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Technical Direction – TD 00030:2023

Issue date: 17 November 2023

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Title: Clarification to speed zone review process and types of speed zones – Amendment to TS 03631:1.0 *NSW Speed Zoning Standard*

This technical direction is issued by the Asset Management Branch (AMB) as an update to TS 03631:1.0 *NSW Speed Zoning Standard*.

The update includes amendments to the speed zone review process and types of speed zones to align with the latest technical advice.

1 Amendment to TS 03631:1.0

The following sections in TS 03631:1.0 are to be amended as follows:

Section 2 Application

Delete the first sentence in Section 2 and replace with the following:

This document applies when a new technical speed zone review is undertaken on new or existing public roads.

Section 3 Referenced documents

Add the following documents under Other referenced documents heading in Section 3:

Other referenced documents

Transport for NSW *Movement and Place Framework*

Transport for NSW *Design of roads and streets – A guide to improve the quality of roads and streets in NSW*

Section 5 6 NSW Movement and Place Framework

Add the following paragraphs after the last paragraph in Section 5.6:

The function and use of the road should be considered in line with the *Movement and Place Framework* when making an appropriate speed limit recommendation.

Further information about the classification of Movement and Place can be found in Transport for NSW *Design of roads and streets*.

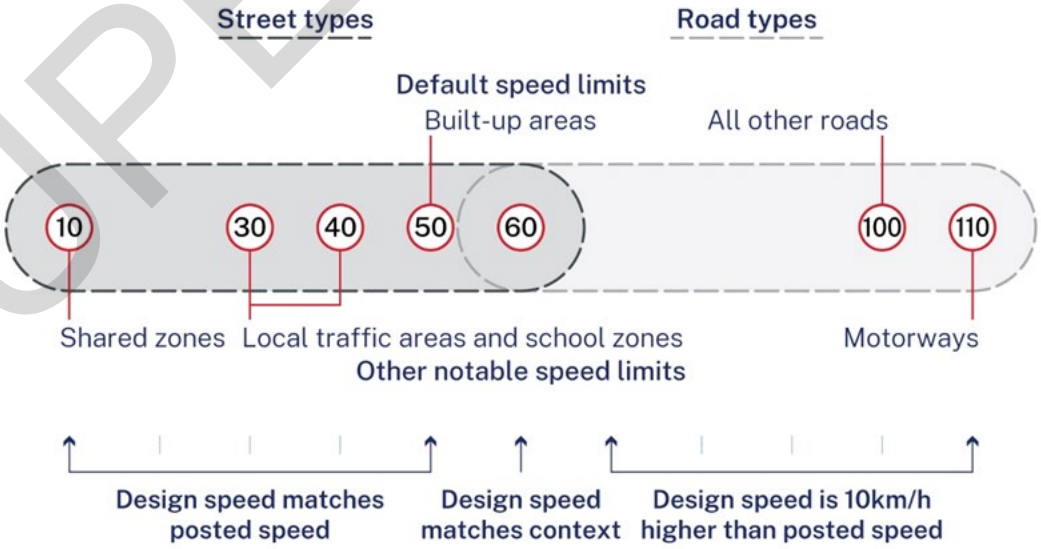
Section 5.7 Self-explaining roads

Add the following content before the last paragraph in Section 5.7:

Design speed should match the posted speed for streets signposted at 50 km/h and below. In the absence of any other evidence, the design speed is 10 km/h above the posted speed on main roads signposted at 70 km/h and above as stated in *Austroads Guide to Road Design Part 3 Section 3.3 Operating Speeds on Urban Roads*.

For streets and roads signposted at 60 km/h the design speed should match the context and movement function of the street.

The following figure shows how speed should match the intended road environment ultimately achieving self-explaining roads.



Context for self-explaining roads for the design of streets and roads

Section 8.4.6.3.2 Stereotypical crash rate analysis

Delete the last paragraph and replace with the following in Section 8.4.6.3.2:

The lowering of the speed limit shall be assessed and prioritised if the crash rate calculated is higher than the stereotypical crash rate.

Section 9 4.12 50 km/h (default urban speed limit)

Add the following content after the last sentence in section 9.4.12:

This includes some State roads where a 40km/h or a 60 km/h speed limit may not be appropriate due to large volumes of vehicles (for example, industrial areas with large amounts of heavy vehicle movements, State roads into city centres and so on).

Section 9.4.16 90 km/h

Delete the first dot point in second paragraph in Section 9.4.16 and replace with the following:

- have a sealed pavement width of 8.0 m (3.5 m lanes with a BL5, BL5 WCL, BL6 orBL6 WCL centreline and 0.5 m sealed shoulders)

Section 9.4.18 100 km/h

Delete the second sentence in the first paragraph in Section 9.4.18 and replace with the following:

100 km/h may apply on undivided rural roads with sealed pavement widths of 9.0 m (with a BL5, BL5 WCL, BL6 or BL6 WCL centreline and 1 m sealed shoulders).

Delete the first dot point in the second paragraph and replace with the following:

- have a sealed pavement width of 9.0 m (3.5 m lanes with a BL5, BL5 WCL, BL6 or BL6 WCL centreline and 1 m sealed shoulders)

Section 9.4.19 110 km/h

Add the following new section under Section 9.14.19:

9.4.19.1 Undivided 110 km/h speed limits

Rural route used mainly for interstate and inter-regional transport with relatively longer trip lengths.

Note: Undivided 110km/h speed limits only apply to existing undivided 110km/h speed limits already installed on the NSW road network. All newly built or installed 110 km/h zones shall comply with 110km/h divided requirements.

Authorisation:

Approved by	Director Safe Systems and Programs Transport Safety Safety, Environment and Regulation

NSW GOVERNMENT

TS 03631:1.0

RTA 11.432

Standard

NSW Speed Zoning Standard

Issue date: 10 July 2023

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Document information

Owner: Director Safe Systems and Programs
Transport Safety
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Mode: Road

Discipline: Multi-discipline

Document history

Revision	Effective date	Summary of changes
4.0	1/04/2011	Fourth issue as RTA 11.432 *NSW speed zoning guidelines*
1.0	10/07/2023	First issue as TS 03631. Version numbering recommenced in line with new designation.

Preface

This document is a first issue as TS 03631:1.0 *NSW Speed Zoning Standard*.

This document supersedes the following documents:

- TD 00028:2023 (TD2003 RS02) *Installation of 40kmh School Zones on Multi-lane Roads and High Speed Roads* (August 2007)
- TD 00029:2023 *40 kmh school zone TD* (This document is available for TfNSW internal use only.)
- TS 00139 *School Zones – RTA* (version 1.2, April 1997)
- TS 00140 (SS/12/01) *Safer Speeds – Shared Zones*
- TS 00141 *40 kmh school zone policy* (September 2011) (This document is available for TfNSW internal use only.)
- TS 03631 (RTA 11.432) *NSW speed zoning guidelines* (version 4.0)
- TS 05440 (RMS, TTD 2014/006) *Variable Speed Limit Signs*
- TS 05441 (TTD 2016/001) *Design and implementation of shared zones including provision for parking*
- TS 06332 (RTA) *40 km/h speed limits in high volume pedestrian areas – A guide to identifying and implementing 40 km/h speed limits in high volume pedestrian areas*

Speed is the biggest single factor involved in road deaths, contributing to around 40% of road fatalities each year in NSW. Speed limits are one of the simplest and most proven strategies for controlling and regulating driving speeds.

TfNSW is responsible for setting speed limits on all roads – state, regional and local. The *Road Transport Act 2013* authorises TfNSW to install prescribed traffic control devices (including speed limit signs).

This document outlines the principles for setting speed zones on roads and streets within NSW. It aims to promote safe and efficient movement of people and goods, facilitating people-centred environments and connecting places.

Table of contents

1 Scope

This document sets out principles and the technical information for reviewing, determining, and implementing speed zones on NSW public roads. It enables practitioners to make recommendations that promote the safe and efficient movement of people and goods, facilitate people-centred environments and connect places.

TfNSW does not set speed limits, install signage or undertake speed zone reviews on private roads, even though they may be classified as a road or road related area under the *Road Transport Act 2013*. Privately owned motorways and school zones can be an exception to this; however, they may be reviewed on a case-by-case basis.

2 Application

This document applies to existing speed zones and establishment of new speed zones within NSW public roads.

The speed zoning principles specified in Section 5.2 apply to both new and existing roads. The common speed zone characteristics specified in Section 6.3 apply consistently across new and existing roads.

This document does not apply to speed zones at work sites. Refer to TS 05492 for speed limits that apply at work sites.

This document applies to TfNSW employees responsible for reviewing, designing, and implementing speed zones on NSW roads to make informed and consistent technical decisions.

This document can apply to local government and designers when considering speed zoning in the planning, design, and management of local roads, such as in urban planning and traffic engineering.

This document may also be used in other business areas in TfNSW where speed zoning is a consideration including network planning, road design and traffic engineering.

3 Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

Australian standards

AS 1742.2 *Manual of uniform traffic control devices – Part 2: Traffic control devices for general use*

AS 1742.4 *Manual of uniform traffic control devices – Part 4: Speed controls*

AS 1742.4:2020 *Manual of uniform traffic control devices – Part 4: Speed controls*

AS 2890.5 *Parking facilities – Part 5: On-street parking*

AS 4049.4 *Paints and related materials – Pavement marking materials – Part 4: High performance pavement marking systems*

AS/NZS 1428.4.1 *Design for access and mobility – Part 4.1: Means to assist the orientation of people with vision impairment – Tactile ground surface indicators*

AS/NZS 2890.1 *Parking facilities – Part 1: Off-street car parking*

AS/NZS 2890.6 *Parking facilities – Part 6: Off-street parking for people with disabilities*

Austroads guides

Guide to Road Design (all parts)

Guide to Road Design Part 3: Geometric Design

Guide to Road Design Part 6: Roadside Design, Safety and Barriers

Guide to Road Safety Part 3: Safe Speed

Guide to Road Safety Part 6: Road Safety Audit

Guide to Traffic Management (all parts)

Guide to Traffic Management Part 8: Local Street Management

Infrastructure Risk Rating Manual for Australian Roads

Transport for NSW standards

TS 00003.1 *Concessions to Transport Standards Part 1 – Concession Process*

TS 00020 *Town Entry Gateway Treatment*

TS 05384.14 (21.053) *Supplement to Australian Standard AS 1742.14:2014, Manual of Uniform Traffic Control Devices – Part 14: Traffic signals*

TS 05411 (TD 2009 SR02) *Dragon's Teeth at School Zone*

TS 05462 (all parts) *Delineation*

TS 05492 (20.346) *Traffic control at work sites – Technical Manual*

TS 06320 (RMS 17.168) *Smart motorway design guide – Tunnel traffic management*

TS 06339.1 (17.177) *Smart motorway supplements – Austroads report AP-R341-09: Freeway design parameters for fully managed operations – Section 9: Lane use management systems (LUMS) including variable speed limits (VSL) (2009)*

Legislation

Disability Discrimination Act 1992 (Cth)

Road Rules 2014 (NSW)

Road Transport Act 2013 (NSW)

Other referenced documents

Austroads Research Report AP-R560-18 *Towards Safe System Infrastructure – A Compendium of Current Knowledge*

Austroads Research Report AP-R611-20 *Integrating Safe System with Movement and Place for Vulnerable Road Users*

Commonwealth of Australia, *National Road Safety Strategy 2021-30*

Roads and Traffic Authority of New South Wales *Guidelines for Road Safety Audit Practices*

Stephen Levett, 2009, *Guidelines for Retro-fitting Existing Roads to Optimise Safety Benefits. A Practitioners Experience and Assessment of Options for Improvement* (TfNSW)

Transport for NSW *2026 Road Safety Action Plan – Toward zero trauma on NSW roads*

Transport for NSW *Curve advisory speed assessment practice in NSW* (This document is not publicly available. Internal users can access it on the Transport Standards Portal (TS 06313). External users can request access by emailing standards@transport.nsw.gov.au.)

Transport for NSW *Cycleway Design Toolbox – Designing for cycling and micromobility*

Transport for NSW *Flashing lights request form* (D.4) (available on request from Safer.Roads@transport.nsw.gov.au)

Transport for NSW *Future Transport Strategy – Our vision for transport in NSW*

4 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply in this document.

85th percentile speed (V85 km/h) speed at or below which 85% of vehicles are observed to travel under free-flowing conditions past a nominated point

active level crossing for the purposes of this document level crossings that have boom gates and/or flashing lights to alert road users when a train is approaching

alignment geometric form of the centreline (or other reference line) of a carriageway in both horizontal and vertical directions (Source: Austroads)

arterial road roads that provide for traffic movement across and between regional areas. In NSW, state roads and freeways are considered primary arterials and regional roads are sub arterials

built-up area in relation to a length of road, means an area in which either of the following is present for a distance of at least 500 metres or, if the length of road is shorter than 500 metres, for the whole road—

(a) buildings, not over 100 metres apart, on land next to the road,

(b) street lights not over 100 metres apart.

(Source: *Road Rules 2014* (NSW))

CCE community and customer engagement

classified road means any of the following—a main road, a highway, a freeway, a controlled access road, a secondary road, a tourist road, a tollway, a transitway, a State work. (Source: *Roads Act 1993* (NSW))

default rural speed limit statutory speed limits that apply in the absence of a signposted speed limit in non-built-up areas

default urban speed limit statutory speed limits that apply in the absence of a signposted speed limit in a built-up area

desire lines generally preferred route of cyclists or pedestrians; often, the shortest or flattest route between two attractors or paths across the road section. Note some desire lines may be discerned even if they are not observable by pedestrian counts, for example, a straight-line distance between a university gate and a bus stop on the opposite side of the road, where pedestrian fencing may be suppressing the pedestrian movement.

freeway a motorway for which vehicles do not pay a toll (also see motorway). A classified road – see above. Considered a ‘primary arterial’ road.

gateway traffic calming the addition of traffic calming or changed road environment at the start of the new speed zone to clearly highlight the changed speed limit. Commonly used when wanting vehicles to reduce speed when traveling into a lower speed limit.

HPA high pedestrian activity

ITS intelligent transport system

motorway for the purpose of this document, a divided highway for through traffic with little or no access for traffic between interchanges and with grade separation at some interchanges

MVK million vehicle kilometres

OSM operating speed model

place for the purpose of this document, identifiable geographic area or location, which is a social and physical concept – a physical setting, point, or area in space conceived and designated by people and communities

practitioner for the purpose of this document, TfNSW employee whose role specifically requires them to undertake speed zone reviews

private road any road that is not a public road (Source: *Roads Act 1993* (NSW))

road an area that is open to or used by the public and is developed for, or has as one of its main uses, the driving or riding of motor vehicles (Source: *Road Transport Act 2013* (NSW))

road related area means –

a. an area that divides a road, or

b. a footpath or nature strip adjacent to a road, or

c. an area that is open to the public and is designated for use by cyclists or animals, or

d. an area that is not a road and that is open to or used by the public for driving, riding or parking vehicles, or

e. a shoulder of a road, or

f. any other area that is open to or used by the public and that has been declared…to be an area to which specified provisions of this Act or the statutory rules apply.

(Source: *Road Transport Act 2013* (NSW))

RUM code road user movement code; used for describing the first impact for a crash; used in determining crash risk scores on a stretch of road

SCATS Sydney Coordinated Adaptive Traffic System

sight distance the distance – measured along the road over which visibility occurs – between a driver or rider and an object or between two drivers at specific heights above the carriageway in their lane of travel (Source: *Austroads Glossary of Terms (2015 Edition)*)

SZA speed zone authorisation

traffic control device a traffic sign, road marking, traffic signals, or other device, to direct or warn traffic on, entering or leaving a road (Source: *Road Rules 2014* (NSW))

TfNSW Transport for NSW

TMC Transport Management Centre

5 General

5.1 Safe System approach to road safety

The Safe System approach, comprising of Safe Roads, Safe Vehicles, Safe People, and Safe Speeds, is a method of road safety management based on the principle that human bodies can only withstand limited forces before injury or death occurs.

The Safe System approach has been adopted by all Australian jurisdictions to support road safety outcomes in jurisdictional and national road safety action plans. It underpins the *2026 Road Safety Action Plan – Toward zero trauma on NSW roads* and this standard.

Road safety is a shared responsibility. Decisions should be made with safety in mind, from the design of roads and vehicles, investments, legislation and education, to each road user acting safely every day.

While the Safe System approach to road safety recognises the need for responsible road user behaviour, it accepts that human error is inevitable. It aims to create a road transport system that makes allowances for errors and minimises the consequences, in particular the risk of death or serious injury. By taking a total view of the combined factors involved in road safety, the Safe System encourages a better understanding of the interaction between the key elements of the road systems: road users, roads and roadsides, vehicles, and travel speeds.

The main objective of the Safe System is to ensure that in the event of a crash the impact forces released are within the bounds of human tolerance, no fatalities occur, and serious injuries are reduced. The chances of surviving a crash decrease rapidly above certain impact speeds, depending on the nature of the collision.

5.2 Speed versus risk and severity of crash

The relationship between vehicle speed and crash severity is unequivocal and is based on the laws of physics. There is a significant body of literature and evidence proving that increased travel speeds, even at low levels are directly related to both the likelihood of a crash occurring and the severity of crash outcomes.

Research has shown that travel speeds and fatality rates are correlated, with decreases in fatalities and serious injuries occurring once speed limits are lowered. Increases in fatalities and serious injuries are often recorded when speed limits are increased. The evidence is clear that lower speed limits result in irrefutable road safety benefits.

5.3 Safe speeds

Speed is the critical variable within a safe system. Research clearly and consistently demonstrates that road crash frequency and severity are closely related to speed: the faster a driver travels, the more likely they are to crash and the greater the risk of serious injury or death. Vehicle speed directly affects the force of the impact and the resulting trauma outcome. The relationship between speed and crash occurrence has been modelled to show that a 1% increase in average speed can result in a 4% increase in fatal crash frequency.

Speed limit setting aims to manage the risk of crashes and the force that road users are exposed to, minimising the risk of fatal or serious injury in the event of a crash. For example, at locations where the level of pedestrian or cyclist activity is significant, lower speed limits are appropriate. Similarly, where the potential for conflict is high, such as winding roads with no side or median barriers, speed limits should be set at a level that minimises the risk of fatal or serious injuries in the event of a crash.

Key measures available for achieving safe speeds include:

- setting appropriate speed zones for safety, mobility and place
- road design to support desired speeds/compliance for example self-explaining speed environments
- changing behaviour through community engagement and education
- vehicle technologies to support compliance and limit speeding.

