
# 2. Planning

## Pedestrian Network Guidance

NZ Transport Agency Waka Kotahi

1 February 2025

V1.1

**More information**

NZ Transport Agency Waka Kotahi
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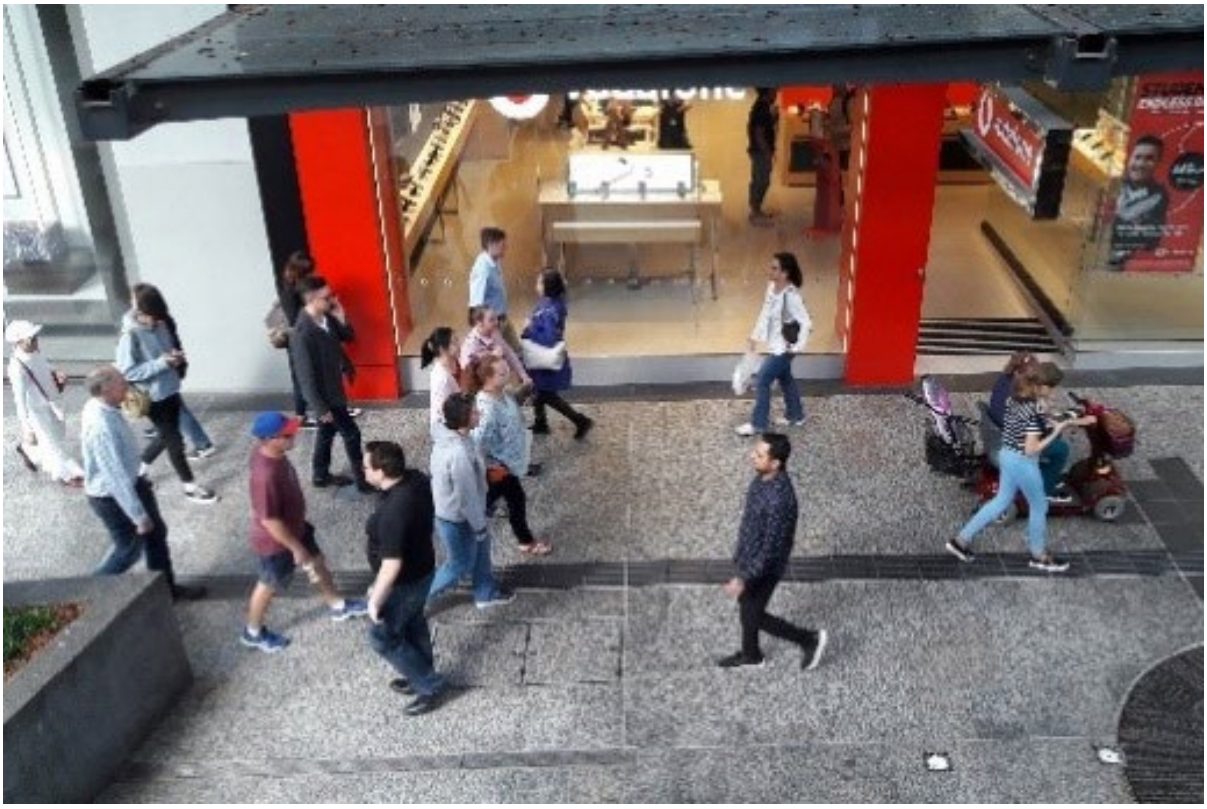
## Contents

This document constitutes a chapter within the NZ Transport Agency Waka Kotahi Pedestrian Network Guidance (PNG). For access to the other chapters of the guidance, please visit nzta.govt.nz/png.

This version of the PNG, dated February 2025, is published in a hybrid format comprising both HTML (ie webpages) and PDF components, marking a departure from the previous version, which was available solely in HTML. The PDF documents, each addressing discrete sections or thematic areas, are designed to complement the overarching HTML structure, which presents the guidance in a cohesive and navigable format. Together, these formats are designed to function as an integrated whole, ensuring that users can access and engage with the content in a manner that is both flexible and coherent, while preserving the integrity and consistency of the guidance.

# 2. Planning

## 2.1. Pedestrian planning principles



### 2.1.1. Pedestrian characteristics

Humans are diverse. Designing streets and places for pedestrians means designing for all manner of human capabilities and states. Every human is unique in their physical, mental, and sensory capabilities. These capabilities can change over time or in different situations, for example if a person is carrying luggage, or accompanying a small child. In addition, states such as anxiety, happiness, and wellness can affect how easy it is to travel as a pedestrian.

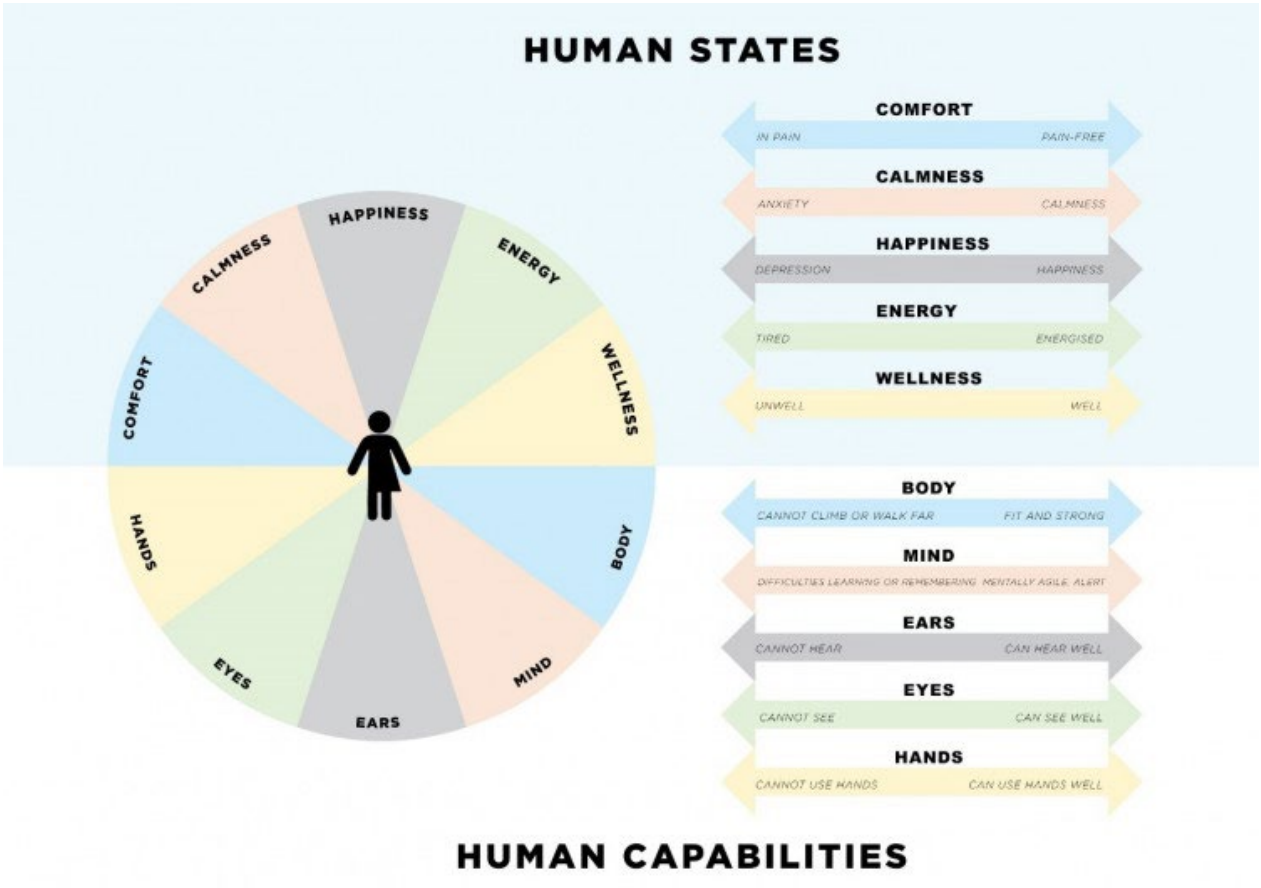



Figure 1: Different human states and capabilities.

Human states include comfort, calmness, happiness, energy and wellness. Human capabilities include body strength, cognitive abilities, hearing, vision and hand strength.

### 2.1.1a Human capabilities and states

Pedestrians have different characteristics that affect their safety, confidence and comfort when walking, including when using a mobility aid. People's different capabilities (vision, hearing, body, mind, hands) and their momentary state - that is, how they are feeling - can impact how they can travel. Decisions made by those who design streets and places affect how easy it is for people to travel, even if their capabilities are reduced, or they are not feeling as well as they could be.

#### Vision

Limited vision affects pedestrians' comfort, safety, and ability to find their way on paths, determining when it is safe to cross, keeping alignment when crossing roads, and in public spaces where there are no well-designed pedestrian facilities; car parks can be an example. Making street and path environments safe for people with low or no vision requires separation from other modes, or for those other modes to be travelling slowly, along with legible and consistent design. Separated spaces mean that pedestrians are not likely to be in conflict with heavier, faster modes of travel. Where people cannot be physically separated (when crossing streets for example, and in shared zones) slow traffic speeds reduce impact speeds and can increase pedestrian confidence.

People with low vision rely on contrasting colours and surface textures. Pedestrian routes should include visually contrasting and tactile cues for blind people to follow. Detailed information about pedestrian infrastructure design for vision impairment is contained within RTS14: Guidelines for facilities for blind and vision impaired pedestrians.

New Zealand 2018 Census data states that 3% of males and 4% of females have a health problem or condition (lasting 6 months or more) that causes them difficulty seeing, even when using glasses or contact lenses[1]. Around 30,000 people in New Zealand are either blind, or have limited useful sight even when using lenses[2] and many more people experience imperfect or deteriorating vision. Vision can be temporarily obstructed on crowded paths and visibility between pedestrians and other road users can be obstructed by different temporary obstacles including vegetation, street furniture and other road users themselves.

For specific guidance on designing areas for people with low or no vision, see RTS 14 – Guidelines for facilities for blind and vision impaired pedestrians.

### Hearing

Pedestrians' ability to hear affects their comfort using paths, and crossing roads and public spaces. When crossing the road, pedestrians who cannot hear well rely on their sight and traffic control devices (such as traffic signals) to be safe. On paths, many pedestrians who cannot hear well are affected by people approaching from a direction they cannot see. Devices such as bicycles, skateboards, and scooters on paths can be very concerning for pedestrians whose hearing is compromised. It is very important to separate spaces for people travelling at different speeds and in low-speed environments where pedestrians mix with cyclists and other forms of micro-mobility.

An estimated 19% of New Zealand's population suffer from some form of hearing loss.[3] New Zealand Census data (2018) states that 10% of males and 9% of females have a health problem or condition (lasting 6 months or more) that causes them difficulty hearing, even when using a hearing aid.[4] Pedestrians' hearing can also be temporarily impaired by ambient noise, or by devices such as headphones.

### Body

People vary in their size and physical strength. Many people, including children, shorter adults, and people who use wheelchairs or mobility scooters on paths and road crossings, cannot see over obstacles as well as other people can, and are also less likely to be visible to drivers. Safe street and crossing design means designing for those least likely to be seen.

Around 15% of New Zealand adults living in private households, and 90% of adults living in residential care facilities have a mobility impairment[5].

Some people can walk, but not very far, or very quickly. Some people can move using a mobility aid and/or a support person, but rely on that aid and/or support person to help them. Design features that help people whose body strength is limited include seating, step-free choices and wayfinding information (to connect with public transport, for example). Designing safe environments where traffic speeds are low will mean that people with limited strength are less likely to be injured.

### Hands and arms

Peoples' hand strength varies, so transport that includes opening doors or reaching to press buttons, such as push buttons at signalised crossings, is not always accessible. Some people have strength in one hand, or one side of their body only. Handrails on both sides of staircases are important. Arm rests on both sides of a seat so that people can choose where to sit and so that they can support themselves to stand up again is important, as are back rests so people can support themselves when seated.

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[1] Statistics NZ (2013) Household Disability Survey 2013: Data Tables, accessed 25 October 2019

[2] Blindness and Low Vision in New Zealand – Latest statistics, accessed https://blindlowvision.org.nz/information/statistic-and-research/#sta

[3] Deloitte (2017) Social and economic costs of hearing loss in New Zealand, accessed 25 October 2019

[4] Statistics NZ (2013) Household Disability Survey 2013: Data Tables, accessed 25 October 2019

[5] Statistics NZ (2013) Household Disability Survey 2013: Data Tables, accessed 6 April 2020

It is unclear how many people in New Zealand have impairments affecting their hand strength. It can be a condition such as arthritis, which is experienced by approximately 16% of New Zealand's population[6]. Stroke is another cause of reduced hand strength. Approximately 9,000 people in New Zealand experience a stroke each year, of whom 25% are under the age of 65 years[7].

### Mind

Design for varying states of mind and neurological diversity is broadly captured by the principles of 'safe, obvious, step-free' (see section 3.1.2a in PNG: Pedestrian design principles). The two most relevant of those principles for neurodiversity are 'safe', including feeling comfortable and secure; and 'obvious', whereby environments are clear and legible, so that people do not feel confused, and are able to remain calm.

People with conditions such as autism; with neurological disease such as dementia; and with mental health problems exist in all communities. There is no objective way to prioritise for them specifically within a town or city, as part of pedestrian network planning. However, identifying gaps in accessible walking networks and working to retrofit best-practice infrastructure can help people to walk, wherever they live. Given that walking is a determinant of good health, including good mental health, prioritising accessible pedestrian networks can help people maintain healthy state of mind; as well as supporting access for people who are experiencing anxiety or depression.

People vary in their ability to navigate complex environments such as busy urban streets. For example, visual clutter, objects on the footpath, unusual lighting, unexpected designs, and high traffic volumes of pedestrians and vehicles (including cyclists) can affect a person's ability to identify and navigate the continuous accessible path of travel, therefore creating a complex environment. The principles described here summarise design guidance for people with autism; people with learning disability, people unfamiliar with conventions, including children; and for people with dementia or other conditions affecting cognition, including stroke.

The 'Six Feelings Framework'[8] (Knowlton School of Architecture, 2019) provides more advice for designers interested in understanding the needs of autistic people. The six design principles of dementia-friendly neighbourhoods[9] show the need for clear and safe design:

- **Familiarity**: Familiar surroundings enable people to recognise and understand their surroundings, which helps to prevent and reduce losing a sense of direction, confusion and to aid short-term memory.
- **Legibility**: People can understand where they are and identify which way they need to go, helping to prevent and reduce losing a sense of direction, confusion and anxiety
- **Distinctiveness**: People's attention and concentration are captured by the unique parts of the neighbourhood, which aids orientation and wayfinding.
- **Accessibility**: People are able to reach, enter, use and move around the places and spaces they need or wish to visit, regardless of any physical, sensory or cognitive impairment.
- **Comfort**: People feel at ease and are able to visit, use and enjoy places and spaces of their choice without physical or psychological discomfort.
- **Safety**: People are able to use, enjoy and move around the neighbourhood without fear of coming to harm.

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[6] New Zealand Health Survey 2018/2019, accessed 6 April 2020

[7] Stroke Aotearoa New Zealand

[8] Knowlton School of Architecture, 2019 Autism Planning and Design Guidelines 1.0, accessed 12 December 2019

[9] Mitchell, L., & Burton, E. (2010). Designing dementia-friendly neighbourhoods: Helping people with dementia to get out and about. Journal of Integrated Care, 18(6), 11-18.

### Human states

All of the variable human states of mind are related to how people are feeling. In any moment feeling can be affected by temporary or long-term physical and psychological conditions; as well as momentary fluctuations in mood and comfort.

People who identify with disability are also more likely than the general population to experience mental health problems as well as low incomes, so they have fewer transport choices. The pedestrian network is the most freely available when it exists. The pedestrian network can therefore enable participation, so long as it is accessible to all.

Whatever peoples' current state good planning and design of paths and crossings that are safe and obvious can support peoples' travel. Clear and consistent design that makes travel as a pedestrian easy and straightforward can help to overcome extremes of short or long-term mental impairment.

## 2.1.1b Physical space and walking speed

Physical space is relevant to design of the widths of paths, crossings, and refuge areas for pedestrians. The space that pedestrians need depends on the devices people use on paths. Walking speed is relevant to the design of crossings.

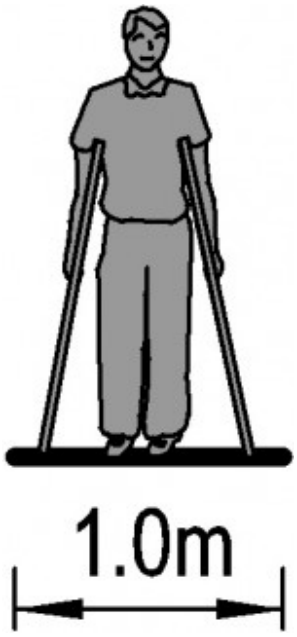
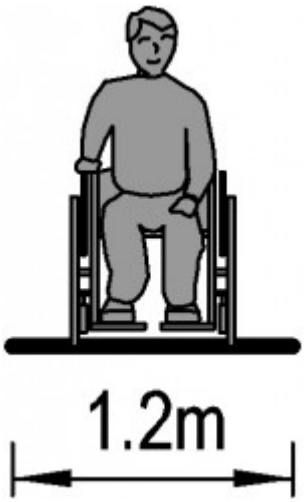
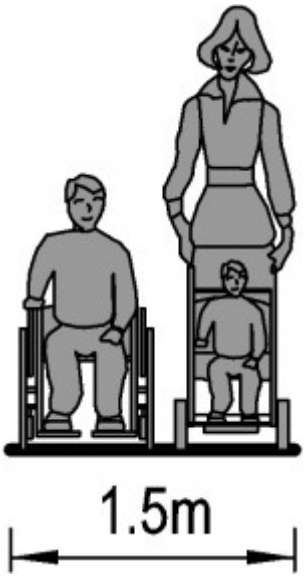
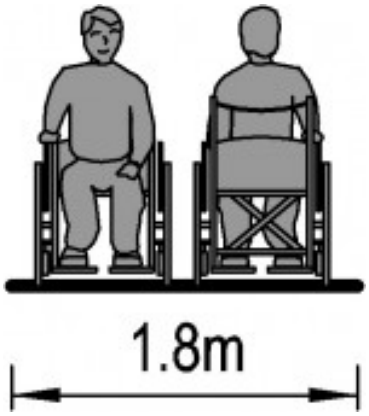
### Pedestrian space

Pedestrians require different spaces within which to manoeuvre. Newer wheelchairs are increasingly variable in their dimensions and this should be considered in design. Mobility scooters are usually longer but the same width as manual wheelchairs. For information on the technical design requirements to accommodate mobility scooters on paths and at crossings and intersections, refer to the Horizontal geometric design for mobility scooters technical advice note.

Table 1 shows the clear widths for manoeuvring various mobility devices, the widths referred are not minimum footpath widths. NZS 4121 outlines recommended widths for people using different devices (long canes, crutches, guide dogs)[10].

