

CHRISTCHURCH CITY BUS STOP GUIDELINES

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1 Introduction

1.1 Purpose

The Christchurch City Council (CCC) is committed to providing for and encouraging the use of public transport. Encouraging public transport use means providing services and supporting facilities together as an overall package that allows for convenient, cost effective, reliable, safe and appealing travel.

Bus stops, together with the buses and their drivers, the bus exchange and suburban bus interchanges, are the 'shop window' for the entire public transport system. Bus stop location and design has a critical role to play in improving the quality of public transport in Christchurch.

The purpose of this document is to encourage consistency and provide a definitive reference in the provision of bus stops. This document provides guidance on bus stop location, design and facilities for use by anyone who is involved in planning and designing bus stops in Christchurch.

In order to meet the relevant target in the *Metro Strategy 2006-2012*, 85% of Metro stops in Christchurch will need to comply with these guidelines by 2012.

It should be noted here that while these guidelines provide assistance with decision-making, each potential site is a unique location with different characteristics that need to be taken into account.

1.2 Planning framework

The CCC is the road controlling authority for roads (excluding state highways) within the Christchurch City boundary. It is responsible for providing all bus stops on these roads and also has the delegated authority to provide bus stops and facilities on state highways. Environment Canterbury (ECan) is responsible for providing bus services. Together the two councils co-ordinate the planning and delivery of the Christchurch public transport system under the *metro* brand name.

A number of other documents are directly relevant to the subject matter of these guidelines. The *Land Transport (Road User) Rule 2004* regulates how traffic operates on roads, including the marking and operation of bus stops. The *Metro Strategy 2006-2012* outlines the strategic direction for public transport in Christchurch; the CCC *Parking Strategy* outlines the Council's policies on the relationship between bus stops and parking; the *City Plan* covers the Council's requirements for public transport facilities in new developments; the CCC *Infrastructure Design Standard* provides guidance on

designing a road environment that promotes public transport access. These guidelines should be read in conjunction with the aforementioned documents.

1.3 A user-centred approach to bus stop location and design

The following observations on the bus stop desires of different stakeholders have been adapted from Tyler (2002). These provide an initial reference point for the guidance material in this document.

In general, bus stop users like a place:

- that is not too far from their home;
- where they can wait comfortably and safely for a bus service to which they will have easy access, that will arrive within a time that is reasonable enough to wait and that is going to take them where they want to go;
- which they can identify easily;
- where they can find out about the bus service (arrival and departure times, destinations and other information);
- where they can find out about the area around the bus stop so that, on alighting from a bus, they can find their way from the bus stop to their destination.

Bus drivers want a place:

- that is easy to identify in the street space;
- that is easy to stop at;
- that is devoid of parking and delivery vehicle problems;
- where passengers can board and alight as quickly as possible;
- that has no obstacles that can be struck by the bus on arriving or leaving the stop;
- that is consistent in its design so that all bus stops feel the same;
- that is easy to leave and re-enter the traffic stream;
- where it is easy to see passengers boarding and alighting from the bus.

Bus operators want a place:

- where the bus can stop without problems;
- where the bus can re-enter the traffic stream as easily as possible;
- which imposes the least possible delay on buses.

Pedestrians who are not using the bus system want a place:

- that does not obstruct their use of the footway;
- that does not make them feel insecure when they walk past.

Cyclists want a place:

- that does not obstruct their use of a cycleway or the road;
- that does not make them feel unsafe.

People living near to bus stops like a place:

- that is not too far from their home;
- that is not outside their home;
- that is not unsightly.

Traders based near to a bus stop like a place:

- that is close to their business (if they believe that bus users are core customers);
- that is far away from their business (if they believe that bus users are not core customers);
- that does not obstruct views of their premises;
- that does not obstruct access for delivery vehicles and customers.

Motor vehicle drivers want a place:

- that does not interfere with the traffic system in any way;
- that does not eliminate or reduce parking.

Traffic planners want a place:

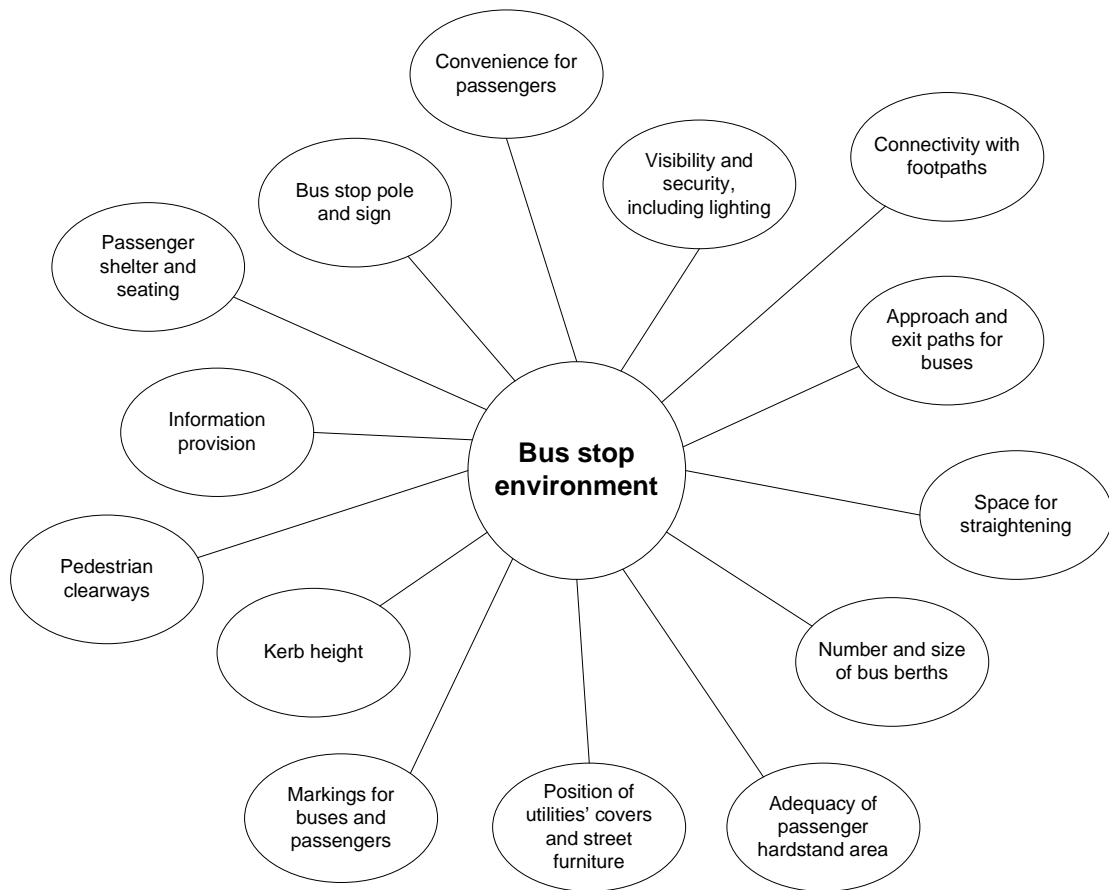
- that is attractive and convenient for passengers, and encourages public transport use;
- that is safe for buses to stop with a minimum disturbance to traffic;
- that is cheap to install and maintain;
- that will incur minimal opposition from users, nearby residents, and businesses and bus operators.

Clearly, many of these desires are incompatible, and the task of the bus stop designer is to achieve a compromise that will satisfy as many of these as possible while keeping the interests of bus stop users at the forefront of the process.

1.4 The bus stop environment

These guidelines promote a bus stop environment designed to provide for the 'accessible journey'. The accessible journey covers all the steps needed for a person to get to their destination and return. The concept includes the ease with which all categories of passenger can use public transport and recognises that bus passengers are pedestrians at each end of a public transport journey (Human Rights Commission, 2005).

As a means of promoting the accessible journey, these guidelines focus on several features of the bus stop environment that will support public transport accessibility if they are provided in a consistent and integrated fashion. These features are outlined in Figure 2. The remaining sections in these guidelines focus on these various elements of the bus stop environment.



(adapted from Transport for London, 2006)

Figure 1: Features of the bus stop environment

2 Bus Stop Locations¹

2.1 Legal requirements

- *The Land Transport (Road User) Rule 2004 prevents buses from stopping:*
 - *close enough to any corner, bend, rise, dip, traffic island, or intersection to obstruct the views of drivers of approaching vehicles, unless explicitly authorised by the road controlling authority (this is not recommended for bus stops);*
 - *within 6 metres of an intersection, unless explicitly authorised by the road controlling authority (this is not recommended for bus stops);*
 - *on 'no stopping' lines - these are broken, yellow lines within 1 metre of the kerb;*
 - *within 6 metres of the approach side of a pedestrian crossing;*
 - *where a sign is placed to show that part of the road is reserved for classes of vehicles shown by that sign (e.g., taxi or goods service vehicle). In many cases, this restriction is marked by a broken yellow line more than 1 metre from the kerb;*
 - *on or within 0.5 metres of a fire hydrant;*
 - *on a marking indicating the presence of a fire hydrant or between the marking and the nearer edge of the roadway.*

These comprise the minimum requirements for bus stop locations in these guidelines.

2.2 Catchment area

- *Locate bus stops to maximise the population within 400m (5 minute walk) of a stop.*
- *Where possible locate bus stops near an intersection with a side street to decrease walking distances for bus passengers living on side streets.*
- *Consider any adjacent bus routes when seeking to maximise the catchment area served by a bus stop.*
- *Consider current and anticipated population sizes and densities when locating bus stops in designated growth areas.*
- *Consider any walkways through parks or public spaces that give mid block pedestrian access to a wider catchment area. However, the practice of locating bus stops alongside parks and reserve frontages with limited access, solely to avoid potential objections, should be avoided.*

¹ This chapter updates the existing CCC Bus Stop Location Policy (1999).