All parts of the Safe System play an important role in managing speed and achieving safety outcomes.

5.4 2026 Road Safety Action Plan – Toward zero trauma on NSW roads

The *2026 Road Safety Action Plan – Toward zero trauma on NSW roads* (the Plan) has a vision of zero fatalities and serious injuries on NSW roads by 2050. Through the Safe System approach to road safety the Plan aims to halve fatalities and reduce serious injuries by 30% on NSW roads by 2030.

This standard is a key enabler in achieving these targets.

5.5 Future Transport Strategy

The *Future Transport Strategy – Our vision for transport in NSW* sets TfNSW's vision for safe, healthy, sustainable, accessible, and integrated passenger and freight journeys in NSW. This includes a vision for zero trauma on the NSW transport network aligned with the *National Road Safety Strategy*.

The *Future Transport Strategy – Our vision for transport in NSW* works to deliver TfNSW's three high level outcomes. These are:

- connecting customers' whole lives
- successful places for communities
- enabling economic activity.

The Future Transport Strategy – Our vision for transport in NSW provides the framework that informs network plans, service plans and policy decisions to achieve the outcomes.

5.6 NSW Movement and Place Framework

Movement and Place is a cross-government framework for planning and managing roads and streets across NSW. The framework delivers on NSW policy and strategy directions to create safe and successful streets and roads by balancing the movement of people and goods with the amenity and quality of places. It does not replace a technical speed limit review nor the ability to prescribe speed limits but it should be considered as part of the speed review process.

In the past, roads have been considered as just a way to get vehicles from A to B. The Movement and Place Framework recognises that streets are not just about moving people and goods – they also interact with places where people live, work, and spend time. The Movement and Place Framework considers the whole street, including footpaths, from property line to property line and how the space interacts with surrounding land uses. It considers the needs of all users of this space, including people walking and cycling, freight, servicing and deliveries, private vehicles and public transport. Every location has a movement and place function.

It also considers the people spending time in those places, whether moving around the place or enjoying street life, including outdoor dining, shopping, or waiting for a bus. A movement and place approach acknowledges the effect road design, speed and associated environmental factors like traffic noise and air pollution have on the land use and adjoining properties.

The Movement and Place Framework has identified the following four street environments:

- Civic spaces – often in major centres, tourist and leisure destinations and community hubs. They are places for people, with a priority on place.
- Local streets – activity levels are less intense than for civic spaces, but these streets can have significant meaning to local people. Town and village main streets are usually 'local streets'.
- Main streets – significant movement functions and place qualities. Balancing the functions of these streets is a common challenge.
- Main roads – central to the efficient movement of people and goods. Their place activity levels are less intense.

Each type of street environment has typical characteristics. The nature of the road network and needs of customers is complex and the set of rules, assumptions and planning outcomes can vary. Every road and street should be considered individually within its own context.

Managing speed, including setting speed limits, is a critical consideration in achieving movement and place outcomes of the road network and surrounding places. Speed and associated road design are a major determinant of street character and therefore place qualities.

5.7 Self-explaining roads

A self-explaining road is a traffic environment which elicits safe and consistent behaviour among road users simply by its design.

A self-explaining road incorporates numerous design principles, appropriate geometric design standards, good delineation under all conditions, adequate surface skid resistance and a roadside free of unforgiving hazards. It should serve the safety needs of all vehicles and road users on that road.

It should also consider how road users perceive and process information, make decisions and react to stimuli within specific timeframes. Comfortable and safe driving occurs when road users operate below a stressful process and decision-making rate.

Self-explaining roads are based on the concept that implicit messages in the road design can influence a road user's perception of an appropriate speed of travel. Information such as vehicle composition, road environment, road quality and roadside hazards are all implicit information sources which are analysed by a road user into an appropriate response. For example, drivers tend to select lower speeds when they are travelling on roads that have rough surfaces, are narrow, winding, hilly, and where the direction of the road and boundaries are not well delineated. By reducing their speed, drivers in these situations are more able to navigate through the road environment safely.

The influence of road design on travel speeds is based on the road user's ability to manage the information flow rate in their peripheral vision. As speed increases, the amount of information the brain needs to process also increases and in a shorter time. Road users also analyse information about the upcoming road to anticipate the movements required for upcoming manoeuvres. If this process becomes too strenuous or limited information is available about the upcoming road, motorists will generally slow down to adapt to the road environment. An effective self-explaining road can assist and moderate driver speeds. Road and roadside characteristics which can influence driver speed selection include:

- alignment
- sight distance
- lane width
- shoulder width and sealed/unsealed shoulders
- roadside development (the environment through which it passes, such as rural, residential, schools, commercial/shopping or industrial)
- type and frequency of property access points, at-grade intersections (controlled and uncontrolled) and whether there is restricted access on one or both sides of the road due the presence of service roads, parkland, rail line, river, beach, and so on
- set back of roadside features and hazards

- road smoothness (for example rutting or surface friction)
- road traffic (other road users).

A well-designed road should be self-explanatory and allow road users to accurately perceive the demands of the road and thereby prevent crashes in the first place. If there is a failure of the road user's ability to accurately perceive the demand, then the road and roadsides should be forgiving: allowing the road user to safely recover and avoid a crash or minimise the severity of a crash.

It has been found that design speeds have a greater effect on driver speed choice than sign posted speed limits. For speed limits to be effective, they need to be compatible with the road design and roadside environment.

The willingness of some road users to tolerate uncertainty and risk-taking will mitigate the safety effect of a self-explaining road. For example, pedestrians at signalised intersections are increasingly likely to attempt to cross on a red walking phase if they perceive that their wait time is too extensive or their crossing time is too limited. The role of the Safe System is to adopt a holistic approach to addressing the overall road safety challenge for all road users.

6 Speed zoning principles

The following are foundational principles for how speed zones in NSW should be assessed, designed, and implemented. The principles align with the Safe System approach to road safety, *Future Transport Strategy – Our vision for transport in NSW*, and objectives of the Movement and Place Framework.

The emphasis placed on each of the principles may vary from case to case according to its context. However, the principles shall be read and applied as a set. All principles should be taken into account in order to form a robust, evidence-based decision.

6.1 Principle 1 – Speed zones should be set to minimise harm

Speed zones should be reviewed and implemented to reduce the likelihood and severity of a crash. When setting speeds, consideration should be given to:

- The types of vehicles and road users using the road and the degree to which different road users are exposed to potentially serious and life-threatening risks.
- The nature and standard of the road infrastructure and its surrounds.

Vulnerable road users such as pedestrians and cyclists are much more likely to be fatally or seriously injured at impact speeds above 30 km/h. Priority should always be given to the needs and volume of vulnerable road users when setting speeds.

On rural roads, which have a primary movement function that supports efficient travel, speed zones are often mitigated by lower advisory speed limits and other infrastructure measures (such as barriers) to reduce harm.

In movement corridors, vehicle occupants face increased risks of fatality and serious injury at different speeds depending on the crash type. Low angle, merge-type impacts are more survivable than high-angle impacts such as head-on and right-angle impacts. Consideration should always be given to the potential crash types in a particular road environment when setting speeds.

Travel speeds and fatalities usually decrease when speed limits are lowered, and higher travel speeds and fatalities follow increases in speed limits. Lower speed limits result in irrefutable road safety benefits.

6.2 Principle 2 – Speed zones should align with surrounding environments to support liveability, amenity, and successful places

The liveability, amenity and economic success of communities and places are enhanced by appropriate speed zoning. In town centres and precincts with a high place function, lower speeds enable the use of civic street design elements. Roads that have both a high place and movement function may require speed limit setting to balance function, safety and comfort. On roads that have lower movement functions, for example local roads, speed limits should enhance comfort, amenity and promote the safe use of active transport modes.

When setting speed limits, consideration should be given to the current and future use of the road and adjacent places. The road environment should include infrastructure treatments to ensure the road is self-explaining. Lowering a speed limit to support the creation of a successful place should still be considered if there is potential to include the infrastructure over time. Aligning speed limits with the surrounding environments delivers a more integrated network that caters for all users.

6.3 Principle 3 – Speed zones should ensure safe, efficient and reliable travel on roads that have a primary movement function

For roads that have a high movement function and a low place function, speed zones should maximise safe, efficient, and reliable travel to reflect the nature and standard of the road infrastructure and its surrounds. In urban environments, the surroundings are likely to dictate a lower speed than non-urban environments, due to the higher place function, presence of vulnerable road users, closer spacing of intersections and traffic signals. Where high-speed travel is being considered, appropriate infrastructure and clearances should be in place to decrease the severity and likelihood of trauma.

6.4 Principle 4 – Speed zones should be self-explanatory, consistent and support compliance

Road user behaviour, including the perception of an appropriate speed of travel, can be influenced by the design of a road. Where possible, the speed limit of a road should be self-explaining. The visual cues such as vehicle composition, road environment and road quality should align with safe and appropriate behaviours.

Speed zones should be clearly indicated to road users through appropriate signage. In addition, supporting infrastructure (such as traffic calming devices in lower speed zones) should reinforce safe behaviours.

Speed zone changes along a route should be kept to a minimum. Route and area-based speed limit reviews should be conducted to ensure consistent speed zones can be achieved where the road environment is similar.

Where the street environment changes, such as entering a town, a change in speed zone consistent with that change in environment also supports compliance. Speed zoning in a consistent manner increases acceptance of, and compliance with, the speed zone.

6.5 Principle 5 – Speed zones should mitigate environmental impacts of road traffic

The NSW Government has committed to a 35% cut in emissions by 2030, compared with 2005 levels. As a significant emitter of greenhouse gases, transport has an important role to play by operating in a more sustainable way to limit environmental impacts.

Appropriate speed zones can lead to more sustainable transport choices. For example, lowering speeds in civic spaces may encourage more people to walk. Mode shift can reduce congestion and the transport sector's emissions intensity, improve air quality, and support better health and wellbeing.

Appropriate speed zone application can also result in less stop-start driving and more efficient engine operation, leading to a reduction in emissions and noise. Safer speeds reduce the number of crashes that can result in significant traffic delays and unnecessary emissions. These outcomes can provide benefits by increasing the place qualities of areas and allow for greater activation of spaces such as outdoor dining.

6.6 Principle 6 – Local government and the community shall be engaged in the speed zoning process

Opportunities should be optimised to improve road user understanding of travelling at safe speeds and to foster positive and proactive local government and community engagement in speed management activities.

It is required that TfNSW in partnership with local government conduct engagement with local communities and road users during the speed zoning review process.

Engagement enables understanding of the change, expectations, and impacts. The level of engagement may differ depending on the review. Effective communication and engagement can help achieve better outcomes for the community by increased acceptance of speed limits.

Engagement should assist in communication with local communities in understanding the long-term role of the road and speeding risk in setting safe speed limits to support all road users.

7 Approvals and authorisations

7.1 Delegated authority for speed zone authorisations

The *Road Transport Act 2013* section 122 authorises the appropriate authority to install or display a prescribed traffic control device.

TfNSW is the only authorised authority in NSW that can install a speed zone.

The authorised authority within TfNSW is outlined in the TfNSW delegation's manual.

7.2 Additional approvals

7.2.1 Motorways

The installation of variable speed zones on freeways, motorways or tollways should be submitted through the appropriate TfNSW business approval process.

7.2.2 Concessions

Approval is required from the Director, Safe Systems and Programs (Safety, Environment and Regulation) TfNSW for any departure from the requirements of this standard through the concession process.

8 Speed zone review process

8.1 Introduction

A high incidence of crashes along a road may indicate road hazards and/or poor traffic conditions. If these issues cannot reasonably be treated or causes determined, then a lower speed limit than the current posted speed should be assessed.

Reducing posted speed limits can be a permanent or temporary countermeasure to reduce the likelihood of a crash occurring. A vehicle's travelling speed affects the severity of injuries when a crash does occur. During a crash, the occupants' injury severity is influenced by the kinetic energy that is released, which is directly related to the travel speed prior to impact. The

introduction of the 50 km/h urban speed limit in NSW was found to reduce road crashes by 24% where it was introduced (TfNSW).

8.2 Existing roads

The process set out in Section 8.4 shall be applied when undertaking a speed zone review of an existing road on the NSW road network.

8.3 New roads

The speed limit of new roads is a key factor in the planning and design stages of new road construction. New roads include those built on greenfield and brownfield development sites as well as major road upgrades.

The determination of a speed zone shall be undertaken with the delegated authority, as part of the approval process for new roads and major road upgrades, as outlined in Section 7.1.

Delegated authorities should be engaged as early as possible in the planning and design stages of new roads or major road upgrades.

New roads, including green/brownfield development sites and major road upgrades present an opportunity to implement best practice road design and speed management principles which reflect the Safe System approach to road safety and the Movement and Place Framework.

8.4 Process

8.4.1 General

The speed zone review process in Figure 1 has been established to ensure the steps, analysis and decision-making involved in reviewing and implementing speed zones are transparent and well documented. It has been designed to promote consistency in the approach to speed zoning in NSW. The review process is aligned with the principles described in Section 6.

The speed zone review process applies to existing roads.

All speed zone reviews shall follow the process outlined in Figure 1.

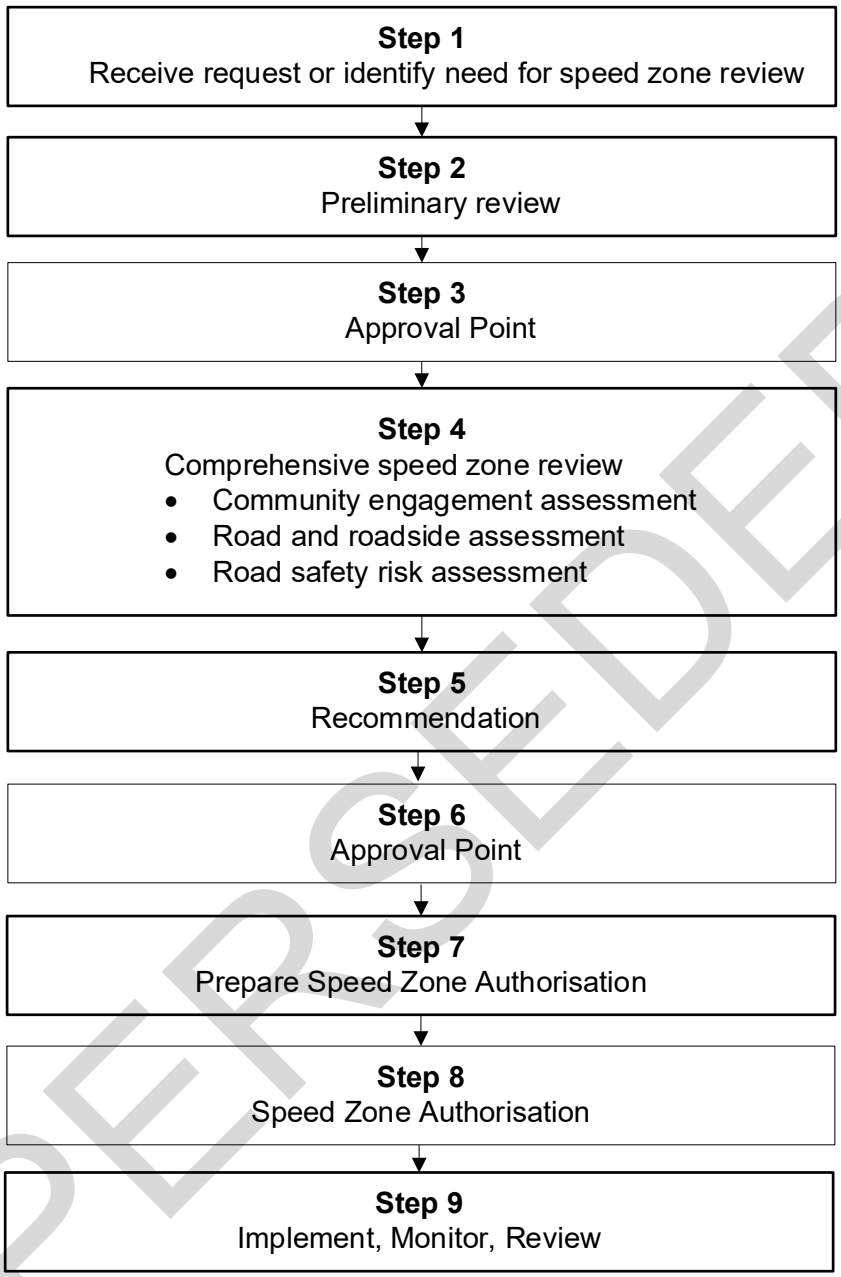

Figure 1 – Speed zone review process

8.4.2 Timeframes

The preliminary review, up to step 3, shall be complete within four months from the date the request was received or need identified. This includes notifying local government of the outcome and outlining the next steps in the review.

Timeframes for the completion of the comprehensive reviews should be identified at the start of step 4. Local government should be informed of these timeframes and of any variation to these timeframes with the reasoning for the variation.

8.4.3 Step 1: Receive request or identify need

There are multiple drivers for initiating a speed zone review, which can be requested by internal or external stakeholders. All speed zone review requests shall be recorded, including reviews initiated by TfNSW staff.

There may be instances where a review request falls outside of the scope of this standard. These requests, and the reason as to why they are out of scope, should be documented.

8.4.4 Step 2: Preliminary review

The function of a preliminary review is to determine, at a high level, whether a speed zone review should proceed.

The preliminary review does not require the same level of detail as a comprehensive review however, it pulls together the relevant information for the site, enabling the practitioner to make an informed decision about whether the comprehensive review should proceed or not.

The following should be considered while completing the preliminary review:

- proposed speed limit as well as any current or future speed limits
- recent speed zone reviews
- movement and place function of the road and surrounding area
- physical characteristics of the road and surrounding area
- crash data (latest available five-year finalised data and any subsequent fatal crash information)
- community and stakeholder views
- traffic volume including mix of heavy vehicles and vulnerable road users.

If a decision is made not to proceed with a comprehensive review, then the rationale for the outcome shall be documented and communicated to local government. The criteria for when a review may not be required include, but are not limited to:

- A comprehensive speed zone review was recently completed for this section of road (within the last 12 months) and the surrounding land use, traffic volumes and community position has not changed.
- A review was requested in response to a safety issue but is not supported by evidence when preliminary crash data analysis, land use assessment or other safety risk assessments have been undertaken.
- Infrastructure upgrades with funding approval and development or construction works have commenced. However, in these situations, a speed zone review as an interim measure should be considered.

- A safety concern has already been addressed.
- A request for a speed limit that is not included within this standard.

