4. Implementation and maintenance

Pedestrian Network Guidance

NZ Transport Agency Waka Kotahi

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NZ TRANSPORT AGENCY
WAKA KOTAHI
Te Kāwanatanga o Aotearoa
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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.

4. Implementation and maintenance

4.1. Maintenance and renewals

4.1.1. Purpose

Walking is part of almost every journey, failure in providing and maintaining safe, attractive and accessible environments will undermine the ability of majority of journeys to be undertaken, not just those that are solely walking for the entire journey. Without timely and adequate maintenance, facilities that initially encouraged walking can become trips or falls hazards, create safety issues and ultimately discourage pedestrian movement.

The purpose of maintaining public pedestrian infrastructure goes beyond ensuring they do not degrade; it can also be used to improve them. Pedestrian assets include footpaths, walkways, shared paths, shared zones and pedestrian crossings. These facilities make up the pedestrian network that comprises of roads, streets and other public spaces, such as parks and reserves.

This section provides guidance on:

- Applying the principles of Safe, Obvious, and Step-free to maintenance.
- Planning for maintenance: prioritising methods so that higher quality paths and crossings are provided for those who need them most.
- Opportunities to improve pedestrian infrastructure in conjunction with maintenance (see example in Figure 1).
- Funding maintenance and renewals.

For information on maintaining pedestrian crossing infrastructure at traffic signals, see the NZ Transport Agency Waka Kotahi [Specification for the maintenance and repair of traffic signal installations], or the relevant road controlling authority (RCA) specifications.

Figure 1: Opportunity example: Missing footpath connection could be added when the existing path is next resurfaced. (Photo: Jeanette Ward).

4.1.2. Principles

Principles of Safe, Obvious and Step-free (SOS) incorporate human variation, so that universal access can be incorporated in maintenance and renewals contracts and works (section 2.1.2. Principles of Safe, Obvious and Step-free (SOS) in PNG: Planning).

The specific applications of the SOS principles for maintenance and renewals are described below.

Safe streets

- Pavement reseals: ensuring no lips on edges of seal.
- Footpath and kerb design: smooth finishes within design tolerances, so that people using small wheels can navigate the kerb and channel easily.
- Maintenance of lighting and landscaping: important so that people feel safe while walking, and landscaping does not reduce the effective width of paths or reduce visibility between people inside and outside of vehicles.

Figure 2: Lower branches of a street tree reduce path width and obscure the visibility between people, Auckland. (Photo: Jeanette Ward).

Obvious streets

- Tactile ground surface indicators correctly installed so that it orients people directly across traffic lanes.
- Care with different surfaces so that everybody can find their way, with no confusion about where in the street they should be, even if they have low or compromised vision.
- Clear, non-slip surfaces.
- Signs, vegetation and debris are not obscuring paths or making them unattractive, for example when a plant from an adjacent property is overhanging the footpath.

Smooth, Step-free streets

- Maintenance of paving stones is particularly important: explore opportunities to replace them with concrete or asphalt where possible to avoid maintenance challenges.
- Tree roots can cause footpaths to become uneven and create tripping hazards, resolving this could be challenging due to the benefits that trees provide. Solutions could involve board walk structures over the roots (see the example in Figure 3).
- Good drainage so that paths are useable, but crossfalls are not excessive (no more than 2% on accessible path of travel, which includes all footpaths)
- No gravel or loose chip
- Materials have slip resistant properties.

Figure 3: Boardwalk over tree roots to facilitate a footpath, Lincoln Road Christchurch (Photo: Chris Blackmore).

In terms of smooth surfaces, any debris or deviation less than 6 mm high is considered 'smooth' as it is unlikely to cause a slip, trip, fall, or inconvenience for people, including those using devices with small wheels. Lips also contribute to ponding of rainwater, which can make crossings inaccessible.

The following thresholds and treatments apply:

- up to 6 mm: no treatment necessary
- 6 mm to 13 mm: remove and reinstate the surface or provide a bevelled edge
- greater than 13 mm: remove and reinstate the surface or construct a ramp to reduce deviation to less than 6 mm.