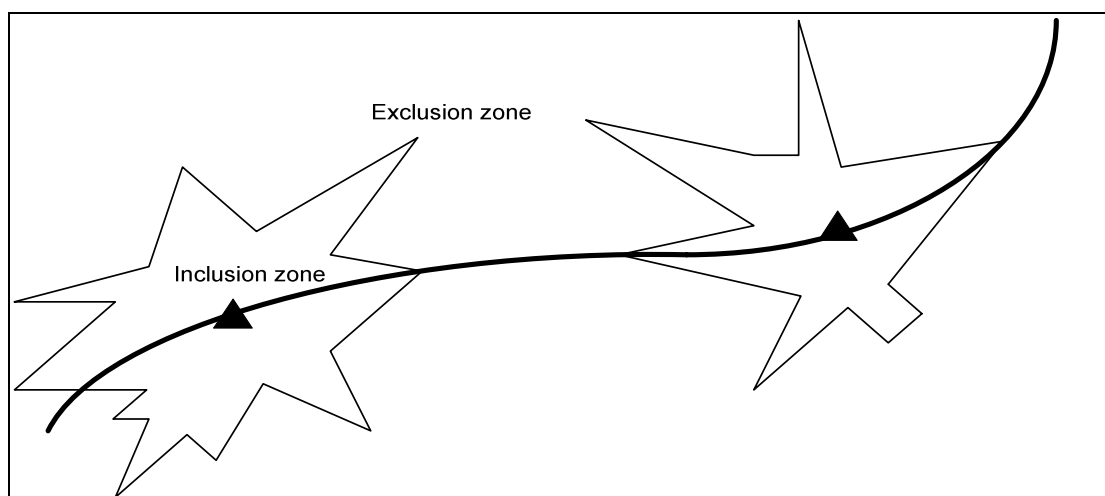
Studies show that most people will walk around 400 metres or 5 minutes to a bus stop and the distance they will walk depends on factors such their mobility, the weather and topography, and what they are carrying.

Parks and reserve frontages can often be in more isolated locations slightly removed from the main catchment area and pedestrian flows. Bus stops at these locations may have reduced levels of pedestrian access. Bus stop users may also feel less secure when using the bus stop, particularly during the hours of darkness.



A bus stop located next to a walkway

It may also be useful to think in terms of inclusion and exclusion zones when identifying a potential location. The inclusion zone may not necessarily be a circle with a radius of 400m around the location, but will depend on factors such as walking access and the perceived safety of routes.



(from Tyler, 2002)

Figure 2: Inclusion and exclusion zones for two bus stops

2.3 Distance between stops

- *Distances should be standardised as much as possible, while bearing in mind the other criteria in these guidelines. The following are recommended distances between bus stops:*
 - *High frequency corridors (<10 mins between buses at peaks): 400-500m*
 - *Medium frequency corridors (10-30 mins between buses at peaks): 300-400m*
 - *Low frequency corridors (>30 mins between buses at peaks): 200-300m*
- *Wherever a service travels in both directions along a road, inbound and outbound pairs of stops should be spaced opposite each other, tail to tail (or as close as possible), at a safe location to cross the road.*

The recommended distances seek to provide a balance between access and efficiency depending on the specific requirements of each area or service.

Speed and reliability is vital to increasing public transport use on priority bus routes. Bus journey times are affected by the number of stops on a route and therefore a careful balance must be achieved. The higher service frequency and additional facilities at stops can provide some compensation to passengers who are disadvantaged by having further to walk.

Access is more of a priority in the city centre and other activity centres where there is increased demand for convenient stopping points. Additional bus stops may be provided in these areas if there is an identified need e.g. a major demand generator located nearby.

2.4 Topography

- *Where possible locate bus stops on a level section of road to maximise accessibility and safety for mobility impaired passengers.*
- *Bus stops on hills may need to be located closer together to allow for reduced walkability. A suggested guideline is to reduce the maximum walk distance of 400 metres to a bus stop by **10 metres** for every **1 metre** rise or fall.*
- *Rivers may place a physical constraint on access to bus stops. Bus stops on routes adjacent to rivers should be located to maximise access by bridges.*

2.5 Demand generators

- *Bus stops should be located to maximise access to major demand generators, including but not limited to:*
 - *malls and shopping centres*
 - *schools and tertiary institutions*
 - *rest homes, elderly persons housing*

- *hospitals*
- *smaller suburban shopping centres*
- *recreational facilities e.g. parks, pools*
- *medical centres*
- *community centres*
- *libraries.*
- *Conversely, bus stops may not be required along sections of road where there is little or no current demand e.g. rural sections or arterial roads with no pedestrian facilities. In these situations, criteria for coverage and distance between stops will not be relevant.*

Proximity to demand generators can be a significant determining factor in whether a trip is made by car, or at all in the case of some mobility impaired people who do not have access to independent transport. Proximity also increases the attractiveness of a service if it is perceived to be 'door to door'.

2.6 Safety and security

- *Bus stop locations should be selected to maximise safety and security for bus passengers, residents, and road users.*
- *Where possible, bus stops should be located near land uses that provide passive surveillance. There needs to be a balance between providing opportunities for passive surveillance and intruding on the privacy of neighbouring residences. The potential for intrusions on privacy should be considered when the site is inspected.*

Placing bus stops at more isolated locations to avoid potential objections can impact upon passenger safety and security, thus creating a barrier to increasing public transport use.

- *The bus stop location should be visible from all sides and sight lines, and should not be obstructed by trees, buildings, etc.*
- *The bus stop location should provide adequate rear vision sight distances to bus drivers.*

Visibility from all sides and sight lines is important to ensure that pedestrian/motor vehicle conflicts are minimised and drivers can see waiting passengers.

- *Consider the location of existing lighting.*

Lighting can be expensive to install so the location of existing lights should be considered when placing a bus stop.

2.7 Intersections

Locating bus stops near intersections can improve access for potential passengers. However, traffic management issues may need to be considered in determining the most appropriate location.

- *Where possible, stops should be located on the departure rather than the approach side of an intersection (Figure 4).*

Bus stops on intersection approaches can impair the visibility to the right of traffic emerging from a side road. A bus that must turn right at an intersection may also have difficulty reaching the right-hand lane of a multi-lane approach from a kerbside stop immediately prior to the intersection.

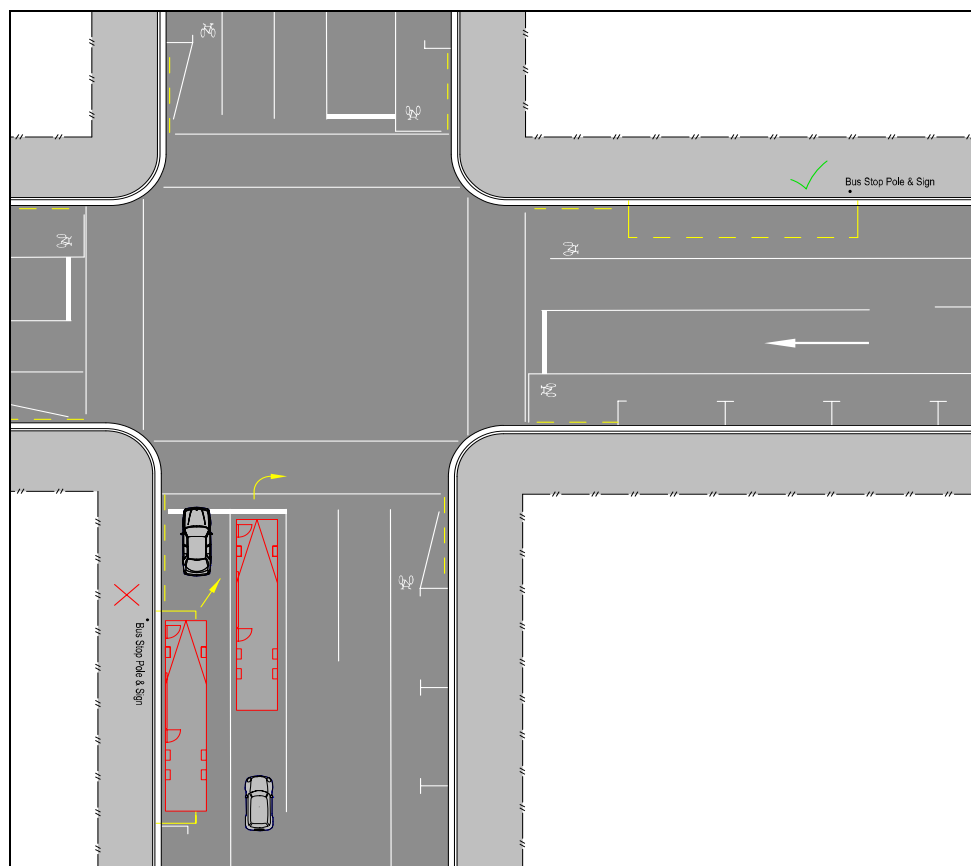


Figure 3: Bus stop on intersection departure

- *The bus stop should be located sufficiently downstream of the intersection to provide the required manoeuvring space for buses (Figure 5).*

Kerb build-outs at intersections increase pedestrian safety and convenience when crossing the road. The bus stop needs to be sufficiently downstream of the intersection so that any current (or future) kerb build outs do not impact on the functioning of the bus stop.

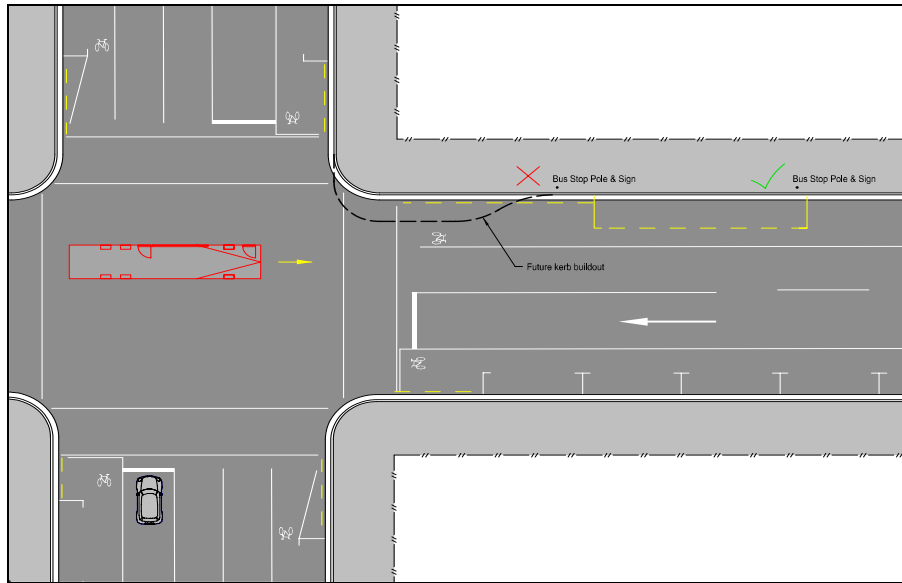


Figure 4: Location of bus stop downstream of intersection

- *Road geometry and/or traffic movement requirements on a departure leg may preclude buses from stopping soon after having passed through an intersection. In these circumstances the stop would be better located on the approach rather than the departure side of an intersection.*
- *Bus stops on intersection approaches should be sufficiently upstream of a side road so as not to impair the visibility between traffic emerging from a side road and through traffic.*

2.8 Infrastructural Considerations

Opportunities to provide future infrastructure at a bus stop should always be considered when selecting a location.