A preliminary review is not required if it has already been determined that a comprehensive speed zone review will be conducted. If a practitioner is unsure if a comprehensive full speed zone review should be undertaken, then a preliminary review shall be conducted.

8.4.4.1 Minor speed zoning extension

In some circumstances a minor speed zoning extension is accepted without completion of a comprehensive speed zone review. The following criteria shall be met to complete a minor speed zone extension:

- The minor speed zone extension shall not result in a speed limit increase within the extended zone length. Minor speed zone extensions can include school zones.
- The land use and the roadside environment of the extended zone shall be consistent with the existing speed zone. The extended zone cannot extend past where there is a land use change such as an urban fringe environment to a high-speed rural environment.

If the extended zone exceeds 200 m, then a comprehensive speed zone review is required. The extended speed zone should not extend past where the land use changes.

A speed zone authorisation is required to alter, remove, or replace a speed zone sign in line with the *Road Transport Act 2013* section 122. This requirement also applies to minor speed zone extensions.

8.4.5 Step 3: Approval point

The recommendation shall be submitted through the appropriate TfNSW business approval process before the review progresses.

8.4.6 Step 4: Comprehensive speed zone review

8.4.6.1 Community engagement assessment

Undertaking a speed zone review presents an opportunity to educate the community about safe speeds, why they are important and how safe speeds fit within the broader context of the Safe System and Movement and Place Framework. Well managed engagement and planned communications can influence positive behaviours which are essential for speed zone changes and the broader success of speed management across the State.

Working with local government and engaging with the community on proposed speed zone changes allows the project team to demonstrate the rationale for and benefits of the change.

Practitioners shall undertake an engagement assessment as part of the speed zone review with their nominated CCE team. This assessment should be undertaken at the start of the speed

zone review process to allow sufficient time for a communications and engagement plan to be developed. The plan shall document how TfNSW will work with road safety partners, such as local government, and set communication expectations.

The level of engagement required will be influenced by the complexity of the speed zone review. The outcome of the assessment shall be documented.

The engagement guidelines provide a guide for practitioners and the CCE team to assess and determine an appropriate level of engagement. The engagement guidelines provide considerations, tools and content to enable the CCE teams to deliver consistent, effective engagement and communications around speed zone changes on a state-wide basis.

Once the level of engagement has been determined, the CCE team should develop a communications and engagement plan outlining all communications activities, the audiences, and key messages.

8.4.6.2 Road and roadside assessment

As part of this assessment the factors in Section 8.4.6.2.1 to Section 8.4.6.2.14 should be considered and assessed, and a site inspection carried out.

8.4.6.2.1 Traffic volumes

The volume of traffic, its characteristics and whether it is associated with residential or commercial land use should be considered. This assessment should include the collection of traffic data such as annual average daily traffic (AADT), volume/nature of heavy vehicle movements and traffic volume growth in the area.

Identifying whether a road has a high, medium, or low level of traffic will determine the movement function of the speed zone under review. Building this picture is essential for understanding the nature and level of risk within the speed zone, directly informing appropriate speed.

Specific traffic volumes have not been set for each speed as high, medium and low classifications will vary depending on the location of the speed zone.

In circumstances where traffic data is not readily available within the speed zone review length, the nearest available traffic count data on the same, or similar road in close proximity should be sought. In every instance, a quantitative assessment should be prioritised over qualitative assessments in the speed zone review process. The Safer Roads team can also be consulted to provide support.

8.4.6.2.2 Pedestrian and bicycle rider volumes

The presence of vulnerable road users, such as pedestrians and cyclists, should be taken into consideration when determining the speed limit for a length of road. The speed limit should be compatible with the pedestrian and bicycle rider activity on that length of road.

Identifying whether a road has a high, medium or low level of pedestrian and bicycle rider volume will determine the movement function of the speed zone under review. Building this picture is essential for understanding the nature and level of risk within the speed zone, directly informing appropriate speed. Assessments may be quantitative or qualitative.

Specific pedestrian and bicycle rider volumes have not been set for each speed as high, medium, and low classifications will vary depending on the location of the speed zone. Practitioners are encouraged to consider the four street environments outlined in the Movement and Place Framework.

8.4.6.2.3 Movement

The movement function within the review area should be considered. This includes more than traffic, pedestrian, and bicycle rider volumes. It requires an understanding of how transport networks within the review area are or should be integrated with land use and public space, and how they serve users' needs. Are they strategic freight routes or do they support high frequency public transport routes? What level of interaction is there between modes and the land use?

Under the Movement and Place Framework, main roads will have the highest movement function. Main streets may also have a significant movement function that will typically need to be balanced among different road users, including pedestrians and bicycle riders, as well as a significant place function.

8.4.6.2.4 Place

Place analysis involves a bigger picture and more rounded study of a particular place. It should consider its interrelated layers of activity, physical form, and meaning, across social and cultural, environmental, and economic factors. It is more than a land use assessment as it requires practitioners to consider not only the physical form but how that physical form is used.

Practitioners should consider the following:

- amenity of a place and the impact that speed and speed related road design elements may have on the character of the place
- features of the road reserve including street trees, landscaping, shared path, footpath dining, active and passive frontages
- type and profile of road users accessing roadside locations, such as proportion of tourists or people making purely recreational trips
- when and how the place may get used more intensely and whether that increases crash risk.

8.4.6.2.5 Roadside development

The level of roadside development can influence the speed at which drivers travel. Drivers usually accept reduced speed limits when there is greater adjacent roadside development particularly if it is residential or urban development. Future development and its impact on the review area should be considered if additional access, changes in traffic volumes, changes in exposure to vulnerable road users or vehicle mix are expected. If a future development is reasonably expected to warrant a future speed zone review, then engagement with the delegated ROM or GS teams should commence at the earliest opportunity. At this stage, a speed zone review can be considered similar to a new road project, whereby the intended speed zone once a development is completed can inform the design and construction of that road. The speed zone change should be implemented when construction has been completed and meets the requirements of the new land use environment.

8.4.6.2.6 Speed cameras

If there is an existing speed enforcement camera within the speed zone, review and analysis of the camera data shall occur as well as consultation with both the Safer People team and Camera Enforcement branch within Safety Environment and Regulation. The review of a speed limit should not be influenced by enforcement camera locations.

8.4.6.2.7 Route-based speed zones

Decisions made during the review and setting of speed limits should not focus on isolated sections of roads. The adjoining road network shall be taken into account to enable a route-based approach to speed zoning. This approach will minimise speed limit changes along a route, across an area or a precinct.

A route-based approach supports a self-explaining road environment by having a consistent set of speed environments, where changes in the posted speed limit match the immediate roadside environment. Continuous speed zone changes (every 3 minutes) along a single route can increase the cognitive load for drivers, especially where speed limits can vary marginally (by 10 km/h), or where the need for such change is not clear to the road user. Speed zones should be installed for a minimum length. These minimum lengths are found in Section 10.1.2.

8.4.6.2.8 Road features

The physical features of the road and its layout should be taken into account. For example, whether the road is divided or undivided, if it has kerb and gutter, how many lanes there are in each direction, whether there are any existing safety treatments, what condition the pavement is in and the distance from the kerb or edge line to property boundary lines.

8.4.6.2.9 Road alignment

The geometric features of a road may influence the speed at which drivers want to travel. Speed zoning should consider the overall standard of road alignment.

Horizontal alignment on rural roads has a significant impact on the safety of the road and its operating speed. This should be a key consideration on low volume (2000 vehicles per day or less), high speed (80 km/h and above) undivided (two-lane, two-way) rural roads.

Internal TfNSW crash analysis studies show that smaller radius curves have higher numbers of crashes. However, the vehicle speed through the curve determines the severity of crash, with smaller curves more likely to have lower speed crashes. Single vehicle crashes on curves of 200 m or less in radius (P2 curves), are usually less severe. More serious crashes tend to occur on curves with radii ranging from 200 m to 600 m (P1 curves), as shown in Figure 2. Further information can be found at *Guidelines for Retro-fitting Existing Roads to Optimise Safety Benefits. A Practitioners Experience and Assessment of Options for Improvement, 2009.*

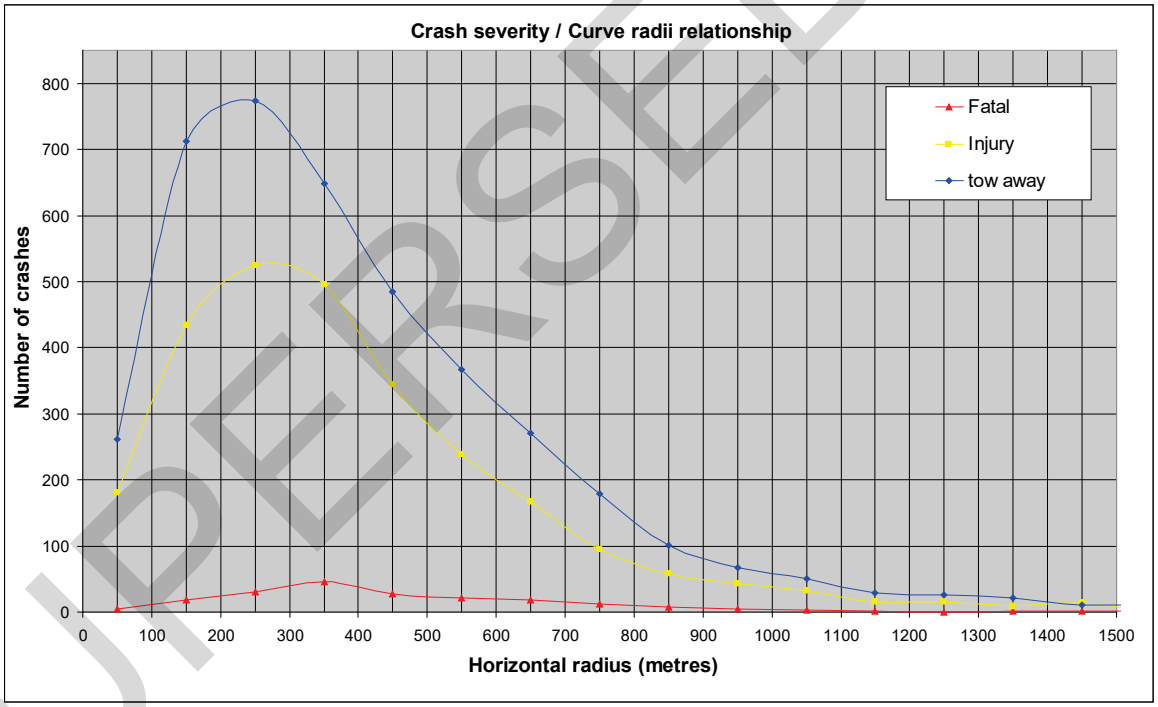

Figure 2 – Relationship between crash severity and curve radii excerpt from *Guidelines for Retro-fitting Existing Roads to Optimise Safety Benefits. A Practitioners Experience and Assessment of Options for Improvement, 2009*

Priority 1 curves make up approximately 10% of the State Road network and are the most at-risk curves. These curves often appear to drivers as being negotiable at speeds higher than the posted speed limits, usually resulting in higher severity injuries. This range of curves should receive priority as they generate the highest number of serious crashes. The types of remedial treatments that can be used should take into account reducing both the occurrence and severity of crashes.

Priority 2 curves make up approximately 3% of the State Road network and generate the highest number of crashes, which are generally less severe. These types of curves are usually harder to eliminate as they tend to occur on roads through difficult terrain where improvements to alignment are often impossible to achieve.

The types of remedial treatments used on these curves should look at reducing the occurrence of crashes on the smaller curves (50 m to 100 m radius) but both the severity and occurrence of crashes on the larger curves (150 m to 200 m radius).

8.4.6.2.10 High-risk curves

High-risk curves should be identified using the OSM and be included as part of the speed zone review if a high-risk curve is included within the review length. The Austroads *Guide to Road Design Part 3: Geometric Design* for roads provides a procedure for calculating speeds along road sections based on the geometric features of the road.

The model acknowledges that the maximum desired speed for any section may vary depending on the road alignment and terrain. The OSM applies the exit speed at the end of each curve or straight to the approach speed for the following section of road. For each curve the model identifies whether deceleration is required. If it is, the OSM identifies whether it is:

- out of context (unacceptable/undesirable) deceleration
- within context (desirable) deceleration.

The OSM also identifies curves where no deceleration is required. These curves are considered within limit.

For the purposes of speed zone reviews an out of context curve is considered a high-risk curve. Curves may only be high risk in one direction. This can occur if there is a series of curves which slows a motorist down before a sharper curve (See Figure 3).

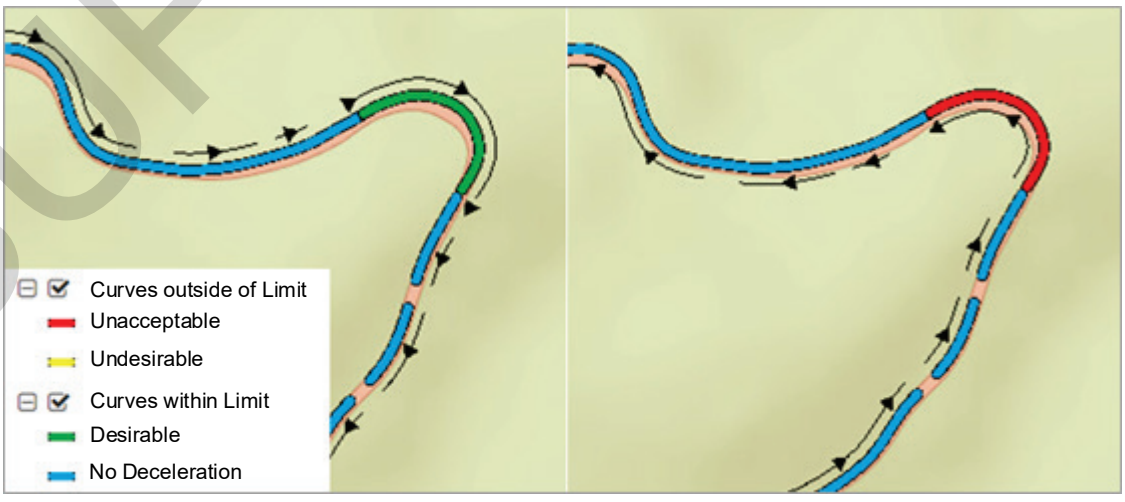

Figure 3 – Example of curve analysis on Alpine Way, NSW in southern direction (left) and northern direction (right) (Source: Transport for NSW)

In some circumstances a curve may have high-risk characteristics but may not be identified as high-risk. This can occur where a high-risk curve is followed by several curves which are within context (see Figure 4). This occurs because drivers slow down sufficiently at the first curve and do not have sufficient straight sections to accelerate before approaching the following curves. In these instances, it may be more appropriate to only address the first curve even if they have a lower radii and lower negotiation speed.

Figure 4 – Curve analysis on Alpine Way shows low radii curve analysed as within context (Source: Transport for NSW)

8.4.6.2.11 Carriageway width

Carriageway width is the portion of a road or bridge devoted particularly to the use of vehicles, inclusive of shoulders and auxiliary lanes.

Carriageway width has a substantial influence on the safety and comfort of road users. Lane width is the distance between the centreline and edge line. Sealed shoulder width is the distance between the painted edge line and the edge of the sealed road surface. Depending on the lane configuration and road alignment, a reduction in lane width reduces the lateral clearance between vehicles, which will reduce the traffic travel speed and lane capacity. A reduction of lane width shall take into account reduced speed limits.

Sealed shoulder width can influence where drivers choose to travel within their lane, the speed at which they travel and the consequences of driver deviations from their intended path. In terms of gravel shoulders, a site-by-site assessment should determine whether existing gravel

shoulders are traversable and to be measured and included as shoulder width as part of the speed zone review.

8.4.6.2.12 Access density

The number and type of access points within a speed zone review length should be taken into account. The number of access points and sight distance of these access points are indicators of risk. For this reason, they should be assessed to inform the appropriate speed environment as an indicator of severity of any potential crashes.

Further guidance on appropriate numbers of access points appropriate for a set speed limit are set out within Section 9.4.

AS/NZS 2890.1 provides more guidance regarding safe sight distances and should also be used for guidance on sight distance.

8.4.6.2.13 Road and roadside hazards

The presence of road and roadside hazards can influence the speed at which drivers may want to travel as well as the severity of any crashes that may occur.

While roadside hazards can vary along a length of road, the frequency, severity and offset of the hazards should be considered when determining a speed zone.

If a hazard can't be removed or mitigated (such as by a safety barrier) a reduction in the speed limit should be considered. This includes situations where there is non-conformance with design standards.

8.4.6.2.14 Speed data

Speed surveys are used to determine overall traffic speed and volume of a road. The speed is usually determined by a survey of vehicles travelling under free-flow conditions. The 85^{th} percentile speed may be captured to determine the operating speed of the road.

The operating speed is useful for designing, implementing and evaluating speed management initiatives to address potential speeding problems on a length of road. The operating speed does not indicate the safe speed limit.

If the operating speed is greater than the reviewed speed limit of a road, then it may be necessary to implement a broad speed management program in order to reduce speeding. Typical measures may include a combination of speed signs, enforcement, public education, reduced speed limit or other engineering solutions. A reduced speed limit should only be applied after a speed zone review is completed.

Speed data is also an essential tool to monitor the actual road conditions if a speed zone change has been implemented.

8.4.6.3 Road safety risk assessment

The road safety risk assessment is made up of three parts: crash data analysis, stereotypical crash rate and crash risk assessment. Completing the road safety risk assessment is an important step in determining if the current speed limit is appropriate or if changes are required.

8.4.6.3.1 Crash data analysis

Crash data analysis considers the crashes that have occurred by collating crash history for the length of road under review. A thorough crash analysis shall be undertaken before adjusting the speed limit for any road length, including an examination of possible factors associated with road crashes.

Five years of finalised crash data using both fatal and serious injury crashes shall be investigated as part of this assessment. In addition, practitioners shall look at preliminary fatal crash data for the most recent period. Practitioners shall look at the details of the crashes including:

- crash severity
- crash type (RUM code)
- time of day
- weather and road surface condition
- road user types
- vehicle types
- crash contributing factors
- location of crash (intersection versus mid-block).

Practitioners may also include findings from a road safety audit or consider the star rating of a road. Australian Road Assessment Program (AusRAP) is a risk model based on the International Road Assessment Programme (iRAP) specifications. AusRAP is a 5 tier star rating system that measures the inherent safety of the road infrastructure for vehicle occupants, motorcyclists, bicyclists and pedestrians. It provides an objective measure of the likelihood of a road crash and its severity. Road sections are rated on a scale of 1 to 5-stars, with 1-star being the least safe and 5-star being the safest. Practitioners should consider whether additional road and roadside engineering solutions have been undertaken or a change in road function has occurred which could have potentially addressed the crashes. Further monitoring may be required before a speed zone review is considered.

