NGATEA ACCESSIBILITY AUDIT REPORT

CCS DISABILITY ACTION

TAYLORED ACCESSIBILITY SOLUTIONS LTD

DECEMBER 2014

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Revision History

Rev. No.	Prepared By	Description	Date
0.	Steve Taylor	Draft issued for CCS review	10/09/2014
1.	Steve Taylor	Draft issued for HDC review	12/09/2014
Final.	Steve Taylor	Issued as Final	18/12/2014

Document Acceptance

Action	Name	Signed	Date
Prepared By	Steve Taylor		18/12/2014
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On behalf of	CCS Disability Action		

EXECUTIVE SUMMARY

Hauraki District Council (HDC) has requested an accessibility audit for the urban area of Ngatea, with particular emphasis for disabled and elderly residents. The audit covers:

- Mobility Parking spaces;
- Kerb ramps;
- Tactiles;
- Footpaths;
- Road crossings;
- Street Furniture; and
- Temporary Traffic Management;

While CCS Disability Action recognise that standards such as NZS 4121:2001 and the Department for Building and Housing Building Code Compliance Documents contribute to improving disabled access, there are often relatively small and inexpensive solutions that can remove significant barriers to access that are overlooked.

Ngatea is a small town on the Hauraki Plains located 18 kilometres southwest of Thames and 70 kilometres southeast of Auckland. The population of Ngatea is currently 1245, approx. 7% of Hauraki District's population.

There are 65 residents in Ngatea (5.2% of the population) that have a Mobility Parking Permit. An estimated 55 people in Ngatea use a mobility aid due to permanent disability. Some of these will have a Mobility Parking Permit and some will not.

CCS Disability Action is an organisation that supports people with disabilities to live independent lives. One of the many services CCS Disability Action provides is to work with communities to ensure that they are welcoming and inclusive of all people.

CCS Disability Action was chosen to conduct the audit as they make a significant contribution to mobility improvements in communities around New Zealand, and is an active partner in Hauraki District Disability work.

An estimated 1.1 million New Zealanders live with a disability, representing approx. 25% of the total population.

In Ngatea, at the 2013 Census:

- 27.4% of people were aged 65 years and over. This is an increase from 23.2% in 2006, and compares to 14.3% for New Zealand as a whole.
- 17.8% of people were aged less than 15 years. This is a decrease from 22.7% in 2006, and compares with 20.4% for all of New Zealand.

The median age is 48.4 years for people in Ngatea. The projected 2031 population of Hauraki District is 18,680 people, which is roughly the same as the current (2014) population. However, the proportion of people aged over 65 living in Hauraki is predicted to increase to approximately 34% by 2031.

The boundaries for the Geographic area of interest are, and include:

- Mahana Road;
- Paul Drive – Mahana Rd to Leonard St;
- Leonard Street – Paul Drive to River Road;
- River Road – Leonard St to Orchard West Rd (SH.2);
- Kaihere Road – Orchard West Rd (SH.2) to Benner Dr;
- Benner Drive;
- Darlington Street – End to Harris Pl;
- Harris Place;
- Kohunui Street; and
- Pipiroa Road – Orchard West Rd (SH.2) to Mahana Rd.

A specific community meeting for this project was held on the 7th May 2014 at the Ngatea War Memorial Hall on SH.2.

Following this meeting, site visits were completed. Feedback from the initial Community Consultation Meeting and subsequent site visits identified access issues such as:

- Location of Mobility Spaces and access to the footpath;
- Lips and grades on kerb ramps;
- Lack of safe road crossing opportunities;
- Lack of footpaths;
- Crossings at intersections and pedestrian crossings; and
- Street clutter (signage, wares for sale and alfresco dining furniture).

This report is intended to remain a ‘living’ document. In order to ensure the on-going success of investment in access improvements it is suggested that Hauraki District Council regularly review the recommendations included within this report.

The recommendations from this audit are seen as a long term investment for HDC to improve accessibility in Ngatea. CCS Disability Action understands that the spending of ratepayer money is a sensitive issue and respects that all recommendations cannot be achieved immediately. By programming the recommendations into the regular maintenance programmes, HDC will be able to take advantage of any NZTA funding to maximise their investment.

CCS Disability Action therefore suggests setting a yearly budget for each section that is affordable and manageable for HDC and then using this audit to prioritise the order of works.

Identified issues and recommendations are discussed throughout this report. For ease of reference and to assist in prioritisation of recommendations, all recommendations are listed in Section 15 according to considered priority for general and specific sites, and with indicative costs.

The specific recommendations are split into three categories:

- Serious Safety Risk – Where it is considered serious injury may occur if the issue is not addressed;
- Significant Concern – Major inconveniences; and
- Minor Concern – Minor inconveniences.

