



Pedestrian crossing selection guidance note

Pedestrian Network Guidance

NZ Transport Agency Waka Kotahi

29 April 2024

Version 1

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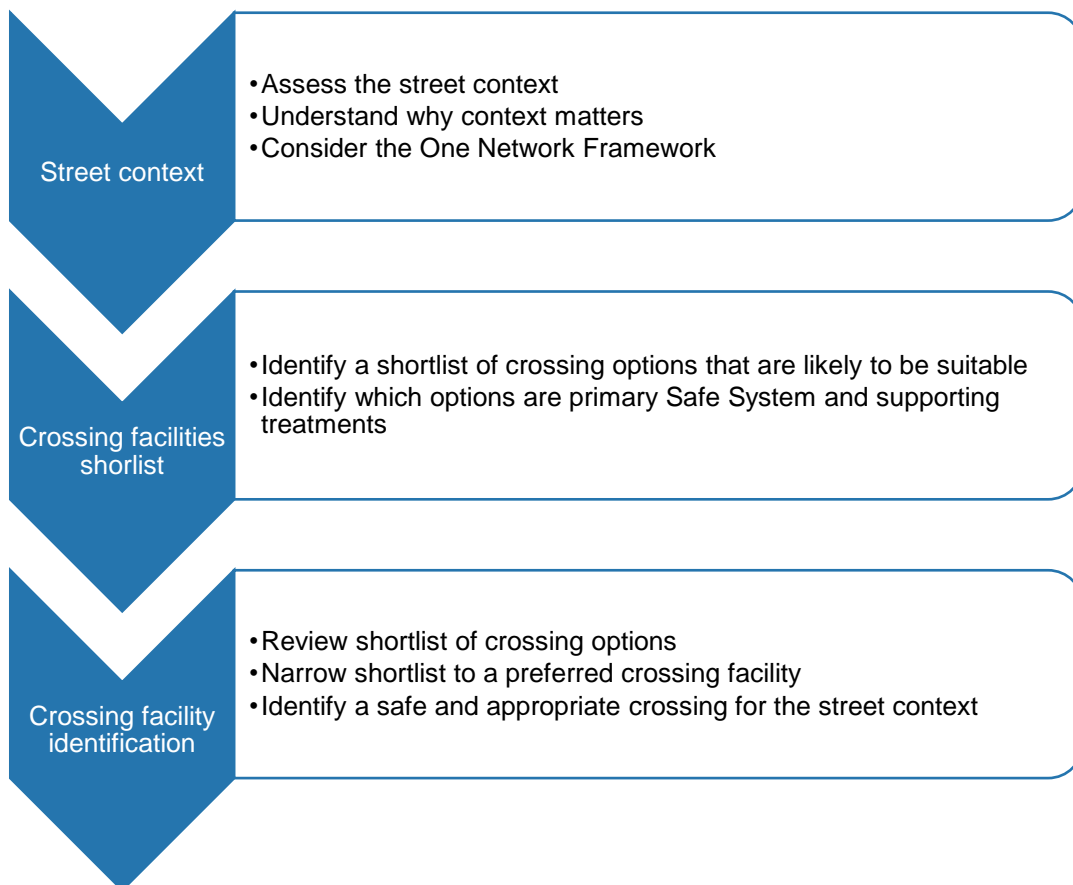
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1. Introduction

Selecting the appropriate pedestrian crossing facility is critical to ensuring people can cross streets safely and easily. Selecting the type of pedestrian crossing facility to implement requires a comprehensive and context sensitive approach. This guidance recommends a three-step process to identify safe and appropriate mid-block pedestrian crossing facilities.

Firstly, understand the street context (outlined in Section 2) and why it matters using the prompts. Then identify a shortlist of crossing options that might be suitable for your location (Section 3). Finally use the crossing facilities table (Section 4) to find out more about detailed considerations for each crossing facility type and other important considerations to identify a safe and appropriate pedestrian crossing facility along with crossing aids (such as kerb extensions) for your location.

This process should be used to assist in identifying suitable mid-block crossing facilities in New Zealand cities and towns. It should not be used to select crossings that support particular user groups (for example, school patrolled zebra crossings and kea crossings) or those that need to accommodate other modes (for example, dual crossings) and rail level crossings. Some streets such as shared zones pedestrians share the space with other road users meaning crossing facilities are not required. Refer to 'Streets and public realm' section of the Pedestrian Network Guidance for further guidance on the characteristics and implementation of these streets.



