

Additional technical information

Speed management guide:
Road to Zero edition



Speed limit signs

Speed limit signs display maximum enforceable speed limits. Specifications for signs are available on the Waka Kotahi sign specifications webpage.

Under the Land Transport Rule: Setting of Speed Limits 2022 (the Rule), the road controlling authority (RCA) retains responsibility for installing speed limit signs in compliance with the Land Transport Rule: Traffic Control Devices 2004 where road users can easily see them.

Speed limit sign locations

A speed limit sign must be located on the left-hand side of a road at or near and not more than 20m from the point on the road where a speed limit changes.

Speed limit change points must be at or close to a point of obvious change in the roadside development or road environment.

If the estimated two-way annual average daily traffic at the point where a speed limit changes exceeds 500 vehicles per day, an additional speed limit sign must be installed on the right-hand side of the road or on the central median where appropriate.

Intervals between speed limit signs

Repeater signs are generally used where the speed limit is above 50km/h and below 100km/h.

They are not usually necessary if the nature of a particular length of road is such that a road user would reasonably understand that the speed limit displayed on the last speed limit sign remains the speed limit on the road throughout the whole of that length of road.

In deciding on the use and placement of repeater signs, RCAs should monitor mean operating speeds as well as speed limits on adjacent and connecting roads.

Where repeater signs are appropriate, RCAs can refer to the following guidance on the recommended maximum intervals between speed limit signs (see Table 1).

Table 1: Recommended maximum intervals between speed limit signs

Permanent or seasonal speed limit (km/h)	Maximum interval (km)
60	2.0
70	2.4
80	2.7
90	3.0

Compare: Land Transport Rule: Setting Speed Limits 2017, Schedule 2.

Further information on intervals between speed limit signs is in section 2 of the Waka Kotahi *Manual of traffic signs and markings*.¹

Traffic control devices

The Land Transport Rule: Traffic Control Devices 2004 defines a traffic control device as a device used on a road for the purpose of traffic control and includes any sign, signal, notice, traffic calming device, marking or road surface treatment. Therefore, speed limit signs are traffic control devices.

Guidance on the speed limit and related signs is provided under the Land Transport Rule: Traffic Control Devices 2004. Please refer to the *Traffic control devices manual* on the Waka Kotahi website for more information.

www.nzta.govt.nz/resources/traffic-control-devices-manual/sign-specifications/

¹ Waka Kotahi NZ Transport Agency. 2011. Section 2: Regulatory signs – general, in *Manual of traffic signs and markings* (Part 1). Wellington.

Variable speed limits

A variable speed limit can be an effective option to address road safety and traffic management priorities.

Variable speed limits can apply to specified times or be activated under certain traffic and weather conditions. They can be operated manually for specific timeframes or events or automatically for specific timeframes or by specific triggers such as a vehicle nearing an intersection.

Variable speed limits help to manage and smooth traffic flows particularly where traffic volumes are high such as managed motorways. They can help reduce crash frequency and severity.

Traditionally, variable speed limits have been used outside schools. They have been shown to be effective for reducing the severity of injury crashes at high-risk intersections and on road corridors during cold and wet weather.

Area-based approaches can preclude the need for variable speeds limits

Area-based approaches to speed management, such as implementing or planning for broader 30km/h urban speed limit residential areas and 60km/h rural areas, can preclude the need for expensive electronic variable speed limit signs.

Therefore, it is advisable to consider the potential application of area-wide approaches aligned with the safe and appropriate speed information provided in a speed management plan or implementation programme, before committing resources to a variable speed limit at a particular location.

Variable speeds limits facilitate both the place and movement aspects of the One Network Framework

Variable speed limits are suitable for corridors with congestion or peaks in traffic volumes or where an elevated likelihood of incident or delay exists. Therefore, they can be applied to local roads (such as a road outside a school), urban arterials, network corridors and motorways. This means variable speeds limits are applicable whether the One Network Framework place or movement function predominates.

For motorways, a variable speed limit can smooth traffic flow, particularly when volumes are high or when on-ramps or off-ramps are present. Electronic variable speed limit signs on motorways (as with variable speed limit signs generally) can be

automatically or manually activated. They are used in conjunction with managed motorway systems.

For schools, the need for variable speed limits (that is, speed limits that vary from the prevailing speed limit during school times) is expected to be less under the Land Transport Rule: Setting of Speed Limits 2022 (the Rule) than under the previous rule, particularly in urban areas.

Variable speed limits around schools should be considered only when all other alternatives have been exhausted. This is because in urban areas, the estimated safe and appropriate speeds now include a significantly larger proportion of recommended permanent 30km/h and 40km/h speed limits and fewer recommended 50km/h limits than in previous assessments. Therefore, the safe and appropriate speed limit in an urban area is much more likely to align with the safe and appropriate speed limit required outside a school.

Consideration of variable speed limits could be used as a phased step towards a Safe System end-state on both urban and rural roads.