It is recommended that the Serious Safety Risk recommendations are implemented first, and that Significant and Minor concerns are addressed as part of longer term planning. The total estimated cost for the Serious Safety Risk items is $25,000.

Costs shown are indicative construction costs only and should only be used as a guide. They do not include Traffic Management Costs, consultation with affected parties, costs of design or any other professional service fees.

General Recommendations are provided in addition to immediate recommendations for improving infrastructure. These have no capital cost but are likely to result in improved accessibility outcomes for the people of Ngatea through improved processes and practices more aligned with best-practice universal design and construction.

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1 INTRODUCTION

1.1 HAURAKI DISTRICT

The Hauraki District is located along the Hauraki Plains at the southern tip of the Firth of Thames. The population of the Territorial Authority decreased 0.3% between the 2006 census and 2013 census, to 17,808 residents[1]. This equates to approximately 0.4% of New Zealand's population. Main urban areas in the district include Waihi, Paeroa and Ngatea. All up, the district covers an area of 1,269 square kilometres[2].

1.2 NGATEA

Ngatea is a small town on the Hauraki Plains located 18 kilometres southwest of Thames and 70 kilometres southeast of Auckland. It was established in the 1900s as a result of a unique series of canals and stop banks which drained the land and produced rich farmlands for dairy production. It is now the 'service centre for the farming area of the Hauraki Plains.

The population of Ngatea is currently 1245, as recorded in the 2013 New Zealand Census. Ngatea has approx. 7% of Hauraki District's population.

1.3 CCS DISABILITY ACTION

CCS Disability Action is an organisation committed to supporting communities that include all people and ensure that they are welcoming and inclusive of everyone. This is achieved by using universal design principles in the built environment and including everyone in activities and events.

CCS Disability Action's role is to support people with disabilities to be 'in the driver's seat' of their life; to achieve their own dreams and aspirations. With sixteen offices around New Zealand, CCS Disability Action provides frontline support and services, and creates local awareness of and education around issues encountered by disabled people in their everyday lives.

CCS Disability Action works with government departments, local councils, building developers and owners on a range of issues that impact on the lives of disabled people. CCS Disability Action has expertise in ensuring public buildings, homes, amenities, walkways, streets and public transport more accessible for everybody.

[1] Statistics New Zealand – 2013 census URPC Tables
[2] Hauraki District Council/Our District

2 STATISTICS

2.1 DISABILITY IN NEW ZEALAND[3]

The first results of the Disability Survey as part of the 2013 National Census has recently been released by Statistics New Zealand.

An estimated 1.1 million New Zealanders live with a disability, representing approx. 25% of the total population.

In the 2006 census, 82% of people with disability were adults living in households, 5% were adults living in residential facilities and 14% were children (under 15 years) living in households.

The percentage of people with disability increased with age, from 10% for children aged less than 15 years to 45% for adults aged 65 years and over.

The most common disability types for adults are physical and sensory disabilities. 27% of all adults aged 15 years and over have a physical, sensory, or intellectual disability.

2.2 MOBILITY PARKING IN NEW ZEALAND[4]

Because of their disability, an estimated 129,100 adults and 8,700 children needed to park close to their destination in 2006. Among adults, the need to park close increased with age.

There are 65 residents in Ngatea (5.2% of the population) that have a Mobility Parking Permit.

In the six months before the 2006 Disability Survey, an estimated 61,100 adults and 5,900 children had problems finding a carpark in New Zealand. The most common problems were:

- Finding a park close to their destination;
- Carparks meant for disabled people being used by non-disabled people; and
- The available carparks being too awkward to use.

31% of disabled adults and 15% of disabled children used taxis for short trips at least once in the 12 months prior to the 2006 Disability Survey. An estimated 1% of all disabled adults used taxis every day or almost every day.

[3] Statistics New Zealand – 2006 Disability Survey: Disability and Travel and Transport in New Zealand 2006

[4] Statistics New Zealand – 2006 Disability Survey: Disability and Travel and Transport in New Zealand 2006

The Total Mobility Scheme provides disabled people with vouchers for discounted taxi fares. At the time of the 2006 Disability Survey, parents/caregivers of 22% of disabled children and 34% of disabled adults had heard of the Total Mobility Scheme. An estimated 4% of disabled adults had used Total Mobility Scheme vouchers in the 12 months prior to the survey.

An estimated 8% of disabled children aged 5–14 needed special transport or help to get to school.

2.3 AGE IN HAURAKI DISTRICT

While mobility impairments are considered to primarily affect people with disabilities, older persons progressively experience a reduction in sensory and physical ability and children progressively develop decision making ability.

