Bus Stop

Public Transport Design Guidance

Waka Kotahi NZ Transport Agency

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V18

WAKA KOTAHI NZ TRANSPORT AGENCY

Te Kāwanatanga o Aotearoa New Zealand Government

More information

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1. Introduction

The Public Transport Design Guidance supports consultants and regional and local councils to deliver high-quality, consistent, user-centric public transport infrastructure. Each topic in the guidance series is a 'one-stop-shop' of best-practice guidance within the context of New Zealand's regulatory and operating environments.[1]

1.1. Scope of this document

The focus of this topic is bus stop design (which means the physical stop and associated infrastructure, defined below). The aim is more consistent, safer, more accessible and efficient bus stop planning and design. Well-designed bus stops meet a variety of customers' needs and support safe and efficient bus operation. This topic is of great importance because most public transport trips in New Zealand are by bus, and buses are likely to remain the main form of passenger transport. Therefore, bus stops are most people's first point of contact with the public transport system.

This guidance covers the planning and design of bus stops.

In simple terms, a bus stop is a space reserved for buses to load or unload passengers. It includes the space on the road in which the bus stops and the space in which passengers wait for, get on (board) and get off (disembark or alight) a bus, which then continues on its route. Therefore, a bus stop is a defined space on the roadway and footpath, representing the point of connection between pedestrian and bus. It also includes associated infrastructure such as shelters, seating, signage, poles or other related physical infrastructure.

When a bus stop sign is installed, it:

- establishes the area of roadway where the bus may stop
- defines the minimum area of roadway where other road users may not park, stand or stop.[2]

While bus stop design may seem simple, there are complex design details to consider in supporting the connection between pedestrian and bus in an accessible, safe and affordable manner.

1.2. Legislation

There is much legislation that is relevant to planning and design of bus stops and which has been considered in the development of this guidance.

Building Act 2004

Land Transport Act 1998

Land Transport Rule: Road User 2004

Land Transport Rule: Traffic Control Devices 2004

Local Government Act 2002

Public Works Act 1981

Resource Management Act 1991

[1] The guidance topics are available from our website: Public transport design guidance.

[2] Land Transport (Road User) Rule 2004, clause 6.8.

1.3. Safety

Road to Zero 2020–2030, New Zealand's road safety strategy, tells us all what we need to do to improve road safety.[3] This strategy sets the country on a path to achieve Vision Zero – a New Zealand where no one is killed or seriously injured on the roads. The Road to Zero strategy sets an initial target to reduce deaths and serious injuries on New Zealand's roads, streets, cycleways and footpaths by 40 percent over the 10 years to 2030 (from 2018 levels). Reaching that target would mean reducing annual road deaths to 227 and serious injuries to 1,680 by 2030. Improving safety on New Zealand roads is a Waka Kotahi priority, and this guidance is a part of our contribution to a safer transport network.

Road to Zero 2020-2030

The bus stop design topic is relevant to four focus areas under Road to Zero:

- infrastructure improvements and speed management
- work-related road safety (for bus drivers)
- road user choices (for example, making public transport more appealing to customers, improving accessibility for disabled passengers, developing better multi-modal integration with other road users such as pedestrians, cyclists and general traffic)
- system management (support best practice road safety activity through leadership, coordination, and engagement, to bring the public along on the journey towards Vision Zero)

We strongly recommended that an independent safety review is undertaken of both the network philosophy and detailed design of each bus stop location.

1.4. Related guidelines

The guidelines reviewed in developing this Public Transport Design Guidance on bus stop design are listed below. Some guidance may offer readers additional useful information.

Auckland Transport

Transport Design Manual (draft for industry feedback)

Austroads guides (webpage with links to guides)

National Transport Authority (Ireland), *Guidance on Bus Stop Locations in Rural Areas*, *National Cycle Manual 5.1 Bus Stops*

NZ Transport Agency, *Manual of Traffic Signs and Markings: Part 1 Traffic signs*

TransLink, *Public Transport Infrastructure Manual (PTIM) 2015*.

Waka Kotahi NZ Transport Agency:

- Code of Practice for Temporary Traffic Management (webpage)
- Cycling Network Guidance (webpage)
- Disability sector engagement: Good practice guide
- Guidelines for the Safe Siting of School Bus Stops
- Hononga kit e iwi | our Māori engagement framework
- Pedestrian Network Guidance (webpage)

[3] New Zealand Government. 2019. *Road to Zero: New Zealand's road safety strategy 2020–2030*. Wellington: Ministry of Transport.

- Traffic Control Devices Manual (webpage with links to the documents that make up the manual)
- Traffic notes (webpage with links to notes)
- Road and traffic standard series (webpage with links to Transport Agency standards).

Note that a full Bus Stop Design Reference list is also provided later in this document.

1.5. Sustainable outcomes

Sound ways exist to reduce environmental impact and promote sustainable outcomes in the design of bus stops.

Facilities supporting a public transport network should be designed to enhance and improve the local community. One enhancement should be to reduce negative environmental impacts, particularly when compared with private single-occupant cars that travel the same journey.

Areas of improvement can be in:

- vehicle technology
- reduced stormwater run-off
- green roofs
- the choice of materials in construction
- low energy equipment and smart design that reduce operational energy costs.

This section discusses:

- solar lighting (section 1.5.1)
- trees and shrubs (section 1.5.2
- green and living roofs (section 1.5.3)
- battery electric bus charging stations (section 1.5.4)
- shelter materials (section 1.5.5)
- recycled materials (section 1.5.6).

1.5.1. Solar lighting

Consider attaching solar panels to bus stop shelters to power lighting or other powered hardware like security cameras or customer information systems. Locate solar panels to maximise solar exposure and minimise visual impact.

An extra benefit of solar shelters is the ability to take them ‘off grid’. They don’t require mains electricity, so invasive and time-consuming street works are not required.

1.5.2. Trees and shrubs

Trees and shrubs can be planted to reduce the environmental impact of infrastructure and the built environment. This reduction is achieved by combining natural and built environments. Trees and shrubs can improve the amenity of the area and the waiting experience for passengers. However, consider the impact of such measures on inclusive access to the bus stop and corridor clearance.

For more design principles, see Public Transport Design Guidance topic https://www.transport.govt.nz/area-of-interest/environment-and-climate-change/public-transport-decarbonisation/.

1.5.3. Green and living roofs

Bus shelters offer an opportune surface for an attractive green space in the country's concrete-dominated urban streets (see the examples in *Figure 1* and *Figure 2*).

Living vegetation installed on the roof of a bus shelter (called a green or living roof) is in a prime position to filter pollution and particulates from transport exhausts.

Green bus shelters highlight the value of integrating sustainable design and green travel in attempts to address climate change and support biodiversity, particularly in densely populated urban areas.

When deliberating on using green roofs on bus shelters, consider the impact such measures may have on the shelter's structure (for example, additional weight on the roof) and whether additional maintenance will be required (for example, watering). Consider selecting appropriate native plant species to help support local biodiversity and to minimise watering.

Figure 1: Green/living roof on a UK bus stop shelter. Source: Clear Channel UK.

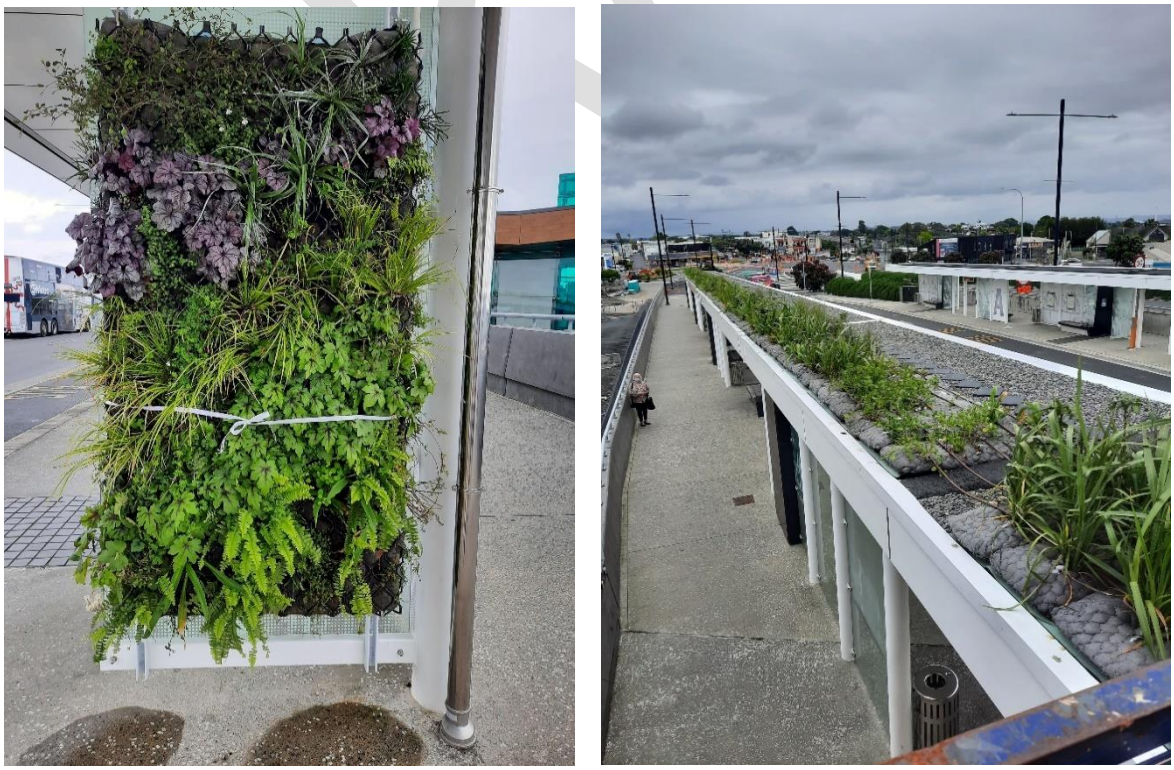


Figure 2: Green roof bus stop trials in Panmure, Auckland. Source: Cathy Bebelman, Auckland Transport.

1.5.4. Battery electric bus charging

Opportunity charging for battery electric buses is most likely to be relevant at locations where buses may stop for longer periods (for example, bus layovers and interchanges).

For brief information about the location and placement of charging units, see Public Transport Design Guidance topic Bus layover and driver facilities.

In the longer term, more comprehensive guidance about battery electric bus charging infrastructure will be released in the Public Transport Design Guidance series.

1.5.5. Shelter materials

When installing bus shelters, minimise environmental impact by considering both the embedded carbon associated with making the shelter and the likely asset life of the shelter. The shelter with the lowest environmental impact is one made of sustainable materials with a long life.

Emerging innovations may offer additional options for shelter material. At least one council has been approached by a supplier of 3D-printed bus shelters that would be equipped with solar panels, seating and space for art. Long term, production of shelters by 3-D printing may offer a low-cost method of shelter production, enabling more widespread rollout of shelters and other favourable outcomes.

1.5.6. Recycled materials

Street furniture can be made of recycled materials as depicted in the image below

Figure 3.

Figure 3: Seat made from recycled plastic materials. Source: Sarah Thorne.

2. Bus stop location planning

This section covers the wide range of planning factors that are critical when deciding where to locate a bus stop.

This section starts by explaining bus stop classifications (section 2.1). These classifications are based on the One Network Framework, New Zealand's national classification system for determining the function of roads and streets.

For information about the framework, see One Network Framework.

Other topics covered in this section are:

- Location fundamentals (land use, bus stop spacing, personal safety and security, section 2.2)
- Walking access (section 2.3)
- Bus stops near intersections (section 2.4)
- Site specific considerations (section 2.5)
- School bus stops (section 2.6)

Note that network and route planning is out of the scope of this guidance. We may develop new guidance on that topic in the future. In the interim we recommend using the *Auckland Transport Code of Practice*: Chapter 2: Integrated transport planning.

2.1. Bus stop classifications

The five bus stop classifications are basic, standard, intermediate, premium and public transport interchange. The classifications are based on place and movement considerations to support the aspirations of the One Network Framework. That framework seeks to balance and integrate the intended strategic and local place and movement functions of the road network as well as the levels of service for all transport modes.

One Network Framework

Table 1: Indicative bus stop classifications – place and movement based on the One Network Framework (ONF) classification

ONF Place scale	Indicative land use or sense of place	ONF public transport descriptor*	Passenger volume at stop†	Bus stop classification
P1	Very high density mixed-use (high-rise apartments and office towers), downtown retail and commercial centres, civic spaces, shared spaces, downtown precincts and waterfronts.	Dedicated (PT1), spine (PT2), (and regional services)	High	Public transport interchange or premium
			Moderate	Premium or intermediate
P2	Diverse mixed use, low-rise apartments, special zones, high-density commercial/retail and main street promenades.	Dedicated (PT1), spine (PT2), primary (PT3) (and possibly inter-regional services)	High	Premium or intermediate
			Moderate	Intermediate
P3	Medium-density and mixed-use residential/commercial,	Spine (PT2), primary (PT3), targeted (PT5)	High	Intermediate
			Moderate	Intermediate
			Low	Standard

ONF Place scale	Indicative land use or sense of place	ONF public transport descriptor*	Passenger volume at stop†	Bus stop classification
	villages, urban greens and stopping places.			
P4	Mostly low/medium density residential neighbourhoods in urban and peri-urban areas. Lifestyle blocks in peri-urban areas.	Secondary (PT4), targeted (PT5)	Moderate	Intermediate
			Low	Standard
P5	Mostly rural, except for motorways and expressways in urban areas	Targeted (PT5)	Low	Basic

* The public transport descriptors (dedicated, spine, primary, secondary, targeted) are defined in Public transport.

† Indicative number of daily boarding passengers by bus stop classification: basic – 0–5; standard – over 5 and up to 20; intermediate – over 20 and up to 200; premium – over 200 and up to 1000; public transport interchange – more than 1000 passengers per day.

ONF Mode Classification: Public Transport

Further guidance

For more information about design considerations for different classifications of bus stop, see:

- section 4.2: Bus stop components
- section 4.3: Bus stop components – detail.

2.2. Location fundamentals

Fundamental considerations for bus stop location planning include:

- Land use
- Bus stop spacing
- Personal safety and security

2.2.1. Land use

This section discusses:

- the importance of bus stop planning being integrated with wider land use and transport planning
- considering bus stop accessibility in location planning

Integrating bus stops with land use and transport

Bus stop planning should be an integral part of the early phases of land use and transport planning projects, so it is integrated with existing and planned land use developments. As noted in the Government Policy Statement on Land Transport 2021,[4] it may make sense to invest in public transport ahead of demand when land is more affordable and to support better transport and land use integration. Integration with surrounding land use is critical for all public transport infrastructure to:

- ensure safe operation and minimise potential road safety conflicts

[4] The *Government Policy Statement on Land Transport 2021/22–2030/31* sets out how money from the National Land Transport Fund is allocated towards achieving the Government's transport priorities.

- facilitate community access to social and economic opportunities
- support mode shift (that is, the move away from reliance on private cars)
- reduce greenhouse gas emissions.

The early introduction of public transport services to a newly urbanising area can help establish multi-modal travel patterns and minimise car dependency.

Government Policy Statement on Land Transport 2021

Accessibility considerations for location planning

Accessibility should be considered in bus stop location planning because all people should be able to use public transport. Accessibility includes making the bus stop safe, obvious, step-free and considering elements such as seating type, hard surfaces and kerb depth and height.

It is acknowledged that some aspects of accessibility can make bus stops relatively expensive to implement, so we recommend a pragmatic approach that focuses on the very highest accessibility standards for:

- busy bus stops (such as those in town and city centres)
- bus stops where people access essential services such as supermarkets, local shopping centres, hospitals and other medical clinics, and social support services
- residential areas with large proportions of people likely to need these features such as outside residential care facilities and retirement villages.

It is acknowledged that it may not be feasible to provide every element of universal access at every bus stop. Accessibility recommendations by bus stop type are provided in section 4.2, Bus stop components and 4.3.2, Accessibility.

2.2.2. Bus stop spacing

Bus stops should be spaced to balance accessibility and efficiency of the bus service and to provide ‘paired’ bus stops for services running in opposite directions.

This section discusses:

- the optimal distance between bus stops
- bus stop pairing

Optimal distance between bus stops

The optimal distance from one bus stop to the next depends on a wide variety of factors that have to be balanced but is usually 250–800m (see Table 2).

A more frequent stopping pattern is appropriate around major trip generators (usually in town or city centres) and important community facilities (for example, places of employment, places of education and hospitals). Locate bus stops as close as possible to these major trip generators and important community facilities. Good practice bus stop location and spacing is illustrated in Figure 4.

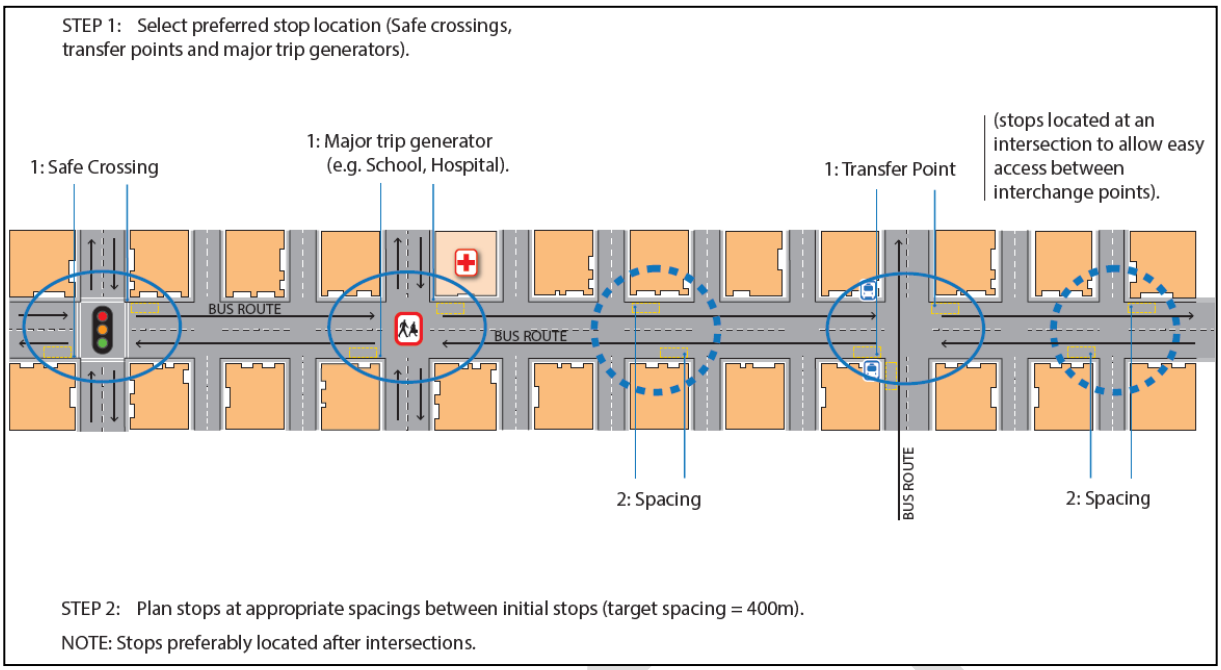


Figure 4: Good practice principles for bus stop spacing and location. Source: Auckland Transport Engineering Design Code Public Transport Bus Infrastructure: https://at.govt.nz/media/1984537/engineering-design-code-public-transport.pdf

For buses to offer people an attractive and viable alternative to private cars, bus stop spacing design must consider and balance the street's place and movement functions and passenger demand for the stop. Bus journey times are affected by the number of stops on a route – the more stops, the more choice, but the longer journey duration. Bus stop spacing is also a factor in accessibility – how far people are expected to walk between stops.

To achieve optimal spacing, carefully balance passengers' need to get to and from bus stops easily with their need for an efficient service (that is, one that doesn't stop too often). Table 2 provides guidance on bus stop spacing in different locations.

Table 2: Bus stop spacing guidance

Location of bus stop	Recommended spacing between stops	Comment
Urban area (general)	400m	Most people in the bus service catchment area have about a 5-minute walk to or from the nearest bus stop.
Very densely populated area	250–400m	Higher density residential areas have higher demand for bus stops. Spacing may be less than 400m but should be no less than 250m.
Rapid transit route	800m	Spacing is usually about 800m, because in areas with higher quality bus services people are more likely to be willing to walk a bit further for a better level of service.
Lower density area	800m or more	In lower density areas such as rural areas, spacing can be increased up to 800m or more due to low passenger volumes and long distances between properties.

You do not have to comply with the recommendations in Table 2, but should determine bus stop spacing based on:

- the location of major trip generators, community facilities and other key land uses
- people's identified needs
- locations being safe for buses to stop and for people to get on and off.

For example:

- bus stops may need to be spaced less than 400m apart to be conveniently located near key land uses, where pedestrian connectivity is poor (such as where there is high severance issues), or where land topology dictates (such as on hills or in steep areas)
- where the trip generator on a bus route has multiple access points for pedestrians, the walking network will be predictive in determining bus stop spacing.

Further guidance

For more information on bus stop spacing, see Public Transport Design Guidance topics:

Getting to and from public transport

Public transport priority and optimisation.

Bus stop pairing

Bus stops should be provided in pairs, that is, with inbound and outbound stops are near each other. Where possible, pairs should be staggered in a 'tail to tail' arrangement on opposite sides of the road, as shown in Figure 5 (and, ideally some crossing facility provided between the stops)

Pairing in a tail-to-tail arrangement compared with a pair of bus stops directly opposite each other has safety and operational benefits. It minimises the potential conflict between overtaking vehicles at the bus stops.

The separation distance between paired stops for a stopped bus to be safely overtaken depends on:

- road width (for example, the wider the road, the shorter the separation distance can be)
- speed limit (for example, the faster the limit, the longer the separation distance should be)
- the opportunity and need to provide a safe crossing point.

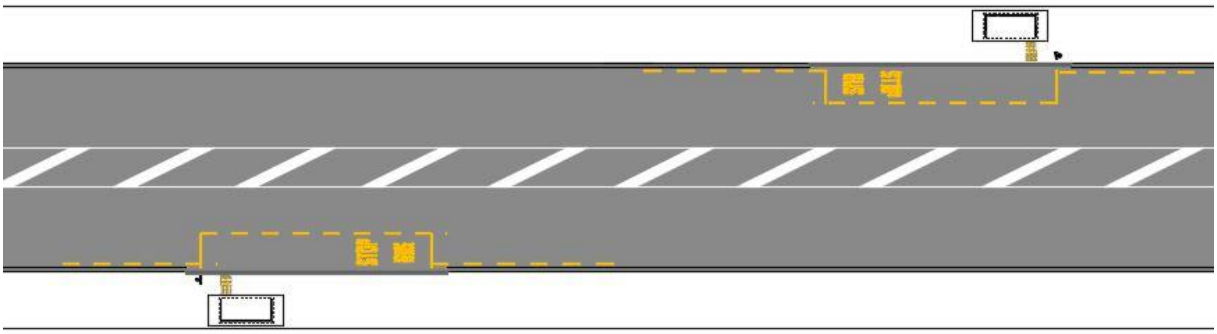


Figure 5: Tail-to-tail bus stop arrangement.

Figure 5 is illustrative only and does not show a crossing, but as discussed in section 2.3 - 2.4, one should be provided, ideally between the stops, to support passengers to cross behind the buses.

The length of the no stopping lines on the approach to bus stops (shown in Figure 5) depends on the visibility requirements at the kerb crossings. For example, curvature of a road may impact sightlines.

Further guidance

- More guidance on planning crossings for bus stops is provided in sections 2.3 - 2.4.
- For advice about the type of pedestrian crossing appropriate in different contexts, see Pedestrian Network Guidance.

2.2.3. Personal safety and security

Bus stop design should support the outcomes of Road to Zero, the national road safety strategy.

The safety of users of bus stops is paramount. This includes road safety aspects incorporating the harm minimisation principles of Vision Zero and the Safe System[5] as well as the personal safety and security of people waiting at stops and the health and safety of bus drivers.

For more information, see Vision Zero for system designers and Road to Zero.

This section discusses:

- Safe System principles for designers and planners (section 0)
- Important safety and security considerations (section 0)

Safe System principles and considerations for designers and planners

Designers and planners should apply four Safe System principles when considering the design and location of bus stops:

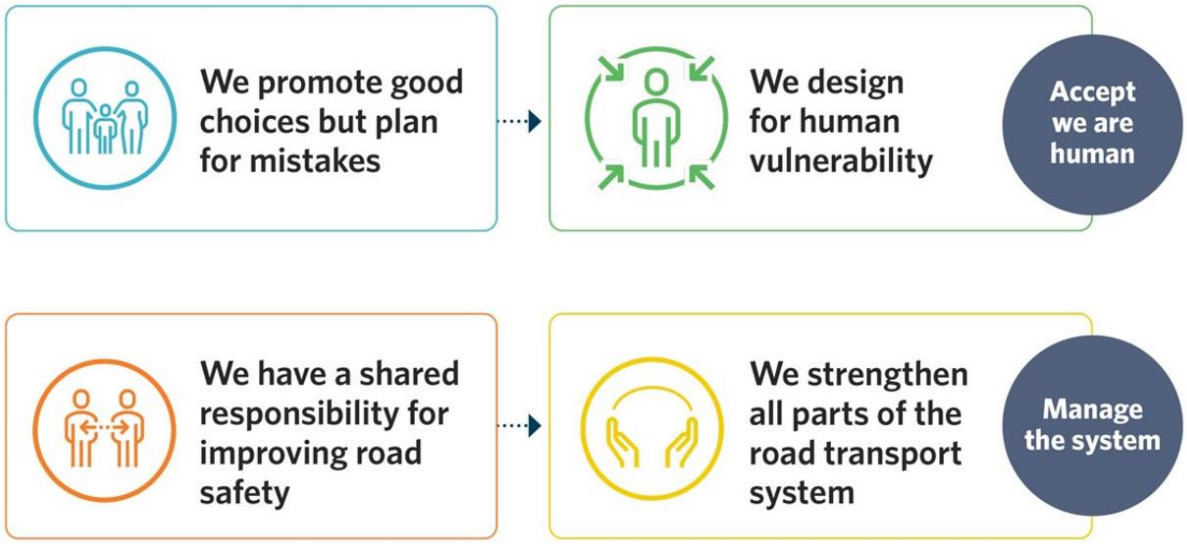


Figure 6: Safe system principles

Important safety and security considerations

Consider the following important road safety issues to support Safe System outcomes.

- Review, at project inception, existing road layouts and public transport routes and include them for consideration when determining the most suitable location for a new or existing bus stop (for example if you are looking at rebalancing bus stops).
- Consider land ownership issues and knowledge of future developments (for example, new shopping centres) that may affect traffic and pedestrian flows and routes to and from a preferred site.
- Design the layout to minimise and manage pedestrian–vehicle conflict by considering, where possible:
  - the position of a bus stop in respect of key local developments (for example, shops and rail stations) so pedestrian routes flow directly to adjacent developments, minimising the need for vehicles to cross paths
  - all passenger and pedestrian routes (desire lines), and design for crossing points accordingly.

[5] The Safe System approach seeks to create a safe and forgiving road system that makes the safety of people a priority. For more information refer: https://www.nzta.govt.nz/safety/what-waka-kotahi-is-doing/nz-road-safety-strategy/

- Manage vehicle speeds, particularly around crossings so vehicles travel at a survivable speed for pedestrians.
- Provide appropriate crossing facilities for pedestrians, actively manage and dissuade parking near bus stops and consider the needs of cyclists.

To support personal safety and security consider the following.

- Locate and design bus stops including shelters to minimise the opportunity for crime and increase the perception of personal security.
- Consider, where practicable, other aspects of network development. Locate the bus stop near trip generators and activity centres where natural public surveillance occurs.
- Balance the provision of opportunities for passive surveillance and intrusion into the privacy of neighbouring residences. Consider the potential for intrusion on privacy when inspecting the site. Placing bus stops at more isolated locations to avoid potential objections can negatively affect passenger safety and security, creating a barrier to increasing public transport use.

Wayfinding is the process of ascertaining one's position and planning and following a route. It is an important element of safety and security. Pedestrians and passengers feel safer and more secure if they feel (and are) less likely to get lost and maintain their confidence in the route continuing to their intended destination. Consider wayfinding carefully for larger interchange sites and integrate bus stop locations with local street mapping displays and facilities. Where possible, promote access for people who cannot see (or cannot see well) or cannot read wayfinding information, by making it audible as well as visible.

The **presence of security** (for example, security guards and security cameras) can bring comfort to customers. However:

- the presence of security guards may give a false sense that an area has a high crime rate, so they are best used at large interchanges or interchanges with higher crime rates where people already expect active surveillance
- security cameras require agreements between organisations such as the New Zealand Police, bus companies and councils about how video footage will be managed and accessed.

In terms of design elements:

- make the bus stop and shelter visible from all sides with sight lines unobstructed by trees or buildings, use clear (transparent) shelters to improve sight lines, and provide clear rear vision sight lines for bus drivers
- consider lighting, because it is an essential element that improves safety and security for passengers, and using existing lighting, which is cheaper than implementing new lighting
- install signage and lighting that is not easily removed and does not give an impression the stop is unkempt, and plan for regular maintenance to maintain a sense of belonging and a welcoming environment
- deter loitering and sleeping at bus stops (for example, give benches armrests at the ends and in the middle of the bench).
- apply the principles of Crime Prevention Through Environmental Design to support actual and perceived safety and security (discussed in section 4.3.3: Safety, security).

