in urban areas and Figure 15-5: Markings for right turn bays in rural areas

The diverge taper for moving through traffic to the left around the right turn bay is based on a lateral shift rate of 0.6 m/s. The same lateral shift rate applies for the "northbound" merge taper on the "northern" side of the intersection.

The no-passing line for "northbound" traffic on approach to the intersection should extend for the full length of the diverge taper and the stacking length so that passing manoeuvres in the vicinity of the right turn bay are prohibited. The no-passing line for "northbound" traffic should commence in advance of the commencement of the diverge taper if there are visibility constraints that indicate a no-passing line is appropriate.

As illustrated in Figure 15-3 and Figure 15-5, the no-passing line for "southbound" traffic on approach to the intersection should extend for the full length of the "northbound" merge taper and extend through until the "southern" end of the "northbound" diverge taper. The "southbound" no-passing line should commence in advance of the commencement of the northern end of the merge taper if there are visibility constraints that indicate a no-passing line is appropriate. The "southbound" no-passing line should also extend south of the southern end of the diverge taper if there are visibility constraints that indicate a no-passing line is appropriate.

The length of the right turn bay entry taper lane line should be based on a lateral shift rate of 3.0 m/s.

The right turn bay lane line should extend from 5 m "north" of the northern end of the right turn bay entry taper lane line to a location north of the side road that defines a clear route for through traffic past the right turn bay and the intersection itself. The length of road to the "north" of the intersection that is the full width

of the right turn bay is not an acceleration lane and is not intended to function as a seagull intersection (refer to Section 17 of this Manual). The right turn bay lane line should extend at least 10 m “north” of the point at which the centre-line marking recommences “north” of the side road.

15.3.5. Figure 15-4: Alternative markings for right turn bays in urban areas

The alternative markings for right turn bays in urban areas are intended for locations where the length of road between intersections may not accommodate a conventional right turn bay but it is still desirable for a right turn bay to be provided. The key differences between a conventional urban right turn bay and the alternative right turn bay are as follows:

1. The diverge taper does not include diagonal markings.
2. Entry into the stacking length is directly from the diverge taper; there is not a right turn bay entry taper.
3. The right turn bay lane line commences at the northern end of the “northbound” diverge taper and should end approximately one design vehicle length north of the holding line. As a guide, 10 m should be adopted as a minimum.

16. Flush Medians

This section contains guidance on how to use traffic control devices for an intersection on a road with a flush median present.

Where pedestrians are likely to cross the road, designers should consider the extra crossing distance created by the provision of a flush median and the potential for pedestrians to wait in the median while making a two stage crossing. Designers should refer to the NZTA Pedestrian Network Guidance for guidance on pedestrian facilities at intersections.

Guidance on cycling facilities for intersections is available in the NZTA Cycling Network Guidance.

16.1. Developing a flush median for an intersection

Part 5 of the TCD Manual provides detailed information regarding the development and continuation of flush medians as a centre-line treatment. The principles described in Part 5 apply for the development of flush medians for intersections. Where a flush median is added for an intersection, it should be treated as a right turn bay and the guidance in Section 15 of this Manual should be applied. However, the tapers for the commencement and termination of flush medians for intersections may be established based on the details illustrated in Figure 16-1.

Flush medians should be marked as shown in Table 16-1. The spacing between diagonal lines, which is the distance between the commencement of one diagonal line and the commencement of the next diagonal line, varies depending on the speed limit.

Table 16-1: Flush median markings

Application	Speed limit range (km/h)		
	30 - 50	60 - 80	90 - 110
Colour	White	White	White
Border (typical); defined as flush median bounding line	100 mm	100 mm	100 mm
Diagonal line width (typical) (measured at right angles to bar length)	600 mm	900 mm	1200 mm
Diagonal line slope	2:1	2:1	2:1
Diagonal line spacing	8 m	14 m	20 m

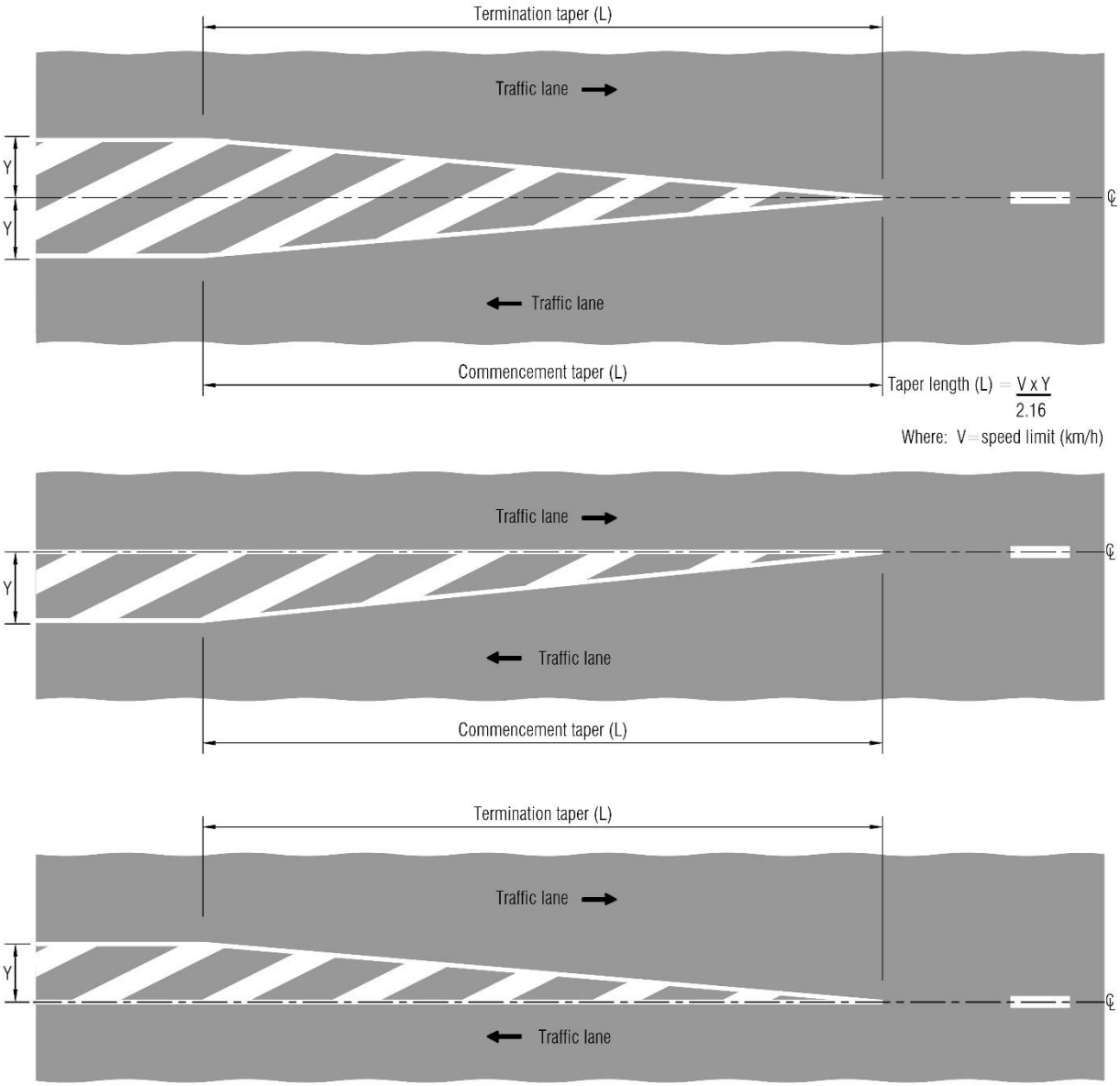


Figure 16-1: Flush median end treatments

16.2. Intersection treatment – general or right turn bays

Right turn bays within a flush median are different from isolated right turn bays as turning traffic is less exposed to a collision from the rear. The minimum width of a right turn bay is 2.5 m. If this width is not available then a gap should be marked in the flush median instead, as shown in Figure 16-2(b), Figure 16-3(b) and Figure 16-4(b).

If a side road has very low turning volumes (similar to that of a private access) or if the RCA considers it better to not highlight the intersection, a flush median may be marked straight through an intersection on the main road.

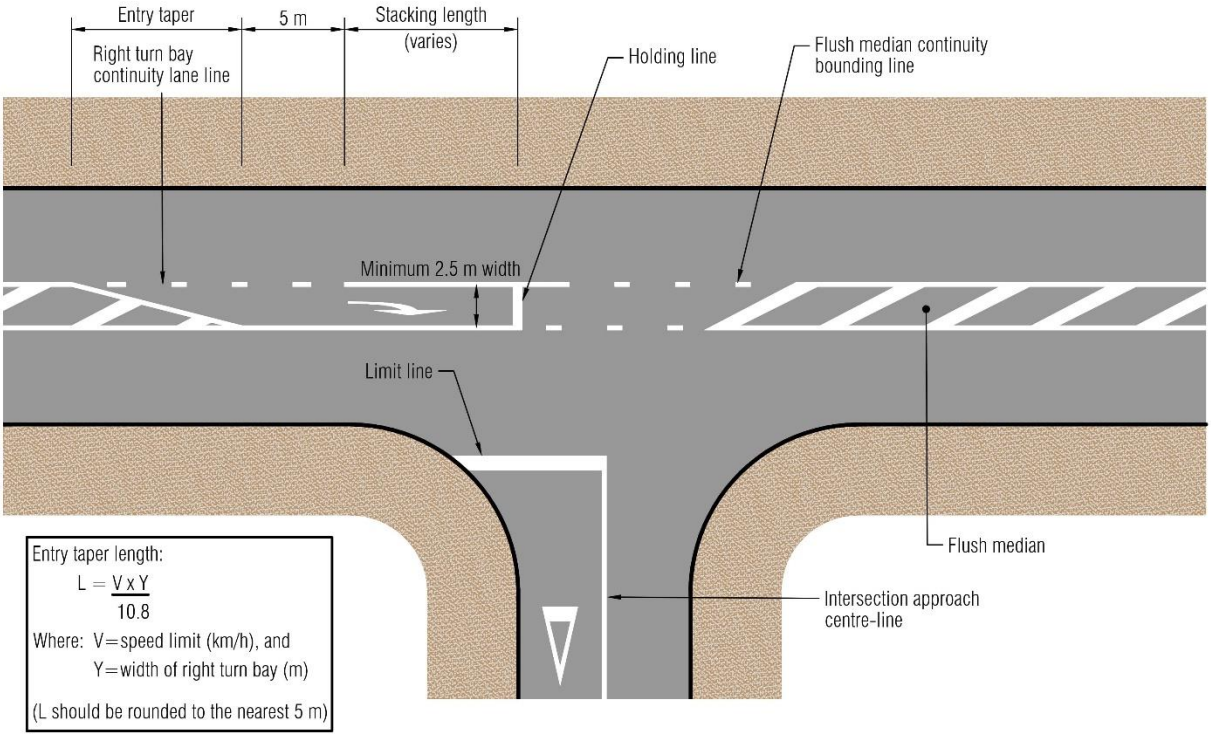
If a right turn lane is provided exclusively for use by cyclists, then in accordance with clause 5.4(2A) of the TCD Rule, “The dimensions of markings intended solely for pedestrians or cyclists may be decreased provided that the dimensions of each letter, numeral or symbol are decreased in approximately the same proportion”. However, the dimensions of markings should be not less than half of those described in Schedule 2 of the TCD Rule.