[10] Standards New Zealand. (2001). Design for access and mobility: Buildings and associated facilities NZS 4121:2001

Table 1: Physical space requirements

| | |
|---|---|
|  A clear width of 1000 mm is adequate for people with ambulant disabilities. It just allows passage for 80 percent of people who use wheelchairs. |  People who use wheelchairs require a clear width of 1.2 m. |
|  A clear width of 1.5 m allows a wheelchair and a pram to pass. |  To allow two wheelchairs to pass comfortably, a clear width of 1.8 m is required. |

### Walking speed

Walking speed is affected by pedestrians' capabilities and states.

A range of speeds could be expected on footpaths because of other users on devices. The chart below illustrates the range of operating speeds for various active modes that could be present on paths.

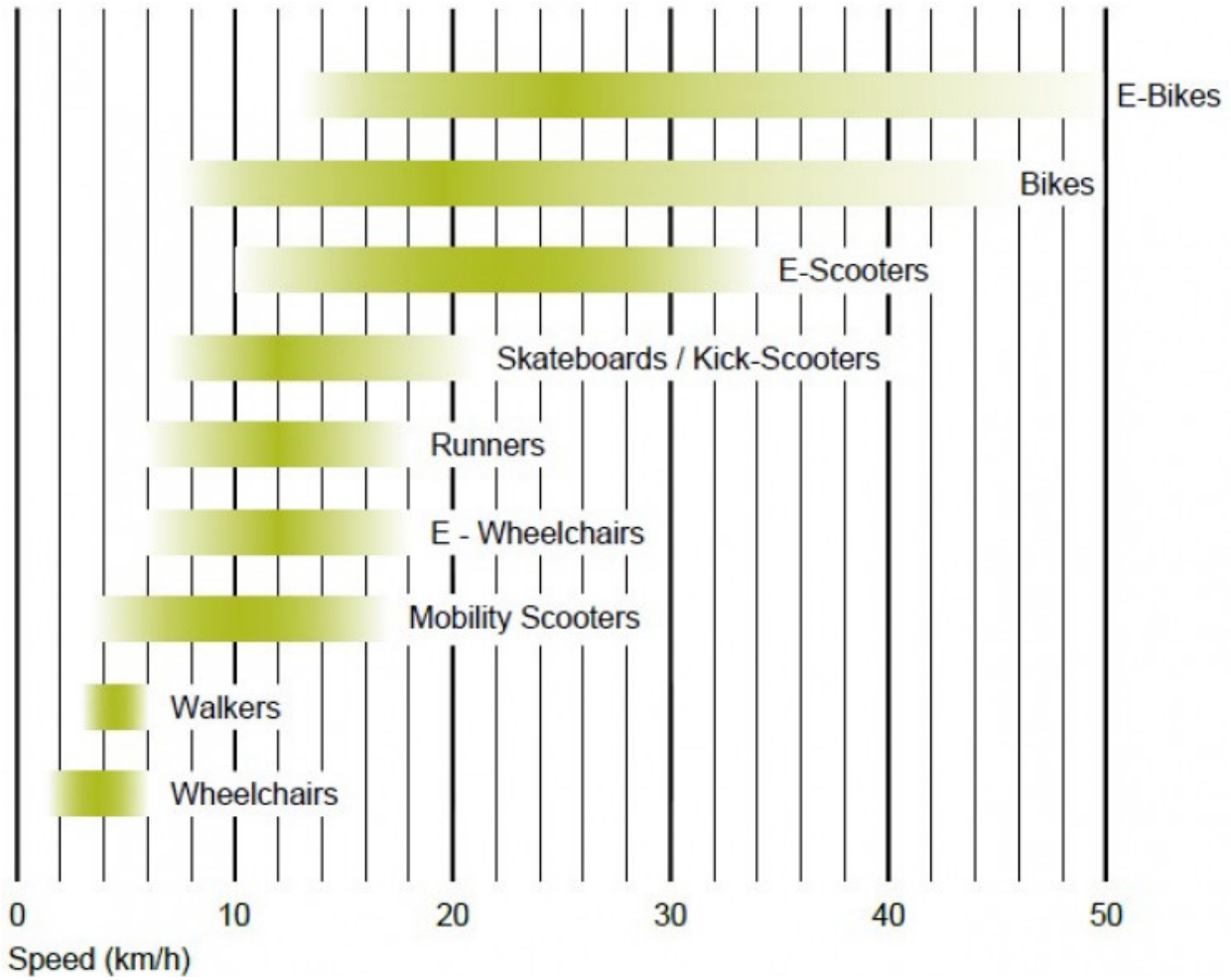



Figure 2: Operating speed ranges for various active modes.

People walk at a range of speeds depending on pedestrian characteristics such as age, gender and physical condition, but also trip characteristics such as walking purpose, route familiarity, trip length and encumbrances.

Route characteristics such as width, gradient, surfacing, shelter, attractiveness, pedestrian density and crossing delays and also environmental characteristics such as weather conditions can impact walking speed.

In some contexts, for example traffic signal timings, it is important to design for people who walk more slowly to ensure they have time to cross safely. However, in other contexts, for example when identifying a walking catchment or in accessibility modelling it may be appropriate to apply a 50th percentile or average person's walking speed. Recommended walking speeds applicable for different purposes are outlined below.

Crossing design including sight distance, pedestrian delay and traffic signal pedestrian clearance times:

- 1.2 m/s is a general design walking speed (ie approximately 15% of pedestrians cross with speeds below 1.2 m/s)
- 1.0 m/s is a design walking speed for slower pedestrians (eg children, elderly, vision impaired or mobility impaired)

Transport modelling, walking catchments – 4.8 km/h to 5.0 km/h (ie 1.3 to 1.4 m/s)[11].

[11] Akcelik & Associates. (2001). An investigation of pedestrian movement characteristics at Midblock signalised crossings

### People on small wheels

The Land Transport (Road User) Rule 2014 currently allows a person using a wheeled recreational device to use either the footpath or the roadway.

For design purposes, it may be assumed that skateboarders, kick scooter users, roller skaters, in-line skaters and runners/joggers are walking pedestrians and, therefore, subject to the same design principles as those travelling on foot. High quality walking routes including safe road crossings and smooth kerb transitions benefit users of small wheeled devices as well as people with temporary or permanent impairments.

For more information refer to section 1.1 Context and definitions in PNG: Walking in New Zealand.

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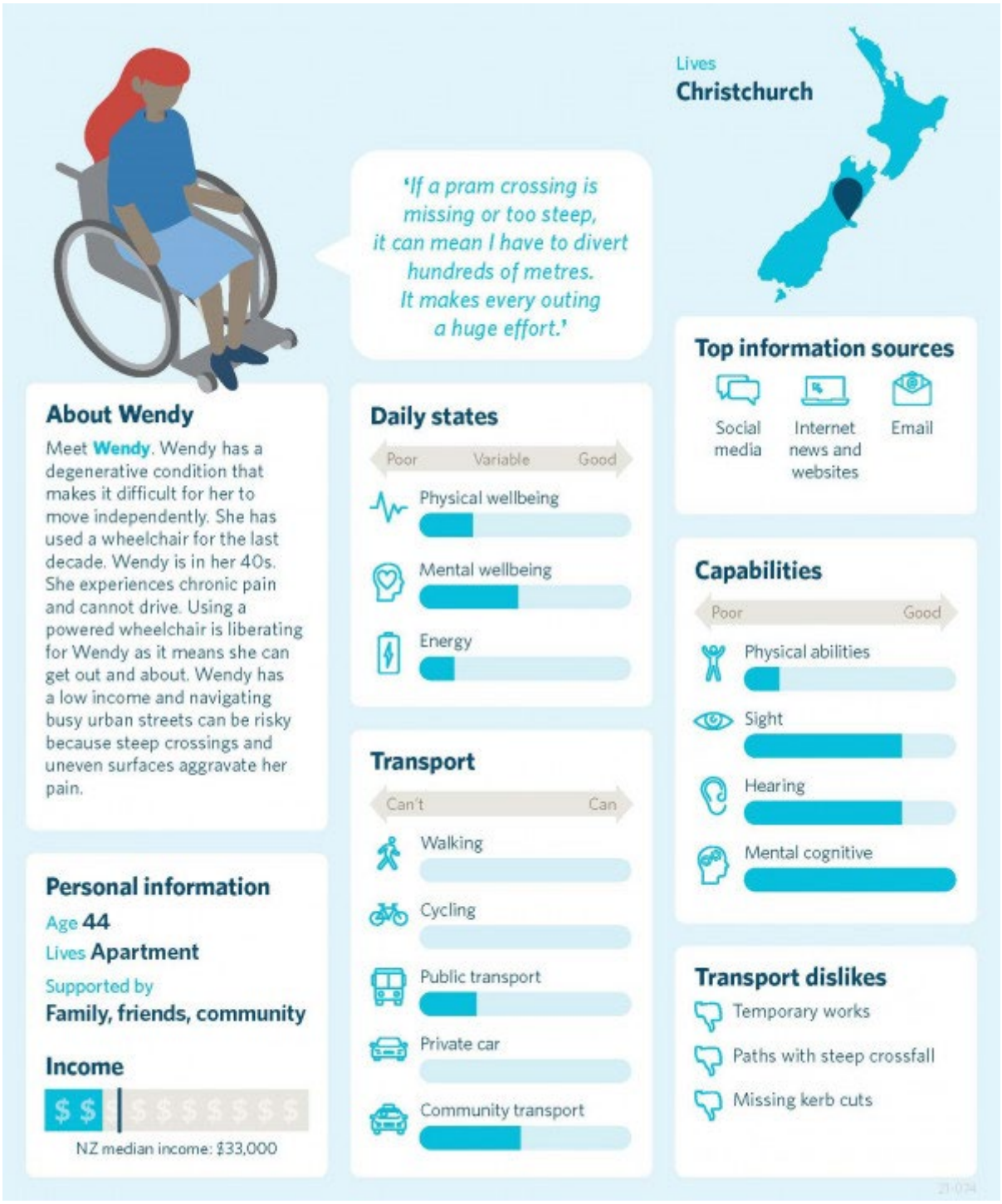
### 2.1.1c Personas

Variations in human capabilities and states means that every person has a unique combination of strengths and weaknesses, and their ability to navigate as a pedestrian can vary from moment to moment, as well as over their lifespan.

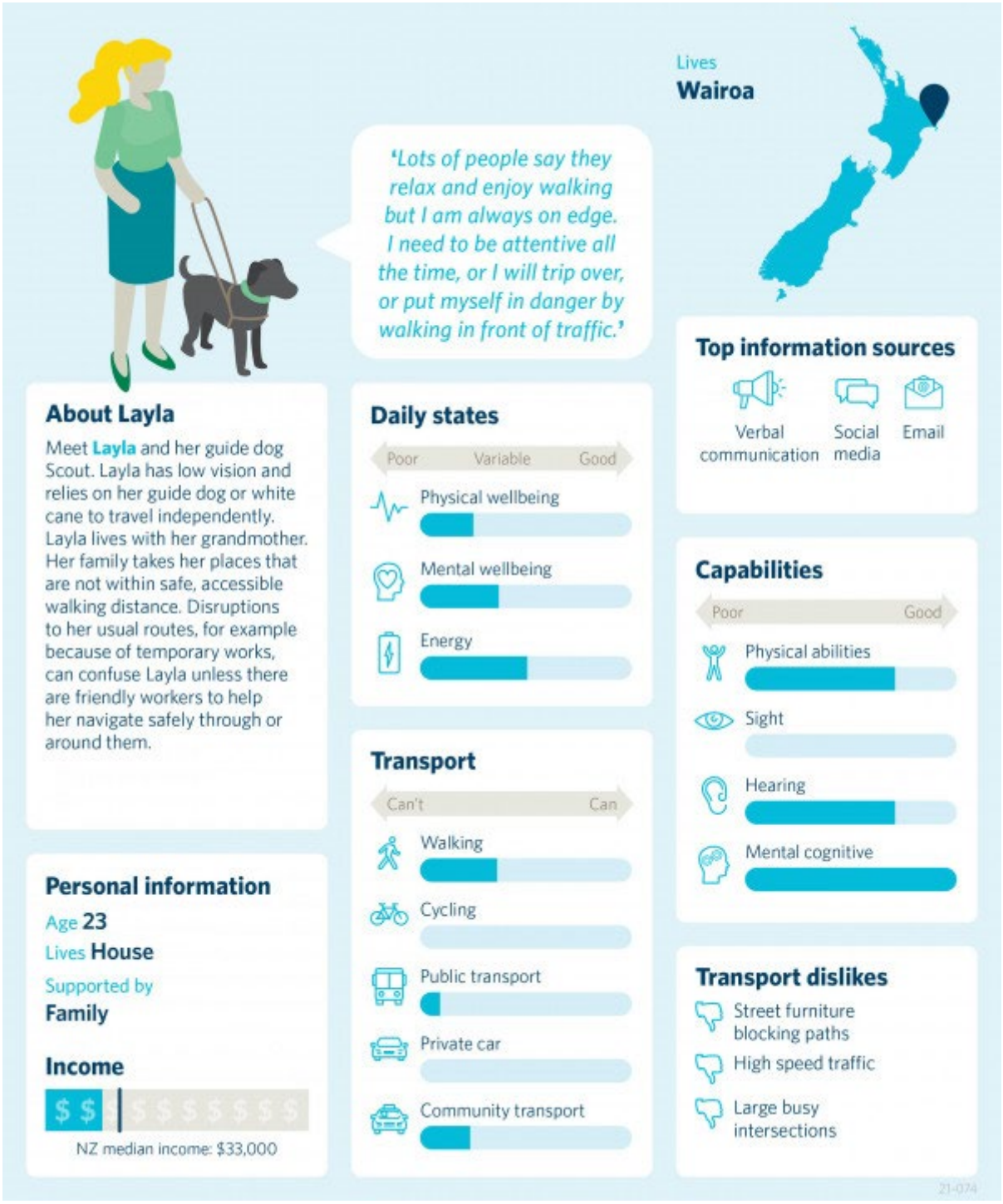
The personas here reflect the broad range of capabilities and momentary states that affect how people live their life, including as pedestrians. They were developed through conversations with a broad range of people. Any resemblance to individuals is purely coincidental.

Throughout this guidance, quotes from these personas illustrate the importance of good pedestrian network design to enable all people to walk for transport and recreation.

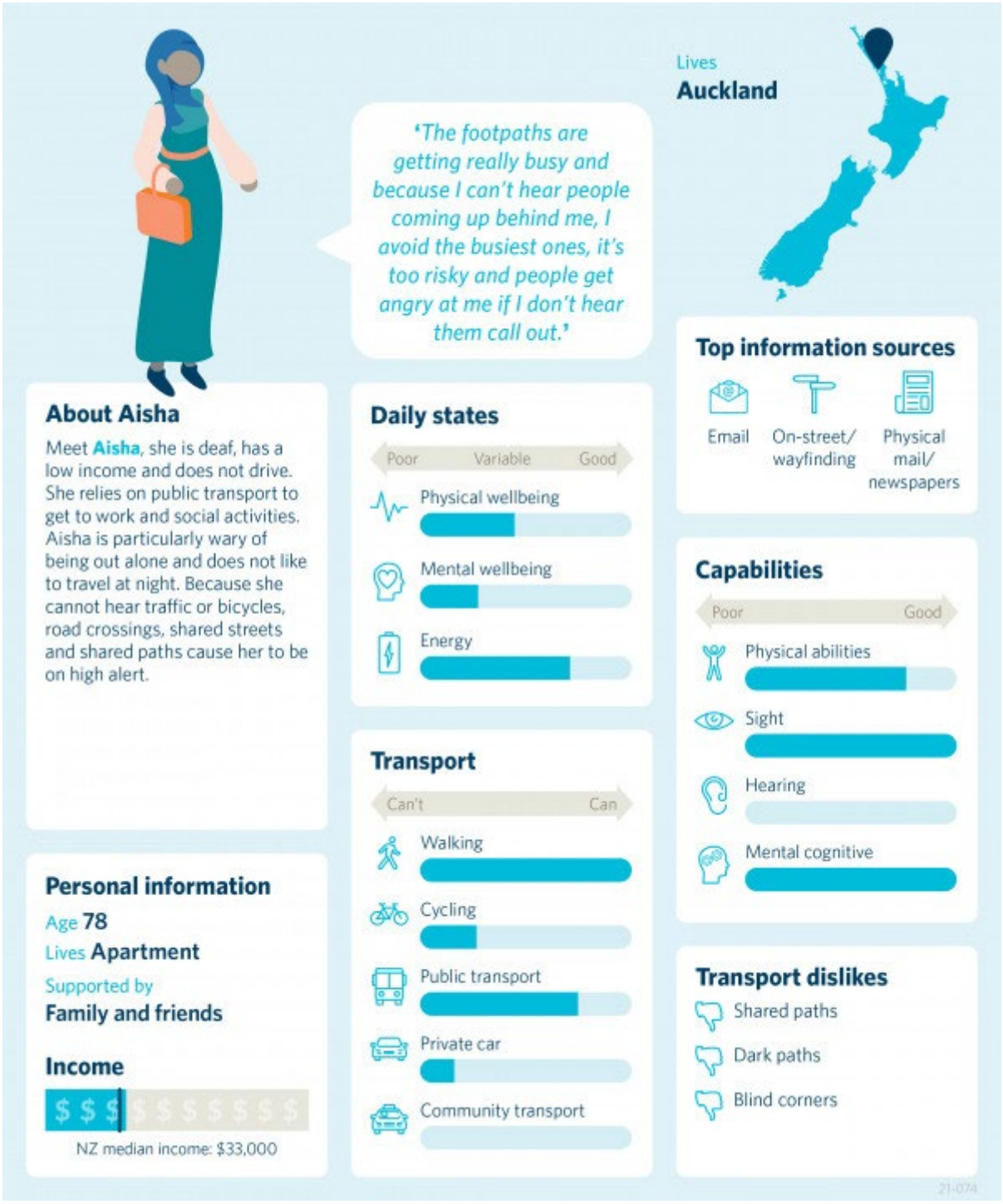
## Wendy


Lives
Christchurch
'If a pram crossing is missing or too steep, it can mean I have to divert hundreds of metres. It makes every outing a huge effort.'
About Wendy
Meet Wendy. Wendy has a degenerative condition that makes it difficult for her to move independently. She has used a wheelchair for the last decade. Wendy is in her 40s. She experiences chronic pain and cannot drive. Using a powered wheelchair is liberating for Wendy as it means she can get out and about. Wendy has a low income and navigating busy urban streets can be risky because steep crossings and uneven surfaces aggravate her pain.
Daily states
Poor Variable Good
Physical wellbeing
Mental wellbeing
Energy
Top information sources
Social media
Internet news and websites
Email
Capabilities
Poor Good
Physical abilities
Sight
Hearing
Mental cognitive
Transport
Can't Can
Walking
Cycling
Public transport
Private car
Community transport
Personal information
Age 44
Lives Apartment
Supported by
Family, friends, community
Income
$ $
NZ median income: $33,000
Transport dislikes
Temporary works
Paths with steep crossfall
Missing kerb cuts

