THE PEDESTRIAN NETWORK PLANNING PROCESS

A range of plans and programmes influence walking in neighbourhoods. They use a similar community planning process to ensure that any actions will effectively address perceived issues as well as more objectively measured problems.

Community involvement should be at the heart of developing any scheme to improve a neighbourhood. Suggestions are made about who to involve along with useful techniques for engaging with the community.

The analysis phase involves assessing the state of the existing walking environment, identifying options for improvement, and understanding where improvements would benefit the most users. Such analysis provides a sound basis for choosing options and prioritising initiatives.

Finally, suggestions are given about getting the planned improvements built.

7 PLANNING FOR PEDESTRIANS

CONSIDER WALKING IN RELATION TO OTHER PLANNING PROCESSES AND PROGRAMMES

Integrate walking into neighbourhood planning processes

Determine the appropriate mix of programmes that affect walking

Coordinate with school and workplace travel plans

Review district plan provision for walking and resource consent processes

7.1 Introduction

Once a walking strategy has been developed for a local authority, attention will focus on planning for the needs of pedestrians in each locality. This needs to consider what other planning activities are already happening that affect walking and what combination of these may be appropriate in the circumstances.

There are a variety of approaches that vary in their transport scope and targets. Ideally, planning for an area should be an integrated process considering all community needs and aspirations in a *community development plan*. Traffic calming measures may be considered in a *local area traffic management plan* (LATM). A *neighbourhood accessibility plan* may consider access needs by all modes including cycling, walking and access to public transport stops. Walking needs alone may be addressed in a *community walking plan*. Particular destinations such as schools and businesses may have their own travel plans. All of these planning programmes follow a broadly similar process which is to involve the community to identify problems and potential solutions, collect information, analyse problems, assess options, decide on actions, prioritise them, put them in a programme of funded actions and implement them, as shown in figure 7.1.

Table 7.1 briefly summarises the scale, scope and groups that are targeted by each of these planning programmes. All of them should consider the needs and aspirations of pedestrians for safe walkable conditions and in this respect should generally follow the process outlined in this guide.
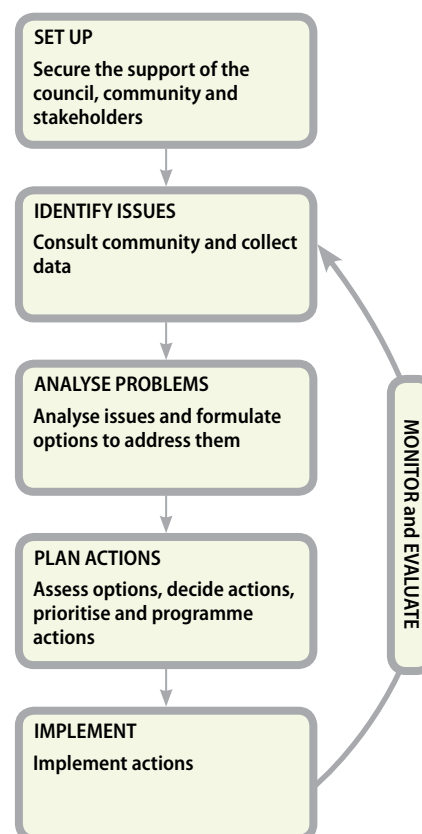
SET UP
Secure the support of the council, community and stakeholders

IDENTIFY ISSUES
Consult community and collect data

ANALYSE PROBLEMS
Analyse issues and formulate options to address them

PLAN ACTIONS
Assess options, decide actions, prioritise and programme actions

IMPLEMENT
Implement actions

MONITOR and EVALUATE

Figure 7.1 Community planning process [74]

Table 7.1 – Nature of community planning programmes			
Plan or programme	**Scale**	**Scope**	**Targets needs of**
Community development plans	**Whole neighbourhood**	**All issues**	**Everyone**
Local area traffic management plans	**Whole neighbourhood**	**Traffic**	**Everyone**
Neighbourhood accessibility plans	**Whole neighbourhood or defined area**	**Active modes plus public transport**	**Everyone**
Community walking plans	**Whole neighbourhood**	**Walking**	**Everyone**
Workplace travel plans	**Site-based**	**All modes**	**Staff/visitors**
School travel plans	**Site-based**	**Active modes plus public transport**	**Children/parents**
Safe routes to school	**Site-based**	**Active modes**	**Children/parents**

Some plans focus more on walking than others, with community walking plans focusing solely on walking. Because all these programmes involve related data needs and processes, integration between them is desirable to achieve potential synergies. When planning projects it will be important to use the most appropriate mix of programmes and tailor them to the needs of each community. The approach depends on a number of factors, including the issues in the community concerned, the goals and the target group. It is important to consider carefully the most appropriate approach to achieve the required results.

The Land Transport NZ community-focused programmes activity class provides resources to prepare plans for improving safety and accessibility for walking and cycling.

The different programmes are discussed in more detail below.

Photo 7.1 – Pedestrian precinct, Christchurch (Photo: Susan Cambridge)

Photo 7.2 – Walking environment, Auckland (Photo: David Croft)

# 7.2 Neighbourhood-wide plans

While fully integrated community development plans are desirable for each neighbourhood, comprehensive approaches are only common for planning new communities and for run-down areas targeted for urban renewal in neighbourhood improvement plans.

Where the speed and volume of through traffic is creating difficulties, local area traffic management plans (LATMs) detail traffic calming measures. Reducing the volume and speed of traffic is the most effective way of improving the pedestrian environment as outlined in the hierarchy for considering solutions in section 5.4. When developing LATMs, locations where pedestrian desire lines cross roads should receive particular attention.