High casualty crash rates or concentrations of crashes along a road length are indicators of road safety deficiencies. Speed limits which are set too high may exacerbate crash rates and injury severity.

Any trends in crashes should be analysed as part of the review. These trends will have a direct impact on the recommended speed limit. Depending on the crash trend, reduction of the speed limit can assist in the reduction of crashes and the severity of these crashes occurring.

By examining the causes of crashes, it is possible to develop appropriate measures to improve road safety. Speed is a predictor of crash outcome regardless of the contributing factors.

8.4.6.3.2 Stereotypical crash rate analysis

Stereotypical crash rates are the average crash rate for a particular road type and can help identify roads with higher crash risks. As part of a speed zone review, the crash rate for the section of road shall be reviewed and compared to the stereotypical crash rate values in Table 1. If the calculated crash rate is greater than the applicable stereotypical crash rate, then the speed limit shall not be increased. Retention of existing speed limit may be justified if safety measures are introduced such as enforcement or infrastructure upgrades. The lowering of the speed limit shall be assessed and prioritised if it is calculated that the crash rate would be below the stereotypical crash rate. These calculations shall be undertaken within the speed zone review.

When conducting a stereotypical crash analysis, it is recommended to consider if there is a cluster of crashes which may affect the overall crash rate. Clusters of crashes may indicate localised problems that are best addressed through road safety infrastructure, additional to speed zoning.

A crash rate shall be calculated with Figure 5 to determine the crash rate:

$$Crash\ Rate = \frac{\text{No. Crashes} \times 10^8}{[\text{Length (km)} \times \text{AADT (total number)} \times 365 \times \text{No. Years (of crash data)}]}$$

Figure 5 – Crash rate

Table 1 – Stereotypical crash rate

Road category	Typical crash rate (total crashes per 100 MVK)*
Motorway/freeway	8.3
Urban state road	34.3
Urban regional road	34.0
Urban local road	20.0
Rural state road	10.9
Rural regional road	9.5
Rural local road	2.1

*100 million vehicle kilometres.

Any exceptions to this requirement shall be through the concession process.

8.4.6.3.3 Crash risk assessment

This assessment considers the types of crashes that may occur by taking into account what level of road safety risk is at the location.

Evaluating the risk of a crash occurring where there is limited, or no available evidence of crash history can be challenging. Where road safety risk is perceived to be high but recorded incidence of crashes are low, alternative methods to assess the crash risk assessment should be utilised. This includes site surveys and data collection to further establish movement and place function actual traffic and risk. The star rating assessment methodology may also be utilised on state roads or where the star ratings are available. High speed (80 km/h and above) undivided rural roads may wish to utilise the *Austroads Infrastructure Risk Rating Manual* to inform their road safety risk assessment.

8.4.7 Step 5: Recommendation

The recommendation should demonstrate that there is clear rationale for the proposed speed and that it aligns with the policy principles set out in within this standard.

In reaching a recommendation, Section 9 should be used to identify an appropriate speed zone that aligns with the review assessment findings.

Evidence to support the recommendation shall include the engagement assessment, road and roadside assessment, and road safety risk assessment. These recommendations shall be documented.

Recommendations may be either a speed zone reduction; a speed zone increase or no change to the speed zone.

Any supporting infrastructure works required to support the recommendation should also be captured in the recommendation.

A recommendation should state whether funding will be sought for any additional infrastructure works from other funding sources or whether a section of the speed zone review warrants further investigation outside of a speed zone review.

Rationale for each decision should be clearly articulated and supported by evidence.

8.4.8 Step 6: Approval point

The recommendation should be submitted through the appropriate TfNSW business approval process before the review progresses.

8.4.9 Step 7: Speed zone authorisation preparation

A speed zone authorisation should be prepared once a recommendation has been approved.

This step involves:

- Speed zone design: Designing the signage layout, and other treatments if needed to support the speed zone.
- Consultation on other design aspects: Consulting with relevant stakeholders on aspects of supporting design and implementation.
- Continued implementation of the communications plan.

Once complete the SZA should be submitted to the delegated authority for authorisation.

8.4.9.1 Speed zone design

Practitioners shall use the design guidance provided in Section 10 to design the speed zone. In most cases, speed zone design will involve determining the location of speed limit signs along the length of road or area, as well as any supporting advisory signs/pavement markings. Subsequent changes shall also be considered as part of a speed zone change. In some cases, it may involve designing other aspects of the road environment such as infrastructure treatments.

The design guidance in Sections 9 and 10 has been reviewed to support guidance found in Australian Standards, Austroads guides, and TfNSW supplements.

8.4.9.2 Consultation on other design aspects

Local councils are responsible for the preparation of all civil engineering and facilities design for local and regional roads.

Practitioners shall consult with TfNSW Network Operations Branch before implementation of changes in speed zones that include traffic signals so that SCATS traffic coordinating algorithms can be designed or adjusted.

Practitioners shall also consult with compliance operations and the Centre for Road Safety before implementing changes in speed zones that include speed enforcement cameras.

8.4.9.3 Implementing the communications plan

The communications plan shall be implemented in collaboration with the nominated CCE team.

The communications and engagement plan should be updated to reflect any changes to the risk environment, where required.

8.4.10 Step 8: Speed zone authorisation

An SZA shall be used for the removal and installation of speed limit signs. It outlines the proposed location and size of the signs.

An SZA shall only be approved by the delegated authority, under section 122 of the *Road Transport Act 2013*, specified in TfNSW delegations manual.

An SZA is not needed when replacing existing signs or installing repeater signs. In this case, only the completion of a work instruction is required.

8.4.11 Step 9: Implement, monitor and review

The implement, monitor and review step involves the following:

- creating a work instruction to implement a speed zone
- checking whether the signs and treatments were installed correctly
- identifying and responding to any unintended consequences
- monitoring and evaluation, where appropriate, by Safe Systems and Programs within Safety Environment and Regulation.

8.4.11.1 Create work instruction to implement signage

Practitioners shall create work instructions to implement the new speed zone by removing existing signage and pavement markers and installing new signage and markers. During a speed limit change, all speed limit signage and pavement numerals shall be changed on the same day; a speed limit change cannot be conducted over several days without the signs being covered. Existing numerals shall also be removed if installation does not occur on the same day.

At this point a public notification shall be issued regarding the speed change.

8.4.11.2 Post-installation check

Conduct a post-installation check to ensure that all signs and supporting treatments, if applicable, were installed and/or removed as provided by the work instruction.

Separate records shall be retained showing details of the actual installation and (any) removal of signs. Details shall include authorisation, exact sign location, date, and time.

8.4.11.3 Identifying and responding to any unintended consequences

Practitioners should monitor for unintended consequences and respond to them promptly if required.

8.4.11.4 Monitoring and evaluation

Monitoring and evaluating the performance of site-specific speed zone changes is the responsibility of the relevant ROM and GS divisions. This includes pre- and post-traffic counts particularly for low-speed environments to ensure compliance with the new speed zone.

The Centre for Road Safety is accountable for monitoring and evaluating the performance of the Speed Management Program for its road safety benefit. This step is important in determining the effect that changes to speed zones have on:

- safety, including crash rates
- the creation of successful places (if that was a key factor in the speed zone review)
- facilitating movement function
- compliance (pre and post installation speed data).

Where appropriate, speed zoning measures will be periodically evaluated.

9 Types of speed zones

The following types of speed limits are used in NSW roads:

- default speed limits
- regulatory signposted speed limits.

Speed limits can also be based on vehicle and licence class. Signposted speed limits do not override vehicle and licence class speed restriction. A speed zone is the length of road where a regulatory signposted speed limit applies.

9.1 Default speed limits

Road rule 25 of NSW *Road Rules 2014* provides detail on the default speed limit for urban and rural areas.

9.2 Regulatory signposted speed limits

Road rule 20 from the NSW *Road Rules 2014* provides that a driver must not drive at a speed over the speed limit applying to the driver for the length of road. A signposted speed limit is the number shown on the speed limit sign (Figure 6) within the red annulus (circle) and defines the maximum legal speed permitted along a specific section of road. This section of road is referred to as a speed zone. All regulatory speed zones are in steps of 10 km/h and always end in 0.

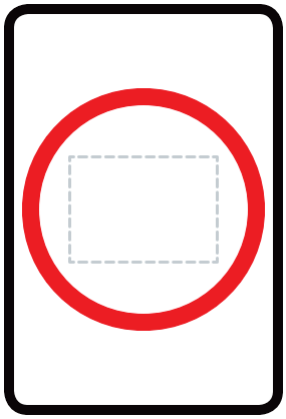

Figure 6 – Speed limit sign (R4-1)

9.3 Advisory speed signs

Advisory speed signs are used to inform motorists of changes in horizontal and vertical alignments – that is curves, bends, humps, dips. Advisory speed signs are used where the appropriate speed on a section of the roadway may be less than the posted speed limit. Although the sign provides a warning to approaching drivers, it is not legally enforceable. Further information can be found in Section 10.1.8.

9.4 Speed zones

A speed zone is a length of road over which a particular speed limit applies. Speed zones are signposted to clearly define where the speed limit applies, with signs at the start, reminder signs within the zone (if required) and signs at the end showing the speed limit of the next zone.

Speed zones can either apply to a length of road (linear speed zone) or a network of roads (area speed zone). Linear speed zones used in NSW range from 10 km/h to 110 km/h. Common area-based speed zones used in NSW include shared zones, high pedestrian activity areas, and school zones.

9.4.1 Shared zones

Shared zones are installed on roads or networks of roads with high levels of pedestrian activity, where the road space is shared safely by vehicles and pedestrians. The maximum speed limit is always 10 km/h and pedestrians have right of way.

Shared zones are often found in CBDs, tourist, heritage and residential areas and shopping centres where there is either limited, substandard or no formal footpaths or where on-road parking on one or both sides of the road restrict the free movement of vehicles and people along the road. Some residential streets may increasingly be designed as shared zones to improve community safety, amenity, and place value.

Additional design guidance can be found in Section 10.3.

9.4.2 High pedestrian activity areas

High pedestrian activity areas (HPAA) are installed to create more successful places for pedestrians while also reducing the risk and severity of pedestrian and bicycle rider casualty crashes. HPAA can either be linear or area zones. They can be signposted at either 20, 30 or 40 km/h. These zones should have a self-explaining speed limit through physical traffic calming devices.

Additional design guidance can be found in Section 10.2.

9.4.3 School zones

School zones are provided in areas near schools to protect children and vulnerable road users.

Children can be particularly vulnerable because they are often physically small, may not yet have the cognitive skills to make safe decisions, and cannot be fully responsible for their own safety in the traffic environment. For this reason, safety is prioritised within NSW school zones (by applying a maximum speed limit of 40 km/h during school zone times).

School zones are implemented outside schools to reduce vehicle speeds where there is an increased potential for conflict between vehicles and schoolchildren. School zones operate on government gazetted school days.

If the school zone is partially or completely within a surrounding lower speed environment than 40 km/h, such as a 30 km/h HPAA, then the school zone shall be changed to the lower speed environment.

School zones are installed and signposted in accordance with Section 10.

9.4.4 Railway level crossing zones

Speed zones shall not exceed 80 km/h at, or on the approaches to, level crossings which are actively controlled by flashing lights or flashing lights and boom gates.

A speed limit of 80 km/h at active level crossings shall be adopted unless:

- a lower speed limit would be appropriate
- there are curve warning signs with an advisory speed plate of 45 km/h or less in which case a limit of 60 km/h or less is to be adopted.

On approach to the active level crossing an 80 km/h speed limit shall be installed for a minimum distance of 400 m. The egress minimum distance (after active level crossing) shall be 200 m.

Additional guidance can be found in Section 10.1.16.

9.4.5 Offset speed zones

In an offset speed zone, there are different speed limits in each direction of a road. Offset speed limits are often difficult to enforce and confusing to some motorists. They are not recommended and should only be adopted after careful consideration of road safety and enforcement implications. It may be appropriate to use offset speed zones in the following situations:

- on divided roads where one direction of a road produces a greater risk than the opposing direction, for example steep downgrades in combination with poor alignment
- an opposing carriageway or divided road where the roadside development or road geometry on the two sides is markedly different
- at steep descents/ascents with unbroken dividing lines and climbing lanes for buses and trucks, it may also be desirable to apply for a lower speed limit for descending heavy vehicles.

9.4.6 Unsealed roads

The default speed limit is often inappropriate for unsealed roads in rural environments. Unsealed roads passing through urban areas or areas with poor alignment should be speed zoned in accordance with the principles and characteristics described in these guidelines. The Reduce Speed To Conditions sign (G9-318-1) should be used to remind drivers to drive to prevailing conditions on unsealed roads.

9.4.7 Variable speed zones

A variable speed zone in NSW can be applied where the designed speed limit can be changed based on congestion, movement and place function, reduced visibility weather conditions or seasonal conditions.

Prospective variable speed zones should follow the high engagement level pathway, outlined in the engagement guidelines.

9.4.7.1 Freeways, motorways or tollways

Guidance on variable speed zones based on congestion are applied on freeways, motorways or tollways can be found in Section 10.1.13.

9.4.7.2 Time of day/week

Variable speed zones can be applied in urban environments where traffic conditions and movement and place function changes throughout the day or week.

A speed zone review may have a different outcome if completed at different times of the day or week. For example, roads at peak travel times that facilitate public transport movements into a CBD environment, while outside of these times are a pedestrianised civic space. Another

example is a road environment that has a strong place function with a mix of pedestrians and general traffic during daytime hours but after business hours the corridor reverts to a movement corridor with limited pedestrian movements and a large increase in through movements.

Variable speed limits due to time of day/week conditions should only be implemented where other means of addressing the road safety problem have been investigated and not deemed currently feasible.

For a time of day/week variable speed zone to be considered the following factors shall be taken into account:

- A permanent speed zone shall be considered in the first instance. If permanent speed is not deemed suitable, justification shall be provided.
- The difference between the lower speed limit and the higher speed limit shall not be greater than 20 km/h. That is if the lower speed limit is 40 km/h than the maximum higher speed limit shall be 60 km/h.
- Time of day variable speed zones are exempt from pavement markings. Section 9.4.7.2 is exempt from Section 10.1.7.
- Variable speed zones shall be signposted electronically, with static signs in place to advise motorists of the speed limit should the electronic signs fail (see motorway approach). Asset acceptance shall be approved by ITS and asset maintenance.
- Roads which have clearways or parking times in the kerbside lane may be considered. A variable speed limit shall be consistent with these operational hours.
- Minimum length criteria shall be applied in accordance with the lower speed limit.

Additional guidance can be found in Section 10.1.14.2.

9.4.7.3 Weather conditions

Variable speed limits due to changes in weather conditions that physically affect the safe speed at which all vehicles can be driven along a particular length of road is permitted. Generally, to support the use of wet weather speed zones there should be an increased crash risk or actual crash occurrence when it is raining or while the road is wet. This should be supported by evidence. Variable speed limits due to weather conditions should only be implemented where other means of addressing the road safety problem have been investigated and not deemed currently feasible.

Additional design guidance can be found in Section 10.1.14.3.

9.4.7.4 Seasonal zones

Seasonal speed zones may be used at some locations where the traffic and/or road conditions vary significantly between seasons. These may occur at:

- coastal or alpine holiday locations where pedestrian, parking and traffic activity increases significantly during holiday seasons
- locations where seasonal weather conditions require a lower than usual speed limit for safe driving, for example prevalent snow/wet weather and ice.

Seasonal speed limits should only be implemented where other means of addressing a road safety problem are not possible.

9.4.8 10 km/h

A speed zone of 10 km/h shall be used where pedestrians and vulnerable road users share the road with motor vehicles.

10 km/h zones are generally shared zones. Road rule 83 in *NSW Road Rules 2014* provides that a driver driving in a shared zone must give way to any pedestrian in the zone.

Other locations may be signposted as 10 km/h however reviews for these locations should carefully consider their movement and place function. The most common uses of shared zones are in laneways and alleyways however this does not preclude other appropriate locations.

10 km/h speed limits should:

- have limited private vehicle movements with no public transport services
- be self-explaining road environment using engineering treatments appropriate for a 10 km/h speed zone, to slow vehicles to that speed
- have a high place function for pedestrians and cyclists, low motor vehicle movement (service vehicles or private access only, no major public transport i.e., light rail)
- cover full extent of pedestrian desire lines coinciding with public transport facilities, meaning there are no minimum lengths for these zones.

Additional information around the setting of shared zones can be found in Section 10.3.

9.4.9 20 km/h

A speed zone of 20 km/h is recommended where pedestrians and vulnerable road users share the road with motor vehicles, but do not have legal priority like a shared zone.

The most common use of 20 km/h speed limits are in locations with high place function and low traffic volumes, where traffic is typically generated from public transport needs. These include public transport interchange locations where pedestrians shall give way to traffic such as light rail and buses.

20 km/h speed limits should:

- Have limited private vehicle use.
- Be a self-explaining road environment, using engineering treatments appropriate for a 20 km/h speed zone, to slow vehicles to that speed.
- Have an at grade footpath and travel lane. It is recommended that pedestrian protection using planter boxers or bollards instead of separation (for example pedestrian fencing) from kerb or delineation.
- Be a high place function, low traffic volumes where most of the traffic is generated from public transport needs.
- Be designed to limit confusion over pedestrian or motorist priority.
- Cover full extent of pedestrian desire lines coinciding with public transport facilities, meaning there are no minimum lengths for these zones.
- Include carparks (with kerb and gutter) and reserves/parks if considered appropriate by the review.

9.4.10 30 km/h

A speed zone of 30 km/h is recommended where there is a high place function with large numbers of pedestrians and low traffic movement function. Unlike 10 km/h and 20 km/h speed zones a 30 km/h zone may have limited through movement of private motor vehicles. Movement corridors or main arterial routes should be avoided.

It is recommended that 30 km/h speed limits be applied in places with pedestrian attractors and generators such as foreshore and tourist destinations that have limited through movements of vehicles.

30 km/h speed limits shall:

- Only have a single lane of travel in each direction including intersections (parking lanes are excluded from this).
- Have parking controls always permitted to ensure that only one lane of travel in each direction is maintained.
- Ensure the crossing distance for pedestrians across a roadway is limited to two lanes of traffic (single lane of travel in each direction). This reduces the crossing distances for pedestrians and limits vulnerable road users' exposure to motor vehicles.
- Be a self-explaining road environment using engineering treatments appropriate for a 30 km/h speed zone, to slow vehicles to that speed. Treatments include gateway traffic calming, and vertical and horizontal deflection through the treatment area. In some cases,

traffic lanes may be reduced, additional pedestrian crossing facilities, additional tree planting, to differentiate between a 30 km/h zone and a 40 km/h zone.