16.3. Holding lines

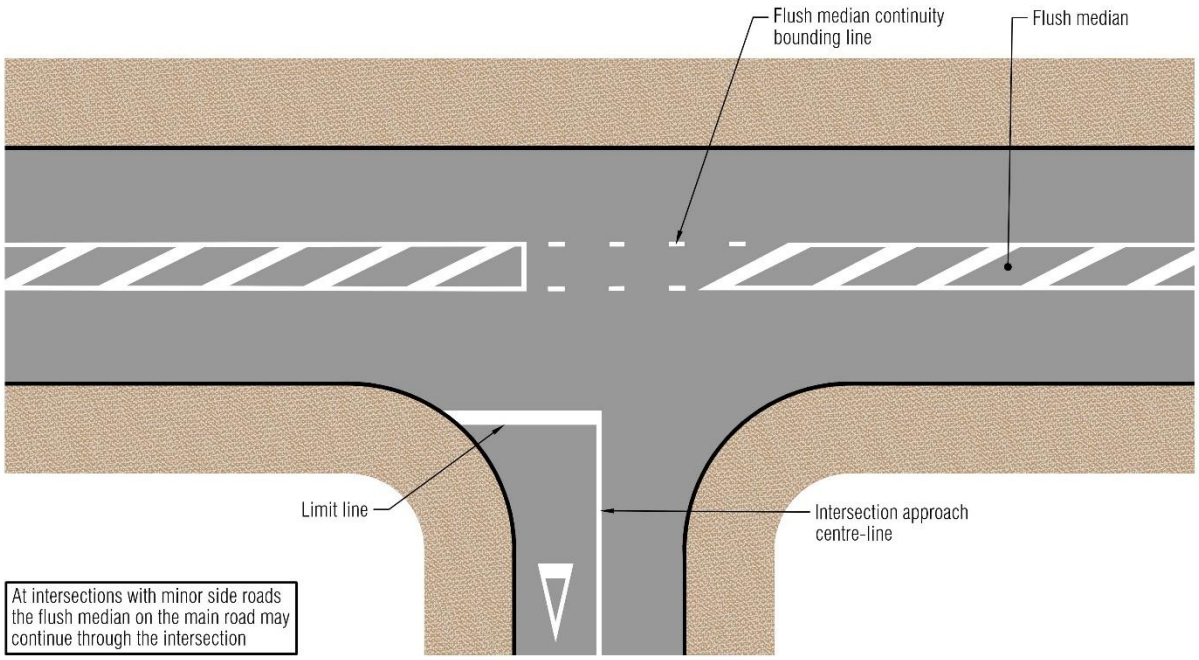
To indicate the point where a vehicle should stop, a holding line may be marked at the terminal of a right turn bay or the start of any gap in a flush median as shown in Figure 16-2(a) and (b), Figure 16-3(a) and (b), and Figure 16-4(a) and (b). The holding line should be marked at right angles to the flush median. This line should be marked in accordance with the guidance on holding lines in Section 15.1.3 of this Manual.

16.4. Example intersection layouts

The following figures are examples of best practice for the marking of flush medians for intersections.