Neighbourhood accessibility plans

Neighbourhood accessibility plans focus on providing access by walking and cycling to local destinations, bus stops, railway stations and extenal links. Detailed guidance on conducting neighbourhood accessibility planning projects is contained in *Neighbourhood accessibility planning – guidelines for facilitators* [74], currently a draft manual which will be available on the Land Transport NZ website. These guidelines may also be helpful in preparing community walking plans as they have many features in common. Assistance and advice on resolving major safety issues when planning for walking is available from Land Transport NZ regional staff.

The Land Transport NZ community-focused programmes activity class provides resources to prepare these plans.
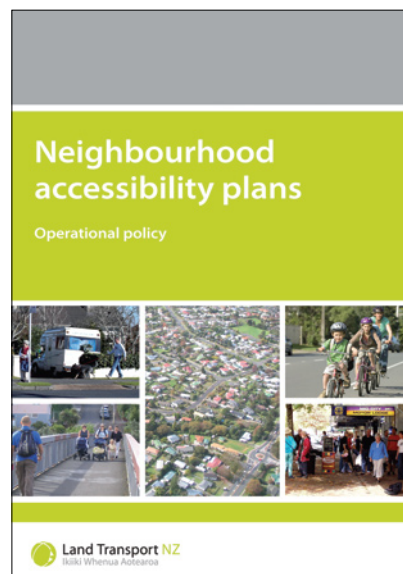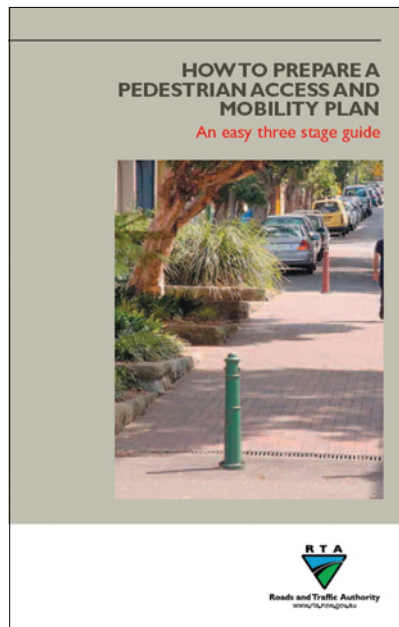
Community walking plans

Varying conditions within local authority areas will affect the walking environment. For instance, pedestrians in a small rural settlement will potentially have different trip characteristics from those in a larger city.

Consequently, the general walking strategy for the local authority area should be supplemented by community walking plans that are specific to small areas, setting out details relating to particular issues and difficulties, and remedial actions in those areas [125]. A community walking plan may be part of a broader neighbourhood planning process, provided walking needs and options are dealt with in the same comprehensive way as they would be in a stand-alone walking plan. Community walking plans are described more fully in section 8.

The Land Transport NZ community–focused programmes activity class provides resources to prepare these plans.

HOW TO PREPARE A PEDESTRIAN ACCESS AND MOBILITY PLAN
An easy three stage guide

RTA
Roads and Traffic Authority

7.3 Workplace travel plans

A workplace travel plan is an integrated package of measures specific to an existing or proposed development, site or organisation, which aims to promote alternative travel choices to, and reduce reliance on, single-occupancy private car use [44]. It should consider transport options and information for all trips to and from the site, whether by staff, customers or other visitors. It can be produced:

- to improve access by other transport modes to the site
- as a strategic business tool to minimise parking problems, reduce car park maintenance costs, or enable car parks to be used for other purposes
- to reduce congestion and improve safety in the local area
- to meet road controlling authority (RCA) requirements as part of a resource consent application
- to help in recruiting and retaining employees
- to demonstrate an organisation's environmental credentials
- to encourage employees to follow a healthier lifestyle.

Workplace travel plans vary in complexity and detail, but generally include measures and activities in the workplace to support alternative forms of travel, together with a consideration of improvements required on the wider transport networks. Each plan is also likely to contain clearly stated objectives and measurable targets to ensure real and sustainable improvements in non-car travel.

Walking plays an important part in a business travel plan because short journeys can easily be made on foot and walking is part of accessing other forms of travel, particularly public transport [44].

When preparing a workplace travel plan, it helps to have a good-quality walking environment already provided by the RCA at key locations and on major pedestrian routes in the vicinity of the development, site or organisation. Where this is not the case, one action for the plan may be to lobby for improvements.

The Land Transport NZ community-focused programmes activity class provides resources to prepare these plans.

Workplace travel plan coordinator's guide

Land Transport NZ
Ikiiki Whenua Aotearoa

7.4 School travel plans and safe routes to school

Journeys to school are of key safety importance because:

- younger pedestrians are at greater risk of being involved in a crash [76]
- journeys on foot account for nearly a third of all trips made to and from school [76].

Making pedestrian routes to school safer can also help increase the number of walking trips, which then [129]:

- reduces car-based trips to school, reducing congestion on the wider road network
- reduces congestion at the school entrance
- improves children's health through increased exercise
- equips children with better road safety awareness.

Two programmes have been developed in response to the need to reduce injuries and increase the number of walking trips for school children: *school travel plans* and *safe routes to school*. Both are very similar in their process.

The Land Transport NZ community-focused programmes activity class provides resources to prepare these plans.

The needs of schools vary. At some schools the main issue may be encouraging more walking and cycling to school, less car travel and a reduction in congestion near the school gate. School travel plans were initially conceived with this emphasis. Safety engineering is involved to the extent that perceived dangers are an obstacle to more walking and cycling.

Photo 7.3 – Walking school bus, Christchurch

Photo 7.4 – Safe routes to school crossing point sign, Christchurch (Photo: Tim Hughes)

At other schools the main aim may be to improve the conditions for the majority of children that are already walking or cycling to school. Safety engineering is always a key issue at these schools and travel behaviour change may only be a minor element. This is more typical of lower socio-economic areas. The safe routes to school programme was initially conceived with this emphasis.