At existing signalised intersections, signal phasing shall be reviewed.

Opportunities to reduce wait times and increase crossing times for pedestrians should be implemented. Signal phasing should prioritise pedestrian movements over vehicle movements.

Pedestrian crossings within 30 km/h zones should be installed as zebra crossings and wombat crossings (un-signalised).

If there is a school zone adjacent or within the proposed 30 km/h speed zone the school zone shall be signposted at 30 km/h. The 30 km/h school zone signage shall be approved in accordance with Section 10.4.

Additional information around the setting of high pedestrian activity areas can be found in Section 10.2.

9.4.11 40 km/h

A speed zone of 40 km/h is recommended where a place function with large numbers of pedestrians also has a movement function. 40 km/h zones are recommended for town centres, tourist destinations, urban local roads as well as some state roads.

In these locations, a mix of pedestrian and vehicle priority is expected. In many circumstances, there are evident times of days where a movement function or a place function is the priority (examples include Oxford Street in Paddington and King Street in Newtown). In many cases, the movement function also facilitates public transport movements.

In 40 km/h zones through vehicle movements are allowed for which there may be up to two lanes of travel in each direction. Pedestrians will be exposed to through traffic.

It may be appropriate for existing 40 km/h high pedestrian activity areas to be converted to 30 km/h high pedestrian activity zones if they meet the 30 km/h requirements set out in Section 9.4.10. In these scenarios it is likely that the existing 40 km/h high pedestrian activity areas will require additional works and traffic calming to achieve operational speeds of 30 km/h.

40 km/h speed limits shall:

- have a high place function that includes pedestrian attractors and generators where pedestrians frequently cross the road and may be required to cross up to four lanes of traffic (two lanes in each direction)
- consider whether signalised pedestrian crossing options are appropriate

- include recommended treatments such as gateway traffic calming, and vertical and horizontal deflection through the treatment area. In some cases, traffic lanes may be reduced
- have protected bicycle lanes (physical separation between vehicles and cyclists).

Additional information around the setting of high pedestrian activity areas can be found in Section 10.2.

9.4.12 50 km/h (default urban speed limit)

A default urban speed limit of 50 km/h applies in all built-up areas in the absence of other speed limit signs. Default urban speed limit is defined in the NSW *Road Rules 2014*.

The 50 km/h area sign (R4-10(50)) and end 50 km/h area sign (R4-11(50)) should no longer be installed.

A concession can be applied in accordance with TS 00003.1 for a departure from a requirement.

9.4.13 60 km/h

A speed zone of 60 km/h is recommended for roads in built-up areas. These roads are generally major arterial roads that are designed for travel between localities. Roads can be divided or undivided, have closely spaced access to abutting development and, in more densely populated areas, are usually multi-lane roads.

The 60 km/h speed limit is recommended in some rural residential areas which do not meet the legal definition for the urban default speed limit but have more than 10 regularly used driveways per kilometre on each side of the carriageway.

If there are more than 10 access points per kilometre on each side of the carriageway the speed limit shall not be signposted above 60 km/h.

9.4.14 70 km/h

A speed zone of 70 km/h is recommended in an urban environment on a divided arterial road with full or partial urban development that has limited access to the main carriageway. A 70 km/h should not be used in a rural environment.

70 km/h speed limits shall:

- have a high standard of alignment and signalised intersections at regular intervals
- not be applied where there are high levels of traffic conflict, or side friction resulting from adjacent pedestrian activity and vehicle parking

- be applied on arterial two-lane or more roads with limited driveway access (typically 6 to 10 regularly used driveways per kilometre on each side of the carriageway) with low pedestrian activity
- have access points that are limited to left in left out.

9.4.15 80 km/h

80 km/h speed zone differs between urban and rural environments. 80 km/h is the maximum allowable speed environment for traffic signals and roundabouts. Further guidance is available through the Austroads *Guide to Road Design (all parts)* and Austroads *Guide to Traffic Management (all parts)*.

Urban 80 km/h speed limits shall:

- have no direct abutting access
- have a safety barrier providing separation between opposing traffic lanes.

80 km/h speed zones can be installed on semi-urban/rural fringe. Semi-urban/rural fringe is defined as having no more than one to two intersections per kilometre and no more than five regularly used driveways or private accesses per kilometre.

Rural 80 km/h speed limits shall:

- be a high-standard divided arterial road
- have less than five regularly used private accesses per kilometre on each side of the carriageway with adequate sight distance
- be applied to undivided roads in rural areas where road design is not aligned with current TfNSW standard of vertical or horizontal alignment.

Tunnels should not be signposted at a speed greater than 80 km/h unless a concession has been approved.

Rural 80 km/h speed limits should be assessed on a route-based approach to provide consistency across the road network.

9.4.16 90 km/h

A speed zone of 90 km/h can be applied to urban motorways and some rural roads. Roads with traffic lights are not suitable for 90 km/h speed limits.

Urban 90 km/h speed limits shall:

- be high-volume urban motorways with safety barriers providing separation between opposing traffic lanes
- have no direct abutting access

- have a roadside that supports the safe recovery of errant vehicles – sealed shoulders and roadside safety barriers should be provided
- not have any traffic control signals or roundabouts within the speed zone.

Rural 90 km/h speed limits shall:

- have a sealed pavement width of 8.5 m (3.5 m lanes with a BB1 centreline and 0.5 m sealed shoulders)
- have no more than four regularly used private accesses per kilometre on each side of the carriageway with adequate sight distance – access should be limited to left in left out
- have a roadside that supports the safe recovery of errant vehicles – sealed shoulders and roadside safety barrier should be provided
- not have any traffic control signals or roundabouts within the speed zone.

9.4.17 100 km/h (default rural speed limit)

A default rural speed limit of 100 km/h applies on all rural roads in the absence of a speed limit signs. Default rural speed limit is defined in the *NSW Road Rules 2014*.

A 'Reduce Speed to Conditions' (G9-318-1) sign should be installed on the entry to a road where the default speed limit applies for the length of road, but not recommended to be signposted at 100 km/h.

Uncontrolled, signalised or roundabouts are not recommended in these high-speed environments.

9.4.18 100 km/h

A speed zone of 100 km/h can be applied on urban and rural motorways and rural divided roads. 100 km/h may apply on undivided rural roads with sealed pavement widths of 9.5 m (with a BB1 centreline and 1 m sealed shoulders). Divided roads speed zones of 100 km/h are suitable for key transport routes. This speed limit is considered most appropriate for motorways and rural divided roads.

Divided 100 km/h speed limits shall:

- have a safety barrier providing separation between opposing traffic lanes
- have no more than two regularly used private accesses per kilometre on each side of the carriageway with all with adequate sight distance – access should be limited to left in left out
- have a roadside that supports the safe recovery of errant vehicles – sealed shoulders and roadside safety barrier should be provided.

Undivided 100 km/h speed limits shall:

- have a sealed pavement width of 9.5 m (3.5 m lanes with a BB1 centreline and 1 m sealed shoulders)
- align with TfNSW design requirements
- have less than one regularly used accesses per kilometre on both sides of carriageway, all with adequate sight distance – access should be limited to left in left out
- have a crash rate that does not to exceed 8.3 crashes/100 MVK, calculated with finalised crash data over a period of 5 years
- have a roadside that provides a good opportunity for drivers to regain control of their vehicles, and sealed shoulders and roadside safety barrier should be provided.

Uncontrolled, signalised or roundabouts are not recommended in these high-speed environments.

9.4.19 110 km/h

A speed zone of 110 km/h can be applied for divided roads for key transport routes. 110 km/h are recommended for use only on motorways in non-built-up areas, the continuation of divided carriageways beyond motorway sections and high-quality divided rural roads.

110 km/h shall not be applied to undivided roads.

Divided 110 km/h speed limits shall:

- have a safety barrier providing separation between opposing traffic lanes
- have no more than two regularly used private accesses per kilometre on each side of the carriageway – access should be restricted to left in left out
- have a deceleration lane for private property access (dependent on existing or proposed land use function)
- have a design speed of 120 km/h in accordance with Austroads *Guide to Road Safety Part 3: Safe Speed*
- have a roadside that supports the safe recovery of errant vehicles – sealed shoulders and roadside safety barrier should be provided consistent with the Austroads *Guide to Road Design Part 6: Roadside Design, Safety and Barriers*
- intersections should be grade separated.

Uncontrolled, signalised or roundabouts are not recommended in these high-speed environments.

10 Design and implementation

10.1 Design guidance

Consistency in designing speed zones is essential to:

- ensure uniformity across NSW
- improve drivers' compliance with speed limits
- highlight the presence of specific road environments
- provide the legal framework for enforcement purposes.

This section includes design guidance that shall be taken into account when designing all speed zones. It also includes design guidance for particular speed zones such as shared zones, high pedestrian activity areas, school zones.

10.1.1 Supporting infrastructure

Regardless of the speed zone applied at a location or throughout a precinct, supporting infrastructure should be provided to reinforce speed limits and deliver achievable and safer outcomes. For example, areas with low speed limits may require traffic calming measures to ensure that the operating speed of traffic matches the sign posted speed limit. Alternatively, higher speed roads with numerous tight curves and other geographical constraints should have an safe speed limit that protects motorists from placing themselves at higher risk of serious injury.

10.1.2 Zone length

To avoid excessive variations in speed limits, a balance needs to be achieved between changes in the road environment and roadside development and the number of changes of speed limit. The recommended minimum speed zone lengths are set out in Table 2.

Table 2 – Speed zone lengths

Speed limit (km/h)	Minimum length (km)
10, 20	There is no minimum length. Speed limit should cover the full extent of the pedestrian desire line.
30	0.2
40	0.4
50 (default)	Not applicable
60	0.5
70	1.0
80	2.0

Speed limit (km/h)	Minimum length (km)
90	2.0
100	3.0
110	10.0

10.1.3 Location of signs

Location of signs is applicable to all roads. Specific design guidance for special types of speed zones is available for variable speed limits (Section 10.1.14), shared zones (Section 10.3), school zones (Section 10.4), and high pedestrian areas (Section 10.2).

At each change of speed limit, two speed limit signs shall be provided, one on each side of the carriageway in a symmetrical position in accordance with Figure 7.

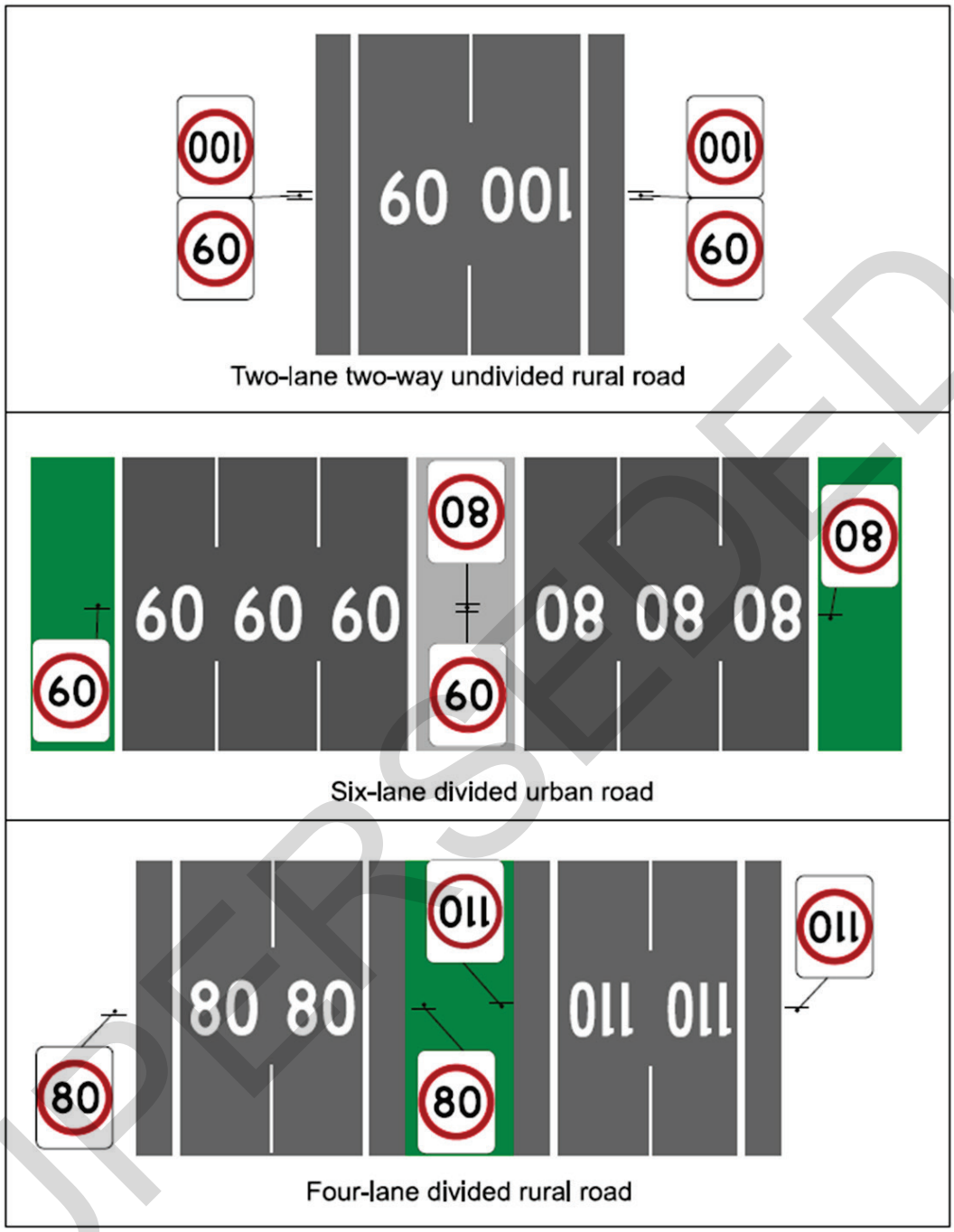

Figure 7 – Typical signs and marking at change of speed limits

Minimum clearances of vertical and horizontal offsets from the ground and carriageway shall be applied. Refer to AS 1742.2 for minimum clearances of vertical and horizontal offsets.

10.1.4 Sign size

Speed limit signs come in four sizes, ranging from A to D. Sign sizes and speed control signage is outlined in Section 3.1.2 of AS 1742.4:2020. Refer to TfNSW website for a complete list of signs approved for use in NSW. Speed limit signs shall be installed at locations that provide for sight distances as shown in Table 3.

Table 3 – Sight distance to speed limit signs

Speed limit sign size	Sight distance (m)
B	150
C	240
D	300

10.1.5 Conflict with other signs – recommended separation distances

Speed limit signs shall not be placed on the same post as other signs or in close proximity to other road signs.

Where possible, the recommended separation distances between a speed limit sign and another sign should be applied. See Table 4 for separation distances in different speed zones.

Table 4 – Recommended separation distance between signs

Speed zone (km/h)	Recommended separation distance (m)
10, 20, 30, 40	50
50	80
60	80
70	90
80	100
90	110
100	120
110	130

10.1.6 Repeater signs

Repeater speed limit signs are used to reinforce speed limits. Repeater speed limit signs are not supported for default speed limits. Repeater speed limit signs should be positioned on the left-hand side of the road where the following applies:

- on roads that have a higher number of traffic volumes than the surrounding area
- on other roads with a substantial volume of traffic
- on undivided two-way roads with three or more lanes or one-way carriageway (divided road) with two or more lanes in the direction of travel of that carriageway
- where the speed limit may not be obvious, for example where there are frequent changes to the speed limit or there are differing speed limits to the surrounding road environment and drivers require additional confirmation of the limit that applies at any point
- beyond key intersections if the limit is not a default limit.

Repeater signs should be installed where the road is straight. The distances between repeater signs should be installed at intervals of five minutes of travel at the proposed speed limit for rural environments. Repeater signs should be installed at intervals of two minutes of travel at the proposed speed limit for urban environments.

When choosing the location of a repeater sign, the recommended separation distances between speed limit signs and other road signs should be taken into account.

10.1.7 Road pavement markings

At the point of change in speed zoned areas, the speed limit should be indicated on the road surface. This is applicable to all state roads. For regional and local roads, the decision to provide pavement numerals is the responsibility of TfNSW when installing new speed zones.

When implemented, markings should be located centrally in each lane carrying moving traffic, and adjacent to the speed limit signs. If a speed zone entry location is changed, markings shall be removed if they do not match the new speed zone.

Pavement markings shall be implemented in accordance with AS 1742.2 and meet the skid resistance level given in AS 4049.4. Further information around road pavement markings can be found in TS 05462.

Pavement markings may also be introduced in conjunction with repeater signs in exceptional circumstances. This includes roads that have a history of poor compliance with the posted speed limit, multilane roads, and those with a high incidence of speed-related crashes or enforced speed camera locations.

10.1.8 Advisory speed signs

Advisory speed limit signs (Figure 8) are not legal speed limits but indicate the maximum speed at which a curve may be comfortably and safely negotiated in good road and weather conditions. Speed limit signs and advisory speed signs showing different speed values from one another should not be placed where drivers can see both signs at the same time.

Advisory speed signs are used to advise motorists of the highest safe speed limit to comfortably navigate a bend or curve. Although the sign provides a warning to drivers, it is not legally enforceable. Advisory speed signs should end in the numeral 5 and be at intervals of 10 km/h.

Advisory speed signs should be at least 15 km/h below the posted speed limit.

Determination and signposting of advisory speed limits shall be done in accordance with AS 1742.2. For further information, refer to the *Curve advisory speed assessment practice in NSW* fact sheet.

When speed zones are introduced or reviewed, a survey should be made of all advisory speed signs within the zone to ensure that existing signage does not indicate an advisory speed above

the new posted speed limit. Existing curve advisory signage shall comply with the 15 km/h below the new posted speed limit.

Advisory tram speed limit signs (Figure 9) are used in light rail corridors and indicate the safe operational speeds for trams along certain sections of the tracks. Advisory tram speed limits are exempt from ending in the numeral 5.