- *Locations that have a wide footpath (a minimum of 1.5 metres, preferably 2 metres or more) and road reserve width (>3.5m) are more likely to be suitable for a seat or shelter in the future.*

While there may not be any infrastructure provided at the bus stop when it is initially established (other than regulatory signage, a road marking and a sealed space), the ability to provide infrastructure should be considered, particularly at a location with a substantial current or future passenger catchment.

- *Where possible, bus stops should be located close to (on the exit side of) existing pedestrian crossing facilities such as traffic signals, a pedestrian crossing or a pedestrian island. If there are no facilities currently provided, the space required should be taken into account.*

All bus passengers are pedestrians for at least part of their journey, so ensuring safe and convenient pedestrian access is crucial when deciding on the location of a bus stop. This extends to ensuring a similar level of access for

buses, because good bus access to a stop will contribute to the safety of bus passengers.

As passengers usually make a return trip, they will generally need to cross the road at least once at the beginning or end of their journey. As bus stops are often on busy roads, a lack of suitable crossing facilities will impact on the ability of passengers to cross the road safely and conveniently.

- *If possible, bus stops should not be located on kerbside storm water gullies and gratings.*

Kerbside storm water gullies and gratings can become damaged over time through the repeated impact from buses. They also tend to be avoided by bus drivers, meaning passengers may have to step onto the roadway before boarding the bus, which can cause difficulties for mobility impaired passengers.

- *Consider the required size of the bus stop during the location process.*
- *Bus stops may be marked on the road across the threshold of private driveways.*

If a bus stop is likely to be used by a number of buses at a time, the length of the bus stop should reflect the need to accommodate additional buses (see Bus Stop Design).

It may prove difficult to locate bus stops for more than one bus in the space between driveways. Buses may stop across the thresholds of driveways for the purpose of allowing passengers to board and leave the bus. Buses on layover (those at the end of their trip) and waiting at timing points must not obstruct private access ways.

In all cases, to promote access for elderly and physically or sight impaired passengers, the points of boarding and alighting from buses should be onto footway level and not driveway level and be free of street furniture such as sign poles, telegraph poles and advertising boards (see Bus Stop Layout and Facilities).

2.9 Removal or relocation of bus stops

- *As a general guideline, Christchurch City Council will only remove or relocate an existing bus stop if:*
 - *the bus route is changed;*
 - *the current location fails to comply with legal requirements;*
 - *the current location creates a verifiable safety hazard;*
 - *the current bus stop is poorly located for users and relocation or removal will be of net benefit to passengers.*

- *Any proposal to remove a bus stop or relocate it beyond the existing site should include an assessment of benefits and impacts, and consultation with stakeholders, including Environment Canterbury (see Consultation).*
- *The bus stop location criteria should be applied when a bus stop is relocated.*

The relocation of a bus stop can be a costly exercise as it may involve undertaking physical ground works, for example, the installation of new concrete pads, seating and other associated facilities, and a consultation process.

3 Bus Stop Design

When designing a bus stop it is important to consider it as an interchange between transport modes rather than as a location. The ideal bus stop will achieve the objectives outlined in Figure 6.

The key functional requirement of the bus stop is that it allows the bus to stop parallel to, and as close to the kerb as possible to promote access. A well designed bus stop will minimise both the vertical gap, or step height, from the kerb to the bus floor and the horizontal gap from the kerb edge to the side of the bus.

It should be noted that every bus stop site is different and basic designs may need to be adapted in almost every case. However, these guidelines endeavour to provide the reasoning underlying the basic designs so that the inevitable compromises can be made with minimal loss to the accessibility and functionality of the bus stop.

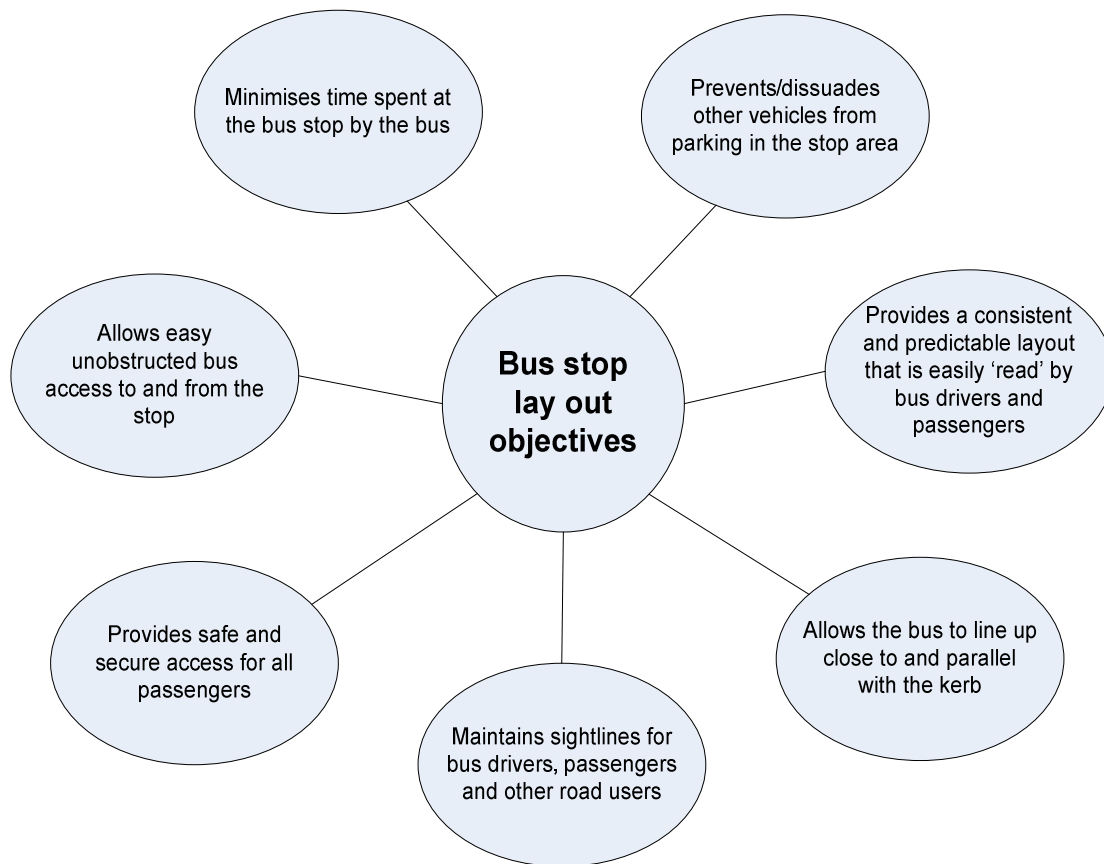


Figure 5: Bus stop lay out objectives

3.1 Types of bus stop

- *There are three main types of bus stop: kerb side, bus boarder and bus bay. Select the type of bus stop that is most appropriate for the site and route characteristics.*

3.1.1 Kerb side

The most common type of bus stop in Christchurch, this is simple in design, easy to construct and relatively easy to relocate.



Typical kerb side bus stop in Christchurch

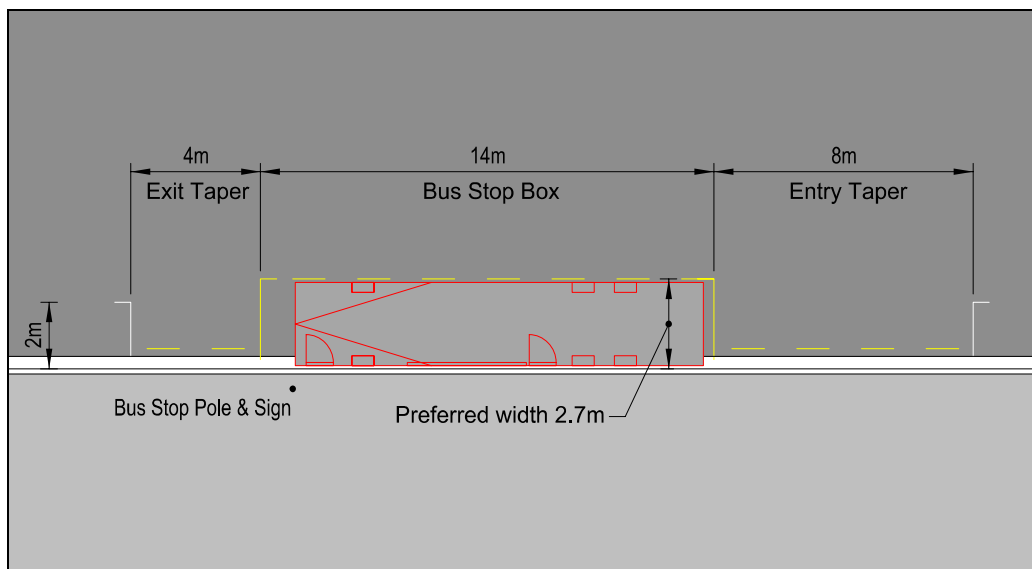


Figure 6: Recommended dimensions for kerb side bus stop

3.1.2 Bus boarder

Bus boarders involve a kerb extension to bring the footpath out to near the edge of the closest traffic lane. Bus boarders are very convenient for passengers (and particularly the elderly and disabled) as they make boarding easier thanks to the bus pulling up very close to the edge of the footway. They also make boarding faster and reduce the time lost through manoeuvring into and away from the stop.

A further advantage of bus boarders is the lower impact on kerbside parking for cars. Whereas a normal kerbside bus stop requires at least a 26 metre gap

between parked cars, a bus boarder removes the need for additional manoeuvring space. This can save several car park spaces in comparison to the space required for a normal kerbside bus stop.

Bus boarders can also provide additional footway space if there is insufficient space to accommodate bus stop facilities and pedestrian flows. They also provide opportunities for landscaping and improving the amenity of bus stop surroundings.



Trial bus boarder on Hills Rd

- *Traffic volumes should be carefully considered when determining the potential for bus boarders.*

Experience elsewhere has shown that bus boarders are effective in urban speed environments of 50 km/h or less with moderate traffic flows. Bus boarders should not be used where the frequency of buses or their dwell times will cause delay to following buses (Transport for London, 2006).