Rule requirements relating to variable speed limits

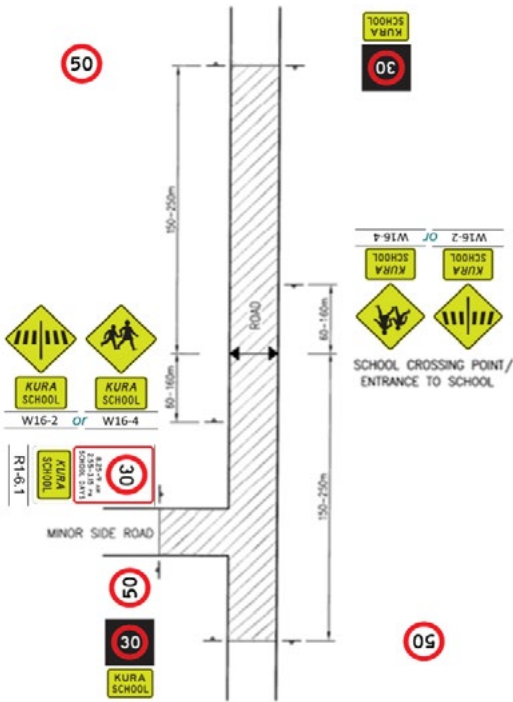
Under the Rule, an RCA may set a variable speed limit only if it is satisfied that:

- the speed limit needs to vary in order to be safe and appropriate for the road
- a variable speed limit is necessary to address or manage one or more of the following:
 - different numbers and types of road users or different traffic movements
 - the effects of changing traffic volumes, such as easing congestion
 - for emergency or temporary traffic management
 - a crash risk posed by turning or crossing traffic
 - changing climatic conditions
 - the presence of a school
 - the presence of a marae
 - vehicles driving on a beach or riverbed.

In any other case, Waka Kotahi (as an RCA) or the territorial authority may set a variable speed limit only with the Director of Land Transport's approval.

Figure 1 provides an example of a variable speed limit outside a school.

Figure 1: Variable speed limit outside a school



Signs for variable speed limits

Variable speed limits require electronic variable speed limit signs to be effective for reducing main road speeds. Static variable speed limit signs (showing times of operation) are used on minor give way and stop-controlled side roads to support electronic variable speed limit signs located on the main roads.

Every variable speed limit application has a specific permitted sign or sign set. Variable speed limits are not legal or enforceable unless the correct sign set, installed according to the sign set's associated conditions, is used.

Minimum road lengths for speed limits

Schedule 1 to the Land Transport Rule: Setting of Speed Limits 2022 (the Rule) specifies minimum lengths for specified speed limits, which are informed by average travel time over the stretch of road concerned. These are set out in Table 2.

Table 2: Road lengths for speed limits

Speed limit (km/h)	Minimum length (m)
50	500
60	600
70	700
80	800
90	2,000
100	2,000
110	As approved by the Director of Land Transport under clause 4.4 of the Rule

As specified in clause 4.6 of the Rule, exceptions to the minimum lengths in Table 2 apply in case of one or more of the following:

- the requirement is impracticable for the road
- the section of road is a road outside a school
- a lower speed limit is applied to a section of road as part of a variable speed limit.

Notwithstanding, it is desirable for all speed limits, regardless of type, to comply with minimum lengths wherever possible. RCAs need to carefully consider potential effects if they are considering implementing short road length or multiple changes in speed limit along a road or street.

Under clause 4.7 of the Rule, a speed limit may apply to a road length shorter than that referenced above if set at the same speed limit of an adjoining 'main' road. This can apply even if the speed limit on the short length is not specified in a speed management plan or subject to Director of Land Transport approval via the Alternative Method (under clause 2.6 of the Rule).

Point on road at which a speed limit changes

Clause 4.8(1) of the Rule requires the RCA to be satisfied that speed limit change is at or close to a point of obvious change in the roadside development or the road environment.

Clause 4.8(2) of the Rule provides that the presence of a school nearby may be treated as an obvious change in the roadside development or road environment. This provision enables a lower permanent speed limit to be applied to a section of road outside a school (see specific sign requirements in Appendix 2).

Speed limits of less than 50km/h applied to road lengths

The Rule does not specify minimum road lengths for speed limits of 30km/h or 40km/h. However, the road lengths in Table 3 should be considered minimum lengths if the road length is sufficient and other considerations allow.

Intersection speed zones

Intersection speed zones help reduce speeds around intersections, making it easier and safer for people to pull into or out of a side road. These zones give drivers more time to react to mistakes and avoid collisions, so crashes are less likely and the outcome of a crash is less severe, if not avoidable.