2. Street context

Table 1 below outlines prompts to assist you understanding and assessing the street context to inform the decision making process.

Table 1 Street Context

Topic	Prompts	Why it matters
Street function	<ul style="list-style-type: none"> What is the current and future movement and place classification of the street? (<u>One Network Framework (ONF)</u>). This classification can be found on Mega Maps. What is the modal classification for walking (and other modes)? Is the street part of the strategic (or supporting) walking network? Should pedestrians have priority when crossing the street? 	<p>The ONF street category can assist in identifying possible crossing treatments as outlined in Table 2 below.</p> <p>The place function ranking guides the level of priority that should be given to pedestrians crossing the street. ONF P1-P3 rankings and W1-W3 classifications generally require priority crossings (or traffic managed or traffic free environments), whereas crossing aids might be acceptable on P4 and W3 streets.</p>
Pedestrian volumes and composition	<ul style="list-style-type: none"> Who is most likely to walk here and wants to cross? Think about pedestrian age, ability and accessibility needs. How many people want to cross here? What needs are they likely to have? What is the surrounding land use and nearby trip attractors/ generators and how might these activities affect the types, times, and volumes of pedestrians wishing to cross? Are there public transport stops or stations nearby and how does that affect crossing demands? What would pedestrians expect in this area? Are pedestrians not crossing here because it is too difficult or unsafe (suppressed demand)? 	<p>Higher crossing demand and less able or less confident pedestrians (for example, young, elderly or disabled people) elevates the need for a priority crossing facility particularly where traffic volumes are considerable because pedestrians then do not need to find a suitable gap in the traffic flow to cross.</p> <p>If few pedestrians are currently crossing, or only certain types of pedestrians are crossing, this can indicate the existing crossing is inadequate.</p>
Pedestrian desire lines	<ul style="list-style-type: none"> Where do pedestrians cross now? Where do pedestrians want to go or come from? Do they cross in one place or are they spread out along the street, or at an intersection? What other crossing opportunities are nearby and what type are they? 	<p>Crossings should be located on pedestrian desire lines as far as practicable. The availability and type of crossings nearby can influence the crossing choice. It may be appropriate to provide priority crossings at key locations (for example, intersection signals) along with non-priority crossings or aids (pedestrian refuges) in between. Refer to <u>Location and spacing of crossings</u> section of the Pedestrian Network Guidance.</p>
Vehicle speeds	<ul style="list-style-type: none"> What is the speed environment, operating speeds, speed limit and the 	<p>Vehicle operating speeds over 30km/h increase the severity of injury or likelihood</p>

Topic	Prompts	Why it matters
	<p>Safe and Appropriate Speed based on the ONF classification?</p> <ul style="list-style-type: none"> Should traffic calming and speed management be used along the route/area to achieve Safe System speeds for people crossing? 	<p>of death in crashes involving pedestrians. Higher speeds make it more difficult for pedestrians to judge safe gaps, affect the driver's ability to react, and require longer sight distances and longer braking distance. Further, higher speed streets are more difficult, and act as barriers, for less able or less confident pedestrians (for example, elderly).</p> <p>In a crash, survivable impact speeds for people outside vehicles is no more than 30km/h¹. Therefore, primary Safe System crossing treatments are those where the operating speed over the crossing will be no more than 30km/h.</p>
Vehicle volumes and composition	<ul style="list-style-type: none"> What are the traffic volumes and composition of traffic (including heavy vehicles, buses and people cycling)? Should the traffic volumes be reduced? Should the traffic composition be modified or restricted? 	<p>Priority crossing treatments can result in delays to other road users, which in urban areas is generally appropriate.</p> <p>At non-priority crossing treatments (crossing aids), people walking must identify a safe gap in the traffic flow to cross. As traffic volumes increase above 7,500 vehicles per day, this increasingly becomes more difficult, particularly for less able or less confident pedestrians (for example, elderly, children, disabled people), and delays can cause frustration and risk taking, and in walking journeys not made. Refer to <u>Crossing aids and pedestrian delay section of the Pedestrian Network Guidance</u>.</p> <p>The frequency of heavy vehicles, buses and cyclists using the street also influences the crossing choice and design.</p>
Road layout and allocation	<ul style="list-style-type: none"> How many traffic lanes are there in each direction? What is the roadway width? Can it be reduced? Can road space be reallocated to reduce the number of lanes? Are there special vehicle lanes such as bus lanes, transit lanes, cycle lanes or separated cycleways? Are there conflict zones such as driveways? How might the road alignment or other obstructions affect visibility and therefore the location and type of crossing? 	<p>The number of traffic lanes directly influences the crossing distance for pedestrians, as well as the width of the roadway. Crossing points should be designed to minimise the crossing distance. When using kerb extensions to reduce the crossing distance, care is needed to not create pinch-points for people cycling on the street.</p> <p>Zebra crossings are not suitable where there is more than one traffic lane in a direction as vehicles in adjacent lanes might block visibility of people crossing or waiting to cross.</p>