- *Bus boarders can cause traffic momentarily to queue behind the stopped bus (particularly at popular stops) and so should not be so close to the downstream side of an intersection as to cause exit blocking.*

- *Bus boarders can include cycle bypasses to reduce impediments and improve safety for cyclists. These designs require fencing to direct passengers to a safe crossing point over the cycle lane.*
- *Signage should be provided on the approach to all bus boarders to identify to traffic that buses may stop in the lane.*

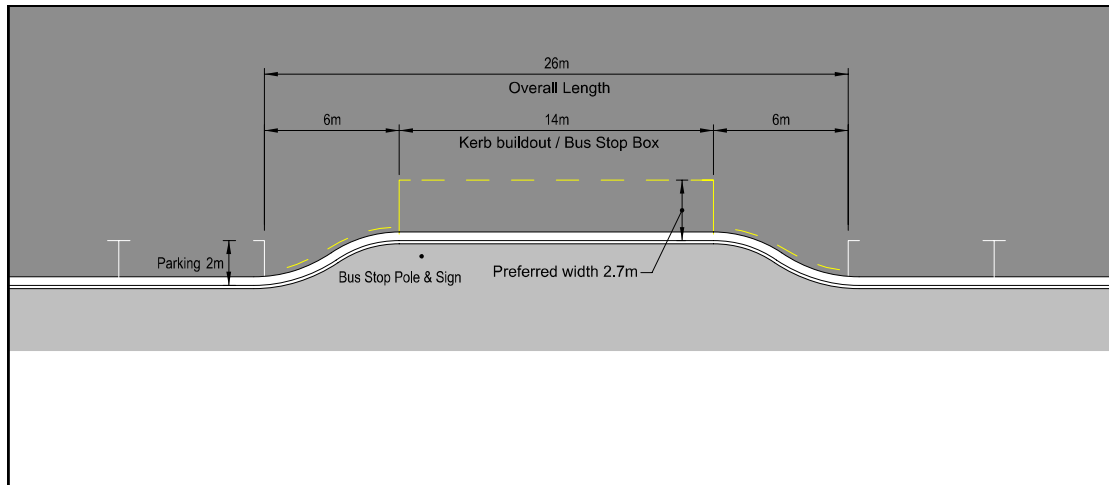


Figure 7: Recommended dimensions for bus boarder

3.1.3 Bus bay

As the name suggests, bus bays involve the construction of a bay in the adjacent roadside area to remove stationary buses from the traffic flow. Bus bays may provide a solution for routes with higher traffic flows and speeds as they provide minimal obstruction to passing traffic (including cyclists).

However, bus bays can cause delays for buses attempting to re-enter the traffic flow. They are also more expensive to construct and relocate than kerb side bus stops, and require more road reserve space. This may reduce the amount of space available for shelters and other bus stop facilities.

- *For these reasons bus bays should be avoided except on safety grounds, such as in 80km/h zones, or at layover points.*
- *Ideally, bus bays should only be used in conjunction with a special vehicle lane. As a minimum, provision should be made for buses to merge back into traffic through the use of bus priority measures (e.g. road markings or static roadside signs advising motorists of the need to give way to exiting buses), or an acceleration taper.*



Bus bay, Whiteleigh Avenue

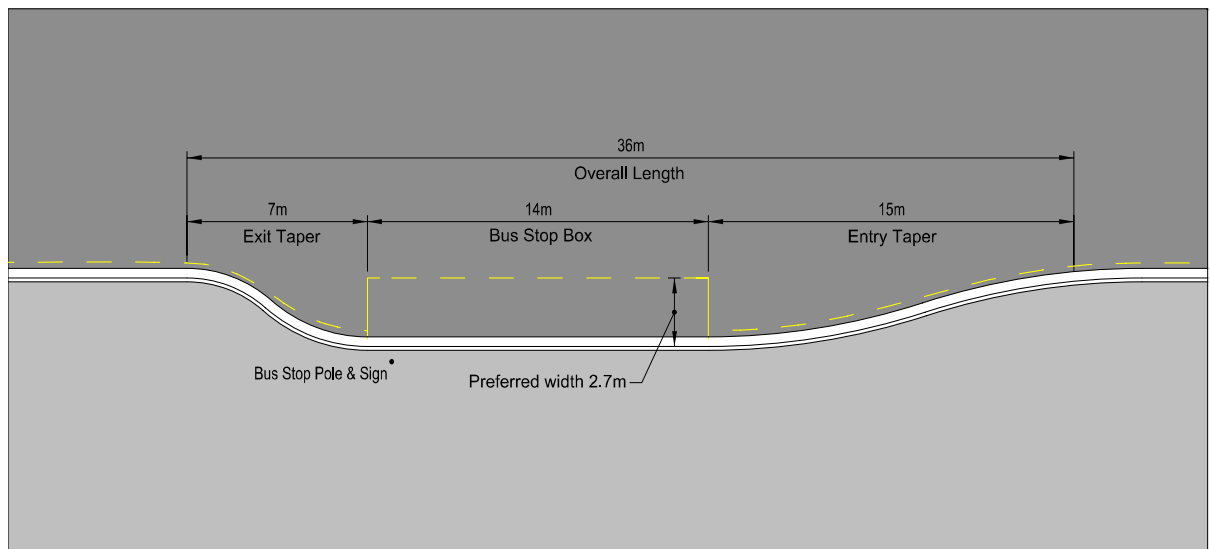


Figure 8: Recommended dimensions for bus bay

3.2 Bus stop dimensions

- Allocate sufficient space to meet the minimum requirements for unobstructed length detailed below. Lengthen the bus stop accordingly if it is likely to be used by two or more buses at a time, for example on high frequency routes or bus stops serving multiple routes (ECan is able to provide information on current and anticipated future bus flows).

One Bus

<i>Minimum total unobstructed length (includes entry and exit space)</i>	<i>26m</i>
<i>Marked length of bus stop box</i>	<i>14m</i>

Two Buses

<i>Minimum total unobstructed length (includes entry and exit space)</i>	<i>41m</i>
<i>Marked length of bus stop box</i>	<i>29m</i>

Three Buses

<i>Minimum total unobstructed length (includes entry and exit space)</i>	<i>56m</i>
<i>Marked length of bus stop box</i>	<i>44m</i>

Bus Boarder

<i>Minimum kerb build out length (between front and rear doors)</i>	<i>9m</i>
<i>Marked length of bus stop box</i>	<i>14m</i>

Bus Bay

<i>Minimum total length (includes entry and exit taper)</i>	<i>44m</i>
<i>Marked length of bus stop box</i>	<i>14m</i>

- The preferred width of the bus stop box is 2.7m.
- Ensure that the required unobstructed length on each side of the bus stop box is marked with broken yellow 'No Stopping' lines.
- Mark the bus stop in accordance with the marking style in the *Manual of Traffic Signs and Markings*.

These dimensions are based on a marked bus stop box of 14m x 2.7m. This provides for the length and width of a typical bus plus potential add-ons such as bike racks (See Appendix 1 for the typical dimensions of buses in Christchurch). An 8m entry taper and a 4m exit taper are then added to determine the minimum unobstructed length required for a kerbside stop that has parallel parking at each end. Bus stops for more than one bus allow for a gap of 1m between buses (see Figure 10).

The total unobstructed length is the minimum distance required to allow a bus to consistently pull up parallel to the kerb and then exit safely. Modelling and field tests have shown that ideally this should be around 36m-43m (depending on horizontal gap requirements) in order to consistently align both bus doors with the kerb and prevent any overhang caused by steep entry and exit angles (Tyler, 2002; VicRoads 2006).

Recognising that space is often severely constrained in urban environments, several existing guidelines set minimum lengths below these ideal measurements, while acknowledging that this will have some impact on bus stop performance (Transport for London, 2006; VicRoads, 2006; Greater Manchester, 2007).

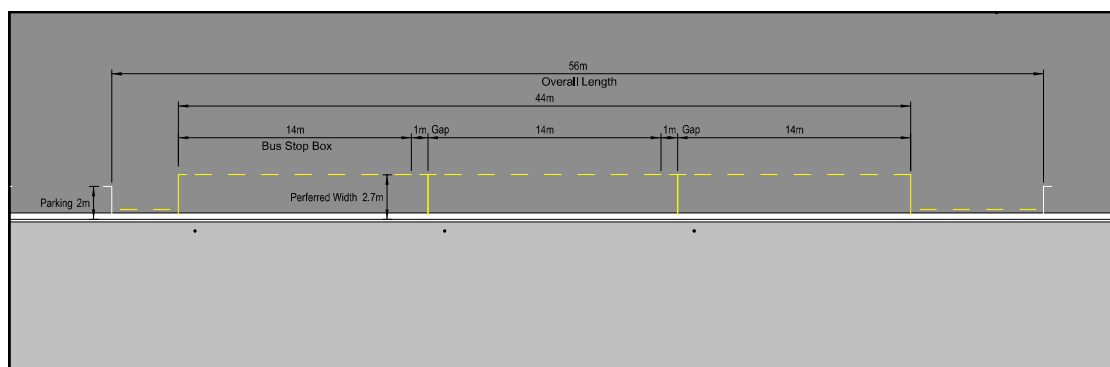


Figure 9: Bus stop dimensions for multiple buses

- *The allocation of the necessary space may require the removal of onstreet parking spaces.*

The Christchurch City Parking Strategy (2003) prioritises the use of kerbspace for bus stops over all other potential uses, including car parking. However, prohibiting 26m of kerbside parking may prove difficult at some sites. Locating the bus stop so that the bus makes use of other road space on the approach or exit to the stop can reduce the amount of clear kerbside space required (the potential for future pedestrian kerb build outs should be considered when employing this method). Alternatively, a bus boarder taking up less kerbside space could be employed.

4 Bus Stop Layout and Facilities

The level of service for facilities provided at a bus stop depends on the characteristics of the stop. These guidelines recommend a graduating system based on the type and location of the stop. Within this classification, the provision of facilities such as shelters and real time information is based on passenger demand and service frequency criteria. The recommended bus stop levels of service are summarised in Appendix 2, while more detailed information on layout and facilities is provided in the following sections.

4.1 Minimum requirements for all bus stops

This section describes the minimum requirements for all stops². These requirements are depicted in the following diagram.