Further guidance

- Section 1.6. Falls – slips, trips and stumbles in PNG: Walking in NZ
- Section 3.4.3c Kerb ramp design in PNG: Crossings

4.1.3. Planning

Minor maintenance activities such as cleaning or sweeping can happen at any time. For more invasive maintenance activities there are four main planning considerations:

- asset condition
- timing, considering seasonal impacts on infrastructure (eg rain, snow, ice, and leaf fall), and timing with ongoing works to ensure efficient spending with minimal disruptions
- One Network Framework: movement and place aspirations
- community demographics.

4.1.3a Planning consideration: asset condition

Pedestrian infrastructure should be fully integrated within asset management systems of local government and other authorities involved in public infrastructure (for example, KiwiRail, or large employers such as hospitals and education campuses), along with accurate records of where maintenance has been carried out, the actions taken and the timeframes within which problems were addressed. This also helps identify high-maintenance locations and potential underlying problems.

Maintenance has benefits beyond ensuring infrastructure survives to the end of its design life. Some pedestrian infrastructure incorporates drainage slopes, such as footpath crossfalls, and kerbs and channels. It is important that the walking and accessibility functions of paths and crossings are not compromised solely for stormwater management reasons.

Pedestrian Pathways Fault Assessment & Condition Rating Guide, a best practice guide for performing fault assessment and condition rating on pathways in New Zealand Aotearoa, has been developed as part of the Pathway Network Data Collection Standard Project. This was a joint project with NZ Transport Agency Waka Kotahi, Road Efficiency Group (REG) and Roading Infrastructure Management Support Group (RIMS). The primary aim of the guide is to create a standard framework for collecting pathway fault data and deriving a severity rating using the aggregated fault data. The combination of both datasets forms a solid evidence base for asset managers and investors to make informed decisions to better maintain the level of service.

4.1.3b Planning consideration: timing

When planned in conjunction with other construction programmes, there is greater opportunity for maintenance budgets to go further. For example, combining a kerb and channel replacement with minor works program can mean that new road crossings can be combined with regrading footpaths and building new kerbs, including at a bus stop for example, making the whole street more accessible and safer.

Collaborative planning across all transport activities within a local authority and with NZ Transport Agency Waka Kotahi also avoids cost implications of construction taking place on the same street twice, in short succession. The savings for temporary traffic management and construction activities are important considerations when making the effort to plan different activities together. Some councils coordinate forward works using tools such as the New Zealand Forward Works Viewer to coordinate construction activities, including maintenance and renewals, as much as possible.

Planning should consider the need to maintain path quality in all seasons. Activities such as clearing fallen leaves (including in channels where they might block drains, creating flooded walking routes), adding grit for icy paths, and maintenance after storms should be built into annual planning.

The specific timing of maintenance works should consider avoiding high volume pedestrian routes at peak times. Context is important, because, for example, a school will have a different usage pattern to a main street or town centre. Holiday periods may be good or bad times to complete maintenance, depending on the likely demand. Consult with local councils and others to understand local contexts before planning works, particularly works that require pedestrian detours.

4.1.3c Planning consideration: One Network Framework

When planning for maintenance and renewal activities, it is important to consider the current, as well as the aspirational, function of the street and the modal classifications within the One Network Framework (ONF).

When all else is equal, maintenance activities can be prioritised according to the function of the street and the modal classifications in the ONF. The more pedestrians use a street, the more benefit there is likely to be gained from maintaining the pedestrian infrastructure.

Maintenance has a significant role in creating a better future not just re-establishing what was present before the maintenance work commenced. Maintenance activities should as a minimum provide a pedestrian environment that is in accordance with the current ONF street classification and the current walking modal classification.

Further to this where the future ONF street classification and the related walking modal classification exists then this is the ultimate delivery goal. Maintenance activities can contribute to delivering the future aspirational state by aligning the project deliverables desired vision (future ONF). Where both the current and future ONF classifications exist then maintenance activity deliverables should be primarily compared to the future state such that the pedestrian environment better reflects the future desired state not the one that currently exists.

4.1.3d Planning consideration: community demographics

People who have difficulty walking are most likely to need safe, obvious, smooth and step-free surfaces. Some people can more easily manoeuvre around hazards and avoid paths in poor condition. Other people may not be able to make a trip at all, if paths and other infrastructure are in poor condition. Understanding communities with the greatest need for high quality infrastructure starts with conversations across the authority. Prioritisation can be helped by census data concerning the number of people in a neighbourhood who have difficulty walking. The higher that proportion, the more benefit there will be for them of improvements to pedestrian infrastructure.