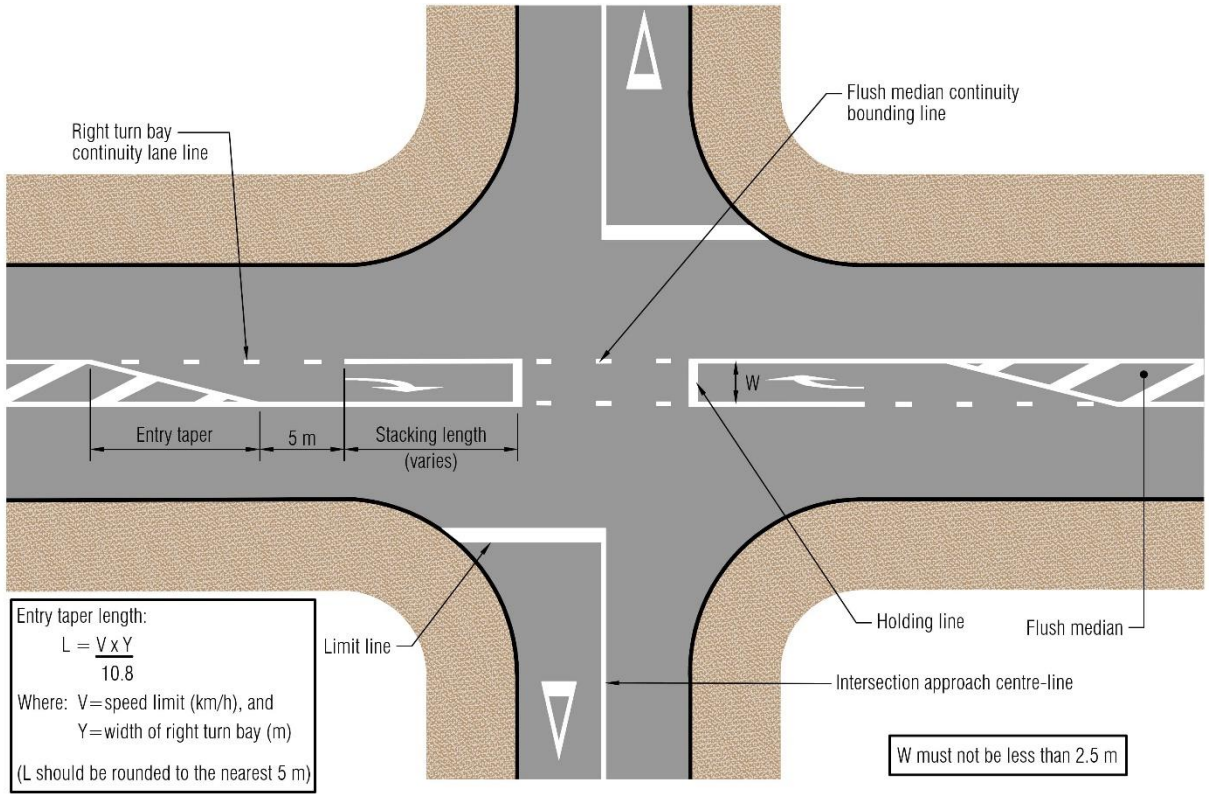


(a) Simple T-intersection – with right turn bay

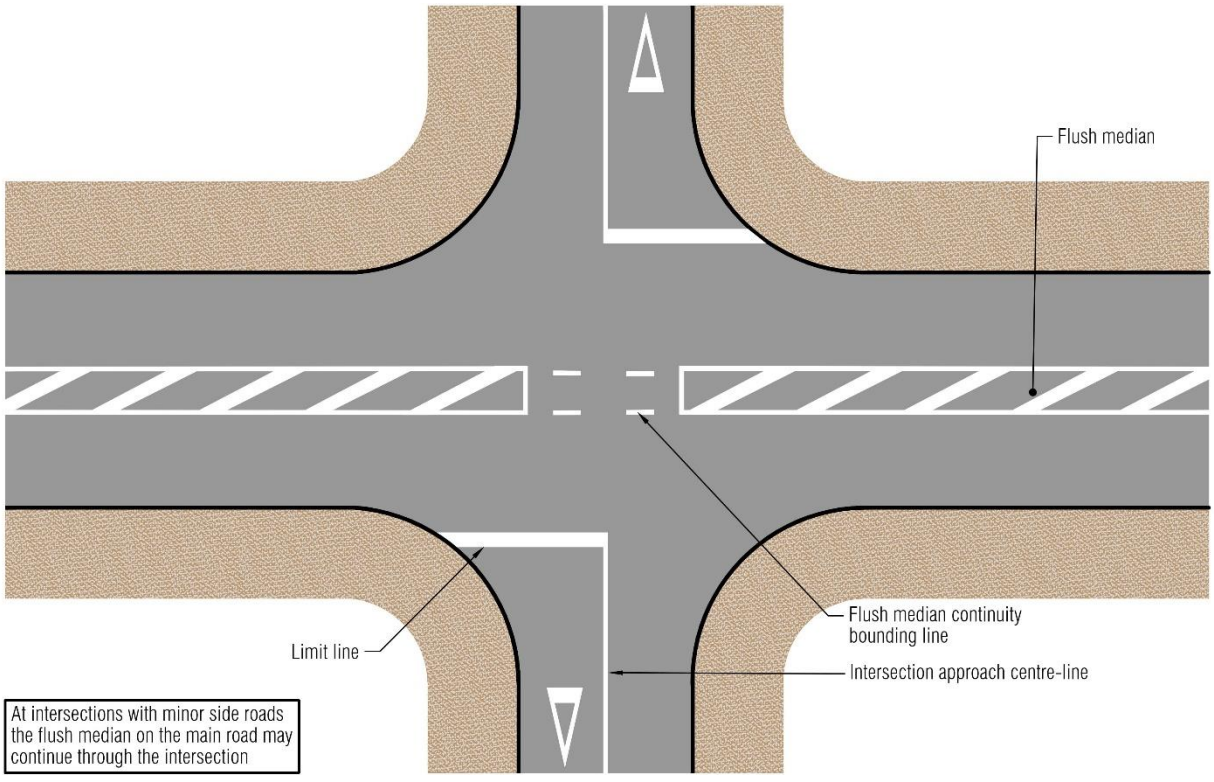


(b) Simple T-intersection – without right turn bay

Figure 16-2: Markings for flush medians at T-intersections

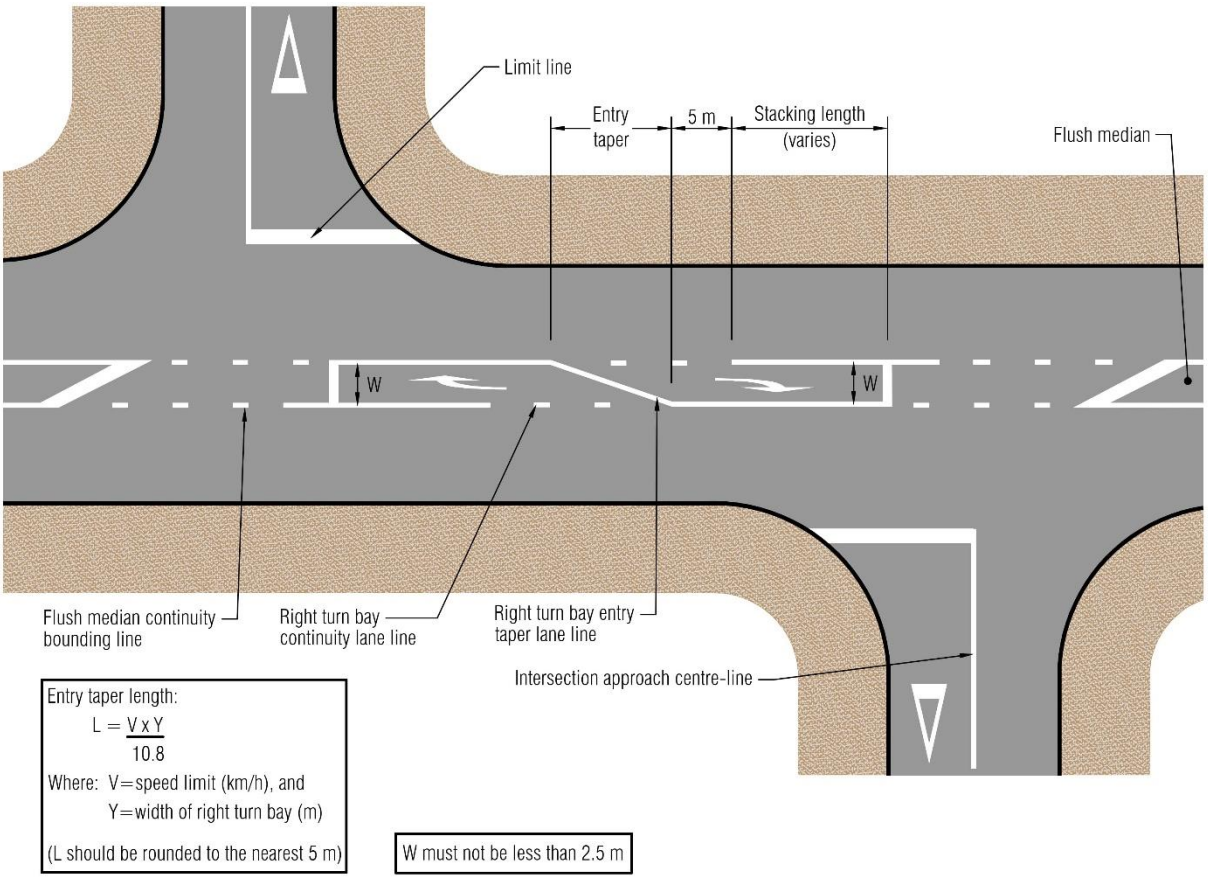


(a) Simple crossroads intersection – with right turn bays

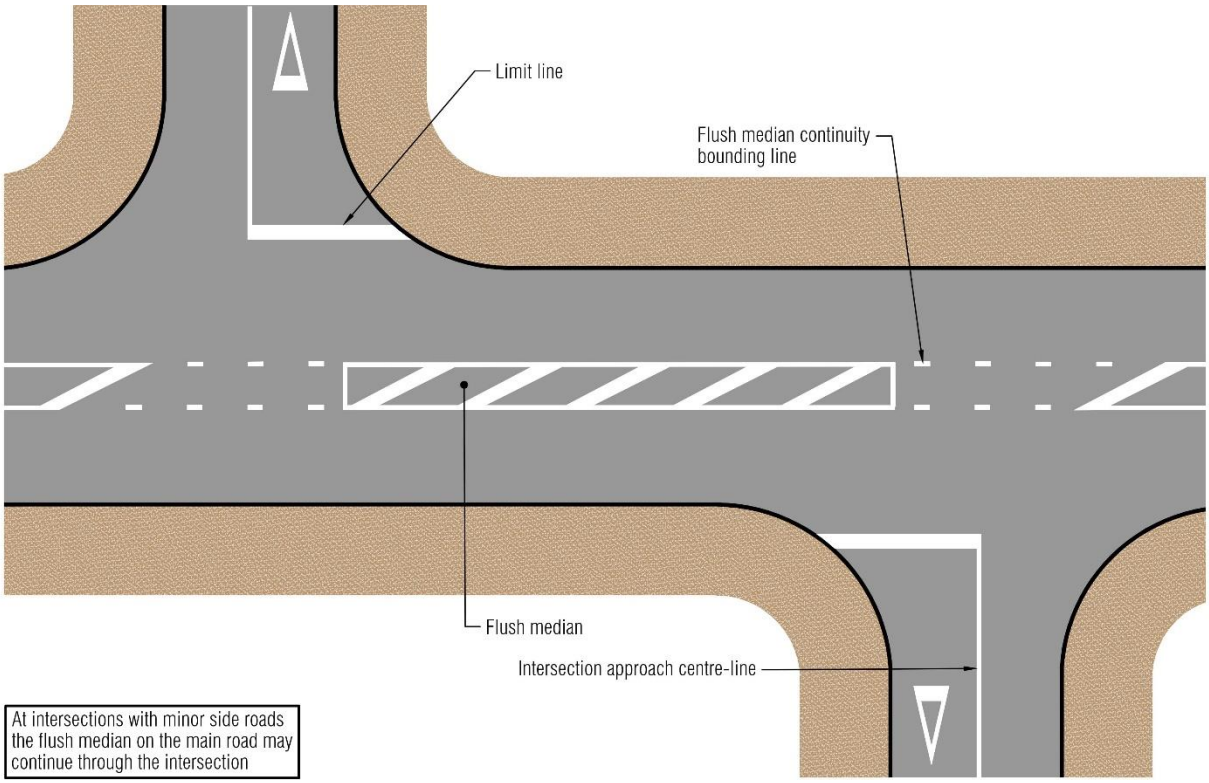


(b) Simple crossroads intersection – without right turn bays

Figure 16-3: Markings for flush medians at crossroads



(a) Staggered T-intersections – with right turn bays



(b) Staggered T-intersections – without right turn bays

Figure 16-4: Markings for flush medians at left-right staggered T-intersections

17. Seagull Intersections

Seagull intersections are T-intersections where provision is made for vehicles turning right from the stem of the T to be sheltered within a central median where provision is also made for acceleration of those turning vehicles before they merge with through traffic travelling along the top of the T. Seagull intersections can work well where right turning traffic from the side road would be delayed for extended periods due to the small number of coincident gaps on the main road, particularly if upstream events on the main road cause traffic to arrive at the intersection in platoons. They may be priority controlled intersections, signalised intersections, or roundabouts.

Generally, traffic signals should be installed on seagull intersections where right-turn vehicles from the stem of the T-intersection have to merge with through traffic on the departure and weave across through traffic to turn left just beyond the signals. Merging by these right-turn vehicles can result in rear-end collision.

If traffic has to merge on the departure, the safest option is for through traffic in the left-most lane to merge to its right. This means providing right-turn vehicles from the stem of the T-intersection with their own lane or lanes on the departure.

A well designed seagull intersection can provide a safe and efficient intersection form; however, the design needs to allow for:

- Protection for vehicles turning right from the side road;
- Adequate length for acceleration, so that vehicle speeds at the merge area are similar;
- Provision for pedestrians and cyclists; and
- Preventing drivers on the main road from using the right turn in and out lanes across the top of the T as a de facto passing lane.

Reference should be made to the following documents when designing seagull islands:

- Austroads Guide to Traffic Management Part 10: Transport Control – Types of Devices; and
- NZTA research report 644: The crash performance of Seagull intersections and left turn slip lanes.

Whilst seagull islands may be an appropriate intersection form for some locations it is important to recognise that they do not cater for pedestrians crossing the main road. Consideration also needs to be given to accommodating the needs of cyclists at seagull islands; it may be appropriate to provide a cut through area for cyclists at a seagull intersection.

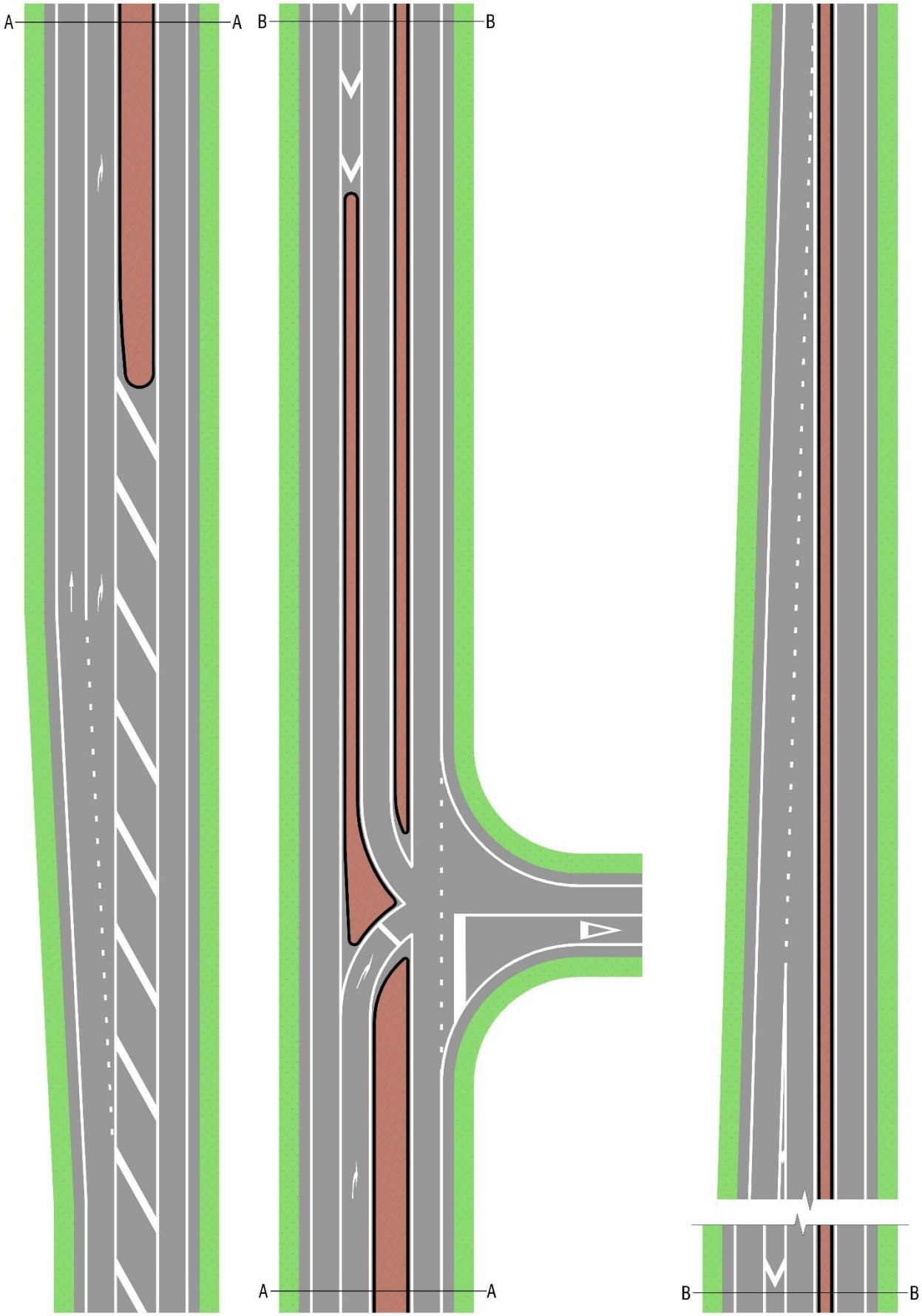


Figure 17-1: Example rural seagull intersection

18. Regulation of Movements at Intersections

Regulatory signs are used to control vehicle movements; these controls may apply part-time or full-time or be restricted to certain classes of vehicles. For signs relating to the regulation of movements in specific lanes at intersections refer to Section 10 of this Manual.

The recommended minimum size (Table 18-1) for a circular regulatory sign is dependent on the particular application and, as a general rule, is determined by the following factors:

- TCD Rule requirements; signs must never be smaller than the minimum dimensions described in the Rule;
- Urban or rural situation;
- Number of lanes for the direction of travel (for example, two-lane two-way road or a multi-lane road);
- Lateral offset, from drivers' position to the sign; and
- Actual vehicle speeds at the sign site.

Table 18-1: Recommended minimum sizes for regulatory signs

Area	Speed Limit	Size
Urban	Speed limit on any approach to intersection is 70 km/h or less (except as noted below)	600 mm diameter
	Divided roads where speed limit on any approach to the intersection is in range 50 km/h to 70 km/h	750 mm diameter
Rural	Speed limit on any approach to intersection is 80 km/h or more (except as noted below)	750 mm diameter
	Divided roads where speed limit on any approach to the intersection is 80 km/h or more (except as noted below)	900 mm diameter
	High speed high-volume roads, such as motorways and expressways, and at critical locations where there is a speed limit change	1200 mm diameter

Unless specified otherwise, signs that regulate vehicle movements at intersections should be located on the left-hand side of the roadway at a point not more than 15 m before the intersection, where they are clearly visible to approaching drivers over the distances described in this section of this Manual. There may be times where in order to achieve these sight distances it is necessary to install the sign on the right-hand side of the roadway.

18.1. Prohibited movements

This section includes information on prohibited movements including bans of particular turns. For further information on direction control signs that can be used in conjunction with these signs refer to Section 18.2.

Where a turning movement is prohibited, the turn restriction signs in Table 18-2 must be used. If there is only one turning movement available to drivers, or drivers must proceed in a specified direction, the Regulatory signs in Table 18-3 should be used.

Table 18-2: Signs for the prohibited movements

Code	Sign	Policy and Use
R3-1 No left turn		Where an RCA has prohibited either a left or right turning movement at an intersection, an R3-1 or R3-2 sign (respectively) must be installed at the intersection. Where both left and right turns are prohibited at a crossroads intersection, an R3-9 (No turns) sign should be installed instead. Where an RCA has prohibited a right turn, but the prohibition operates part-time, an active LED sign R7-11.1 sign should be used to display the legend of the R3-2 sign. When the prohibition does not apply, the sign must be unlit and black. When the prohibition applies the outer ring and diagonal bar must be continuously lit, but the inner rings must flash at approximately 1 Hertz. This sign must be 800 mm x 800 mm with the roundel 600 mm in diameter and 90 mm wide.
R3-2 No right turn		
R7-11.1 No Right turn, Part time (Active) LED		
R3-3 No U-turn		R3-3 signs must be installed where the RCA has prohibited U-turns. If the restriction applies along a length of road, signs should be installed at the start of the restriction and along the length. The spacing between any two successive signs should not exceed 120 m on each side of the road.
R3-4 No entry		Subject to formal authorisation by the RCA, an R3-4 sign should be installed at locations where traffic must be prevented from entering the roadway in the wrong direction. An R3-4 sign may be installed at intermediate intersections on a one-way roadway to prevent traffic from entering the roadway in the wrong direction by making a turn from a side road. An R3-4 sign should also be installed at the end of an off-ramp at a grade separated intersection to prevent traffic from entering the ramp in the wrong direction. No other sign may be attached to an R3-4 sign, or its support other than appropriate turn control signs to direct traffic on other approaches to the intersection. The sign should normally be installed on the left-hand side at the start of the restriction so that it is clearly visible to approaching drivers over the distances described in Note 1. In

Code	Sign	Policy and Use
		order to achieve these sight distances the sign may need to be installed on both sides of the road. The signs may also be gated to highlight the restriction road for users. At locations where the road surface is suitable, "NO ENTRY" message markings may also be marked and maintained. Markings must comply with the TCD Rule and should comply with the TCD Manual Part 1.
R3-6 Road closed		An R3-6 Road closed sign should be installed where a road or a section of a road is closed to traffic. The sign should be located at the point of the closure and should be located in line with the direction of travel for approaching drivers.
R3-7 Wrong way		An R3-7 or R3-7.1 sign should be installed on sections of road to warn drivers who may inadvertently enter a one-way section of road and travel in the wrong direction towards opposing traffic. The sign should be located 30 m from the end of the one-way section and to the left of, drivers who may enter the section in the wrong direction. The signs may also be gated to highlight the restriction road for users.
R3-7.1 Wrong way – go back		

Note 1: Sight distance requirements.

The sign is to be clearly visible to approaching drivers for at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)
≤30	1.5	20
40	1.5	25
50	1.5	30
60	2.0	50
70	2.0	60
80	2.0	70
90	2.5	95
≥100	2.5	105

18.2. Required movements

Direction control includes no turns, turns, turn left, turn right and one-way signs.

Where there is only one turning movement available to drivers, or drivers must proceed in a specified direction, the signs in Table 18-3 should be used. If a turning movement is prohibited, the turn restriction signs in Table 18-2 must be used.