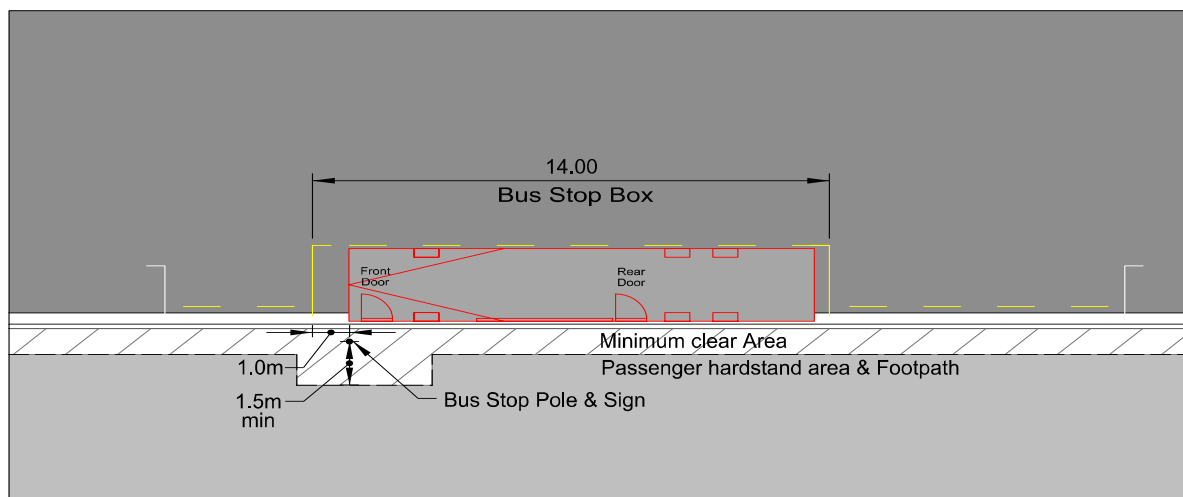


Figure 10: Minimum requirements for all stops

Notes:

- The clear areas shown in the figure are to be kept free from any fixed or movable obstacles. These areas also need to be kept free of any above ground obstacles that may impede movement e.g. foliage.

4.1.1 Marking

- *Every bus stop should be marked on the road. The marking should meet the requirements in the section on bus stop dimensions.*

In the past, some bus stops have not been marked on the road. This has created problems with illegal parking, which has had a detrimental effect on the ability of buses to enter and exit the stop safely and efficiently. Unmarked

² There is a limited number of stops in rural areas where these requirements may not be met. At these locations, a bus stop pole and sign, and a level surface of sufficient size for boarding and alighting should be provided as a minimum.

bus stops also create problems for enforcement as there is more ambiguity in terms of the area covered by the stop.

4.1.2 Pole and sign

- *Every bus stop must be identified by a bus stop sign³. The sign should be located at the head of the marked bus stop box and 600mm in from the kerb edge. The front doors of the bus should consistently open in the clear area just behind the sign location.*

The bus stop pole and sign are used to identify the bus stop. The positioning of the pole and sign is important because it creates a consistent and predictable bus stop environment. This serves as a 'marker' to bus drivers, allowing them to stop the bus at the same position when picking up and setting down passengers.

Consistency is extremely important. Tyler (2002) notes a common complaint from users is that they do not know where the bus door will be. It is only possible to advise where the entrance door of the bus will be if the bus stop has been designed to enable bus drivers to stop consistently at the same position.

- *The sign should be mounted on a metal pole⁴ at a least 2.1m above the adjacent footpath. In the interests of consistency, bus stop signs should not be affixed to bus shelters, information bollards or street light columns. Signs may be affixed to Real Time Information poles providing they are located in the correct position.*

The installation of wooden poles at bus stops and the placing of signs on other bus stop facilities should be avoided and phased out through the traffic signs renewals programme and through other opportunities for replacement.

4.1.3 Clear areas

- *Ensure that the footway edge along the length of the marked stopping area is free from obstructions such as verandah supports, sign poles, phone booths, bins or shop advertising boards that would prevent easy access to and from either front or rear doors, or impede visibility.*
- *Bus stop facilities should not be placed where they unreasonably prevent access to any land having a frontage to the road.*

Unobstructed areas should be created within the entire boarding and alighting zone where possible, by moving street furniture downstream of the bus stop, rationalising it or removing it altogether. This will help the visibility

³ RP-5 (MoTSaM)/P3-2.1 (Traffic Control Devices Manual).

⁴ The pole should be of a type and installed in accordance with the Christchurch City Council regulatory parking signs standard installation detail SD647.

of approaching buses as well as increasing pedestrian space. (Transport for London, 2006).

- *In all cases no part of any fixed or moveable street feature in the footway within the limits of the bus stop area should be within 600mm of the kerb face.*

The absence of obstructions will ensure that buses manoeuvring into and away from the stop do not sustain damage. This allows for the overhang of the bus and its mirrors on entry and exit.

- *The location of bus stop poles and signs, seats and shelters, information bollards and all other facilities associated with bus stops should provide at least a 1.5m continuous accessible path of travel throughout the bus stop area. These areas also need to be kept free of any above ground obstacles that may impede movement e.g. foliage. The amount of space provided should be increased at high usage stops.*

The bus stop layout must ensure there is sufficient space to maintain accessibility in the bus stop area. The main basis for measurement of this is the manoeuvrability of a wheelchair. Skilled users of manual wheelchairs should be able to complete a 360° turn in a space of no more than 1.5m x 1.5m (Department for Transport, 2005).

A wheelchair user should be able to leave the bus and move away from the stop, enter any shelter and gain access from a shelter to the bus (Tyler, 2002). Providing sufficient space for wheelchair users will also ensure that access to and through the bus stop is maintained for other users, including those with pushchairs or luggage, as well as minimising conflict between passing pedestrians and waiting passengers.

4.1.4 Passenger hardstand area

- *Extend the existing pavement to the kerb edge. Where possible, the clear area between the front and rear doors of the bus should be sealed or paved, and connected to the existing footpath.*
- *There should also be a sealed accessible path of travel throughout the bus stop area with a minimum width of 1.5m.*

A passenger hardstand area with a sealed smooth surface provides a connection between the bus doors and the nearby footpath, which is particularly important for wheelchair users and other people with mobility impairments. It also defines the waiting and circulating space around the bus stop passenger facilities.

- *All bus stops should have even and well draining non-slip surfaces. Take note of road camber and locate bus stops on a level section of road if possible.*

Even, non-slip surfaces will ensure safe all weather access for potential users. Poor drainage and ponding can affect the safety and amenity of the bus stop

environment resulting in passengers slipping or being splashed by passing traffic (or the bus).



Unsealed passenger areas make access difficult for elderly and mobility impaired passengers

4.1.5 Kerb

- *Bus stops should have a minimum kerb height of 130mm (160mm is desirable) to minimise the step up to the bus from the kerb.*

Kerbs need to be high enough to minimise the step up to the bus, while taking into account the ground clearance of buses and the possibility of overhang. Higher kerbs of 160mm (for the length of the passenger hardstand area) should be considered if the bus stop is well-established and is being reconstructed as a part of the street renewals programme.

- *Boarding and alighting areas should not coincide with dropped kerbs.*

The bus stop also needs to be carefully located so that passengers are not required to board or alight the bus from access points with dropped kerbs. This increases the vertical distance between the kerb and the bus step, creating an extra obstacle for elderly and mobility impaired bus users.

- *Where the bus stop is adjacent to open dish channel, channel cover blocks should be provided along the full length of the areas used for boarding and alighting.*

Locating bus stops adjacent to open dish channel is often unavoidable. In these cases the channel needs to be covered to remove this additional obstacle for elderly and mobility impaired users.

4.1.6 Lighting

- The bus stop and the area surrounding it should be well lit at night to ensure that:
 - passengers can get on and off the bus safely;
 - passengers feel secure waiting for the bus;
 - bus drivers can clearly see waiting passengers.

Poorly lit areas at bus stops can impact on the personal security of waiting passengers and the visibility between drivers and waiting passengers. Ideally, the lighting will also provide bus stop users with the opportunity to survey the surrounding area at night.

4.2 Desirable requirements for boarding stops

This section covers the requirements for all boarding stops⁵ in addition to the requirements for all bus stops in the preceding section.

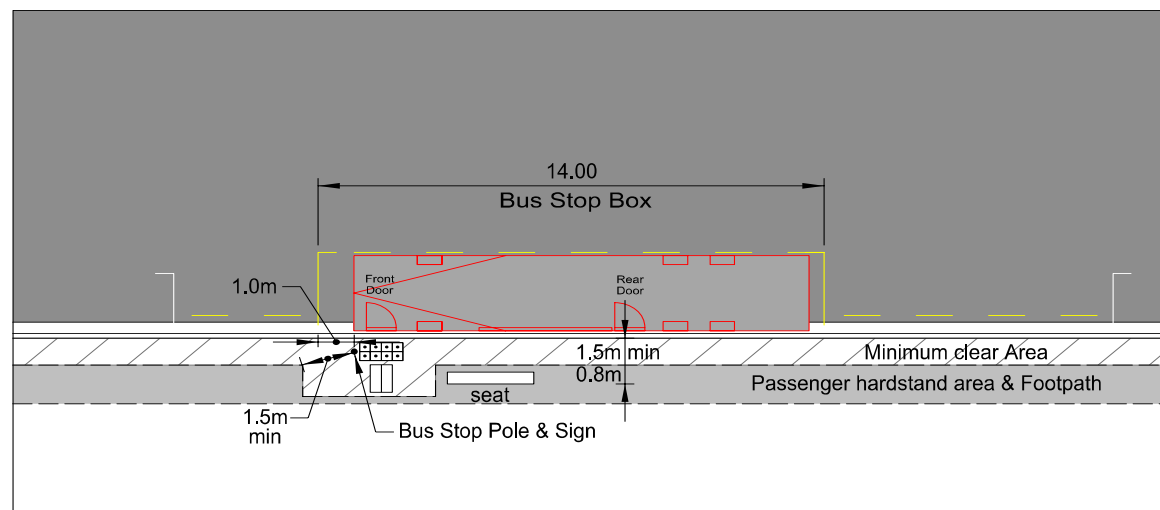


Figure 11: Minimum requirements for boarding stops (seat only)

Notes:

- The clear areas shown in the figure are to be kept free from any fixed or movable obstacles. These areas also need to be kept free of any above ground obstacles that may impede movement e.g. foliage.

4.2.1 Seating

People need to feel comfortable waiting for a bus. Many people, particularly the elderly cannot comfortably wait for a bus without sitting down.

- Seating at bus stops (including seating in shelters if provided) should be located as close as possible to the front door of the bus when it pulls into the stop, providing

⁵ Boarding stops are bus stops that act as a boarding point for passengers based on foreseeable demand for downstream destinations, particularly the anticipated needs of the elderly and mobility impaired. ECan is able to provide information on whether a bus stop is a boarding point for passengers.

that the required clear areas and minimum continuous accessible path of travel is maintained.