As the programmes have developed, each has adopted the key elements of the other.

All school-based programmes aim to improve safety and remove institutional, physical and attitudinal barriers to walking (and cycling) to and from school [129]. They can be highly effective in increasing the number of children walking [63]. From a planning and design perspective, they typically involve improving and/or installing [89, 129]:

- road crossing facilities
- vehicle speed-reduction devices
- pedestrian and cycle paths
- road markings
- signs to warn drivers of the presence of children
- lighting
- traffic management measures.

Measures can be highly targeted, as this is one of the few cases where pedestrian trip origins and destinations can easily be identified (from school records of pupils' addresses), as can associated risks (through reviewing accident records).

However, the approach is more comprehensive than solely providing infrastructure, as maximising walking journeys and overcoming obstacles require behavioural changes from a range of stakeholders [121]. To this end, school-based programmes take a multi-disciplinary approach, allow for joint work across several agencies, and actively involve the wider school community by having:

- teaching staff incorporate road safety within the school curriculum
- children at the school map their own routes, identify physical barriers and suggest ways to solve the problems
- parents who would normally drive their children to school being made aware of their impacts upon those walking and upon the wellbeing of their own children.

7.5 Resource consent applications

The resource consent application stage can offer opportunities to make improvements for pedestrians. For example, local authorities can ask for workplace travel plans as part of granting consents.

When assessing resource consent applications, RCAs should ensure that all potential impacts on pedestrians of the development or subdivision have been fully considered, assessed and mitigated by people with appropriate skills [46, 169]. This includes the walking routes within the site (for example through car parks) as well as those external to it, both during and after construction. It also includes pedestrian provision in subdivisions. These policies need to be included in district and city plans.

Photo 7.5 – Car park, Christchurch (Photo: Megan Fowler)

As a very 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, all new infrastructure should be provided to a standard higher than the permissible minimum, and city and district plans should reflect this. Urban developments are more likely to be successful, and to have a higher economic value, if pedestrians are properly catered for [26].

If an application involves apparently unused public land (including road reserves), the 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.

Proposed residential communities raise unique issues. As they will provide a place for people to live, through traffic should be discouraged and the pedestrian environment be of a high quality. The layout should provide continuous footpaths and direct walking routes to key destinations (including retail centres and bus stops). Traffic-calming techniques should apply to all new residential development (although this does not remove the need for good design in the first place) [114].

Gated residential communities can be a barrier to pedestrian routes. Where one is proposed, pedestrian access through it should be maintained. In the unlikely event that this is not feasible, existing formal or informal pedestrian routes should not be blocked.

Appendix 2 discusses matters that should be addressed in district plans.

8 PEDESTRIAN PLANNING PROCESS

SYSTEMATICALLY PLAN FOR PEDESTRIAN NEEDS IN EACH AREA
Define the scope, the area and who to involve
Research the area and its issues
Develop and assess solutions
Prioritise actions
Implement
Review

8.1 Introduction

This section focuses on the pedestrian planning process for community walking plans. The general process used is common to other planning programmes that consider pedestrian needs, such as workplace travel plans, neighbourhood accessibility plans, and school-based programmes.

8.2 Define objectives

A community walking plan should have clear objectives that can be achieved within a reasonable timescale and be monitored (see section 19). Objectives should always support the community's walkability (see section 4), but may also focus on particular issues such as [125]:

- improving accessibility for all pedestrians
- improving accessibility for particular types of pedestrian
- identifying and resolving pedestrian crash issues
- reducing severance on all pedestrian routes
- improving links to other transport services
- accommodating pedestrians' special event needs
- enhancing road crossing opportunities
- providing a consistent level of walking environment
- providing and improving relevant pedestrian facilities for the prevailing land use(s)
- integrating recreational and road corridor routes
- encouraging behavioural change.

8.3 Select appropriate stakeholders

The most effective community walking plans involve a cross-section of the local authority and community from the outset. Depending on the needs of the area, it may be appropriate to involve:

- planners
- traffic and/or roading engineers
- road safety officer(s)/coordinator(s)
- accessibility officer(s)
- the road controlling authority walking advocate
- walking advocacy groups
- public transport operators

Photo 8.1 – Stakeholders meeting, Mount Manganui (Photo: Megan Fowler)

- New Zealand Police community constables
- representatives from local walking and running clubs
- elected members
- community board representatives
- representatives of local iwi
- business representatives from the area
- community representatives
- a cross-section of individual members of the community
- the local Land Transport NZ area engineer.

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

8.4 Define the area

Community walking plans should relate to areas that have common elements defined by factors such as:

- geographic area
- land use
- administrative boundaries
- planning designations
- the scale of pedestrian activity
- the types of pedestrian present and/or expected.

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.

8.5 Research the area

The area's current and likely future characteristics for walking should be identified using a twofold approach, as shown in Table 8.1.

Table 8.1 – Approaches to researching the area		
Approach	**Purpose**	**Data to be gathered**
National and local policy/strategy documents	**To define the overarching framework for community walking plans**	• **Local and neighbouring walking strategies** • **Disability and access policies** • **Land use allocations and zoning** • **Resource consent applications** • **Workplace travel plans** • **Safe routes to school/school travel plans** • **Neighbourhood improvement plans**
Desktop assessment	**To identify how the area appears to be used at present**	• **Pedestrian crash data** • **Traffic surveys** • **Pedestrian demand/surveys** • **Key trip origins and destinations** • **Likely points of severance** • **Social/demographic population data** • **Public transport routes/service frequencies** • **Land uses** • **Maintenance records** • **Existing pedestrian facilities** • **Letters of complaint** • **Community satisfaction surveys**

Researching the area also involves assessing demand. See section 10 for details on how to do this.

8.6 Site visits

Although the research will collect a substantial amount of information, site visits should always be done to check how the walking networks are used in practice and to observe pedestrian behaviour – at peak-use times and in some cases after dark. Additional data collection exercises can be undertaken if required.