¹ Waka Kotahi. 2022. Speed management guide: Road to Zero edition 2022. <https://www.nzta.govt.nz/resources/speed-management-guide-road-to-zero-edition/>

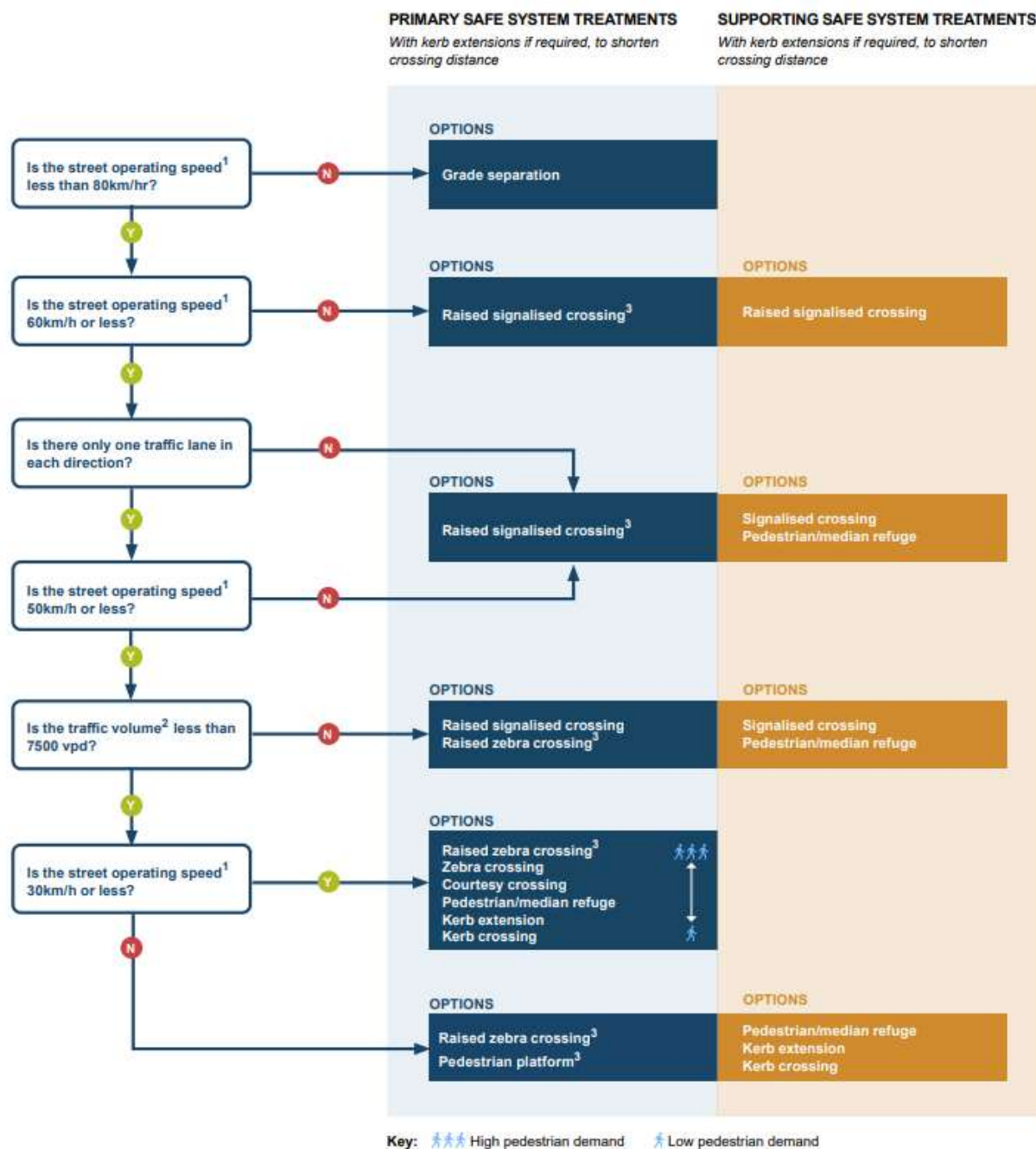
Table 2 below shows the type of crossing facilities that may be suitable for the different ONF street categories. This can then be confirmed using the flowchart in Section 3. The flowchart helps when a street may have a certain ONF classification but have existing vehicle volumes or/and speeds that preclude the implementation of a type of crossing facility listed in Table 2.