Further guidance

PNG: Planning:

- For pedestrian characteristics, see section 2.1.1
- For information on measuring pedestrian activity, see section 2.1.3

4.1.4. Opportunities

4.1.4a Opportunities to save future costs by removing redundant infrastructure

Maintenance inspections can be used to identify any infrastructure that is unnecessary or redundant. For example, if there are signs that are no longer serving their intended purpose, they can be removed instead of being replaced. In some cases, there might be infrastructure that could be converted to greenspace (such as large kerb buildouts or unnecessary road space), which may save on maintenance costs depending on what it is used for, and the type of planting introduced.

4.1.4b Opportunities to improve pedestrian infrastructure in conjunction with maintenance

When combined with other upgrades and depending on the nature and extent of works, maintenance can be used to progressively upgrade pedestrian infrastructure so that it meets current technical requirements and best practice, and, where possible, it meets RCA’s aspirational criteria. As an example, Figure 4 shows the narrow footpath width before a rail bridge was replaced and the wider footpath after the replacement.

Figure 4: A rail bridge replacement offered the opportunity to widen a footpath, Richardson Terrace, Christchurch (Photo: Jeanette Ward)

Some factors to consider when undertaking asset renewals are outlined below. These may not have been considered when the pedestrian infrastructure was originally installed. They include improvements for pedestrian access, and safety improvements for all road users, such as (but not limited to):

- Footpath renewals/resurfacing may offer opportunities to increase the footpath to align with current standards.
- Footpath renewals/resurfacing may offer opportunities to clear vegetation from berm areas that are reducing the footpath width (see example below where a path width was inappropriately reduced to below standard to retain berm planting).

- Provide missing footpath connections.
- Suitable surface for all devices likely to legally be using the path, eg, wheelchairs, mobility scooters, micro mobility devices.
- Smooth, step-free transitions to street crossings, eg kerb ramps that are damaged, missing or misaligned should be part of the maintenance programme.
- Adequate signage and wayfinding, including locating signage such that it does not compromise the path quality or pedestrian experience.
- Ensuring that trees and other vegetation provides shade and amenity, without degrading the walking experience, through leaf fall, or by reducing visibility between pedestrians and others using the street or by reducing the effective width for walking.
- Resurfacing of zebra crossings should apply current specifications, for example widening the zebra crossing bar marking widths or relocating any areas of red coloured surfacing from under the crossing bar markings.
- Whenever a roadway is resurfaced, crossing points must continue to comply with the latest road marking requirements and design best practice. This will avoid problems such as:
  - an upstand or 'lip' being created between the gutter and the roadway, creating problems for the mobility impaired using kerb ramps (see the image below for an example of where an asphalt overlay has created a tripping hazard at a kerb cutdown, it will also be difficult for wheeled devices to cross the street.
  - an increase in the gradient created for pedestrians as a result of the roadway crossfall becoming more severe.
  - perpetuating incorrect installation or layout of tactile ground surface indicators.

For the above reasons it is important to consider maintenance of roads and streets in a holistic context, including with consideration of surrounding land use, to get the best return on investment for everyone.

Figure 5: A path width has been inappropriately reduced to below standard to retain berm planting (Photo: Erik Teekman)

Figure 6: Asphalt overlay that has created a high lip at the kerb cut down point (Photo: Jeanette Ward)

Further guidance

For details on path widths, pedestrian characteristics, kerb ramp's design, wayfinding and zebra crossings' design elements, see:

- Section 3.3.2a Footpath width in PNG: Paths
- Section 2.1.1. Pedestrian characteristics in PNG: Planning
- Section 3.4.3c Kerb ramp design in PNG: Crossings
- Section 3.6.3. Wayfinding in PNG: Supporting infrastructure
- Section 3.4.5a Zebra crossings in the PNG: Crossings

See the Traffic control devices manual for latest road markings:

- Part 4: Traffic control devices for general use – for intersections
- Part 5: Traffic control devices for general use – between intersections

4.1.5. Funding

A holistic approach to maintenance and renewals will ensure that everyone who uses a street can benefit from how it is maintained and potentially reconfigured.