Further guidance

For more information, see:

- Section 4.3.3: Safety, security, and lighting
- National Guidelines for Crime Prevention through Environmental Design in New Zealand(external link)
- New Zealand Police's Crime Snapshot (external link)

- PoliceData.nz

2.3. Walking access

2.3.1. Walking accessibility

The layout of streets and footpaths can help or hinder access to bus stops. Bus stops should be within a comfortable walking distance from people's origins and destinations.

Locate bus stops where they:

- are easy, safe and as direct as possible for pedestrians to access and near at-grade crossings (at-grade crossings are discussed in section 0)
- maximise the number of people (the catchment) near the bus stop
- reduce the distance that passengers walk and help passengers complete the rest of their journey safely
- coordinate with neighbourhood walking connections and building entrances.

If there are no existing paths, investigate the feasibility of creating new pedestrian short-cuts to bus stops.

Look for opportunities to link public transport with the wider pedestrian and cycling network.

For more information about the importance of people being able to get to and from a bus stop, see the Public Transport Design Guidance topic Getting to and from public transport.

Design guidance for crossings is covered in section 2.3.2. Additional guidance related to planning and design for walking and cycling infrastructure is available in the Pedestrian Network Guidance and Cycle Network Guidance.

2.3.2. Mid-block crossings

Ideally, a crossing facility will always be close to the bus stop (for example, within 50m) to support safer access to the stop. If people experience discomfort or delays when crossing the road, fewer people within the catchment may be willing to use public transport at that stop.

The crossing could be a:

- pedestrian priority crossing such as a signalised crossing or zebra crossing (controlled)
- non-priority crossing opportunity such as drop kerbs or a pedestrian refuge island (uncontrolled)

All crossings must be designed to operate so vehicles are encouraged to approach the crossing at a speed that will not lead to a death or serious injury should they and pedestrians collide.

It is preferable for crossings to be located so that pedestrians will cross behind the bus stop in both directions. This is a safer location for pedestrians and more operationally efficient for the buses.

Figure 7: A zebra crossing located behind a bus stop encourages people to cross behind the bus (Source: Lorelei Schmitt)

Given the cost of installing a crossing as well as a new bus stop, it may be more cost–efficient to locate the stops near an existing crossing.

There are several different variables to consider in planning and design for mid-block crossings which should be assessed on a case-by-case basis. The Pedestrian Network Guidance provides advice on a process for selecting crossings which includes contextual considerations and a flowchart to identify suitable crossing types. It also describes how the Austroads Pedestrian Facility Selection Tool can be applied within this process. This advice will help practitioners select the most appropriate type of crossing based on walkability, safety and economic outcomes.

Pedestrian Network Guidance Crossing Selection

The Austroads tool and a user guide can be downloaded from the Austroads website:

- Australasian Pedestrian Facility Selection Tool
- Australasian Pedestrian Facility Selection Tool User Guide.

This section next discusses:

- at-grade crossings
- grade separation

At-grade crossings

An at-grade crossing is a crossing which is at the same level as the road.

At-grade crossings provide a more direct means of access for people walking or cycling than grade-separated solutions (where bridges or underpasses are used to separate pedestrians from motor vehicles). An international study of bus rapid transit corridors across several countries found that grade-separated crossings (bridges) on arterials are not associated with any statistically significant safety

benefits.[6] This is because some people will still cross at ground level when a safe at-grade crossing has not been provided.

Design at-grade crossings on a case-by-case basis, considering:

- local road context
- traffic volumes
- speed
- other key variables.

To support Safe System outcomes at-grade crossing facilities should:

- be located, where practicable, at the rear of bus stops to reduce the risk of passengers crossing the road in front of a stopped bus
- not be within 6m of the bus stop
- manage surrounding vehicle speeds to a survivable speed (that is, no more than 30km/h).

Grade separation

If bus stops are to be located on high traffic, multi-lane or high-speed roads where safe at-grade crossings are not practicable, consider a grade-separated crossing such as an overbridge or underpass.

A grade-separated crossing may increase a pedestrian's journey length (or perception of walking distance) relative to crossing the road at-grade or be associated with inadequate personal security, will can discourage walking to a bus stop and people choosing to cross at-grade where no safe place to do so is provided.

Grade-separated crossings are likely to be appropriate only:

- near transport interchanges
- near certain developments
- in addition to an at-grade crossing when you are trying to achieve wider urban design objectives (for example, place-making).

Consider the length of the accessible route using the crossing.

A grade separated crossing, should include a ramp to make it accessible to a wider group of users.

Given the cost of building a new grade-separated crossing, you may need to consider locating bus stops closer to an existing at-grade crossing.

2.4. Bus stops near intersections

This section discussions bus stops:

- near intersections (section 2.4.1)
- near priority signals (section 2.4.2)
- mid-block (section 2.4.3).

Locating bus stops near intersections maximises walking catchments, however, there are a number of matters to consider in selecting whether to locate the stop before or after the intersection, or in-between intersections, with potential impacts on safety, bus capacity and signal operations.

[6] Traffic Safety on Bus Priority Systems: Recommendations for integrating safety into the planning, design, and operation of major bus route.

2.4.1. Intersections

The three broad choices for locating bus stops near intersections are to locate them:

- near-side (before an intersection)
- far-side (after an intersection)
- mid-block (between intersections).

Locating bus stops in the direct vicinity of intersections maximises walking catchments by increasing the number of directions with a direct path to stops, so are often preferred over mid-block locations. However, take care when locating bus stops within the direct proximity of intersections, as stop design has impacts on safety, bus capacity and signal operations.

It is generally recommended to avoid locating bus stops within about 12m of pedestrian crossings and 20–60m of an intersection due to the potential for blocking sight lines. *Figure 8* illustrates bus stop placement around intersections.

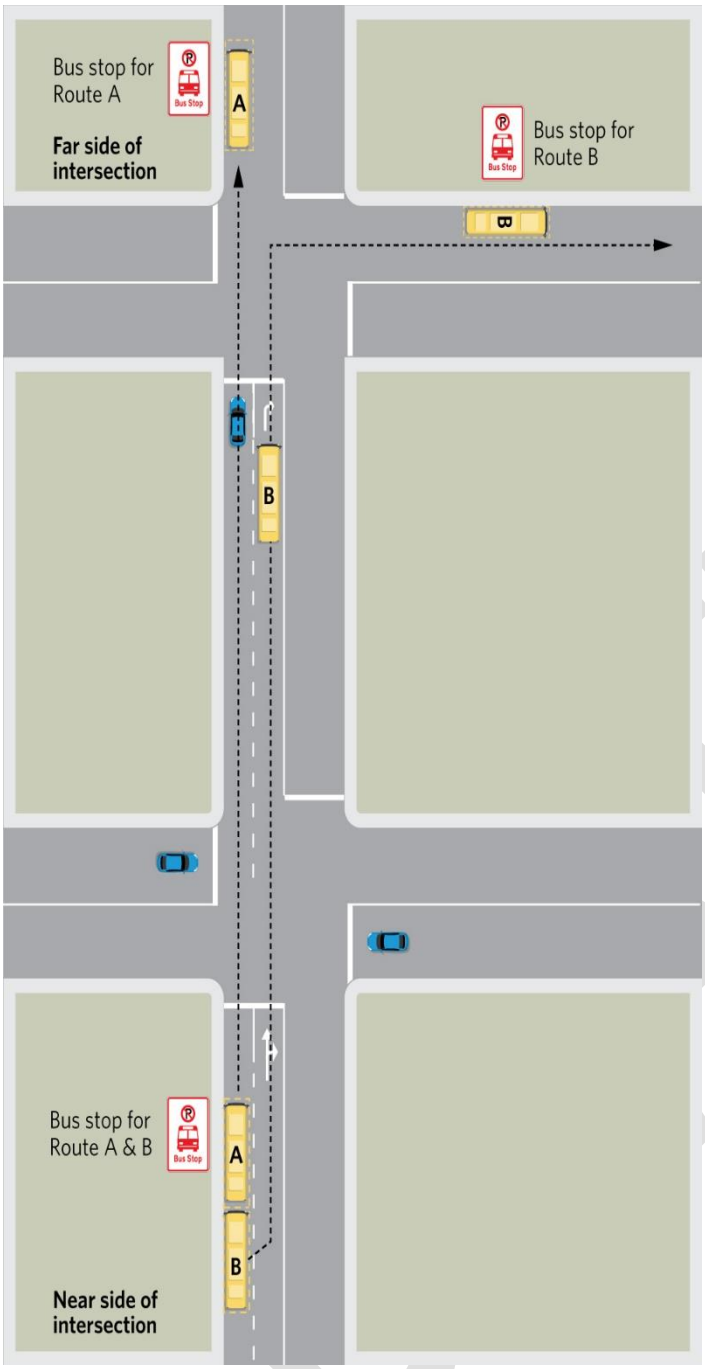


Figure 8: Bus stop crossroad placement.

Driveways or other infrastructure may affect the possible proximity of bus stop location relative to an intersection. Some intersections are commercial nodes and town centre locations, so availability of kerb space and catchment could be a deciding factor on bus stop location.

The optimal location of bus stops at intersections vary based on local context, so assess location on a case-by-case basis. When locating bus stops near intersections there are four main considerations.

- Type of intersection control and pedestrian crossing.
    - Signalised intersections can usually accommodate near-side or far-side configurations, but take care that all vehicles can enter and exit the intersection safely. For far-sided stops, the stop capacity should be able to accommodate more than one bus for high frequency routes, so a safe queueing space is provided for multiple buses arriving at the bus stop.

- At priority controlled intersections, including roundabouts, stops should be located after the pedestrian crossing so they don't interfere with sight lines. Take care not to block exiting traffic at roundabouts. To avoid impeding sight lines from side roads, it is preferable to locate stops on the departure side (far-side) of priority-controlled intersections especially if there is no flush median for right-turning vehicles.
- Near-side bus stops are inappropriate in the presence of zebra crossings, as the risk exists that vehicles overtake a stopped bus and enter the zebra crossing without seeing a pedestrian on the crossing. Bus stops should generally be located on the far side of pedestrian crossings to remove the risk of the bus masking a pedestrian from an approaching driver overtaking the bus.

- Bus direction of travel (right, straight or left).
  - A bus that must turn right at an intersection on a multi-lane road may have difficulty reaching the right-hand lane from a kerbside stop just before the intersection. Therefore, stops are preferred after the intersection.
  - The bus stop should be located at a sufficient distance from the intersection so a bus can straighten up into the bus stop after it turns. Take care that a vehicle behind the bus has time to react to a bus stopping immediately after the intersection.
  - If bus routes diverge at signals, near-side stops allow for common connection and transfer opportunities between diverging routes.
- Traffic volumes and predominant private vehicle direction of travel.
  - If left-turning volumes are high at an intersection, a far-side stop will reduce the conflict that would exist between left-turning vehicles and a near-side stop.
  - If left- or right-turning volumes are low, consider reallocating lanes paired with a bus stop on the near-side to allow for de facto traffic signal priority for the bus.
- Feasibility of bus priority measures.
  - A near-side bus stop may pair well with bus priority measures such as a 'B' light or queue jump. This can be particularly useful when the bus needs to move into the right-hand lane after the intersection.
  - A far-side bus stop may pair well with a truncated red phase or extended green phase.

Advantages, disadvantages, and practice guidance in terms of stop location choice is in *Table 3*.

Table 3: Advantages, disadvantages, and practice guidance for stop location choice

Location	Advantages	Disadvantages	Practice guidance
Near-side of intersection	Can be paired with priority measures Takes advantage of red phase at signalised intersections May be necessary if a common stop is required before the intersection before routes diverge	May conflict with left-turning vehicles May be difficult for buses turning right at the intersection to merge into the right-turning lane Affects sight lines from side roads at priority-controlled intersections	Ensure safe sight lines for pedestrian crossings Ensure sight lines for vehicles on side roads are met (applies at priority-controlled intersections only)
Far-side of intersection	Eliminates conflicts with left-turning vehicles Allows the bus to clear the intersection, blocking fewer movements and sight lines	Could result in traffic queued into the intersection if a bus stops in the travel lane or multiple buses arrive at once May cause difficulty for a bus that must turn right at an intersection on a multi-lane road to reach the right-hand lane from a kerbside stop just before the intersection	Don't block traffic exiting the intersection Allow time for a vehicle directly behind the bus to react safely to the bus stopping
Mid-block away from intersection	Eliminates conflicts with intersections	Reduces walking catchments and access to crossings	Locate a crossing point within 50m of the bus stop (ideally) Locate bus stops on the departure side of mid-block zebra crossings

The choice of bus stop location should also consider key trip origin and destination points and minimise pedestrian walking distances, where feasible. Locate bus stops to encourage connections between buses, trains and ferries. Stops should be close to where different bus routes or other passenger transport services intersect to minimise walking time for connecting passengers (see *Figure 9*).

Figure 9: Bus stops located near an attractor location to encourage connections, The Palms, Christchurch. Source: Environment Canterbury.

2.4.2. Priority signals

If bus priority signals are provided at an intersection, their operation should be designed in conjunction with bus stop placement and bus lanes.

Bus lanes at intersections are recommended where bus priority signals are to be implemented.

For more information about best practice priority signals, see Public Transport Design Guidance topic Public transport priority and optimisation.

2.4.3. Mid-block stops

In general, bus stop placement near intersections is preferred because it increases the walking catchment of the bus stop. Bus stops may be placed mid-block if the available road width does not allow safe and efficient location close to an intersection, provided the block length does not adversely affect the walking catchment.

Safe crossing facilities are an important consideration with mid-block stops.

2.5. Site specific considerations

Consider potential unique local characteristics in bus stop location planning such as topographical barriers, safety, traffic calming measures, property entrances, conflicting activities, taxi stands, and whether the bus stop is a timing point.

2.5.1. Topographical barriers

Consider the impacts of topographical barriers such as hills and waterways when planning bus stop locations.

In hilly or very steep areas, bus stop spacing may need to be less than the recommended 400m to compensate for reduced walkability. Where possible, locate bus stops on a level section of the road to aid accessible movement on and off the bus. Similarly walking accessibility may be affected by waterways which could contribute to walking amenity but contribute to severance so it may be sensible to locate bus stops near waterway crossings to increase catchments.

Figure 10: A bus stop located in a more level location of a hilly area (Source: Mark Edwards)

2.5.2. Safety

When establishing the best and most appropriate location for a bus stop it is important to remember that the Land Transport (Road User) Rule 2004 states that a vehicle must not be stopped, stood or parked within certain distances of features such as intersections, pedestrian crossings, railway-level crossings and bends.[7]

For example, a vehicle must not be stopped, stood or parked:

- within 6m of an intersection
- within 6m on approach of a pedestrian crossing, unless set back from the traffic lane
- On or near a level rail crossing which will obscure the view of other vehicles to the rail crossing

Although the Land Transport (Road User) Rule stipulates that within 6m is inappropriate for bus stops, we recommended avoiding them being within about 12m of pedestrian crossings and 20–60m of an

[7] Land Transport (Road User) Rule 2004, Part 6 (stopping and parking).

intersection due to the potential for blocking sight distances. These distances are ‘rule of thumb’ guidance, so specific road factors may justify variation from them. The reason for our guidance is that the road safety of all users is paramount, and locations such as these are usually inappropriate for a bus stop. See the illustrations in section 4.4.1: Bus stop layouts: Kerbside stops, Figure 56 and Figure 57.

2.5.3. Traffic-calming measures

Be careful in considering use of traffic-calming measures (such as speed cushions and speed bumps) on the immediate approach to and departure from bus stops as they have both advantages and disadvantages for bus users.

For example, avoid speed cushions near a bus stop as passengers are likely to be standing up after boarding or before alighting and risk falling in the bus as it goes over the cushion. The underside of a bus, especially a modern, accessible, low-floor bus, may also scrape the road surface when it is negotiating heavily undulating road surfaces or traffic-calming measures. At the same time, traffic-calming measures can support safe and survivable speeds for users, especially vulnerable users, so are suitable in some contexts.

For more information on designing for traffic calming along bus routes, see Underside clearance in Public Transport Design Guidance topic Corridor Clearance.

2.5.4. Property front doors

To maintain privacy, try to avoid positioning bus stops outside the front door of residential properties.

Identify opportunities to use existing hedges or fences of private properties to give occupants privacy, without unduly compromising appropriate bus stop spacing or requiring customers to wait in secluded locations.

2.5.5. Conflicting activities

Some sites may be undesirable for bus stops due to potential use by conflicting activities. Undesirable sites include:

- near an area that generates large amounts of short-term, high-turnover parking (such as ATMs, letter boxes, dairies and lotto shops), because visitors to such locations often park illegally at bus stops
- on the approach side of a high-use vehicle access, where bus operation and pedestrian safety may be compromised by turning movements
- near a tourist facility visited by many coaches or charter buses; provide separate locations for urban and coach services to access the facility.

2.5.6. Taxi stands

If a taxi stand and a bus stop are adjacent to one another, bus stops should be located in front of taxi stands. Positioning taxi stands in front of bus zones will result in taxis queuing back into the bus zone.

2.5.7. Timing point bus stops

A timing point is a stop that bus drivers try to reach at the scheduled time as specified on the timetable. A bus is not supposed to pass a timing point before the scheduled time, so buses typically spend longer than usual times at timing point stops.

Where possible, locate bus timing points away from residential or other sensitive frontages where the potential for continuous noise and disturbance or visual blocking are undesirable.

Do not locate bus timing point stops across driveways. This is because under the Land Transport (Road User) Rule 2004, buses waiting at the timing point must not obstruct driveways for any purpose other than picking up or dropping off passengers.[8]

[8] Land Transport (Road User) Rule 2004, clause 6.9(1) and (2).

Similarly, the Land Transport (Road User) Rule 2004 prohibits bus stop timing (that is, standing without the purpose of picking up or dropping off passengers) within special vehicle lanes.[9] A timing point in a cycle lane makes a bus an unnecessary obstacle for cyclists, and a timing point in a bus lane prevents the lane operating to its greatest potential and may be a road safety hazard.

For further information, see the Land Transport (Road User Rule 2004), clauses 1 (definitions of 'loading zone' and 'parking'), 6.6 (parking in a special vehicle lane) and 6.9 (obstructing vehicle entrances and exits) and definitions of 'loading zone' and 'parking':

The road surface is another factor to consider when selecting and managing timing point locations as longstanding idle buses may cause load-bearing issues.

Further guidance

For more information on:

- road surface maintenance, including pavement design for high-stress locations to prevent rutting, see Corridor inspections and maintenance requirements in the Public Transport Design Guidance topic Corridor clearance
- planning, design, implementation and monitoring for bus layovers and driver facilities, see Public Transport Design Guidance topic Bus layover and driver facilities.

2.6. School bus stops

This section discusses:

- bus stops on school routes (section 2.6.1)
- shelter at school stops (section 2.6.2)
- design principles for school stops (section 2.6.3).

Figure 11: Image of a school bus.

[9] Land Transport (Road User) Rule 2004, clause 6.9(3).

2.6.1. Bus stops for school routes

On routes served by school buses only, lay out stops to facilitate safe and efficient access for the bus and students.

For rural school bus services, additional aspects must be considered given the often-higher speed environment.

The location of stops at or on the way to schools are influenced by:

- the need for an adequate pull-in area for the bus and space for students to be separated from traffic
- the age group of students expected to use the service
- constraints on the routing of the school bus service
- hazards getting to the school bus stop (for example, lack of suitable footpath or crossing point)
- other land uses and trip generators in the vicinity from which non-school customers will use the stop
- the distance motorists need to see and slow down for a school bus
- space for parent and caregiver vehicles
- other aspects such as the weather.

The school may prefer bus stops to be within the school grounds. This has safety and convenience benefits as well as freeing up public road space, although a conflict between buses and concentrated groups of students may arise. This potential conflict can be managed, for example, with the school having buses arrive before the school-day ends and actively managing the footpath to facilitate the safe manoeuvre of buses around students crossing the road.

School bus stops and pick-up/drop-off areas for parents/caregivers may overlap, especially in rural areas, so parking provision and location is also a factor in facilitating a safe transfer between the two modes. It may be that the school bus stop is designed within or as part of a parking area or located near an existing parking lot. The walking path between the school bus stop and the parking area should be safe and accessible for pedestrians, particularly vulnerable pedestrians.

2.6.2. Shelter at school stops

Strong demand can come from communities for shelter to protect children from inclement weather, despite the need being infrequent (once or twice per day). For cost-effectiveness, explore opportunities to combine school and public transport stops.

It is desirable to provide bus shelters for:

- inbound pick-up stops used as boarding points by school children
- the stop close to the school from which children board their return buses in the afternoon.

Peak waiting demand can often be very compressed, requiring potentially larger shelters than the total patronage might otherwise suggest, probably shelters of at least intermediate size (refer Section 4.3.4). Wider footpaths are often needed at school bus stops to retain the through movement of other pedestrians and provide a safe waiting area for large groups of students.

2.6.3. Design principles of school stops

The provision of access to bus services on routes operated by only school buses should follow the same principles as on other routes. Different design standards may apply to the layout of school bus stops, as they are generally required only at certain periods on weekdays.

The primary design difference is to enable the space required by buses to approach, stop and depart safely and efficiently to be reserved for their use only at the appropriate time, thereby allowing other uses of the space at other times. This can be achieved by forming a single ‘bus box’ of a recommended minimum of 39m and making that single box effective only during school drop-off and pick-up periods (for

example, from about 8:00–9:30am and 2:30–3:30pm) (see Figure 12). This approach avoids the unnecessary use of ‘no stopping’ markings that cannot be time limited. The 39m length allows a 30m parking length for two buses and 9m between the two buses so the rear bus can exit first if needed. This is consistent with the dimensions of a typical kerbside bus stop.

For more information about the design of kerbside bus stops, see section 4.4: Bus stop layout.

Figure 12: Extended school bus stop, Auckland. Source: Flow Transportation Specialists.

School bus services are provided using a wide variety of vehicle types (for example, minibuses, buses, and truck-based vehicles) as shown in Figure 13.

Figure 13: Truck-based school bus, Gisborne. Source: Mark Edwards.

For more guidance on siting school bus stops, see our *Guidelines for the Safe Siting of School Bus Stops*.

3. Bus stop capacity

Bus stops play a critical role in determining the capacity and service quality of bus services. While bus stop capacity will not be relevant for many bus stops in New Zealand, consider the hourly capacity of bus stops required on high volume bus corridors or at stops with particularly long dwell times.

Bus stops determine the overall capacity of a bus route, so it is critical for bus stops to be designed to have sufficient capacity for the planned number of bus services along the route.

Bus stops with insufficient capacity will force buses to queue on the road, causing delays for bus passengers and negatively impacting road safety and passenger accessibility.

A bus stop's capacity is determined by:

- length of time a bus spends occupying the bus stop (dwell time) (section 3.1)
- presence and timing of nearby traffic signals (section 3.2)
- type of bus stop provided (section 3.3)
- number of bus stops provided (section 3.4).

3.1. Length of time a bus spends occupying the bus stop

The length of time a bus spends occupying a bus stop is called dwell time.

Dwell times of less than 30 seconds are optimal from a bus capacity perspective. Longer dwell times incrementally reduce bus stop capacity.

Factors that influence dwell times, include:

- the average number of passengers getting on and off each bus – the more passengers, the longer the doors need to be opened and closed and the longer it takes passengers to get on and off, so the longer the dwell time
- the mix of fare payment methods – the more methods (especially if one is cash), the longer the dwell time
- the number of doors used for boarding – one door means a longer dwell time than two doors
- whether the stop is a timing point – if so, the bus may spend time idling in the stop, which means a longer dwell time. This can reduce 'live' bus stop capacity more than what one expect based on volume of passengers alone (for more information about timing point stops, see section 2.5.7)
- whether the stop is a transfer point – if so, it requires at least two buses to occupy the bus stop at the same time to enable passenger connections, which lengths dwell time
- factors that affect bus re-entry into the traffic – whether there's a dedicated bus lane the bus would be entering or if it would be trying to re-enter a high-volume mixed traffic lane - the latter would increase dwell time

3.2. Presence and timing of nearby traffic signals

Placing bus stops near intersections with traffic signals facilitates walking access to and from the bus stop, but it also reduces bus stop capacity. When a bus stop is located at a signalised intersection or crossing, if the light is red, buses cannot:

- leave the stop immediately after passengers have got on and off (at approach or near-side stops)
- enter the bus stop (at departure or far-side stops).

The impact of a traffic signal on bus stop capacity is determined by the green time ratio; that is, the proportion of bus green time to total traffic signal cycle length. The higher this ratio, the more capacity a bus stop has. Figure 14 illustrates the difference between a 25 percent and 50 percent green time ratio.

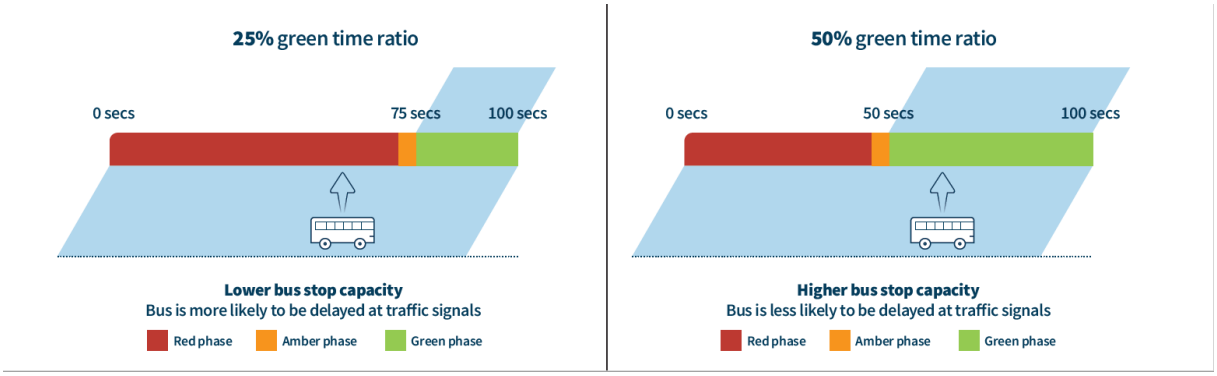


Figure 14: Impact of a traffic signal's green time ratio on bus stop capacity

For near-side stops, dwell time that occurs during the red phase does not affect capacity, because the bus would not have been able leave the stop during this time anyway. Compared with near-side stops, far-side stops can have a larger impact on bus stop capacity because dwell times and red signal times cannot overlap.

If traffic signals are significantly reducing bus stop capacity, consider mitigating the effect by:

- increasing the green phase length for the bus direction of travel
- pairing the active signal priority with a near-side stop so the green phase is coordinated with the bus's departure from the bus stop.

For more information about providing bus priority and optimising your public transport network, see Public Transport Design Guidance topic Public transport priority and optimisation.

3.3. Type of bus stop provided

Where more than one bus at a time is required at a bus stop, the stop may be one of three types: split, linear, or sawtooth (see figures below). Each type has different implications for bus stop capacity.

- Split stops have a linear design where bus stops serve separate bus routes and have separate entry and exit tapers (lead in and lead out space), so buses can enter and exit independently of each other.
- Linear stops have a linear design where multiple bus stops are stacked linearly. Multiple bus routes share the same bays and buses need to wait for the bus in front of them to leave before they can move (dependent operation).
- Sawtooth stops have a non-linear design that allows buses to enter and exit the bus stops independently of each other (parallel, angled). Usually, these bus stops are at an angle to the roadway and off the street (for example, at an interchange).

The advantages, disadvantages and practice guidance for each stop type are summarised below.

3.3.1. Stop type: split

Figure 15: Example layout: split stop with independent operation

Figure 16: Bus stops by Wellington Hospital are split for multiple routes. Source: Nadine Dodge.