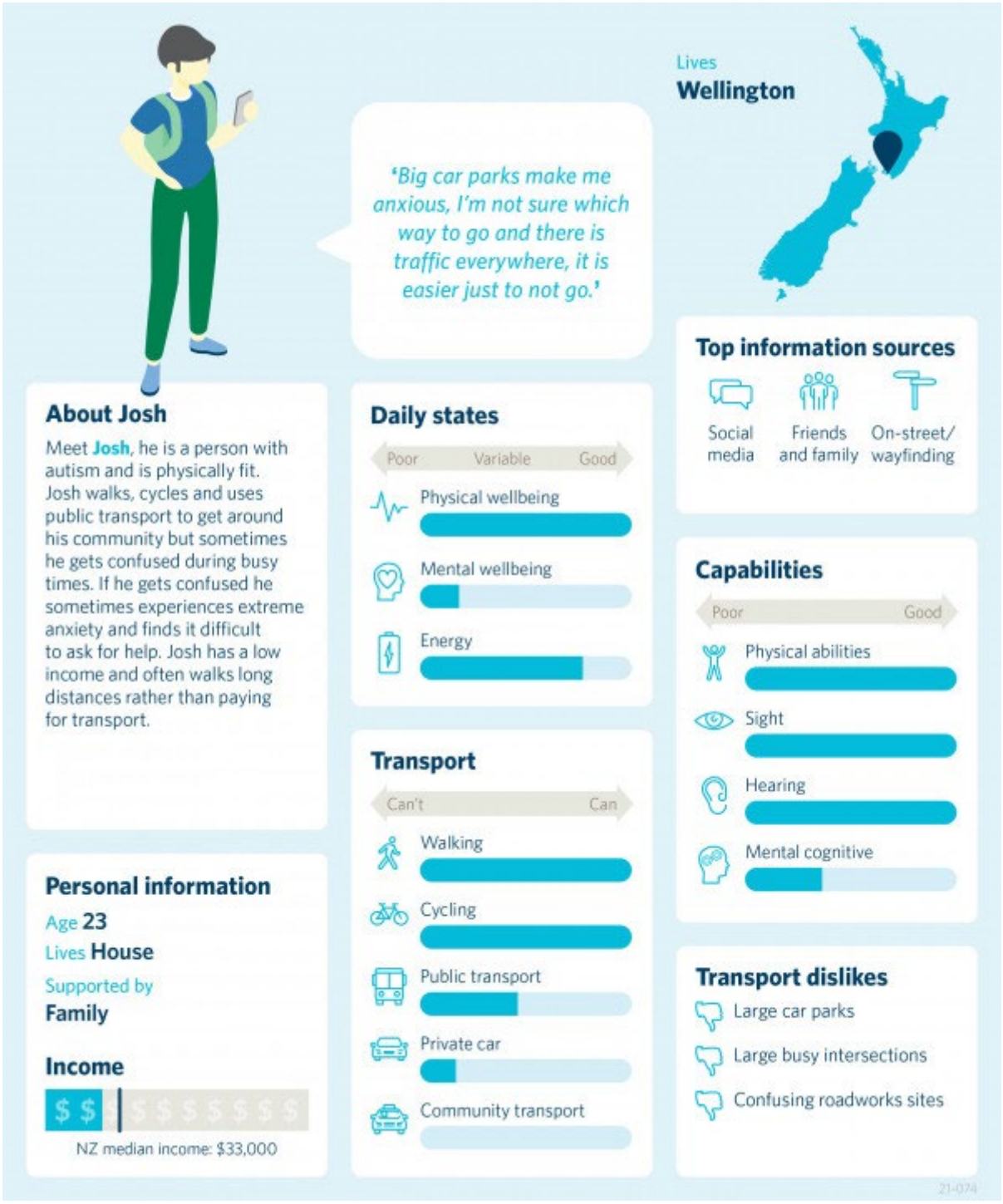
## Layla


Lives
Wairoa
'Lots of people say they relax and enjoy walking but I am always on edge. I need to be attentive all the time, or I will trip over, or put myself in danger by walking in front of traffic.'
About Layla
Meet Layla and her guide dog Scout. Layla has low vision and relies on her guide dog or white cane to travel independently. Layla lives with her grandmother. Her family takes her places that are not within safe, accessible walking distance. Disruptions to her usual routes, for example because of temporary works, can confuse Layla unless there are friendly workers to help her navigate safely through or around them.
Daily states
Poor Variable Good
Physical wellbeing
Mental wellbeing
Energy
Top information sources
Verbal communication
Social media
Email
Capabilities
Poor Good
Physical abilities
Sight
Hearing
Mental cognitive
Transport
Can't Can
Walking
Cycling
Public transport
Private car
Community transport
Transport dislikes
Street furniture blocking paths
High speed traffic
Large busy intersections
Personal information
Age 23
Lives House
Supported by Family
Income
$ $ $ $ $ $ $ $ $
NZ median income: $33,000
21-074

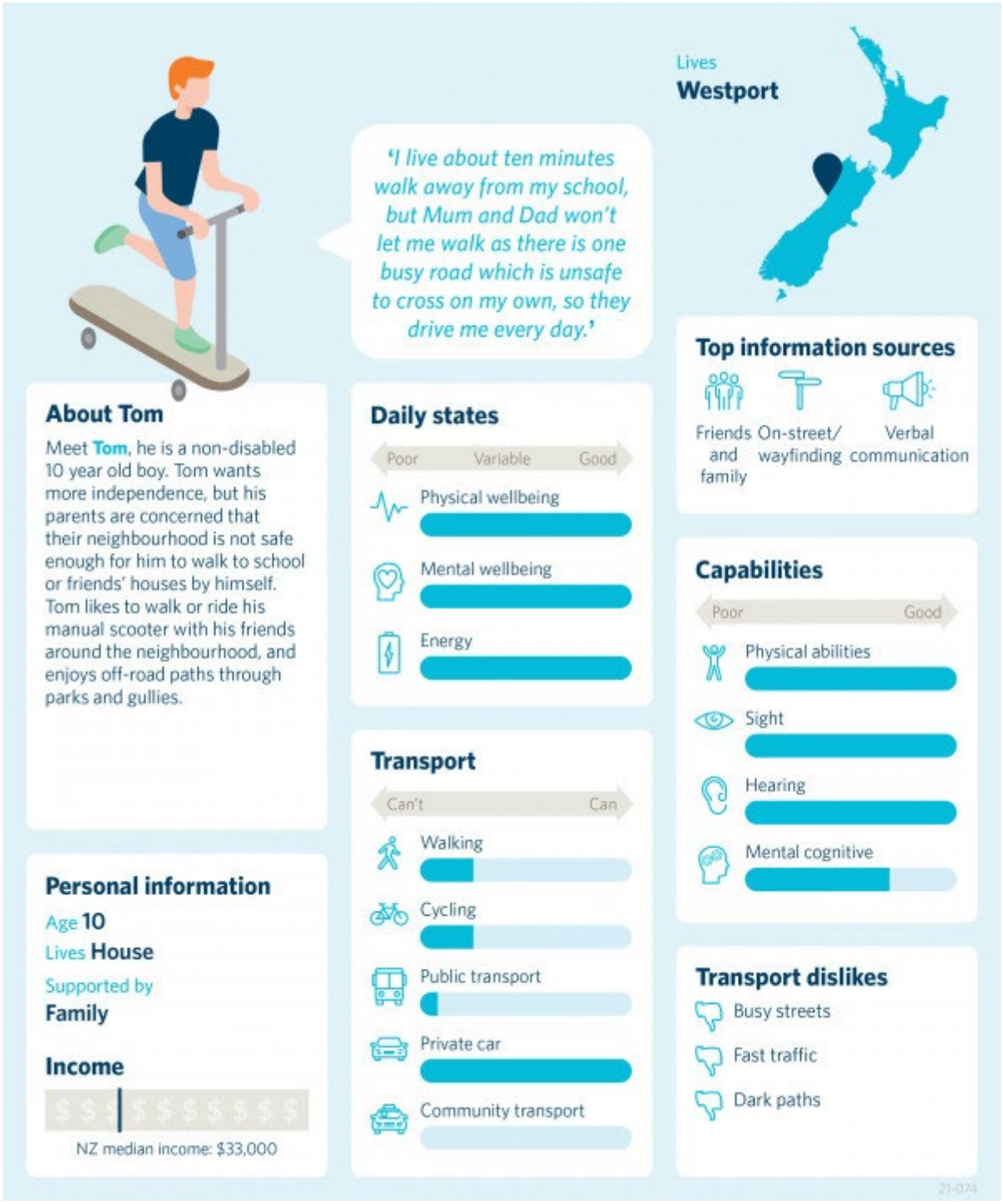
## Aisha


Lives
Auckland
'The footpaths are getting really busy and because I can't hear people coming up behind me, I avoid the busiest ones, it's too risky and people get angry at me if I don't hear them call out.'
About Aisha
Meet Aisha, she is deaf, has a low income and does not drive. She relies on public transport to get to work and social activities. Aisha is particularly wary of being out alone and does not like to travel at night. Because she cannot hear traffic or bicycles, road crossings, shared streets and shared paths cause her to be on high alert.
Daily states
Poor
Variable
Good
Physical wellbeing
Mental wellbeing
Energy
Top information sources
Email
On-street/ wayfinding
Physical mail/ newspapers
Capabilities
Poor
Good
Physical abilities
Sight
Hearing
Mental cognitive
Transport
Can't
Can
Walking
Cycling
Public transport
Private car
Community transport
Transport dislikes
Shared paths
Dark paths
Blind corners
Personal information
Age 78
Lives Apartment
Supported by
Family and friends
Income
$ $ $ $ $ $ $ $ $ $
NZ median income: $33,000
21-074

## Josh


'Big car parks make me anxious, I'm not sure which way to go and there is traffic everywhere, it is easier just to not go.'
Lives
Wellington
About Josh
Meet Josh, he is a person with autism and is physically fit. Josh walks, cycles and uses public transport to get around his community but sometimes he gets confused during busy times. If he gets confused he sometimes experiences extreme anxiety and finds it difficult to ask for help. Josh has a low income and often walks long distances rather than paying for transport.
Daily states
Poor
Variable
Good
Physical wellbeing
Mental wellbeing
Energy
Top information sources
Social media
Friends and family
On-street/ wayfinding
Capabilities
Poor
Good
Physical abilities
Sight
Hearing
Mental cognitive
Transport
Can't
Can
Walking
Cycling
Public transport
Private car
Community transport
Personal information
Age 23
Lives House
Supported by
Family
Income
$ $
NZ median income: $33,000
Transport dislikes
Large car parks
Large busy intersections
Confusing roadworks sites
21-074

## Tom


Lives
Westport
'I live about ten minutes walk away from my school, but Mum and Dad won't let me walk as there is one busy road which is unsafe to cross on my own, so they drive me every day.'
About Tom
Meet Tom, he is a non-disabled 10 year old boy. Tom wants more independence, but his parents are concerned that their neighbourhood is not safe enough for him to walk to school or friends' houses by himself. Tom likes to walk or ride his manual scooter with his friends around the neighbourhood, and enjoys off-road paths through parks and gullies.
Daily states
Poor Variable Good
Physical wellbeing
Mental wellbeing
Energy
Top information sources
Friends and family
On-street/ wayfinding
Verbal communication
Capabilities
Poor Good
Physical abilities
Sight
Hearing
Mental cognitive
Transport
Can't Can
Walking
Cycling
Public transport
Private car
Community transport
Transport dislikes
Busy streets
Fast traffic
Dark paths
Personal information
Age 10
Lives House
Supported by Family
Income
NZ median income: $33,000
21-074

### 2.1.2. Principles of Safe, Obvious and Step-free (SOS)

Designing for universal access means accounting for humans, in all of their varied capabilities and states.

The following principles of Safe, Obvious and Step-free (SOS) incorporate human variation, so that planners and designers can incorporate universal access into their projects. It is important that safe, obvious, step-free routes are provided as a priority on the most important pedestrian routes in towns and cities.

#### 2.1.2a Safe

Pedestrians are safe from harm. They feel safe and comfortable in environments that have:

- safe speeds where pedestrians and vehicles can conflict: collisions are survivable if someone makes a mistake
- separation: pedestrians are separated from faster modes
- sufficient width to allow users to pass each other
- non-slip surfaces: surfaces are not slippery or in need of maintenance
- no hazards: routes are free from obstacles and trip hazards
- good lighting: all public space and walkways are well-lit
- public surveillance: public spaces and walkways are located in places where they are visible by the public.

For more information of the relationship between speed and speed environment, refer to section 1.5. A safe system for walking in PNG: Walking in New Zealand.

*People regularly grab me in public, usually trying to be helpful but it is so disconcerting I avoid places that make me feel even more unsafe, particularly at night. I like to know there are other people around and that places are well-lit, even though I cannot see. I am definitely more likely to walk in some places than others, based on how safe I feel from the risk of being attacked.*

Layla[12]

#### 2.1.2b Obvious

Routes and wayfinding are clear for all people when:

- affordable, accessible transport choices are available
- there are clearly marked pedestrian-priority routes along paths and streets, through public spaces and across roads.
- routes are navigable: wayfinding information is –
- provided in digital, paper, and on-street formats
- visual, tactile, and audible
- consistent within and between towns, cities, and across New Zealand
- pedestrians, bicycles, other mobility devices, cars, buses and trucks each have their own space or are clearly excluded.

[12] For more information about the personas, see section 2.1.1c.

*If something doesn't feel familiar or if I am not sure which way to go, I can panic and freeze, and I can't talk to people when that happens. So I stick to the most obvious walking routes.*

Josh[13]

### 2.1.2c Step-free

Step-free route choices are available. They are easy to find and navigate when:

- smooth step-free, obstacle-free ways to navigate through spaces and to access public spaces and buildings exist
- safe and obvious (that is, they do not involve excessive diversions, or require people to put themselves in danger to avoid a step)
- step-free routes can be negotiated independently
- routes have gentle gradients and places to rest (for example, landings on ramps).

## 2.1.3. Measuring pedestrian activity

Effective planning for walking requires an understanding of pedestrian movement and activity (or lack of activity). Measuring pedestrian activity allows us to assess current demand, provide a basis for assessing future demand and to inform on-going investment and maintenance activities. It is important to measure not just the number of pedestrians, but the types and whether they are walking through or dwelling in a place.

For example:

- a gender imbalance (fewer than 50% female) may suggest that the personal security of a place is poor
- an age imbalance may suggest that the place is not inclusive of the needs of children or older people
- an absence of people, particularly those with disabilities, may suggest that safe, obvious step-free choices are not present.

Ensuring an area reflects the characteristics of a walkable pedestrian network can address these imbalances.

Refer to section 2.3.3 for information on the seven key characteristics for a high quality pedestrian environment.

### 2.1.3a Why measure

Reasons to measure pedestrians may include:

- collecting baseline information for development of a strategy or plan
- monitoring a network/route/location
- planning for and/or measuring success of an intervention.

Measuring pedestrian activity can also be useful for sectors other than transport, for example, many city centres count pedestrians as a proxy indicator of economic activity or to investigate links between walking and/or health, or to measure the liveability of an area.

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[13] For more information about the personas, see section 2.1.1c.

### 2.1.3b What to measure

Depending on the reason for measuring, a variety of metrics can be captured, for example:

- How many people are walking?
- Who is walking? (assuming age group and gender through observation, or by asking people as part of the counting)
- What proportion of people are using mobility aids? (as a proxy indicator of accessibility)
- Why people are walking
- How people are using a facility or space
- Walking speeds and their variation
- Dwell times: how long people are spending in a defined space

All of these measures can be assessed through a manual observation survey. Surveyors can count pedestrians at specific locations in-person or by reviewing video footage. Information about why people are walking, including where they are walking from and to, can be captured by intercept surveys. In an intercept survey, surveyors interview pedestrians about who they are and characteristics of their trip.

Measuring the proportion of people using mobility aids can be done manually and be supplemented with interviews. A pilot study was undertaken in Hamilton and the methodology can be found in the resulting report: Measuring accessible journeys: A tool to enable participation.

A pedestrian survey undertaken on a length of street can establish where people prefer to walk, where they cross the street and how frequently crossing facilities are used. Example project that examined crossing locations of pedestrians on Oriental Parade, Wellington.

### 2.1.3c When to measure

Volumes of pedestrians vary by time of day, week and year; and in different weather conditions. Depending on the measurement purpose, surveys may be most appropriate at peak times (eg when deciding on the extent of pedestrian facilities at a new or improved intersection) or outside of peak times, eg in a city centre environment where most pedestrians might be active in the middle of the day. Some survey times will depend on the immediately surrounding land use, such as school start and finish times, or shift change times near a hospital. In some locations, for example, in a city centre or retail area, weekends may be busier and therefore should be surveyed as well.

The more data that is collected, the more robust the results are likely to be, but as a minimum, two-hour surveys of pedestrian activity across each of morning, midday and afternoon/evening peak hours is a good starting point. In locations with fewer than 100 pedestrians per hour, longer surveys may be required to achieve a robust result.

To analyse the effectiveness of an intervention, several hundred pedestrian observations are likely to be required before and after the intervention is installed. If the behaviour of a particular sub-group of pedestrians is of interest (eg school-aged children, or people who use mobility aids) then as a minimum, 50 pedestrians in each sub-group of interest should be counted. Planners can then estimate the length of survey time likely to be required, depending on how many pedestrians are observed in the initial surveys.

The ideal time of year to monitor walking in a general sense and to compare year to year is when weather conditions are favourable – this usually means the summer months. For year to year comparisons, it is important to avoid short term, special events which are likely to skew the data showing unexpectedly high pedestrian flows. It is good practice to collect data at the same time each year, as long as weather conditions are comparable.

In some cases it may be desirable to count when special events are happening to identify peak pedestrian volumes to design for, for example, after a sports event.

Pedestrian flows can fluctuate significantly owing to weather, school/public holidays, sporting events and seasonal factors such as daylight hours and tourism activities. All factors that may influence the results

should be noted when the survey is carried out and included when interpreting historic data. For this reason, consideration should be given to the survey method as a means to understand long-term trends.

### 2.1.3d Where to measure

Pedestrian surveys should take place to understand current demand (for situations where a project location is yet to be defined), or where there is likely to be new investment that affects pedestrian travel. Depending on the nature of the problem or project, some monitoring activities may require a number of surveys carried out simultaneously in different locations to provide reliable and useful data. These approaches are known as 'site-specific' for surveys in the scheme's immediate vicinity and 'areawide' for those on the immediate approach to, or within, the area.

If your survey is counting pedestrians then the counts are undertaken as either linear counts or cordon counts. Linear counts consider the number of people passing a specified point or line. These counts are most appropriate where people are walking along a defined path or restricted to a limited area, meaning most of them will pass the designated location. This could include locations such as along a footpath, or across a road. Pedestrians are typically counted crossing the point/line in each or all directions.