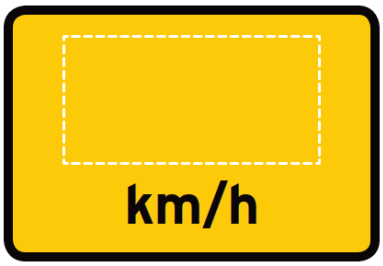

Figure 8 – Advisory speed limit sign (W8-2)

Figure 9 – Advisory tram speed limit sign (G9-N390)

The ball bank indicator method or an accelerometer should aways be used to determine advisory speeds on horizontal curves. Determining and signposting advisory speed limits shall be reviewed in accordance with AS 1742.2.

10.1.9 Speed restriction ahead signs

Speed restriction ahead signs (see Figure 10) can be utilised to provide advance warning of changes in speed. Speed restriction ahead signs are recommended to be installed:

- where there is a speed reduction of 20 km/h or more
- where there is insufficient sight distance
- on a downhill approach
- where under normal driving expectations, the change in speed zone may not be apparent to the motorist.

On roads with three or more lanes in each direction, speed restriction ahead signs shall be on both sides of the road. Buffer zones should not be installed in NSW.

Buffer zone is a gradual reduction in speed limits, such as an 80 km/h speed limit between a 100 km/h rural limit and a 50 km/h urban limit.

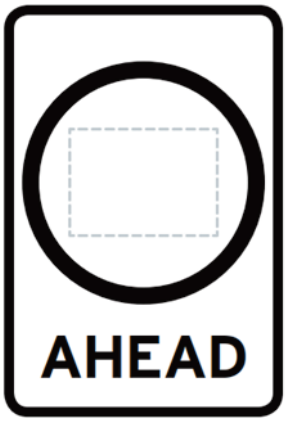

Figure 10 – 'Speed restriction ahead' sign (G9-79n)

Table 5 provides recommended sign spacing of speed restriction ahead signs in relation to the speed zone change. Table 5 may also be applied to the distance between a curve advisory sign and the curve.

Table 5 – Recommended placement of speed restriction ahead signs

85th % speed (km/h)	Distance of first repeated sign form start of zone (m)
80	120 to 140
90	140 to 170
100	170 to 210
110	210 to 260

10.1.10 Town entry treatments

Refer to TS 00020 for information around the settings of town entry treatments.

10.1.11 Offset speed zones

Offset speed zones occur where there are different speed limits applying to opposite directions of a road. Offset speed zones are recommended for installation after careful consideration of road safety and enforcement implications. Offset speed limits shall not be used on undivided roads except at railway level crossings.

However, it is recommended to use offset speed zones in the following situations:

- On divided roads where one direction of a road produces a greater risk than the opposing direction (for example steep downgrades in combination with poor alignment).
- At steep descents or ascents with unbroken dividing lines and climbing lanes for buses and trucks, it is also recommended for a lower speed limit for descending heavy vehicles. Further information can be found in Section 10.1.15.

- An opposing carriageway or divided road where the roadside development or road geometry on the two sides is markedly different.
- On the approach and egress of railway level crossing where a reduced speed is implemented. Further information can be found in Section 10.1.16.
- An offset school zone may be installed if the existing road environment limits the ability to install a school zone that commences and terminates at the same location for each direction of travel. Note that an offset school zone should not extend through an intersection. If an offset school zone is adopted, it is recommended that the entry school zone sign be located within 20 m of the end of school zone sign at any given entry or exit point of a school zone.
- Construction sites (refer to TS 05492).

Offset speed zones are not appropriate at locations where pedestrians cross the road; therefore, lower speed limit should be implemented on both carriageways.

10.1.12 Default signs

10.1.12.1 Default 50 km/h

Signposting is not required on roads in built-up areas where the 50 km/h default speed limit applies. However, there are some situations where 50 km/h speed limit signs may be installed, including where there is some uncertainty about whether a road is in a built-up area (see definition in Section 4).

Pavement numerals do not need to be installed on roads covered by the default urban speed limit. Existing pavement numerals (other than at the entry to an urban area) do not need to be removed or replaced.

10.1.12.2 Default 100 km/h

While the default speed limit does not require signposting, 100 km/h speed limit signs may be installed at the start of the default to remind road users that the 100 km/h speed limit applies.

In all other situations, the End speed limit sign (Figure 11) shall be used at the start point of a section of road covered by the default rural speed limit.

This sign should be supplemented with the reduce speed to conditions sign (Figure 12).

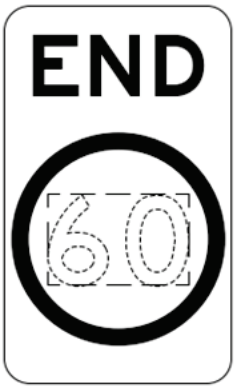

Figure 11 – 'End speed limit' sign (R4-12)

Figure 12 – 'Reduce speed to conditions' sign (G9-318-1)

10.1.12.3 Entering NSW

The State limit sign (Figure 13) indicates to drivers entering NSW that a 100 km/h rural default speed limit applies. This sign should be applied at an appropriate distance from the State border sign, to avoid a proliferation of signs at the border. The State border sign (Figure 14) should be applied at the border.

If a speed zone other than 100 km/h has been signposted on crossing the border, the State limit sign should be located at the commencement of whichever of the following comes first – the start of a 100 km/h default speed limit or the start of a 100 km/h speed zone.

Figure 13 – 'State limit' sign (R4-205N)

Figure 14 – 'State border' sign (G6-3)

10.1.12.4 Unsealed roads

Unsealed road environments adopt the default speed limit. No sign is required where:

- an unsealed road commences at an intersection
- an unsealed road is a continuation of a sealed section of road to which the default limit applies.

Where an unsealed road is a continuation of a sealed section of road to which a speed limit less than the default limit applies, an End speed limit sign (Figure 11) supplemented with a Reduce speed to conditions sign (Figure 12) shall be installed. In all cases, a Gravel road reduce speed sign (Figure 15) should be used on gravel roads.

Figure 15 – 'Gravel road reduce speed' sign (W2-211-5N)

10.1.13 Motorways

High speed road environments such as motorways require larger signs than other road environments.

The following signs shall be used on all motorways:

- On the main carriageway at the start of the length, all speed limit signs shall be D-sized with one sign placed on each side of the carriageway when the speed limit is greater than 100 km/h.
- Repeater signs on the main alignment shall be C-sized and placed in pairs on each side of the carriageway.

10.1.13.1 Signage for on ramps and off ramps

On ramps shall be signposted well in advance of the merge with through traffic to allow drivers to reach the signposted speed. The signposted speed on the on ramp shall be the same as the signposted speed on the motorway at the merge point.

Speed limits on off ramps from motorways should be the same as the road it joins. If there are isolated geometric deficiencies in the off ramps, those locations should be treated with warning signs (see Speed restriction ahead signs Section 10.1.9). In some cases where there is a safety concern, a reduced speed limit may be required.

10.1.14 Variable speed limits

VSLs are typically used on motorways and in tunnels as a way to achieve and maintain optimal network traffic conditions and minimise delays and congestion.

There are signage options for implementing VSLs on roads that are not motorways or tunnels:

Recommendations for a particular signage scheme should be made on a case-by-case basis, taking into account the current road environment and proposed hours of operation.

All electronic VSL signs are controlled centrally by the TMC. TMC is responsible for keeping a record of all speed limit changes (times, dates and locations) within electronic VSL schemes.

Table 6 – Variable speed limit sign size

Location	Size
Shopping precincts or high pedestrian areas	Size B
Tunnel	Size B Size A may be used where size constraints prohibit the use of Size B signs
Expressway type road	Size C
Other	Size C on other high speed roads (80 km/h or more) Size B for all other cases.

10.1.14.1 VSLs on motorways and in tunnels

When signposting VSLs on motorways or in tunnels, there shall be:

- ‘Start variable speed limit’ signs (Figure 16) before the first VSL signs and at any entry point into the VSL scheme
- an ‘If variable speed limit sign is blacked out’ sign (Figure 17) at all entry points to the VSL scheme and/or when the posted speed limit changes, on motorways
- an ‘If variable speed limit sign is blacked out – (tunnel use only)’ sign (Figure 18) at all entry points to the VSL scheme, in tunnels

- ‘Electronic VSL’ signs (Figure 19) located symmetrically in pairs, with one sign on each side of the carriageway or, if they are located on a gantry structure, with a sign above each lane
- ‘Electronic VSL’ signs (Figure 19) and ‘If variable speed limit sign is blacked out’ signs (Figure 17) should also be used as repeater signs along the length of the VSL scheme
- ‘End variable speed limit’ signs (Figure 20) after the last VSL sign and before any static speed limit signs.

Figure 16 – ‘Start variable speed limit’ sign (G6-315)

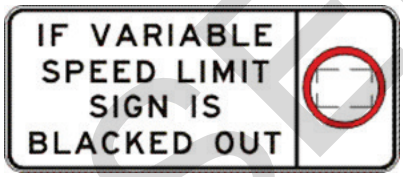

Figure 17 – ‘If variable speed limit sign is blacked out’ sign (G6-317)

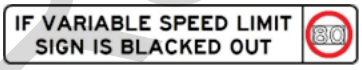

Figure 18 – If variable speed limit sign is blacked out – tunnel use only’ sign (G6-317-1N)

Figure 19 – Electronic VSL sign

Figure 20 – ‘End variable speed limit’ sign (G6-316)

VSL schemes on motorways and in tunnels shall also comply with requirements provided in:

- TS 06339.1
- TS 06320.

10.1.14.2 Change in movement and place function by time of day/week

Variable speed limits have additional uses outside of motorway settings. Variable speed limits may be used on routes or locations where there is a large shift in the use of the road. A full-time speed limit reduction should be investigated/considered prior to the installation of a variable speed limit. These variable speed limits should be electronically signposted.

When signposting electronic VSLs, there shall be:

- a ‘Start variable speed limit’ sign (Figure 16) before the first electronic VSL sign (Figure 19)
- an electronic VSL sign (Figure 19) sign after each intersection
- an ‘End variable speed limit’ sign (Figure 20) at the entry to each intersecting side road, accompanied by a speed limit sign, if the default does not apply to the road
- an ‘End variable speed limit’ sign (Figure 20) after the last electronic VSL sign and before any speed limit signs.

A typical signage plan for an electronic VSL is outlined in Figure 21.

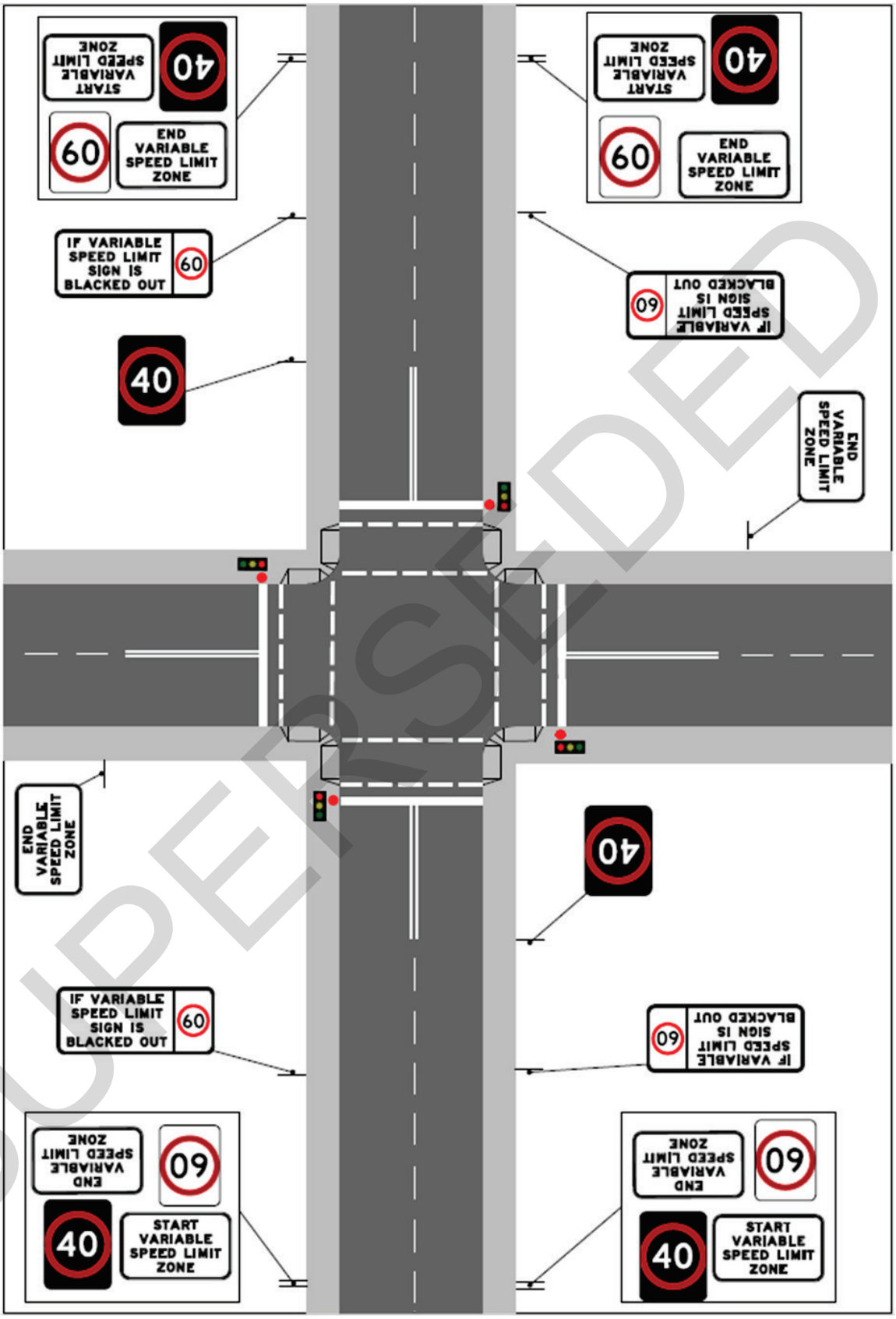

Figure 21 – Typical signage plan for an electronic VSL

10.1.14.3 Wet weather VSLs

Wet weather VSLs are generally only used on roads where there are significantly more crashes and crash risk when it is raining.

When signposting a wet weather VSL, there shall be:

- a ‘Wet weather speed limit ahead’ sign (Figure 22)
- a ‘speed restriction – when raining here’ sign (Figure 23) alongside a ‘speed restriction – unless raining’ sign (Figure 24) at the start of the zone.

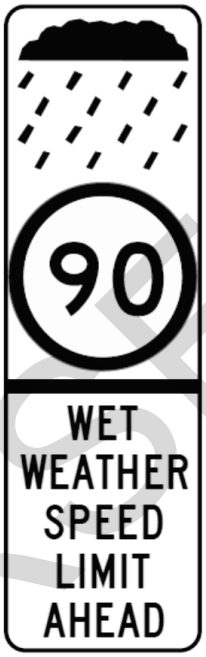

Figure 22 – ‘Wet weather speed limit ahead’ sign (R6-249)

Figure 23 – ‘Speed restriction – when raining here’ sign (R4-238N)

Figure 24 – 'Speed restriction – unless raining' sign (R4-239N)

10.1.15 Heavy vehicle speed zones

Speed zoning for heavy vehicles (trucks and buses) is recommended where there is a significant risk to this road user group due to steep grades.

Where the prevailing speed limit exceeds the safer speed for heavy vehicles, taking into account road grade and length of a descent, a lower heavy vehicle speed zone should be considered.

When implementing a speed zone for heavy vehicles that is different from the prevailing speed limit, there shall be:

- a 'Truck and bus speed limit' sign (Figure 25) installed at the start of the zone
- an 'End truck and bus speed limit' sign (Figure 26) at the end of the zone.

Refer to the AS 1742.2 to determine whether other supplementary signs are required.

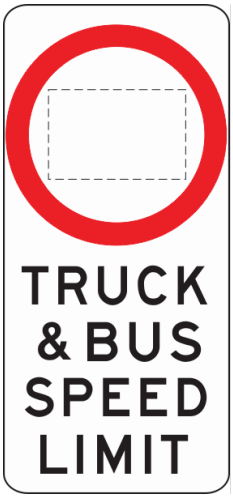

Figure 25 – 'Truck and bus speed limit' sign (R4-229N)

Figure 26 – 'End truck and bus speed limit' sign (R4-220N)

10.1.16 Active level crossings: train

Offset speed limits should be installed at all active level crossings across NSW. It is recommended that an 80 km/h speed limit is installed 400 m on approach to the level crossing as well as continued for additional 200 m on the egress of the active level crossings.

The approach speed limit ensures that heavy vehicles can comply with the safe stopping distance as well as ensuring adequate sight distance on approach to the active level crossing.

The egress speed limit should be continued for an additional 200 m to ensure that motorists approaching a level crossing cannot see the reduced speed limit sign of 80 km/h as well as seeing an increased speed limit sign for the exit of the offset speed limit.

Further information can be seen in the signage plan in Figure 27.