Advantages

- Provides high capacity as bus bays do not interfere with one another
- Enables buses on different routes to use separate stops
- Reduces bus-on-bus delay
- Splits up waiting areas, supporting space efficiency
- Can reduce the distance customers have to walk between the 'top' of the stop and their bus arrival location
- May allow customers to better see oncoming buses

Disadvantages

- Can be less intuitive for customers who may not realise they are waiting at the wrong bus stop!
- Can take drivers a little getting used to
- May require more kerb length which may reduce the amount of on-street car parking
- Is feasible only on streets with sufficient space for buses to overtake one another safely

Practice guidance

- Independent manoeuvrability is essential for stop splitting (that is, a bus needs adequate room to pass another bus at the bus stop and pull in and out)
- Stops may need to be split just to support customer visibility
- Real-time information is highly recommended for split stops
- Bus routes with common destinations/routes should share the same stop

3.3.2. Stop type: linear

Figure 17: Example layout: Linear stop with dependent operation

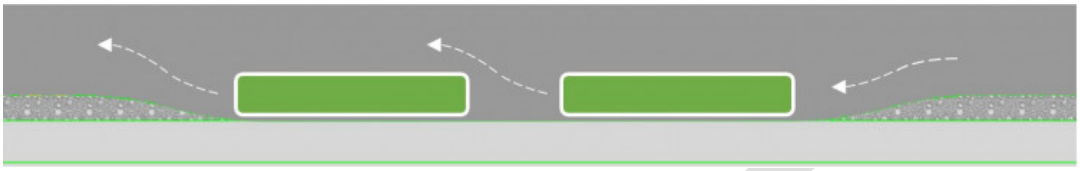


Figure 18: Example layout: Linear stop with semi-dependent operation (bus can exit but another bus cannot enter the space without relocating other buses)

Advantages

- Increases capacity compared with single bus bays
- Reduces the amount of kerb space required
- May be more intuitive for passengers, especially when many bus routes can be used for a journey

Disadvantages

- Provides less capacity than sawtooth or split stops; capacity depends on a bus stopping at either end (that is, a bus at the rear end must wait for the bus ahead to exit first, and vice versa for buses entering)
- Passengers may have difficulty knowing where to wait, and buses may have to pick up passengers at multiple points along the length of the bus stop

Practice guidance

- Real-time information is highly recommended to assist customers
- Sufficient waiting area space must be provided for the number of passengers

Stop type: Sawtooth (off-street sites only)

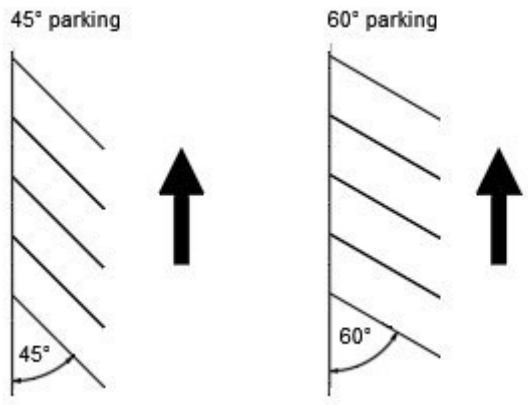


Figure 19: Example layout: Sawtooth - Angled bus stop parking

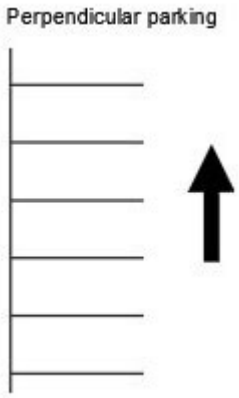


Figure 20: Example layout: Perpendicular parking

Advantages

- Provides high capacity as bus stops do not interfere with one another Allows different routes to be assigned different stops
- Minimises confusion, if it has good signage and information

Disadvantages

- Increases the time it takes the bus to exit the stop (clearance time) since buses may need to reverse
- Requires reversing which needs to be well managed for safety
- Requires more length per stop

Practice guidance

- Not suitable for on-street bus stops (see Public Transport Design Guidance topic Public transport interchanges)

3.4. Number of bus stops provided

If it is not feasible to increase bus capacity by reducing dwell time or signal delays, consider adding additional bus stops. Base decisions on additional bus stops on a mixture of:

- the number of scheduled buses per hour relative to capacity
- on-site observations of the actual performance of the bus stop
- communication with public transport service operators.

Bus stop capacity should be well above scheduled hourly bus volumes to allow for efficient operation, even when some buses have longer than average dwell times.

Figure 21 shows the indicative hourly capacity of bus stops away from traffic signals, assuming average dwell times of 30, 60 and 120 seconds.

If operating conditions allow for dwell times of 30 seconds or less, one or two bus bays should provide adequate capacity for almost all bus stops in New Zealand, with a capacity of 68 buses per hour with one bay, 120 per hour with two linear bus bays, and 136 per hour with two split bays.

If a bus stop has dwell times of 60–120 seconds, bus capacity is dramatically reduced to 20–26 buses per hour per bay. If the stop also serves as a timing point or layover and experiences longer than normal dwell times, it may be desirable to provide additional bus bays to ensure adequate capacity.

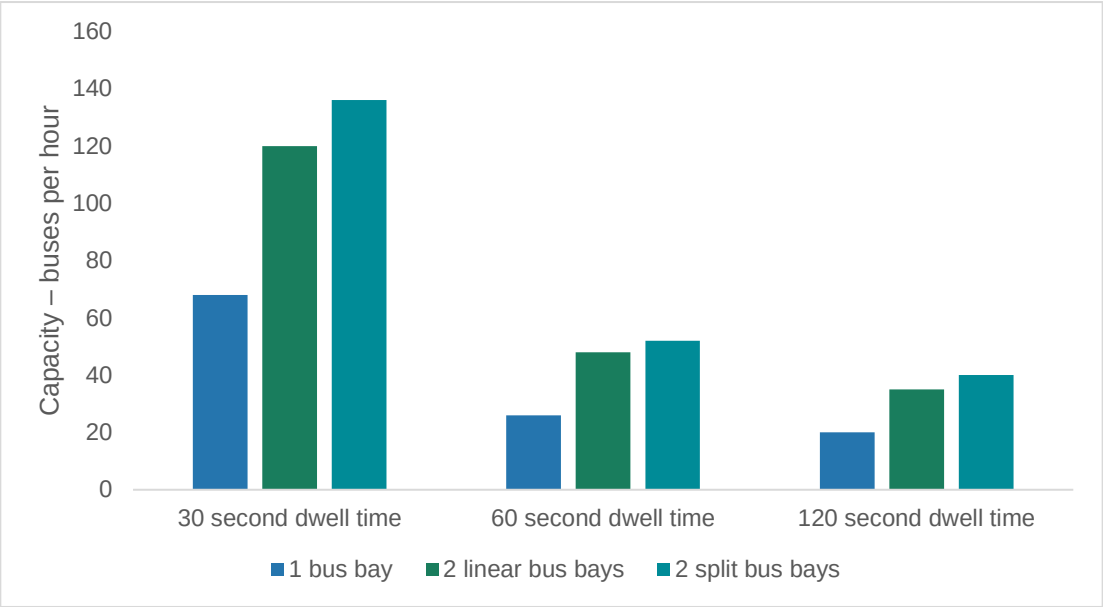


Figure 21: Capacity of bus stops away from traffic signals. Source: Nadine Dodge, using data from Transit Capacity and Quality of Service Manual (3rd edition).

Figure 22 shows the indicative hourly capacity of bus stops at traffic signals, assuming a green time ratio of 0.5 and average dwell times of 30, 60 and 120 seconds.

With a 0.5 green time ratio, traffic signals can be expected to reduce capacity at near side bus stops by around 30 percent, although this will vary depending on dwell times. For bus stops on the far side of the traffic signal, a 0.5 green time ratio would reduce capacity by 50 percent.

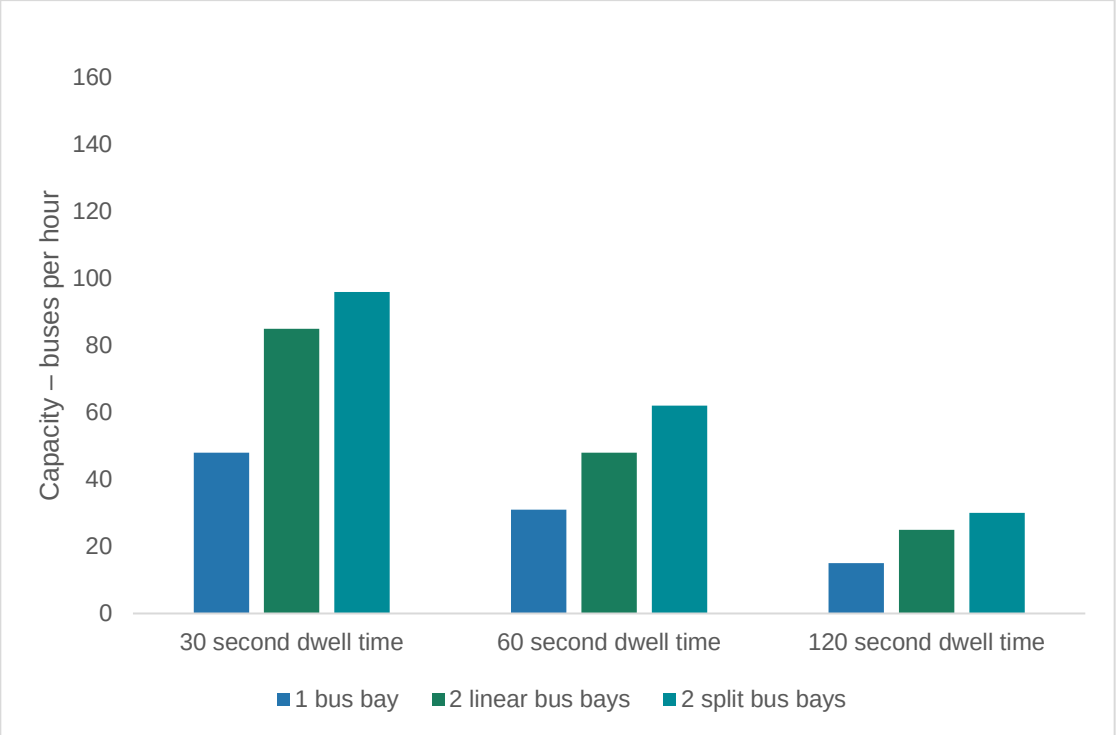


Figure 22: Capacity of near-side bus stops at traffic signals. Source: Nadine Dodge, using data from Transit Capacity and Quality of Service Manual (3rd edition).

For more detailed analysis of and procedures for calculating bus stop capacity, see *Transit Capacity and Quality of Service Manual* (3rd edition).

Related information:

For further information about bus stop layouts including the advantages and disadvantages of kerbside, in-lane with bus boarders, or indented bus stops refer to section 4.4 Bus stop layout.

4. Bus stop design

This section provides guidance on the design elements to consider when installing bus stops. It discusses:

- bus stop design principles (section 4.1)
- bus stop components – overview (section 4.2)
- bus stop components – detailed (section 4.3
- bus stop layouts (section 4.4)
- integration with cycling (section 4.5).

4.1. Principles and parameters

4.1.1. Key design principles

Bus stops should be designed so a bus can:

- pull into and out of a bus stop safely and efficiently without incurring excessive front or rear overhang of the bus (for more information, see Public Transport Design Guidance topic Corridor clearance)
- stop close and parallel to the kerb to pick up or drop off passengers, so that all passengers can get on or off in a safe, comfortable and accessible manner and not be hit by bus tail swing
- safely and easily merge back into traffic.

To ensure that these design principles are met and without substantially increasing risks to other functions in the corridor, **we strongly recommended that an independent safety review is undertaken of both the network philosophy and detailed design of each bus stop location.**

4.1.2. Impact of vehicle design on design parameters

The type of bus serving a bus stop has a direct impact on many aspects of the stop's design. Recommended design parameters are based on the two main types of urban bus that operate in New Zealand.

- Rigid single-deck buses are the most common type of bus in New Zealand. These large single-deck buses can have two rear axles that assist with steering.
- Double-deck buses have two levels or decks with an internal stairwell.

The design length of these vehicles is taken as approximately 14.5m in total (a vehicle length of 13.5m plus a 1m bicycle rack when in use).

Note that at this stage the Bus Stop Design does not provide guidance specifically for articulate buses though this may be developed in the future.

For more information about vehicle dimensions, see Public Transport Design Guidance topic Bus dimensions for design.

4.2. Bus stop components - overview

The types of facilities provided at bus stops reflect the bus stop classification, namely: public transport interchange, premium, intermediate, standard, and basic (discussed in section 2.1: Bus stop classifications).

Table 4 summarises the bus stop component provision corresponding to each type of bus stop classification and whether the component is essential, recommended, or optional. For more details, see sections 4.3: Bus stop components – detail and 4.4: Bus stop layout.

Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority.

Table 4: Summary of infrastructure provision by bus stop type

	Public transport interchange	Premium	Intermediate	Standard	Basic
Accessibility					
Recommended minimum kerb height at front door (& ideally rear door): 150mm for normal kerb, 160mm for accessible kerb*	Essential	Essential	Essential	Recommended	Optional
Paved clear stand area (hardstand)	Essential	Essential	Essential	Essential	Recommended
Tactile ground surface indicators	Essential	Essential	Recommended	Recommended	Optional
Connecting footpath to/from bus stop	Essential	Essential	Essential	Recommended	Optional
Crossing facility close to bus stop	Essential	Essential	Recommended	Recommended	Optional
Signs and road markings					
Bus stop sign (R6-71 or R6-71.1) †	Essential	Essential	Essential	Essential	Essential
Bus box road marking (M3-2 or M3-2A)†	Essential	Essential	Essential	Essential	Essential
'Bus Stop' text road marking (M3-2 or M3-2A)†	Essential	Essential	Recommended	Recommended	Optional
'No Stopping' road marking	Essential	Essential	Recommended	Recommended	Optional
Coloured surface treatment	Optional	Optional	Optional	Optional	Optional
Safety and security					
Street lighting	Essential	Essential	Essential	Recommended	Optional
Shelter with lighting	Essential	Essential	Essential	Recommended	Optional
Emergency help point	Essential	Recommended	Recommended	Optional	Optional
CCTV cameras	Recommended	Recommended	Recommended	Optional	Optional
Street furniture					
Seating	Essential	Essential	Recommended	Recommended	Recommended
Shelter‡	Essential	Essential	Essential	Recommended	Recommended
Rubbish bin	Essential	Essential	Recommended	Recommended	Optional
Recycling bin	Recommended	Optional	Optional	Optional	Optional
Ticket sales/top-up services (machine or counter)	Essential	Recommended	Recommended	Optional	Optional
Cycle parking	Essential	Recommended	Recommended	Recommended	Optional

	Public transport interchange	Premium	Intermediate	Standard	Basic
Stop-specific information					
Bus stop flag	Essential	Essential	Essential	Recommended	Optional
Stop number	Essential	Essential	Essential	Recommended	Optional
Direction of travel	Essential	Essential	Essential	Recommended	Optional
Site-specific fare information	Essential	Essential	Recommended	Recommended	Optional
Stop-specific timetable (departure times)	Essential	Essential	Essential	Recommended	Optional
Stop-specific route diagrams	Essential	Essential	Recommended	Recommended	Optional
Information telephone number or web address	Essential	Essential	Recommended	Recommended	Optional
Stop name	Essential	Essential	Essential	Recommended	Optional
Wider area fare information & zone map	Essential	Essential	Recommended	Recommended	Optional
Wider area route map	Essential	Essential	Recommended	Recommended	Optional
Real-time information signs	Essential	Recommended	Recommended	Recommended	Optional
Enhancements					
Landscaping	Recommended	Recommended	Optional	Optional	Optional
Public art	Recommended	Recommended	Optional	Optional	Optional
Community notice board	Recommended	Recommended	Optional	Optional	Optional
Vending machine	Recommended	Recommended	Optional	Optional	Optional

Notes:

* Accessible kerbs and certain kerb heights may not be appropriate in some contexts due to topographical constraints.

† Where a bus stop is formally established at least one bus stop sign must be provided and that sign must conform to the sign type in Schedule 1 of the Land Transport Rule: Traffic Control Devices 2004. When the bus stop area is less than 12m (for smaller buses), then a bus box is not legislatively required but best practice is that it is essential for intermediate and standard bus stops and recommended for intermediate and standard.

‡ Shelter provision is also affected by whether a stop is primarily used for boarding or alighting.

In addition to the components in Table 4, extra consideration of the road surface may be needed for busier stops or interchanges. Rutting can be prevented by using concrete pads or other high stress pavement designs. See:

- Road surface maintenance in Public Transport Design Guidance topic Corridor Clearance
- Technical Advice Note 17-01: Asphalt depths at high stress locations for new pavements and renewals.

4.3. Bus stop components – detailed

The bus stop components discussed in more detail in this section are:

- signs and road markings (section 4.3.1)
- accessibility (section 4.3.2)
- safety and security (section 4.3.3)
- lighting (section 0)
- landscaping and vegetation (section 0)
- street furniture (including seating and shelters) (section 4.3.4)
- enhancements (section 4.3.6).

4.3.1. Signs and road markings

Road users must not park, stand or stop on or within 6m of a bus stop sign.[10]

[10] Land Transport (Road User) Rule 2004, clause 6.8 (parking near bus stops).

Bus stops must be marked out where the space reserved for the bus extends more than 6m on either side of a single bus stop sign or when the bus stop is located in a parking zone.

This section covers:

- Signs and road markings
- Bus stop signs
- Number and type of bus stop signs
- Bus box road marking
- Bus stop roadway text
- 'No Stopping at All Times' road marking
- Coloured surface treatment

Signs and road markings summary

Table 5 summarises signs and markings corresponding to each type of bus stop classification and whether the component is essential, recommended or optional.

Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority.

Table 5: Summary of signs and markings by bus stop classification

	Public transport interchange	Premium	Intermediate	Standard	Basic
Signs and road markings					
Bus stop sign (R6-71 or R6-71.1) †	Essential	Essential	Essential	Essential	Essential
Bus box road marking (M3-2 or M3-2A)†	Essential	Essential	Essential	Essential	Essential
'Bus Stop' text road marking (M3-2 or M3-2A)†	Essential	Essential	Recommended	Recommended	Optional
'No Stopping' road marking	Essential	Essential	Recommended	Recommended	Optional
Coloured surface treatment	Optional	Optional	Optional	Optional	Optional

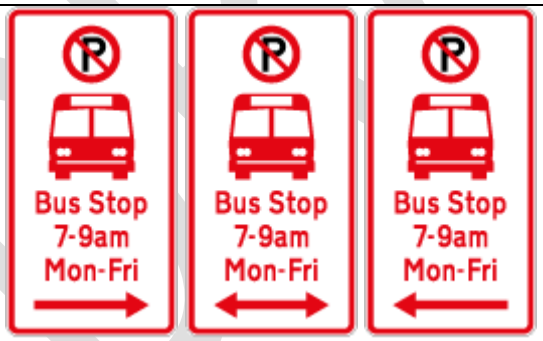
† Where a bus stop is formally established at least one bus stop sign must be provided and that sign must conform to the sign type in Schedule 1 of the Land Transport Rule: Traffic Control Devices 2004. When the bus stop area is less than 12m (for smaller buses), then a bus box is not legislatively required but best practice is that it is essential for intermediate and standard bus stops and recommended for intermediate and standard.

Bus stop signs

A bus stop is a form of loading zone. Therefore, the bus stop sign is a form of regulatory parking/loading sign and consists of component parts in the same manner as other parking/loading signs.

Although there is a basic standard bus stop sign, the sign can have additional components such as arrows to show the extent and direction of the stop and the times when the stop operates (if not 24 hours a day). This means the standard bus stop sign (R6-71) can vary (for example, R6-71.1) as illustrated in Table 6.

Table 6: Examples of bus stop sign types

Sign reference	Example	Use
R6-71 (bus stop standard)		Establishes the presence of a bus stop and the parking restrictions associated with the sign.
R6-71.1 (extent of bus stop)		Establishes the presence of a bus stop and the parking restrictions associated with the sign. For use with long bus stops (more than 30m). Signs with left and right arrows are usually all that is necessary to define either end of the bus stop area.
R6-71.1 variations (bus stop, specific days and times of operation)		Establishes the presence of a bus stop and the parking restrictions associated with the sign and when the bus stop operates (if other than 24 hours a day).
R6-71.1 variations (extent of bus stop and specific days and times of operation)		Establishes the presence of a bus stop and the parking restrictions associated with the sign, the extent of the bus stop and when the bus stop operates (if other than 24 hours a day).

For detailed sign specifications, see Sign specifications in the Traffic Control Device Manual.

The bus stop sign identifies the space of roadway as a bus stop and prohibits parking in the space. It is also an important indicator to passengers, bus drivers and motorists and acts as a regulatory control point for the layout of bus stop facilities.

When a bus stop road marking is not present, the bus stop extends 6m either side of the bus stop sign.

When the bus stop sign is associated with a bus stop marking, then the sign should be positioned at the head of the bus stop, preferably on a standalone post in line with the head of the bus box. This allows for a consistent and predictable environment to be created at the bus stop. The sign should face the roadway, oriented parallel to the roadway, so it can be read by drivers pulling up next to it.

Number and type of bus stop signs

When a bus stop sign is installed, the presence of that sign defines the bus stop area. The bus stop length is 6m either side of the sign unless markings are present indicating a longer bus stop. Only a single bus stop sign is needed when the bus stop marking is present and extends up to and including 30m in length.

If the bus stop:

- is more than 30m in length, then two bus stop signs are required, and these signs should incorporate an arrow in the style of sign type R6-71.1 (see Table 6)
- operates only at certain times and/or days, then the bus stop sign must indicate the period of operation.

Ideally, the R6-71 or R6-71.1 sign should not be mounted on the existing poles. Where an additional supplementary sign is provided, it should be co-mounted on a bus stop–specific pole (see Figure 23). To mount the bus stop sign and/or the bus flag sign, the pole must be installed sufficiently far from the kerb so the sign achieves adequate clearance from the kerb (usually 1m) and achieves a clear walking path.

The final location of the bus stop sign should work with the surrounding location, but should be clearly visible to road users, be located near the front of the bus stop box and, ideally there should be some consistency in location across stops in a jurisdiction.

Figure 23: Bus stop sign (R6-71) with supplementary sign. Source: Thomas Chu.

Bus box road marking

The bus box marking defines the outer perimeter of the road space dedicated to the bus stop. This helps create a consistent environment at the bus stop. Bus drivers know to stop their vehicle at the head of the box, which is where key infrastructure components are provided (for example, clear stand areas, tactile ground surface indicators, information and shelter). This is particularly important for disabled or vision-impaired passengers.

Where the road surface is suitable, bus stops should be marked on the section of road a road controlling authority has authorised to be reserved for a bus stop. Bus stop bays must be marked if they extend more than 6m on either side of a single bus stop sign.

Bus stop box markings must be marked in yellow and used in conjunction with those signs described above. Additional ‘BUS STOP’ words may be used if required, depending on the length of the reserved area (see the section Bus stop roadway text).

The box marking consists of a 1m yellow bar marking that is 100mm wide. The gap between bar markings must be a minimum of 1m and up to a maximum of 2m for the first gap at either end. The range dimension in the gap marking is so the marking can be correctly laid out at certain bus box lengths (even number lengths).

Aim to create a visually consistent layout when varying the gap. We recommend varying the gap in only the first gaps at either end of the bus stop box marking. All other intermediate gaps should be 1m in length.

The bus box should be a minimum of 2.5m wide and preferably 3m wide.

Bus stop roadway text

It is best practice to mark a bus stop with the words 'BUS STOP' on the road surface as per the layouts illustrated in this guide (for example, Figure 24). It is an important means of reinforcement to drivers and pedestrians that the space is used by bus services, so encourages compliance.

The marking 'BUS STOP' can be positioned and oriented in two different ways: parallel to the roadway (Figure 24) or perpendicular (as per Traffic Control Devices Rule, Schedule M3-2). Either text orientation is legal, but we recommend that in a city or region, the same orientation is implemented consistently.

The key dimensions of the bus box are shown in Figure 24.

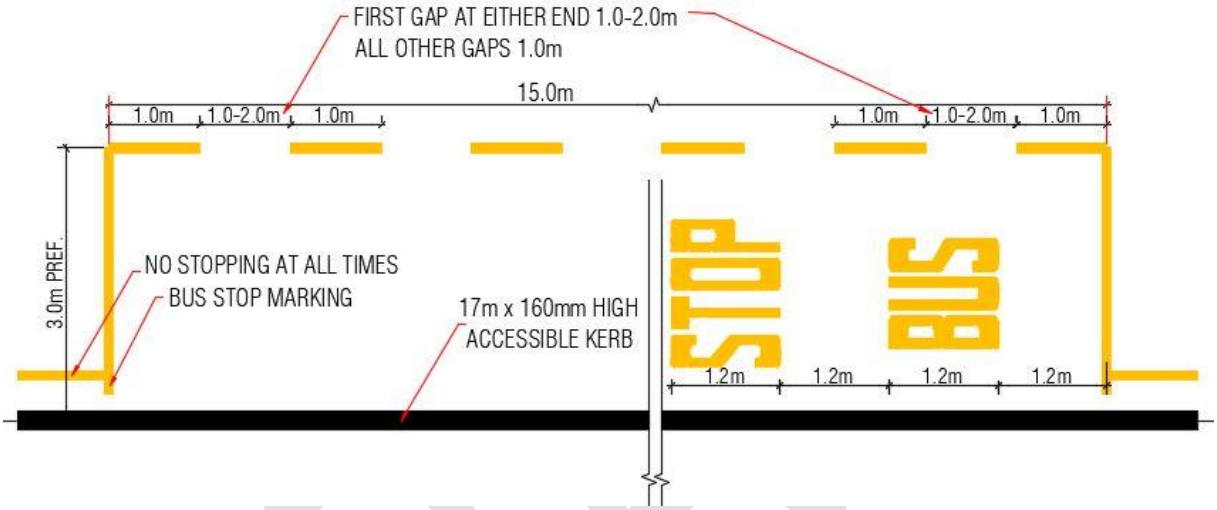


Figure 24: Typical bus box markings

'No Stopping at All Times' road marking

The 'No Stopping at All Times' road marking consists of broken yellow lines. They are a mechanism to legally prohibit vehicles from obstructing the lead-in and lead-out of the bus stop, so the bus can approach and depart from the bus stop correctly. For more information, see section 4.4: Bus stop layout.

Coloured surface treatment

The profile of the bus box area may be raised further by highlighting the box with a coloured surface treatment. This makes the bus stop area more prominent to passengers and motorists. Although the treatment imposes additional costs, the raised profile of the stop may prove an effective deterrent to illegal parking and reduce enforcement problems at stops with a high potential for road user conflict (see Figure 25).

The use of green surfacing has become associated with special vehicle lanes and, as a result, modes such buses. To maintain this association with public transport, coloured surfacing used at bus stops should be green. For the colour specifications, see *Technical Advice Note 17-18: P33 Specification for Coloured Pavement Surfacings*.

Figure 25: Bus box with coloured surface treatment, Auckland. Note: This stop does not appear to have adequate clearance. Source: Auckland Transport.

4.3.2. Accessibility

This section outlines key design parameters for accessibility:

- Kerb arrangements
- Access ramps
- Tactile ground surface indicators
- Pedestrian movement.

Summary of accessibility components by bus stop classification

The table below summarises signs and markings corresponding to each type of bus stop classification and whether the component is essential, recommended or optional.

Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority.

Table 7: Summary of accessibility components by bus stop classification

	Public transport interchange	Premium	Intermediate	Standard	Basic
Accessibility					
Recommended minimum kerb height at front door (& ideally rear door): 150mm for normal kerb, 160mm for accessible kerb*	Essential	Essential	Essential	Recommended	Optional
Paved clear stand area (hardstand)	Essential	Essential	Essential	Essential	Recommended
Tactile ground surface indicators	Essential	Essential	Recommended	Recommended	Optional
Connecting footpath to/from bus stop	Essential	Essential	Essential	Recommended	Optional
Crossing facility close to bus stop	Essential	Essential	Recommended	Recommended	Optional

Notes:

* Accessible kerbs and certain kerb heights may not be appropriate in some contexts due to topographical constraints.

Kerb arrangements

The kerb forms a critical interface between the bus and the passenger. For a bus to dock correctly and deploy its ramp safely, kerbs should be provided as an expected minimum at all bus stops. This facilitates basic accessibility.

Kerbs at bus stops should:

- Provide a clear and safe delineation between the road surface for vehicle movement and the footpath or waiting areas for passengers and pedestrians.
- Reduce the step height between the bus floor and the bus stop to help passengers board and alight more easily and quickly. facilitating quicker, safer and more comfortable boarding and alighting times.
- Reduce the gradient of a deployed ramp for wheelchair users, people traveling with assistance animals such as guide dogs, older people, people with prams and young children, and people with luggage.

Considerations for kerb arrangements (discussed next) are:

- Kerb height
- Step height and horizontal gap
- Crossfalls
- Accessible kerbs

Kerb height

Kerbs need to be high enough to minimise the step or ramp up to the bus, while taking into account the variable ground clearance of buses.

Depending on the local road environment, bus stops should have a kerb height of 150–160mm.

- A 150mm ‘standard’ kerb height is desirable along the length of the passenger hardstand area to minimise the step up to the bus from the kerb (see also Accessible kerbs).
- A minimum height of 120–140mm should be provided if the desirable kerb height cannot be achieved (for example, due to severe crossfall issues).
- From an accessibility perspective, it is important to recognise that even when deployed on a minimum 120mm high kerb, the gradient of the bus ramp may vary (see Figure 26). The major determinants include:
    - ramp type
    - ramp length
    - roadway and footway crossfalls
    - the distance of the bus from the kerb
    - the ‘kneeling’ height of the bus floor
    - whether the bus is heavily laden.

Although a large proportion of New Zealand urban buses can ‘kneel’, the reduction in step height achieved by kneeling is not necessarily uniform along the side of the bus. If the kneeling system operates on the front axle alone, the front door will be lower than the centre door. Alternative kneeling configurations include tilting of the near-side of the bus or lowering of the entire vehicle.