Table 18-3: Signs for indicating required movements at intersections

Code	Sign	Policy and Use
R3-8 Turn left		Where the approach is a one-way road, R3-8 signs should be installed on both sides of the roadway. No other sign may be attached to an R3-8 sign or its support other than an R3-4 no entry or an R3-12 one way sign attached to the reverse of the 3-8 sign. On the terminating approach to a T-intersection, where the road across the top of the T is a one-way road, an R3-2 no right turn sign should be used in preference to an R3-8 sign.
R3-9 No turns		Where an RCA has prohibited turning movements at an intersection and traffic must proceed in a required direction, an R3-9 sign must be installed at the intersection. Where the approach is a one-way road, R3-9 signs should be installed on both sides of the roadway. No sign may be attached to an R3-9 sign or its support other than an R3-4 No entry sign attached to the reverse of the sign.
R3-10 Turn right		Where the approach is a one-way road R3-10 signs should be installed on both sides of the roadway. On the terminating approach to a T-intersection, where the road across the top of the T is a one-way road, an R3-1 No left turn sign should be used in preference to an R3-10 sign.
R3-11 Turn		Where the approach is a one-way road R3-11 signs should be installed on both sides of the roadway. Where the approach forms part of a multi-lane divided roadway an additional R3-11 sign should be erected on the median. No other sign may be attached to an R3-11 sign or its support other than an R3-4 no entry sign or a W14-2 two-way sign which may be attached to the reverse of the R3-11 sign. Refer to Part 5 of the TCD Manual for guidance regarding the use of W14-2 and W14-2.1 signs.
R3-12 One way		Where the RCA has formally authorised a one-way road, an R3-12 sign should be installed on a one-way roadway at every intersection and at intervening locations near private accesses at which there are significant turning movements. R3-4 No entry signs may also be required to reinforce the message.

Code	Sign	Policy and Use
		Where the one-way roadway is two lanes or less in width, the sign must be at least 600 × 250 mm. In all other situations the minimum size of the sign should be 750 × 300 mm. The sign should be installed as close as possible to the intersection or access, be approximately parallel to the one-way roadway, and face traffic about to turn into the one-way roadway. The sign should be clearly visible to approaching drivers over the distances described in Note 1 R3-12 signs should not be used in the case of a divided highway or one-way sections of road within a channelised intersection. At channelised intersections, R3-13 (Keep left - single disc), R13.3.1 (Keep left - twin disc), or R3-13.2 (Keep right) signs should be used instead.

Note 1: Sight distance requirements.

The sign should be clearly visible to approaching drivers for at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)
≤30	1.5	20
40	1.5	25
50	1.5	30
60	2.0	50
70	2.0	60
80	2.0	70
90	2.5	95
≥100	2.5	105

18.3. Road user and vehicle exemption

Where particular movements are prohibited (for example, no left turn) or required (for example, turn right) at intersections, the supplementary signs in Table 18-4 may be used under the movement prohibition (for example, R3-1 No left turn) or turning requirement (for example, R3-10 Turn right) sign to define classes of vehicles exempt from the regulatory requirements.

Table 18-4: Signs to indicate road user or vehicle exemptions

Code	Sign	Policy and Use
R3-5.1 Supplementary – except buses		The signs must only be used as a supplementary sign to a regulatory sign, where a particular type of vehicle is exempt. Each sign may only be used to supplement specific regulatory signs and practitioners should check the permitted use in Schedule 1 of the TCD Rule. The sign should normally be installed on the left-hand side at a point not more than 15 m before the intersection, so that it is clearly visible to approaching drivers (and cyclists) over the distances described in Note 1.
R3-5.2 Supplementary – except cycles		
R3-5.3 Supplementary – except authorised vehicles		
R3-5.4 Supplementary – except “class” or “description” of vehicle		The general policy and use requirements for an R3-5.4 sign are described above. The exception defined by the sign applies to the "class" or "description" of vehicle defined on the sign. For example, the TCD Rule refers to “Goods vehicle”, therefore, the legend on an R3-5.4 sign could refer “Except Goods Vehicles”.

Note 1: Sight distance requirements.

The sign should be clearly visible to approaching drivers for at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)
≤30	1.5	20
40	1.5	25
50	1.5	30
60	2.0	50
70	2.0	60
80	2.0	70
90	2.5	95
≥100	2.5	105

18.3.1. Lane use controls that apply to particular vehicle types

Where a certain vehicle class is required and / or permitted to undertake a turning manoeuvre from a given lane, while general traffic is prohibited from undertaking the same manoeuvre (for example, buses are permitted to proceed straight from a lane that is otherwise left turn only), there must be:

- A marked lane use arrow in that lane for general traffic; and
- A regulatory sign installed to define the permitted movement for the certain vehicle class that is contrary to the movement defined by the lane use arrow for general traffic. This can be achieved using an R7-10 General regulatory sign to define the exception (for example, “left lane left turn only except buses”).

Section 22 of this Manual includes information regarding lane configurations for special vehicle lanes.

19. Keep Clear Markings

19.1. Markings

The Road User Rule (4.5(2)) requires that road users must not enter an intersection if their intended passage or exit is blocked by stationary traffic. Where queuing traffic regularly blocks intersections or where such blocking is expected to occur, road controlling authorities may mark keep clear markings to reinforce the Road User Rule requirement.

Clause 10.6(1) of the TCD Rule states that “A road controlling authority may mark the road surface of an intersection, or a place used as a vehicle entrance or exit, to indicate the area that a road user must not enter when the road user’s intended passage through that area is blocked by traffic."

Clause 10.6(2) of the TCD Rule states that keep clear markings at intersections must be marked by means of either:

(a) “yellow reflectorised material in the form of diagonal cross-hatched markings; or

(b) the words ‘keep clear’ marked in yellow between lines that define the area.”

Keep clear markings on the road surface through an intersection should be used sparingly because of the potential for reduced skid resistance. Consideration should also be given to using long-life marking materials that have enhanced levels of skid resistance and do not require remarking as frequently. Cross-hatched markings and the words “keep clear” must not be used together.

19.1.1. Keep clear cross-hatching

Keep clear cross-hatched (M4-2) markings (10.6(2)(a)) must be marked as follows:

- The diamonds in each lane created by the M4-2 Keep clear cross-hatching markings must be half the lane width wide.
- Based on the width, there must be the equivalent of two columns of diamonds along each lane.
- Where there are adjoining lanes and the cross-hatching marking extends across more than one lane, the lines of the cross-hatching must be continuous across the adjoining lanes.

Figure 19-1 below illustrates keep clear cross-hatching marking for westbound traffic.

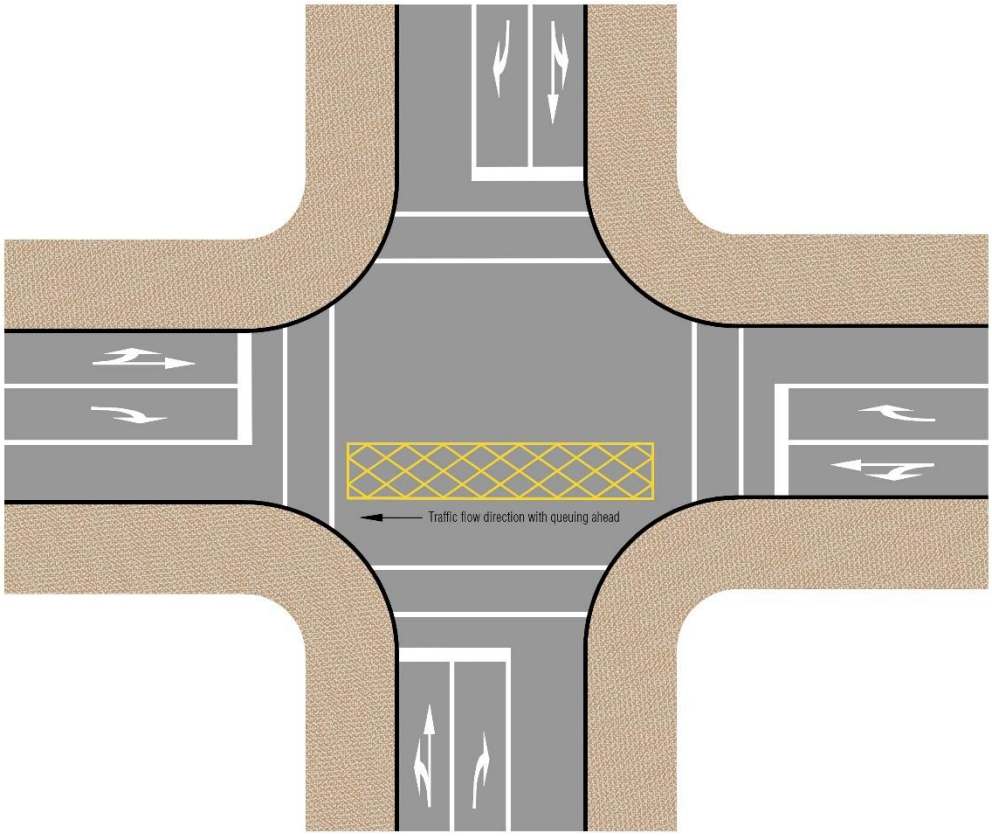


Figure 19-1: Example layouts for keep clear cross-hatching marking

Table 19-1: Specifications for keep clear cross-hatching marking

Application	Urban	Rural
Colour	Yellow	
Line width	100 mm	
Diamond size	Half the lane width	

19.1.2. Keep clear word message and lines

Keep clear message (M4-1) markings must be marked as follows:

- The area to which the marking applies must be defined by yellow lines.
- The words ‘keep clear’ must be marked within the area defined by the lines.
- Road users travelling in the direction to which the Keep clear word message primarily applies must encounter the word "keep" before the word "clear".

Figure 19-2 below illustrates a keep clear message marking for westbound traffic.

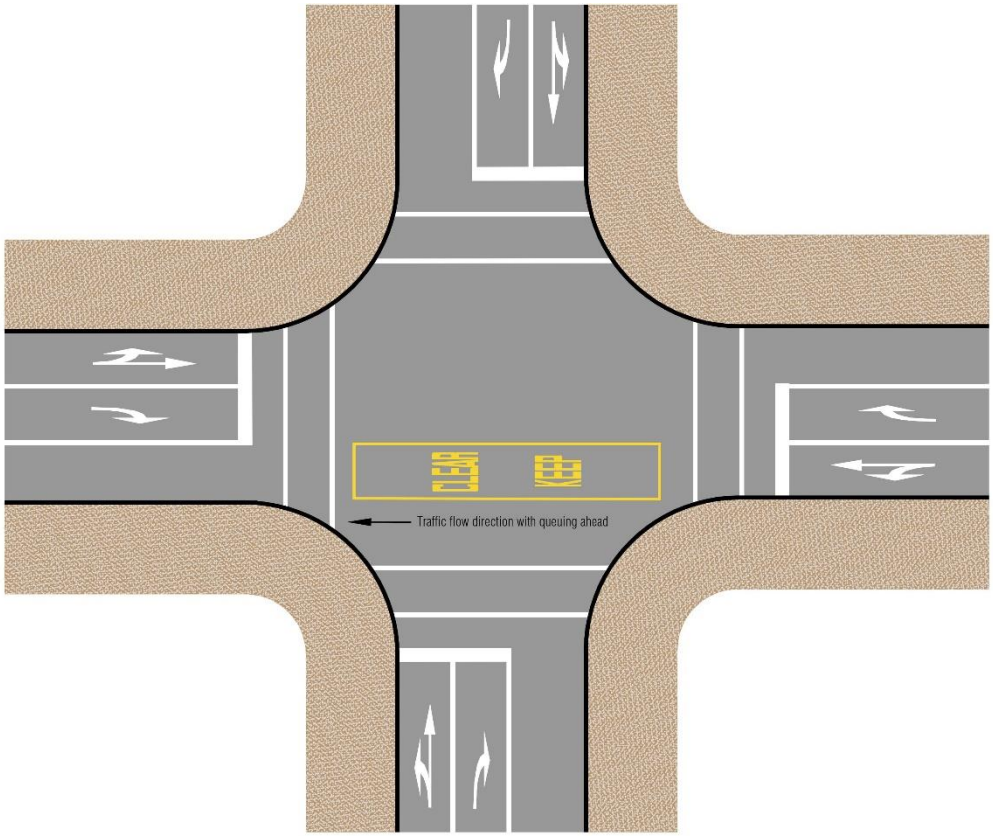


Figure 19-2: Example layouts for keep clear lines and text markings

Table 19-2: Specifications for keep clear message markings

Application	Specification
Colour	Yellow
Line width (typical)	100 mm
Lettering height (minimum)	2.4 m
Location (typical)	Yellow lines define the area that road users must not enter. Typically, the words "keep clear" will be positioned centrally across and along the area.