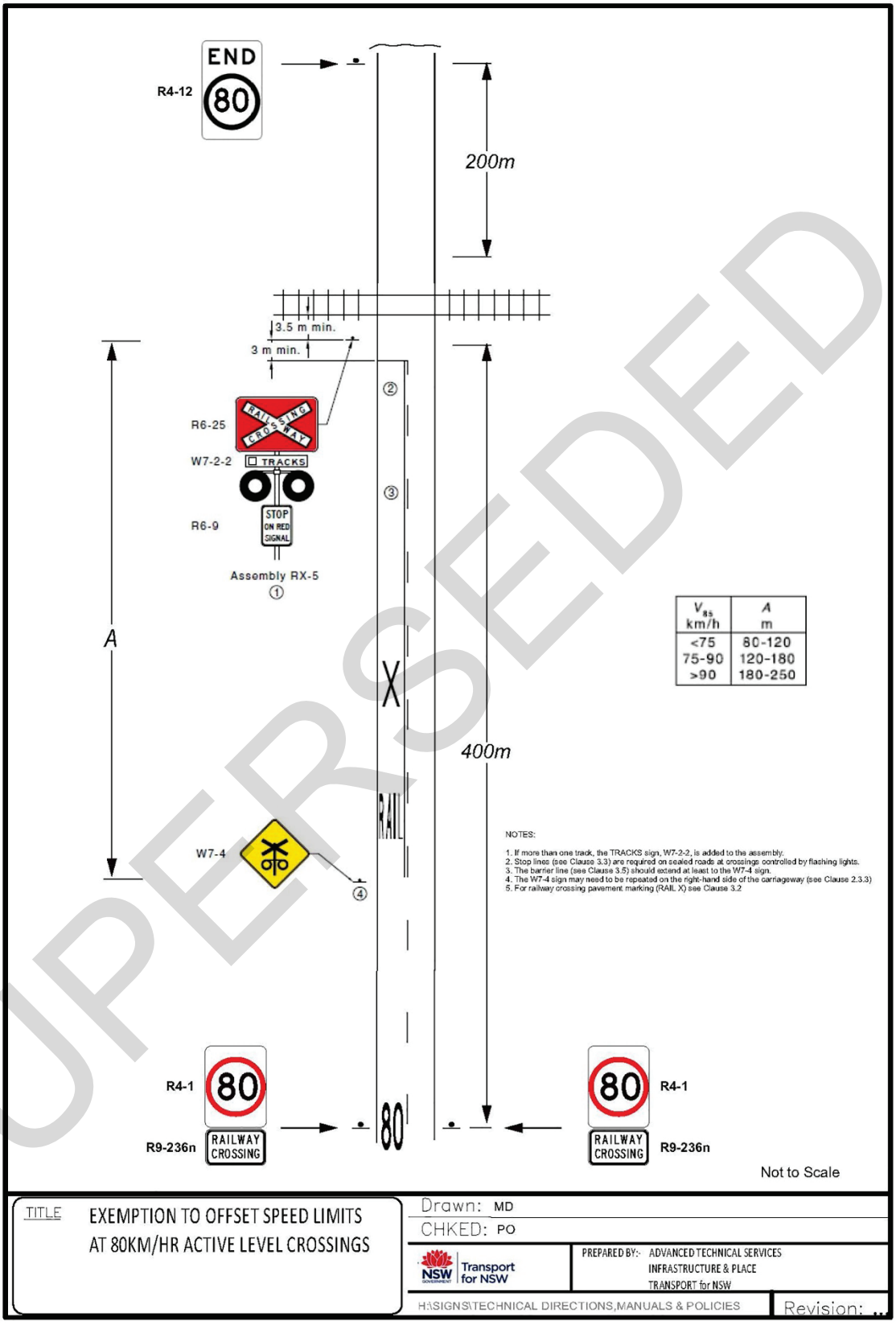

Figure 27 – Speed signage layout for active level crossings

10.1.17 Supplementary plates

Supplementary plates may be used to highlight particular risks along a speed zone. For a detailed list of supplementary signs refer to AS 1742.4.

Note: Time of operation supplementary plate is not supported.

When installing an 80 km/h zone ahead of an active railway level crossing, practitioners should install a railway crossing sign (Figure 28) below the speed limit sign.

Figure 28 – 'Railway crossing' sign (R9-236N)

10.2 High pedestrian activity areas

A high pedestrian activity area is a road, or network of roads, with a posted speed limit of 20, 30 or 40 km/h. Installation of high pedestrian activity areas is for use in areas with high numbers of pedestrians on local, regional and some state roads.

High pedestrian activity areas are appropriate in central business district (CBD) areas, suburban shopping strips, town centres, areas where land-use generates or facilitates significant pedestrian traffic (parks, beaches, tourist attractions), local streets and residential areas.

As part of the installation of a high pedestrian activity area, a local area traffic management assessment (local area traffic management in accordance with Austroads *Guide to Traffic Management Part 8: Local Street Management*) is required:

- where pedestrians frequently cross the road and cyclist share the road corridor with general traffic
- un-separated bicycle lanes (no separation between vehicles and cyclists)
- change in surrounding road environment to distinctively display that the road corridor is a low speed road environment, this can be completed through narrowing the road corridor.

The *Cycleway Design Toolbox – Designing for cycling and micromobility* should be taken into consideration when installing 20 km/h, 30 km/h and 40 km/h zones.

When installing new low speed environments, such as a 30 km/h high pedestrian activity area, supporting infrastructure shall be installed to support the operations of lower speeds. Supporting infrastructure should be installed prior to the installation of the reduced speed limit. Further information around supporting infrastructure can be found in Section 10.1.1.

TfNSW will review and comment on civil engineering designs before the installation of additional traffic calming devices commences. This process occurs through the Local Traffic Committee process and usual arrangements for the delivery of TfNSW funded work.

10.2.1 Deciding on treatments

Selecting the appropriate treatments to create safe speeds for pedestrians in a high pedestrian activity area involves consideration of the crash history and evidence-based risk factors as well as the movement and place functions of the route or area. A balance of these considerations will determine the level of infrastructure required to support the speed limit reduction or consolidation of limits across an area.

The following questions provide context on the decision-making process of deciding on treatments.

- What is the level of crash risk to pedestrians?

  Classification of the route or area under review as having either a high or low evidence-based crash risk to pedestrians.

- What is the differential between the existing operational speed and the high pedestrian activity area speed limit?

  Determine differential between surveyed operational speed and the proposed high pedestrian activity area speed limit. If the 85th percentile speed based on the current speed zone is more than 10 km/h over the proposed high pedestrian activity area speed limit, the differential is high.

10.2.1.1 High-risk area

The following provides context on what is considered a high-risk area:

- road or area with history of pedestrian and bicycle rider fatal and/or serious injury crashes and/or risk modelling which indicates high risk to pedestrians and bicycle riders; and/or
- high differential between current operational speed and proposed high pedestrian activity area speed limit; and/or
- areas that service a high number of pedestrians who are aged or disabled.

10.2.1.2 Low-risk area

The following provides context on what is considered a low-risk area:

- road or area with low or no pedestrian or bicycle rider crash history and/or risk modelling which indicates low risk to pedestrians and bicycle riders
- low differential between current operational speed and proposed high pedestrian activity speed limit.

10.2.2 Treatment options

Traffic calming schemes shall be designed and installed to restrict vehicle travel speeds throughout the whole speed restricted area. For further information around the criteria for 30 km/h and 40 km/h see Section 9.4.

Typical traffic calming treatments include:

- raised threshold, including speed humps and wombat crossings (primary Safe System treatment)
- footpath and kerb extensions (supporting treatment)
- continuous footpaths or textured threshold treatments at gateways (supporting treatment)
- channelisation of roadway (supporting treatment)
- staggered carriageway (supporting treatment)
- managed on-street parking (supporting treatment)
- installation of medians (supporting treatment)
- traffic signal timing (supporting treatment)
- raised safety platform (supporting treatment).

In areas that service a high number of pedestrians who are elderly or disabled, extra traffic calming measures should be considered, for example:

- tactile and or coloured pavement tiles, considering *Disability Discrimination Act 1992* requirements for vision-impaired pedestrians
- handrails
- lipless transitions (from footway to carriageway).

Pedestrian crossings should be raised (wombat) and installed in association with kerb extensions. Specific devices that emphasise the marked foot crossing such as textured pavement treatments should be considered.

Existing research shows that long wait times for pedestrian phases results in pedestrians becoming impatient and noncompliant with signal phasing, which in turns leads to increases in pedestrian crashes. Wait times of 30 seconds can be considered excessive by pedestrians particularly where there are no obvious conflicting vehicle movements.

Insufficient crossing time and turning vehicles are also known contributors to increased safety risk for pedestrians at signal phases.

A review of all traffic control signals (TCS) within the identified high pedestrian activity area needs to be conducted in regard to the following:

- crossing times for pedestrians should be increased to ensure that pedestrians have additional time to safely cross the road
- reprioritising the signals so they rest in green for the pedestrian phase
- update of signals to include pedestrian protection
- pedestrian waiting times should be decreased
- review existing intersections to ensure that a marked foot crossing on each leg of the intersection or junction in accordance with the TS 05384.14
- investigation into the possible use of raised safety platform treatments within the proposed HPAA.

For more information regarding design and implementation of traffic calming schemes, see the Austroads *Guide to Traffic Management Part 8: Local Street Management.*

10.2.3 Treatment matrix

The traffic mix shall be taken into account when designing a traffic calming scheme, including bicycles, buses and other service vehicles.

The following treatment matrix (Table 7) is provided as a quick reference guide for the additional infrastructure treatments which may be appropriate to support the desired outcome and change in travel speed.

Table 7 – HPA treatments matrix

Risk	High crash risk/low crash risk	Primary Safe System treatments	Supporting Safe System treatments
High risk	High crash risk / high differential	Shall be installed	Shall be installed
High risk	High crash risk / low differential	Installation recommended	Installation recommended
Low risk	Low crash risk / high differential	Installation recommended	Installation recommended
Low risk	Low crash risk / low differential	Considered	Installation recommended

Note: See the Austroads Research Report AP-R560-18 *Towards Safe System Infrastructure – A Compendium of Current Knowledge* for more information about primary and secondary Safe System treatments. Austroads Research Report AP-R611-20 *Integrating Safe System with Movement and Place for Vulnerable Road Users* also provides guidance around appropriate and safe supporting infrastructure considerations for different environments from a vulnerable road user perspective.

10.2.4 Signposting high pedestrian activity areas

When high pedestrian activity areas are installed as area speed zones there shall be:

- a ‘High pedestrian activity 30 area’ sign (Figure 29) or ‘high pedestrian activity 40 area’ sign (Figure 30) installed at all entry points to the area
- ‘30’ or ‘40’ in pavement numerals marked on the road at all entry points
- a ‘High pedestrian activity 30’ (Figure 29) or ‘high pedestrian activity 40’ (Figure 30) repeater signs installed at intervals as specified in Section 10.1.6, with a maximum interval of 500 m on a through road

  Note: On roads with limited lateral space – a ‘speed limit’ sign may be installed above a ‘high pedestrian activity’ sign (Figure 6) instead
- an ‘end 30 area’ (Figure 31) or an ‘end 40 area’ (Figure 32) sign installed at each exit point to the area. Speed limit signs for the adjoining speed limit shall be installed at the nearest practical point unless the default applies.

A typical signage plan for a 40 km/h high pedestrian activity area has been provided in Figure 33.

Figure 29 – ‘High pedestrian activity 30 area’ sign (R4-236-1N)

Figure 30 – ‘High pedestrian activity 40 area’ sign (R4-236N)

Figure 31 – 'End 30 area' sign (R4-11-1N)

Figure 32 – 'End 40 area' sign (R4-11)

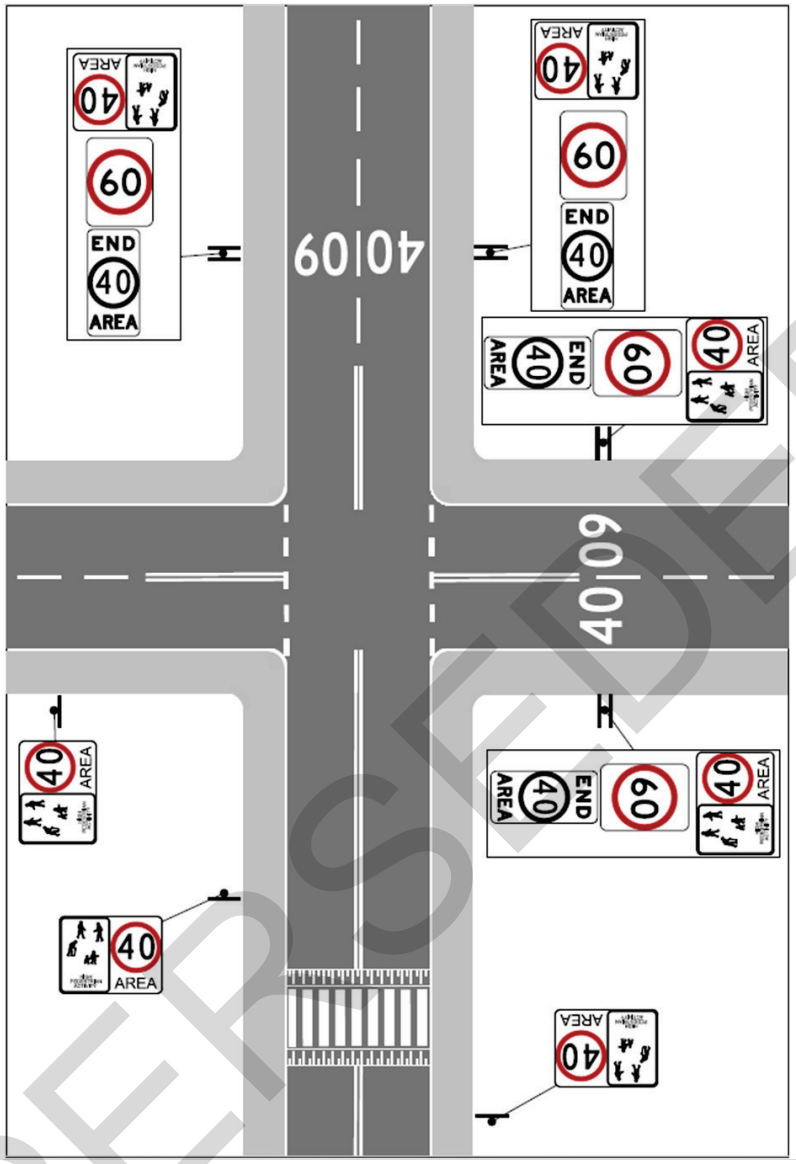

Figure 33 – Typical signage and markings for high pedestrian activity area

Note: Figure 33 does not include additional traffic calming only signage layout.

10.2.5 Road safety audit and post installation review

It is a requirement that post installation review is conducted on the high pedestrian activity area to ensure that all road users are provided with a safe environment. A road safety audit should be conducted post installation if the speed zone required additional engineering treatments.

Road safety audits provide a means of managing road safety by identifying risks associated with road and traffic works. Road safety audits are a device to assist project managers to ensure improved road safety outcomes.

On regional and local roads, councils are responsible for designing and installing traffic calming schemes. TfNSW may provide a grant for these works. The local council shall conduct road safety audits in accordance with the *Austroads Guide to Road Safety Part 6: Road Safety Audit*

and RTA *Guidelines for Road Safety Audit Practices*, prior to TfNSW endorsing the scheme. Completion of the speed zone review and speed zone authorisation is not a matter for the Local Traffic Committee.

On state roads, TfNSW is required to design and install all treatments. TfNSW will ensure that a road safety audit is conducted in accordance with the Austroads *Guide to Road Safety Part 6: Road Safety Audit* and RTA *Guidelines for Road Safety Audit Practices* on all TfNSW works.

TfNSW traffic engineering, in collaboration with local council traffic engineering, shall inspect and review the scheme within a month of the speed zone installation. Elements to be inspected include:

- Signs and markings:
    - Do the signs adequately inform the motorists of the speed limit?
    - Are there enough signs?
    - Do gateway treatments require textual paving to reinforce the posted speed limit?
- Traffic calming scheme:
    - Does the traffic calming scheme adequately restrict vehicle speeds throughout the area or zone?
    - Do service vehicles have satisfactory access to the area?
    - Are there suitable pedestrian crossings installed?
    - Does the traffic calming scheme support pedestrians crossing the roadway?

10.3 Shared zone, including provision for parking

10.3.1 Shared zones

A shared zone is a road or network of roads where pedestrians have priority over vehicles. All shared zones in NSW shall display a speed limit of 10 km/h.

There are two different categories of shared zones:

- A category one (1) shared zone is provided on a road or road related area, has different surface treatments from the surrounding roads, and typically does not have kerbs.
- A category two (2) shared zone is provided on a road and can include kerbs and footpath parking. These shared zones will likely require traffic calming devices and treatments to regulate traffic speeds to 10 km/h.

When designing and installing a shared zone, there shall be:

- A ‘shared zone’ sign (Figure 34) in combination with a ‘give way to pedestrians’ sign (Figure 35) installed on each entry road into the area. Entry signposting is to be duplicated on each side of the road, where possible.
- ‘Give way to pedestrians’ pavement marking installed on the road for category 2 shared zones.
- ‘Shared zone’ signs in combination with ‘give way to pedestrians’ signs repeated at appropriate intervals.
- ‘End shared zone’ signs (Figure 36) installed on each exit road from the area. The speed limit signs for the adjoining speed limit shall be installed at the nearest practical point.

Where parking is provided in a shared zone, there shall be:

- ‘Park in bays only’ signs (Figure 37) provided under the ‘shared zone’ signs at each entry into the shared zone.
- Marked parking bays within the shared zone. The length and width of any parking space shall comply with AS/NZS 2890.1.

A typical signage plan for a category 1 shared zone has been provided in Figure 38. A typical signage plan for a category 2 shared zone has been provided in Figure 39.