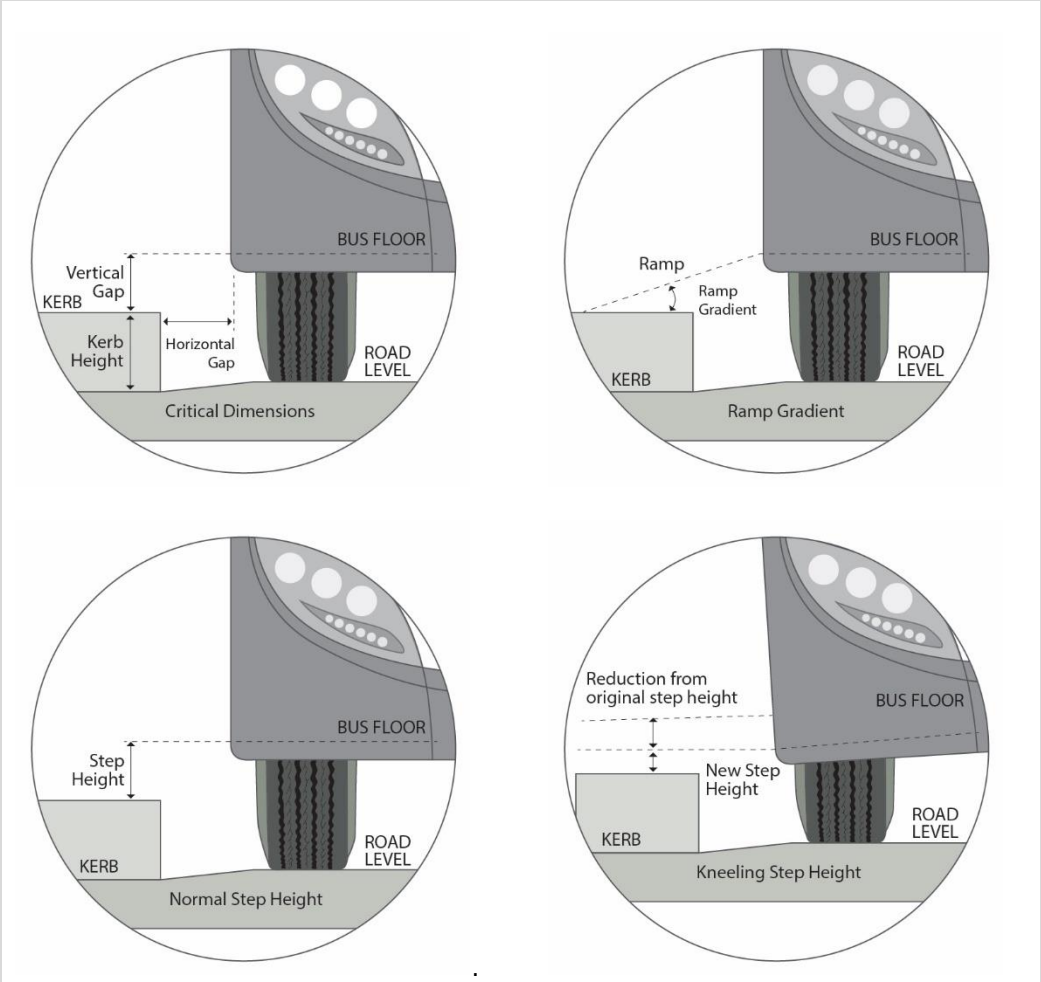


Figure 26: Horizontal gaps, ramp gradient and step height. Source: Flow Transportation Specialists.

The use of higher kerbs and the transition between them need careful consideration because:

- bus overhang may ground and damage the bus and the kerb face
- bus drivers fear this possibility, so may not dock the vehicle flush with the kerb face, negating the benefit of these kerbs.

These risks can be mitigated by providing the correct bus stop layout with the correct lead-in and lead-out and appropriate driver training. However, existing bus stops with higher kerbs may not allow buses to approach correctly (for example, when road camber is severe).

Before increasing kerb heights, review the layout of each bus stop to ensure no conflict will occur. Factors to consider include the following.

- **Ground clearance of buses** – Although bus stop layouts are designed to avoid the need for buses to overhang the kerb on arrival or departure, it may occur at sites with, for example, constrained layouts or inconsiderate parking. In this case, the kerb should be no higher than the minimum ground clearance of the bus.
- **Proximity of driveways** – If the bus stop is close to a driveway, the ability to increase the kerb height may be limited. Bus stops may have to be relocated slightly to facilitate raised kerbs and not affect the driveway.

Figure 27: Damage to kerb and footpath from bus scraping associated with inadequate ground clearance (Source: Lorelei Schmitt)

Step height and horizontal gap

The bus stop layout should allow the bus to stop parallel to and as close to the kerb as possible. This makes it easy and safe for passengers to get on and off the bus.

The critical dimensions to consider are the:

- vertical gap (step height) from the kerb to the bus floor
- horizontal gap from the kerb edge to the side of the bus.

The design should aim to minimise these two distances.

Crossfalls

Where kerb heights are changed, consider carriageway and footpath crossfalls carefully. Footpath crossfalls should have a gradient of no more than 2% within the clear stand area, as a steep backfill from the kerb is undesirable for customer safety and comfort.

Accessible kerbs

The ideal kerb arrangement should provide close vertical and horizontal alignment between the bus floor and adjacent footway.

Consider using accessible kerbs, such as Kassel kerbs (see Figure 28). These kerbs have a profile to help guide the bus along the kerb edge and into a position that reduces the horizontal gap between bus and footpath without damaging the wheel and tyre.

Accessible kerbs are available in different heights with 160mm and 180mm being most common. The preferred height for a Kassel kerb is 160mm, although site-specific circumstances may mean a different height is appropriate.

Accessible kerbs of more than 160mm should be provided at bus stops only where buses always have clear, flat, unimpeded access on the approach and departure from the boarding point and no likelihood of any obstruction that would prevent the bus arriving parallel to the kerb without hitting it.

Consider accessible kerbs for:

- new or upgraded bus stops or bus interchanges
- any new busway, dedicated bus road project or large-scale streetscape project
- bus stops on frequent bus service routes or in town and city centres
- kerbs and channels being replaced as part of a renewals programme
- bus stops where the existing kerb is being broken out as part of road works.

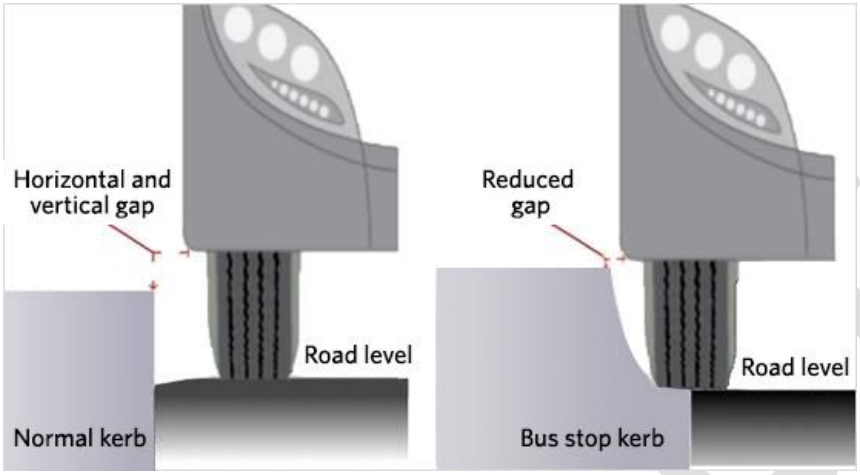


Figure 28: Kassel kerb profiles. Source: Adapted from Flow Transportation Specialists.

Access ramps

Consistency of user experience is very important.

Where kerb and bus door heights can be brought to within about 40mm and the bus docked close and parallel to the kerb, it should be possible for most people, including those using wheelchairs, to get on and off without using the integrated ramp (see Figure 29).

Figure 29: Small gaps between the kerb and bus floor make it easy for passengers to get on or off. Source: Auckland Transport.

Where a kerb and bus door height of about 40mm cannot be achieved, it should still be possible to deploy the ramp from the front door with the bus docked close and parallel alongside the kerb (see Figure 30).

The key to good design is ensure bus drivers are not obliged to position the bus differently to deploy the ramp, as non-ramp users must also be able to get on and off with the bus in the same position.

The maximum gradient allowed for the step ramps formed between two horizontal surfaces is 12.5% or 1:8 (see NZS 4121:2001 and Requirement for Urban Buses). More standards for kerb ramps are in section 4 of NZS 4121:2001.

Figure 30: Accessible ramp. Note the narrow width of the boarding island next to the cycleway creates a conflict with the cycleway that the driver is standing on. Source: Brenda O'Donoghue.

The requirements for new urban buses are that wheelchairs and prams load at the front.

Wheelchair ramps of about 800mm wide and about 800mm long are fitted to all new and a large proportion of older urban buses.

Tactile ground surface indicators

Figure 31: Tactile ground surface indicators in Dunedin (Credit: Mark Edwards)

Tactile ground surface indicators provide visual and sensory information about the road environment. They assist people with vision impairments to access the bus from the adjoining footpath by warning and directing them.

- Tactile indicators **warn** people about the kerb and potential hazard beyond it. Warning indicators of 600mm x 600mm (a square layout) should be installed approximately 400mm-450mm back from the front of the kerb edge, adjacent to a bus stop, preferably close to the location of the entry door. This will location will support sufficient distance between bus swing hazard and someone waiting to board the bus, but not so much space that a pedestrian could inadvertently bypass the warning indicator. Note this square layout of warning tactile indicators should only be used at bus stops, leading to the door of the bus. At crossing points, the width of the warning tactile indicators should be the full width of the path/ pram crossing, being a minimum width of 900mm, as per RTS14 guidelines.
- Tactile indicators **direct** people from the footpath to the kerb where the bus front door will be and from the bus back to the footpath. Where warning indicators are not in the direct line of a continuous accessible path of travel, directional indicators 600mm wide should be installed, when necessary to provide guidance, to form a continuous path leading to the warning indicators. Overuse of directional indicators can be uncomfortable for some users.

A recommended layout for tactile ground surface indicators at bus stops is shown in Figure 32.

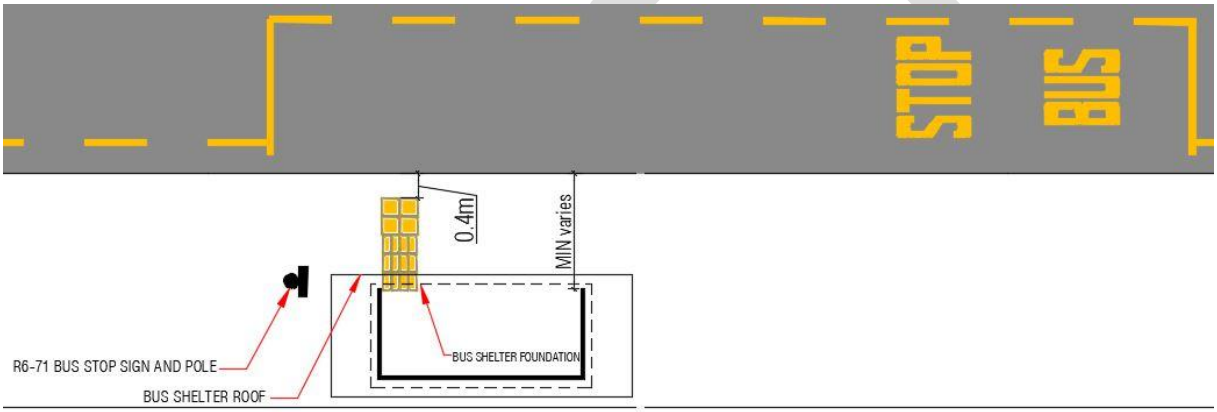


Figure 32: Recommended layout for tactile ground surface indicators at bus stops. Source: Auckland Transport.

Pedestrian movement

Bus stop design should allow for both the safe and easy movement of pedestrians along the footpath and for an adequate waiting area for bus passengers.

Bus stops should be located where footpaths are wide enough, so waiting bus passengers do not obstruct passing pedestrians. A continuous accessible (safe, obvious, step-free) pedestrian through route of at least 1.8m, should be provided for the full length of the bus stop.

A minimum 9–10m should be paved at the bus stop box, forming a 1.8m x 9–10m (16.2–18m^2) paved hardstand area free of fixed obstacles. This length of 'landing pad' means both bus doors have access to the hardstand. In constrained locations, a minimum footpath width of 1.5m may be acceptable.

If an existing footpath is too narrow, consider locating the bus stop where the footpath can be widened, without compromising other location criteria. This is especially important for bus stops alongside retail activity or other busy places.

4.3.3. Safety, security and lighting

Summary of safety and security components by bus stop classification

Table 8 summarises signs and markings corresponding to each type of bus stop classification and whether the component is essential, recommended or optional.

Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority.

Table 8: Summary of safety and security components by bus stop classification

	Public transport interchange	Premium	Intermediate	Standard	Basic
Safety and security					
Street lighting	Essential	Essential	Essential	Recommended	Optional
Shelter with lighting	Essential	Essential	Essential	Recommended	Optional
Emergency help point	Essential	Recommended	Recommended	Optional	Optional
CCTV cameras	Recommended	Recommended	Recommended	Optional	Optional
Coloured surface treatment	Optional	Optional	Optional	Optional	Optional

Safety and security

Bus stop components provide an important role in perceptions of personal safety. The main safety and security considerations are as follows.

- Provide clear visibility between bus drivers and passengers.
- Maintain clear visibility for vehicles around the bus stop and prevent objects and foliage obstructing sight lines.
- Adhere to the design principles set out in *National Guidelines for Crime Prevention through Environmental Design in New Zealand*. Locate bus stops and shelters to minimise the opportunity for crime and increase feelings of safety and security for all people, including when they are travelling at night. Design for the security needs of a wide range of demographics including women, younger people, older people, LGBTQIA+ communities,[11] ethnic minorities, and disabled people, some of whom experience disproportionate levels of violence or abuse. Locate bus stops:
    - in clear, visible locations away from tall vegetation and other objects that people can hide behind
    - in well-lit areas near street lighting or other existing sources of illumination, if the bus stop does not have its own illumination
    - near activity centres where natural public surveillance occurs such as service stations, other stops, rest homes.
- Enhance bus waiting areas to raise public transport users' level of comfort and improve safety for users at night by improving facility visibility.
- Use paving and other surface enhancements to make areas for different modes on walking and cycling paths apparent and obvious, improve safety, and make it easier and smoother to walk and cycle along the routes.

For more information on safety and security factors related to bus stop location and wayfinding, see section 2.2.3: Personal safety and security .

To mitigate safety issues for all road users, including cyclists and turning traffic, undertake visibility assessments in accordance with:

- Austroads *Guide to Road Design Part 4A*
- Guidelines for Visibility at Driveways.

Remember to also assesses visibility during hours of darkness, as additional issues or obstructions may be apparent that aren't during daytime.

[11] LGBTQIA+ stands for lesbian, gay, bisexual, transgender, queer (or questioning), intersex, and asexual with the plus (+) sign representing other gender identities and sexual orientations (such as gender-fluid, pansexual and non-binary).

Further guidance

For more information, see:

- section 2.2.3: Personal safety and security
- Austroads *Guide to Road Design Part 4A*
- Guidelines for Visibility at Driveways.
- National Guidelines for Crime Prevention through Environmental Design: Part 1.

Lighting

Lighting at bus stops:

- enhances the security of passengers
- improves the perception of personal safety
- enhances the bus journey experience
- allows bus drivers to see waiting customers.

The bus stop and the walk up to it should be well lit at night. The extent that this should be included as part of any bus stop installation or improvement depends on the specific site requirements. Where street lighting is inadequate, independent lighting should be installed, which could be solar powered and mounted on the bus stop pole.

For further guidance on the standards for pedestrian and vehicle lighting levels, see Lighting for Roads and Public Spaces (AS/NZS 1158.3.1:2020).

Connections to the local electricity network can often be difficult or costly. Ideally, each bus shelter should have its own source of illumination. In many instances, good quality solar powered lighting may make the most sense to install from practical and cost perspectives (see Figure 33).

Figure 33: Bus stop shelter with lighting. Source: Elisa Hardijanto.

4.3.4. Street furniture

Street furniture such as seats, shelters, rubbish bins and information signs improve the amenity at a bus stop. To ensure bus stops make a positive contribution to the streetscape, street furniture should be well designed and not impede access or encourage loitering.

All street furniture at bus stops should be set back from the kerb line by 1m for the full length of the bus box. This prevents the front swing and tail swing of a bus from colliding with fixed obstacles. Where the bus stop is likely to be serviced by double-decker buses, extend the 1m horizontal clearance 10m either side of the bus stop box; that is, alongside the lead-in and lead-out space. This increased clearance

requirement relates to the risk of the upper deck being hit by obstacles (for example, shop canopies). For further information, see Public Transport Design Guidance topic Corridor Clearance.

Additionally, all street furniture at bus stops should:

- be located to maintain clear boarding and alighting areas
- keep a clear pedestrian through route of ideally 1.8m (slightly lower widths may be agreed for very constrained locations)
- be consolidated as much as possible to maximise a barrier-free space
- not block sight lines when a bus stops at the bus stop.

Street furniture can be placed to influence the path of cyclists and micromobility users[12]. For example, by placing street furniture near the kerb to lead cyclists and micromobility users around the back of the footpath rather than into the path of alighting bus passengers – so long as minimum clearance to the kerb is met.

Where cycleways and bus stops are adjacent, shelters should be transparent to promote sight lines and situational awareness.

This section next provides more details about:

- Seating
- Rubbish and recycling bins
- Bus stop shelters.

Summary of street furniture components by bus stop classification

Table 8 summarises street furniture components corresponding to each type of bus stop classification and whether the component is essential, recommended or optional.

Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority.

Table 9: Summary of street furniture components by bus stop classification

	Public transport interchange	Premium	Intermediate	Standard	Basic
Street furniture					
Seating	Essential	Essential	Recommended	Recommended	Recommended
Shelter‡	Essential	Essential	Essential	Recommended	Recommended
Rubbish bin	Essential	Essential	Recommended	Recommended	Recommended
Recycling bin	Recommended	Optional	Optional	Optional	Optional
Ticket sales/top-up	Essential	Recommended	Recommended	Optional	Optional
Cycle parking	Essential	Recommended	Recommended	Recommended	Optional

Notes:

‡ Shelter provision is also affected by whether a stop is primarily used for boarding or alighting.

Seating

People need to feel comfortable waiting for a bus, and comfortable seating at or near bus stops improves the passenger experience. Many people, particularly some older people, cannot comfortably wait for a bus without sitting down.

[12] Micromobility refers to lightweight vehicles such as bicycles, e-bikes, and electric scooters and skateboards.

- Provide seating in quantities reflective of expected waiting times and number of customers (level of patronage). Ideally, all boarding stops would be provided with a seat. Sit-rails are permitted, but if only sit-rails are provided, be aware that they will not cater for the needs of customers such as some older people.
- Consider providing less seating at locations serving high-frequency bus routes with minimal passenger waiting times and high passenger volumes.
- Locate seating at bus stops (or in shelters) as close as possible to the front door of the bus when it pulls up at the stop while also maintaining the required clear areas and minimum continuous accessible path of travel.
- Consider seating with arm rests to make it easier for people to sit down and stand up and to deter people sleeping on benches (see Figure 34).

Figure 34: Bus stop shelter with arm rests (circled). Source: ARA Shelters & Structures.

Rubbish and recycling bins

A rubbish and potentially a recycling bin helps keep the bus stop environment clean.

Rubbish bins:

- should be located near highly patronised boarding stops and close to places that generate litter such as takeaway food shops.
- are essential at public transport interchanges, premium stops and intermediate stops, recommended at standard stops, and optional at basic stops
- should preferably be located downstream of the bus stop and consider potential nuisances for waiting passengers such as smells and flies
- should not be located near required clear areas or create an obstacle to the circulation of pedestrians, prams and wheelchairs.

Where serviceable, a recycling bin should also be incorporated at a bus stop. Its placement should meet the requirements set out for standard bins and maintenance schedules and contracts should be in place.

Bus stop shelters

This section discusses:

- When to provide bus stop shelters
- Bus stop shelter types
- Where to place bus stop shelters
- What if required dimensions cannot be met

When to provide bus stop shelters

A bus stop shelter should generally align with the bus stop classification (as shown in Table 4 in section 4.2: Bus stop components). However, sometimes bus shelter provision needs to be determined case by case. Table 10 lists situations when a shelter may or may not be required.

Table 10: Shelter provision considerations

Significance of provision	Situation
Shelter may be needed	Bus stops that serve customers connecting between services
	Bus stops near retirement villages or nursing housing that serve elderly people
	Bus stops serving infrequent bus services, where passengers tend to arrive earlier and in turn wait longer
	Existing bus stops are being consolidated and the combined patronage justifies shelter provision
	Shelters to be funded and maintained by the private sector
Shelter may not be needed	Bus stops where passengers primarily use the stop to alight (outbound stops)
	If the bus stop has a very low daily patronage (for example, 5 daily boardings).
	Where there are building canopies or other low-cost seating facilities that can be used as an alternative. Determine this on a case-by-case basis, as a building canopy may not give adequate shelter from wind-driven rain in an exposed site.

Weather protection

Local climate and prevailing wind directions should be considered in determining shelter provision. Ideally, shelters should have at least three walls (one back wall and two side panels), as well as a roof and an entrance that together provide effective shelter to waiting passengers. At some narrow sites, shelters without side panels may be installed.

Bus stop shelter types

A range of shelter sizes and designs exist in the market and are available to suit different sites. Usually, shelters come in three approximate roof lengths:

- 4.9m – minor
- 8.5m – intermediate
- 12.1m – major.

Each of the minor, intermediate or major shelters can come in four approximate roof depths: 2m, 1.5m, 1.3m and 0.8m). These depths are used in this guidance as ‘standard’ installations. Other sizes and designs can be developed for specific sites as discussed further down in the guidance.

A **minor shelter** is the standard type at a bus stop (see Figure 35). It is generally around 1.5–2.0m deep but a 1.3m variant is also suitable if a larger shelter cannot be fit safely.

More compact shelters (around 0.8m deep) are generally used only in very constrained sites (as customer weather protection is compromised with this design).

Figure 35: Minor 1500mm shelter. Source: Flow Transportation Specialists.

At stops with high boarding demand (for example, in town centres or outside schools and train stations), it may be necessary to provide greater capacity in the form of an **intermediate or major** shelter (see Figure 36 and Figure 37, respectively). The same size and depth dimensions as minor shelters apply to these shelters.

Figure 36: Intermediate shelter. Source: Flow Transportation Specialists.

Figure 37: Major shelter. Source: Flow Transportation Specialists.

Where to place bus stop shelters

The preferred configuration at a bus stop is shown in Figure 38.

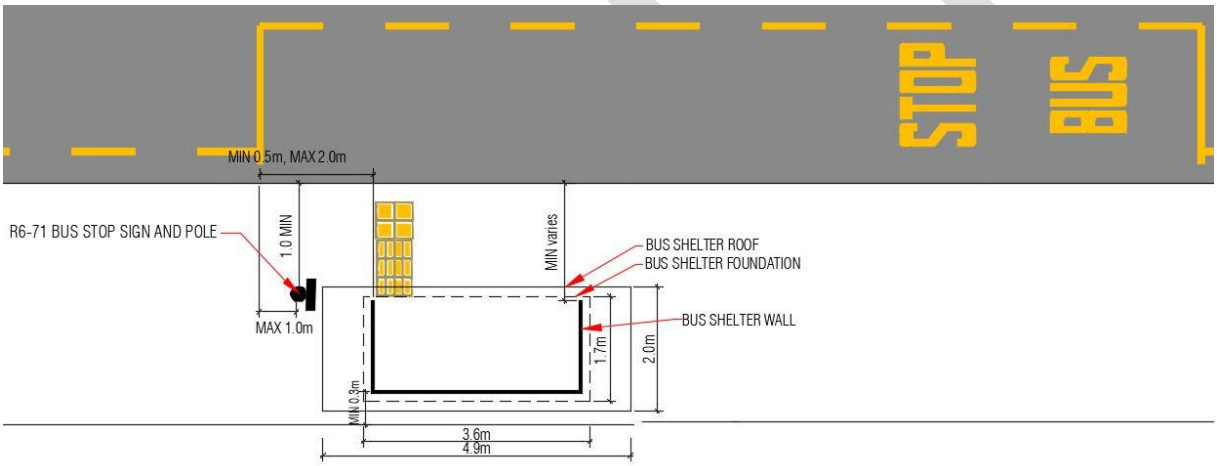


Figure 38: Bus stop shelter layout.

A shelter should not block the pedestrian through route on the footpath.

Where there is enough width, locate a shelter to the back of the footpath, further from the roadway. The area for the pedestrian through route caters for the pedestrian flow along the route and the potential obstruction caused by waiting passengers. Placing the shelter to the rear of the path enables the remaining width to be made available to undivided pedestrian movement but can require the main flow along the path to weave around the shelter.

If the shelter backs directly onto a property boundary or fence, the property owner may wish to have a gap between the back of the shelter and the boundary for activities such as maintenance access. Even if no maintenance is needed for the property, the shelter itself may need space behind it for maintenance purposes. This space is usually 500–600mm. However, in constrained sites, a minimum of about 350mm would mean more space for people using the footpath.

Where space permits, a shelter can be placed in front of the main pedestrian movement alignment, as long as the recommended minimum of 1.8m between the front of the shelter and the kerb can be achieved. Less than 1.8m may be acceptable in some space-constrained, lower pedestrian volume contexts subject to agreement with local road controlling authorities and project co-funders, being mindful

that narrower widths might result in pedestrians walking in the road causing a safety risk that would need to be managed.

Bus shelters also need a concrete pad foundation, so the construction of that pad should be considered if the shelter is not being located on an existing footpath

Other shelter features may include CCTV, Wi-Fi and electrical cables. Consider connecting these when locating and constructing the shelter.

Sight lines

Bus stop shelters can negatively impact on sight lines of oncoming traffic, especially where shelters are to the right of vehicles exiting a driveway. When considering placing shelters either side of driveways, consider pedestrian and vehicle visibility splays from driveways.

Consider the appropriate (and feasible) visibility layout for each site on its own merits. The setback of shelter from the roadway may be more important than the distance from the driveway to provide sufficient visibility.

Shelters can also prevent waiting passengers from being seen. Sight lines are required to avoid the ability for people to conceal themselves behind panels. If possible, all shelter panels should be interchangeable for alternate designs including glass panels and steel. Where possible, use transparent materials to enhance visibility and passive security. Materials and design should allow passengers to see the approaching bus while standing or sitting inside the shelter.

Shelters in the vicinity of cycleways, especially two-way (or bidirectional) cycleways should be transparent to better accommodate situational awareness between people on bikes/scooters, pedestrians and bus passengers.

For more information, see *Guidelines for Visibility at Driveways* (RTS 6).

What if required dimensions cannot be met?

For constrained sites where the ideal configuration cannot be achieved, consider the advantages and disadvantages of alternative layouts such as:

- offsetting the shelter from the head of the stop
- a narrower shelter
- a bus boarder with the shelter at the back of the footpath.

Where the minimum width of pedestrian through route or setback of a shelter cannot be met (noted above), consider, without compromising pedestrian safety, the following alternatives.

- Reduce the dimensions of shelter by, for example, cutting back the end walls or sides of the shelter to accommodate the required clear footpath width (see Figure 39), providing no walls at all with a cantilevered style shelter (see Figure 40), or cutting back the shelter roof to provide sufficient clearance. However, these adaptations should be avoided where weather conditions can be harsh as better weather protection is needed.
- Install a bus boarder to widen the available area.
- Reposition the bus stop to a nearby location with more space.
- Acquire land to provide additional width.

Figure 39: Bus shelter with reduced width of sides to accommodate a clear pedestrian path on a constrained footpath in Wellington. Source: Lorelei Schmitt.

Figure 40: Cantilevered shelters. Sources: Lorelei Schmitt and Flow Transportation Specialists.

4.3.5. Stop-specific information

Public transport information is essential for customers. Information provision can:

- help potential customers to determine whether public transport is a viable option for their intended journey
- help customers successfully undertake their trips
- reassure customers about when their service will show up and where it will take them.

Information is useful for people taking unfamiliar journeys, which may be associated with anxiety.

This section discusses:

- Types of information
- Location of and audience for information
- Making information easily readable
- Table 11 summarises the type of signage recommended for each type of bus stop and whether the component is essential, recommended or optional. Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority. More details are in the sections following the table.

Table 11: Overview of stop-specific information by bus stop type

	Public transport interchange	Premium	Intermediate	Standard	Basic
Stop-specific information					
Bus stop flag	Essential	Essential	Essential	Recommended	Optional
Stop number	Essential	Essential	Essential	Recommended	Optional
Direction of travel	Essential	Essential	Essential	Recommended	Optional
Site-specific fare information	Essential	Essential	Recommended	Recommended	Optional
Stop-specific timetable (departure times)	Essential	Essential	Essential	Recommended	Optional
Stop-specific route diagrams	Essential	Essential	Recommended	Recommended	Optional
Information telephone number or web address	Essential	Essential	Recommended	Recommended	Optional
Stop name	Essential	Essential	Essential	Recommended	Optional
Wider area fare information & zone map	Essential	Essential	Recommended	Recommended	Optional
Wider area route map	Essential	Essential	Recommended	Recommended	Optional
Real-time information signs	Essential	Recommended	Recommended	Recommended	Optional

- Bus stop information sign ('bus stop flag')
- Electronic information displays
- Wayfinding.

Types of information

In general, the type of information to provide users includes:

- signs at bus stops, including a bus stop sign (RP5 sign) and a bus stop information sign (also known as a bus stop flag).
- timetable information, including bus stop number, local authority contact details and links to the local authority's website and apps
- a fare zone map
- information on the schedule of services that operate from the stop or within the local area during the weekday and weekend
- a diagram showing service routes and the location of the specific bus stop relative to the whole route
- signage related to active modes to increase awareness of active transport to and from public transport
- static or digital signage, although real-time arrival information is recommended as it:
    - reassures prospective passengers about the arrival time of their service
    - raises the profile of public transport as a travel option
    - may improve passengers' perceptions about the reliability of services

Location of and audience for information

Provision of information at a bus stop should carefully consider location and audience.

Place signage so it is intuitive and easy to find. Ideally, it should be visible to people waiting in shelters, but it must not block sight lines between bus drivers and waiting passengers. It is beneficial to locate the sign so passengers are facing the direction of the oncoming bus as they view the sign, particularly with real-time arrival information.