Table 2 Possible crossing facility types by ONF Street category

Street category	Possible crossing facility types
Civic space	If low vehicle speeds and low vehicle volumes, design street to allow users to share the space. No formal crossing facilities necessary.
Local street	Pedestrian platform Median refuge Kerb extensions
Activity street	Raised zebra crossing Zebra crossing Raised signalised crossing Signalised crossing Courtesy crossing Median refuge (only when priority crossing nearby)
Main street	Raised zebra crossing Zebra crossing Raised signalised crossing Signalised crossing Courtesy crossing Median refuge (only when priority crossing nearby)
City hub	Raised signalised crossing Signalised crossing
Urban connector	Raised signalised crossing Signalised crossing Median refuge (only when priority crossing nearby)
Transit corridor	Grade separation as likely to be high vehicle speeds

3. Crossing facilities shortlist

Now that you have understood and assessed the street context of your crossing, you can use the flowchart below to identify a shortlist of crossing facilities likely to be appropriate for your street. The flowchart identifies primary Safe System treatments (those which are Safe System aligned) and supporting Safe System treatments (those which can support or make incremental improvements to safety for pedestrians).



Notes:

1 Street operating speed is the 85th percentile vehicle speed at the proposed crossing location before any speed reduction device is implemented. If the operating speed is not known, then assume at least the posted speed.

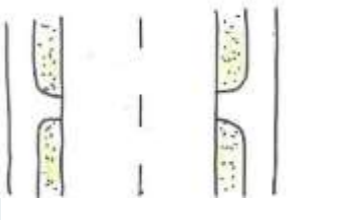
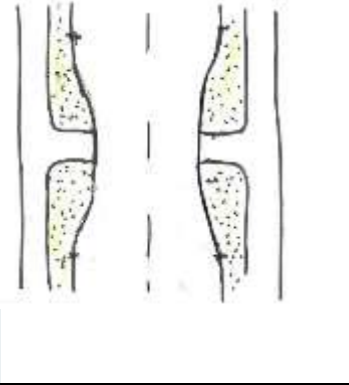
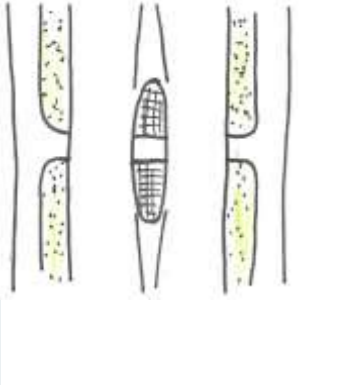
2 If there is an existing or proposed solid median, the traffic volume can be the volume that applies to each side of the median.

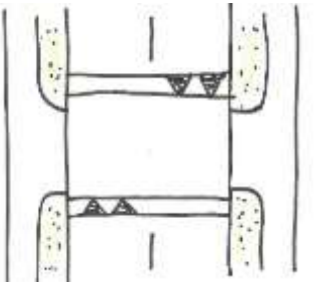
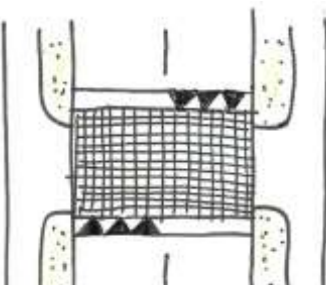
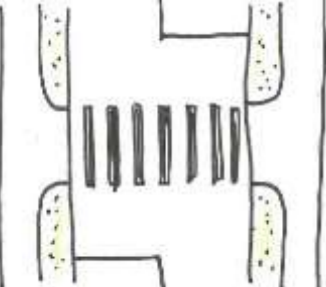
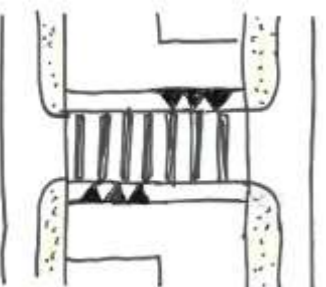
3 Primary Safe System treatment if crossing and vehicle approach is designed to reduce vehicle speeds to 30km/h or less (eg appropriate ramp gradients).