Cordon counts consider the number of people entering (or exiting) an area. They are most appropriate for locations where one or more defined entrance/exit points provide access to the area. Cordon count locations might include a school or sports facility. As an example, the annual Auckland Transport Active Mode survey includes cordon counts so they can monitor people entering the city on foot and that is compared year upon year.

Another way of collecting pedestrian origin or destination data is through interviews or questionnaires.

### 2.1.3e How to measure

Emerging technologies for pedestrian data collection include crowd-sourced data and WiFi/Bluetooth surveys. Crowd-sourced data can include voluntary feedback systems for pedestrians to identify faults or uncomfortable locations on their routes (eg the Snap Send Solve app by Christchurch City Council). WiFi and bluetooth technologies can be used to count pedestrians, including anonymised origin/destination surveys. They can be costly to install but are likely to yield more data than manual surveys, so are most useful for long-term pedestrian count locations, and to track pedestrian movement patterns.

Table 2 shows some common techniques (see also Austroads Guide to Traffic Management Part 3 for examples of counting technologies and approaches).

As well as counting, there are other sources of data that can provide insights into walking. This includes census data collected by Statistics NZ that can be examined by statistical area. Useful census data includes:

- age structure
- household access to a motor vehicle
- deprivation
- gender

Other useful data sources include household travel surveys, user satisfaction surveys (such as Council Residents Surveys, that may include questions such as satisfaction with footpaths), public transport passenger data, and signals operation data (pedestrian crossing activation). All of these have strengths and limitations which should be considered in conjunction with the purpose of collecting the data.

Table 2: Measuring methods

| Technique | Characteristics |
|---|---|
| **Interviews and questionnaires** | |
| On-street surveys | • Can collect origin and destination data that enable trip length and route to be determined, as well as demonstrating how walking relates to other modes.<br>• Can also be used to gather information on perceptions of the walking environment by those actually using the facilities. |
| Household surveys | Useful to obtain general and background information on walking trips. |
| Travel diaries | |
| **Pedestrian counts** | |
| Manual pedestrian counts | Collect a range of data for pedestrian flows, such as:<br>• pedestrian ages<br>• group size<br>• mobility impairments<br>• conflicts with vehicles or other pedestrians<br>• crossing location<br>• delays experienced<br>• path taken across the road<br>• uncertainty in crossing (abortive crossing attempts).<br>Need to have enough staff to cope with anticipated pedestrian numbers and avoid fatigue/loss of accuracy.<br>Surveys can be videotaped and reviewed later, but this increases costs. |
| Automatic video imaging | • Walking activity is videotaped and subsequently processed using computer software.<br>• Can provide good data when extended monitoring is required.<br>• Generally, less flexible and more expensive than manual methods. |
| Infrared sensors (through-beam or retro-reflective) | • Create an invisible beam that pedestrians break as they walk past.<br>• Pedestrians have to be in single file, which occurs infrequently.<br>• Can provide good data when extended monitoring is required.<br>• Generally, more expensive than manual methods. |
| Infrared sensors (diffuse-reflective) | • Capture pedestrian targets and trace their path.<br>• Very flexible and can produce data on walking speed, routes and sudden deviations (indicating conflicts).<br>• Can provide good data when extended monitoring is required.<br>• Generally, more expensive than manual methods. |

### 2.1.3f Pedestrian data within other surveys

Pedestrian counts and surveys can sometimes be easily included within other surveys, such as manual classified vehicle counts. While this is a straightforward and cost-effective way of gathering information, it does have drawbacks, such as:

- the survey locations and timing may not be appropriate for observing representative pedestrian flows and patterns
- the surveys may only identify the main mode of travel, rather than all modes
- the surveys may be targeted at groups that do not have typical walking behaviour
- when surveyors get busy, they tend to miss pedestrians.

As a result, this technique should only be used in addition to, not in place of, properly arranged and programmed pedestrian counts.

**Further guidance**

Two useful guides that give further detail on measuring pedestrian activity and participation surveys are Measuring Walking (Victoria Walks, 2013) and Using Public Life Tools: The Complete Guide (Gehl, 2017).

The Planning for Walking Toolkit (Transport for London, 2020) also provides guidance on different techniques to understand pedestrian movements.

Also see Austroads Guide to Traffic Management Part 3 and supporting webinar for more information, Measuring pedestrians – survey and audit methods.

## 2.1.4. Assessing the demand for walking

It is important to understand pedestrian numbers and characteristics in any given location to ensure there is an appropriate walking environment. Understanding current pedestrian activity is a useful starting point, however it is also important to be able to estimate how many people would walk if the environment were modified, such as through land use changes or removing physical or other barriers to pedestrian movements. This is known as ‘latent demand’.

### 2.1.4a Current demand

Understanding pedestrian demand informs the planning and design of projects where pedestrians are or could be present. Pedestrian counts or directly observing the number of people walking in (or using) a particular area is one of the main ways to assess how many pedestrians are using the spaces. Refer to section 2.1.3.

Other approaches can also be used, as shown in the table below. All are useful but should not be used in isolation – a combination will provide a comprehensive understanding of likely existing demand.

The approaches outlined in the table are:

- crash data
- planning information
- existing provision
- Ministry of Transport Travel survey
- census data
- local survey.

Table 3: Ways to assess current demand for walking

| Technique | Description | Benefits | Limitations | Application |
|---|---|---|---|---|
| Crash data | Examine NZ Transport Agency Waka Kotahi crash records to identify where pedestrians have been injured. This identifies areas used by pedestrians. | • Simple to use.<br>• The data is readily available.<br>• The data is needed anyway for improvement measures.<br>• Useful to understand city-wide and nationwide patterns in pedestrian crash characteristics. | • Does not identify heavily used but safe routes.<br>• May not identify unsafe routes avoided by pedestrians.<br>• Does not include incidents involving only pedestrians, such as falling.<br>• Low reporting rate for pedestrian crashes means some locations will not be identified. | • A useful 'first-pass' approach to decide where improvement measures may be required in busy areas such as city centres. |
| Planning information | Using the district plan zoning for land use to identify areas that are likely to generate or attract walking trips. | • Uses readily available information.<br>• Very useful to identify common walking trip origins and destinations.<br>• Can be used to estimate the relative likelihood of walking trips. | • Does not provide information about pedestrian numbers or routes.<br>• Can be costly if a high 'grain' of results is required.<br>• May require detailed local knowledge. | • Obtain information about land use zones, growth areas, major residential subdivisions or commercial or community developments from district plans or local authorities' planning departments.<br>• Identify where walking may be expected by plotting significant trip origins and destinations, together with existing facilities (and severance). |
| Existing provision | Identifying the location of current infrastructure for pedestrians as a proxy for where there are significant pedestrian numbers. | • Easy to understand and carry out.<br>• Information forms a base inventory that is useful for many other purposes. | • Can be costly to collect and manage the information.<br>• Assumes previous provision was made in response to need, rather than for other reasons.<br>• May reflect locations where pedestrian numbers were significant in the past but not at present. | • As the information is needed anyway, it is a useful exercise to undertake. |
| Ministry of Transport Travel Survey | Information on walking trips can be gathered from surveys conducted for other transport planning projects and from Ministry of Transport travel surveys. | • Minimal cost of data collection.<br>• Ministry of Transport data is regularly updated.<br>• Data set may be comprehensive. | • The Ministry of Transport survey is national and is sufficient for national and regional analysis but has insufficient data for local analysis.<br>• Data may not identify routes. | • Use Ministry of Transport data only where local data is not available, or to identify large-scale patterns. |

| | | | | |
|---|---|---|---|---|
| Census data | Finding information on mode of travel to work and the location of respondents' homes and workplaces. | • Minimal cost of data collection.<br>• Data set is comprehensive for the working population.<br>• Other demographic factors can be included.<br>• Can be used to map key destinations. | • Does not provide data on nonwork trips.<br>• Does not identify routes.<br>• Costly to process because of extensive amounts of data.<br>• 'Snapshot' of one day only, and could be affected by<br>• other factors such as the weather.<br>• Does not include the elderly and children for whom walking is a key travel mode. | • Useful for research projects, strategy and high-level planning documents rather than as a design input. |
| Local survey | May include questioning as part of resident satisfaction, quality of life and travel perception surveys. | • Minimal cost when data is being collected for other purposes. | • Costly when data is not being collected for other purposes.<br>• Data may not identify routes. | • Readily applicable when available. |

### 2.1.4b Latent demand

The methods outlined above can also be used to identify and measure latent demand, or the 'untapped potential', for walking and cycling, as well as to aid understanding of how improved provision for walking and cycling may realise a portion of latent demand. However, estimating latent demand for walking and cycling is an emerging science in New Zealand, with limited research into the application and effectiveness of the different methods employed around the country over the past decade.

NZ Transport Agency Waka Kotahi Research Report 676 sought to understand how latent demand for both walking and cycling is currently estimated in a range of New Zealand and overseas settings. Secondly, it sought to describe preferred approaches that could be adopted nationally in New Zealand and recommend a method for developing and testing estimates of latent demand.

### 2.1.4c Future demand

There is currently no robust way of forecasting walking trip generation, and all current methods have limitations. However, forecasting methods can help identify schemes that have the greatest potential to attract new walking trips. The table below outlines a rage of methods that can be used to assess future demand. These are:

- similar conditions study
- aggregate behaviour
- sketch plan
- discrete choice
- travel models

Table 4: Ways to assess future demand for walking

| Technique | Description | Benefits | Limitations | Application |
|---|---|---|---|---|
| Similar conditions study | Carrying out surveys before and after a scheme is installed. The change in pedestrians is assumed to be due to the scheme. The results are then used to predict the trip generation of similar improvements in another location. | • Simple.<br>• Easy to understand.<br>• Easy to apply. | • Only provides a rough estimate of demand.<br>• Difficult to find comparable sites where all factors are similar (including environmental and social).<br>• May reflect changes that are unrelated to the<br>• scheme (such as weather or nearby changes to the road). | Before and after surveys are a useful part of monitoring, so the necessary database can be built up over time. |
| Aggregate behaviour | Developing models/equations by relating the known characteristics of a population to observed numbers of walking trips.<br>The equations are then applied to other areas to predict walking trips. | • Fairly straightforward to apply using spreadsheets.<br>• Can be easily updated as new information emerges.<br>• Can also be used to identify the factors that most influence walking.<br>• Certain data is already collected (population characteristics and land-use).<br>• Can be used to forecast trips over a wider area. | • Wide variety of possible influencing factors may mean some issues are overlooked.<br>• Models need to be validated before use.<br>• Sufficient data capturing all possible factors may not be readily available.<br>• Not suitable to assess the impacts of small- scale schemes.<br>• Using aggregate data does not take into account individual factors.<br>• May not be transferable to different areas. | Useful for a major area-wide study, but otherwise may be too expensive compared with the cost of the schemes being considered. |
| Sketch plan | Using regression to predict the number of walking trips as a function of (usually) physical factors such as adjacent land uses and/or other trip generation indicators (parking capacity, public transport patronage, traffic movements). These are then applied to other areas. | • Straightforward to understand and apply using spreadsheets.<br>• Makes good use of data that already exists or can be easily collected.<br>• Can be applied to trips within specific corridors.<br>• Can be very accurate, particularly for high- density areas.<br>• Can be used to determine the location of improvement schemes and for prioritising.<br>• Can be easily updated as new information emerges. | • Disregards some issues that affect walking (such as environmental factors).<br>• Does not consider latent demand.<br>• Validation is required before use as models may be location specific.<br>• Using aggregate data does not take into account individual factors. | An easy way to get a rough estimate of potential use. Initial focus on relating the percentage of walking trips to the local population and major trip generators. |

| | | | | |
|---|---|---|---|---|
| Discrete choice | Predicting an individual's decision to walk, and their route choice, as a function of other variables including changes in facilities provided or in policies/ strategies. The model is then applied across the wider population to estimate total trips. | • Can be very accurate if based on local data.<br>• Very good at isolating the effects of specific factors.<br>• Can be used to relate factors (such as whether age affects crossing facility preference).<br>• Takes into account individuals' preferences.<br>• Models can be used to derive elasticities (the percentage change in walking expected as a result of changing any other factor). | • Can require extensive data collection.<br>• Requires considerable modelling expertise.<br>• Wide variety of possible influencing factors may mean some issues are overlooked.<br>• Not easily transferable to different geographic areas. | Very resource intensive. Useful for a major scheme investigation, but otherwise may be too expensive. |
| Travel models | Employing the 'traditional' four-step travel demand model, using land use conditions and transport network characteristics to predict future walking travel patterns. | • Models may already exist and be capable of adaptation.<br>• Provides an integrated framework for considering walking.<br>• Can be a very powerful tool.<br>• Model outputs can become inputs for sketch plans. | • Spatial scale of existing models may be too great.<br>• May require considerable data collection.<br>• Models require specialised software and a high degree of expertise. | Can be effective if existing models exist or creating a new model as part of a long-term investment in walking. Building new models for only small projects is costly. |

### 2.1.5. Engagement

#### 2.1.5a Why engage?

Engagement is a necessary part of every project, programme or initiative. It helps you understand your customers, gather user information, assess the needs of the community and ensure what you deliver is right for those that will use it. Additionally, by engaging with communities and bringing them on the journey it helps build important relationships and gather support for the work.

Any planning or design activities have the potential to affect the daily lives of so many New Zealanders, so it's important that their values, priorities and opinions about how mobility is delivered is important.

Deciding when and how to engage the public requires judgement. The complexity and sensitivity of a project will influence the extent of engagement required and the approach taken. It is important to involve specialists early on in any project that affects pedestrians. Early engagement is important because it can improve the level of community support for a project.

For more information, refer to NZ Transport Agency Waka Kotahi engagement guidance.

Engagement with the disability sector is particularly important to ensure processes, plans and infrastructure for walking are designed to be as inclusive of all people as possible. For more information, refer to section 2.1.6.

In addition to engaging with the public, collaborative relationships with stakeholders and partners will be required.

Engagement is also a requirement of the Land Transport Management Act 2003, Local Government Act 2002 and the Resource Management Act 1991.

#### 2.1.5b Education

When installing a new facility or intervention for pedestrians, particularly if the intervention is new to New Zealand, it may be necessary to include a programme of education and marketing to support the installation so that all users are aware of what they should be doing and be aware of. This should include, but not be limited to local residents and schools, nearby shops and industry, plus relevant mobility representatives.

### 2.1.6. Disability sector engagement

#### 2.1.6a Why engage with disabled people

One quarter of New Zealand's population identifies as disabled (Statistics NZ 2018). Engaging with people who have lived experience of being a disabled pedestrian is the best way to provide insights that are not otherwise apparent to transport professionals. Disability sector engagement can help ensure that processes, plans, and infrastructure for walking are all designed to be as inclusive as possible, of all people.

There are four different groups of people that can be engaged with as described further below. The right group or groups to engage with depend on both the nature of the project, and the nature of the relationships that the project team have with local or national representatives of the different groups.

Further guidance on deciding who to engage with for transport projects depending on the type of project can be found in the Disability sector engagement: good practice guide.

#### 2.1.6b Groups to engage

##### Government advisory groups

Advisory groups are comprised of people selected to advise central or local government on issues relevant to disabled people. The advantage of advisory groups is that the people involved usually have (or

quickly develop) some understanding of transport planning. They are likely to appreciate constraints and challenges in government. Disadvantages of advisory groups include that they do not necessarily represent all disabled people; the members may have particular biases; and consulting the group may be seen by some government staff as providing a comprehensive accessibility assessment of a project or scheme. Therefore, consulting with a disability advisory group is useful but not always sufficient to ensure inclusive access for walking projects.

#### Disabled peoples' organisations

Disabled persons' organisations (DPOs) are groups comprised of disabled people themselves. They provide support and advocacy for people with different specific impairments. DPOs are useful contacts for an overarching policy position or view on a specific project. They can also provide links to members when the views of local people are likely to be helpful.

#### Disability service providers

Disability service providers are groups and agencies that provide support, advocacy, information, and education services for people with different specific impairments. They are not typically or necessarily staffed by disabled people. Service providers, such as CCS Disability Action, Deaf Aotearoa and Blind Low Vision NZ are often central sources of information about the local disability community. They typically have paid staff, some of whom will have specialist interest in transport, or in a specific aspect of transport related to the needs of the people they support.

While these 3 service providers have a particular interest in transport, other service providers may also be engaged with depending on the scope of a specific project.

#### Local disabled people (individuals and/or groups)

For projects that result in construction (that is, not strategy or policy projects), it is often valuable to talk with local disabled people who are going to be affected directly. Local disabled people can also highlight low-cost improvements that could be included in the works (such as kerb cut replacements), which could have a significant positive impact on inclusive travel choices for everyone. DPOs are the most useful way to find local disabled people who may have an interest in a specific project.

### 2.1.6c A commitment to accessible information

The Ministry of Social Development is delivering a programme of work to ensure the public sector is accessible for everyone and inclusive of disabled people.

The programme is delivered across central and local government, including core public sector agencies, Crown entities, District Health Board's (DHBs), and local authorities and applies to those tasked with developing information and communications for government agencies, including employees, vendors and contractors. It will support your project to meet the needs of all groups in your communities.

You can read more about the Accessibility Charter, how to develop engagement materials for accessible communities, and about alternate formats on the Ministry of Social Development website.

## 2.2. Planning methods

### 2.2.1. Planning activities

Planning for pedestrians ideally form part of an integrated planning activity, so that walking becomes an easy choice for many daily travel needs.

#### 2.2.1a Outcomes to make walking an easy choice

There are a range of outcomes that can influence whether walking is a viable and preferred mode choice for many daily travel needs, either alone or complementary to other modes, for example, public transport.

Outcomes that influence and support more people to walk more regularly are much broader than purely providing more walking infrastructure.

Examples of a range of outcomes are outlined in the table below along with appropriate methods or tools that could be applied in these contexts. These outcomes range from ensuring land use and transport are integrated, removing severance and reallocating how streets are used through to travel behaviour change initiatives.

Further information on the methods and tools are provided in Appendix A – Planning activities – Outcomes to make walking an easy choice.

#### 2.2.1b Plans and programmes that can support walking

There are a range of plans and programmes that, although not solely focussed on pedestrians, may benefit pedestrians as summarised in the table below. The scale and scope, when to use, and how they benefit pedestrians is provided in the table along with links to further guidance.