Factors that should be confirmed through site visits and interviews include:

- trip origins and destinations
- community severance locations and extent
- the extent of pedestrian infrastructure provided
- the types of pedestrian present
- public transport stops
- areas of high pedestrian use
- footpath condition
- informal routes used (such as worn paths on grass)
- walking hazards and barriers
- signage (and lack of signage)
- pedestrian behaviour
- opportunities for improving public spaces (art, seating etc)
- anomalies between mapped facilities and actual provision.

8.7 Using technology

Developing a community walking plan involves collecting, managing and analysing a considerable amount of data. Coding it onto a geographical information system (GIS) system as it is gathered will help to:

- preserve data integrity
- minimise the chances of data being accidentally lost
- enable data processing and analysis in future.

8.8 Walkability

It can be useful to determine the area's walkability, and walkability audits should be done on more heavily used routes. See section 11 for details of potential approaches.

8.9 Community involvement

The community should be involved because some hazards may have been overlooked during data collection and site visits. The data may not reflect community perceptions of problems that influence walking behaviour.

Community involvement should involve all parties using the area, including bus and taxi companies, local community services, schools and representatives of people with mobility and sensory impairments.

Section 9 sets out techniques for involving the community.

8.10 Define deficiencies and identify opportunities

After developing an 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 improvement. This can be done by examining:

- routes between trip origins and destinations
- apparently hazardous locations
- inconsistencies in infrastructure
- the condition of infrastructure
- informal pedestrian links
- areas where particular types of pedestrian are not properly accommodated.

8.11 Action plan

Once the deficiencies have been identified, the next stage involves developing remedial measures, 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 audit of particular areas may be needed to identify the most suitable solution.

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

As resources are likely to be constrained, the measures should be prioritised according to local circumstances. Section 12 covers the many ways this can be done.

8.12 Implementation

The action plan is followed by implementation, during which it is important to understand the role of walking advocacy groups, the community and partnerships. Section 13 covers implementation.

8.13 Monitoring and review

Community walking plans should be monitored and reviewed regularly to check their progress and success. Section 19 covers monitoring techniques.

9 COMMUNITY INVOLVEMENT IN SCHEME DEVELOPMENT

9.1 Introduction

The Land Transport Management Act (2002) and Local Government Act (2002) have specific requirements for community consultation. However, as everyone has the potential to be a pedestrian, and walking is an element of nearly every journey, ensuring effective community involvement in scheme development can require considerable effort and resources [48]. The community also needs to be involved in the planning and design of facilities on private land, such as new developments and retail areas.

9.2 Benefits of involving the community

Members of the development team may not have as much in-depth local knowledge or understand local issues as well as the people living close by who regularly walk in the area. By accessing and using this knowledge and experience, the team can ensure they identify the option with the greatest support and develop the most acceptable solution. They are more likely to get it right the first time and be cost effective if the community is involved [139].

Community involvement from the outset can improve the level of community buy-in. Involving the community in certain aspects of implementation (for example carrying out an education initiative) assists with the completion of tasks and can improve uptake of key messages. Community support can also add weight to preferred initiatives and ensure recommendations are better received by councils and other stakeholders.

Photo 9.1 – Community street review, Christchurch (Photo: Glen Koorey)

9.3 Groups to involve

Effective community involvement should focus on the scheme users and those directly affected [146]. These include:

- existing pedestrians
- people not currently walking but who might do so in future, such as those currently specifically excluded from walking, and potential visitors
- people directly affected by the provision for pedestrians, including other road users, those living nearby, and those responsible for managing the pedestrian network in the area
- people indirectly affected, including council officers, retailers and employers, and the emergency services
- people with various types of impairment.

These groups must have the opportunity to make meaningful contributions at all stages of planning and design, using techniques appropriate to the community or area. Consultation should not be a 'bolt-on' separate task [48, 103].

9.4 Techniques for involvement

Table 9.1 illustrates the techniques for involving the public [47, 48, 120, 146].

Table 9.1 – Specific techniques for community involvement		
Involvement	**Description**	**When used**
Providing information — Using the media	News releases or paid advertisements for radio, television and newspapers.	To provide initial contact for schemes. To gain initial views. To keep the public updated on progress. To thank them for being involved.
Posters, leaflets and information sheets	Promotional materials produced to inform the public.	To reach a wide audience while ensuring that information is consistently presented.
Public meetings	An 'open' meeting to which the public is invited to hear about the proposal and give their views.	To explain issues and encourage debate. Where no firm data is required. To demonstrate public involvement.
Undertaking consultation — Presentations	A formal presentation, usually given to individuals with a common interest.	To involve a specific audience. To obtain views on final designs for schemes.
Questionnaires/ surveys	Pre-planned questions about a proposal, posed to specific respondent groups.	When 'hard' data is needed. Where a high level of interest is expected. To help define and quantify issues, problems and concerns. To obtain views on final scheme designs.
Exhibitions	Visual displays of the proposal, displayed at a convenient venue.	Where there are specific options to present.
Focus groups	A series of meetings with up to 12 people comprising a cross-section or sub-section of the community, for discussion of the proposal.	To generate a deep understanding of a particular or complex issue by discussion and debate (qualitative data). To better understand the reasons for opinions/beliefs. To generate new ideas.
Facilitating participation — Transport forum/citizens' panel	A 'standing' group of interested individuals, set up on a longer-term basis and meeting regularly.	When informed contributions are required. Where there is a specific issue/question to address.
Community participatory events	Full community involvement in a series of informal, two-way workshops or street audits.	Where the involvement of the whole community is desirable. Where the outcome will be implemented. When physical issues are being investigated.
New technologies	New technologies are emerging to involve the public, such as using the internet for posting proposals for comment and providing online questionnaires.	When trying to reach members of the community that may not otherwise be involved. To supplement other facilitation measures.