Present information so it is clear for a person unfamiliar with the area such as visitors and newcomers. Consider access needs such as audible assistance and braille (see Figure 41).

Figure 41: Signage showing bus stop number in digits and braille. Source: Flow Transportation Specialists.

Making information easily readable

Following a robust accessibility approach will ensure good outcomes for all travellers, including disabled people. It is good practice to:

- engage with the disability sector to review proposed bus stop designs
- obtain a review of designs by disability groups like Blind Low Vision NZ and People First Aotearoa
- adjust designs based on feedback (for example, increase font sizes and improve legibility of maps)
- test signage with an external tester before and after information and signage are installed.

Table 11 summarises the type of signage recommended for each type of bus stop and whether the component is essential, recommended or optional. Where items marked essential are not legislative requirements, departures should be approved by the relevant road controlling authority and public transport authority. More details are in the sections following the table.

Table 11: Overview of stop-specific information by bus stop type

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Direction of travel	Essential	Essential	Essential	Recommended	Optional
Site-specific fare information	Essential	Essential	Recommended	Recommended	Optional
Stop-specific timetable (departure times)	Essential	Essential	Essential	Recommended	Optional
Stop-specific route diagrams	Essential	Essential	Recommended	Recommended	Optional
Information telephone number or web address	Essential	Essential	Recommended	Recommended	Optional
Stop name	Essential	Essential	Essential	Recommended	Optional
Wider area fare information & zone map	Essential	Essential	Recommended	Recommended	Optional
Wider area route map	Essential	Essential	Recommended	Recommended	Optional
Real-time information signs	Essential	Recommended	Recommended	Recommended	Optional

Bus stop information sign ('bus stop flag')

A bus stop information sign, known as a bus stop flag, shows stop-specific information (for example, the bus stop number, bus stop name, timetable direction of travel, and routes that use the stop). Where possible, mounted this sign on the same pole as the RP-5 (see Figure 42 and Figure 43).

Signs should be at least 1m from the kerb face and must be mounted perpendicular to the kerb.

At stops in town centres and central business districts, the information sign may take the form of a double-sided plinth, which must be clear of both the pedestrian through path and from the doors of a stopped bus.

Figure 42: Bus stop information sign and RP-5 mounted on a same pole. Source: Auckland Transport.

Figure 43: Timetable information mounted on the bus stop information sign. Source: Mark Edwards.

Electronic information displays

Electronic information displays (or real-time information) at bus stops are used primarily to give customers up-to-the minute information about when a bus is due to arrive at the stop. They can also provide the public with messages advising of planned service changes or major service disruptions, enabling customers to change their travel plans if necessary.

Real-time information displays are preferable to static displays. Some research[13] indicates that real-time information wait estimates are more than twice as close to actual wait times than timetables alone while perceptions of wait time may be reduced by the presence of real-time information.

Real-time information signs can be installed as stand-alone items (see Figure 44) or integrated in bus stop shelters (see Figure 45). These signs should be accompanied with an audio button to cater for vision-impaired passengers.

[13] O Cats & G Loutos. 2016. Real-time bus arrival information system: An empirical evaluation', *Journal of Intelligent Transportation Systems* 20(2), 138–151. DOI: 10.1080/15472450.2015.1011638

Figure 44: Standalone real-time sign mounted on pole. Source: Metlink.

Figure 45: Real-time sign incorporated into a shelter. Source: Flow Transportation Specialists.

Some installations of real-time displays have been problematic and costly in New Zealand, especially relating to issues such as power supply connections, reliability and overall cost to operate.

More recent technology developments such as various ‘e-paper displays’ generally offer lower power solutions, including solar solutions, with cloud-based connections making the whole connection task much easier and often cheaper to supply and install (see Figure 46 and Figure 47).

Vandalism is also an issue where display signs are at a reachable height. Consider surveillance and maintenance when considering installing such signs.

When deciding where to provide electronic passenger information displays, give priority to bus stops:

- on major bus routes
- that cater for transfers
- near major trip generators such as shopping centres and education facilities
- near transport interchanges such as train stations and ferry terminals.

Prioritising these locations will offer more use of the resources per dollar spent, but real-time information is also appreciated by customers on lower-frequency routes where the cost of not knowing when your bus is arriving may be long wait times (for example, 30 minutes). In these locations, if real-time information displays cannot be financially justified, provide signage informing passengers of other ways to obtain real-time information such as phone numbers they can call or text and addresses of apps or websites they can use.

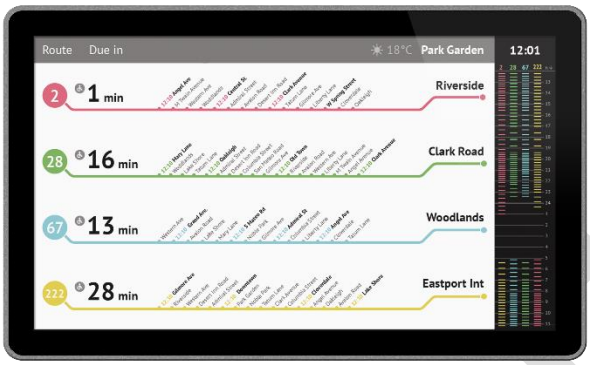


Figure 46: 'E-paper' real time information display. Source: Papercast

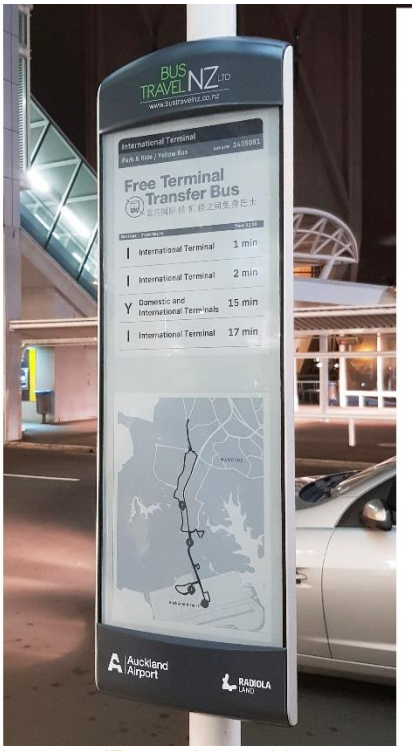


Figure 47: 'E-paper' timetable at Auckland Airport. Source: Radiola Land.

Wayfinding

Wayfinding is an important element of safety and security by preventing passengers from getting lost and providing confidence that the route continues to the intended destination.

A good wayfinding system:[14]

- has an environment that is, to as great a degree as possible, self-explaining
- is recognisable and consistent
- is backed by plentiful on-the-ground research
- is functional, accessible, seamless and interesting to a wide and varied audience
- breaks complexity into a series of connected stages and well-defined routes that are easy to navigate
- has good signage placement – signs stand out and can be seen from any angle or distance
- enables anyone to reach their destination easily and quickly, by providing relevant cues and information
- does not clutter the urban landscape – it is simple and concise, providing just the right amount of information

[14] The key elements of a good wayfinding system are adapted from O Cats & G Loutos. 2016. Real-time bus arrival information system: An empirical evaluation', *Journal of Intelligent Transportation Systems* 20(2), 138–151. DOI: 10.1080/15472450.2015.1011638

- has maps and directories in public places that give a bird's eye view of the environment for people to study before their journey.

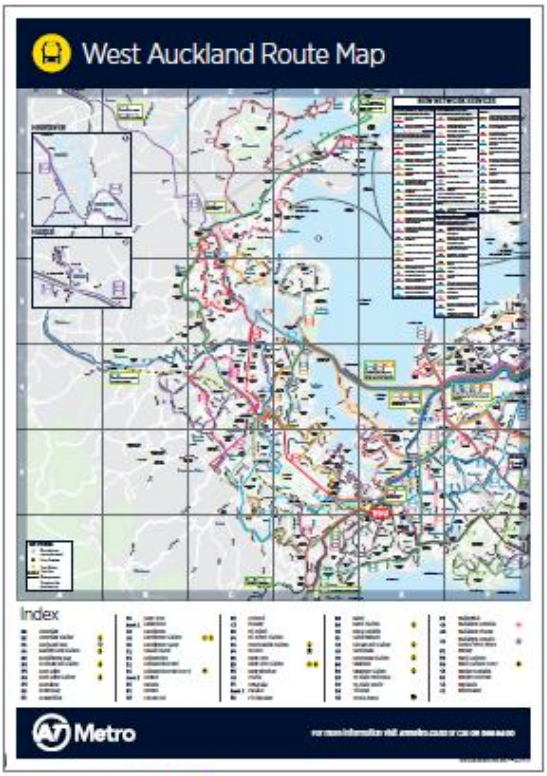
Consider wayfinding for all bus stop locations and, if possible, integrate it with local street mapping displays and facilities (for example, integrate wayfinding maps and local area maps to assist with journeys outside the bus stop area.)

When developing wayfinding tools consider:

- the orientation of the map ('heads up' mapping)
- showing 500m or 10-minute 'walking catchment' circles around the maps to show the scale of the environment around stops or stations.

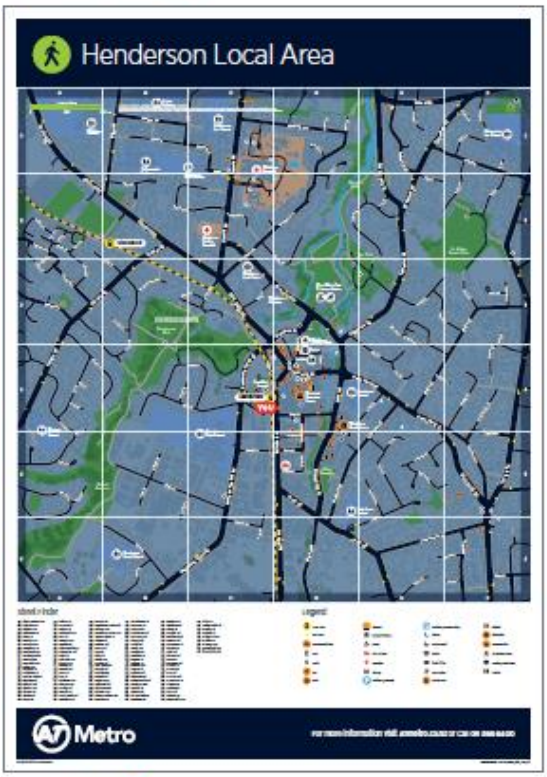
Develop public transport network maps to favour legibility, but remember this can skew distances. Therefore, consider the purpose of map thoroughly in its development to reach the right balance.

See the examples of wayfinding information at bus stops in Figure 48.



Geographic Route Map

Spider Map



Local Area Map

Station Plan

Figure 48: Wayfinding information at unstaffed bus stops and interchanges. Source: Auckland Transport.

4.3.6. Enhancements

This section on enhancements covers:

- Landscaping and vegetation
- Amenity

- Graffiti deterrents and treatments
- Smart shelter design

Summary of enhancements by bus stop classification

Table 12 summarises enhancements corresponding to each type of bus stop classification and whether the component is recommended or optional.

Table 12: Summary of enhancements by bus stop classification

	Public transport interchange	Premium	Intermediate	Standard	Basic
Enhancements					
Landscaping	Recommended	Recommended	Optional	Optional	Optional
Public art	Recommended	Recommended	Optional	Optional	Optional
Community notice board	Recommended	Recommended	Optional	Optional	Optional
Vending machine	Recommended	Recommended	Optional	Optional	Optional

Landscaping and vegetation

Landscaping at bus stops can enhance bus stop amenity but also needs to be balanced with ensuring adequate visibility. Select suitable plant varieties, locate appropriately, and maintain vegetation properly.

Natural landscaping at a bus stop can enhance the bus stop amenity. It is important to provide adequate forward visibility at bus stops because it:

- provides vehicles with enough opportunity to see a stopped bus and safely stop in time
- allows vehicles approaching from an opposing direction to take care when passing a bus
- allows drivers to safely observe passengers and pedestrians crossing the road near a bus stop.

Visibility can commonly be obstructed by overgrown hedges and vegetation, particularly on rural roads.

On the approach side of a stop, limit planting to ground cover or low shrubs less than 0.5m high. Maintenance routines should keep vegetation regularly maintained and sight lines preserved.

Considerations specific to trees and landscaping are that:

- planting should not be located in the boarding and alighting areas or pedestrian path of travel because it will obstruct sight lines between approaching buses and waiting passengers
- tall, clean-stem shade trees can be used towards the rear boundary of the road reserve and provide shade to passenger standing areas without obstructing sight lines
- tall vegetation that obscures sight lines or offers a place to hide reduces personal security, so don't plant it.

In addition, plantings used for landscaping should:

- be consistent with the surrounding natural environment and unlikely to intrude on the integrity of the stop environment
- be drought resistant
- be unlikely to interfere with above- and below-ground services and utilities
- not be toxic, highly allergenic or noxious weeds
- not produce thorns, barbs, stings or noxious secretions.

Amenity

Bus stops are important places in our urban environments. Amenity is important to support them as nice places to be and support the attractiveness of public transport. The amenity at bus stops can be improved

by incorporating items such as local art and ‘play’ features, replacing steel panels in shelters with timber pillars, and applying designs on glass panels (see Figure 49 and Figure 50).

In New Zealand, it is common practice for advertising companies to form contracts with councils that mean they pay for bus shelter maintenance in exchange for advertising rights, which may reduce opportunities for art, play and amenity.

Landscaping and planting can also be incorporated to complement bus stop architecture and enhance the identification of a particular location (see above section for guidance).

Figure 49: A Bus Stop Moves shelter wrapped with exercise how-to’s. Source: Allison Lukacsy-Love.

Figure 50: Shelter with cultural art on the sides, Wellington. Source: Lorelei Schmitt.

Figure 51: A modular, functional, and aesthetic bus shelter in Auckland that resulted from a design competition for a new suite of shelters. Source: Design Brand

Graffiti deterrents and treatments

All infrastructure components, including furniture, lighting equipment, and timetable and information devices, that come into contact with passengers should be resistant to acts of vandalism and graffiti. This may involve components being applied with anti-graffiti coatings or constructed from non-porous graffiti-resistant materials. The use of appropriate colours or artwork can also deter graffiti.

In some circumstances, vegetation may be planted adjacent to structures or walls to prevent access by vandals.

Smart shelter design

Shelters can be designed to incorporate or be ready for Wi-Fi, CCTV, digital advertising, digital media, cellular infill, Smart Metering and other opportunities (such as leveraging the shelter as a point of network connection for infrastructure connectivity and monitoring). Digital advertising and digital media are possible revenue generators that can offset the costs of shelter provision or even generate revenue while also improving the customer experience.

4.4. Bus stop layout

Appropriate layout of bus stops is essential to supporting the safe, efficient, and accessible operation of bus services. The key component of a successful bus stop is that the bus can reliably and consistently align close and parallel to the kerb and stop where passengers expect it to stop relative to the bus stop sign, shelter, footpath indicators, or road markings. A failure to align the bus with the kerb properly is often for one of two reasons:

- the bus driver deliberately stops far away from the kerb to make it easier to pull out of the bus stop or
- the kerb or bus stop layout forces the driver to pull in or out of the bus stop at too sharp an angle.

Either reason can have serious implications for the bus service being accessible and safe.

Figure 52: An indented bus bay with inadequate entry and exit angles resulting in bus drivers not pulling in closely to align with the kerb. Source: Lorelei Schmitt

The main types of bus stop layouts are:

- kerbside bus stops (section 4.4.1)
- in-lane bus stops with bus boarders (section 4.4.2)
- indented bus bays (section 4.4.3).

Note that integrating bus stops with cycling facilities is covered in a separate section of the guidance (section 4.5)

4.4.1. Kerbside bus stops

Kerbside bus stops are located on the street to the side of the roadway next to the kerb edge (see Figure 53 to Figure 57). Usually, the line of the kerb does not deviate at standard kerbside bus stops.

Kerbside bus stops are the most common bus stop layout for most urban and suburban streets in New Zealand. Lead-in and lead-out space is required where the bus needs to pull out of and back into the kerbside traffic lane because of an obstruction, usually on-street parking (see Figure 53). When on-street parking is too close to a kerbside bus stop, the bus may have trouble entering and exiting the stop and aligning close and parallel to the kerb.

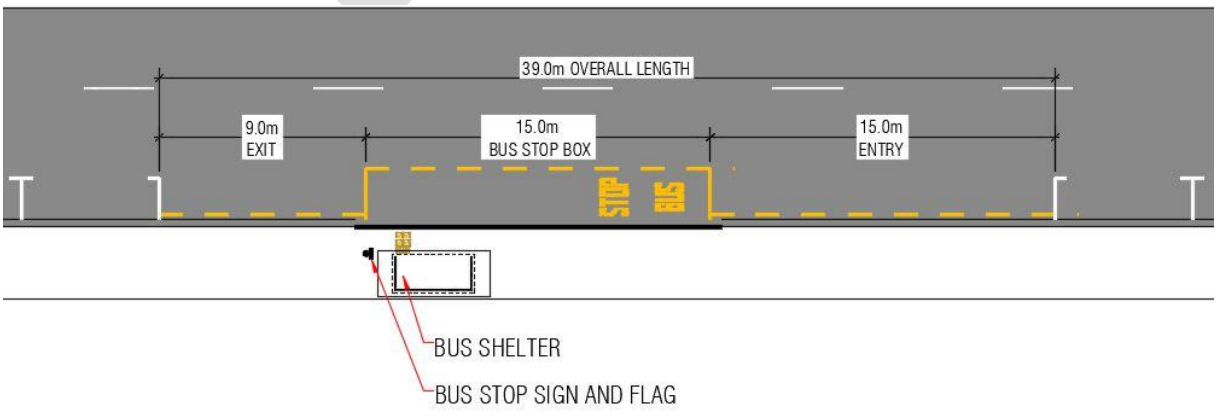


Figure 53: Kerbside bus stop for a standard 13.5m bus with mounted bike rack and parking on either side.

Figure 54 shows a **linear** (or 'double') 30m bus stop with capacity for two buses. It requires an R6-71 bus stop sign. This type of design tends to have dependent operation, that is, the first bus must pull out before the second bus can easily egress the stop. Note that bus stops *longer than* 30m would require a R6-71.1 bus stop sign at each end, with arrows pointing inwards.

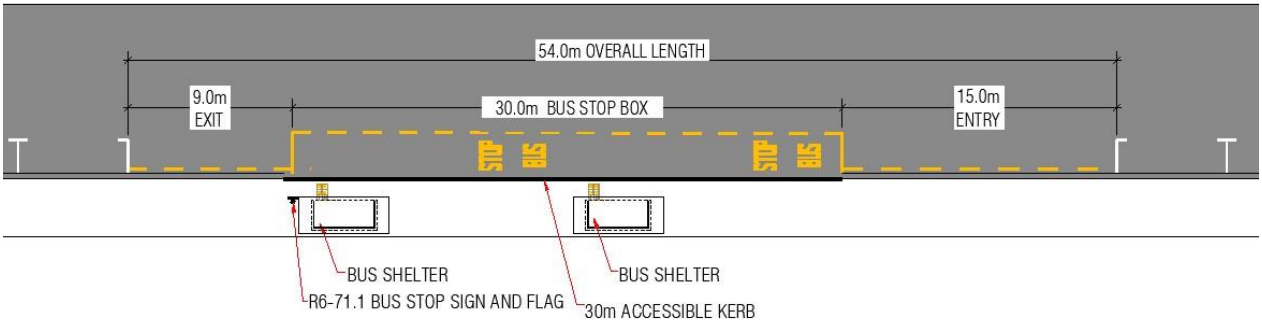


Figure 54: Linear 30m bus stop with capacity for two standard 13.5m-long buses with dependent operation.

Figure 55 shows a **split** stop, which has two kerbside bus stops. Consider this design when capacity warrants two or more separate stops. The consideration of a linear or split stop is based on bus stop capacity, is discussed in section 3: Bus stop capacity.

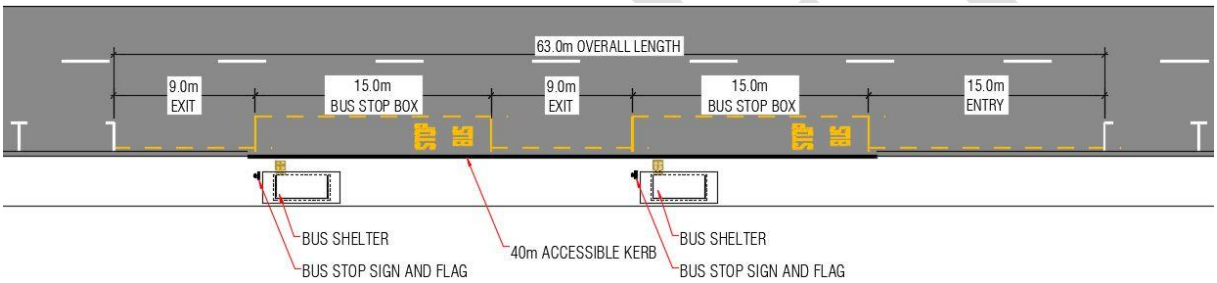


Figure 55: Split kerbside bus stop with parking on either side for two standard 13.5m-long buses supporting independent operation

In an urban environment, creating a length of kerb that is free from activities such as parking can be a challenge. It is made easier by using existing clear spaces such as driveways and imposing stopping restrictions near pedestrian crossings and intersections. This aids bus access while minimising the length marked out as a bus stop and has the advantage of placing stops nearer to where passengers may wish to cross the road (see Figure 56 and Figure 57).

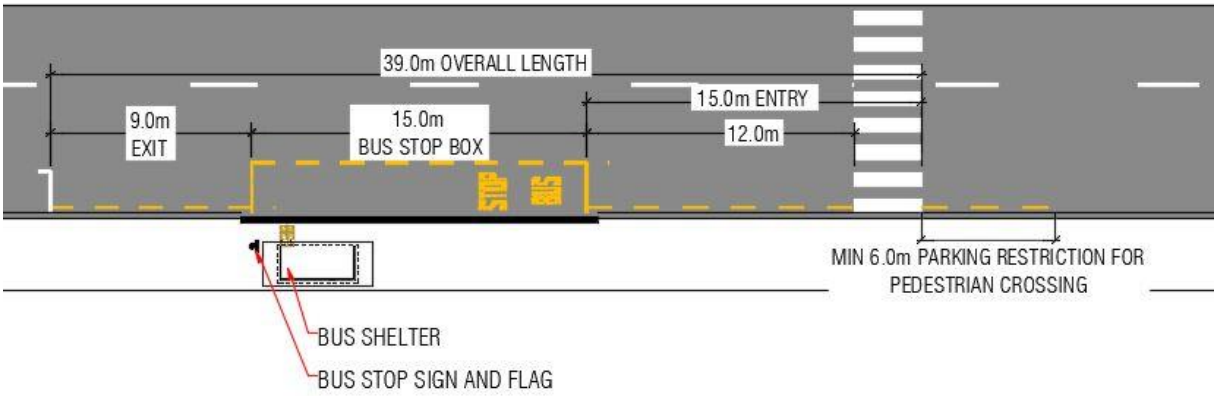


Figure 56: Kerbside bus stop on the departure side of a pedestrian crossing.

For more information about the design of crossing facilities, see Pedestrian Network Guidance.

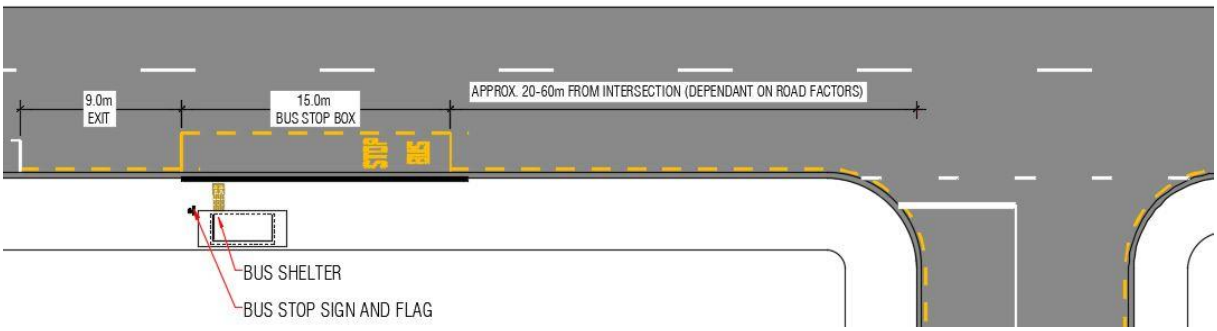


Figure 57: Kerbside bus stop on the departure side of an intersection.

Avoid vehicle crossings within the forward 9m of a bus stop box. Aim to avoid vehicle crossings within any part of the 15m length of a bus stop box, although this is sometimes unavoidable.

Never make crossings through a length of accessible kerb (see Kerb arrangements in section 4.3.2: Accessibility). When determining bus stop placement consider potential impacts on intersection sight lines, particularly for higher frequency stops. For example, as shown in Figure 57 a general rule of thump is to not locate bus stops closer than 20-60m though exact distances can vary based on a variety of physical and operational factors.

Street trees should be located clear of the through route and boarding spaces. Tree trunks should be at least 1m inside the face of the kerb if within the 15m length of a bus stop box. Tree canopies must be capable of being maintained clear of the bus envelope for entry, stopping and exit.

Consider tail swing when choosing the location of the bus stop and designing layout.

Underside clearance might also be problematic with excessive camber or crossfall on the road surface, and it can change over time.

Bus overhang might damage the bus and the kerb face. For more guidance on the clearance needed at bus stops, see Public Transport Design Guidance topic Corridor Clearance.

Trees and other street furniture should not obstruct sight lines between people waiting at the bus stop and the driver of an approaching bus.

When deciding the preferred bus stop layout, consider the expected behaviour of vehicles behind the bus and safety outcomes for all users. The design should achieve at least one of the following conditions:

- a sufficient width for vehicles to pass a stopped bus, ideally with the passing manoeuvre taking place without any part of the passing vehicle having to cross a centreline
- sufficient forward visibility and appropriate conditions for vehicles to safely overtake a stopped bus

If one of conditions is not met (that is, the width between the bus stop box and centreline is inadequate to allow for safe passing or drivers are encouraged to pass the bus on a horizontal bend, vertical crest or busy road), consider an:

- in-lane design – to make it clear to drivers they must wait behind the bus (section 4.4.2), or an
- indented bus stop – to make it clear to drivers whether they can safely pass (section 4.4.3).

4.4.2. In-lane bus stops (with bus boarders)

In-lane (also called ‘in-line’) bus stops enable public transport to stop within traffic lanes rather than needing to exit and re-enter the traffic lane. In-lane bus stops are often achieved through use of bus boarders, which are arrangements where the kerb line is extended outwards for a bus stop

In-lane (also called ‘in-line’) bus stops enable public transport to stop within traffic lanes. Traditional kerbside bus stops require buses to exit the traffic lane and manoeuvre into a kerbside bus box. This delays buses due to manoeuvring time and the need wait for a gap to re-enter the traffic stream. In some cases, particularly when lead-in and lead-out space is inadequate, drivers may not pull in close to the kerb, resulting in access issues, particularly for people with constrained mobility. In-lane bus stops

eliminate these sources of delays for buses and improve the ability for the bus to reach the kerb line, making it easier for people using wheelchairs or with prams to get on and off the bus. They can also provide other benefits such as reduced parking loss and better footpath operation. and improved ability for the bus to reach the kerb line, making it easier for people using wheelchairs or with prams to get on and off the bus.

While in-lane bus stops do require private vehicles to wait behind the buses when they stop at bus stops, this (usually small) delay is usually often outweighed by benefits to bus passengers. Despite the public's concerns, there is usually little actual impact on general traffic flow, especially on lower volume roads and in main urban and suburban centres where managing general traffic speed is important. More information about benefits and implementation is provided further down in this section.

In-lane bus stops are usually achieved though bus boarders, which are arrangements where the kerb line is extended outwards for a bus stop (see Figure 58). Typically, the bus boarder replaces roadway that would otherwise be for parking or a traffic lane.

Figure 58: Full width bus boarder in Auckland. Source: Thomas Chu.

Bus boarders can be full width (minimum 2m wide) or half width (about 0.5–1.5m wide).

Full-width bus boarders (see Figure 58 and Figure 59) require the shortest kerbside length of all the layouts. Lead-in and lead-out space is not usually needed, only the length of the marked bus stop box itself (15m which includes ample room for bike rack deployment).