Table 5: Planning methods – Plans and programmes that can help planning for walking

| Plan and programmes | Scale and scope | When to use | How it benefits pedestrians | Further information |
|---|---|---|---|---|
| Business cases | Business cases are carried out in phases. The scale and scope should be proportionate to the complexity and risk of the problem and proposed investment. | When seeking investment from the National Land Transport Fund. | Takes a robust approach to make sure outcomes are clearly linked to government funding. | Business Case Approach guidance |
| Spatial Plan / Future Development Strategy | Applied to a region to spatially identify locations where development capacity (housing and business land) will be provided to contribute to well-functioning urban environments. | Provides the high-level strategy for developing a region to achieve desired outcomes. All tier 1 and tier 2 local authorities must prepare a Future Development Strategy. Note, tier 1 local authorities need to provide for intensification. | Well-functioning urban environments have good accessibility for all people including by way of public or active transport (eg walking). In addition, tier 1 local authorities must allow for intensification within a walkable catchment of rapid transit stops, city centre zones and metropolitan centre zones. | National Policy Statement on Urban Development (NPS-UD) |
| Speed management planning | Usually applied to a district or wider area. | When looking to improve walking and cycling within a neighbourhood district to encourage residents to walk in their local community for trips to the shops or schools etc. | Applies safe and appropriate speeds resulting in lower vehicle speeds in urban areas where pedestrians are present, making the environment more attractive and less overwhelming for people walking. | Speed and infrastructure |
| Local area traffic management (LATM) plans | Planning and management of road space within a local area particularly to reduce vehicle speeds and volume of through traffic. | Where the speed and volume of vehicle traffic is creating difficulties in a neighbourhood as identified by the road controlling authority (RCA) and the local community through a consultation process. | Reducing volumes and/or speed of traffic improves amenity, liveability, safety and access for all road users. LATM plans generally involve the installation of traffic calming devices or other measures to slow down or make it difficult for vehicles to travel at speed through local streets. | Austroads Guide to Traffic Management Part 8: Local Street Management |
| Low traffic neighbourhoods | A group of residential streets where through traffic is discouraged through traffic calming measures to slow traffic and direct drivers onto main through roads. The area should be small, ideally where residents can walk or wheel from one side to the other in less than 15 minutes. Ideally they are part of an integrated network of low traffic areas within a town or city. | Any neighbourhood where there is a desire to lower traffic volumes on the residential streets to enable residents to walk and cycle for their daily needs. | Low traffic areas can reduce traffic volumes both within and outside the neighbourhood which make it easier for residents to use alternative modes such as walking. | The Shared Path<br><br>Traffic filtering to improve network efficiency guidance (coming soon) |
| Masterplans / structure plans | Plans that guide the development or redevelopment of an area by defining | Used to guide design and development intentions for an area. | Masterplans and structure plans set out the urban form and function of an area so | Structure Plan guidance |

| | | | | |
|---|---|---|---|---|
| | future development and land use patterns including configuration and phasing of buildings, transport infrastructure and public spaces. | | they influence how viable walking can be in the area. | Urban Design Toolkit |
| District plans | District Plan provisions guide the development of new walkable communities as well as improving the walkability of existing communities when development occurs. | A District Plan review or plan change is an opportunity to improve the provisions that affect the safety and ease of walking. | District Plan provisions can influence whether there are connected and dense pedestrian networks as well as finer design details to support people to walk. | Section 2.2.4. |
| Walking strategy and walking action plans | District wide or town/city focussed strategy and/or action plan centred on walking. | Where there is a clear need to improve access for walking for example, after historic underinvestment in walking infrastructure and support. | Focusses on the walking mode in itself and supporting other modes (eg public transport). | Section 2.2.2. |
| Parking strategy and parking management plans | A parking strategy provides the strategic direction and objectives or an urban area or entire district. A parking management plan is a location specific plan outlining parking management interventions for a centre, neighbourhood or particular land use. | Use to guide good parking management to ensure parking supply is appropriate and used efficiently in a way that equitably supports wider transport and urban form outcomes. | Good parking management can contribute to mode shift by enabling higher densities and compact urban form, freeing up space for walking and other modes, and disincentivising car travel. | National parking management guidance |
| Organisational travel plans | Site-based - All modes.<br>For staff/students and potentially customers in any place-based organisation such as a workplace, school, or campus. | To plan and take practical steps throughout occupation of a site.<br>To meet resource consent requirements. | Reduce car use, improve safety, and promote active travel through a range of behaviour change actions and by removing barriers (institutional, physical and attitudinal). | Workplace travel plan guidance |
| Station access plan or area plan | Area around new or existing stations or public transport interchanges. | Plan focused on optimising connections between the origin or destination of trips and public transport stations or interchanges. Good station access planning can reduce the quantity of Park and Ride required in some cases by encouraging more walking trips to public transport. | Most public transport trips begin and/or end with walking so ensuring the station environment and key connections makes walking an easy choice is critical to maximising public transport use. | Public transport design guidance<br><br>People, Places and Movement – an integrated public transport and urban form design guide |

### 2.2.1c Indicators of success

There are currently no standard indicators for assessing the pedestrian environment. Potential indicators of success for walking are shown in the following table.

Table 6: Suggested indicators of success for walking plans and programmes

| | Quantitative | Qualitative |
|---|---|---|
| Walkability | • Percentage of dwellings that are within Xm of a major destination or public transport stop.<br>• Percentage of pedestrian crossing points that are designed for inclusive access.<br>• Proportion of footpaths that meet a minimum condition standard.<br>• Density of pedestrian crossings.<br>• Presence of certain pedestrian groups in a location or area (eg elderly, people with disabilities, young children). | • Percentage of people who feel the streetscape has improved in quality.<br>• Percentage of people who are satisfied with the footpath conditions. |
| Mode share/ walking uptake | • Increase in numbers of pedestrians at key locations.<br>• Percentage of trips less than 2 km that are made by walking.<br>• Percentage of population that are walking to work or education. | • Percentage of the public who feel more inclined to walk. |
| Safety | • Number of fatal and serious injuries involving pedestrians per 100,000 population or by time/distance walked.<br>• Number of reported crimes involving pedestrians per 100,000 population. | • Percentage of people who feel safe while out walking.<br>• Percentage of people who feel safe while crossing the road.<br>• Percentage of parents/caregivers who consider it safe for their children to walk to school. |
| Other | • Percentage of transport funds spent on pedestrian facilities.<br>• Percentage of planned pedestrian network completed. | • Percentage of pedestrians who know how to provide feedback on footpath condition. |

## 2.2.2. Walking action planning

### 2.2.2a Introduction

Walking action planning aims to increase the number of walking trips, both as walk only trips and supporting other modes such as public transport, while improving the safety and experience for people walking. They can be developed at a district, city centre, activity centre or neighbourhood scale and can be a stand-alone strategy or action plan, or combined within a broader transport strategy.

A good walking strategy or action plan will work towards creating an environment where walking is an easy transport choice for all people with different abilities and states, connecting all travel modes in a multi-modal transport system and will contribute to a Council's transport, health, planning and climate change objectives. It coordinates and prioritises work to support walking and should improve integration with other modes of transport, increase the safety of walking and raise the profile of walking.

Alternatively, walking actions can be included within other strategies and plans and this can be an effective way of integrating walking with other modes as outlined in section 2.2.1b.

In many situations however, there is a need to take a more intentional approach by focussing on walking both by itself and supporting other modes (eg public transport). This will ensure the objectives and actions are focussed on walking, moving away from a business as usual approach which has tended to neglect the opportunities that walking provides within our urban environments.

Historically, many territorial authorities have combined walking and cycling planning into a single strategy. Combined strategies can be useful in some cases, such as for off-road connections through parks and reserves, such as Timaru Off-road Walking and Biking Strategy.

However, cycling and walking are complex modes and combining their strategies can lead to adverse consequences[14]. For example, it may be perceived that they can be planned for in similar ways, with similar outcomes, which is not necessarily the case. Separating planning for walking and cycling helps to emphasise their individual importance as alternatives to car travel, and as supporting modes for public transport.

Examples of walking action plans include are the Buller Walking Action Plan (2019) and the Walking Action Plan, Transport for London (2018).

An example of walking actions included within a broader transport strategy is Christchurch Transport Strategic Plan, 2012

The development of a walking action plan follows a structured process with the following steps. The development of a walking action plan should align and integrate with other broader planning processes, for example an overarching transport strategy.

Table 7: Development of a walking action plan

| Step | Process | Plan |
|---|---|---|
| 1 | Set up<br>(section 2.2.2b) | • Define objectives<br>• Define area<br>• Identify and secure support of stakeholders |
| 2 | Research and collate information<br>(section 2.2.2c) | • Define objectives<br>• Define area<br>• Identify and secure support of stakeholders |
| 3 | Identify issues and plan actions<br>(section 2.2.2d) | • Define objectives<br>• Define area<br>• Identify and secure support of stakeholders |
| 4 | Implementation<br>(section 2.2.2e) | • Implement actions<br>• Monitor and evaluate |

### 2.2.2b Set up

#### Define objectives

A walking strategy or action plan should have a clear purpose or objectives that can be achieved within a reasonable timescale and can be monitored. Objectives may already be identified for walking from higher level plans, for example a transport strategy or sustainable urban mobility plan. For example, there may be an objective to increase the share of active modes (including walking) to achieve carbon emissions reduction targets.

Objectives should always support the community's needs but may also focus on particular pedestrian network characteristics, some suggestions are described in Table 8.

[14] Audrey, Suzanne. (2020). We need to admit that cycling and walking are completely different activities) www.bristol247.com

Table 8: Example objectives for a walking action plan

| Pedestrian network characteristics | Potential objectives |
|---|---|
| Safe | • Identifying and resolving pedestrian crash risk issues<br>• Identifying locations where pedestrians are not present because of perceived safety |
| Inclusive | • Improving inclusive access for all pedestrians |
| Comfortable | • Providing for shade, shelter from wind and rain, seating, and public toilets |
| Direct | • Reducing severance by providing safe, obvious road crossings<br>• Improving permeability by providing alleyways, lanes and paths within developments |
| Legible | • Providing clear and consistent wayfinding |
| Connected | • Improving links to other transport services such as public transport<br>• Providing and improving relevant pedestrian facilities for the adjacent land use(s)<br>• Connecting recreational and road corridor routes |
| Attractive | • Providing a pleasant and consistent walking environment |

For more information on these seven key characteristics of a pedestrian network, refer to section 2.3.3.

It is helpful to include indicators to measure success of the objectives over time. Possible indicators are described in section 2.2.1c.

### Define area

A walking strategy or action plan should apply to an area that has common elements defined by factors such as:

- geographic area
- land use
- administrative boundaries
- planning designations
- walkable catchment of a neighbourhood or other destination.

Once defined, background information should be gathered to confirm that the proposed area is appropriate, and in particular that there are no adjacent areas that should be included. Where necessary, the original area may need adjusting.

It can also be helpful to identify key walking routes and secondary routes within the study area as this can assist with focussing or prioritising actions. These can be identified through the desktop assessment and stakeholder engagement tasks.

### Identify and secure support of stakeholders

Engagement is the practice of actively bringing community voices into decisions that affect or interest them. The most effective walking plans involve a cross-section of professionals and community members from the outset. Depending on the area, it may be appropriate to involve various community representatives and professionals.

**Community representatives**

- walking advocacy groups
- disability advocacy groups
- NZ Police community constables
- elected members
- community board representatives

- local iwi representatives
- representatives from local walking and running clubs, schools
- invited members of the public, including local people with lived experience of disability, youth, and older people

**Professionals**

- urban planners
- transportation engineers and planners
- road safety officers/coordinators
- accessibility experts
- public transport operators
- regional council and NZ Transport Agency Waka Kotahi representatives

Community stakeholders should not be selected solely on the basis of whether they have any specialist or technical knowledge of pedestrian-related issues.

Further guidance on how to engage with stakeholders and the community is provided in sections 2.1.5 and 2.1.6.

### 2.2.2c Research and collate information

The area's current and likely future characteristics for walking should be identified. This could include the following tasks.

#### National and local policy context

Review relevant national and local policy as these define the overarching framework that a walking action plan needs to fit within. This could include the following:

**National legislation, policy and guidance**

- Human rights legislation, including the United Nations Convention on the Rights of Persons with Disabilities
- Government Policy Statement on Land Transport
- Other national policies and strategies as appropriate

**Local and regional policy and guidance**

- Disability and access policies
- District Plan rules and zoning
- Regional Land Transport Plan and Public Transport Plan Policy context
- Other local and regional policy/plans as appropriate

#### Collate baseline information

A desktop assessment to bring together baseline information will assist in identifying how the area is currently used, as well as potential use if walking improvements were made. The assessment may indicate issues to address and relative priorities. Also refer to datasets and tools that can inform planning for walking.

It may also be helpful to identify key walking routes and secondary routes. These can be identified through the desktop assessment and engagement with stakeholders and the community.

Desktop data could include:

- Information about people and place:
    - Community age structure, ethnicity and socio-economic demographics (Statistics NZ)
    - Community access to a motor vehicle (Statistics NZ)
    - Community proportion that finds walking difficult, or cannot walk at all (Statistics NZ)
    - Pedestrian volumes
    - Pedestrian experience data (from surveys)
    - Existing travel data (Journeys to work and journeys to education census data, Household travel survey data)
- Information about pedestrians' exposure to harm (injury and air pollution):
    - Pedestrian crash data or crash risk datasets
    - Any available pedestrian trips, falls and hospitalisation data
    - Traffic volumes and speeds
    - Air pollution data if available
- Information about streets:
    - Road classification (One Network Framework) and walking mode classification
    - Key trip origins and destinations
    - Public transport routes and service frequencies
    - Land uses
    - Existing pedestrian facilities
    - Asset inventory data
- Maintenance records

Collecting, managing and analysing a considerable amount of data within a spatial system (eg GIS) can help to preserve data integrity and enable efficient data processing and analysis. Refer to section 2.2.3 for more information on data sets and tools.

### Site visits or walkability audits

Although the desktop assessment will collect a substantial amount of information, walkability audits or site visits should always be done to check how the walking network is used in practice and to observe pedestrian behaviour – at peak-use times and in some cases after dark. It is recommended that a cross-section of people in the community complete the audit as people have a variety of capabilities and states.

Site visits or walkability audits should be undertaken on foot, not in a vehicle or by video as it is difficult to identify all aspects that are important for pedestrian journeys from a vehicle.

Factors that should be confirmed through site visits include:

- trip origins and destinations
- community severance locations (such as busy roads with infrequent crossing opportunities) and their extent
- the extent of pedestrian infrastructure provided
- whether routes are safe, obvious, and have step-free choices
- the extent of diversions needed for safe, obvious, step-free routes
- the types of pedestrians present and pedestrians that are not present

- walking hazards and barriers, including obstructions in the accessible path of travel; bollards and other street furniture that people may collide with; and footpath condition, including irregularities that could lead to slips, trips and falls
- any unnecessary signage that could be a hazard
- extent of wayfinding signage and/or markings
- pedestrian behaviour: where people tend to cross streets and open areas; whether they use informal routes (such as worn paths on grass); whether people tend to run across roads; where people congregate and sit
- opportunities for improving public spaces (art, seating, shade, etc)
- anomalies between mapped facilities and actual provision.

More detailed walkability audits can be carried out on key routes. There are a range of methods to measure walkability that can be applied – for more information, refer to section 2.3.4.

#### Measure pedestrian activity

An important component is to understand existing pedestrian activity and depending on the objectives of the action plan it can be important to forecast future demand. Refer to sections 2.1.3 and 2.1.4 for more guidance on the methods and techniques to measure existing and forecast future pedestrian activity.

#### Community and stakeholder input

The community should be involved in the data collection stage because some hazards or issues may have been overlooked during data collection and site visits. The data may not reflect current community perceptions of issues that influence walking behaviour.

Community involvement should involve all groups using the area, such as local residents, faith based and cultural groups, community and non-government services, schools, representatives of disabled people, and bus and taxi companies.

Figure 3: Stakeholder consultation (Photo: Tracy Fleming).

### 2.2.2d Identify issues and plan actions

#### Analyse issues

After developing a full understanding of the area, all data should be assessed, and initial views developed about where and how the walking environment is deficient and the opportunities available for improvements. This can be done by examining:

- routes between trip origins and destinations
- identifying hazardous locations

- identifying inconsistencies in infrastructure provision, such as a lack of safe, obvious, step-free routes
- identifying poor condition of pedestrian infrastructure
- informal pedestrian links
- areas where young, old, female, or mobility-impaired pedestrians are not as prevalent as expected by analysis of population demographics and trip attractors

Refer to section 2.1 for more information.

#### Identify measures and actions

Once the issues and deficiencies have been identified, the next stage involves developing remedial measures or actions, describing the anticipated benefits of each, and detailing the costs and implications for other road users (if any). If several measures are possible, a more detailed assessment may be needed to identify the most suitable solution (for example upgrading a pedestrian crossing facility will require an assessment of a number of alternatives).

In practice, developing remedial measures can lead to the creation of further opportunities and/or additional constraints. This means some iteration between this and the preceding stage can be useful.

#### Prioritise programme

As resources are likely to be constrained, the measures or actions should be prioritised according to the objectives set for the plan, local circumstances, and funding (noting a variety of funding opportunities are available). Other transport projects taking place simultaneously may create opportunities to bring forward comparatively low-ranked walking interventions, but in a highly cost-effective way (eg avoiding digging at the same location twice).

In Appendix B – Methods for prioritising programmes to benefit pedestrians, approaches can be employed to help decide which measures or schemes should be implemented first whilst being cognisant of the overall objectives of the pedestrian planning process.

Each approach has advantages and drawbacks so it is a good idea to prioritise improvement measures and actions using several approaches.

A holistic route treatment is best, as a physical barrier to walking in just one location can result in the whole trip being made by another form of travel. It is better to get a few key routes right to start with than to attempt piecemeal change that is spread too thinly.

### 2.2.2e Implementation

#### Implement actions

The action plan is followed by implementation, which includes:

- Funding and constructing the prioritised programme of works
- Providing for walking within other infrastructure projects.

For more information on funding, refer to section 2.4.

#### Monitor and evaluate

Walking action plans should be monitored and reviewed regularly to check their progress and success.

Guidance on how to monitor walking plans is provided in section 4.3. Monitoring and evaluation in PNG: Implementation and maintenance.

### 2.2.2f Structure of a walking strategy or action plan

While a walking strategy or action plan should reflect local conditions, there will be common features in them all. The common elements are outlined below:

Table 9: Common elements in walking strategies and action plans

| | |
|---|---|
| Background | • A statement of purpose.<br>• How the plan fits with other national and local strategies.<br>• The benefits of the walking action plan.<br>• Local information on pedestrian activity and safety. |
| The existing walking environment | • Outline of the current environment for pedestrians (quantitative and qualitative). Ideally includes audits of the street environment and surveys of local perceptions.<br>• The local authority's achievements to date. |
| Vision | The community's broad vision for walking. |
| Objectives and desired outcomes | Clear statements of what the strategy or plan intends to achieve, and what measures are in place to be used in monitoring the plan's progress in achieving its objectives. |
| Actions | A description of the policies to be put in place, and the actions to be taken to meet each objective. |
| Funding | The likely level of overall funding and how it will be allocated (including maintenance work over the lifetime of any infrastructure). |
| Monitoring performance and targets | Methods and timescales for collecting and reporting the information needed to monitor effectiveness. |
| Partnership/consultation | How links will be made with other organisations and communities that can support walking, and how they can provide support for the plan. |

Victoria Walks (2013)[15] provides suggested contents and form for a good walking strategy. A Pedestrian Access and Mobility Plan (PAMP)[16] is a structured method developed in Australia to develop a walking action plan.

## 2.2.3. Datasets and tools

Building an evidence base through good data and using an appropriate tool for the scale and complexity of what is being considered are important aspects of best practice planning for walking.