The results of any public involvement technique must be interpreted cautiously, as they may not reflect the opinions of the 'silent majority' [146]. Equally, they may be unduly influenced by dominant personalities. To determine if this is the case, a random survey of those affected may help.

Bias can occur if stakeholders are not treated equitably or if certain groups are unfairly disadvantaged. It should be minimised by [48]:

- using appropriate statistical techniques to calculate sample sizes and confidence levels
- proactively managing the involvement of groups that might otherwise be excluded
- ensuring that, if there is only a small number of respondents, they are able to 'speak' for the majority.

9.5 Extent of community involvement

Community involvement should be planned to ensure it is at the heart of the development process. Ad hoc approaches can be inadequate.

Plans for community involvement will vary according to local circumstances and the scope of the scheme being considered. Consultation plans should be revised and updated as the scheme's development progresses, with the main issues for consideration being [48, 146]:

- defining affected parties
- the geographic area over which each affected group should be consulted
- key stage(s) of the planning/design process when the community should be involved
- the nature, extent and depth of the information required from the community at each of the identified stages
- the potential difficulties in obtaining the required information, including minimising bias, associated costs and impact on timescales
- the type of involvement for each group at each stage
- the ways by which additional groups will be included if necessary.

10 ASSESSING THE DEMAND FOR WALKING

ASSESS DEMAND FOR WALKING
Assess current demand for walking
Assess potential demand for walking
Identify locations where improvements are likely to lead to more walking

10.1 Introduction

It is important to establish pedestrian numbers and characteristics in any given location to ensure an appropriate walking infrastructure [115]. The techniques are useful not only for forecasting walking generation for new developments but also for retrofitting existing roads.

10.2 Key issues in assessing demand

Pedestrians are more likely to be found within and/or around residential areas, retail areas, transport interchanges/ nodes, major employers, tourist centres, leisure facilities and education establishments [29, 130, 169]. However, trip origins and destinations change with time, so forecasting walking demand is not a one-off process.

Existing 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 and/or institutional barriers to pedestrian movements. This is known as 'latent demand'.

10.3 Methods of assessing current demand

Pedestrian counts are one of the main ways to assess current demand – that is, directly observing the number of people walking in (or using) a particular area. Section 19 covers techniques and considerations for doing this.

The national census is also a useful source of background information, particularly for age groups, and travel to work and car ownership rates in specific areas or communities.

Other approaches can also be used, as shown in Table 10.1. All are useful but should not be used in isolation – a combination will provide a comprehensive understanding of likely existing demand.

Photo 10.1 – High demand for use of crossing facilities, Auckland (Photo: Judith Goodwin)

Table 10.1 – Ways to assess current demand for walking				
Technique	**Description**	**Benefits**	**Limitations**	**Application**
Crash data	Examine Land Transport NZ crash records to identify where pedestrians have been injured. This identifies areas used by pedestrians.	Simple to use. The data is readily available. The data is needed anyway for improvement measures. Reliable trends.	Does not identify heavily used but safe routes. May not identify unsafe routes avoided by pedestrians. Does not include incidents involving only pedestrians, such as falling. 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.
Planning information	Using the zoning system for land use to identify areas that are likely to generate or attract walking trips.	Uses readily available information. Very useful to identify common walking trip origins and destinations. Can be used to estimate the relative likelihood of walking trips.	Does not provide information about pedestrian numbers or routes. Can be costly if a high 'grain' of results is required. 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. 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. Information forms a base inventory that is useful for many other purposes.	Can be costly to collect and manage the information. Assumes previous provision was made in response to need, rather than for other reasons. 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 surveys	Gathering 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. Ministry of Transport data is regularly updated. 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. Data may not identify routes.	Use Ministry of Transport data only where local data is not available. Data should be used with care to prevent misrepresentation.
Census data	Finding information on mode of travel to work and the location of respondents' homes and workplaces.	Minimal cost of data collection. Data set is comprehensive for the working population. Other demographic factors can be included. Can be used to map key destinations.	Does not provide data on non-work trips. Does not identify routes. Costly to process because of extensive amounts of data. 'Snapshot' of one day only, and could be affected by other factors such as the weather. Does not include the elderly and children for whom walking is a key travel mode.	Offers only limited benefits – most of the results can be gained through other techniques.
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. Data may not identify routes.	If this data is already available, use it.

10.4 Methods of assessing future demand

There is currently no robust way of forecasting walking trip generation [49], and all current methods have limitations. However, forecasting methods can help identify schemes that have the greatest potential and can estimate improvements that will attract the most new users.

This guide does not consider building infrastructure on an ad hoc or parochial basis. While the approach is well intentioned and can sometimes create benefits for pedestrians, a more focused approach is better as resources are invariably limited and not all improvements can be funded [49].

Table 10.2 sets out some specific approaches [49]. These have not been rigorously tested within New Zealand and further work is required to confirm their validity.

Table 10.2 – 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. Easy to understand. Easy to apply.	Only provides a rough estimate of demand. Difficult to find comparable sites where all factors are similar (including environmental and social). May reflect changes that are unrelated to the 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. The equations are then applied to other areas to predict walking trips.	Fairly straightforward to apply using spreadsheets. Can be easily updated as new information emerges. Can also be used to identify the factors that most influence walking. Certain data is already collected (population characteristics and land use). Can be used to forecast trips over a wider area.	Wide variety of possible influencing factors may mean some issues are overlooked. Models need to be validated before use. Sufficient data capturing all possible factors may not be readily available. Not suitable to assess the impacts of small-scale schemes. Using aggregate data does not take into account individual factors. 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. Makes good use of data that already exists or can be easily collected. Can be applied to trips within specific corridors. Can be very accurate, particularly for high-density areas. Can be used to determine the location of improvement schemes and for prioritising. Can be easily updated as new information emerges.	Disregards some issues that affect walking (such as environmental factors). Does not consider latent demand. Validation is required before use as models may be location specific. 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. Very good at isolating the effects of specific factors. Can be used to relate factors (such as whether age affects crossing facility preference). Takes into account individuals' preferences. 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. Requires considerable modelling expertise. Wide variety of possible influencing factors may mean some issues are overlooked. 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. Provides an integrated framework for considering walking. Can be a very powerful tool. Model outputs can become inputs for sketch plans.	Spatial scale of existing models may be too great. May require considerable data collection. 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.