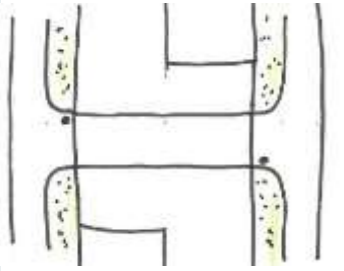
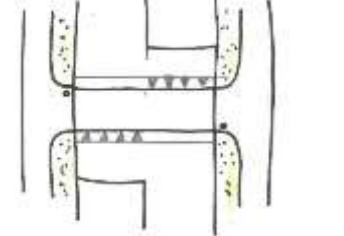

4. Crossing facility identification

Now that you have your shortlisted crossing facility types, use Table 3 below to find out more about the benefits, implications and the recommended parameters that apply to your shortlist. This can help you identifying a safe and appropriate crossing for the street context. Once you have selected the type of pedestrian crossing to be implemented, refer to the relevant crossing facility type design sections of the Pedestrian Network Guidance to find out more about the legal considerations, design considerations and design elements including traffic control device requirements.

Table 3 Crossing facilities – detailed considerations

FACILITY	BENEFITS	IMPLICATIONS	RECOMMENDED PARAMETERS
Non-priority crossings / aids			
<p>Kerb crossing</p> 	<ul style="list-style-type: none"> Provides a smooth transition between the footpath and roadway. 	<ul style="list-style-type: none"> Does not give pedestrians priority. Does not assist pedestrians to cross if street is wide. It can be unsuitable for less able or less confident pedestrians. 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are 30km/h or less. Supporting treatment if operating speeds at the crossing are above 30km/h up to 50km/h. Only appropriate for low vehicle volume environments. Only appropriate on their own for low pedestrian demands.* They are only appropriate where crossing distance is 9m or less. For longer crossing distances, consider kerb extensions. Ensure on-street parking does not block access or visibility from the crossing point.
<p>Kerb extension</p> 	<ul style="list-style-type: none"> Reduces crossing distance and therefore crossing time for pedestrians. Improves visibility to oncoming drivers and pedestrians can view approaching vehicle better. Creates space for pedestrians to wait without blocking others walking past on the footpath through zone. Physically prevents drivers from parking and blocking the crossing point. Can help to slow vehicle speeds by narrowing the roadway. 	<ul style="list-style-type: none"> Does not give pedestrians priority, so it can be unsuitable for less able or less confident pedestrians. Can create an obstruction that may be struck by people cycling and vehicles particularly on narrower streets. Where the kerb alignment is being altered, they can create drainage issues and places where rubbish can accumulate ('stick on' extensions could overcome this if designed well). 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are 30km/h or less. Supporting treatment if operating speeds at the crossing are above 30km/h up to 50km/h. Supports other crossing facilities and aids to reduce the crossing distance. Only appropriate on their own on local streets with low pedestrian demands* and vehicle volumes less than about 7500vpd.
<p>Pedestrian refuge</p> 	<ul style="list-style-type: none"> Crossing task is divided into two stages: <ul style="list-style-type: none"> pedestrians only need to find a gap in one stream of traffic at a time potentially reducing delays to pedestrians. total crossing distance is divided into two crossings, which makes each crossing distance shorter. Can help to slow vehicle speeds by narrowing the traffic lanes. 	<ul style="list-style-type: none"> Does not give pedestrians priority, so it can be unsuitable for less able or less confident pedestrians. Can cause issues for people cycling on road; 3.2m (or 4.2m if on a bus/heavy vehicle route) wide traffic lanes may be required. Alternative provision for people cycling such as cycle bypasses could be used. Can create an obstruction that may be struck by vehicles. Can restrict vehicle access to adjacent driveways. 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are 30km/h or less. Supporting treatment if operating speeds at the crossing are above 30km/h up to 60km/h. Appropriate for low to medium pedestrian demands.* Could be appropriate for low pedestrian demands on multilane high-volume streets with a solid median if vehicles arriving in waves with sufficient gaps and an alternative priority crossing is within 80-100m. Should be combined with kerb extensions to further reduce crossing distance where space permits. Must be designed so the refuge storage area does not cause a pinch point for people cycling past the refuge island. Can be installed on a raised safety platform. Check below for benefits and implications of platforms.