- *Seating and shelters should be positioned so that sightlines between approaching buses and waiting passengers (seated or standing) are maintained. They should also provide good visibility for surveying the surrounding environment. Maintaining sightlines is particularly important when planting trees in the bus stop surroundings.*

4.2.2 Tactile ground surface indicators

- *Tactile ground surface indicators should be installed at a position adjacent to the front doors of the stopped bus.*
- *Land Transport New Zealand publication RTS 14 – Guidelines for Facilities for Blind and Vision Impaired Pedestrians recommends that directional and warning indicators be installed at public transport access points according to the following design:*
 - *warning indicators a minimum of 600 mm wide x 600mm deep installed 300mm back from the front of the kerb edge when used adjacent to a bus stop.*
 - *directional indicators 600mm deep, installed where the warning indicators are not located in the direct line of the continuous accessible path of travel, forming a continuous path to the warning indicators.*

Blind and vision-impaired pedestrians rely heavily on public transport and therefore need to identify areas of access to public transport. Consistency in bus stop design and layout is particularly important for vision impaired people because tactile indicators and other cues only work if they are consistently applied. The bus doors also need to be consistently aligned at the same point every time. Any compromise in terms of the space available to manoeuvre the bus will affect the driver's ability to do this.

Tactile ground surface indicators assist people with vision impairment to access the bus from the adjoining footpath. Tactile directional indicators direct people from the footpath to the kerb where the bus front door will be, and from the bus back to the footpath. Tactile warning indicators warn people of the kerb and potential hazard beyond it (Land Transport New Zealand, 2007).



Directional and warning indicators at a bus stop, Colombo St

4.2.3 Timetables and maps

- *Every boarding stop should be provided with a printed timetable and an accompanying map showing the times and routes of each service passing the stop. The map should indicate the location of the bus stop.*
- *Timetable and route maps should be provided on the bus stop pole or a separate information bollard placed so that it is easily accessed by waiting passengers without obstructing sightlines or access to or through the bus stop area.*

Providing timely and accurate service information in a format appropriate to the needs of the people who will use it is an essential component of a modern, well used public transport system. Timetables are prepared, installed and maintained by Environment Canterbury.

4.3 Criteria-based facilities for boarding stops

A multi-criteria points system has been developed to ensure that the investment in facilities providing an enhanced level of service is optimised, and they are located in places that provide the greatest passenger benefit.

The criteria for bus shelters and real time information are weighted in favour of boarding stops in areas with significant potential demand and where bus services are of medium frequency. The reason for this weighting is that real time information and shelters are likely to provide the greatest benefit at high use stops where passengers generally have longer waiting times between buses. The comparative benefits of having real time information units and shelters generally decreases as service frequency increases beyond a point where buses are arriving every 10 minutes or less.

The criteria are a tool to assist with decision-making, for example, prioritising the installation of facilities at several comparable sites. There is no requirement to use the criteria if there is a clearly identified need to install a shelter or real time information at a particular site.

No formal criteria have been developed for the provision of cycle stands and rubbish bins. These are subject to a case by case assessment of potential demand for the facility.

4.3.1 Real time information

- *Real time information units should be progressively installed at boarding stops that meet the threshold score according to the criteria in Appendix 3, with priority given to those stops with the highest scores.*

Real time information units provide up to date information on the expected time of arrival of any given service at the stop. Real time information in general has proved to be a valuable tool in building and maintaining patronage (particularly in congested cities) as the information it provides gives passengers confidence in the time they have to wait for the next service.

- *Electronic real time information boards should only be installed at high volume passenger spaces served by a number of different bus routes. The boards should face the passenger waiting area and be clearly visible to waiting passengers.*

Electronic boards can be used to present real time information in a large format able to be read from a distance by passengers waiting at a bus stop. These are relatively costly to install and should therefore be carefully sited to give maximum benefit to passengers.

4.3.2 Bus shelters

- *Bus shelters should be progressively installed at boarding stops that meet the criteria in Appendix 3, with priority given to those stops with the highest scores.*
- *Install a seat rather than a shelter at boarding stops where there is already shelter, such as a shop verandah, or in cases where a purpose built shelter cannot be provided, for example, because of space constraints⁶.*
- *Select a bus shelter design that meets the following requirements. A shelter should:*
 - *Protect: consideration needs to be given to the prevailing wind, rain, sunlight and heat.*
 - *Inform: the shelter is also the location for information about the bus services and the local area. It is the point where people have continuous access to information*

⁶ From CCC Bus Passenger Shelters and Seats Policy (1993).

to proceed on their journey, whether they are waiting for a bus or have just left one.

- *Provide comfort: The shelter should have seats, preferably located within the shelter and space for wheelchairs, pushchairs, shopping and luggage should also be included where possible.*
- *Promote safety: shelters must enable people to feel secure and safe while they wait for a bus. Shelters must also have a design element within 150mm of the ground, so that they can be detected by use of a long cane.*
- *Select a bus shelter size that meets the space and access requirements for bus stop layout (see Appendix 4).*

These needs should be met for all users of the bus system, so a shelter must be able to accommodate people with wheelchairs, pushchairs, shopping and young children, as well as elderly people and the sight impaired. The shelter should enable people to wait for the bus and to enter it in comfort (Tyler, 2002).

Shelters with front panels provide extra protection from the elements at exposed sites. These should have two entrances to prevent entrapment, and of sufficient depth to allow people to walk past seated passengers within the shelter to reduce the feeling of confinement.

- *A bus shelter with advertising may be installed at any bus stop providing it meets the requirements for bus stop design and facilities in these guidelines. No advertising of alcohol or tobacco products, or of a racist, religious or political nature or implicit or explicit sexual nature shall be permitted on the shelter⁷.*
- *Ensure that advertising panels or decorative patterns do not block out the sightlines between waiting passengers and the drivers of approaching buses. Advertising panels should be placed on the downstream side of the bus stop.*

The City Council makes provision for passenger shelters from two sources. The Council constructs, installs and maintains its own type of shelters, and also oversees the installation of shelters (usually displaying advertising) under an agreement with Adshel Limited. Adshel also maintain the shelters they install.

Adshel shelters are usually installed in high profile locations where their revenue from advertising covers the significant costs associated with the installation and maintenance of the shelter. Council will liaise with Adshel to select the most appropriate locations to install their shelters.

⁷ From CCC Advertising on Bus Shelters Policy (1999).

4.3.3 Standard layouts (with shelter)

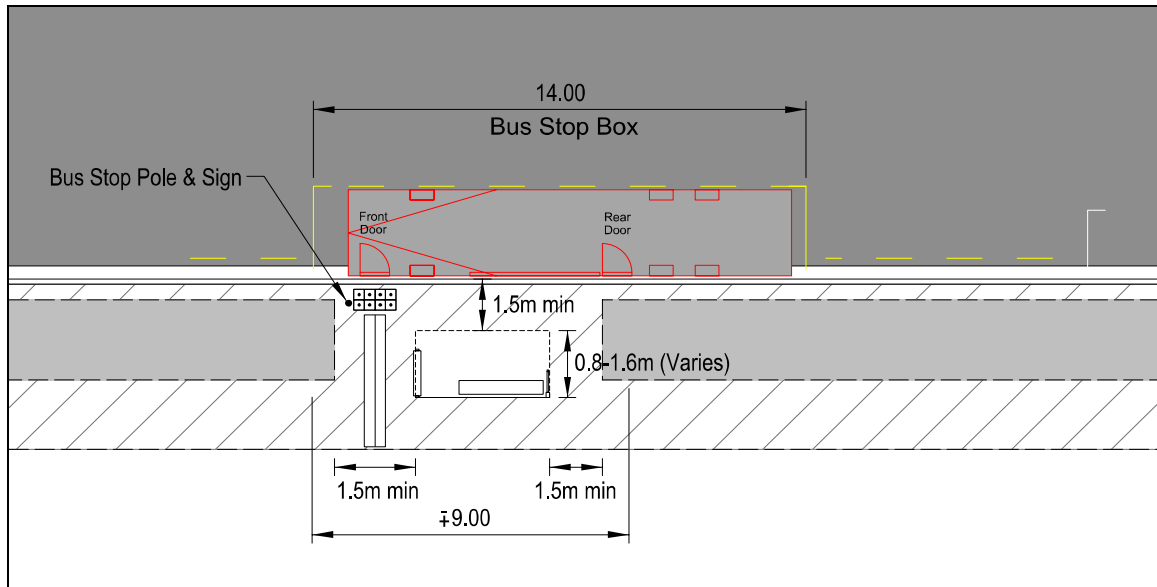


Figure 12: Standard layout - roadside width > 4m

Notes:

- A minimum width 1.5m is shown in front of and behind the shelter to provide a continuous accessible path of travel. Any reduction in this measure will affect a wheelchair user's ability to manoeuvre to and within the bus stop environment.
- The clear areas shown in the figure (or clear areas of equivalent width) are to be kept free from any fixed or movable obstacles. These areas also need to be kept free of any above ground obstacles that may impede movement e.g. foliage.
- A footpath width of at least 2m should be provided behind the shelter if pedestrian flows are significant.

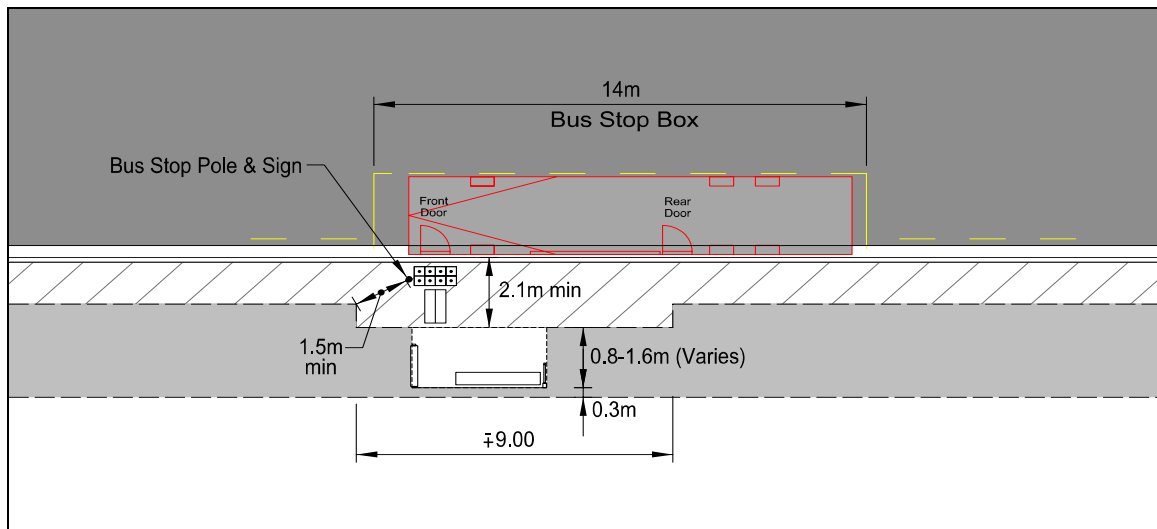


Figure 13: Standard layout - roadside width < 4m

Notes:

- The clear areas ensure that a continuous accessible path of travel of 1.5m is maintained throughout the bus stop. These areas also need to be kept free of any above ground obstacles that may impede movement e.g. foliage.
- The space behind the shelter is required for cleaning and maintenance. This is only required if there is a wall or hard surface that prevents access.