11 MEASURING WALKABILITY

11.1 Introduction

Measuring the walkability of an area or route means quantifying pedestrian experiences consistently. It can be done through a 'desktop' analysis of connectivity and as an on-site assessment of the quality of routes. Taken together, they create a good understanding of the ease by which pedestrians can move around an area.

There are no national thresholds for walkability indicators in New Zealand. Road controlling authorities (RCAs) may set a suitable minimum threshold, otherwise it is left to the design team to assess what is acceptable and what is not. However, Land Transport NZ is currently developing walkability assessment systems in New Zealand.

11.2 Desktop assessment of walkability

Desktop analysis 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 signing and irregular surfaces, although all may affect pedestrians [100].

The several existing approaches to desktop assessment of walkability [5, 23, 95, 99, 115, 158, 171] can be used in isolation or combination. As some elements of walkability are very difficult to quantify accurately, the connectivity of the pedestrian network is used as a proxy measure, through identifying and assessing the routes between potential walking trip origins and destinations. In some cases, such as for trips from home, it may be impractical to identify every trip origin, so a representative sample should be used. Table 11.1 has some examples of ways to assess connectivity.

Photo 11.1 – Quality walkable link from car park, Nelson (Photo: Tim Hughes)

Table 11.1 – Ways to assess connectivity

Technique	Indicator
Pair each potential origin with a common destination to identify the mean walking distance.	Walkability reduces as distance increases.
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.
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.
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.
As a variation on the above: 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.
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.

11.3 On-site assessment of walkability

On-site assessments of walkability generally involve the use of:

- consumer tests and ratings
- technical audits and reviews.

Using a technique that is inclusive of both these techniques is recommended. However, any assessment tool needs to be sufficiently easy to use, so that it gets used, yet sufficiently comprehensive to give consistent and meaningful results.

Consumer tests and ratings

These involve assessments of user perceptions and suggestions for improvements. They use numeric ratings of the walking environment so that comparisons with other infrastructure can be made.

Assessments of walkability by pedestrians have the advantage of reflecting 'real world' experience and taking into account environmental and psychological factors. They can also be targeted to particularly vulnerable pedestrian groups [36]. However, they require active local public participation as community contributions are needed to reflect the true views of local pedestrians, and can only be carried out for newly constructed or existing routes [36, 99, 100].

These use checklists and rating systems against which pedestrians compare their own experience as they travel along the route [1, 23, 52, 100, 123, 158, 167]. This means assessments are subjective and results can vary according to individuals' abilities and confidence, and the prevailing conditions.

To minimise any bias, the same route should be assessed using different pedestrians at different times, including during hours of darkness, or using a group and requiring a consensus on each issue. Issuing pedestrians with single-use or digital cameras can also be useful, so that problems can be photographed and easily fed back to the RCA.

The checklist complexity may vary, but should be tailored to match the characteristics of the pedestrians undertaking the assessment. Including more details may generate more comprehensive and focused comments from some pedestrians, but it may be unsuitable for children [52]. Conversely, a shorter checklist may provide only a rudimentary assessment of the route, but is simpler to use.

Checklists must be presented appropriately, which means:

- minimising the use of jargon
- maximising the 'reading ease index'
- using a suitable font size
- using different languages for people whose first language is not English.

The criteria on checklists have several categories such as [1, 23, 52, 96, 100, 123, 158, 167]:

- footpath surfaces and alignments
- obstructions on the footpath (permanent and temporary, including parked cars)
- provision of crossing facilities, including delays
- perceived personal safety
- enjoyment of the journey
- the route directness
- congestion and crowding on the footpath
- provision for different types of pedestrian
- characteristics of adjacent motorised traffic
- characteristics of landscaping and street furniture
- signage.

A simple checklist may ask respondents to rate each of the above on a scale, with the results being weighted and combined to quantify the walkability. More complex checklists use a series of more specific questions within each category, but a correspondingly limited range of responses [52, 100, 123, 158].

Community street review procedures have been developed for New Zealand by a Health Sponsorship Council project [1]. Community street reviews combine the community street audit approach which identifies deficiencies and opportunities for improvements with a user perceptions rating system. The procedure rates the environment with respect to overall walkability (or the extent to which the place was walking friendly), as well as more detailed characteristics:

- safe from traffic   – *I felt safe from traffic danger*
- safe from falling   – *I felt safe from slips, trips and falls*
- obstacle free   – *I was unhindered by physical features*
- secure   – *I felt safe from intimidation or physical attack*
- efficient   – *I was unimpeded by others*
- pleasant   – *I enjoyed being in this place*
- direct   – *I did not have to detour to use this crossing point.*

Using this procedure will ensure sites are assessed on a common basis.
The procedures and survey forms are available at a link from the Land Transport NZ website.

Technical audits and reviews

Technical audit and review tools are complementary to consumer tests and ratings.
These can include:

- technical deficiency assessments relating to design and maintenance
- a numerical rating system that predicts walkability and pedestrian level of service based on measured technical factors.

A tool that has been used overseas to technically assess walkability is PERS (pedestrian environment review system) [158]. Such tools use checklists similar to those used for consumer tests and ratings, but with a technical focus to evaluate walkability. It is important that if such tools are used they can be shown by research to predict the perceptions of pedestrians. New Zealand pedestrian technical audit and review tools are under development.