FACILITY	BENEFITS	IMPLICATIONS	RECOMMENDED PARAMETERS
Pedestrian platform 	<ul style="list-style-type: none"> Guides pedestrians to a safer place to cross. Reduces or helps to reinforce slower vehicle speeds. Can eliminate grade changes from the pedestrian route and therefore provides a smooth transition from the footpath. 	<ul style="list-style-type: none"> Does not give pedestrians priority, so it can be unsuitable for less able or less confident pedestrians. Can result in unsafe use if pedestrians believe they have right of way. Can create discomfort for vehicle occupants travelling over platforms if not well designed (and travelling above the recommended speed). May increase noise as vehicles brake, slow, pass over them and then accelerate (particularly heavy vehicles). 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are below 30km/h[1]. Supporting Safe System treatment if operating speeds at the crossing are above 30km/h (for example, if the platform ramp gradients or other features do not achieve a speed reduction to 30km/h or less). Only appropriate for local streets with vehicle volume less than 3000vpd (could be higher if a median refuge is provided). Only appropriate for low pedestrian volumes.* Should be combined with kerb extensions to minimise crossing distance. Crossing should be of an appearance that is clearly distinguishable from the footpath to indicate that pedestrians do not have priority.
Courtesy crossing 	<ul style="list-style-type: none"> Can result in courteous behaviour where drivers yield to pedestrians. Intended to facilitate eye contact between pedestrians and drivers resulting in a mutually negotiated position of who goes first. Can improve pedestrian safety and level of service while causing minimal delay to vehicles. Can eliminate grade changes from the pedestrian route and therefore provides a smooth transition from the footpath. 	<ul style="list-style-type: none"> It is not obvious who has right of way, so it can create uncertainty and can be unsuitable for less able or less confident pedestrians. Can result in unsafe use if pedestrians believe they have right of way. 	<ul style="list-style-type: none"> Likely to be a Primary Safe System treatment as operating speeds need to be below 30km/h[1] for a courtesy crossing to operate effectively. Not obvious who has right of way, so their use is discouraged except where pedestrian volumes are very high and vehicle speeds and volumes are low and where alternative priority crossings are located within 80-100m as this provides route choice. Vehicle volume less than 7500vpd. Only appropriate for crossing distances 7m or less (can be combined with kerb extensions to achieve) as only used in slow speeds where people cycling and motor vehicles share the roadway. Can be combined with kerb extensions. Crossing should be of an appearance that contrasts with both the roadway and footpath to indicate that users are guests in the spaces.
Priority crossings			
Zebra crossing 	<ul style="list-style-type: none"> Gives pedestrians priority resulting in minimal delays for pedestrians. Are obvious for all road users as a place for pedestrians to cross. Can reduce community severance. 	<ul style="list-style-type: none"> Unless on a platform, or without other measures like kerb extensions and median refuge, zebra crossings may not improve pedestrian safety or may even decrease it. High pedestrian flows can dominate and cause vehicle delays (depending on the ONF street category and modal priority this might be acceptable). 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are below 30km/h. Supporting treatment if operating speeds above 30km/h. Posted speed of 50km/h or less (>50km/h posted speed requires approval from NZTA as per TCD Rule Clause 8.2(2)). Maximum of one traffic lane in each direction to avoid traffic in adjacent lanes blocking visibility of people crossing or waiting to cross. Suitable for medium to high pedestrian demand so drivers are expecting pedestrians. Can be combined with kerb extensions and/or a pedestrian refuge.
Raised zebra crossing 	<p>In additional to zebra crossings:</p> <ul style="list-style-type: none"> Reduces or helps to reinforce slower vehicle speeds and increases drivers' give way rates. Can eliminate grade changes from the pedestrian route and therefore provides a smooth transition from the footpath. So, it is more suitable for less able or less confident pedestrians 	<p>In additional to zebra crossings:</p> <ul style="list-style-type: none"> Can create discomfort for vehicle occupants travelling over platforms if not well designed (and travelling above the recommended speed). May increase noise as vehicles brake, slow, pass over them and then accelerate (particularly heavy vehicles). 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are below 30km/h. Supporting treatment if operating speeds at the crossing are above 30km/h[1] up to 50km/h (if the platform ramp gradients do not achieve a speed reduction to 30km/h or less). Posted speed of 50km/h or less (>50km/h posted speed requires approval from NZTA as per TCD Rule Clause 8.2(2)). Lower approach speeds result in higher yielding by drivers. Maximum of one traffic lane in each direction. Suitable for medium to high pedestrian demand* so drivers are expecting pedestrians. Can be combined with kerb extensions and/or a pedestrian refuge.