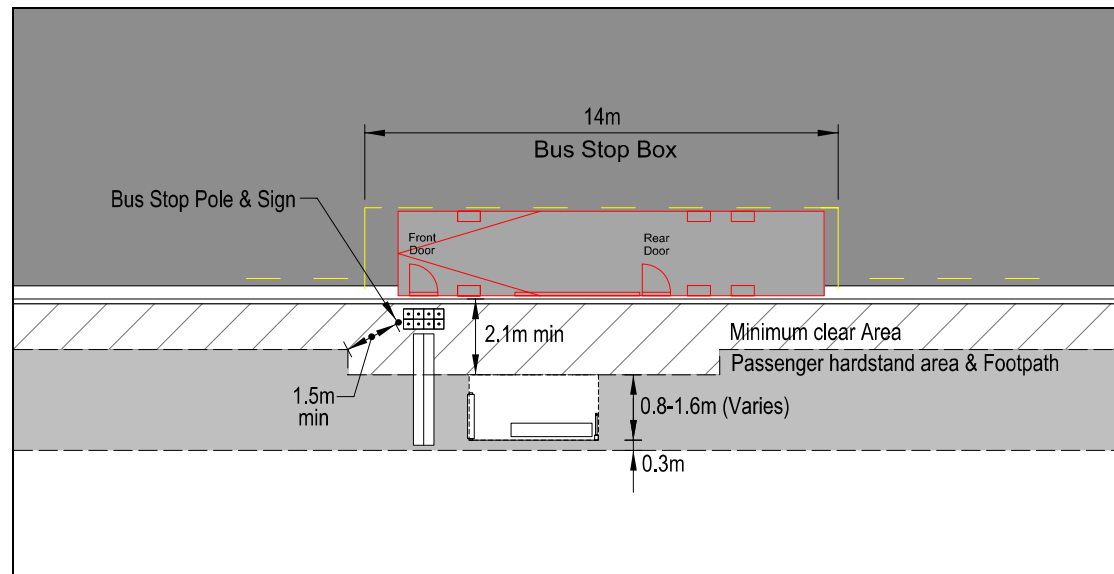


Figure 14: Standard layout – roadside width <4m (variation)

Notes:

- The clear areas ensure that a continuous accessible path of travel of 1.5m is maintained throughout the bus stop. These areas also need to be kept free of any above ground obstacles that may impede movement e.g. foliage.
- People waiting (seated or standing) occupy a 0.8m width, and if more than this space is occupied (for example by a wheelchair user) then this additional space could be shared with the continuous accessible path of travel.
- The space behind the shelter is required for cleaning and maintenance. This is only required if there is a wall or hard surface that prevents access.
- When the roadside width is less than 2.6 metres, it can be difficult to provide a bus passenger shelter and maintain the appropriate clearances.

4.3.4 Cycle stands

- *Cycle stands should be prioritised at bus stops where there is:*
 - *a significant cyclist catchment or demand; and*
 - *a number of different destinations accessible from the stop; and*
 - *a high volume of pedestrian traffic or other sources of passive surveillance (e.g. shops).*
- *Cycle stands should be of a design that allows the user to lock the frame and at least one wheel, and should ideally be covered to provide protection from the elements.*

- *Cycle stands should be of a design and colour consistent with other facilities at the stop.*

Cycle stands at bus stops give people with the flexibility to interchange between modes, therefore providing greater transport choice. Potential demand and bicycle security are key factors when deciding whether to install cycle stands at bus stops.

4.3.5 Rubbish bins

- *Rubbish bins should be located near highly patronised boarding stops, and boarding stops close to places that generate litter e.g. takeaway food shops. These bins should be serviced and cleaned.*

Providing a rubbish bin assists with keeping the bus stop environment clean. The bin should not be located in the vicinity of the required clear areas and should preferably be located downstream of the bus stop. The bin location should also take into account potential nuisances for waiting passengers, such as smells and flies.

4.4 Enhancements for boarding stops on bus priority corridors

The following have been identified as bus priority corridors:

- Colombo Street / Cashmere Road (Princess Margaret Hospital to the City)
- Main North Road / Papanui Road (QEII Drive to the City)
- Queenspark Bus Route (City via New Brighton Road / Shirley Road / Hills Road)
- Hornby-City via Riccarton Road
- New Brighton-City via Pages Road
- Sumner-City via Ferry Road
- Oaklands-City via Halswell Road
- Main North-City via Cranford Street
- Orbiter
- Metrostar

These are bus routes that require increased levels of service at bus stops to complement the bus priority measures that are either currently being implemented, or will be in the near future. The following enhancements should also be considered along bus priority corridors:

4.4.1 Paving

- *Red, grey and blue cobblestones laid along the full length and width of the footway adjacent to the bus stop (with gaps where necessary for planting) in order to create*

a high quality, visually appealing and clearly identifiable bus stop passenger area. Laying should be in accordance with Part 6 of the Christchurch City Council Construction Standard Specifications.

For consistency, it is recommended that the colours and textures of the footpaths at bus stops are the same throughout each corridor. The reason for installing coloured pavements at bus stops is to make them more prominent. Introducing new footpath materials improves the character, appearance and overall attractiveness of the bus stop environment (Greater Manchester, 2007).

As more stops are upgraded on bus priority corridors around Christchurch, the value of having a standard template will increase.



Cobblestone paving laid to herringbone and staggered patterns

4.4.2 Planting

- *Where space and sightlines permit, planting (including trees and flowering shrubs) should be considered wherever possible adjacent to the limits of the bus stop area to improve the amenity for passengers and neighbours, as well improve the overall quality of the corridor. Mature planting should not obstruct sightlines between buses and waiting passengers or reduce the ability of waiting passengers to survey their immediate surroundings.*
- *Tree and shrub species may vary and should be decided in consultation with the adjacent land owner and the Community Board.*

5 Consultation

5.1 Bus stops

The Council is not bound by any specific legislation to consult on the location of bus stops. However, the introduction or relocation of bus stops and shelters can be a contentious issue, particularly for residents and business owners. Council must also act according to the consultation requirements in the Local Government Act 2002. To this end, Council has developed a Decision-making Guide and Consultation Policy to provide guidance on the appropriate level of consultation on any particular proposal.

These guidelines recommend that consultation on bus stop locations be undertaken as early as possible in the bus service planning process (see section on Bus Routes). This allows community views and preferences to be taken into account at the initial stages of the process, while providing time and cost savings to both CCC and ECan.

In the absence of prior knowledge of the community's views on bus stop locations, it is CCC practice to consult with adjacent property owners and occupiers⁸ as a minimum. The following is recommended for any proposal to introduce, relocate or make a significant⁹ change to an existing bus stop:

- 1 Several alternative sites are identified for each bus stop if possible.
- 2 ECan and the relevant bus operator(s) are contacted for their views.
- 3 Adjacent property owners and occupiers are contacted by way of a letter accompanied by a follow-up telephone call.
- 4 If no response is received within 14 days, staff may proceed with selecting and recommending the preferred location from the options identified.
- 5 If one or more responses are received, staff will then recommend a preferred location, taking into account:
 - a) any feedback received; and
 - b) the locational guidance in this document.
- 6 Community Boards have the delegated authority to make final decisions on bus stop locations. Property owners have the right to express their views to the Community Board before this decision is made.

⁸ Adjacent property owners and occupiers – means the occupiers, and also the owners if the occupiers are not the owners, of any property with a frontage abutting any part of the bus stop area. The bus stop area includes the full length of the marked bus stop (bus stop box + entry and exit tapers) and the space occupied by bus stop facilities.

⁹ In this context a 'significant change' is any change requiring Community Board approval under current delegations.

5.2 Bus shelters

The Local Government Act 1974 (s339) contains a procedure that Council must follow when seeking to install a bus shelter. This is paraphrased as follows:

- 1 The Council gives notice in writing of its proposal to erect a shelter to the occupiers and if they are not also the owner, to the owner of any land the frontage of which is likely to be injuriously affected by the erection of the shelter¹⁰.
- 2 Within 14 days after the service of the notice, the occupier or owner may object in writing to the Council against the proposal. If there are no objections, the Community Board makes the final decision on the erection of a shelter.
- 3 Where a person objects to the proposal the Council arranges a day for a Council Hearings Panel to consider the objection and informs the objector of the time and place where the objection can be heard. This cannot be earlier than 7 days after the date on which the notice of objection was received by the Council.
- 4 The Hearings Panel considers the objection, and after hearing any submissions made by or on behalf of the objector, either dismisses the objection, or decides not to proceed with the proposal, or modifies the proposal to which the objection relates as it thinks fit.
- 5 Where there is more than one objector, the Hearings Panel shall, as far as is practicable, hear all objections together and give each objector an opportunity to be heard and considered in respect of all other objections.
- 6 The Hearings Panel makes its final decision once all the objections have been heard.

5.3 Bus routes

ECan undertakes consultation when implementing a new bus route or reviewing services on an existing route. CCC takes part in consultation on the development of new route proposals prior to implementation, commenting on the merit of the proposals in achieving patronage growth, implications for locating safe bus stops and the general safety issues surrounding buses driving and manoeuvring on affected roads. In the absence of specific safety issues, ECan has the final responsibility for determining the routes of buses.

This process also represents an opportunity to better integrate service planning with the planning of bus stop locations and facilities, rather than identifying bus stop locations on a case by case basis (see Figure 16 for a recommended process).

¹⁰ Legal opinion is that Council should consider giving notice under s339 to the properties either side of those with bus shelter in front as a matter of course.