Modelling walkability

Research is being conducted in several countries, with Florida, USA having published research on developing models that predict walkability on paths alongside roads and crossing roads at signalised intersections [94]. The models are based on the measurable physical characteristics of some walking environments and comparing them to user ratings of those environments. Land Transport NZ has also begun to develop a database of perception surveys and site characteristics that can be used to develop and validate any prediction models.

Accessibility assessment

Walkability assessment relates to the broader assessment of accessibility which is concerned with how easy it is to access goods and services by different transport modes. Key destinations include shops, schools and medical services. Accessibility assessment for the walking mode measures and maps how easy it is to walk directly to those destinations. It includes walking access to bus stops or rail stations for destinations reached by public transport. In England, accessibility analysis is required in the preparation of all local transport plans. Software has been developed to automate this. Thematic maps are produced showing for example the locations of households within 1 km walking distance of a primary school, or households within 1 hour public transport trip of a public hospital. Land Transport NZ has research projects aiming to develop similar tools for use in New Zealand.

12 PRIORITISING SCHEMES AND MEASURES

DECIDE WHICH SCHEMES SHOULD BE DONE FIRST
Adopt an appropriate prioritisation process
Put projects into priority order

12.1 Introduction

Prioritising improvement schemes and measures involves a significant number of factors – there is no simple assessment process. The situation is further complicated when implementing other roading and cycling projects, as these may create the opportunity to bring forward comparatively low-ranked walking schemes, but in a highly cost-effective way. The approaches here aim to help decide which schemes should be implemented first, once the methods for each have been decided.

12.2 Approaches to prioritising

While several criteria are easily applied, each has drawbacks, so it is a good idea to assess schemes using several approaches, then implementing those that perform well overall [24, 125]. 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 [36]. Table 12.1 presents some prioritisation schemes.

The ultimate approach to prioritising schemes, however, is to select a method based on the expected improvement in walkability received by the greatest number of new and existing pedestrians. This depends on being able to measure and predict levels of walkability and latent demand but shows potential as a prioritising measure in the future.
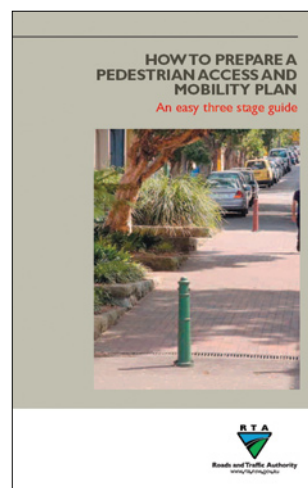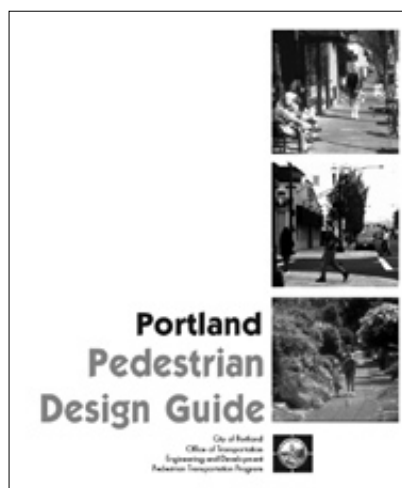
Table 12.1 – Prioritisation schemes to benefit pedestrians [23, 125]

Method	Priority given to	Advantages	Disadvantages
Pedestrian numbers	Schemes on routes with existing high pedestrian use.	Ensures that the greatest number of pedestrians will benefit from the treatment. Can be useful to identify high-profile schemes that help demonstrate a commitment to walking.	Fails to consider areas where flows are suppressed by hazards, physical difficulties or personal safety concerns. Difficulties in comparing pedestrian flows, due to their inherent variability.
Trip linkage	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. Can be useful to identify high-profile schemes that help demonstrate a commitment to walking. May reflect latent demand.	Does not consider pedestrian numbers. Takes no account of whether there are actual or perceived problems.
Barrier/gap removal	Schemes that remove physical obstacles on routes where the surrounding pedestrian facilities are of high quality.	Creates continuous routes. Straightforward to identify physical barriers. Especially effective in creating the core of the pedestrian network.	Difficult to ascertain perceived barriers without considerable data.
Proximity	Schemes that are geographically closest to a major trip origin or destination.	May benefit the maximum number of pedestrians, as the likelihood of walking declines with increasing distance. May reflect latent demand. Trip origins and destinations are straightforward to identify.	Does not consider pedestrian numbers. Takes no account of whether there are actual or perceived problems.
Land use	Schemes in areas likely to be used by vulnerable pedestrian groups, such as in the vicinity of schools and hospitals.	Can have a major effect on crash rates in the area(s) treated. The type of land use to be treated can easily be changed. Creates a high-quality environment for pedestrians, albeit in a limited area.	Disregards longer-distance routes between origins and destinations. May not support connected networks. May not identify the needs of other pedestrians in areas of different land uses.
Perceived need	Schemes in areas where pedestrians feel there is the greatest need, determined through consultation.	Has the potential to reflect latent demand. Can be useful to demonstrate publicly a commitment to schemes.	Actual need may be different from perceived need. Requires a consultation exercise. Only reflects the views of those consulted.
Crash records	Schemes that generate the greatest potential crash cost savings.	Crash data is easily available. Can result in cost-effective solutions.	Significant under-reporting of pedestrian accidents means not all locations will be identified. May not account fully for places that pedestrians may avoid because of poor perceptions and long delays.
Demonstrable achievement	Schemes that are the cheapest and/or easiest to implement.	Generates the maximum number of schemes on the ground.	Does not consider the perceived pedestrian need for schemes. The cheapest and easiest solutions may not be the most cost effective or appropriate.
Road hierarchy	Schemes on roads that are higher in the roading hierarchy.	Ensures that roads where pedestrians are especially vulnerable are treated. May reflect latent demand. Road hierarchy is widely available.	Does not consider pedestrian numbers or desire lines. Takes no account of whether there are actual or perceived problems.
Combined approach taking into account pedestrians' actual and perceived needs	Schemes that take into account safety factors and exposure for existing and expected future use.	Holistic approach.	