FACILITY	BENEFITS	IMPLICATIONS	RECOMMENDED PARAMETERS
<p>Signalised crossing</p> 	<ul style="list-style-type: none"> Provides clear information on when a pedestrian can cross so it is better for less able or less confident pedestrians. Can balance the delays to pedestrians and vehicles through time separated priority. Allows pedestrians to cross multiple vehicle lanes. Can reduce community severance across busy streets. Can encourage pedestrians to cross in groups, rather than intermittently, minimising overall vehicle delays. 	<ul style="list-style-type: none"> Can delay pedestrians when vehicles are given more green time. This can result in pedestrians' frustration and crossing therefore the street when the pedestrian signal is still red. Slower pedestrians may find it difficult to cross within the allotted time. More costly to install, operate and maintain than other at-grade crossing types. May increase risk for pedestrians crossing near the signals from drivers not expecting them. Can be disruptive to high vehicle flows if frequently called. 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are below 30km/h. Supporting treatment if operating speeds at the crossing are between 30km/h and 60km/h[1]. Suitable for high pedestrian demand* so signals are activated regularly. For locations with lower pedestrian demand conspicuous advance signal display is recommended. Can be combined with kerb extensions and/or pedestrian refuge. Different signal display, activation and detection options are available.
<p>Raised signalised crossing</p> 	<p>In addition to signalised crossing:</p> <ul style="list-style-type: none"> Can eliminate grade changes from the pedestrian route and therefore the need for kerb ramps. Reduces or helps to reinforce slower vehicle speeds. 	<p>In addition to signalised crossing:</p> <ul style="list-style-type: none"> Can create discomfort for vehicle occupants travelling over platforms if not well designed (and travelling above the recommended speed). May increase noise as vehicles brake, slow, pass over them and then accelerate (particularly heavy vehicles). 	<ul style="list-style-type: none"> Primary Safe System treatment if operating speeds at the crossing are below 30km/h. Supporting treatment if operating speeds at the crossing are between 30km/h and 60km/h[1]. Suitable for high pedestrian demand* so signals are activated regularly. For lower pedestrian demand conspicuous advance signal display is recommended. Can be combined with kerb extensions and/or a refuge. Different signal display, activation and detection options are available.
<p>Grade separation</p> 	<ul style="list-style-type: none"> Allows pedestrians to cross unhindered by vehicles . Allows free traffic flow. Can be covered for weather protection (bridges). 	<ul style="list-style-type: none"> May increase the safety risk if pedestrians continue to cross at-grade. Can increase pedestrians' travel time due to requirement to change level or other detours. Can result in personal security concerns because of reduced natural surveillance. It can be unsuitable for less able or less confident pedestrians. Costly to construct. Can be visually intrusive. Gradients, steps and increased walking distance can create difficulties for less able pedestrians or pedestrians carrying loads. 	<ul style="list-style-type: none"> Should only be used to cross transit corridors (check ONF street categories), natural features (such as waterbodies) and railways; suitable for some rural roads particularly where the operating speed is 80km/h or more. Primary Safe System treatment as pedestrians are separated from vehicle traffic. Grade separated route must be more convenient to pedestrians than any other option (use topography to minimise grade changes for users). If cost prohibitive, consider reducing vehicle speeds so other crossing types become feasible.

* Pedestrian demand may be existing volumes or aspirational volumes because of a project or latent demand. The range for low, medium and high pedestrian demands should be based on local expectations and likely pedestrian characteristics and needs at the crossing.

References

[1] Corben, B. (2020) *Integrating Safe System with Movement and Place for Vulnerable Road Users*, AP-R611-20, p19

Notes:

Crossing sketches are for illustrative purposes only and details such as tactile indicators are not shown.

vpd = vehicles per day.