Figure 34 – ‘Shared zone’ sign (R4-4)

Figure 35 – ‘Give way to pedestrians’ sign (R4-10)

Figure 36 – 'End Shared zone' sign (R4-5)

Figure 37 – 'Park in bays only' sign (R5-65)

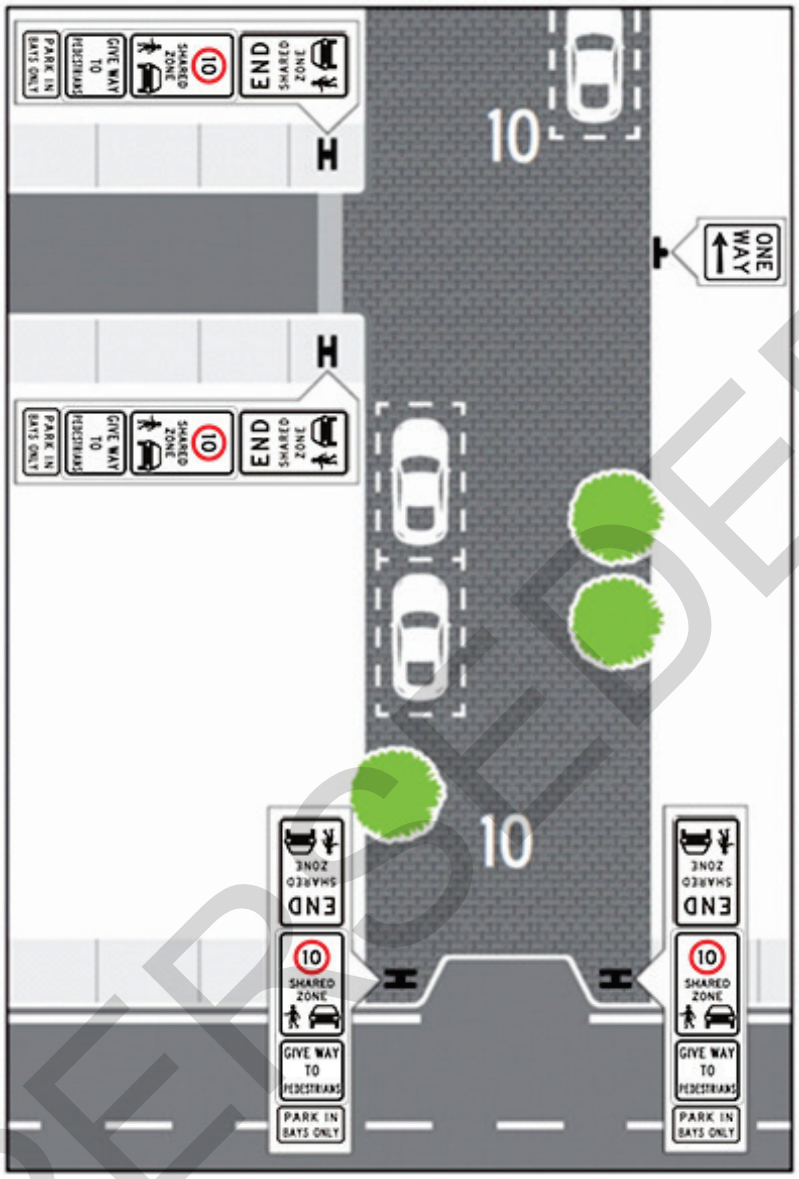

Figure 38 – Typical category 1 shared zone layout and treatments

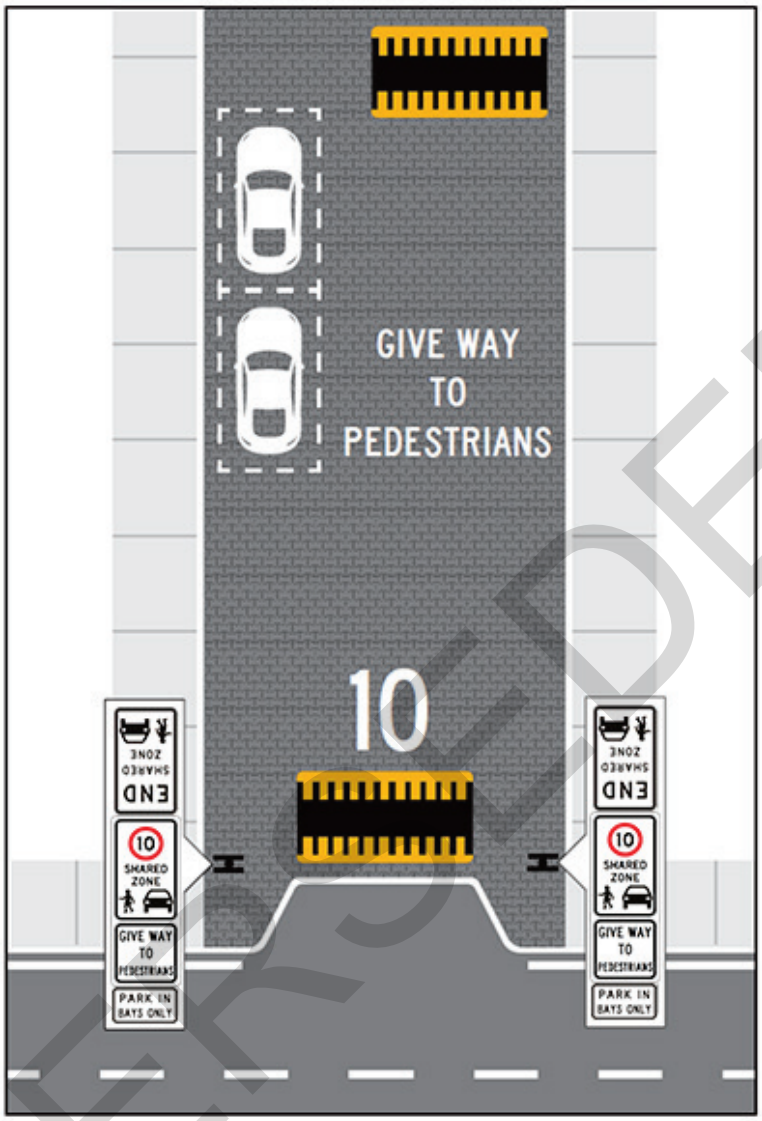

Figure 39 – Typical category 2 shared zone layout and treatments

10.3.2 Deciding on treatments

Selecting the appropriate treatments to create safe speeds for pedestrians in shared zones involves consideration of the particular category of shared zone being implemented.

10.3.3 Road safety audits

Road safety audits provide a means of identifying and managing road safety risks within all road environments.

The features provided in shared zones shall be safe for all road users and pedestrians in particular. The road safety audit shall identify issues pertaining to vehicle speeds, movements and pedestrian safety and disability use.

Road safety audits shall be conducted at a number of points during a project, including at the design stage. The project manager shall address any identified deficiencies before construction. A road safety audit shall be conducted after implementation.

Road safety audits shall be completed in accordance with the Austroads *Guide to Road Safety Part 6: Road Safety Audit* and RTA *Guidelines for Road Safety Audit Practices*.

A shared zone should not look like a normal road environment and should be self-explaining. Therefore, the design shall clearly highlight to drivers that there is a change in the road environment and traffic conditions and that pedestrians have priority.

10.3.3.1 Kerb and guttering

All new category 1 shared zones shall be constructed without kerbs and delineation (other than parking bays if required).

For shared zones on existing roads, kerbs should be removed, except in special circumstances, for example heritage considerations or cost constraints. The retention of kerbs shall have TfNSW approval.

Where existing kerbs are retained, traffic calming devices and a visibly changed road environment may be needed to slow vehicles. See 10.3.3.2 for more guidance.

Appropriate drainage grates should be installed to cater for pedestrian and cyclist use.

10.3.3.2 Traffic calming treatments

Traffic calming treatments shall be included within shared zones to reduce vehicle speeds, where a change in the road environment will not work alone.

Where kerbs and gutters are retained, these treatments should be considered:

- road narrowing/kerb extension
- raised thresholds at entry points and midblock
- change in carriageway surface and texture
- landscaping and street furniture, for example bollards, architectural decorations, seating and lighting
- pavement markings.

As shared zones are pedestrian priority environments, pedestrian crossings and pedestrian fencing shall not be installed. Where already installed, these treatments shall be removed.

10.3.3.3 Entrance/exit points

Category 2 shared zones shall include:

- prominent features to indicate a change in the environment and highlight the start/end of the shared zone such as signage, pavement markings and architectural or landscape features
- 'Give way to pedestrians' pavement marking at the entrance points.

When designing any shared zone, continuous footpath treatments or raised thresholds should be considered as entry/exit treatments to assist traffic calming.

10.3.3.4 Signage

For category 1 and 2 shared zones:

- regulatory traffic signs shall be installed as per Section 10.1.3
- all entry signs shall be provided on both sides of the road or road related area
- advisory speed plates are not required to supplement speed hump advisory signs
- regulatory speed signage should be approved through Local Traffic Committee.

10.3.3.5 Pavement surface and markings

For category 1 and 2 shared zones, the pavement surface shall be changed to highlight the difference in the shared zone from the surrounding road network. It should be clearly distinguishable by colour, texture and/or materials.

For category 2 shared zones, 'Give way to pedestrians' pavement markings shall be provided at entry points. Pavement markings such as the pedestrian symbol and the numerals 10 at regular intervals along the existing road length shall also be taken into account.

10.3.3.6 Provision for mobility and vision-impaired people

The design for shared zones shall safely accommodate the needs of those who are mobility restricted and vision impaired. Features such as tactile paving, handrails and the careful placement of landscaping and street furniture shall be taken into account during the design process. Refer to AS/NZS 1428.4.1 or detailed design requirements.

10.3.3.7 Forward visibility

To encourage drivers to comply with the 10 km/h speed limit, it is recommended that shared zones have limited forward visibility.

In locations where it is considered necessary to maintain visibility, a minimum stopping sight distance of 12 m shall be applied and traffic calming considered.

10.3.3.8 Bicycles

Cyclists shall be able to navigate the traffic calming infrastructure safely. Accordingly, features to lower vehicle speeds shall be bicycle and pedestrian friendly, especially where pedestrians are less agile.

In one-way shared zones, consideration should be given to contra-flow bicycle movements. This provision will increase access for non-motorised transport and, if implemented, shall include bicycles excepted (R9-3) signs below the 'no entry' and/or 'one way' signs.

10.3.3.9 Vehicle mix and accessibility requirements

Access shall be designed for emergency vehicles, delivery and garbage trucks. Alternative access for large vehicles such as buses needs to be planned.

In a shared zone with two-way traffic movement where the available travel width is less than six metres, storage gaps should be provided to allow moving vehicles to pass each other. A convenient position for storage gaps is adjacent to driveways where the loss of parking spaces is minimised. Storage gaps may not be necessary where the street is short and a driver entering at one end of the shared zone is able to see a vehicle entering at the opposite end.

10.3.3.10 Parking bays: general

The following provides additional information on the installation of parking bays within a shared zone:

- Where parking is provided in a shared zone, it shall only be permitted in marked bays and shall have the relevant signage provided.
- If parking bays are located on each side of the road the width between them shall not be less than three metres to allow vehicles to travel safely along the road or road related area.
- The location of the parking spaces or areas shall not compromise sight distances at a shared zone entry point.
- The location of parking spaces shall not impinge on emergency and delivery vehicle swept paths.
- Car parking bays shall be marked in accordance with the prescribed lengths and widths in AS 2890.5 and AS/NZS 2890.6.
- On-street parking for people with disabilities shall be provided in accordance with AS/NZS 2890.6.

Angled parking is not considered appropriate in a shared zone as wider carriageway widths are required, and it is undesirable to have vehicles reversing.

10.3.3.11 Parking bays: retained kerb considerations

In category 2 shared zones, marked parking bays are permitted to straddle existing kerb and gutter, where required and approved.

Retaining barrier kerb (type SA) is acceptable adjacent to parking spaces that have direct access via a driveway from one end. This would limit parking to a maximum of two parallel parking spaces in series between driveways.

Providing roll-top kerb (type RT) is the ideal treatment where parking spaces are not directly accessible from a driveway, or where there are long lengths between driveways. This treatment will facilitate the provision of three or more parallel parking spaces in series. Alternating short lengths of different kerb types along a kerb line should be avoided. This practice may be acceptable if the kerb types are separated by driveways.

Provisions for pedestrian access shall be provided for essential services, including property access and letterboxes.

10.3.3.12 Parking, utilities and access

- Utility poles may restrict positioning and access to and from parking bays. The location of parking bays in relation to utility poles shall be defined to suit the relevant road authority.
- The parking spaces, including vehicle access to and from the spaces, shall not affect access to utilities. Utility covers may not be trafficable, ensure that car parking does not damage utilities.
- Parking bays should not restrict access to property entrances.
- Parking spaces shall be located so they can be accessed without the driver breaking the law.
- Trees and shrubs planted in the shared zone may affect positioning and access to and from parking bays, depending on the location and size of the tree or shrub.

10.4 School zones

A school zone shall be installed wherever there is a point of entry from a public road which is utilised by school students.

School zones shall be 40 km/h on roads where the prevailing speed limit is 40 km/h or more.

Where a school zone is on a road with a prevailing speed limit less than 40 km/h, the school zone speed limit shall be the same as the lower speed limit. If the prevailing speed limit is less than 40 km/h the school zone should be installed with fluorescent signage (R4-235).

School zone signage should be installed as per Section 10.4.1.3.

10.4.1 School zone position and length

A school zone should only be installed on a road that has a direct access point to the school. The school's main direct access point should be the midpoint for measuring the school zone length. In the case of multiple access points on one length of road, the midpoint of these access points should be located to serve as the midpoint of the length of the school zone. The position and length of each school zone shall be determined on a case-by-case basis, taking into account the following factors:

- approach speed limits
- visibility of school zone signage
- road alignment
- roadside development
- suitable sign installation locations
- location of pedestrian crossing facilities, fixed enforcement devices
- proximity to the intersection of a classified road
- proximity to other schools (for example precincts).

The minimum length of a school zone on the main school frontage should not be less than 200 m where the school zone speed limit is 40 km/h.

The actual lengths of school zones should be determined from the needs of the individual school, having regard for the type of road, traffic volume, traffic speed, visibility and road conditions.

The minimum length that a school zone may extend into a side street is 10 m.

10.4.1.1 Extending minimum lengths of school zones

School zones should be extended beyond the minimum requirements to meet sight distances as determined by deceleration distances for vehicles approaching a school zone. The entry school speed zone signs should be installed at locations that provide for sight distance shown in Table 8.

The length of a school zone shall not be extended if any of the following circumstance eventuate:

- existing traffic facilities are obscured
- major arterial roads (with no direct access points to the school) are disrupted
- adjacent speed zones do not meet desired minimum speed zone length.

10.4.1.2 Standard school zone days and times

School zones apply on school days, as outlined in NSW *Road Rules 2014*.

School zone times are:

- 8:00 – 9:30 am
- 2:30 – 4:00 pm.

Consistent operation of school zones, including standard operating times, is a key element of ensuring safety around schools. Requests for non-standard school zones are assessed on a case-by-case basis.

10.4.1.3 School zone signage

A school zone may commence at any of the following signs:

- a ‘school zone’ sign (Figure 40)
- a ‘school zone – non-standard time’ sign (Figure 41)
- a ‘flashing school zone’ sign or ‘flashing school zone – non-standard time’ sign.

At the start of a school zone, the sign shall be installed at only one of the following:

- on both sides of the carriageway
- on the side of the road and in the median
- on the side of the road and over the roadway, to form a gateway effect.

Over-the-roadway school zone signage should only be installed if the following elements apply:

- the school zone is on a multi-lane road
- the start of the school zone does not meet sight distance requirements in accordance with Table 8
- the start of the school zone cannot be relocated in order to improve sight distance in accordance with Table 8
- there is sufficient width available and there is no conflict with utility services or other sign or traffic controlled signal installations.

At the end of the school zone, at least one ‘end school zone’ sign (Figure 42) shall be installed on the left-hand side of the carriageway.

Other speed limit signs shall not be placed within school zones.

Figure 40 – School zone' sign (R4-230N)

Figure 41 – School zone – non-standard time' sign (R4-235-N)

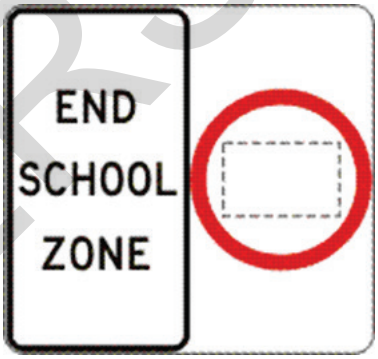

Figure 42 – End school zone' sign (R4-231)

Where there is a speed reduction of 20 km/h (or more) for the school zone, or sight lines are particularly limited on approach to a school zone, a 'speed restriction ahead (school zone)' sign (Figure 43) may be installed.

Figure 43 – Speed restriction ahead (school zone)' sign (G6-332)

Table 8 outlines the required distance between a 'speed restriction ahead (school zone)' sign and the start of the school zone based on the posted approach speed.

Table 8 – Placement of 'speed restriction ahead (school zone)' sign

Posted approach speed to school zone (km/h)	Distance to school speed zone change (m)
50	60 to 80
60	80 to 100
70	100 to 120
80	120 to 140
90	140 to 170
100	170 to 210
110	210 to 260

10.4.2 Flashing light treatments

At least one flashing lights treatment should be provided for every school in NSW:

- A flashing lights treatment may be a set of two flashing lights at either end of a school zone, or where a one-way school zone is treated, only one sign may be required at the entry into that zone.
- Schools within a school zone precinct may be treated with a common flashing lights treatment.
- School zone entry points should be identified for flashing lights to achieve the greatest road safety benefit.

Figure 44 and Figure 45 show the different types of school flashing light treatments that may be used.

Figure 44 – Flashing school zone sign

School zones on lower-risk roads (Figure 44):

- with a speed limit of 50 km/h or less
- only 1 or 2 lanes.

Figure 45 – Flashing school zone sign – with annulus

School zones on higher-risk roads (Figure 45):

- with a speed limit of 60 km/h and above
- high-traffic roads with 3 or more lanes and a speed limit of 50 km/h and above.

Additional school zone flashing lights may also be installed at locations that TfNSW identifies as higher risk locations. The *Flashing lights request form* (D.4) includes the program guidelines for the provision of additional school zone flashing lights.

Repeater flashing lights treatments should not be used except for particularly long school zones, or to support the operation of school zone red-light/speed cameras.

The existence of a school zone is determined by the school zone sign. Flashing lights are high visibility treatments which support the signage.

10.4.3 Delineation treatments

In addition to signage, pavement markings are also required as part of a school zone including:

- '40' (or speed limit appropriate) pavement patches. For more information, refer to TS 05462.
- Dragon's teeth. Refer to TS 05411 for more information.

10.4.4 Signage and treatment requirements for NSW Government schools in recess or closed

When a NSW Government school is placed in recess or gazetted as closed, the process outlined in Table 9 should be followed.

Table 9 – Treatment requirements for NSW Government schools in recess or closed

School status`	School zone treatments
Placed in recess	• Cover/bag the school zone signs (including flashing lights), but do not remove them. • Remove the school zone from Speed Management Portal. • Leave patches and dragon's teeth in place.
Gazetted as closed	• Remove the school zone signs (including flashing lights). • Remove the patches and dragon's teeth.

10.4.5 Pre-schools

School zones are not intended for implementation at pre-schools. School zones are not appropriate at pre-schools for a number of reasons:

- The success and compliance with school zones relies heavily on the presence of pedestrian footpath activity. This level of activity does not occur at pre-schools and therefore the necessity to slow down is not always evident to motorists.
- Pre-school children are escorted into the school property by parents and therefore the level of risk is significantly reduced in comparison to a primary or infant school where many children are unaccompanied on or near the road.
- Pre-schools are often located in converted residential premises and are therefore not readily identified by motorists.

10.4.6 Other school zone exclusions

On some school frontage roads, the presence of a school zone will add little to overall safety of the school environment, for example:

- in rural situations with wide setbacks, greater than 20 m, where no children walk to school and children are picked up or set down near access gates located well clear of the carriageway
- minor dead end road frontages where speeds are likely to be below the school zone speed limit.

In these and other similar circumstances a school zone may not need to be implemented if the agreement of the school principal is obtained. However, this does not preclude reconsideration at a later date. These cases should be documented for future reference.

It is recommended that greenfield schools that are built should not have direct school access points onto the State Road network. Adding school access to state roads increases student exposure to risks.

10.5 Advice on situations not covered

Not every situation is covered within this document. Where a situation arises and the requirements of this document cannot be applied, the advice of the responsible speed authoriser (as per the ancillary document) shall be sought in the first instance. The responsible speed authoriser may seek the advice of the Safer Roads team in Safety, Environment and Regulation for complex speed zone reviews or where this document does not cover the situation.

The outcomes of a speed zone review or speed zone assessment may also be referred to the Safer Roads team if escalation from ROM or GS is required.