20. No-Passing Lines

Diagrams in this Manual show no-passing lines on approach to and departure from some intersections. The guidance provided in Section 15.3 in relation to no-passing lines for right turn bays is explicit, however, similar guidance is not provided for other forms of intersection. This section of this Manual describes situations for which it may be appropriate to include no-passing lines for intersections.

The TCD Rule (7.3(1)) states "A road controlling authority may mark a no-passing line on a section of roadway if the road controlling authority considers that there is a risk to safety from vehicles that, when passing other vehicles […] that are moving in the same direction, intrude into a lane that is being used by traffic travelling in the opposite direction." Part 5 of the TCD Manual includes guidance for the configuration of no-passing lines and situations where no-passing lines should be used. Those situations include:

- On the approaches to raised traffic islands and medians that separate opposing traffic flows.
- On the approaches to hazards or obstructions located within a roadway and which separate opposing traffic flows.
- On the approaches to railway level crossings.
- As centre-lines on undivided four lane rural roads.
- Where it is considered necessary to prohibit passing because drivers may not be aware of visibility restrictions caused by vertical and / or horizontal curves.

On the approaches to and departures from intersections, the correct and appropriate use of traffic control devices should alert road users to the presence of intersections and the need to comply with the controls of the intersections. For locations where there is the potential for road users to not identify features associated with an intersection that make passing at that location inappropriate and / or unsafe, it may be appropriate to include no-passing lines. Examples of such locations include the following:

- Multi-lane approach to a signalised intersection where there is not a solid island separating opposing flows for the intersection.
- Multi-lane approaches to any intersection; including those with solid islands for the intersection, where road users may not perceive that it is unsafe to pass.
- Departure from an intersection where road users may consider the opposing lanes are a suitable passing opportunity, however, because of the configuration of lanes on approach to the intersection the intentions of approaching road users could be misinterpreted.
- On approach to an intersection at which there is a solid splitter island to which approaching road users may not have good visibility.

There are not any specific situations for which there is a legislative requirement to have a no-passing line marked on the approach to or departure from an intersection. However, a no-passing line may be marked for any location (including for intersections) where the road controlling authority considers there is a risk to safety from vehicles passing other vehicles at that location. Figure 20-1 below provides an example of no-passing lines on approach to and departure from a signalised intersection.

Figure 20-1: No-passing lines on approach to and departure from a signalised intersection

21. Turnaround Facilities

Turnaround facilities, which may be installed at midblock locations or on side roads; allow road users to change the direction in which they are travelling on a median divided carriageway. These facilities allow road users to turn around and change their direction of travel to access side roads or property accesses which cannot be accessed via right turn movements due to the presence of the median division of the carriageway. The following layouts are examples of turnaround facilities.

These layouts are relatively new on the New Zealand network; the diagrams below illustrate best practice being developed by NZTA.

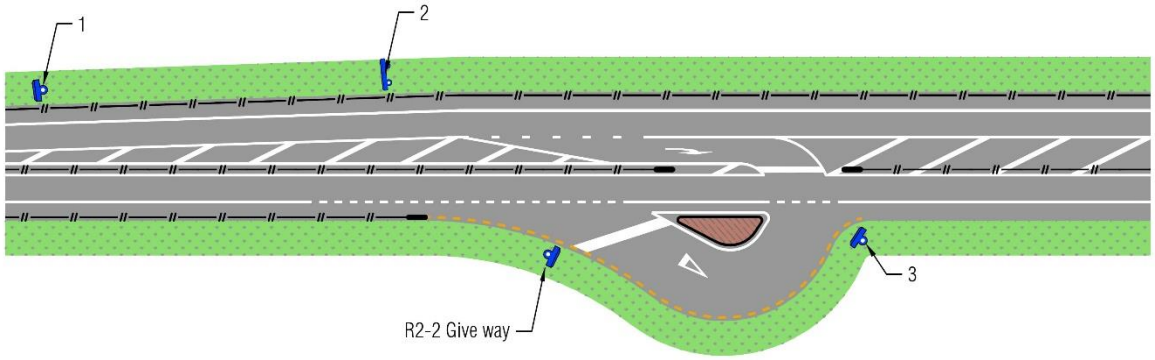


Figure 21-1: Standard detail for mid-block turnaround bay

While Part 4 of the TCD Manual relates to traffic control devices for intersections, mid-block turnaround bays are included in this Manual because of the interaction between through traffic and traffic using the turnaround bay. They may also facilitate road user movements to and from intersections that may otherwise be prevented due to the presence of median barriers along the roadway. Therefore, reference to mid-block turnaround bays is included in this Manual.

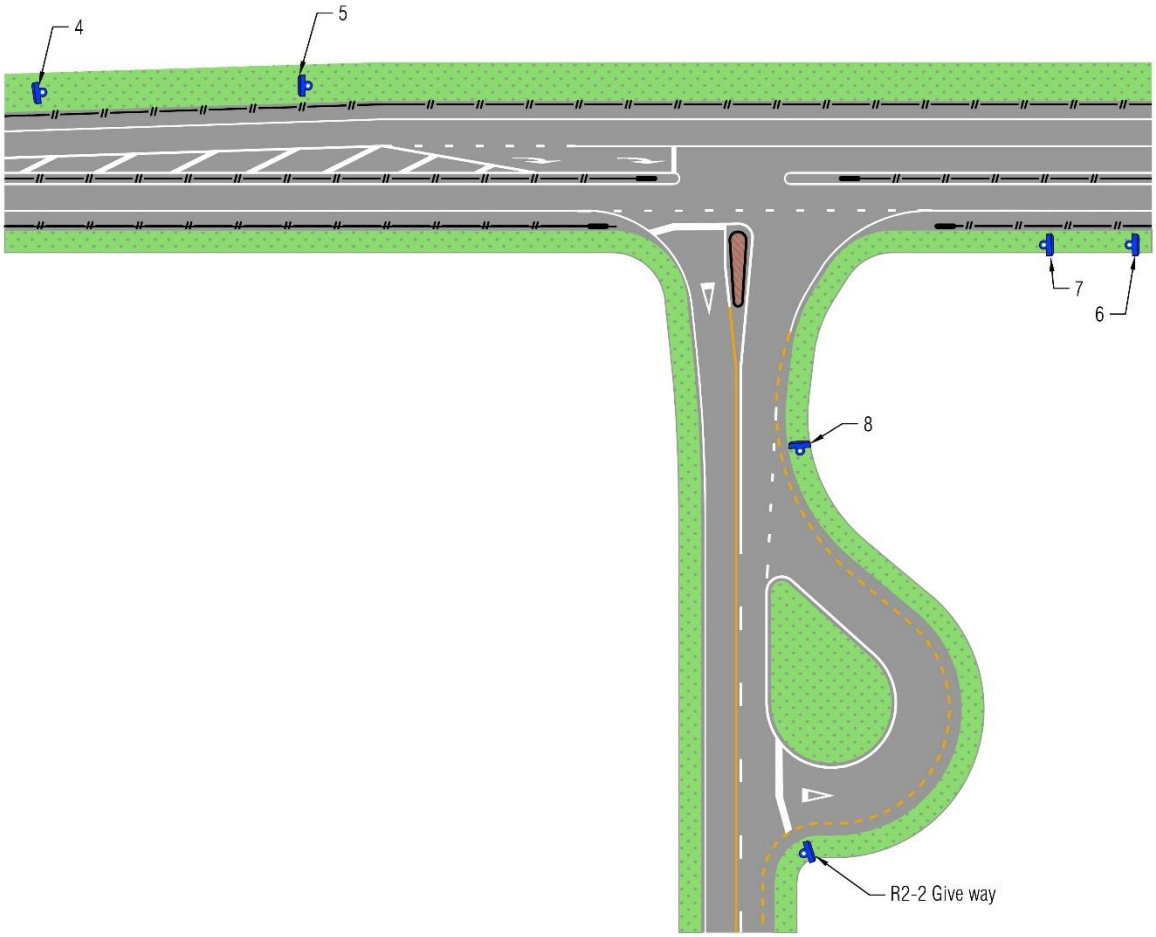


Figure 21-2: Standard detail for side road turnaround bays

As turnaround facilities become more common, road users will become familiar with their use. To advise road users of the presence of the facilities, and how to access them, A50-1 General advisory signs may be used, which allow "such words as are necessary to convey the advice to road users". To encourage consistent signing of turnaround facilities, the sign legends listed below are recommended for use for turnaround facilities such as those illustrated in Figure 22-1 and Figure 22-2 above:

Legend for each numbered sign:

Mid-block turnaround bay:

1. 'Turnaround bay 500 m [or other distance as appropriate] ahead', or 'Turnaround bay ahead'.
2. 'Turnaround bay on right 300 m [or other distance as appropriate] ahead'.
3. 'Turnaround bay' (if required).

Turnaround bay on side road:

4. 'Turnaround bay on side road 500 m [or other distance as appropriate] ahead', or 'Turnaround bay ahead'.
5. 'Turnaround bay on side road turn right 300 m [or other distance as appropriate]'.
6. 'Turnaround bay on side road 500 m [or other distance as appropriate] ahead', or 'Turnaround bay ahead'.
7. 'Turnaround bay on side road turn left 300 m [or other distance as appropriate]'; refer to Figure 21-3 for an example of this sign.
8. 'Turn left for turnaround bay'.

Figure 21-3 below provides an example of the manner in which the information for Sign 7 could be presented.

Figure 21-3: Example of sign on main road approach to turnaround bay on side road

22. Special Vehicle Lanes

Part 2 of the TCD Rule defines a special vehicle lane as, "[…] a lane defined by signs or markings and restricted to a specified class or classes of vehicle; and includes [but is not limited to] a bus lane, a transit lane, a cycle lane, and a light-rail vehicle lane."

Refer to Section 8 and Section 18 of this Manual and Section 8 of the TCD Manual Part 5 for guidance on markings and signs for cycle lanes.

Refer to Section 16 of the TCD Manual Part 5 for guidance on signs and markings for other special vehicle lanes. For intersections, special vehicle lanes must be marked and signed in accordance with clause 11.2 of the TCD Rule, which states:

(1) "If defining a part of a road as a special vehicle lane, a road controlling authority must, at the start of the special vehicle lane and after each intersection, along its length:

- (a) mark on the road surface a white symbol, that complies with Schedule 2, defining the class or classes of vehicle for which the lane has been reserved; and
- (b) if for other than a 24-hour restriction, install a special vehicle lane sign that complies with Schedule 1:
  - (i) defining the class or classes of vehicle for which the lane has been reserved; and
  - (ii) stating the periods for which the reservation applies."

(2) "A road controlling authority may provide the following traffic control devices to discourage use of a special vehicle lane by other vehicles, or to draw attention to the likely presence of vehicles entitled to the use of the lane:

- (a) additional white special vehicle lane symbols described in 11.2(1)(a) [of the TCD Rule] or signs described in 11.2(1)(b) along the length of the lane; or
- (b) if for a 24-hour restriction, special vehicle lane signs; or
- (c) a surface treatment that provides a contrasting colour or texture to that of adjacent lanes used by other vehicles:
  - (i) at locations along the length of the lane; or
  - (ii) along the length of the lane."

22.1. Example layouts

Figure 22-1 to Figure 22-6 show example layouts for special vehicle lanes for intersections. For examples of layout diagrams for locations between intersections, refer to Section 16 of the TCD Manual Part 5. The figures below show example layouts for transit lanes or bus lanes; however, the layouts also apply to other special vehicle lanes (excluding cycle lanes) and may be adapted by changing the signs and stencils to match the classes permitted to use the special vehicle lane. These figures do not include all traffic control devices and / or all specific features of intersections that should be included in designs for real world applications. Many of the diagrams in this Manual are not drawn at a conventional scale, therefore, they are not suitable for copying directly into design drawings.