### 2.2.3a Scales of delivery

Three scales of delivery are helpful to consider in terms of planning for walking. These are:

- The town/city scale – planning for growth by better integrating transport modes that are linked with walking trips.
- The neighbourhood and local scale – planning for walking as part of area wide initiatives so that people can access local amenities, town centres and employment areas by walking. New developments should be designed so that active travel is a safe and convenient choice.
- The street / local place scale – designing high quality pedestrian environments with sufficient space allocated for lingering as well as travelling through, taking into account the street function.

[15] Victoria Walks. (2013). Developing a Walking Strategy: A Guide for Councils

[16] Roads and Traffic Authority NSW. (2002). How to prepare a pedestrian access and mobility plan; An easy three stage guide

Table 10 outlines the range of datasets and tools that could be employed across different spatial scales. The table is inspired by the Planning for Walking Toolkit (Transport for London, 2020) which provides further guidance on planning and design tools for walking.

Table 10: Datasets and tools that can inform planning for walking at different scales

| Information that may be useful to collect or analyse | Suggested datasets and tools that may assist |
|---|---|
| **Town/city-scale analysis** | |
| Identify walking potential of an area (ie trips that could feasibly be walked that are being made by other modes) | • Household travel survey data<br>• Census data<br>• Example: Transport for London, 2016, Analysis of Walking Potential |
| Identify where some pedestrian groups are under-represented due to a lack of walking access | Section 2.1.3 |
| Effect of vehicle volumes and speeds on walking prevalence in an area | • Vehicle volumes (including percentage of heavy vehicles)<br>• Vehicle operating speeds |
| Areas where public transport uptake could be improved | • Accessibility modelling<br>• Public transport design guidance |
| Understand the function of corridors in relation to both movement and place | • One Network Framework Street categories and mode classifications<br>• Public Life Surveys |
| Pedestrian safety and security statistics | • Crash analysis system (CAS)<br>• Ministry of Health or ACC injury datasets |
| Level of service of the pedestrian network | Still under development |
| **Neighbourhood and local scale analysis** | |
| Understand walking catchments | • Map the area covered by a certain walking time (eg 5 minutes) from a destination. Also known as a 'pedshed'.<br>• Accessibility modelling |
| Understand neighbourhood character, land uses, destinations and attractors, walkable routes and connections, severance and barriers | • Neighbourhood scale mapping and analysis<br>• One Network Framework Street categories<br>• Community engagement |
| Understand existing and forecast future pedestrian demand | Section 2.1.4 |
| Understand how pedestrians are using a space / place | • Pedestrian count / survey<br>• Place audit<br>• Public Life Tools |
| Identify locations with poor walking connectivity and legibility | • Walk time analysis<br>• Identify intersections with missing crossing legs |
| Pedestrian safety/security information | • Crash analysis system (CAS), hospital or ACC data may provide city or regional information<br>• CPTED Audit<br>• Community engagement |
| **Street scale analysis** | |
| Audit of the quality of the street for people walking | • Pedestrian Level of Service Assessment Tool<br>• Healthy Streets Design Check – NZ version<br>• Walking condition assessment |
| Understand where pedestrians are using the street or an area | • Pedestrian flows and demographic surveys<br>• Attitudinal surveys<br>• Community engagement<br>• Map pedestrian desire lines<br>• Compliance with traffic signals<br>• Pedestrian crossing delay analysis |

| | |
|---|---|
| | • Measuring pedestrian activity |
| Pedestrian crowding/comfort levels | NSW Government, 2020, Walking Space Guide |

Notes:

- Injury data from the Ministry of Health or ACC may be more representative of all pedestrian incidents occuring on the transport network (compared with CAS data), however it is likely to lack detail on where the incidents occurred. Hence, this data is helpful at an aggregate level over a large area (ie town/city scale analysis). ACC datasets can be searched or requested from the Government's data website.
- Neighbourhood scale mapping and analysis means mapping land uses and trip attractors within a walkable catchment of a centre. Locating cycle routes and bus stops/railway stations can be useful for identifying where walking trips are likely to start and finish as well as identifying opportunities and constraints. Severance and barriers to walking such as rail routes, topography, lack of crossing facilities should also be identified.
- Walk time analysis means comparing the actual walking route length with the straight line distance between two key destinations. The difference in walking time can then be calculated using a walking speed (eg 1.1 m/s).

#### 2.2.3b One Network Framework

The One Network Framework (ONF), an evolution of the One Network Road Classification (ONRC) is a core element of the land transport management system used to provide a consistent classification system for a wide range of planning processes. The ONF is based on street categories within Movement and Place matrices. Further information is available at: One Network Framework.

##### Walking mode classification

As well as street categories, mode classifications have been developed. This allows each modal network to be considered on its own, as well as part of the overall movement function of the corridor. ONF will consider both the current and future modal networks. Refer to the Mode classification section of the One Network Framework classification guidance for information on the current walking mode classifications. In due course the 'future network planning process' will support the classification of the future modal layers, including that of walking. Details of the future network planning process can be found on ONF Future network planning.

### 2.2.4. District plan provisions

District plans assist territorial authorities in carrying out their functions in order to achieve the sustainable management purpose of the Resource Management Act. A district plan must outline the objectives for the district, policies to implement the objectives and methods or rules to implement the policies.

District plans have a key role to play in developing new walkable communities as well as improving the walkability of existing communities when development occurs.

During strategic planning and larger development processes, ensuring connected and dense pedestrian networks should be the focus, whereas finer design details to support people walking should be considered during more localised consenting processes.

Provisions for pedestrians will predominantly be contained within the transportation and subdivision chapters and/or within the zone chapters of a district plan.

The matters discussed in the table in Appendix C – Matters to be addressed in district plans should be addressed in district plan provisions to support walking. Some design guidance is best provided in a code of practice rather than in the district plan, however key requirements should be included in the district plan. The table provides a discussion of each issue and the recommended provisions that can address the

issue. The details and extent of the provisions will need to be tailored to the context of each district, land use patterns, availability of transport choices and strategic direction of the district plan.

Figure 4: Example of a pedestrian walkway through a car park (Photo: Jeanette Ward).

Figure 5: Good practice accessway example. (Photo: Jeanette Ward)

Figure 6: Poor practice accessway example (Photo: Jeanette Ward).

### 2.2.5. Resource consents

Urban developments are more likely to be successful, and to have a higher economic value, if pedestrians are properly catered for.

Land use resource consent applications offer opportunities to make improvements for pedestrians. Subdivision consents also often alter the way land is used and hence how pedestrians access and use the land needs to be considered.

When assessing resource consent applications, territorial authorities should ensure that all potential impacts on pedestrians of the development or subdivision have been fully considered, assessed and mitigated. This includes the walking routes within the site (including for example, through car parks) as well as those external to it, both during and after construction.

Assessing the area against the pedestrian network characteristics (section 2.3.3) or undertaking an audit or review of the area may assist in identifying shortcomings and improvements. For more information on review and audits, refer to PNG: Reviews and audits.

As a minimum, no resource consent application should adversely affect conditions for pedestrians. However, developments often create opportunities to provide new walking links and/or increase pedestrian activity. To positively encourage walking, new and improved infrastructure should ideally be provided in accordance with this guidance.

For larger developments, transport professionals should be engaged early to guide the layout and design of the development and ensuring it adheres to the pedestrian network characteristics. Preparing an Integrated Transport Assessment (also known as an ITA), whether required by the District Plan or not, can be beneficial for identifying the potential transport impacts for all travel modes, including pedestrians.

If an application involves apparently unused public land (including road reserves), the road controlling authority (RCA) should visit the site over a suitable period to check whether pedestrians use the land on a casual basis. If they do, any adverse impacts of the development on walking should be identified and, where possible, mitigated. However, as this may not always be possible, pedestrian interests should be protected by including, in formal planning documents, all routes that are well used or have walking potential.

Walking routes may be located where historic and cultural heritage exists. The Considering historic heritage in walking and cycling projects information sheet provides guidance on heritage considerations in walking and cycling projects.

## 2.3. Walkability

Walkability describes the extent to which the built environment is walking-friendly. Urban form contributes to walkability and a walkable place will have a range of characteristics that are important for pedestrians. Methods are available to measure and assess walkability.

### 2.3.1. Walkable places

'Walkability' describes the extent to which the built environment is walking-friendly. It is a useful way to assess the characteristics of an area or a route, and considers accessibility in terms of proximity to destinations. There is no agreed definition of walkability, however, the following is considered a broad definition:

> 'Walkability is the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network.[17]
>
> In a walkable community, walking is considered a normal mode choice that connects people with their destinations and other modes of travel… A highly walkable environment invites people of any age, gender or degree of mobility to access their city independently and with enjoyment.' (SUTP, 2018).[18]

[17] Forsyth, Ann. (2015). What is a Walkable Place? The walkability debate in urban design. Urban Design International 20, no 4: 274-292

[18] Sustainable Urban Transport Project. (2018). iNUA #8: Meeting the Needs of People – Walking

*If Mum and Dad think that it's safe enough, I can go to the park by myself or to the dairy, but if there are busy streets and no safe places to cross the road we usually take the car.*

Tom[19]

The walkability of a place is influenced by its urban form and whether it meets seven pedestrian network characteristics. There are a range of outcomes that influence whether walking is a viable and easy mode choice for many daily travel needs.

### 2.3.2. Urban form

#### 2.3.2a How urban form influences walking

Urban form relates to how communities are designed and structured, the type of development that is allowed and where, and how the different areas are connected. Urban form affects the need to travel and the attractiveness (or otherwise) of walking as a practical form of transport.

Three interrelated elements affect whether urban form is suitable for pedestrians – permeability, connections to destinations and density which are discussed in the table below.

Table 11: Important elements of urban form for pedestrians

| Element | Definition | Typical approaches |
|---|---|---|
| Pedestrian permeability | The extent to which urban form permits ease of movement of people walking and avoids severance. Smaller block sizes or providing mid-block connections offer more route choices for people walking as explained on page 47 of the Urban Street and Road Design Guide by Auckland Transport. | • There are minimal waiting times at traffic signals and crossings.<br>• Pedestrians have priority at side road crossings.<br>• Pedestrians can use routes that are closed to other transport modes.<br>• Traffic-calming, low-speed zones and shared zones are implemented. |
| Connections to destinations | The extent to which the walking network integrates with likely trip origins and destinations, including the public transport network. | • The pedestrian network links to obvious destinations, such as schools, shops, supermarkets, parks, public spaces and community services.<br>• Particular attention is paid to the interface between these destinations and the pedestrian network, such as providing shelters, shaded seating and pedestrian signage/wayfinding. |
| Density/ compactness | Concentrating land uses and activities brings them closer to each other, thus making distances more walkable. | • Important destinations are close to where people live, so they can access these destinations by walking.<br>• The environment in the immediate vicinity of public transport nodes and interchanges is more intensively developed and pedestrian friendly, which encourages the combination of walking with public transport use. |

As pedestrians are the lowest speed mode, any deviation in their routes will inconvenience them more than other modes. Pedestrians benefit most from dense, permeable networks. A comparison of the average distance a pedestrian can travel in five minutes compared to a vehicle is illustrated in the photo

[19] For more information about the personas, see section 2.1.1c.

below. This illustrates that the pedestrian network should be designed at a significantly finer grain than the vehicle movement network.


Figure 7: Average travel distance in five minutes for pedestrians compared with vehicles

### 2.3.2b The effect of urban design on walking

Best practice urban design is focussed on compact urban form that features an interconnected street network with closely located employment, retail and neighbourhood centres, public transport connections, and open spaces. Walking is a viable travel option in these areas owing to the reduced distance between trip origins and destinations and because the road layout helps to reduce severance. The pedestrian network should be more permeable than the vehicle network, meaning that a pedestrian journey is shorter than one by car.

Off-street pedestrian networks can be the most enjoyable walking experiences if they are well-lit and public. That is, off-street paths should be safe for all people to use, day and night, without fear of being attacked. If well placed they can also reduce the distance travelled by those on foot. Good off-street connections avoid the need to walk alongside and across high-volume, high-speed roads where pedestrians are exposed to noise, air pollution, and the risk of being hit by a vehicle.

Good urban form can result in a high proportion of trips being made by pedestrians and people using micromobility and bicycles. Locating high-density residential, retail and other services around public transport interchanges provides options for longer distance trips that do not require a private motor vehicle. This can result in areas deliberately created with fewer cars and greater pedestrian activity.

Since many journeys start or end at home, the location of new housing and links to existing transport routes are particularly important.

### 2.3.2c Movement and place

The function of roads and streets has traditionally been considered as primarily the movement of people and goods along a route, with the on-street activity function of roads and streets being secondary, if considered at all.

A ‘Movement and place’ approach brings on-street activity together with adjacent land use and the movement function of transport. It can contribute to walkability through better consideration of the different roles a street plays.

‘Place’ in this context is defined as where

> a street is a destination in its own right: a location where activities occur on or adjacent to the street, and where the buildings and spaces may have a social or cultural significance in their own right[20].

[20] Austroads. (2020). Classifying, Measuring and Valuing the Benefits of Place on the Transport System, AP-R626-20

Adjacent land use has an impact on place through generation of on-street activity and movement through its requirement for access. On street activity also generates lateral movement across the roadway, impacting on the movement of traffic. The photo below shows a street with a high place function and a low movement function.

Figure 8: Civic Space, Darby Street, Auckland (Jeanette Ward).

The One Network Framework applies a movement and place approach to classifying NZ's road network.

Further information on the ONF relevant to planning for pedestrians can be found in section 2.2.3.

To learn how the movement and place approach translates into design, refer to PNG: Streets and public realm, and also the Aotearoa urban street planning and design guide.

To learn more about the classification of movement and place within the One Network Framework, refer to One Network Framework: Street categories.

### 2.3.3. Pedestrian network characteristics

Planning and designing walkable pedestrian networks and communities requires the consideration of seven key characteristics that focus on the needs of all pedestrians. These characteristics should be used throughout the planning and design process to identify the impact of decisions on the pedestrian experience and to ensure a consistently high-quality pedestrian environment[21]. They should be used to plan for improvements for walking in existing streets, and to ensure new developments are walkable. Note the characteristics are broad and there is overlap between them. The key seven characteristics are:

[21] Based on Transport for London. (2020). Planning for Walking Toolkit

| | |
|---|---|
| **Safe** | Public areas and pedestrian facilities should be safe as practicable to use at all times of day and for people to feel safe to spend time in. |
| **Inclusive** | All pedestrian environments should adhere to the principles of inclusive design by ensuring that they are accessible to, and usable by, as many people as reasonably possible. |
| **Connected** | Pedestrian networks should have a high density of route options to connect pedestrians to the places they wish to reach including public transport and surrounding networks. |
| **Direct** | Clear statements of what the strategy or plan intends to achieve, and what measures are in place to be used in monitoring the plan's progress in achieving its objectives. |
| **Legible** | Features should be consistent and easy to understand for all pedestrians to know intuitively how to navigate a space. |
| **Attractive** | Pedestrian environments should be inviting for pedestrians to pass through or spend time in. This can mean low levels of noise and pollution, places to shelter, play, or rest, as well as a clean and visually appealing environment. |
| **Comfortable** | Pedestrian areas should allow unhindered movement for pedestrians by providing sufficient space, even surfaces and gentle gradients. |

The principles of safe, obvious and step-free (SOS) ensures universal access is addressed. It is important that safe, obvious and step-free routes are provided as a priority on the most important pedestrian routes in towns and cities. Refer to section 2.1.2, for more information.

Several other methods describing similar characteristics have been developed internationally to categorise environmental factors for walking including the 5Cs and the 7Cs. The seven pedestrian network characteristics explained above based on the Transport for London principles are considered the most distinct and simple to understand.

### 2.3.3a Safe

Safety for pedestrians includes a number of aspects:

| Safety from vehicles | Safety from hazards on the footpath | Safety from other people | Safety from other users |
|---|---|---|---|
| • Feeling vulnerable when walking close to fast moving traffic, particularly heavy vehicles<br>• Conflicts with vehicles at crossings, intersections and driveways | • Falling or slipping over on uneven surfaces<br>• Falling into the roadway<br>• Colliding with street furniture and footpath clutter | • Narrow footpaths with overgrown greenery, lack of space and visibility<br>• Dark streets, poor lighting<br>• Isolated paths away from the street, without public surveillance eg: bridges, overpasses and underpasses | • Bicycles, scooters, skateboards and micro-mobility users using the path at a faster speed<br>• People walking their dogs |

#### Safety from vehicles

For more information about the Safe System approach and on pedestrian safety from vehicles, refer to section 1.5. A safe system for walking in PNG: Walking in New Zealand.

Safe system aligned measures for pedestrians either separate pedestrians from motor vehicles or ensure impact speeds in the case of a collision are less than 30 km/h. For more information, refer to section 3.1.1. Safe System design in PNG: Pedestrian design principles.

### Safety from hazards on the footpath

Pedestrians walking or jogging on footpaths, stepping off kerbs and crossing roadways can fall, slip trip or stumble. For further information on this matter, refer to section 1.6. Falls – slips, trips and stumbles in PNG: Walking in New Zealand.

### Safety from other people

Personal security issues can be a major barrier to walking and creating walkable communities, especially during hours of darkness, in town centres, through underpasses, and on paths through parks, reserves or car parks.

Real and perceived risks of crime and anti-social behaviour can be deterrents to walking.

People who are concerned about perceived dangers, may modify their travel behaviour by not going out alone after dark or avoiding certain areas or routes. Parents, because of perceived danger, may also modify their children's behaviour by not allowing them to walk without adult supervision.

Personal security issues can also create a barrier to walk to/from public transport services.

*I am visually impaired and often rely on strangers to assist me when out in public. I don't go out at night often as I don't feel safe. I want to be more independent and be able to meet friends for dinner*

Layla[22]

Personal security issues should be considered in three general areas:

1. The environment should be legible, with pedestrians able to see and understand their immediate surroundings and those ahead.
2. Pedestrians should be visible to others, particularly other pedestrians.
3. Pedestrians should be provided with alternative safe, obvious and step-free routes to avoid potentially threatening situations.

Crime Prevention through Environmental Design (CPTED) provides a framework for incorporating crime prevention within quality urban design by focusing on reducing the opportunity to commit crime, therefore lessening the motivation to offend.

Applying the practices in this guide will address pedestrians' personal security. Additional advice can be found in the *National guidelines for crime prevention through environmental design in New Zealand*,[23]which identifies seven qualities of safer places. These qualities are:

- access
- surveillance and sightlines
- layout
- activity mix
- sense of ownership

[22] For more information about the personas, see section 2.1.1c.

[23] Ministry for the Environment. (2005). National guidelines for crime prevention through environmental design

- quality environments
- physical protection.

### Safety from other users

People on faster moving devices such as bicycles and electric scooters on paths can affect the safety and comfort for other pedestrians. This is an important consideration in environments such as shared paths and shared spaces, or streets where a lack of appropriate facilities for people using micromobility and bicycles results in them using a footpath or a narrow shared path which then has a negative impact on slower moving pedestrians.