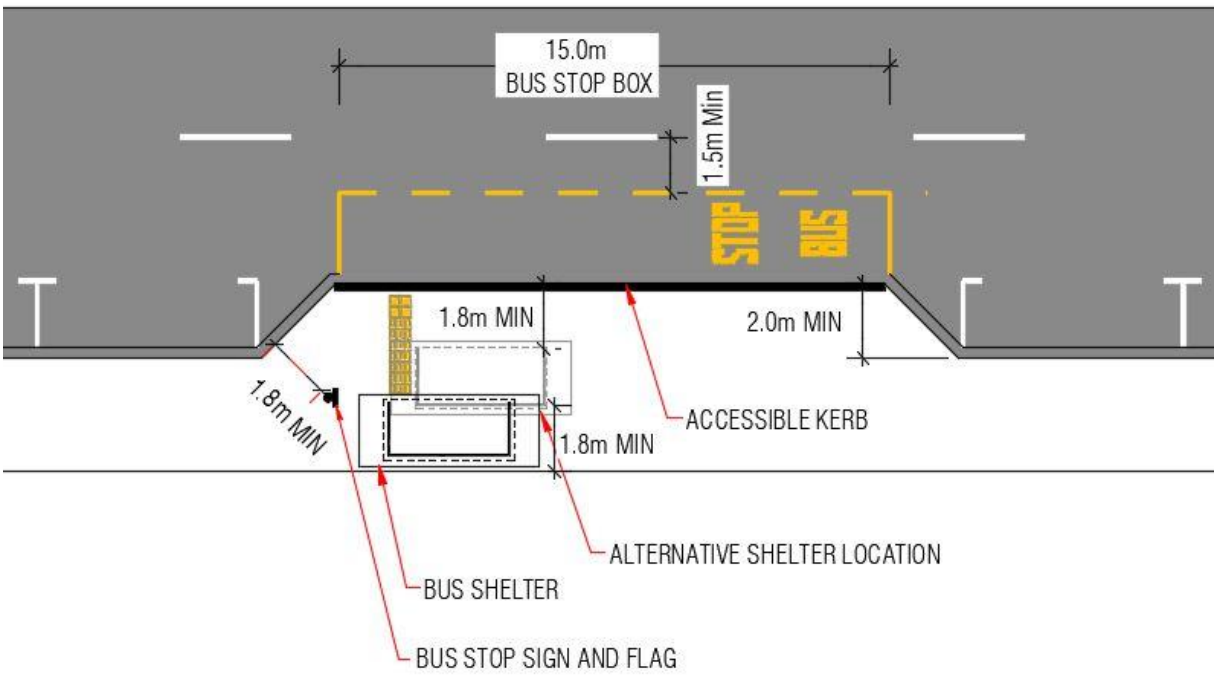


Figure 59: Full-width bus boarder for a single standard 13.5m-long tag-axle bus. Source: Auckland Transport.

Half-width boarders need a lead-in length of about 11m and lead-out of about 6m (see Figure 60 to Figure 63).

Half-width bus boarders are often a useful compromise solution when:

- frequent delays to other vehicles must be avoided
- a full-width boarder would place the bus too close to the opposing traffic stream
- there is on-road provision for cyclists.

The length of the bus boarder along the outer kerb line should correspond to the length of the bus stop box. Where kerbside space is restricted, consider a shorter bus boarder platform, but it should usually measure a minimum of 9–10m along the outer kerb line to allow access to both sets of bus doors.

Designers can be flexible when deciding the optimal length of the bus boarder to accommodate the trade-off between parking provision and additional footpath space given the local context and project objectives.

Figure 60: Half-width bus boarder in Lambton Quay, Wellington. Source: Joanne Tan.

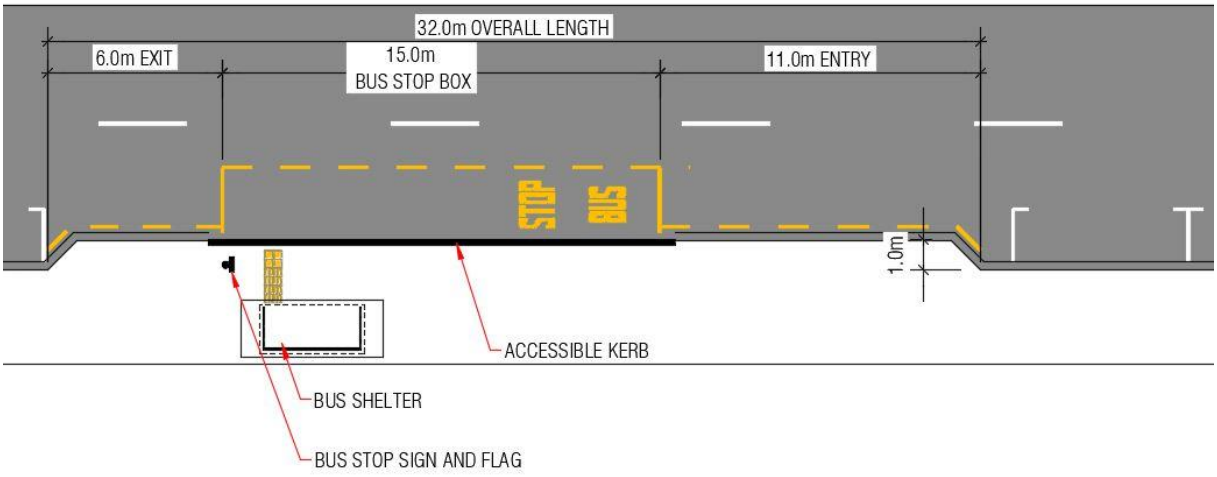


Figure 61: Half-width bus boarder for a single standard 13.5m-long bus. Source: Auckland Transport.

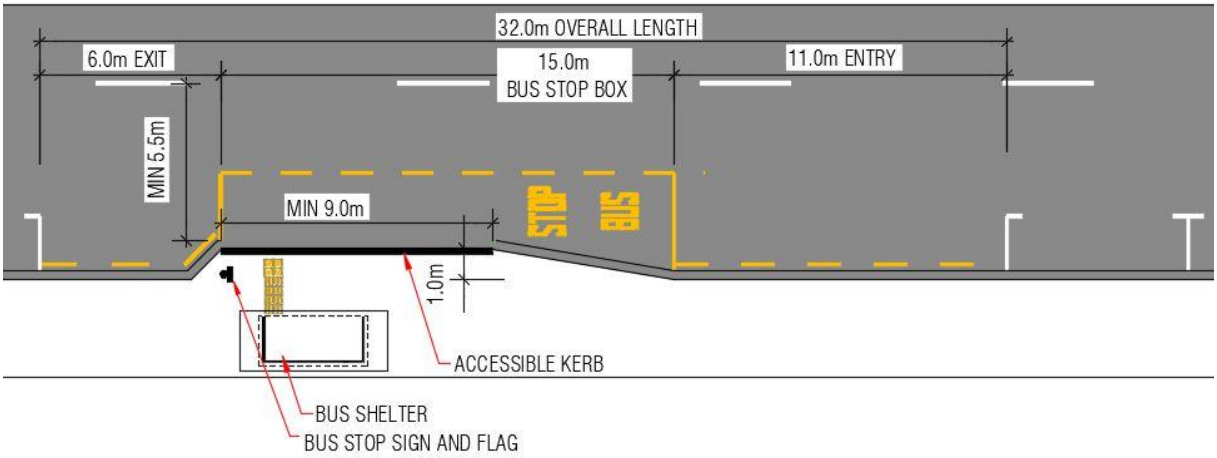


Figure 62: Half-width bus boarder – retrofit to existing street kerb line (alternative 1). Source: Adapted from Auckland Transport.

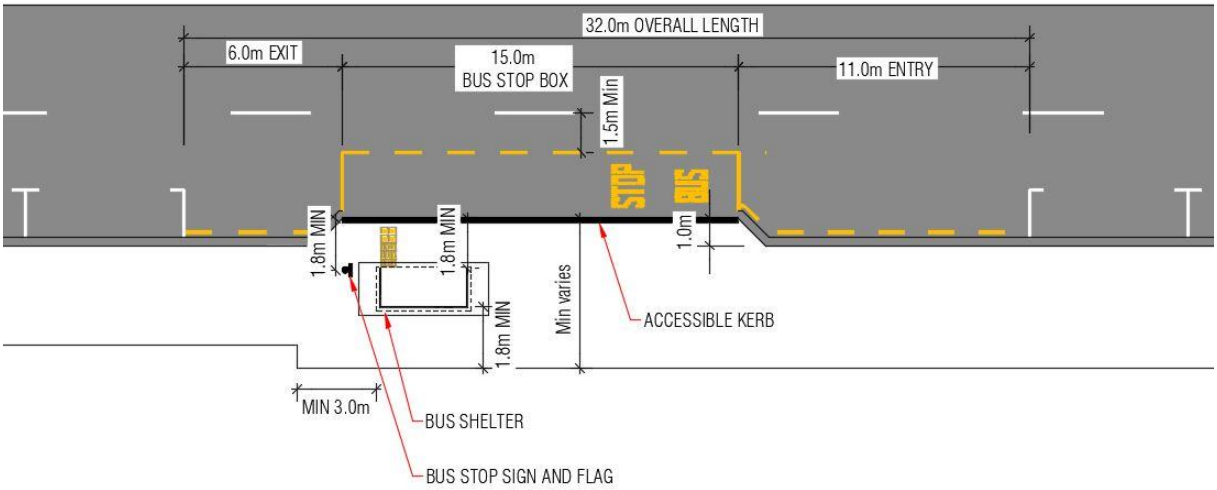


Figure 63: Half-width bus boarder – retrofit to existing street kerb line (alternative 2). Source: Adapted from Auckland Transport.

In the next sections, we discuss:

- Benefits of in-lane bus stops with boarders
- Where to use bus boarders
- Other considerations with bus boarders

Benefits of in-lane bus stops with boarders

The benefits of bus boarders are that they:

- minimise the kerbside space required and allow more parking space where demand is high
- deter illegal on-street vehicle waiting and loading in the bus stop, particularly when the bus boarder is full width
- maintain the place of the bus in the traffic lane closer to the centre line (compared with a kerbside bus stop at the same location without a bus boarder), which gives the bus better priority when re-entering the traffic flow and reduces bus dwell times
- allow the bus to line up parallel and close to the kerb, largely without manoeuvres (on-street parking behind the bus stop may influence the length of the lead-in parking restriction required, so undertake vehicle tracking to determine the appropriate lead-in space)

- avoid buses swinging over the kerb
- provide good accessibility for all passengers
- create passenger waiting areas that do not impede or conflict with the pedestrian flow on the footpath and, with bus infrastructure off the main footpath, make space available for such things as attractive streetscapes, landscaping, cycle parking and street furniture
- act as traffic-calming devices by narrowing the road.
- In the next sections we discuss where to use bus boarders and considerations

Where to use bus boarders

We recommend using bus boarders when:

- the operating speed is no more than 50km/h – consider traffic-calming measures where the operative traffic speed exceeds the posted speed limit, unless the resulting delay is too onerous for other buses and general traffic
- footpaths are narrow, causing conflict between waiting passengers and passing pedestrians
- fewer than 800 vehicles per hour travel in the same direction as the bus, so benefits to bus passengers will likely outweigh disbenefits to private vehicle passengers
- bus dwell time needs to be reduced
- the traffic lane is 3.5–4m wide, which allows 1–1.5m of road space between the lane or centre line and the side of a stationary bus for on-road cyclists to pass (an alternative is to make the bus fully in-lane with a cycle bypass and island/boarder bus stop)
- kerbside parking demand is high, which generally occurs in urban centres
- it is difficult for the bus to merge back into the traffic stream from the bus stop.

To determine the appropriateness of in-lane or kerbside bus stops based on local context, use our in-lane bus stop calculator tool. This tool uses traffic volumes, bus passenger volumes, and bus dwell times to determine which bus stop layout is optimal in terms of reducing overall travel time delays to users.

Other considerations with bus boarders

Other considerations when deciding whether to use in-lane bus boarders are as follows.

- Bus boarders result in an in-lane bus stop, which can cause vehicles to queue behind the stopped bus in the kerbside lane. On corridors where the movement of people is prioritised over the movement of vehicles, this should not be a deterrent to their use. Aim to design the bus stop on the approach to an intersection to avoid traffic blocking back to the intersection.
- Consider using no-passing lines next to the bus stop. This will help to achieve bus priority and discourage drivers overtaking the bus in a dangerous manoeuvre that takes them into the opposing traffic lane.
- Do not use in-lane bus stops if the bus stop is used as a timing point or layover.
- Consider the road type, traffic volume, expected bus stopping frequency and expected bus stop dwell time to determine whether an in-lane bus stop is appropriate for the road in question.

4.4.3. Indented bus bays

Indented bus bays are set into the kerb and footpath space. Their purpose is to remove buses from traffic lanes when they stop. This maintains the general traffic flow and can improve safety in some contexts since a stationary bus in a high-speed traffic lane creates a safety risk. In most situations, an indented bus stop layout is a last choice bus stop design due to the sub-optimal operational impacts described further down.

Indented bus bays can be fully indented (see Figure 64) or half indented (see Figure 65). A half-indented bus bay allows general traffic to overtake the stationary bus safely, while the bus remains in the main stream of traffic. Consider a half-indented bus bay when there is only one wide lane of traffic.

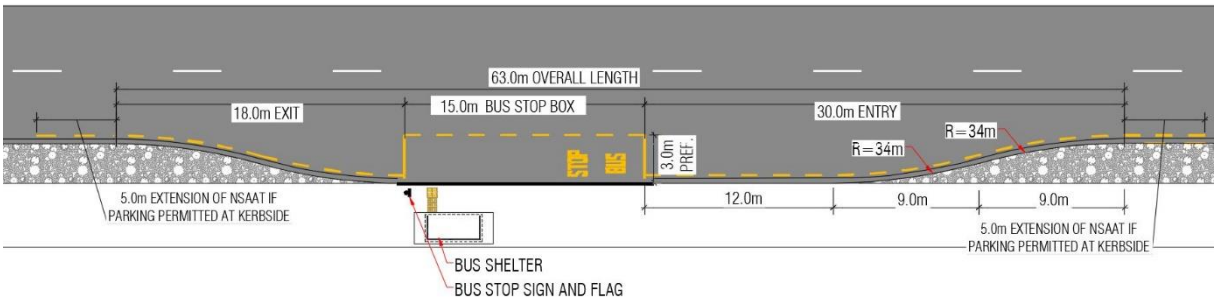


Figure 64: Fully indented bus bay for a standard 13.5m-long tag-axle bus. Source: Auckland Transport.

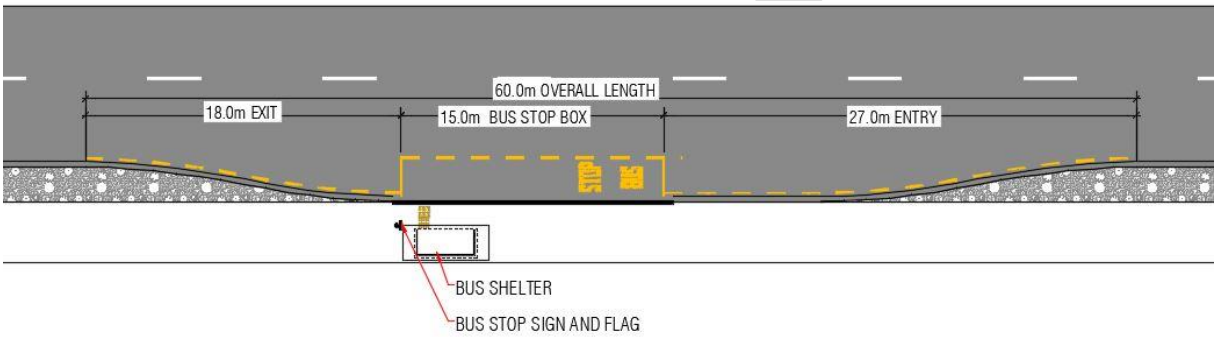


Figure 65: Half-indented bus bay for a standard 13.5m-long tag-axle bus. Source: Auckland Transport.

In the next sections, we discuss:

- Benefit of indented bus bays
- Where to use indented bus bays
- Other considerations with indented bus bays, including disadvantages.

Benefit of indented bus bays

The main benefit of indented bus bays is that they allow other vehicles to pass a stopped bus, avoiding obstructed traffic flows.

Where to use indented bus bays

Use indented bus bays where:

- the posted speed limit is 80km/h or higher, but ensure:
    - good sight lines of approaching traffic
    - lead-in and lead-out spaces that provide for easy and safe manoeuvring of the bus out of and into the traffic
    - bus stops (if possible) are placed immediately downstream of a traffic signal to provide breaks in the passing traffic into which the bus can depart
- the bus will have a long dwell time at the stop and obstruct traffic flow
- busy bus stops with high passenger demand will result in long dwell times, so it may be more efficient to indent stopping buses to allow other buses to pass
- road characteristics such as poor sightlines associated with curves or concealed entries generate a significant crash risk from traffic overtaking a stopped bus conflicting with oncoming traffic
- a kerbside bus stop may leave about a 2m lane width to the centreline (which is not quite enough width for a car to safely pass a stopped bus) and drivers should not be encouraged to pass

- not all buses need to call at every stop such as on high-frequency bus corridors.

Other considerations with indented bus bays, including disadvantages

Other considerations when deciding whether to use indented bus bays are as follows.

- Indented bus bays may present operational problems for buses and passengers. Avoid fully indented bus bays wherever possible, as they reduce the efficiency of bus services.
- Where indented bus bays are provided because of poor sight lines for oncoming vehicles, remember that bus drivers in indented bus bays may also experience poor sight lines of oncoming vehicles. This compromises safety when bus drivers try to re-enter fast-flowing traffic streams and increases journey times.
- Provide fully indented bus bays only when they are:
    - justified by compelling safety or operational reasons
    - required on special vehicle lanes.[15]
- Designs of indented bus bays should support bus drivers to fully pull into the kerb so the bus does not pose a safety issue.
- Remember to provide enough space for cyclists to overtake stationary buses where there is on-road cycle provision, unless an off-road bypass is provided. Provide at least 1.5m from the bus stop box to the centreline to allow cyclists to pass safely.

Indented bus bays have the following six main disadvantages, which must also be considered when deciding whether to use such bays:

- **Difficult merging** – Bus drivers often find it difficult to merge back into the main stream of traffic, causing delays at each bus stop. The variability of this hold-up leads to unreliable, delayed and bunched bus services and adds to overall journey times. This effect is reduced where the kerbside lane is a special vehicle lane, as the reduced density of traffic is likely to provide more opportunity for the bus to depart. Some bus drivers may choose not to pull in close to the kerb, motivated to keep the bus at an angle that makes it easier for them to re-enter traffic, which can block half the lane and impede accessibility.
- **Wasted space** – Indented bus stops require a significant distance so buses can pull in ‘flush’ with the kerb. The recommend length of a fully indented bus bay is 63m from the start of the lead-in to the end of the lead-out. This means less area is available for wider footpaths, streetscaping, berms, landscaping or on-street parking.
- **Poor accessibility** – The design of indented bus bays can impede customer access, particularly where their geometry prevents buses from reaching and stopping close to the kerb. This is because it can be difficult for the bus door to be close enough to the bus stop or footpath for the ramp to be successfully deployed, making it difficult for some passengers to get on or off the bus.
- **Poorer amenity and safety** – Where indented bays reduce footpath width, they can worsen amenity for pedestrians and passengers getting off the bus. This can generate safety and comfort problems where large numbers of people are using electric scooters and other micromobility on the footpath.
- **Illegal parking** – Bus bays are prone to attracting inconsiderate parking or unloading, especially in high-activity areas such as town centres and outside shops. This prevents the bus from reaching the kerbside, which can cause difficulties for some passengers and force them to get on or off from the road.

[15] A special vehicle lane is a lane defined by signs or markings and restricted to a specified class or classes of vehicle. It includes a bus lane, transit lane, cycle lane, and light-rail vehicle lane. These lanes are defined in the Land Transport Rule: Traffic Control Devices 2004 and the Land Transport Rule: Road User 2004.

- **Wider roadway** – Bus bays widen the roadway area, encouraging speeding, making it more difficult for pedestrians to cross the road safely, and making the street environment less aesthetically pleasing.

When reviewing existing indented bus bays, consider filling in and/or relocating the bus stop to address the original reasons for providing an indented bus bay. The additional footpath space can be used to improve the bus stop environment.

4.5. Integrating bus stops with cycling

Cycling integration at bus stops depends on the use and function of the road corridor. Cycling may be provided for on streets by dedicated facilities such as on on-road cycle lanes, separated cycleways (one-way or two-way). Cycling may also be provided for by less dedicated infrastructure such through the use of bus lanes, shared use paths, or low volume roads.

In areas with high demand for all modes of transport, consider the interaction at bus stops between cyclists and bus passengers and carefully consider how best to provide appropriate cycling facilities.

This section describes more common example designs that can be implemented to prevent conflict between vehicular traffic, foot traffic, cyclists and bus users at bus stops. It covers design integration of bus stops with:

- accommodating cyclists at bus stops in bus lanes (section 1.1.1)
- bus stop with on-road cycle lanes (section 4.5.1)
- bus stops with separated cycleways (section 4.5.2).
- bus stops with shared paths (section 4.5.3)

1.1.1 Accommodating cyclists at bus stops in bus lanes

Using bus lanes as a cycling facility is not necessarily preferred by cyclists, yet in New Zealand bus lanes still make up some of the cycling network. For more guidance about when this may be appropriate, see Bus lanes under Cycling Network Guidance.

When bus lanes will be used by people on bikes it is important to carefully consider design around bus stops to support a Safe System. As noted in Cycling Network Guidance, bus lanes that cyclists will use should be either wide or narrow. This is particularly relevant when alternative provision for cycling (such as for example, separated cycleways) has not been provided along the corridor.

- **Wide** (4.2m or over but under 5m) lanes are strongly preferred. All bus lanes should be wide when the bus lane is only a part-time bus lane and accommodates other uses such as parking at off-peak times.
- **Narrow** (3.2m) bus lanes can be used but are less preferable. They should only be considered for full-time bus lanes, only in slow speed environments in urban areas and should be considered more for ‘bus only’ use (i.e. cyclists are provided for elsewhere). Ideally, narrow lanes are typically used only for segments of bus routes without bus stops if cyclist use is expected. Narrow bus lanes do not work well for cyclists where speed differentials are high (for example, on hill climbs) and are better suited for short rather than long stretches of the network. Drivers may also find them uncomfortably narrow given the width of modern buses.

Unless purpose built cycling facilities are provided on the corridor, avoid in-between widths as they are associated with bus–bike passing conflicts.

Integrating bus stops and cycling movements is more straightforward with wide bus lanes than narrow bus lanes.

In the context of wide bus lanes, bus stop design is relatively straightforward as shown in Figure 66.

- Bus stops are typically in-lane.

- Space exists for cyclists to pass the bus to the right of the bus and without needing to interact with other traffic lanes (for example, an adjoining general traffic lane).

In circumstances with increased risk of conflicts such as where multiple buses stop at once or where the adjacent lane is oncoming traffic we recommend a wider design at the stop, for example 4.8m.

A residual risk exists as bus drivers pull out, so local driver training should highlight safe driving around cycles and conflict areas may be highlighted with markings like green paint or other markings.

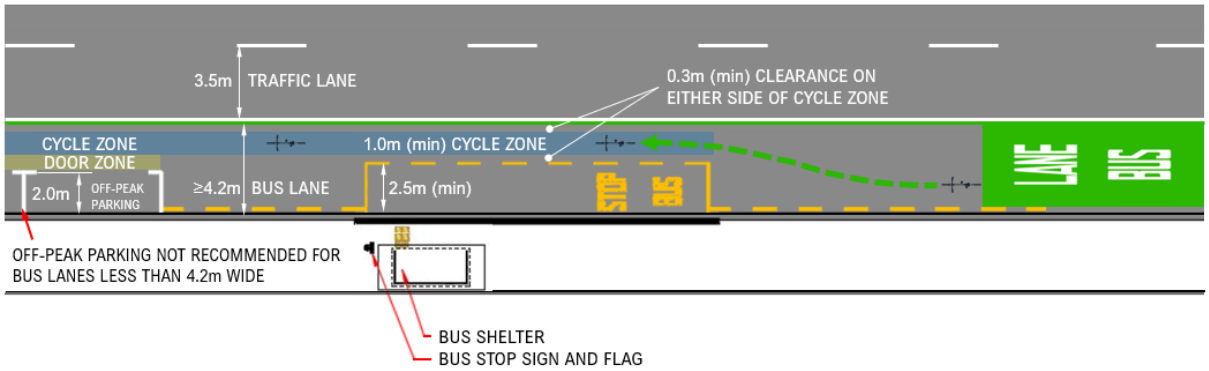


Figure 66: Wide bus lane (4.2m - 5.0m) at kerbside bus stop

Where bus lanes are narrow and cycling use is expected, carefully consider how bus stop integration can support a Safe System. Unless bus dwell times are very short, many cyclists will likely look for a way to pass stopped buses (see Figure 67). Because bicycles are much smaller than larger vehicles people on bikes may try to 'squeeze past' in some way. This issue is likely to be exacerbated where bus dwell times are long or on the approach to a signalised intersection where cyclists may be trying to 'catch the green'.

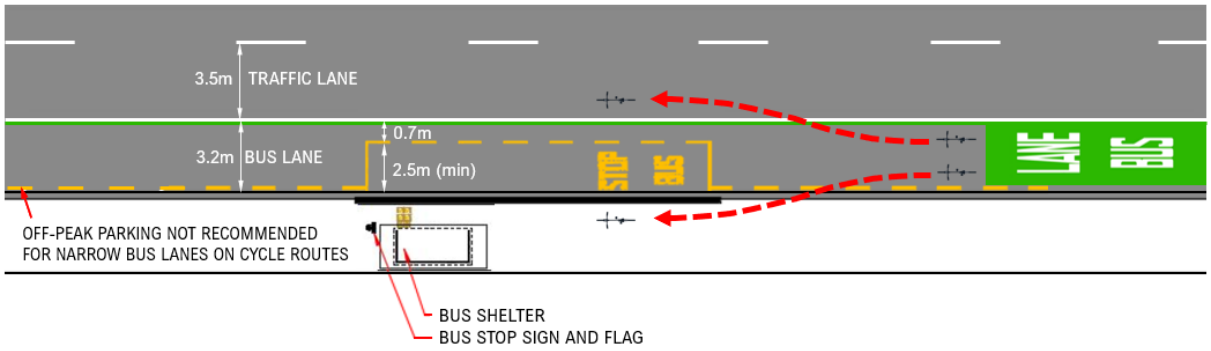


Figure 67: Cycling conflict at a bus stop with narrow bus lanes

For low frequency or low use stops, one *may consider* making no provision for cyclists to pass, expecting them to wait behind the stopped bus. However, we *do not generally recommend* this approach, especially as bus stops or cycling routes become busier. This is because of the risk that cyclists will go in an adjacent or opposing traffic lane or onto the footpath when a passing movement has not been designed for.

The four main options for bus stop design in narrow bus lanes have different levels of preferability.

- Indent the bus stop to accommodate cyclists passing (more safely) to the right of the bus (Preferable, Figure 68)
- Make the bus lane wider at the bus stop to accommodate cyclists passing (more safely) to the right of the bus (for example, by reducing the median or adjacent lane widths) (Preferable, but may be harder to implement Figure 69)

- Build an island bus stop (also known as a bus stop bypass) where cyclists pass bus stops on the footpath side. (These are often used in the context of cycleways – see section 4.5.2.) This option introduces some conflict between boarding and alighting passengers where pedestrians and bus passengers do not have the surrounding visual context of a cycleway. Factor pedestrian and cyclist numbers into consideration of this design as well as topography. (More appropriate for primary cycling routes than secondary or tertiary and a longer cycleway way lead in/out might help mitigate visual context issues.)
- Expect people on bikes to merge into an adjacent traffic lane (if available) to pass buses. This introduces a potentially unexpected conflict for drivers. (Less preferable, more applicable for stops with low bus frequency and low dwell times where number of conflicts is likely to be low)

Options for creating 'extra width' for a wider bus lane at bus stop locations include:

- moving bus shelters slightly upstream or downstream
- narrowing the width of medians, general traffic lanes or, less preferably, footpaths or bus shelters.
- To support a Safe System, speeds in these environments should be slow. Also, be mindful that at busier bus stops where two or three buses may be regularly lining up, people on bikes may not be able to see the indicators of the first or second bus in the queue when buses are ready to depart from the kerb so extra buffer space should be provided.