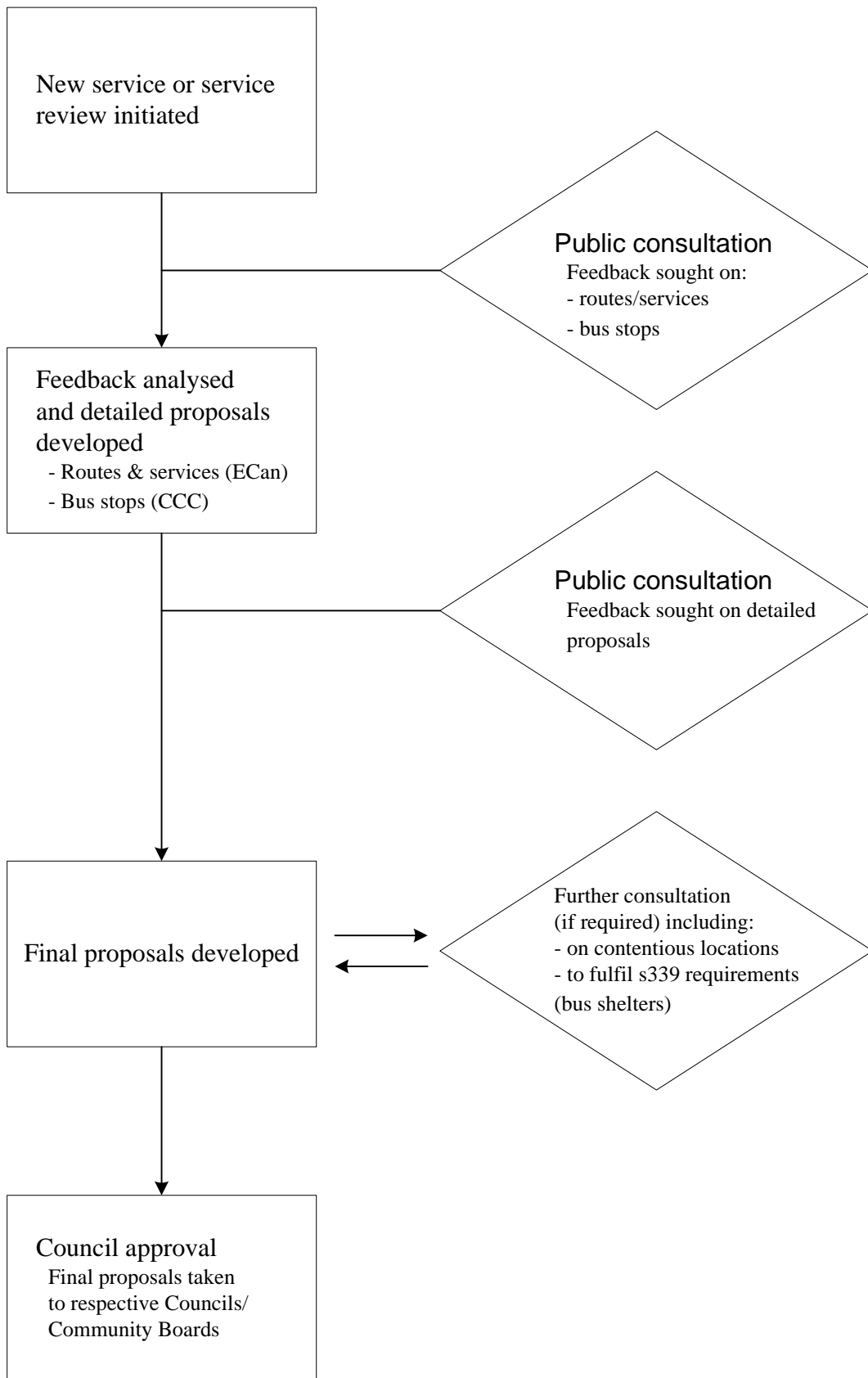


Figure 15: Joint ECan/CCC bus service & bus stop planning process

6 Maintenance

6.1 Facilities

The considerable investment in bus stop facilities needs to be followed up by an efficient and responsive maintenance service to sustain an image of a high quality public transport system.

The City Council uses contractors to install, clean, maintain and renew bus stop infrastructure, with the exception of shelters and seats installed and maintained under agreement with Adshel Ltd. Bus stop facilities are regularly inspected and cleaned to maintain an acceptable level of service to users.

Timetables and their holders are provided, maintained and updated by Environment Canterbury installs, maintains and updates timetables and their holders.


6.2 Road maintenance and renewals

The carriageway, and potentially the kerb, in the vicinity of the bus stop are subject to particular stresses from the repeated manoeuvres of buses. Materials used in these areas should be durable and any faults quickly remedied.

Care also needs to be taken to ensure that kerb height is maintained during road resurfacing work. There is a tendency for the general road surface to rise following success repairs. This has the effect of increasing step heights onto buses.

6.3 Contacts


Christchurch City Council

 03 941 8666

 info@ccc.govt.nz

 <http://www.ccc.govt.nz/Contact/RequestForService/>

Environment Canterbury

 03 3 66 88 55

 metro@ecan.govt.nz

 <http://www.metroinfo.org.nz>

Adshel NZ Ltd

 0800 237 435

 <http://www.adshel.co.nz>

7 Enforcement

Illegal parking or stopping on bus stops has a significant impact on the operation of the bus service. Both journey times and the safety of boarding and alighting passengers can be affected. Vehicles on bus stops block sightlines between drivers and waiting passengers, and can also force buses to pull up away from the kerb. This not only forces passengers to enter the carriageway, it also means that the bus is protruding further into traffic flows.

Clear and consistent bus stop design and layout will assist with enforcement by reducing any ambiguity about the status of the bus stop. The bus stop box needs to be clearly delineated on the road, and broken yellow lines should be used to demarcate the entry and exit zones extending from each end of the box.

8 References

- Department for Transport (2005) *Inclusive mobility*, London: Department for Transport.
- Greater Manchester Passenger Transport Executive (2007) *Design guidelines for bus stops in Greater Manchester*, Manchester: Greater Manchester Passenger Transport Executive.
- Human Rights Commission (2005) *The accessible journey: report of the inquiry into accessible public land transport*, Wellington: Human Rights Commission.
- Land Transport New Zealand (2007) *RTS 14 – Guidelines for facilities for blind and vision-impaired pedestrians (2nd ed.)*, Wellington: Land Transport New Zealand.
- Transport for London (2006) *Accessible bus stop design guidance*, London: Transport for London.
- Tyler, N. (ed.) (2002) *Accessibility and the bus system: from concepts to practice*, London: Thomas Telford.
- VicRoads (2006) *Bus stop guidelines*, Kew: VicRoads.

Appendix 1: Typical Bus Dimensions in Christchurch

The layouts in these guidelines are based upon 11.3 - 12.6 metre buses with front and centre doors, and ramps at both doors. Total bus length could potentially be extended by an additional 1.5m at the front if external bike racks are installed.

Width: up to 2.5m

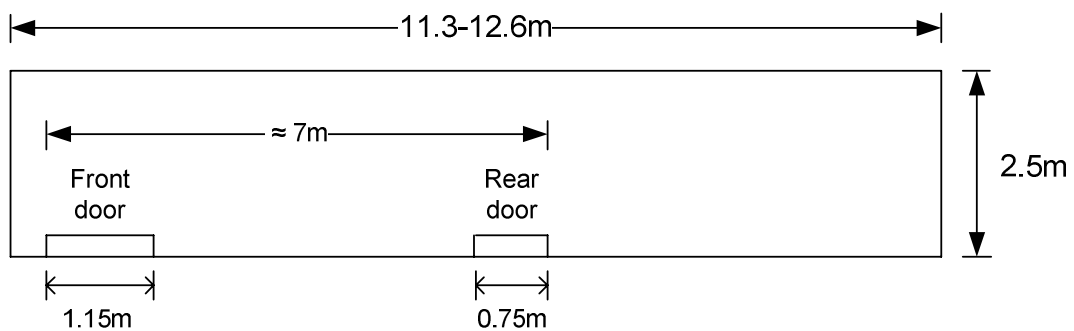
Length: up to 12.6m

Door width: Front 1.15m

Rear 0.75m

Approx. distance between doors (extremities): 7m

Approx. distance between road surface and bus floor (normal operation):
310mm



Appendix 2: Bus stop levels of service

		Facility	Bus stop type				
			Rural	Urban			
				alighting	boarding	Bus priority	
						alighting	boarding
Minimum requirements		Pole & sign	✓	✓	✓	✓	✓
		Clear area	✓	✓	✓	✓	✓
		Marking		✓	✓	✓	✓
		Passenger hardstand area		✓	✓	✓	✓
		Kerb		✓	✓	✓	✓
		Lighting		✓	✓	✓	✓
		Tactile paving			✓		✓
		Timetables & maps			✓		✓
		Seat			✓		✓
Criteria based	Demand & frequency	Shelter			✓		✓
		Real Time Information			✓		✓
	Demand	Cycle stands			✓		✓
		Rubbish bins			✓		✓
Optiona 1		Paving				✓	✓
		Planting				✓	✓

Appendix 3: Criteria for Installing Real Time Information and Bus Shelters

	CRITERIA	MEASURE	CATEGORY	RAW SCORE	WEIGHT	SCORE
DEMAND	Passenger catchment	No. of property parcels/household units within 400m radius of the stop ¹¹	450+	4	15%	
			250 - 449	2		
			0 - 249	0		
	Projected population	Projected 10 year population growth for Census Area Unit the bus stop is within ¹²	>8%	4	15%	
			3-8%	2		
			<3%	0		
	Demand generators	Number of demand generators within 400m radius of the stop ¹³	15+	4	15%	
			8 - 14	2		
			0 - 7	0		
BUS FREQUENCY	Peak bus frequency	Lowest weekday peak bus frequency ¹⁴	0 to 2 buses / hour	0	30%	
			3 to 5 buses / hour	4		
			6 or more buses / hour	2		
	Inter-peak bus frequency	Lowest weekday inter-peak bus frequency ¹⁵	0 or 1 bus / hour	0	25%	
			2 buses / hour	4		
			3 or more buses / hour	2		

Total score _____

(max = 4, threshold for RTI = 2.5, threshold for shelters = 2.8)

¹¹ Property parcel counts are available from the City Council. The measure is a proxy for the likely number of people within a 5 minute walk of the bus stop. Some care should be taken to assess the presence of multiple titles within a land parcel, for example, flats and apartment complexes that may have numerous occupants.

¹² Population projections for Census Area Units are available from the City Council.

¹³ See Chapter 2 for a definition of a demand generator. The 'Community' layer on CCC Webmap is a useful tool for identifying and measuring the number of demand generators within 400m of a bus stop.

¹⁴ The Canterbury Regional Passenger Transport Plan defines the peak period as being 7:30 – 9 am and 2:30 – 5:30 pm on weekdays.

¹⁵ Including evening services.

Appendix 4: Shelter Designs Currently in Use in Christchurch



Full Width Adshel (1.55m)



Variable Width Adshel (ad. panel = 1.55m)

Note: bus stop pole should be positioned at head of bus stop box at least 600mm from kerb



Adshel with front panel (ad. panel = 1.55m)

Notes:

- 1. Bus stop pole should be positioned at head of bus stop box at least 600mm from kerb*
- 2. Gap below advertising panel exceeds 150mm recommended by Guidelines for facilities for blind and vision-impaired pedestrians*



CCC shelter (width = 1.05m)



CCC shelter (width = 0.5m)

Note: bus stop sign should be positioned on pole at head of bus stop box and at least 600mm from kerb