It is important to consider the typical speeds and physical space requirements of different users. Refer to section 2.1.1 and section 3.3.5. Shared paths and trails in PNG: Paths for more information.

## 2.3.3b Inclusive

When designing places for walking, all human capabilities and states should be considered. People can have permanent or temporary limitations, and their energy can fluctuate (refer to section 2.1.1a).

People of different genders, cultural backgrounds, ages and abilities have varying needs that should be considered within the walking environment to ensure it is inclusive.

Elements that can exclude some people are those that do not feel safe, are not obvious, or involve steps or uneven surfaces. For example, narrow footways, insufficient road crossing time, uneven surfaces and steep gradients, street clutter and low-lying obstacles, excessive noise and pollution, and lack of facilities such as seating or public toilets can make journeys impossible for many people. Conversely, non-slip footpath materials as well as clear kerb and building lines, kerb cutdowns and tactile indicators make a space more inclusive.

Following the three SOS principles for walking ensures that as many people as possible can access and use pedestrian environments easily (refer to section 2.1.2).

Measuring pedestrian activity in an area can identify whether the area is inclusive for all people if it reflects the demographics of that area (refer to section 2.1.3).

Figure 9: Diverse range of people walking (Jeanette Ward).

### 2.3.3c Connected

A dense network of pedestrian routes maximises the number of destinations that can be reached by walking. Achieving connectedness often requires overcoming barriers such as railways, waterways, arterial roads and motorways which sever communities and make for long walking trips. Dedicated crossing facilities can help connect neighbourhoods that previously were separated from each other, encouraging people to walk.

Figure 10: Walking connection using old road bridge, Brisbane (Jeanette Ward).

### 2.3.3d Direct

Supporting direct movement for pedestrians on their desire lines is key. Walking can be made more attractive if it is prioritised over other modes, for example through frequent at grade crossing facilities as close as possible to pedestrian desire lines. This principle also relates to permeability as the availability of pedestrian thoroughfares within a block can significantly shorten walking times compared with other modes.


Figure 11: Laneways provide a permeable walking network, Christchurch (Jeanette Ward).

### 2.3.3e Legible

Legibility means the alignment and arrangement of paths and spaces are consistent and logically arranged with readily identifiable features. It means space allocation is coherent (for example, street furniture is aligned in a zone along the street) and consistent surface materials and landscape palettes are used.

Buildings and other features can also aid navigation. It is important that legibility makes walking routes obvious for all pedestrians. For example, the layout of shared space streets such that walking is allowable everywhere but changes in the surface texture, placement of street furniture, planting and bollards guides navigation along the street.


Figure 12: Good example of walking legibility, Auckland (Jeanette Ward).


Figure 13: Poor example of walking legibility, Auckland (Jeanette Ward).

Consistent wayfinding signage is important for locations where users may not be familiar (for example, town centres) ensuring the content and messaging is appropriate at distinct points of arrival.

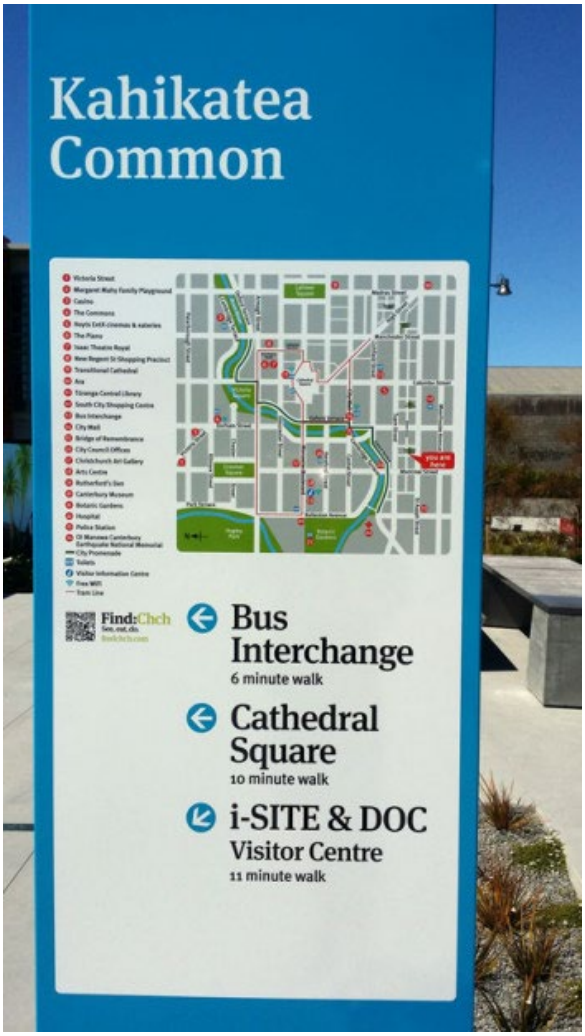


Figure 14: Wayfinding signage, Christchurch (Glen Koorey).

### 2.3.3f Attractive

Appealing materials, greenery such as trees and landscaping, street lighting, and art are some of the ways places can be made attractive to pedestrians. Sound, smell and vision combine to make for a place where people want to spend time as well as encouraging walking trips through the area. Attractive walking routes also help to extend the catchment of a public transport stop or station, as people are willing to walk further when the walking environment is pleasant. For more information, refer to NZ Transport Agency Public transport design guidance: Getting to and from public transport.

Fun, engaging routes and spaces that include storytelling, are informative, include art or cultural perspectives help to encourage people to pass through or spend time.

Maintenance is very important to ensure a place retains its attractiveness. This could involve repairing surfaces, watering plants, and adequate cleaning.


Figure 15: Attractive and vibrant place, Oxford Terrace shared space street, Christchurch (Jeanette Ward).

Figure 16: Attractive and vibrant place in the evening, Britomart, Auckland (Jeanette Ward).

### 2.3.3g Comfortable

Maximising effective width by reducing street clutter, minimising wait times at signal crossings, providing places to sit and shelter from wind, rain or sun, and ensuring surfaces are smooth (eg avoiding large areas of cobblestones) can all contribute to making the walking experience more comfortable.


Figure 17: Comfort features, Richmond (Jeanette Ward).

### 2.3.4. Measuring walkability

Measuring the walkability of an area or route means understanding the ease by which pedestrians can move around. There are many different methods to measuring walkability using desktop analysis, on-site assessment or through pedestrians' experiences.

A desktop assessment of walkability is appropriate for assessing the connectivity and design adequacy of new facilities that are being built. A major drawback of desktop analysis is that it fails to consider the actual circumstances pedestrians encounter. It disregards issues such as debris, ponding, the sense of personal security, temporary obstructions, inconsistent signage and irregular surfaces, although all may affect pedestrians.

On-site assessments of walkability can involve practitioners asking pedestrians for their perceptions, or the use of assessment criteria to measure or score various aspects. Assessments involving pedestrians consist of checklists and rating systems against which pedestrians rate their own experience as they travel along the route. This means assessments are subjective and results can vary according to individuals' abilities and confidence, and the prevailing conditions. To minimise bias, the same route can be assessed using different pedestrians at different times, including during hours of darkness.

Additionally, customer tests with people who do not normally use a space can inform how to better cater for those who are excluded. Asking pedestrians to take pictures to document their feedback can also help understand their perception. The complexity of the checklist used may vary but should be tailored to match the characteristics of the pedestrians undertaking the assessment.

Figure 18: A layperson street review of pedestrian provision through a roadworks, Christchurch (Glen Koorey).

Various methods can be used to assess walkability and pedestrian level of service of an existing environment or proposed projects or schemes. A summary of the following methods is provided in Appendix D. Information such as when to use each method, its strengths and weaknesses and links to further guidance on each method is provided in the table in Appendix D.

Methods include:

- walking audit
- Community Street Reviews
- Predicting walkability
- Pedestrian Level of Service Assessment Tool
- Healthy Streets Check for Designers
- Healthy Streets Survey
- Public Life Tools
- Walk Score
- Accessibility Assessment
- Connectivity Assessment
- Street Accessibility Audit
- Pedestrian Environment Review System (PERS)
- Valuing the Urban Realm Toolkit
- State of Place.

Further information on methods to audit or review projects from concept to post construction is provided in PNG: Reviews and audits.

Note that detailed guidance on carrying out a Connectivity Assessment or Street Accessibility Audit is provided below as information on these methods is not available elsewhere.

### 2.3.4a Connectivity assessment

Techniques to assess connectivity of a walking network are outlined in the table below.

| Technique | Description | Indicator |
|---|---|---|
| Average distance | Pair each potential origin with a common destination to identify the mean walking distance. | Walkability reduces as distance increases. |
| Directness ratio | Compare the length of the direct route between the pairs of trip origins and their common destination ('as the crow flies') with the distance that the pedestrian will actually walk, taking into account development patterns. | Walkability reduces as the difference between the direct and actual route increases. |
| Route density | For each trip origin and destination, calculate the number of route choices between them, for a grid network this can be calculated by: $\frac{(A+B)!}{A! \times B!}$ Where 'A' is the number of blocks in an east- west direction, 'B' is the number of blocks in a north-south direction and '!' is the factorial function, ie 4! = 4 x 3 x 2 x 1. | Walkability reduces as the number of route choices diminishes. |
| Journey time analysis | For each trip origin and destination pair, calculate a journey time based upon the length of the route and average walking speed, but taking into account obstacles, gradient changes and severance that change walking speed or create delays. | Walkability reduces as the difference between the calculated walking time and that expected if the pedestrian did not change their walk speed increases. |
| Walkable catchment or Pedshed analysis | Calculate the physical area within a five minute, 10 minute and 15 minute walking distance, if the pedestrian were to walk as the crow flies from a particular origin and at their ideal speed. Compare this with the area the pedestrian can actually cover taking into account development patterns and obstacles, gradient changes and severance that change walking speed and/or create delays. | Walkability reduces as the difference between the theoretical and actual areas increases. |
| Difficulty impedance index | Assign a value to each type of severance a pedestrian encounters based upon a judgement of the difficulty that it causes the pedestrian, and calculate an 'index' for each trip origin and destination pair. | Walkability reduces as the index increases. |

### 2.3.4b Street Accessibility Audit

A Street Accessibility Audit is a tool for councils and RCAs to have a local street network assessed for deficiencies from the perspective of older and disabled pedestrians. Once the scope of the audit is defined, it involves three steps.

- An auditor experienced in universal access hosts an engagement session with local people (typically older and disabled people) to identify infrastructure problems that make their local journeys difficult or impossible. Problems are typically limited to mobility parking availability and accessibility, and path and road crossing accessibility. Other issues may also be noted, such as bollards in inconvenient places; drainage or leaf fall problems making routes slippery; or a lack of lighting making journeys uncomfortable.

- The auditor reviews technical aspects of the street infrastructure to create a list of recommended improvements. Recommendations range from crossfall correction and path rehabilitation, through to the recommended provision of new paths, road crossings, and mobility parking spaces.
- The auditor prepares a Street Accessibility Audit report for the authority, describing the community of interest; the engagement that informed the audit; and the technical review itself. The report includes an appended, prioritised list of recommended improvements, with indicative costs.

The report recommendations can be incorporated into routine maintenance planning, and/or can be addressed with one-off budgets or as part of other transport investment.

Examples of Street Accessibility Audits:

- Te Aroha Street Accessibility Audit
- Manurewa Town Centre Accessibility Audit

## 2.4. Funding

### 2.4.1. Investing in walking

Walking, and good pedestrian environments have numerous direct and indirect benefits for individuals and for society (for more information, refer to section 1.3. Benefits of walking in PNG: Walking in New Zealand). Investing in walking is a huge opportunity for the transport sector and can help reduce carbon emissions, improve health and reduce health care costs, and support more equitable outcomes.

The goal is to elevate walking in transport planning, investment and decision-making, enabling more people to walk more often. Increased rates of walking can reduce transport spending, increase physical activity, improve health and wellbeing, reduce air pollution and greenhouse gas emissions, and increase local economic activity and household savings. All trips involve walking, failure to invest in walking facilities affects all modes and trips not just pedestrian trips.

Realising the benefits of investing in walking and improved pedestrian environments can require investing beyond direct walking facilities such as footpaths and pedestrian crossings. Supporting interventions could include:

- reducing traffic volumes or speeds
- improving connections to public transport links
- urban design that considers pedestrian access to new developments and key activity centres
- amenity improvements that make walking more attractive and enjoyable, and
- programmes that promote a culture of walking through schools, workplaces and the broader community.

It is also important to consider investment in walking separately from investment in cycling. While there are complementary environments that support both modes, separating the funding streams can help identify the amount of funding specifically targeted for walking as well as improving the strategic focus and effectiveness of investment.

### 2.4.2. National Land Transport Programme (NLTP) funding

The National Land Transport Programme (NLTP) is a 3-year programme that sets out how NZ Transport Agency Waka Kotahi, working with its partners, invests national land transport funding to create a safer, more accessible, better connected and more resilient transport system to keep New Zealand moving.

The NLTP sets out activities that can receive funding from the National Land Transport Fund (NLTF) under the Land Transport Management Act 2003. The NLTP must give effect to the Government Policy Statement on land transport (GPS).

Activity classes are defined in the GPS and are used to provide NZ Transport Agency Waka Kotahi with direction on funding allocations for types of investment. The activity classes are high-level groupings of similar outputs from investments through the NLTP. Activities that deliver similar outputs (eg walking and cycling improvements or local road maintenance) are grouped into work categories which help track expenditure by each category and type of output.

Investment proposals must identify the correct activity classes and work categories as part of the NLTP inclusion and funding approval process.

Further information on the activity classes and funding of walking and cycling improvements is provided in the NZ Transport Agency Waka Kotahi Planning and Investment Knowledge Base.

If you have any queries about funding projects, please contact your local NZ Transport Agency Waka Kotahi Investment Advisor.

### 2.4.3. Other funding streams

Funding can also come from councils, from developers or from communities.

#### 2.4.3a Council funding

A council can fund improvements with no National Land Transport Fund funding. Projects do not need to meet NZ Transport Agency Waka Kotahi's investment goals when they are 100% council funded.

#### 2.4.3b Developer contributions

New residential and commercial developments place additional demand on community infrastructure such as the transport network, water supply and parks. A development contribution is a charge on new developments that place additional demand on capacity in the council's facilities and infrastructure. Development contributions of cash or sometimes land help fund the facilities and infrastructure that the Council provides to cater for growth.

The policy, mechanism and basis for calculating the contribution will be set out in the city or district plan. It is not unreasonable for the proportion of the infrastructure cost funded by the developer to reflect the percentage increase in pedestrians that the development creates. Long-term plans prepared under the Local Government Act may also set out developer contribution policies.

In addition to overarching developer contributions an RCA may consider that additional or improved pedestrian provision is required on the adjacent road network because of the effects of a new development, the developer may be asked for a financial contribution to the cost. Also, planning consent can be conditional on the provision of certain facilities.

### 2.4.3c Community fundraising

Raising funds among the local community can help make an initial case for improvements, for example by funding data collection or public events. It is also a way to build support and awareness around an issue affecting walking among the local community.

In some cases, community fundraising has even gone as far as co-funding infrastructure improvements. For example, Lake Tekapo Footbridge was built with business contributions and community donations complemented by council and NZ Transport Agency Waka Kotahi funding.

Figure 19: Lake Tekapo footbridge (Photo: Penny Gray).

## 2.4.4. Business cases

The Business Case Approach (BCA) is used to guide planning, investment and project development processes. The BCA is a structured process that integrates best practice decision-making, programme management and investment assurance tools. The approach is progressive, scalable, transferable and principles based.

Land Transport Benefits Framework was developed to provide a consistent way of measuring benefits across all projects and across time. Identifying the benefits of an investment is important to understand the contribution to outcomes for our communities. Benefits management is therefore vital to NZ Transport Agency Waka Kotahi management and delivery of the National Land Transport Programme (NLTP).

For more information, refer to the Benefits management guidance.

The benefit measures and benefit and cost monetisation methods associated with projects are outlined in two separate manuals:

Monetised benefits and cost manual – the industry's standard for the economic evaluation (benefit–cost ratio calculation) of land transport activities in New Zealand.

Land Transport Benefits Framework measures manual – guide to how benefits are measured and used in benefits realisation, and how benefits are measured in investment decision making. It provides details about benefits measures – what they are and how to use them. The measures are quantitative (number based) and qualitative (description based).