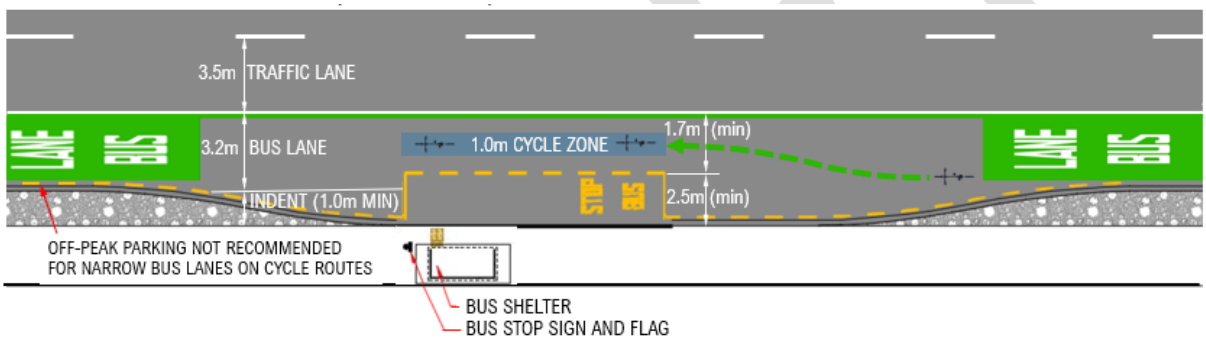


Figure 68: Narrow bus lane (width = 3.2m) with partially indented bus stop to accommodate cyclist passing

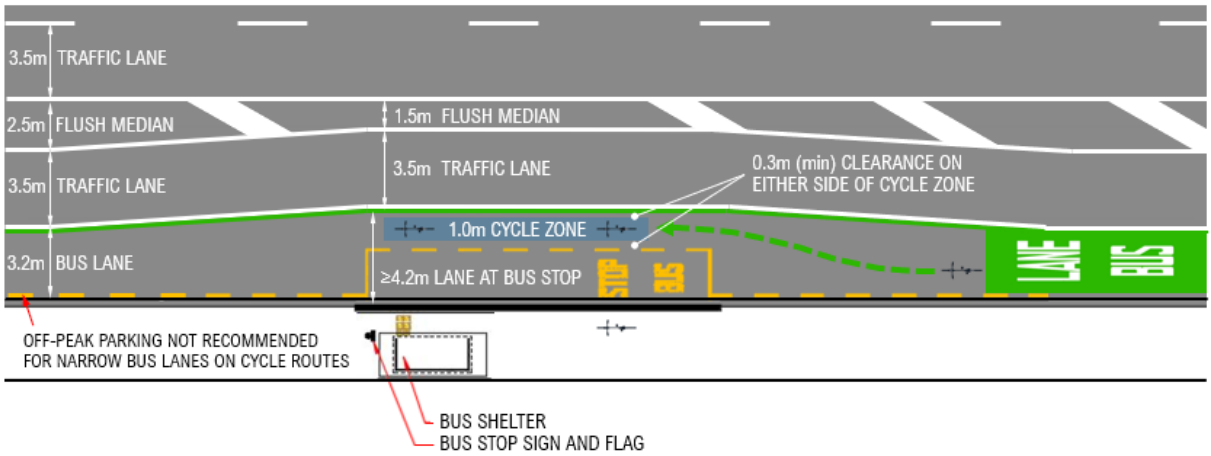


Figure 69: Narrow bus lane (width = 3.2m) with reduced median to accommodate cyclist passing

Further guidance and references

For more information, see:

- Cycling Network Guidance: Bus lanes
- PTDG: Public transport priority and optimisation

- NACTO Transit Street Design Guide: Shared Bus-Bike Lane(external link)
- A summary of design, policies and operational characteristics for shared bicycle/bus lanes

Use of buffered advance stop boxes

For bus stops near intersections, consider use of a buffered advance stop box for people on bikes rather than a standard advanced stop box design. A buffered advanced stop box can reduce encroachment by buses by 83% over a standard design[16] thus reducing bus – bike conflicts. It can also provide a bit more space, increase comfort levels and help time acceleration between modes more harmoniously. Refer to the *Buffered Advance Stop Box* – design guidance note.

4.5.1. Bus stops with on-road cycle lanes

Where a cycle lane coincides with a bus stop, the bus must drive across the cycle lane area to pick up or drop off passengers. In these instances, a cycle lane can be located kerbside (see Figure 70), between a bus stop and a live traffic lane (see Figure 71), or as a bypass behind an 'island' bus stop (see section 4.5.2).

Figure 70: Cycle lane in a kerbside position, Auckland. Source: Flow Transportation Specialists.

Figure 71: Cycle lane between a bus stop and a live traffic lane, Auckland. Source: Flow Transportation Specialists.

On bus routes with infrequent bus services (that is, fewer than about 10 buses per hour[17]) and where buses stop only briefly, bus stops may be marked where cycle lanes are in a kerbside position. Where sufficient road space exists to provide a continuous cycle lane, the cycle lane may be provided around the bus box. Both layouts have an element of conflict between cyclists and buses.

Ideally, raise the visibility of the cycle lane with clear line markings and colouring. We recommend the use of green coloured boxes in the locations where a bus would need to cross the cycle lane to highlight conflict points (see Figure 72). A length of at least 10m green paint on the approach is recommended as it accounts for the wheel tracks of the bus and to maintain visibility of the cycle lane given potential wear from bus swept paths. Green paint markings may need to be longer for the egress conflict area.

[16] https://www.nzta.govt.nz/assets/resources/buffered-advance-stop-box/Buffered-advance-stop-box-design-guidance-note.pdf

[17] See Cycle lanes under Cycling Network Guidance.

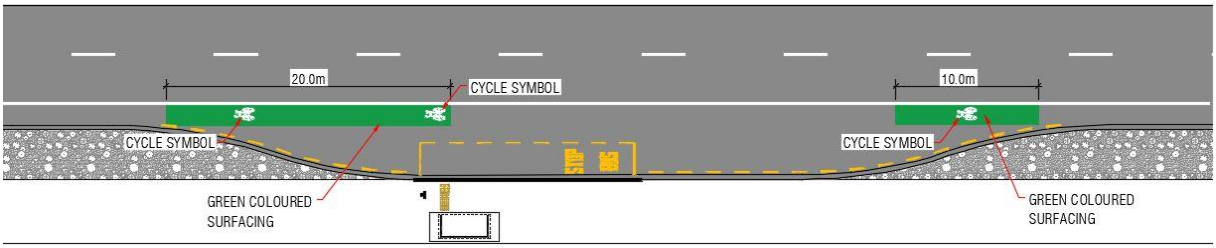


Figure 72: Recommended location of green coloured surfacing near bus stop

For more information about appropriate cycle markings, coloured surfacing and other cycle lane considerations, see Cycle lanes under Cycling Network Guidance.

4.5.2. Bus stops with separated cycleways

Where bus or traffic volumes are high, separated cycling facilities are increasingly being implemented to reduce conflicts between cyclists and other road users. Integrating separated cycleways with bus stops requires careful attention to ensure the safe operation of the bus, people on bikes, and footpath users.

Planning considerations

This section discusses considerations related to:

- Bus stop operation and frequency
- Pedestrians and cyclists
- Road corridor geometry and function

Bus stop operation and frequency

When designing the bus stop design and cycleway integration consider:

- how frequent the bus service is
- how many passengers use the bus stop
- whether the bus stop is mainly used for pick-ups or drop-offs or both.

Such information helps determine how often buses stop and their dwell time (stopping duration).

Other features of bus stop operation to consider are whether the bus stop is a:

- timing point or layover
- location where driver changeovers occur.

Pedestrians and cyclists

For roads with high volumes of cyclists or where they will be separated from high volumes of vehicles, carefully consider how to provide a safe cycle facility around the bus stop.

It is important to recognise that all bus stops will be used from time to time by the full variety of customer groups, including disabled, older and younger people'. Ensure accessibility in the design to avoid transport exclusion.

Consider the needs of pedestrians who have to cross a cycleway. This movement creates a potential conflict area. The choice of mitigation measures is a function of the passenger demand to use the bus stop and how much space is available to make the island a buffer space for pedestrians, so they don't have to wait or step directly into a cycleway.

'Island'-type bus stops (often called 'bus stop bypasses') are typically a preferable way to reduce conflicts associated with cycleways and bus stops and are described in the next section. This type of design may

not be necessary if the likely use of the stop is low (for example, a very low volume of buses passes the bus stop per hour or buses stop very briefly such as when the passenger volume at the bus stop is very low. Designs more similar to those described in the section on integration of bus stops with cycle lanes (4.5.1) may be acceptable though may be less attractive to less confident cyclists and associated with higher bus-bike crash risk.

An island bus stop should be near adequate street lighting for cyclists and people moving to and from the bus stop to be able to see each other.

Road corridor geometry and function

The geometry of the road (including the road reserve and driveway locations) informs the type of cycleway - bus stop that can be installed.

The function of the road corridor (for instance the different modal classifications from the One Network Framework) may inform the preferred design option as trade-offs will often be needed in constrained road corridors to prioritise certain modes or movements.

Because of the space an island bus stop requires, the bus stop may need to re-locate further in-lane. For guidance about in-lane bus stop planning, see section 4.4: Bus stop layout.

Given the potential conflict for vehicles turning left in front of cyclists, pay careful consideration when implementing cycleways behind bus stops near intersections and driveways. Preferably, locate island bus stops on the departure side of the intersection or driveway. If the needs of the catchment area or route taken by the bus service indicate the bus stop should be located before the intersection or driveway, then locate the bus stop where it provides motorists with appropriate sight lines of oncoming cyclists.

Design options for island bus stops

There are different design options for island bus stops depending on the local context of the corridor: full width island, narrow width, nominal width, linear cycleway with boarding island, and bus stops with two-way cycleways. These are each discussed in turn.

Full-width island bus stop

The full-width island bus stop layout (see Figure 73) provides bus passengers with a separate place to wait and means they do not have to cross the cycleway when transitioning between the waiting area and the bus.

Clear glazing in the rear and sides of the bus shelter will ensure visibility between pedestrians and cyclists behind the bus stop. (As noted in section on two-way bidirectional cycleways, we recommend the shelter is clear on all sides.)

Figure 73: Full-width island bus stop. Note the lane markings and residual footpath widths are not optimal. Source: Simon Kennett.

The following sections discuss the:

- Width of island
- Design of cycleway – absolute minimum widths
- Width of obstacle (e.g. shelter**) clearance to the cycleway**

Width of island

In terms of the width of the island:

- the minimum desirable width is a 3.8m wide island with a 1.6m wide one-way cycleway and a 1.8m wide footpath, giving a total distance of 7.2m from the property boundary to the face of the island kerb (see Figure 74)
- it may vary slightly in different situations (for example, if a cantilever bus shelter is used instead of a standard 2m shelter, the island may be narrower since the sides of the bus shelter do not restrict the 1.5m clear path in front of the shelter)
- consider the need of wheelie bin collection from the island.

Design of cycleway – absolute minimum widths

The preferred width of the cycleway depends on its type (separated or non-separated) and use (one-way or two-way). Minimum widths are set out in Cycling Network Guidance.

The absolute minimum width of a:

- one-way separated cycleway is 1.6m
- two-way separated cycleway is 2.3m
- of a cycleway behind a bus stop is 1.2–1.4m, depending on whether there is a kerb; for example, if the cycle lane is:

- ramped up before the bus stop and ramped down on the other side, the space on either side of the cycleway is traversable, so the absolute minimum width of the cycleway is 1.2m
- not ramped up to the height of the footpath, so there are kerbs along the cycle way, the absolute minimum width of the cycleway is 1.4m.

A limit line in the cycleway is needed before the pedestrian crossing. It should be set back 2m. A give way marking before the limit line will further enhance pedestrian priority.

Width of obstacle (e.g. shelter) clearance to the cycleway

If the island has room to provide passenger waiting facilities (for example, a shelter or seat), then a minimum of 300mm should separate the obstacle (the waiting facility) from the cycleway (see Figure 74). The preferred minimum separation is 500mm.

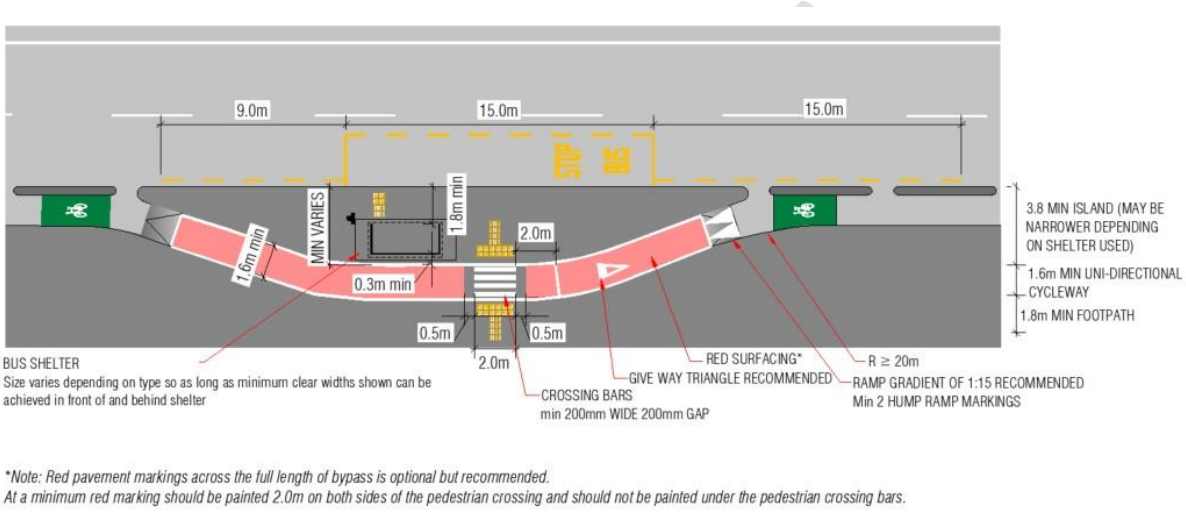


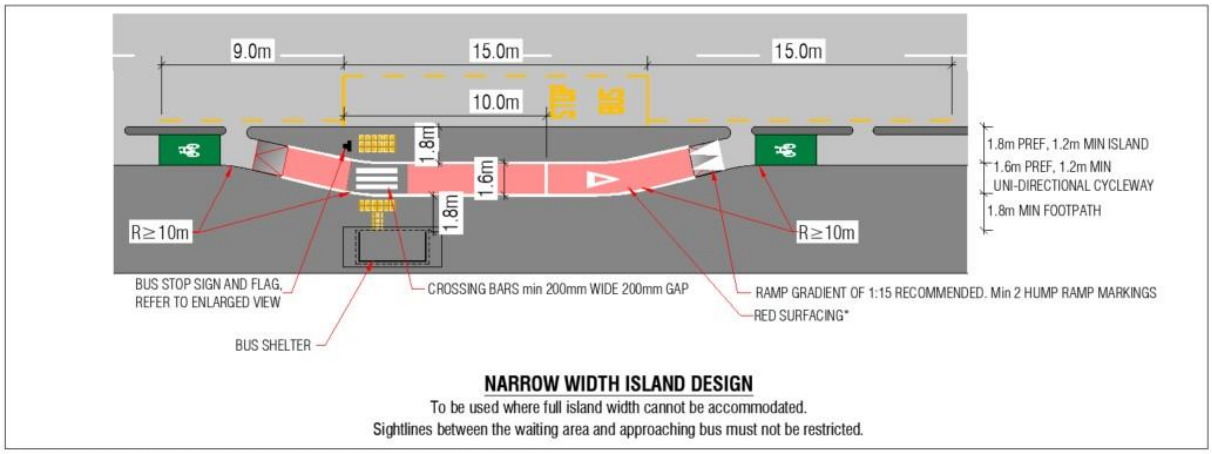
Figure 74: Full-width island design preferred for one-way cycleways.

Narrow-width island bus stop

A narrow-width island bus stop is where the island does not have enough room for passenger waiting facilities (for example, a bus shelter or seat) and such facilities are provided, if at all, on the footpath side of the cycleway (see Figure 75, Figure 76 and Figure 77).

If encouraging bus passengers to wait on the footpath, care should be taken to ensure sight lines between the waiting area and the approaching bus are not restricted (for example, parked vehicles and foliage). When sight lines are limited, this increases the risk to a person waiting on the island which may impact on their safety and amenity when using public transport.

The island should be wide enough to accommodate the deployment of an accessible ramp from equipped buses and allow a person using a wheelchair enough space to clear the ramp prior to moving across the cycleway. Care must be taken to ensure any design does not limit accessible boarding and alighting at the bus stop.



*Note: Red pavement markings across the full length of bypass is optional but recommended.
At a minimum red marking should be painted 2.0m on both sides of the pedestrian crossing and should not be painted under the pedestrian crossing bars.

Figure 75: Narrow-width island design for one-way cycleway.

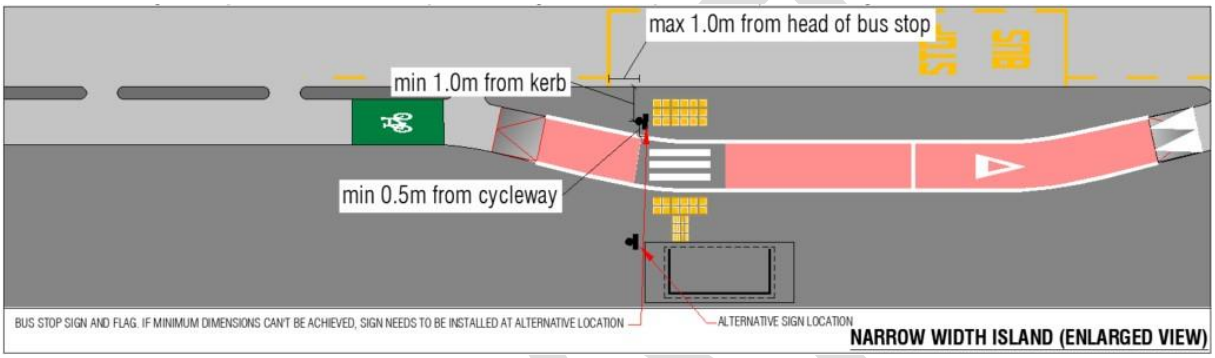


Figure 76: Narrow-width island design (enlarged view).

Figure 77: Narrow-width island bus stop. Source: Simon Kennett.

The following sections discuss the **Width of island – absolute minimum width** and **Width of cycleway – absolute minimum width**.

Width of island – absolute minimum width

The width of a narrow island can vary slightly, depending on the situation. The preferred width is 1.8m, but this may be reduced to 1.5m if less space is available. The absolute minimum width is 1.2m.

Consider the need for wheelie bin collection from the island, factoring in local land use characteristics such as residential density.

For more guidance on wheelie bin collection, see *Good Practice Guidelines for the Collection of Waste on Cycle Lanes.*

Width of cycleway – absolute minimum width

The preferred width of the cycleway depends on its type (separated or non-separated) and use (one-way or two-way). Minimum widths are set out in Cycling Network Guidance.

The **absolute minimum width** of a:

- one-way separated cycleway is 1.6m
- two-way separated cycleway is 2.3m
- cycleway behind the bus stop is 1.2–1.4m, depending on whether there is a kerb.

For more information, see Separated cycleways under Cycling Network Guidance.

Nominal width island bus stop

Where a full-width or narrow-width island cannot be provided between the cycleway and the road, bus passengers enter and exit the bus directly through the cycleway using a nominal-width island (see Figure 78, Figure 79, and Figure 80).

A nominal-width island increases the conflict risk between bus passengers and people cycling because bus passengers must cross the cycleway when boarding or alighting and the buffer area between the kerb and cycleway is quite minimal. This option potentially impedes access for disabled people and people who feel anxious about crossing the cycleway when alighting or boarding a bus. A risk exists with this design that the quality of service for buses will be reduced with significant volumes of cyclists, creating accessibility problems for people who use wheelchairs.

A nominal-width island should have no grade separation between pedestrians and cyclists for three reasons.

- Pedestrian access to and from the bus is safe, obvious and step-free, so it minimises the risk of slips, trips and falls with grade separation.
- Diverting the cyclist around the kerbside of the bus stop breaks the cyclist's forward field of view. This is a good way to alert cyclists that they are entering a space where they are not the prioritised road user, and they need to give way to pedestrians. With a disrupted forward field of view, cyclists are likely to become more conscious and alert of their surroundings.
- Cyclists can take a de-prioritised route through the pedestrian space when pedestrians are boardings and alighting, where speeds are low enough for safe interaction.

Consider using a nominal-width island only if:

- there are geometric constraints to using a full-width or narrow-width island
- passenger volumes at the bus stop are low.

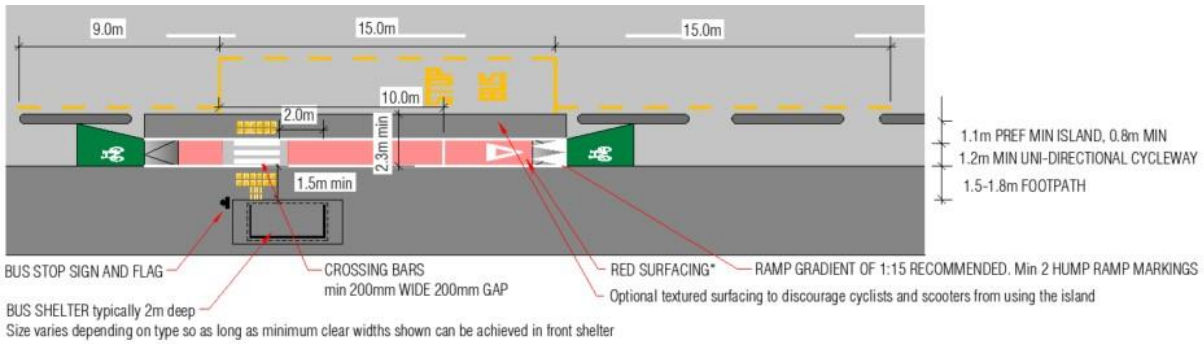
Do not use a nominal-width island if the:

- buses stop frequently to serve high passenger volumes

- bus stop has high dwell times (which can be a factor of high passenger volumes)
- cycleway gradient is high and forms a downhill that may result in a higher cycling speed
- stop attracts a high number of users who require the ramp to be deploy (for example, people using wheelchairs).

The width of a one-way cycleway must be at least 1.2m (an absolute minimum). Provide an additional 0.8m between the cycleway and the bus stop, so a person in a wheelchair can be accommodated on the island.

Consider the need for wheelie bin collection and implications on the width and length of the island.



NOMINAL WIDTH

Only to be used where full or narrow island width cannot be achieved.
Suitable for low patronage stops and/or low cyclist volumes. Not suitable at town centres.
Should be avoided where possible if gradient is downhill in the direction of the cycleway.

**Note: Red pavement markings across the full length of bypass is optional but recommended.*
At a minimum red marking should be painted 2.0m on both sides of the pedestrian crossing and should not be painted under the pedestrian crossing bars.

Figure 78: Nominal-width island design.

Figure 79: Nominal-width island bus stop (one-way cycleway), Christchurch. Note: Red under white crossing markings is not recommended. Source: Waka Kotahi.

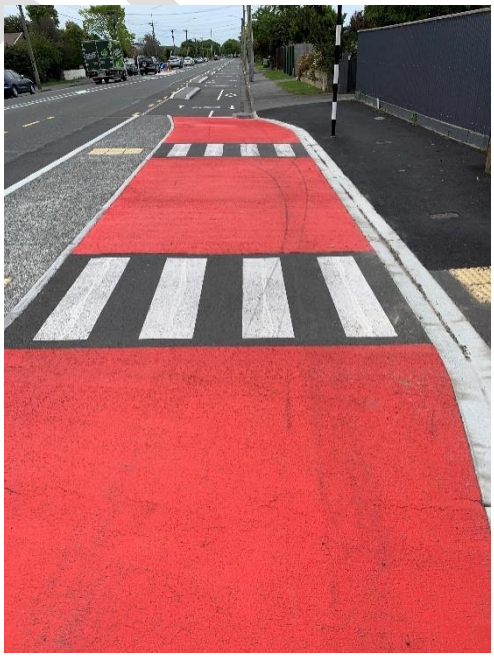


Figure 80: Nominal-width island bus stop (two-way cycleway), Christchurch. Note: the Belisha beacon is not recommended. Source: Simon Kennett.

Linear cycleway with boarding island bus stop

Where a cycleway is next to parallel parking, the design of the bus stop is similar to that of the full-width island design, but the on-street parking provides buffer space for a bus boarder. Therefore, cyclists do not need to deviate to bypass the waiting area.

This has the benefit of not reducing the footpath width, and the cycleway width can be maintained throughout its length. Figure 81 shows the design of a bus stop next to cycleway and parking.

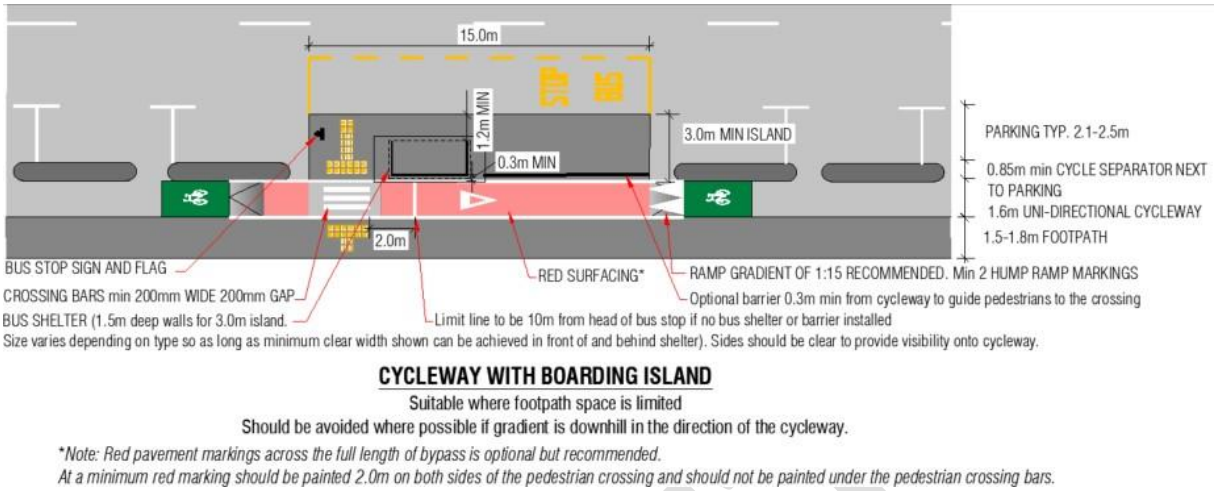


Figure 81: Cycleway with boarding island design.

For this design, the sides of the shelter need to be clear to ensure visibility between cyclists and passengers getting off the bus to cross the cycleway. To guide pedestrians to cross at the crossing, we recommend a fencing barrier is installed on the island adjacent to the cycleway. We recommend this because this design option does not have the horizontal deflection for the cycleway that other design options have. The barrier should be at least 0.3m from the cycleway.

The width of this boarding island is the combined width of the parallel parking space and cycle separator. The standard width for a cycle separator (or flush buffer markings) next to parallel parking is typically 1m with 0.85m being the desirable minimum and 0.7m the absolute minimum. This equates to a 3m wide boarding island, which is adequate to locate a shelter of at least 1.5m deep.

Shelter size can vary depending on its type (for example, cantilever) as long as a clear width of 1.2m can be achieved at the kerb and 0.5m to the cycleway (0.3m minimum).

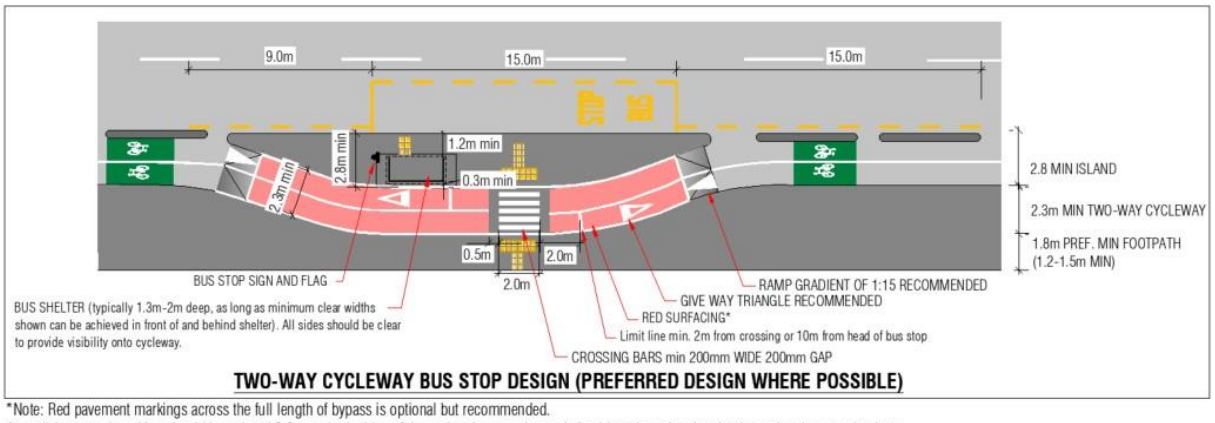
The island should align with the parallel parking space so the bus can pull in adjacent to the kerb.

Bus stops with two-way separated cycleways

Where a bus stop is next to a two-way cycleway, the design considerations are similar as those for bus stops next to one-way cycleways. However, because cyclists will be coming from either direction, there are increased opportunities for conflicts.

The preferred two-way cycleway bus stop design is shown in Figure 82. Take care to ensure high visibility between users from both approach directions. The bus shelter needs to account for this by having clear or transparent walls. Street furniture or plantings should not obstruct visibility between pedestrians and cyclists.

The preferred two-way cycleway bus stop design is intended to reduce cyclist speeds by providing a change in level and horizontal deflection and uses red surfacing and crossing bars to alert cyclists to the presence of pedestrians.



*Note: Red pavement markings across the full length of bypass is optional but recommended.
At a minimum red marking should be painted 2.0m on both sides of the pedestrian crossing and should not be painted under the pedestrian crossing bars.

Figure 82: Preferred design for two-way cycleway bus stop.

As with one-way cycleways, a narrow-width island at two-way cycleways increases the conflict risk between bus passengers and cyclists (see Figure 83). They have reduced horizontal deflection for cyclists and require pedestrians to cross the cycleway to get from the shelter to the bus.

Consider narrow-width islands only if there are geometric constraints to achieving a full-width island.