Maintenance and renewals of pedestrian facilities may be funded through the National Land Transport Fund. The National Land Transport Programme and Planning and Investment Knowledge Base webpages provide guidance and information on how to access funding including work category definitions and investment conditions.

4.1.6. Tactile ground surface indicators

Specific maintenance regimes should be adopted to monitor the condition of tactile ground surface indicators (TGSI) and to plan for replacement as part of maintenance programmes.

When developing a maintenance regime, consideration should be given to the following factors:

- Soiling of TGSI is inevitable especially in areas of high pedestrian activity and in medians. TGSI shall be cleaned free of surface debris to ensure that the visual contrast requirements are maintained. The photos below illustrate this need.
- The profile of the tactile surface is crucial to its effectiveness as a warning or directional aid for people who are blind or have low vision. TGSI should be replaced if the domes or bars drop in height below 4 mm, because the effectiveness of the surface will be reduced and will ultimately become undetectable.
- Changes to the surrounding surface may require changes to the TGSI to ensure that the visual contrast requirements are maintained.
- TGSI shall be kept free of weeds and other vegetation likely to reduce the visual contrast or create a trip hazard (see Figure 7 and Figure 8).

Figure 7: Weeds growing around tactile paving (Photo: Christopher McLellan)

Figure 8: Debris gathering around tactile paving (Photo: Christopher McLellan)

4.2. Temporary traffic management

At times, the pedestrian network needs to be repaired, maintained or used for other activities and temporary traffic management is required.

The New Zealand guide to temporary traffic management (NZGTTM) outlines a risk-based approach to plan and mitigate the risks to road workers and road users (including pedestrians) to keep them safe.

The NZGTTM library includes a practice note on keeping vulnerable road users safe in temporary traffic management environments: Protecting vulnerable road users in TTM environments. It has a significant focus on disabled people because if temporary traffic management is safe for disabled people, it is safe for everybody.

4.3. Monitoring and evaluation

Monitoring pedestrian activity is an important process that should be used to understand if interventions are working for pedestrians, track progress towards goals, and identify trends in travel patterns for planning purposes. This section explains why it is important to monitor pedestrian activity. Information on where, when and how to collect data on pedestrian activity is described in more detail in section 2.1.4. Assessing the demand for walking in PNG: Planning.

4.3.1. Evaluate functionality

Observing how pedestrians move through and spend time in a space post-implementation helps to understand whether the intervention is meeting the needs of pedestrians and informs adaptations to the infrastructure. For example signal timing could be modified, seating or street furniture could be relocated, or wayfinding changed to address issues identified.

Ongoing monitoring of the quality of paths, crossings and spaces that pedestrians use is critical to ensure the walkability and functionality of the space does not degrade over time. There are a range of methods that can be used to assess the walkability of an area or route as described in section 2.3.4. Measuring walkability in PNG: Planning.

4.3.2. Track progress

At the onset of a project or programme of work it is important to establish strategic objectives, define indicators of success, and develop a plan for collecting and reporting data to track progress towards meeting the strategic objectives and monitoring the outcomes of the project. This information is typically documented in a monitoring plan. Monitoring plans can be used for short-term projects or large scale programmes.

The output of your monitoring plan can be communicated monthly, quarterly, semi-annual or annual. It may include an overview of what is being done to make it easier and safer for people to walk in your city/region, a summary of projects that have recently been completed, how many people are walking and where, community initiatives, and a look at what's coming up in the following period.

You may also undertake surveys (usually annually) that captures insights into perceptions and uptake of walking. For an example, see NZ Transport Agency Waka Kotahi report Understanding attitudes and perceptions of cycling and walking.

Further guidance

See section 2.2.1c Indicators of success in PNG: Planning, for more information on developing appropriate indicators for pedestrians.

4.3.3. Identify trends

Identifying trends in pedestrian activity helps to inform traffic operations and future investment decisions. For example, by knowing when the morning peak for pedestrian activity is, you can schedule activities that conflict with the flow of pedestrians (eg deliveries) outside of those peak hours.

In addition, trend analysis can be used as an evidence base for demand/propensity modelling/forecasting. For example, understanding the impact that completing a gap in the pedestrian network has on the number of people who choose to walk can help make the case for future projects of a similar nature.