# Appendix A – Planning activities – Outcomes to make walking an easy choice

| Outcome | Description | Plans, programmes and processes |
|---|---|---|
| Ensure land use and transport are integrated | • The location and type of land use choices determines an area's spatial form which influences mode choices. For example, a wide range of desired destinations should be available within walking distance in urban areas.<br>• Planning provides for a range of services/destinations relevant to all ages within walking distance (policies such as 20 minute neighbourhoods can assist). Mixed and/or higher density development is favoured, particularly close to public transport routes, interchanges and the urban core.<br>• Intensification of land use occurs where it can best be serviced by a range of transport options | • Spatial planning<br>• Land rezoning<br>• Master-planning<br>• Sustainable Urban Mobility Plan (Mode shift plan)<br>• Transport/walking strategy |
| Allow development to occur appropriately and with walking access | • Walking trips occur at a fine grained scale so ensuring people are able to walk for short trips through a development or to adjacent land use is important.<br>• District plan provisions provide for permeable pedestrian networks, streets are designed with narrow roadways and tight intersection turning radii to reduce vehicle speeds and allow short crossing distances for pedestrians.<br>• Crime prevention through environmental design (CPTED) principles are applied.<br>• Provision and pricing of vehicle parking is strategically managed. | • Section 2.2.4<br>• Structure plans<br>• Outline development plans<br>• Master planning<br>• Code of practice requirements<br>• Integrated transport assessments<br>• Development contributions policy |
| Plan, design and improve appropriate infrastructure for walking | • Providing well designed, located and connected paths and crossings for people to walk is a key requirement to making walking an easy choice.<br>• Pedestrians of all human states and abilities are considered at an early stage when planning transport infrastructure.<br>• Appropriate levels of service are established for pedestrians and provided across the network.<br>• Where appropriate provision cannot be retrofitted, alternative pedestrian routes are specifically designed to provide a higher level of safety and convenience. | • Section 2.2.2<br>• 'Build back better' maintenance and renewals policies<br>• Integration of best practice pedestrian design standards into infrastructure codes<br>• Adaptive urbanism |
| Increase walking to public transport services | • First and last mile connections are critical in public transport journeys. Walking is one of the most practical, affordable and widely accessible ways people travel for the first and last mile of journeys involving public transport. | • Station planning<br>• Public transport network planning<br>• Public Transport Design Guidance |
| Remove barriers and severance for walking | • Gaps in the walking network can be barriers to people choosing to walk. For example, motorways, busy roads, railway lines and waterways often sever walking networks unless specific infrastructure is | • Infrastructure codes of practice |

| Outcome | Description | Plans, programmes and processes |
|---|---|---|
| | provided. | |
| Restrict through-traffic in residential areas | • Areas of residential streets where through traffic is prohibited or restricted can tip the balance so active modes including walking and cycling are more convenient modes. | • Low traffic neighbourhoods<br>• Local area traffic management plans |
| Ensure transport is considered as a network | • Network planning can help ensure roads and streets align with their intended Movement and Place function, and effectively prioritise modes. | • One Network Framework<br>• Aotearoa Urban Street Design Guide<br>• Adaptive Urbanism |
| Improve pedestrian amenity | • Improving the amenity, landscaping and comfort features for people will encourage people to linger in a space. | • Revitalisation plans<br>• Master plans<br>• Urban design plan<br>• Adaptive urbanism |
| Reduce vehicle speeds | • Slow vehicle speeds (30 km/h or less) are safe system aligned and are also more comfortable for people walking. | • Speed management planning<br>• Local area traffic management plans<br>• Safe System design |
| Reduce vehicle volumes | • Reducing vehicle volumes can result in streets feeling more comfortable for pedestrians and can enable more space and/or priority to be given to pedestrians and other modes. | • Local area traffic management plans<br>• Low traffic neighbourhood plans |
| Reallocate road space for walking | • Shifting road space currently assigned to vehicle traffic or parking to walking and other modes and uses can result in a more efficient use of space. | • Aotearoa Urban Street Design Guide |
| Reduce crossing times for pedestrians | • Long waiting times at signalised crossings can be a barrier to walking. | • One Network Framework<br>• Network operating plan<br>• Review of pedestrian delay at intersections (eg as part of traffic signal timing reviews) |
| Improve wayfinding for pedestrians | • Enabling people unfamiliar with an area to find their way can support people to walk rather than taking other modes | • Wayfinding strategy |
| Increase uptake of walking in a defined area (town or suburb) | • Focussing improvements for walking in a specific area can result in a step change in walkability and therefore better outcomes. | • Masterplan<br>• Section 2.2.2 |
| Increase walking and active modes to an organisation | • Organisations have a role to play encouraging their people to reduce car use and increase active travel both for commuting and business trips. | • Workplace travel planning |
| Increase walking to and from schools | • Increasing the number of children who walk, scoot or wheel to school reduces traffic congestion, improves children's health and wellbeing, and sets up good habits for the future. | • School travel planning |

| Outcome | Description | Plans, programmes and processes |
|---|---|---|
| Ensure location and use of vehicle parking is managed appropriately | • Well managed parking can contribute to mode shift by enabling higher densities and compact urban form, freeing up space for walking and other modes, and disincentivising car travel. | • Parking management guidance<br>• Integrated parking data hub |

# Appendix B – Methods for prioritising programmes to benefit pedestrians

| Prioritisation based on | Advantages | Disadvantages |
|---|---|---|
| Multi-criteria analysis:<br>Prioritise highest rated schemes after scoring all schemes against different criteria/objectives. Criteria should reflect the objectives of the walking action plan. | • Allows a true comparison across different criteria (Holistic approach) | • Requires enough information (data) about all criteria<br>• Scoring might be time-intensive |
| Pedestrian numbers:<br>Prioritise schemes on routes with existing high pedestrian use. | • Ensures that the greatest number of pedestrians will benefit from the treatment.<br>• Can be useful to identify high-profile schemes that help demonstrate a commitment to<br>• walking. | • Fails to consider areas where flows are suppressed by hazards, physical difficulties or personal safety concerns.<br>• Difficulties in comparing pedestrian flows, due to their inherent variability. |
| Trip linkage:<br>Prioritise schemes on routes used for trips between the greatest number of origins and destinations. | • Can mean that the greatest number of pedestrians benefit from the treatment.<br>• Can be useful to identify high-profile schemes that help demonstrate a commitment to walking.<br>• May reflect latent demand. | • Does not consider pedestrian numbers.<br>• Takes no account of whether there are actual or perceived problems. |
| Barrier or gap removal:<br>Prioritise schemes that remove physical obstacles on routes where the surrounding pedestrian facilities are of high quality. | • Creates continuous routes.<br>• Straightforward to identify physical barriers.<br>• Especially effective in creating<br>• the core of the pedestrian network. | • Difficult to ascertain perceived barriers without considerable data. |
| Proximity to major trip generator:<br>Prioritise schemes that are geographically closest to a major trip origin or destination (e.g. school, supermarket). | • May benefit the maximum number of pedestrians, as the likelihood of walking declines with increasing distance.<br>• May reflect latent demand.<br>• Trip origins and destinations are straightforward to identify. | • Does not consider pedestrian numbers.<br>• Takes no account of whether there are actual or perceived problems. |
| Supporting walking trips to a particular land use:<br>Prioritise schemes in the vicinity of specific land uses, eg schools, hospitals or aged care facilities. | • Can have a positive effect on crash rates in the area(s) treated.<br>• The type of land use to be treated can easily be changed.<br>• Creates a high-quality<br>• environment for pedestrians, albeit in a limited area. | • Disregards longer-distance routes between origins and destinations.<br>• May not support connected networks.<br>• May not identify the needs of other pedestrians in areas of different land uses. |
| Community need:<br>Prioritise schemes that local people feel has the greatest need, determined through consultation. | • Has the potential to reflect latent demand.<br>• Can be useful to publicly demonstrate a commitment to schemes. | • The actual need may be different from perceived need.<br>• Requires a consultation exercise.<br>• Only reflects the views of those consulted. |
| Crash savings:<br>Prioritise schemes that generate the greatest potential crash cost savings. | • Crash data is easily available.<br>• Can result in cost-effective solutions. | • Significant under-reporting of pedestrian accidents means not all locations will be identified.<br>• May not account fully for places that pedestrians may |

| | | |
|---|---|---|
| | | avoid because of poor safety perceptions. |
| Easiest or cheapest to implement:<br>Prioritise schemes that are the cheapest and/or easiest to implement. | • Generates the maximum number of interventions on the ground. | • Does not consider the perceived pedestrian need for schemes.<br>• The cheapest and easiest solutions may not be the most cost effective or appropriate. |
| Road classification or mode hierarchy:<br>Schemes on roads that are higher in the road classification or on key routes for walking (refer to the One Network Framework). | • Ensures that roads where pedestrians are especially vulnerable are treated.<br>• May reflect latent demand.<br>• Road classification is widely available. | • Does not consider pedestrian numbers or desire lines.<br>• Takes no account of whether there are actual or perceived problems. |
| Gaps in assets:<br>Prioritise schemes where asset data shows gaps (eg<br>missing kerb cutdowns). | • Quick and objective comparison criterion | • Requires appropriate data to be either available or collected |
| Demographics:<br>Prioritise schemes in areas that have higher transport disadvantage, or proportion of people with disabilities. | • Is equitable<br>• Can achieve major benefits in previously underserved areas | • The local demographics on their own do not provide information on desire lines or specific locations within these areas: follow-up with street audit and local engagement to prioritise interventions |

# Appendix C – Matters to be addressed in district plans

| Issue | Discussion | Recommended provisions |
|---|---|---|
| Urban form | The principles of urban form that affect whether a place supports walking trips should be incorporated into district plan policies. This includes pedestrian permeability, connections to destinations and density/compactness.<br>See section 2.3.2. | • Maximum block perimeters to maximise pedestrian permeability and directness.<br>• Avoid cul-de-sacs or minimise the number and length of cul-de-sacs if they are necessary due to topographical or other site constraints.<br>• Require cul-de-sacs to have a pedestrian route at the end. |
| Development type and density | Mixed use and / or higher density development should be favoured in zoning and policies, particularly close to public transport routes, interchanges and the urban core (potentially as transit oriented developments. | • Zone areas for medium / high density housing in close proximity to complementary land uses and where a range of travel choices are available. |
| Connected pedestrian routes | Every new development should form part of a connected pedestrian network. Obvious trip destinations should be linked for example residential with shops, supermarkets, public spaces and community services. Policies and rules should give direction to avoid layouts that include circuitous routes and cul-de-sacs that have no alternative outlet for pedestrians. | • Set maximum block perimeters to improve pedestrian permeability and directness. These can be achieved through provision of pedestrian/cycle accessways (see below).<br>• Commercial areas should provide direct and prioritised connections for walking between stores. |
| Internal site layout | Site layouts should encourage vehicles to exit sites in a forward direction. Safe, obvious, step-free pedestrian access should be provided between the road reserve and the front entrance of buildings and through large car parking areas.<br>See section 2.1. | • Parking areas should be designed to provide manoeuvring so vehicles can exit the site in a forward direction (there may be exceptions for low movement roads with low speeds).<br>• The accessible route between the public footpath and the building front door should be safe, obvious, and step-free. Appropriate pedestrian routes should be provided through large car parking areas.<br>• Dwellings should be oriented to face the street as much as practicable. For street facing dwellings, a legible front door is expected to be included on the front façade when possible. |
| Footpath provision | District plans should specify the circumstances where footpaths are required, along with any design standards for footpaths. Refer to footpath design guidance for more information.<br>See PNG: Paths. | • Include footpath provision and width in cross section requirements for new roads. |
| Pedestrian/ cycle accessways | Providing accessways for pedestrians and cyclists between streets assists with permeability, making for direct journeys. These facilities should be encouraged and designed appropriately. | • Encourage provision of pedestrian / cycle accessways between streets and at the end of cul-de-sacs.<br>• Include standards and guidance to ensure appropriate design (wide, straight, low/permeable fences to encourage passive surveillance). The following figures show good and poor examples of pedestrian accessways. |
| Vehicle access | Vehicle access to sites should be located as | • Minimum distance for vehicle crossings to intersections. |

| Issue | Discussion | Recommended provisions |
|---|---|---|
| and driveways | far from street intersections as possible to avoid confusion for pedestrians over the intended path of drivers. High volume accessways should be designed as intersections. The number of driveways crossing footpaths should be minimised and sharing of driveway access between properties encouraged. Vehicle access widths across footpaths should be minimised. The design of the footpath / driveway interface is described further here including visibility requirements between people using the footpath and drivers entering or exiting a vehicle access.<br>See 3.3.4b Driveways in PNG: Paths. | • Allow multiple lots to share a driveway up to a maximum number. If more than this a road should be formed.<br>• Maximum vehicle crossing widths depending on land use (note: wider crossings for industrial land use to accommodate larger vehicles, minimise crossing widths for residential land use).<br>• Ensure visibility splay at all driveways are provided including individual residential driveways. |
| Car parking supply | The availability of car parking is a key driver of mode choice. The National Policy Statement on Urban Development (NPS-UD 2020) requires that District Plans do not set minimum car parking requirements other than for accessible car parks. Aside from accessible car parks, minimising the availability of car parking (particularly long stay parking) is a push lever to using other modes including walking. | • Maximum parking or no parking requirements. A parking strategy along with comprehensive parking management plans for specific areas may assist in managing the parking resource.<br>• Encourage consolidated Council controlled parking provision in town centres / activity centres as this encourages foot traffic and multi-purpose trips and allows parking to be managed through time restrictions and pricing. |
| Public transport | District plans should encourage more intensive development around public transport nodes and interchanges and encourage pedestrian friendly access routes. For new developments, ensure route layouts permit public transport to efficiently serve the area. | • Zoning provisions to encourage intensive development around public transport nodes.<br>• Ensure road cross sections can accommodate bus routes and avoid long cul de sacs. |
| Gated communities | Gated residential communities can be a barrier to pedestrian routes and should be discouraged. Where one is proposed, pedestrian access through it should be provided. If this is not feasible then at least existing formal or informal pedestrian routes should be maintained. | • Give direction to avoid gated community development. |
| Personal security for people walking | Embed Crime Prevention Through Environmental Design principles into the Plan.<br>Provide passive surveillance of footpaths and other spaces where people are likely to walk. | • Ensure footpaths are located alongside streets rather than away from them.<br>• Maximum fence heights, hedge/ planting heights along road boundary to provide passive surveillance or require no fencing in some locations.<br>• Require sufficient glazing on facades facing the public realm to enable passive surveillance opportunities<br>• Require lighting of car parking areas, public spaces and multi-unit developments that will be used during the hours of darkness.<br>• Minimum widths for pedestrian/cyclist alleyways and low fence heights or see-through fencing from adjacent properties to allow passive surveillance.<br>• Require cul-de-sacs and |

| Issue | Discussion | Recommended provisions |
|---|---|---|
| | | pedestrian/cyclist alleyways to have a clear line of sight to intersecting road. |
| Integrated Transport Assessments | An Integrated Transport Assessment (ITA) is a comprehensive review of the potential transport impacts of a proposed development covering all transport modes including walking. | • Require an ITA to be prepared for larger scale developments. This should align with any objectives and policies within the District Plan that promote pedestrian safety and amenity. An ITA should consider the safety and accessibility of pedestrians accessing and moving around the development. |
| Travel plans | Travel plans should be developed for all new developments that are major traffic generators where travel modes other than the car are available and where on-site car parking is minimised. These should promote alternative travel modes and reduce reliance on single occupancy private car use. | • Require travel plans for certain developments or include as a condition of consent in specific circumstances. |
| End of trip facilities | Showers and lockers can support and encourage people to walk/run to work. | • Require showers (and possibly lockers) to be provided in large workplaces to support walking trips (and cycling trips). |

# Appendix D – Area wide and pre-design walkability methods

| Method | Pedestrian network characteristics method can assess | Purpose and when to use | Who can use the method | Data collection technique | Strengths/weaknesses | Further information |
|---|---|---|---|---|---|---|
| Walking audit | • All principles | • Site survey of local walking environment. | • Practitioners or members of the public | • On-site assessment | • Can identify deficiencies in any of the pedestrian network principles | No NZ guidance available.<br>Victoria Walks Walking Audit<br>Also refer to Pedestrian Environment Review System (PERS) below |
| Community street reviews (CSR) | • All principles | • Structured route-specific assessment of walkability from pedestrians' point of view to assess the quality of an existing street environment | • Members of the public guided by practitioners | • On-site assessment – customer rating | • Collate overall feedback on a route and an indication of the walkability<br>• Gives an indication of pedestrian preferences /experiences<br>• Can get feedback from a range of different pedestrian perspectives (including those with various impairments)<br>• Can be labour intensive as requires recruiting members of the public | Guide to undertaking CSRs |

| Method | Pedestrian network characteristics method can assess | Purpose and when to use | Who can use the method | Data collection technique | Strengths/weaknesses | Further information |
|---|---|---|---|---|---|---|
| Predicting walkability | • Safe<br>• Comfortable | • To forecast the extent to which an intervention can improve walkability and therefore attract more pedestrians. The models are based on the measurable physical characteristics of some walking environments and comparing them to user ratings of those environments. | • Practitioners | • Desktop assessment with on-site measurements if necessary | • Requires detailed data on physical attributes of the walking environment<br>• Seeks to reconcile physical attributes of the walking environment and pedestrians' perceptions<br>• The walkability prediction does not capture aspects of inclusive access relevant for disabled people | NZ Transport Agency Waka Kotahi Research Report 452 Predicting walkability |
| Pedestrian level of service (PLOS) assessment tool | • Safe<br>• Comfortable<br>• Legible<br>• Attractive | • Assesses existing and proposed streets against 5 outcomes | • Practitioners | • On-site assessment | • Still being piloted; may require refinement<br>• Not specifically targeted at needs of mobility & visually impaired pedestrians<br>• Hasn't been developed for shared paths<br>• Focused on section of street including intersections | NZ Transport Agency Waka Kotahi Research Report 667 Developing methodologies for improving customer levels of service for walking |
| Healthy streets check for designers | • Safe<br>• Comfortable<br>• Legible<br>• Attractive | • To assess existing streets and designs of proposed street layouts against 10 Healthy Streets Indicators. | • Practitioners | • On-site and desktop assessment using a spreadsheet tool | • Requires concept drawings and local survey data<br>• Extends beyond walkability for pedestrians to other users (people cycling, | Healthy Streets Design Check – NZ version |

| Method | Pedestrian network characteristics method can assess | Purpose and when to use | Who can use the method | Data collection technique | Strengths/weaknesses | Further information |
|---|---|---|---|---|---|---|
| | | | | | public transport users)<br>• Can inform design improvements or option selection. | |
| Public life tools | • All principles | • Surveys of public spaces and the public life that takes place in them. | • Anyone | • On-site surveys and assessments | • Can focus on site, neighbourhood or city scale<br>• Range of tools in the form of templates for different applications. | Great Public Spaces Toolkit developed by NSW government, Australia |
| Walk score | • Direct<br>• Connected | • Accessibility analysis taking distance to destinations and densities into account. Use to assess walking proximity of an address to key destinations. | • Anyone | • Online Tool | • Automatic and free tool that returns a walk score for any address<br>• Does not take the quality of infrastructure, safety, or pedestrians' perceptions into account | Walkscore |
| Accessibility assessment | • Connected | • Measures the connectivity of the pedestrian network as a proxy measure for walkability. Can be used to assess available routes between walking trip origins and destinations | • Practitioners | • Desktop Assessment | • Gives an indication of connectivity for any given route with little data required<br>• Allows comparison of routes<br>• Is a broad brush tool and does not consider safety, user perceptions, or special needs into account. | NZ Transport Agency Waka Kotahi Research Report 512 The New Zealand accessibility analysis methodology |

| Method | Pedestrian network characteristics method can assess | Purpose and when to use | Who can use the method | Data collection technique | Strengths/weaknesses | Further information |
|---|---|---|---|---|---|---|
| Connectivity assessment | • Connected | • Measures the connectivity of the pedestrian network as a proxy measure for walkability. Can be used to assess available routes between walking trip origins and destinations | • Practitioners | • Desktop Assessment | • Gives an indication of connectivity for any given route with little data required<br>• Allows comparison of routes<br>• Is a broad brush tool and does not consider safety, user perceptions, or special needs into account. | Connectivity Assessment |
| Street accessibility audit | • Inclusive | • To identify how well an environment performs for disabled and older pedestrians, identify any deficiencies and recommend specific improvements to paths, crossings and accessible parking. | • Practitioners typically engaging with user groups such as disabled and older people | • Workshop and technical audit | • Provides councils with prioritised list of maintenance and other recommended improvements.<br>• Provides estimates of remediation costs<br>• Narrow focus (on inclusive access) means it does not assess overall walkability but can identify deficiencies | Street Accessibility Audit |
| Pedestrian environment review system (PERS) | • All principles | • A systematic process to assess the pedestrian environment through quantitative and qualitative data. | • Proprietary software used by practitioners | • On-site assessment and desk-based analysis | • Comprehensive and relatively objective<br>• Data-intensive methodology<br>• Does not capture user pedestrians' perceptions | PERS Factsheet |

| Method | Pedestrian network characteristics method can assess | Purpose and when to use | Who can use the method | Data collection technique | Strengths/weaknesses | Further information |
|---|---|---|---|---|---|---|
| State of place | • All principles | • Urban Data Analytics platform for area-wide walkability and urban realm assessment. Can be used to assess urban realm improvements and for business cases. | • Proprietary software used by practitioners | • On-site & online data collection<br>• Desk-based software analysis | • The process is mostly automated<br>• The algorithm was developed in a US context so some criteria may not be suitable for NZ context.<br>• Allows comparison of areas<br>• Allows prioritisation of improvements and quantifying their benefits | State of Place |