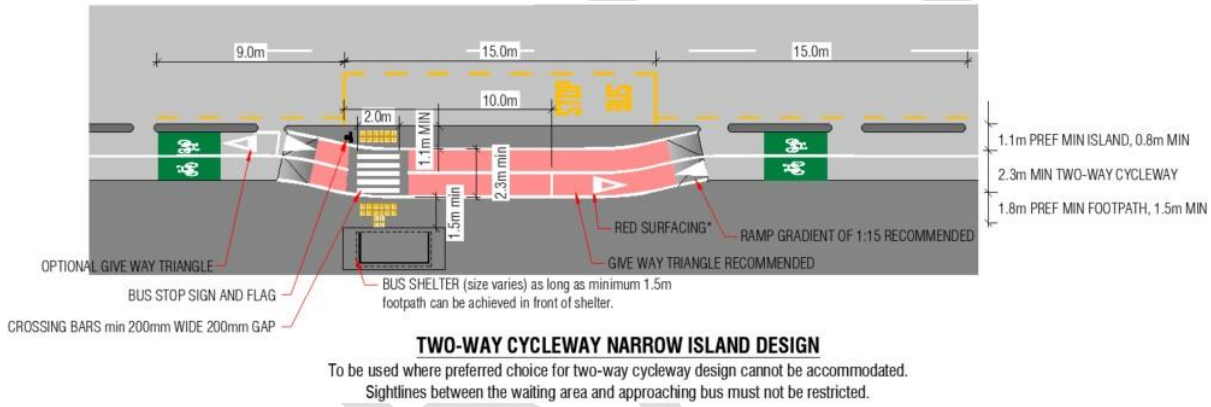


Figure 83: Narrow-width island design for two-way cycleway bus stop.

Key components of island bus stop design

Table 13 outlines the key components specific to the design of island bus stops and whether the component is essential, recommended or optional.

For all other elements at bus stops (for example, accessibility, additional signs and road markings, safety and security, street furniture, stop-specific information and enhancements), see sections 4.2: Bus stop components and 4.3: Bus stop components – detailed.

Table 13: Key components of island bus stop design.

Component	Full width	Narrow width	Nominal width
Bus stop elements			
Cycle lane buffer behind seat/ shelter ('shy space') (at least 300mm, 500mm preferred)	Essential	Essential	Essential
Full height kerb	Essential	Essential	Essential
Cycle parking	Optional	Optional	Optional
Cycle lane and crossing facility elements			
Red surface treatment	Recommended	Recommended	Recommended
Texturised surface along bus boarding/alighting area to dissuade cyclists and scooters	Recommended	Recommended	Recommended
Warning and directional tactile indicators	Essential	Essential	Warning* is essential Directional† is optional
	Optional	Optional	Optional
Give way triangle marking	Recommended	Recommended	Recommended
Advanced warning signage	Optional	Optional	Optional
Pedestrian crossing markings	Essential	Essential	Essential
Raised cycleway	Essential	Essential	Essential
Ramp marking on cycleway	Recommended	Recommended	Recommended
Limit line	Recommended	Recommended	Recommended
Cyclist holding rail	Optional	Optional	Optional
Visual/audible cue with pedestrian or cyclist trigger based on volume threshold	Optional	Optional	Optional

Notes:

* Warning indicators alert pedestrians to hazards in the continuous accessible path of travel indicating they should stop before proceeding further. They should be installed at pedestrian crossing points, and bus boarding positions.

† Directional indicators should only be installed where a person must deviate from the continuous accessible path of travel to gain access to a road crossing point, public transport access point or significant public facility.

Key design principles for some of the components listed above are discussed next:

- Full-height kerb
- Red surface treatment
- Pedestrian crossing markings
- Tactile ground surface indicator
- Give way triangle marking
- Advance warning signage and measures
- Raised cycleway
- Ramp markings on cycleway

Full-height kerb

A full-height kerb on the roadside is needed to:

- assist pedestrians with mobility impediments to enter and exit the bus safely, comfortably and efficiently
- achieve a level path for pedestrians between the bus stop and the footpath.

Red surface treatment

The red surface treatment:

- is optional but recommended for use across the conflict zone on either side of the pedestrian crossing markings
- should not be applied under the white stripes of any pedestrian crossing markings as it will obscure them (see the correct application in Figure 84 and Figure 85).

Figure 84: No red surface treatment under the white stripes (one-way cycleway). Note: Belisha beacons are not recommended. Source: Glen Koorey.

Figure 85: No red surface treatment under the white stripes (two-way cycleway). Note: Belisha beacons are not recommended. Source: Glen Koorey.

Pedestrian crossing markings

International monitoring studies have found demonstrable benefits to pedestrians of using crossing markings on bus stop bypasses, with no obvious disbenefits to cyclists. For more information, see Transport for London's:

New cycle infrastructure on London's streets summary report of on-street trials 2018

Bus stop bypasses surveys of pedestrians and cyclists 2018.

White stripes marked across the cycleway at the pedestrian crossing indicate that cyclists should yield to pedestrians, even though this crossing is not a legal zebra crossing. A Belisha beacon or fluorescent Belisha beacon disc is not appropriate at such locations because it may cause confusion or impede access for alighting passengers or other footpath users. Moreover, the research cited above found no significant benefit associated with use of belisha beacons.

Where possible, crossings across a cycleway should have 300mm wide bars with 300mm gaps and a 2m bar length. At least three bars should be painted. On narrow cycleways where three bars cannot fit, 200mm bars with 200mm gaps are acceptable.

Ideally, the crossing point should be positioned to align with the bus doors *or* at a central crossing point between the footpath and the bus stop island.

Some bus stops have pedestrian crossing markings aligned with the rear door of the bus (see Figure 84 and Figure 85). However, the differences in bus fleet dimensions across New Zealand affect the rear door placement, whereas the front door of the bus is generally consistent no matter the length of the bus. Therefore, rear door pedestrian crossing markings are considered optional and should be determined based on local bus fleet characteristics, bus frequency, alighting numbers and prominence of cycle route.

If the island bus stop is longer than two bus lengths, it may be impractical to have numerous identified pedestrian crossings. Instead, consider providing additional crossing locations instead of standard pedestrian crossing white line markings and provide behavioural messages such as ‘look left’.

Consider using fencing and other physical separators to direct pedestrians to the crossing points. But consider clearance to the cycleway, as fences could become a hazard for bicycle handlebars.

Further guidance

For more information, see Transport for London’s report New Cycle Infrastructure on London’s Streets: Summary report of on-street trials.

Tactile ground surface indicators

Use directional tactile ground surface indicators to indicate the location for vision-impaired people to cross the cycleway to access the island bus stop. On nominal-width islands, directional indicators may be limited to the footpath due to the limited width of the island.

Use warning indicators on each side of the cycleway to alert vision impaired that they are crossing a cycleway.

Give way triangle marking

It is recommended to mark a give way triangle approximately 2m behind the limit line across the cycleway to alert cyclists to give way to people crossing the cycleway. Cyclists are more likely to see this marking than a sign.

Advance warning signage and measures

Consider use of advance warning signage and measures to convey pedestrian priority such as signage saying ‘cyclists give way to pedestrians’, especially when a facility is new, so as to establish correct behaviour.

Mount any such signage close to the eye level of cyclists, but to the side so as to avoid it being a hazard.

As a further aid, especially for visually impaired people, consider using a visual–audible cue with pedestrian or cyclist triggers based on volume thresholds.

Raised cycleway

Ideally, raise the cycleway to the level of the footpath, so the path of pedestrians remains flat. Although cyclists will experience an uphill change when approaching the bus stop, it can be useful to have the cycleway ramp up just before the crossing point, so that vertical acceleration and having to give way occur at the same point. This also makes the layout easier to read for users.

If the cycleway is already level with the footpath, horizontal deflection is recommended to slow cycling speeds.

Raised cycleways are less important for full-width bus stops, depending on the relative location of the footpath and pedestrian volumes.

Ramp markings on cycleway

Best practice is to have white solid triangle ramp markings on a black surface similar to hump ramp markings as outlined in TCD Part 5 on the approach side of the cycleway ramp marking to provide a clear visual cue for both cyclists and pedestrians.

These markings are not needed on the departure side of a one-way cycleway. When used in cycle lanes and cycle paths, hump ramp marking dimensions may be decreased proportionally as specified in clause 5.4(2A) of the TCD Rule and we would recommend this for optimal conspicuousness of the markings.

https://www.nzta.govt.nz/roads-and-rail/traffic-control-devices-manual/part-5-traffic-control-devices-for-general-use-between-intersections/vertical-deflection-devices/markings/

Limit line and hold rails/lean poles

We recommend setting the limit line of the cycleway in advance of the pedestrian crossing back about 10m from the front of the bus stop box.

Any hold rails or lean poles should be visible to cyclists. Ideally, differentiate them in some way such as using colour or reflective tape to make them more visible. It should be clear to cyclists that the rails or poles are not for parking a bicycle.

The distance of the hold rails or lean poles from the edge of the cycleway should be convenient for cyclists but not pose a trip hazard for footpath users.

Cycle parking

A cycle network to, from or near bus stops can increase the catchment area of the bus service. Where this is the case, consider providing cycle parking at the bus stop.

Key planning principles for cycle parking are that parks should:

- be easy to find and access – cycle parking should be in a visually prominent position within or immediately next to the bus stop environment
- have a clear zone around them so they don't impede traffic or access to buses and adjacent footpaths
- be, ideally, protected from rain and enable cycles to be securely locked (for example, by using an existing overhang or constructing a shelter for cycle parking and securely attaching cycle stands to the ground – see Figure 86).
- use, when dedicated cycle storage is provided, materials that are secure, transparent, durable, easily cleaned and resistant to vandalism or abuse.

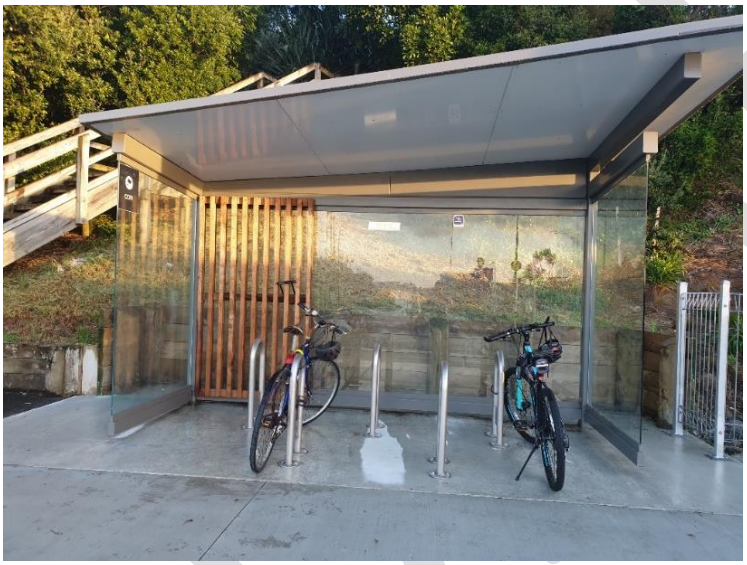


Figure 86: Cycle parking at a bus stop, Auckland/ Source: Flow Transportation Specialists.

For more guidance on designing for cycle and/or micromobility parking, see:

- People on bikes and micromobility under Public Transport Design Guidance topic Getting to and from public transport
- guidance note *Cycle Parking Planning and Design*.

Shared space design

In constrained corridors, one option is for a shared zone to be provided at the bus stop rather than having segregated cycleways and footpaths (see Figure 87). This design may be acceptable in locations where cyclist speeds are naturally slow due to topography or other factors and where boarding/alighting passengers and cyclist volumes are relatively low.

Research in 2021 using intercept surveys of pedestrians and cyclists found relatively positive safety perceptions when these types of designs were implemented in an uphill environment with relatively low numbers of users, but not when implemented on flat topography with higher user numbers.[18]

If this design is used, consider using texturised surfacing in the boarding/alighting zone of the bus stop to dissuade people on bikes or scooters from going through the alighting area. Take care to ensure that adequate width and path markings are provided.

In Figure 87, the walk and cycle marking in the image on the right could be removed, swapped around, or aligned vertically to avoid leading cyclists into the boarding/alighting area.

Figure 87: Shared space designs on Crawford Road, Wellington. Note: In the image on the left, cycle markings would indicate where people should bike. The pedestrian and cycling markings in the image on the right should be aligned vertically show it is a shared space and not 'lead' riders into the alighting zone. Source: Keren Love.

4.5.3. Bus stops with shared paths

Where a bus stop is next to a shared path, the design considerations are similar to those for bus stops next to cycleways. Passengers need to be warned that they are stepping into a path where cyclists may be present, and oncoming cyclists need to be warned of passengers crossing their path.

The design elements are similar to those for a standard bus stop, but on a wider path. (See section 4.4: Bus stop layout for different types of bus stops.)

Key considerations and differences are as follows.

- Cyclists and micromobility users can come from either direction of the shared path. The bus shelter should account for this by having clear or transparent walls.
- To account for cyclists passing pedestrians or other cyclists, a minimum 2.5m clear path width should be allowed to all sides of the bus shelter wall.
- Red pavement markings at both ends of the bus stop across the full width of the shared path will act as threshold treatment. These markings are optional if cyclist volumes are low or the bus stop serves lower frequency routes.
- Shared path markings near the bus stop doors face alighting passengers, so they are aware they are stepping into a cyclist zone.
- Street furniture can influence the path of shared path users. Strategic placement of plantings or street furniture such as signs, seats, trees or rubbish bins near the kerb can realign the path of cyclists and

[18] K Love. y2021. User Perceptions of Bus Stop Bypasses: Intercept surveys of pedestrians and cyclists (unpublished research for Victoria University of Wellington Summer Research programme)

micromobility users away from alighting passengers. However, balance this with maintaining the horizontal clearance at bus stops so buses do not hit these street elements. For more information, see General clearance requirements in Public Transport Design Guidance topic Corridor clearance.

Figure 88 shows the design elements of a bus stop with a bus boarder – the preferred design on a shared path. This preferred design requires a minimum 1.1m bus boarder kerb build out. To achieve the desired 2.5m clear width in front of the bus shelter build out a wider boarder or have a narrower shelter (for example, cantilever).

The preferred design places the bus shelter at the back of the shared path. The shelter may be toward the front of the shared path only if a clear path exists of at least 1.5m (1.2m absolute minimum) in front of the shelter and 2.5m behind the shelter. This separates bus passengers and shared path users. Note the shelter sides need to be clear or transparent to allow visibility between path users coming from either direction.

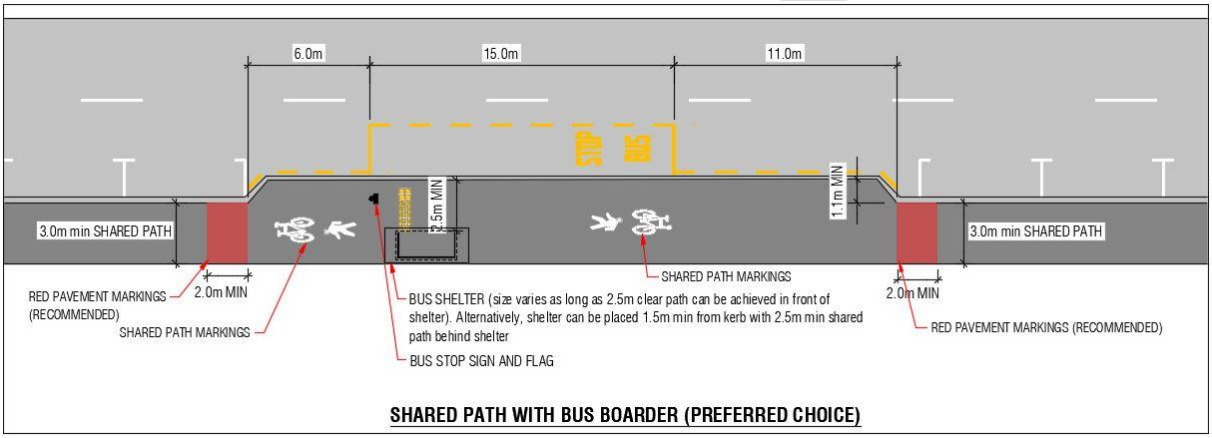


Figure 88: Bus stop with bus boarder to support shared path.

Where the preferred design of a shared path with bus boarder (Figure 88) cannot be achieved, consider a shared boarding zone design (see Figure 89).

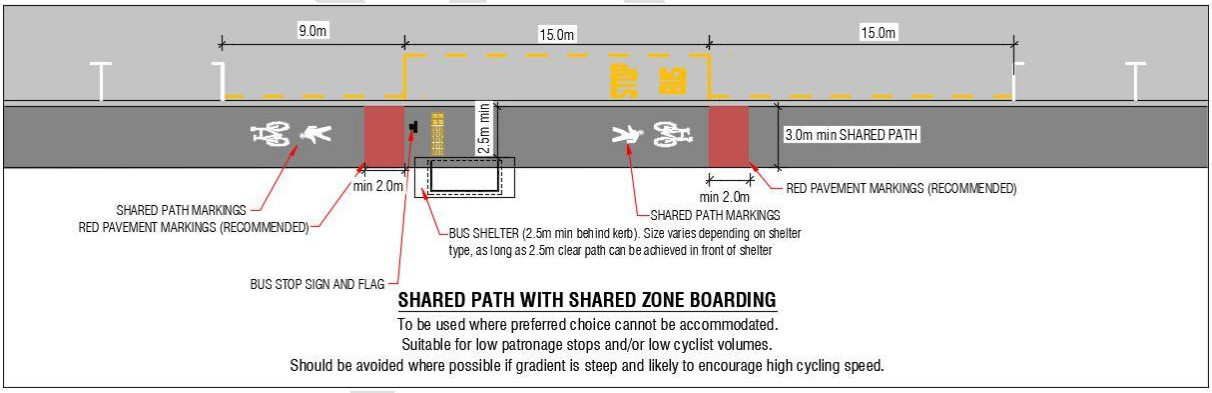


Figure 89: Shared path with shared zone boarding design.

With the shared boarding zone design:

- the bus shelter is expected to be located off the shared path to maintain a 2.5m clear width
- a cantilever shelter can be used (since it is a constrained site)
- the location of the bus stop sign should encourage shared path users away from the kerb while balancing minimum clearance widths.

5. Implementing bus stops

This section provides guidance about consenting (section 5.1), consultation procedures (section 5.2) and legalising traffic and parking controls (section 5.3).

5.1. Consenting

This section steps you through the consenting process for bus stops and their associated components. It covers:

- when resource consents are required (section 5.1.1)
- bus stops within the road reserve (section 5.1.2)
- bus stops within private property (section 5.1.3)
- when building consents are required (section 5.1.4).

5.1.1. When resource consents are required

The need for a resource consent depends on the activity status of a bus stop or shelter in the local district plan.

Table 14 summarises whether a resource consent is required for the activity classes set out in the Resource Management Act 1991.[19]

Table 14: Resource consent requirement by activity class.

Activity class	Is a resource consent required?
Permitted activity	No
Controlled activity	Yes
Discretionary activity	Yes
Restricted discretionary activity	Yes
Non-complying activity	Yes
Prohibited activity	No applications can be made, so no resource consent can be granted.

Check the activity status to determine whether a resource consent is required. This can be confirmed by the rules of the district plan or with the relevant council.

5.1.2. Bus stops in the road reserve

Most bus stops will be located in the road reserve. These areas are maintained and controlled by local road controlling authorities.

In most New Zealand cities, the local council is the road controlling authority. Auckland is an exception where Auckland Transport, a council-controlled organisation, is the local road controlling authority with overlapping authority with Auckland Council. Similarly, other road controlling authorities may authorise bus stops on their roads, for instance Waka Kotahi may authorise bus stops on state highways.

5.1.3. Bus stops in private property

A bus stop may need to (or already) be located in private property.

[19] Resource Management Act 1991, section 87A.

Where a public bus stop needs to be located on private property, local councils or road controlling authorities should enter into an agreement with the private landowner. This is to prevent the landowner restricting access to the bus stop and wasting capital investment.

Where a road controlling authority requires a bus stop, the Public Works Act 1981 provides the Crown with statutory authority to acquire land for a public work.

For more information, on acquiring land see Land Information New Zealand.

5.1.4. When building consents are required

Building works, including bus stop shelters, usually require a building consent.

Submit the consent application to the local council or building consent authority.

Councils can allow exemptions from a building consent. For more information, see section 42A of the Building Act 2004.

5.2. Consultation procedures

This section provides guidance on the procedures and processes for consulting on the implementation and location of bus stops (section 5.2.1) and infrastructure such as shelters (section 5.2.2).

5.2.1. Consultation for bus stops

There is no specific legislation that requires councils to consult on the *location* of bus stops.

The consultation principles in the Local Government Act 2002 mean some councils do consult with adjacent property owners and occupiers to understand and consider their views on new or relocated bus stops.

Councils may want to consult because altering or introducing a bus stop can be contentious among local residents and business.

Some councils have delegated decision-making about bus stops to local community boards that may be involved in consultation with local residents. Local residents will have various concerns (about actual or perceived problems) but may not understand the full aspects of bus stop technical design operation and safety, or the role of bus stops in the wider transportation network. Therefore, consultation can enable a two-way sharing of information.

A bus stop consultation process with residents or landowners is set out in a flowchart (Figure 90). It outlines steps for undertaking consultation on bus stops. Although consultation may not be required, it is a useful guide if consultation is undertaken.

It may sometimes be helpful to engage with local disability communities. For more information, see Disability sector engagement: Good practice guide.

Similarly, local iwi should be consulted for bus stops proposed near marae or other sites important to local iwi. For more information, see Hononga kit e iwi | our Māori engagement framework.

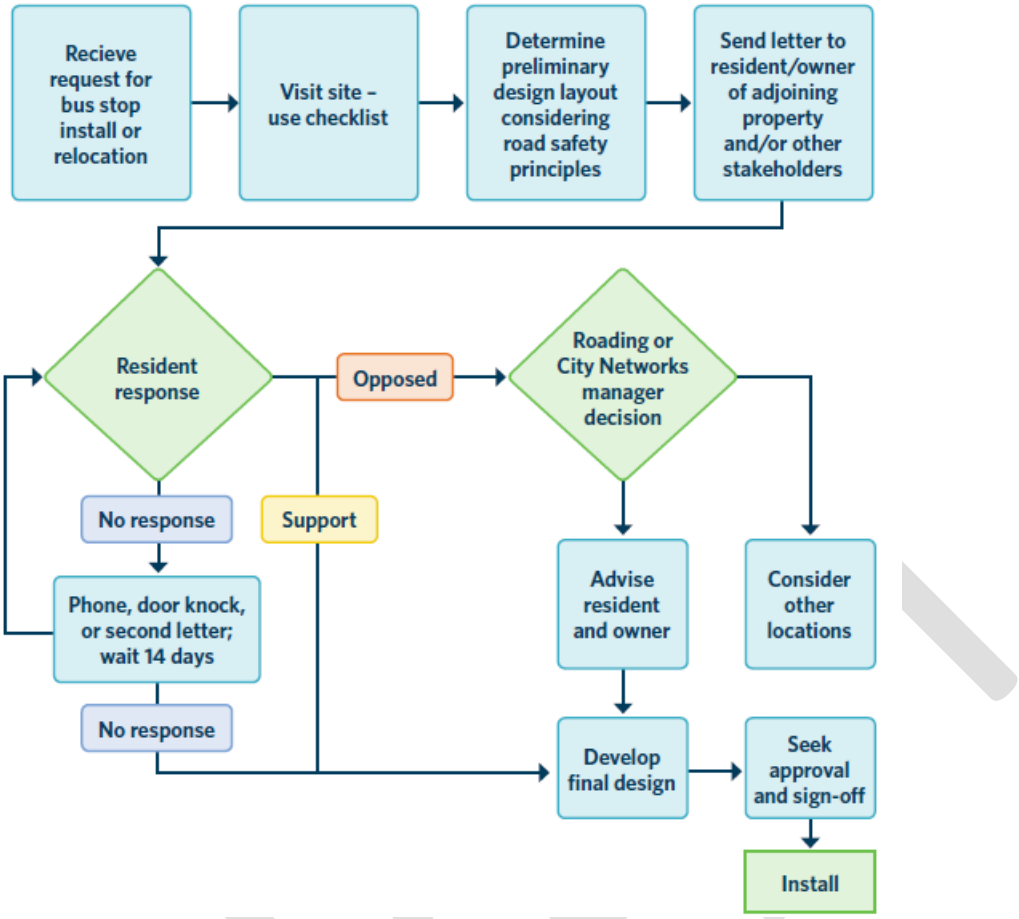


Figure 90: Bus stop consultation process with a resident or owner. Source: Adapted from Palmerston North City Council Bus Stop Guidelines 2017.

5.2.2. Consultation for bus stop shelters

Councils are legally required to consult on 'transport shelters'.[20] A transport shelter is intended for use by passengers of public transport or small passenger service vehicles. These shelters can be installed on the footpath of any road provided they do not unreasonably prevent access to any land that has frontage to the road provided the consultation requirements are complied with.

The approach outlined Figure 90 is also relevant when consulting on bus stop shelters. If residents respond with opposition the council can first attempt to mitigate concerns through design, shelter placement, offering boundary fencing or other measures directly relevant to the concerns raised. Should opposition remain, other locations for shelters may be considered, if appropriate (considering the wider public transport network).

The introduction of a bus shelter can be contentious among local residents and businesses. Local residents will have genuine concerns (about real or perceived problems) but may not understand the positive impact of installing a bus shelter on wider transport network outcomes. Therefore, engagement can be an effective way to share and receive information and improve everyone's understanding.

If the council receives objections to the shelter, a council hearing occurs at which submissions made by (or on behalf of) an objector are considered. The council has discretion to dismiss the objection.

For more information, see the Local Government Act 1974, section 339: Transport shelters.

[20] Local Government Act 1974, section 339

5.3. Legalising traffic and parking controls

General restrictions on parking near bus stops apply under rule 6.8 of the Land Transport (Road User) Rule 2004.

Road controlling authorities can also make bylaws under the Land Transport Act 1998.[21] These bylaws allow a road controlling authority to enforce controls on roads, public places and parking areas that are under the control of the authority.

Consultation processes may apply under the Local Government Act 2002 to the creation or amendment of such bylaws.[22]

When creating or altering a bus stop, confirm the process for securing parking and traffic controls with the relevant road controlling authority.

For more information, see the Land Transport Act 1998, section 22AB.

[21] Land Transport Act 1998, section 22AB.

[22] Local Government Act 2002, section 156.

6. Operations and maintenance

This section discusses the operational (section 6.1) and maintenance (section 6.2) requirements for bus stops.

6.1. Operational requirements

This section provides information about the operational requirements of a bus stop. It considers how to future proof a bus stop for potential growth (section 6.1.1), provides a cross-reference for information about the requirements of bus drivers and physical facilities (section 6.1.2), then touches on the importance of bus driver training (section 6.1.3).

6.1.1. Future proofing for potential growth

Consider how to future proof bus stops to allow for the growth that could occur if there is new development near the bus stop, the bus stop becomes more accessible, or the bus service becomes a more attractive mode of transport.

Future growth at a bus stop could result in the need to:

- increase bus stop capacity if bus frequency is increased
- provide additional facilities such as a new or larger shelter, street or shelter lighting, or cycle parking
- allow for higher capacity buses such as double-decker or articulated buses
- integrate buses with other travel modes such as by providing more manoeuvring space for bus with bike racks mounted.

6.1.2. Bus driver and physical facility requirements

For information about the considerations that should be given to bus drivers and the facilities they may require for operational and staff needs, see Public Transport Design Guidance topic Bus layover and driver facilities.

6.1.3. Bus driver training

It is important to provide practical route-specific training for bus drivers so they can familiarise themselves with their routes and bus infrastructure. For example, if routes include bus lanes shared with cyclists, driver training should highlight that cyclists are likely to pass busses at bus stops so drivers must take particular care when departing bus stops into shared lanes.

Bus drivers should be made aware of new bus stops or new vehicle types, so they understand the specific-site features and any constraints.

6.2. Maintenance requirements

This section identifies potential issues over a longer period and the maintenance requirements of a bus stop. This section also provides guidance to road controlling authorities on maintenance routines.

Ongoing maintenance routines are discussed in section 6.2.1 and reactive maintenance routines in section 5.3.

6.2.1. Ongoing maintenance routines

Councils should:

- establish maintenance routines where bus facilities are regularly cleaned and maintained
- undertake regular inspections and audits to ensure facilities meet required standards.

The components of a bus stop that are likely to require ongoing maintenance are:

- shelter panels and surfaces
- seating areas
- footpath and roadway pavements and markings
- landscaping and trees
- bus timetables and information
- kerbs
- lighting
- rubbish bins.

Consider the cost of ongoing maintenance when developing the bus stop design.

Materials should be easy to maintain and replace, durable and long-lasting.

6.2.2. Reactive maintenance routines

Bus facilities require reactive maintenance after, for example, damage or vandalism.

Councils should establish systems so facilities can be repaired in a timely manner and members of the public and bus drivers can easily report damage.

Design bus facilities to be as resistant as possible to vandalism, without detracting from function or comfort.

6.3. Temporary traffic management at bus stops

Bus stops may be affected by temporary traffic management for a variety of reasons and this needs to be carefully managed to support safe and inclusive access for all travel modes.

Activities that may temporarily impact on a bus stop could include for example:

- road works
- services upgrades
- event management planning
- rail service replacement or bus service diversions

Guidance on bus stops impacted by temporary traffic management is available here:

Guidance for bus stops impacted by temporary traffic management

This document covers the following:

- Introduction:
    - related guidance
    - governing principles
- Planning:
    - bus stops remaining open with temporary traffic management
    - temporary bus stops
    - and closing bus stops temporarily
- Design: Key design considerations
- Implementation:
    - Process for notification/consultation (emergency works and planned works)
    - implementation of TTM traffic control devices for temporary stops
    - risk assessment

For further information about temporary traffic management more generally see Waka Kotahi temporary traffic management guidance:

Code of Practice for Temporary Traffic Management

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