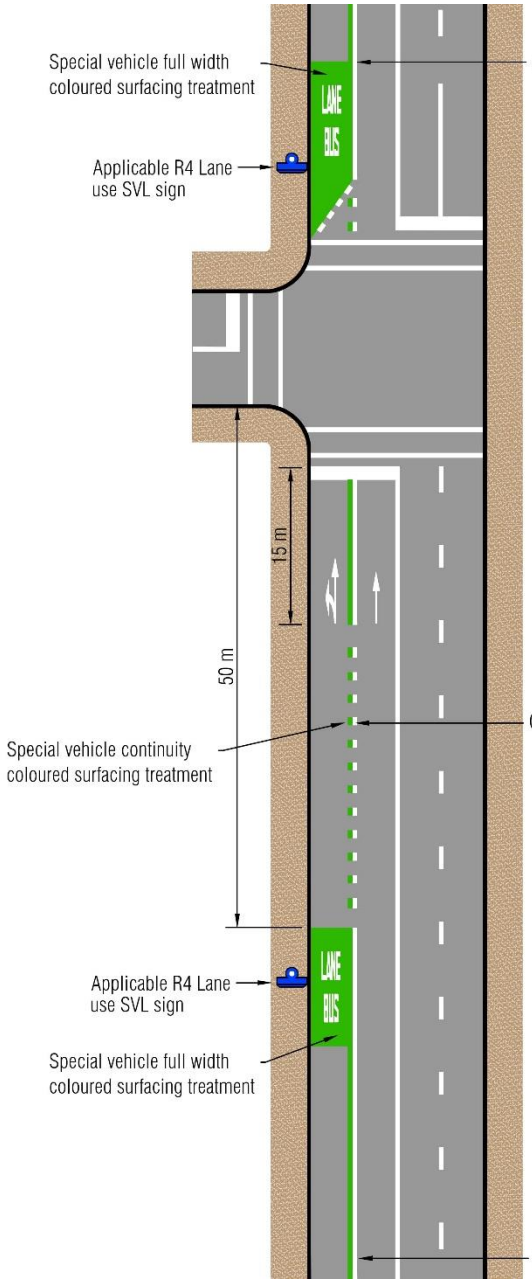


Figure 22-1: Signalised intersection with shared lane left/through

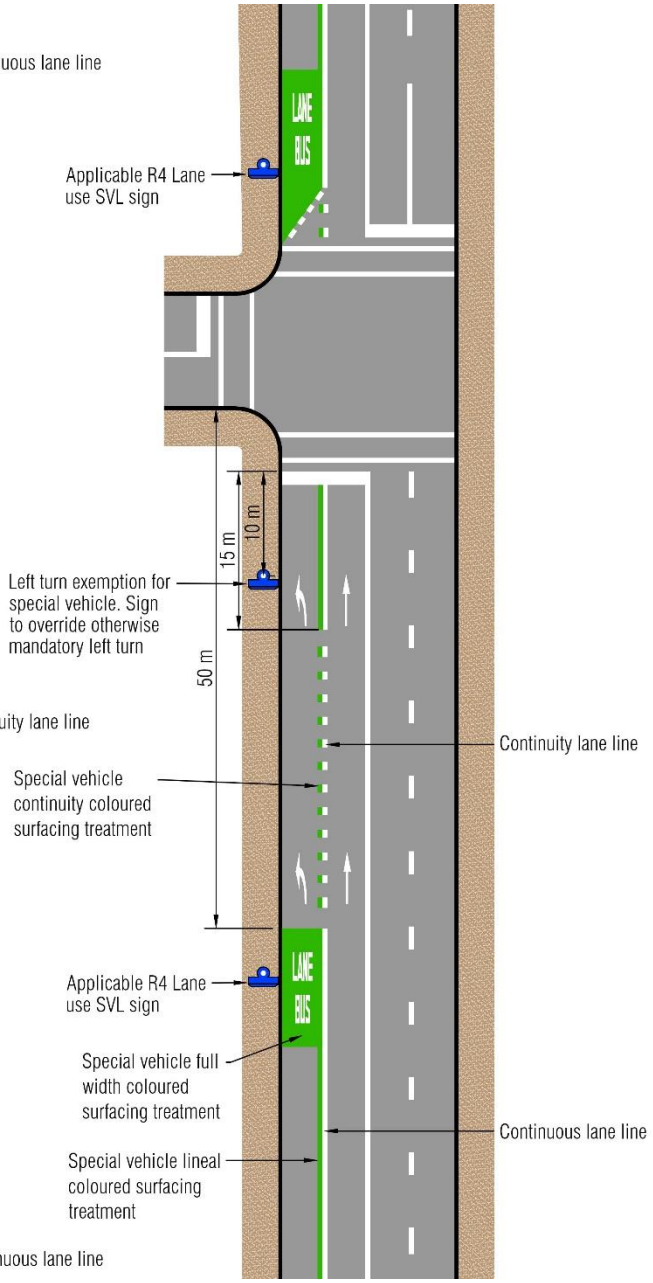


Figure 22-2: Signalised intersection with mandatory left turn and SVL left turn only exemption