13 IMPLEMENTATION

IMPLEMENT PROJECTS THAT PROVIDE FOR PEDESTRIANS

Establish walking champions and walking advisory groups

Fund walking projects

Provide for walking in other infrastructure projects

Audit all infrastructure projects for effects on pedestrians

13.1 Introduction

Each road controlling authority (RCA) is required to take positive steps to promote and provide facilities for walking. The walking strategy and community action plans create a framework for this, but there are a number of procedural and institutional ways to accomplish it. This section discusses other important stages in the implementation process.

13.2 Walking champions

A walking champion is an individual, or group of individuals working for the RCA, who encourage, support and enable pedestrian activity. The walking champion's role may include:

- representing pedestrian needs and views
- raising awareness of walking as a means of travel
- identifying and promoting best practice
- seeking improved conditions for pedestrians
- lobbying for suitable infrastructure standards
- acting as a coordinator and information disseminator
- connecting, facilitating and engaging different agencies and skills, eg roading, parks, health and planning
- ensuring that personnel across departments have the necessary skills to plan and design for pedestrian needs.

Walking affects a range of disciplines, and consequently all RCA departments or divisions are responsible to differing extents for considering pedestrian needs. To help in this, every RCA should designate one person as a focal point for all enquiries from colleagues and the general public.

The walking champion should have sufficient seniority to ensure their comments carry weight, but should not be so senior that their availability and approachability are hampered [13]. They should be a permanent employee of the RCA to minimise the potential of their specialist knowledge being lost.

The RCA should also establish a pedestrian advisory group, made up of a wide cross-section of people with an interest or expertise in walking. Although it should operate independently of the RCA, the advisory group should be consulted on every strategy or scheme that could affect pedestrian movement [13].

Elected members have a significant role in advocacy, and any walking policy, scheme or strategy must have their support to be effective. All members should be fully briefed on the benefits of walking, and additional time taken as needed to explain matters in full before they make any decisions [103].

The role of pedestrians in advocacy should not be underestimated. Many walking advocacy groups form without any RCA intervention in response to particular circumstances or needs, although the RCA can also help establish them. The RCA should always ensure that such advocacy groups reflect representative views or are otherwise able to speak for the majority.

13.3 Training

Because walking trips are so diverse, it is essential that everyone involved in providing services for the built and natural environment has appropriate knowledge of pedestrians and walking [112].

The extent of each individual's knowledge will depend on their role. For example, those involved in land use and transport planning and infrastructure provision require a detailed understanding, as pedestrians and walking trips should be fully integrated within those disciplines. However, people in other fields may have (and require) no more than a basic

understanding. Training may be required for those not directly involved with pedestrian planning and design.

13.4 Community involvement

Section 9 discusses community involvement in schemes in detail, but it is important to stress the need to keep the community informed of progress during implementation.

13.5 Importance of partnerships

Partnerships may be appropriate during implementation. They could be with local councils, businesses, public transport operators, sports trusts, district health boards, individuals and the wider community.

For example, partnerships could be:

- between local workplaces that have few employees on collective travel plan measures (eg a shuttle bus for employees)
- with local organisations or schools, a public transport operator and a local authority with the aim of increasing the service frequency
- between an RCA and a school to deliver improved pedestrian facilities
- between businesses within a retail area to improve the street scene and pedestrian access.

13.6 Funding

Funding and subsidy is available from Land Transport NZ for improvements to pedestrian facilities. The process is set out in Land Transport NZ's *Programme and funding manual* [152]. Projects should

be identified in the RCA's walking strategic plan.

When the RCA considers additional or improved pedestrian provision is required because of the effects of a new development, it can ask the developer for a financial contribution to their cost. 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 council community plans prepared under the Local Government Act may also set out developer contribution policies.

13.7 Pedestrians within other infrastructure projects

Each RCA develops programmes setting out the infrastructure works to be implemented in the future. All projects affect pedestrians, so every project is a walking project. Pedestrian improvement schemes should be integrated with other infrastructure works where they can be incorporated most easily and cost effectively [46].

One way to integrate pedestrian projects within a wider improvements programme is to superimpose the locations of the forward works on a plan of the main routes of the pedestrian network. Work can then focus on locations where the works overlap and/or severely disrupt the network.

All projects that could affect pedestrian movement should routinely be assessed for this and ensure that opportunities for improvement are identified. The planning/design team must also consider involving the wider community at appropriate stages. Such schemes should be assessed by a walking advocate and circulated to the members of the pedestrian advisory group. In areas of high pedestrian use, walkability audits at the pre-opening stage should be considered.

Most major roading schemes undergo either formal safety audits or less formal safety checks to ensure the proposed design does not raise any road safety concerns. These often focus on motorised traffic, but all safety audits or checks should also explicitly consider pedestrians. They should be done at the concept, detailed design and post-construction stages.

13.8 Non-motorised user audit

Safety audits do not currently consider walking convenience and other matters affecting walkability for pedestrians. They also fail to consider similar aspects for cyclists and equestrians. In the United Kingdom a new procedure has been developed called *non-motorised user audit* that provides a process for ensuring the design team fully considers and documents the needs of all non-motorised users related to the project. The project is then audited against these needs at appropriate stages. Land Transport NZ has adapted the UK procedures for New Zealand. The *Non-motorised user project review procedures* [131] can be downloaded from the Land Transport NZ website.