Intersection speed zones implemented in Aotearoa New Zealand have demonstrated their effectiveness by reducing operating speeds, improving vehicle gap selection, improving road user perceptions, decreasing fatal and serious injury crashes and reducing total crashes.¹

In delivering safe system outcomes, intersection speed zones are considered a 'Supporting Safe System Treatment' (or an interim measure) as they improve the overall level of safety at the intersection, reducing severe trauma. However, they are not as effective as a 'Primary Safe System Treatment' (such as a

Table 3: Recommended road lengths for 30km/h and 40km/h speed limits

Speed limit (km/h)	Minimum length (m)
30	300
40	400

The recommended road lengths for 30km/h and 40km/h speed limits need to be considered in context. There are stretches of road of less than 300m in urban environments where such a speed limit can be applicable. These stretches may be streets linking collector or arterial roads or where such a speed limit complements traffic calming approaches.

Any decision to set a 30km/h or 40km/h speed limit should be informed by wider road network considerations such as risks associated with higher operating speeds on approaches.

The recommended distances for 30km/h and 40km/h speed limits (that is, 300m and 400m respectively) align with best practice experience with achieving road user compliance with school permanent and variable speed limits. Road users tend to disregard shorter distances as the speed limit sign at the end of the restriction can be visible before the sign at the beginning of the restriction has been passed, while longer distances lose their effectiveness.

roundabout), which is capable of virtually eliminating the potential risk of death and serious injury.

The following guidance on the appropriate site and variable speed limit selection supersedes any other Waka Kotahi design guidance. However, it does not supersede the criteria in the standard safety intervention toolkit for investment decisions relating to the streamlined investment pathway.²

An intersection speed zone may be a viable solution for Safe System transformation of an intersection if a primary solution is not possible or as an interim measure.

The appropriate variable speed limit for an intersection speed zone should be:

- 70km/h intersection speed zone speed limit, for main roads with 100km/h speed limits and mean operating speeds of 80km/h or higher on the approach to the intersection

1 Waka Kotahi NZ Transport Agency. 2020. *Intersection speed zones: Safe System case study*. Wellington.

2 Waka Kotahi NZ Transport Agency. 2021. *Standard safety intervention toolkit: streamlined investment pathway*. Wellington.

- 60km/h intersection speed zone speed limit (as with rural school variable speed limit signs) for main roads with 100km/h speed limits and mean operating speeds on the approach to the intersection of less than 80km/h
- 60km/h intersection speed zone speed limit for main roads with 80km/h speed limits.

Where the safe and appropriate speed for the main road is 80km/h but the limit has not yet been reduced to that, RCAs should futureproof their intersection speed zone signs by providing for both 70km/h and 60km/h speed limits at the time of installation if the zone is a stand-alone treatment.

Intersection speed zone sign requirements and design

Intersection speed zone signs must comprise an electronic variable speed limit sign with the appropriate format W11-2 controlled crossroads or W11-4 controlled side road warning sign mounted below (shown in Figure 2).

Intersection speed zone signs must be connected to a control and monitoring system as generally described in the following sections.

Figure 2: Intersection speed zone signs



The intersection speed zone is designed to instruct motorists of a lower speed limit when potential conflict situations exist (that is, the presence of a vehicle waiting at a side road or an opposing right-turning vehicle on the main road). This instruction is achieved by potentially conflicting vehicles triggering side-road or right-turn bay sensors and activating the electronic signs on the main road.

An intersection speed zone comprises:

- side-road radar sensors (high-definition radar) to detect approaching side-road traffic about 150m from the intersection and activate main road electronic signs
- automatic side-road limit line sensors (cut loops) to detect waiting traffic and trigger the end of sign activation following a delay
- right-turn bay sensors (where right-turn bays exist) 50–66m from limit line to activate signs plus limit line sensors to detect queuing traffic and terminate sign activation following a delay
- a central control system to manage the zone and accommodate data collection equipment.

Detailed technical requirements for intersection speed zones are addressed as part of intelligent transport systems – electronic warning sign specification.³

³ Waka Kotahi NZ Transport Agency. 2022. [Intelligent transport sections](#) (webpage).

Threshold treatments

Thresholds may involve one or more of:

- speed limit signs (as depicted in Figure 3)
- gateways (as depicted in Figure 3)
- place name signs
- road markings
- side islands
- plantings.

As with the location of speed limit signs, generally, thresholds are used at or close to a point of obvious change in the roadside development or road

environment (such as a change in the speed limit) to increase driver awareness of and compliance with a safe speed.

Thresholds are useful where, for example, the change in roadside development is not immediately obvious on approach and the threshold can be used to reinforce this change. However, a threshold treatment alone does not meet the requirement in the Land Transport Rule: Setting of Speed Limits 2021 for an obvious change in roadside development and road environment.

Figure 3: Threshold treatments

ES2: Speed thresholds	
<p>Description</p>	<p>Threshold treatments or gateways are used to alert road users of a change in road environment and speed limit at a rural/urban threshold and are a combination of a speed limit sign, place name sign and other road markings, side islands or plantings.</p> <p>They are often used where a speed limit sign alone is not effective in ensuring drivers comply with the speed limit on the approach to a town.</p> <p>When designed correctly, thresholds lead to a reduction in vehicle speeds.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>Threshold treatment example (LTSA, RTS 15, 2002) and SH3 Hamilton (Source Google Earth)</p>