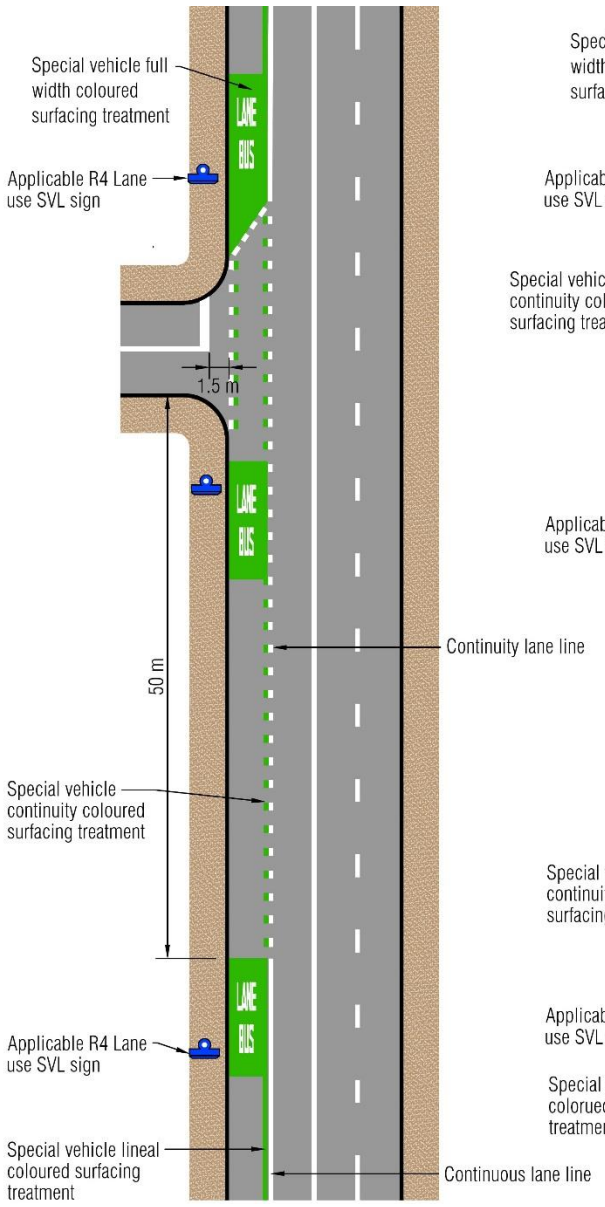


Figure 22-3: Intersection approach with SVL

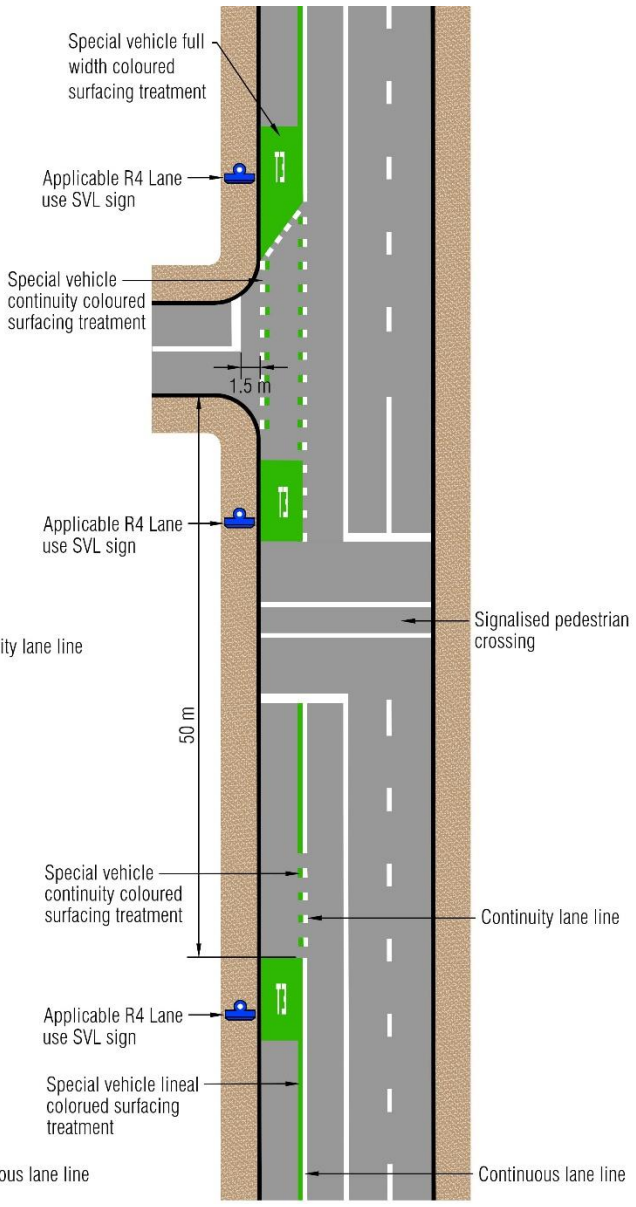


Figure 22-4: Intersection approach with SVL and signalised pedestrian crossing

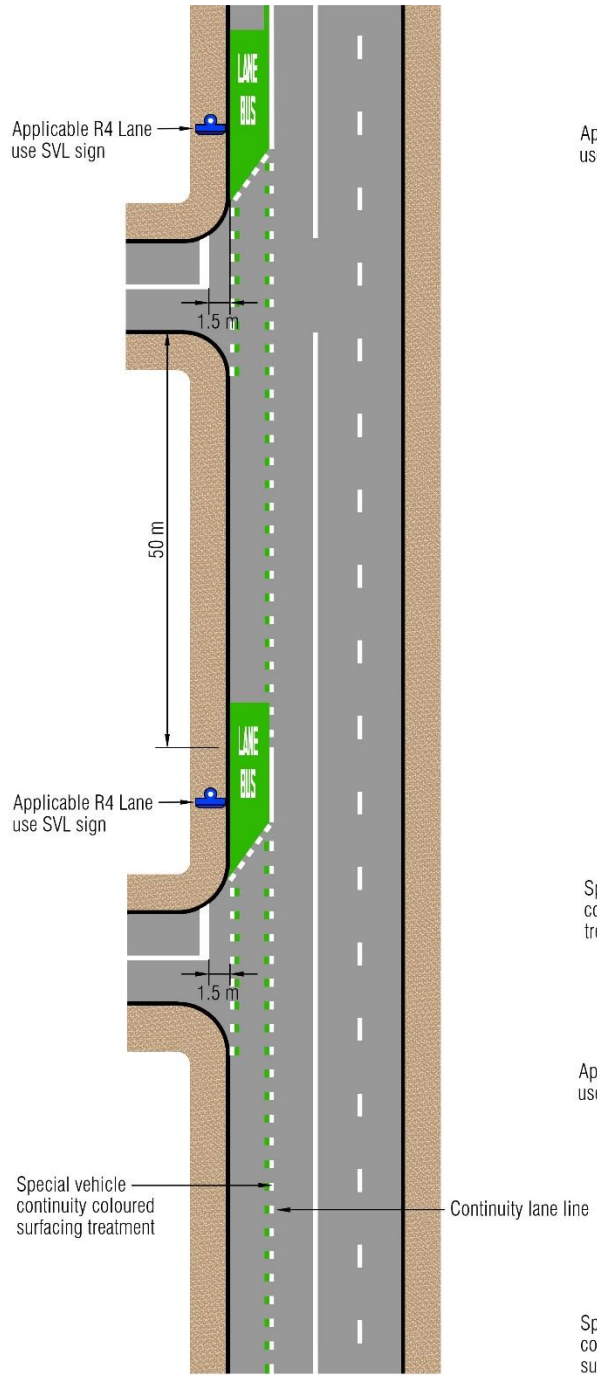


Figure 22-5: Intersections spaced at less than 60 m

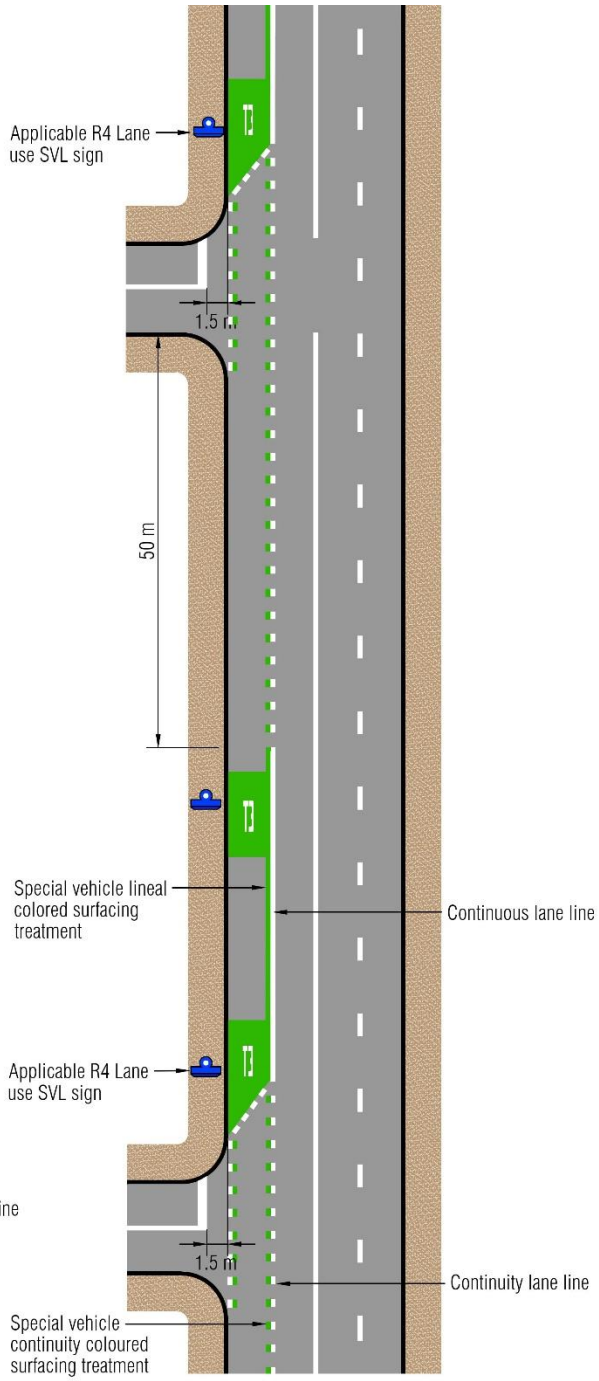


Figure 22-6: Intersections spaced between 60 m and 80 m

22.2. Goods vehicle lane sign and marking

Goods vehicle lanes are a type of special vehicle lane. The R4-14 or A42-6 signs (refer to Table 22-1) in combination with an M2-7 marking (refer to Figure 22-7) may be used to define that a particular lane is only available for use by goods vehicles (as defined in the Road User Rule). The combination of the sign and marking can be used to restrict movements along a particular section of road.

Table 22-1: Signs for goods vehicle lanes

Code	Sign	Policy and Use
R4-14 Regulatory special vehicle lane; Bus and goods vehicles		The signs, used in combination with the M2-7 message marking, should be used to exclude (R4-14) or deter (A42-6) general traffic from sections of road along which the road controlling authority intends to improve the place function of that section of road while still allowing access for public transport vehicles and goods vehicles. The applicable sign should normally be installed on the left-hand side at a point not more than 15 m before the point at which the restriction applies, so that it is clearly visible to approaching drivers over the distances described in Note 1. The sign should be positioned to allow the driver of a general traffic vehicle to turn from the section of road to which the restriction applies.
A42-6 Advisory special vehicle lane; Bus and goods vehicles		

Note 1: Sight distance requirements.

The sign should be clearly visible to approaching drivers for at least the distances described in the table below.

Speed limit (km/h)	Assumed reaction time (sec)	Sight distance to sign (m)
≤30	1.5	20
40	1.5	25
50	1.5	30
60	2.0	50
70	2.0	60
80	2.0	70
90	2.5	95
≥100	2.5	105

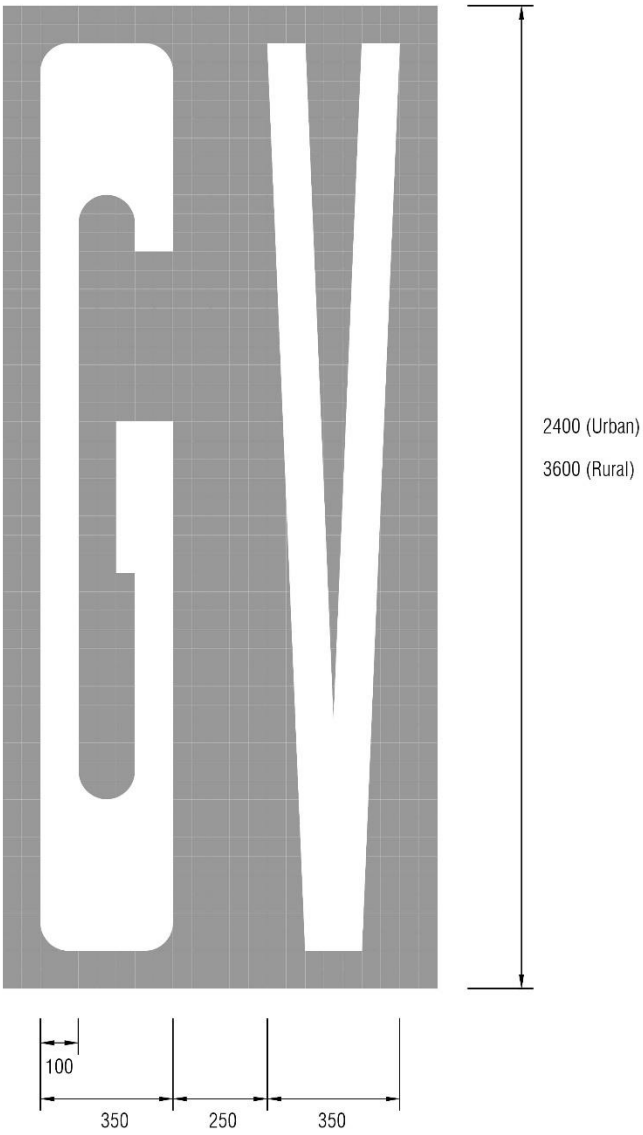


Figure 22-7: M2-7 goods vehicle lane message marking

23. Property Access

Detailed guidance is provided through other reference sources (such as Austroads, the NZTA Planning Policy Manual, and District Plans) regarding the manner in which property accesses should be treated and designed. In some cases, because of the nature and volume of traffic accessing a property, the property access will function as an intersection, therefore, access design and the use of traffic control devices should be in accordance with this Manual. Otherwise, practitioners should refer to Austroads and Part 5 of the TCD Manual for guidance regarding the manner in which to treat property accesses.

Appendix A: Line Naming Convention

TCD Rule Line Names

The Traffic Control Devices Rule has names for specific types of line based on the position on the roadway those lines are located. The names and format for those names used in this Manual follow the naming convention in the Rule, which is as follows:

1. Lane line
2. Centre-line
3. No-passing line
4. Flush median
5. Edgeline
6. No-stopping line
7. Limit line

Longitudinal Lines

The table below is the present draft of the naming convention for lines along roadways. Each name comprises a line name in the format of the TCD Rule along with a descriptor to differentiate that line type from other lines that have the same name in the Rule.

Line Name	Line Dimensions			Colour	Comment
	Dash	Gap	Min. Width		
Lane Lines					
Dashed lane line	3 m	7 m	100 mm	White	Standard lane line. May also be used alongside a special vehicle lane.
Continuous lane line	Continuous	N/A	100 mm	White	Standard continuous lane line. May also be used alongside a special vehicle lane to indicate the extent of the special vehicle lane.
Approach lane line	15 m min.	N/A	100 mm	White	On approach to limit line.

Line Name	Line Dimensions			Colour	Comment
	Dash	Gap	Min. Width		
Intersection priority lane line	1 m	1 m or 2 m	100 mm	White	To guide traffic on main route through intersection where the route does not follow a straight line.
Roundabout lane line	3 m	3 m	100 mm	White	Circulatory carriageway and exit lanes of multi-lane roundabout.
Signalised intersection lane line	1 m	1 m or 2 m	100 mm	White	To guide turning traffic at signalised intersections to ensure swept paths for opposing movements are separated. Refer AGTM10.
Raised island approach lane line (30 - 50 km/h speed limit)	Continuous	N/A	100 mm	White	Used on approach diverge for raised traffic island. Diagonal lines should be included between the right lane line for the left lane and the left lane line for the right lane with 600 mm wide diagonal lines, spaced at 2.0 m, and with a slope of 2:1.
Raised island approach lane line (60 - 80 km/h speed limit)	Continuous	N/A	200 mm	White	Used on approach diverge for raised traffic island. Diagonal lines should be included between the right lane line for the left lane and the left lane line for the right lane with 900 mm wide diagonal lines, spaced at 3.5 m, and with a slope of 2:1.
Raised island approach lane line (90 - 110 km/h speed limit)	Continuous	N/A	200 mm 300 mm (desirable)	White	Used on approach to diverge raised traffic island. Diagonal lines should be included between the right lane line for the left lane and the left lane line for the right lane with 1200 mm wide diagonal lines, spaced at 5.0 m, and with a slope of 2:1.
Slow vehicle bay lane line (rural)	1 m	3 m	200 mm	White	Used to define the right-hand side of the lane of a slow vehicle bay from the commencement of the diverge taper through to the commencement of the merge taper.
Continuity lane line (urban)	1 m	3 m (max.)	100 mm to 150 mm	White	Used in place of a lane line to indicate the position of the lane line. For example, can be used in situations where a diverge for a left turn slip lane crosses a special vehicle lane.
Continuity lane line (rural)	1 m	3 m	200 mm	White	As above.
Special vehicle lineal coloured surfacing treatment	Continuous	N/A	100 mm	Apple green	Used alongside a continuous lane line to indicate the extent of the special vehicle lane.
Special vehicle dashed coloured surfacing treatment	3 m	7 m	100 mm	Apple green	Used alongside a dashed lane line to indicate the extent of the special vehicle lane.

Line Name	Line Dimensions			Colour	Comment
	Dash	Gap	Min. Width		
Centre-lines					
Dashed centre-line	3 m	7 m	100 mm	White	Standard centre-line.
Continuous centre-line	Continuous	N/A	100 mm	White	Used where dashed centre-line is unsuitable or where enhanced definition of centre-line is required. May be used at locations such as on low radius curves or to define centre-line on some multi-lane roads.
Priority centre-line (intersection)	1 m	1 m or 2 m	100 mm	White	To establish priority at an intersection where the main road alignment does not follow a straight line.
Intersection approach centre-line (urban)	30 m	12 m	100 mm	White	Applies to the main road. There should be a continuous centre-line on each approach with a 12 m gap at the intersection. For the side road approach, the centre-line terminates 1.5 m clear of the nearest lane or at the limit line.
Intersection approach centre-line (rural)	50 m	12 m	100 mm	White	Applies to the main road. There should be a continuous centre-line on each approach with a 12 m gap at the intersection. For the side road approach, the centre-line terminates 1.5 m clear of the nearest lane or at the limit line.
Wide centre-lines	Varies	Varies	Varies	White or Yellow	A combination of one or more centre-lines to produce a configuration where the line on the right-hand side of road users is separated from the line on the right-hand side of opposing road users by an unmarked width of road.
Raised median approach centre-line (urban)	Continuous, 30 m min.	N/A	100 mm	Yellow	Centre-line should terminate to the left of the raised median. At intersections, the centre-line may continue along the left of the raised median and terminate at the limit line. Also refer to Median edgeline as potential extension of the approach centre-line.
Alternative raised median approach centre-line (urban)	Continuous, 30 m min.	N/A	150 mm	White	Centre-line should terminate to the left of the raised median. At intersections, the centre-line may continue along the left of the raised median and terminate at the limit line. Also refer to Median edgeline as potential extension of the approach centre-line.

Line Name	Line Dimensions			Colour	Comment
	Dash	Gap	Min. Width		
Raised median approach centre-line (rural)	Continuous, 50 m min.	N/A	100 mm	Yellow	Centre-line should terminate to the left of the raised median. At intersections, the centre-line may continue along the left of the raised median and terminate at the limit line. Also refer to Raised median edgeline as potential extension of the approach centre-line.
No-passing Lines (a type of centre-line (refer TCD Rule 7.2(2)(c), 7.2(3)(c)(ii) and 7.3)					
No-passing line (urban)	Continuous, 30 m min.	N/A	100 mm	Yellow	Continuous yellow line to indicate passing is not permitted.
No-passing line (rural)	Continuous, 80 m min.	N/A	100 mm	Yellow	Continuous yellow line to indicate passing is not permitted.
No-passing advance warning line (urban)	13 m	7 m	100 mm	Yellow	Dashed yellow line on approach to no-passing centre-line; 3 dashes are required.
No-passing advance warning line (rural)	13 m	7 m	100 mm	Yellow	Dashed yellow line on approach to no-passing centre-line; 5 dashes are required.
Flush Medians (a type of centre-line (refer TCD Rule Definitions, 7.2(2)(d) and 7.2(3)(c)(iii))					
Flush median bounding line (urban and rural)	Continuous	N/A	100 mm	White	Line width is not specified in the Rule. However, 100 mm described here based on other centre-lines defined in the TCD Rule.
Flush median diagonal line (30 - 50 km/h speed limit)	Continuous	N/A	600 mm	White	Diagonal lines between continuous centre-line for each direction of travel should be 600 mm wide, spaced at 8 m intervals and with a slope of 2:1.
Flush median diagonal line (60 – 80 km/h speed limit)	Continuous	N/A	900 mm	White	Diagonal lines between continuous centre-line for each direction of travel should be 900 mm wide, spaced at 14 m intervals and with a slope of 2:1.
Flush median diagonal line (90 – 110 km/h speed limit)	Continuous	N/A	1200 mm	White	Diagonal lines between continuous centre-line for each direction of travel should be 1200 mm wide, spaced at 20 m intervals and with a slope of 2:1.

Line Name	Line Dimensions			Colour	Comment
	Dash	Gap	Min. Width		
Flush median continuity bounding line	1 m	3 m	100 mm	White	Used in place of a flush median bounding line to indicate continuity of the flush median bounding line through an intersection.
Edgelines					
Edgeline	Continuous	N/A	100 mm	White	Standard edgeline.
Median edgeline (urban)	Continuous	N/A	100 mm	White	To define the right-hand side of a roadway adjacent to a physical median that is not intended to be used or reasonably usable for vehicular traffic in general. The term "physical" has been used because the median or the island could be raised (such as in a conventional kerbed median or where there is a median barrier), lowered (such as in a drainage swale) or approximately level (such as in a grassed median). The term “roadway” has been used in accordance with the definition in the Rule such that there could be two roadways within a road that are separated by a physical median.
Median edgeline (rural)	Continuous	N/A	150 mm	White	As above.
Continuity edgeline (urban)	1 m	3 m (max.)	100 mm to 150 mm	White	Used in place of an edgeline to indicate the edge of the traffic lane across an intersection or wherever the intended vehicle path is not readily apparent.
Continuity edgeline (rural)	1 m	3 m	200 mm	White	As above.
Continuous special vehicle edgeline	Continuous	N/A	100 mm	White	Where parking is provided, to separate the left-hand side of the special vehicle lane from the parking area.
Special vehicle continuity coloured surfacing treatment	1m	3 m (max.)	100 mm to 150 mm	Apple green	Used alongside a continuity edgeline (urban).
No-stopping Lines					
No-stopping line	1 m (max.)	2 m (max.)	100 mm	Yellow	Used to indicate or reinforce a prohibition on stopping.

Flush Traffic Islands (refer TCD Rule 7.7(4))					
Flush traffic island diagonal line (30 - 50 km/h)	Continuous	N/A	600 mm	White	Diagonal lines between flush traffic island bounding lines. Should be 600 mm wide, spaced at 4 m, and with a slope of 2:1.
Flush traffic island diagonal line (60 - 80 km/h)	Continuous	N/A	900 mm	White	Diagonal lines between flush traffic island bounding lines. Should be 900 mm wide, spaced at 7 m, and with a slope of 2:1.
Flush traffic island diagonal line (90 - 110 km/h)	Continuous	N/A	1200 mm	White	Diagonal lines between flush traffic island bounding lines. Should be 1200 mm wide, spaced at 10 m, and with a slope of 2:1.
Flush traffic island bounding line	Continuous	N/A	100 mm	White	Line width is not specified in the Rule. However, 100 mm described here based on flush median bounding line.
Diagonal Shoulder Markings (refer to TCD Rule 7.6)					
Diagonal shoulder marking (30 - 50 km/h)	Continuous	N/A	600 mm	White	Except at passing lane merges, diagonal shoulder markings should be 600 mm wide, spaced at 40 m, and with a slope of 2:1. At passing lane merges, diagonal shoulder markings should be 600 mm wide, spaced at 8 m, and with a slope of 2:1.
Diagonal shoulder marking (60 - 80 km/h)	Continuous	N/A	900 mm	White	Except at passing lane merges, diagonal shoulder markings should be 900 mm wide, spaced at 70 m, and with a slope of 2:1. At passing lane merges, diagonal shoulder markings should be 900 mm wide, spaced at 14 m, and with a slope of 2:1.
Diagonal shoulder marking (90 - 110 km/h)	Continuous	N/A	1200 mm	White	Except at passing lane merges, diagonal shoulder markings should be 1200 mm wide, spaced at 100 m, and with a slope of 2:1. At passing lane merges, diagonal shoulder markings should be 1200 mm wide, spaced at 20 m, and with a slope of 2:1.

Transverse Lines

Line Name	Line Dimensions			Colour	Comment
	Dash	Gap	Min. Width		
Limit line	Continuous	N/A	300 mm	White	Limit line at priority control, signal control or roundabout. Limit lines at rural intersections should be 450 mm wide.
Holding line	Continuous	N/A	200 mm	White	Holding line for right turn bay. Holding lines for rural right turn bays should be 300 mm wide.
Crosswalk lines	Continuous	N/A	100 mm	White	Used to guide pedestrians as to where to cross a road at a signalised crossing or school patrol.
Cycle path crossing lines	Continuous	N/A	100 mm	White	Used to guide cyclists as to where a cycle path crosses the road and traffic on the roadway is subject to priority or signal control.

Line Names at Right Turn and Left Turn Bays

Right turn bays

The red annotations on the diagram below identify the various lines for which a line naming convention is included below the diagram.

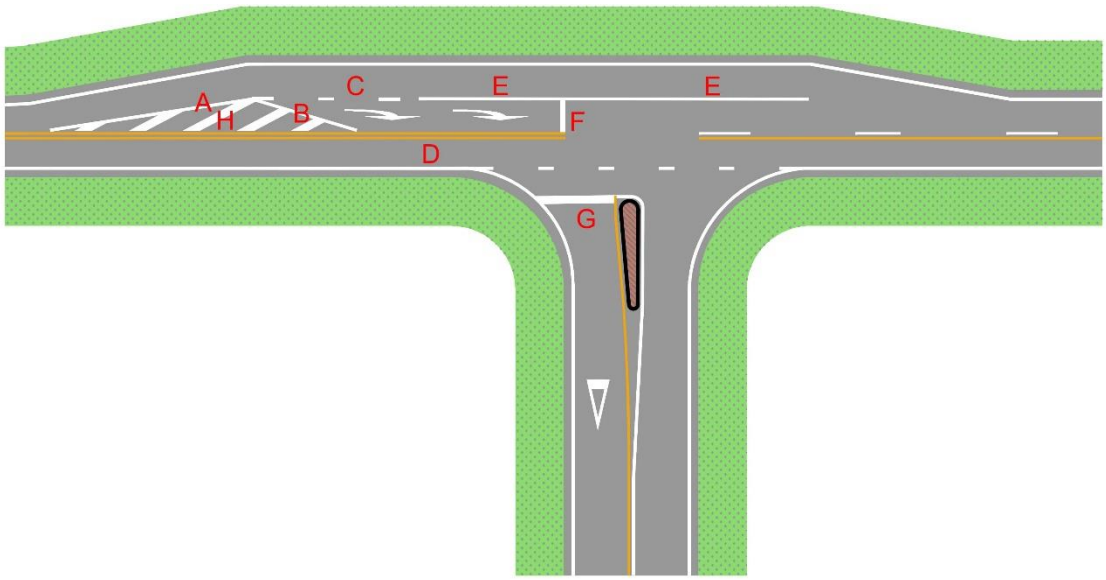


Figure A-1: Line naming key for right turn bays

A. Right turn bay diverge taper lane line (named on the basis that the line is to the right of through traffic, however, because it is not a centre-line and it is not an edgeline therefore it is a lane line).

B. Right turn bay entry taper lane line (named on the basis that the line continues on from line A and, although it is a form of diverge taper, the term "diverge taper" has already been used, therefore, a different "taper" label is required).

C. Right turn bay continuity lane line.

D. Right turn bay centre-line (refer TCD Rule 7.8 (2)(a)). While it could just be called "centre-line", the basis on which the line is there is because of the right turn bay rather than because of the need to discourage passing manoeuvres due to vertical and / or horizontal alignment and / or crash history.

E. Right turn bay lane line (refer TCD Rule 7.8 (2)(b) named on the basis that the line is between two lanes of traffic.

F. Holding line.

G. Limit line (refer TCD Rule 10.2(a) and 10.3(1)(a)).

H. Diagonal markings (refer TCD Rule 7.8(2)).

Left turn bays

The red annotations on the diagram below identify the various lines for which a line naming convention is included below the diagram.

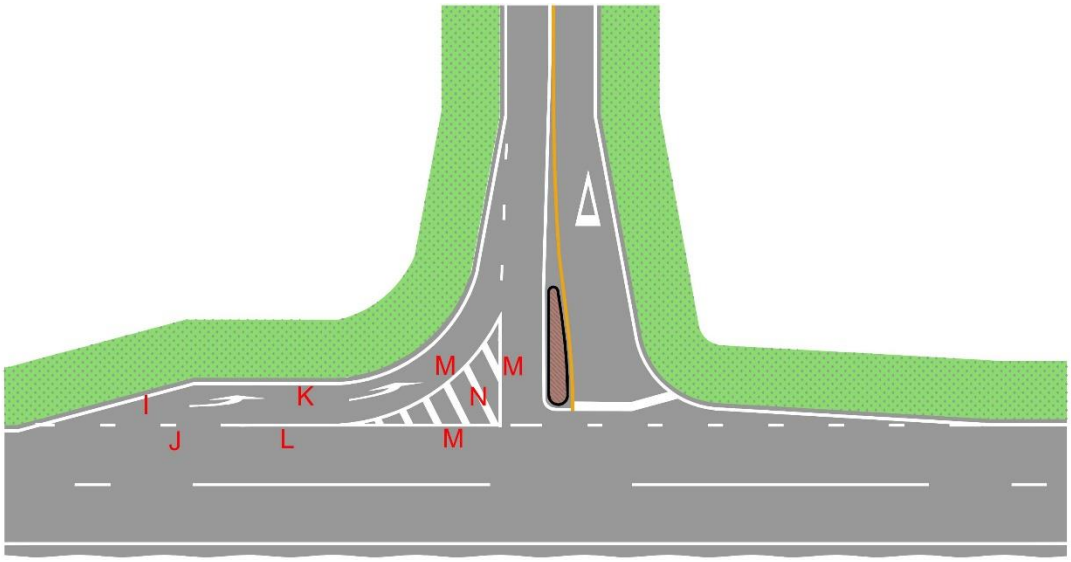


Figure A-2: Line naming key for left turn lanes

I. Left turn bay entry taper edgeline (named on the basis that it is to the left of traffic in the left turn bay and the line is part of the entry taper into the full width portion of the left turn bay).

J. Left turn bay continuity lane line.

K. Left turn bay edgeline (named on the basis that it is to the left of traffic in the left turn bay, but is not the same as the entry taper edgeline).

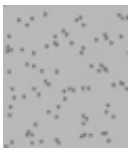
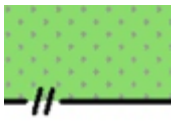
L. Left turn bay lane line (refer TCD Rule 7.8 (3)(a)).

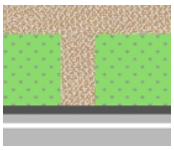
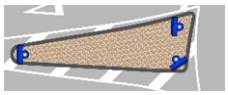
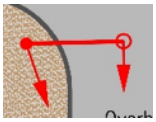
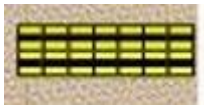
M. Left turn bay flush traffic island bounding line. This applies to all three of the lines bounding the flush island.

N. Diagonal lines (refer TCD Rule 7.7(4)).

Appendix B: Diagram Legend

The table in this appendix defines the legend used for the figures in this Manual. The figures do not include all traffic control devices and / or all specific features of intersections that should be included in designs for real world applications.

	Sealed road
	Unsealed road
	Edge of roadway in rural area
	Edge of roadway in urban area. The black line indicates a kerb or kerb and channel
	A sinusoidal edge to a diagram indicates that the roadway width would extend beyond the wavy edge of the diagram
	Road reserve boundary indicated by black fenceline symbol
	Footpath / cycle path / or similar impervious surface that is not roadway
	Cycle lane in an urban area
	Hook turn box for cyclists
	Advanced stop box for cyclists

	Example of combined features; footpath across the top of the diagram, grassed area between footpath and kerb in an urban area, sealed road surface across the bottom of the diagram
	Example of markings at an urban intersection. The colours used in this Manual to indicate markings are the same as the colours to be marked on the road. That is, white markings are shown white and yellow markings are shown in yellow
	Brick pattern indicates side road threshold to encourage reduced speeds on the side road. The brick pattern is provided as an example; the threshold does not have to be constructed using pavers
	Traffic island with three signs
	Signpost with a sign on one side of the post
	Signpost with a sign on each side of the post
	Large sign supported by two posts
	Traffic signals. The pole mounted signal aspects are indicated by the arrow on the left while the arrow on the right indicates overhead signal aspects
	Directional tactile markings for visually impaired pedestrians
	Warning tactile markings for visually impaired pedestrians
	Special vehicle full width coloured surfacing treatment. In this case the marking is for a T3 transit lane