The median age (half are younger, and half older, than this age) for people in the Hauraki District is 45.5 years[5].

2.4 AGE IN NGATEA

In Ngatea, at the 2013 Census:

- 27.4% of people were aged 65 years and over[6]. This is an increase from 23.2% in 2006, and compares to 14.3% for New Zealand as a whole.
- 17.8% of people were aged less than 15 years[7]. This is a decrease from 22.7% in 2006, and compares with 20.4% for all of New Zealand.

The median age is 48.4 years for people in Ngatea. Based on analysis of age and gender-specific rates of disability, an estimated 55 people in Ngatea use a mobility aid due to permanent disability.[8]

2.5 OLDER PERSONS

When comparing to the Hauraki District, Ngatea had a higher percentage of persons aged 65+ (27.4%, compared to 21.9% for the district)[9].

Many of the older persons are unable to access the community without some form of support, whether using mobility aids such as wheelchairs, mobility scooters etc., or

[5] 2013 Census QuickStats about a place: Ngatea
[6] 2013 Census QuickStats about a place: Ngatea
[7] 2013 Census QuickStats about a place: Ngatea
[8] Estimation methods based on Burdett (2014) Measuring Accessible Journeys: A tool to enable participation *Municipal Engineer*, In Press
[9] 2013 Census QuickStats about a place: Ngatea

simply requiring smooth, level surfaces to avoid tripping and falls. Some do not drive and therefore depend on safe and level footpaths to reach services essential to meet their everyday needs.

HDC has 12 single units available for pensioner housing available in Ngatea, in the following locations:

- Kaihere Road – Four units; and
- Paul Drive – Four units at #18 and four units at #20.

The Organisation for Economic Co-operation and Development (OECD) published a report in 2001 focusing on the effects of Older Persons and traffic.

Mobility is the key issue for an ageing society. OECD concluded[10]:

- Infrastructure design focused on technical efficiency and low costs is no longer sufficient;
- Standards based on fit young males are inappropriate in an ageing society;
- Involvement of older persons is encouraged in policy development;
- In Western Europe, 45% of pedestrian fatalities are aged 65 or more;
- Have educational campaigns to promote maximum mobility and safety for older people;
- Provision is required for suitable transport alternatives to the private vehicle (accessible buses, taxis, Dial a Ride etc.);
- Provide safer roads to accommodate pedestrians and users of scooters and wheelchairs; and
- More forgiving and predictable road design should be used to reduce the need to make complex decisions and performed time related tasks.

OECD stated that improvements in infrastructure that benefit older persons will benefit everyone.

2.6 YOUNGER PERSONS

Ngatea has a lower percentage of persons aged below 15 when compared to the Hauraki District (17.8%, compared to 19.5% for the district)[11].

For this age group, early childcare and schooling facilities are the main destination points for travel.

[10] Organisation for Economic Co-operation and Development – Ageing and Transport: Mobility Needs and Safety Issues.
[11] 2013 Census QuickStats about a place: Ngatea

Education facilities in Ngatea include:

- Central Kids Ngatea – 27 River Road;
- Ngatea Playcentre – McMillan Street;
- Ngatea Primary School – 52 Orchard Road; and
- Hauraki Plains College – 2 Kaihere Road.

A report commissioned by OECD in 2004[12] focused on keeping children safe in traffic. The areas the report focused on were:

- The scale and nature of the vulnerability of children in traffic environments;
- Children's behaviour, abilities, education, training, and publicity approaches;
- The role of the road environment in relation to child safety; and
- The role of legislation and standards in road safety equipment and vehicles.

OECD concluded that the best performing countries in keeping children safe have adopted a holistic approach using a wide variety of measures:

- Road Safety Policies include specific strategies and targets for improving child safety;
- Using education, practical training and publicity to encourage safe behaviour and providing young people with skills and strategies to manage risk; and
- Shifting the focus of responsibility away from children to parents, schools, drivers, policy makers, planners, and traffic engineers.

OECD recommends for the built environment:

- Young children need space for congregation, playing and physical activity;
- Older children require safe and secure routes to access school, playgrounds and other recreational destinations, both as pedestrians and cyclists;
- Traffic Engineers and Planners should take children's needs and abilities into account and incorporate them into road plans and traffic designs; and
- Cyclists and pedestrians need more priority through the use of traffic calming and facilities for walking and cycling.

[12] Organisation for Economic Co-operation and Development – Keeping Children Safe in Traffic: 2004

3 AUDIT PURPOSE

Hauraki District Council (HDC) has requested an audit of Ngatea with particular emphasis for disabled and older residents. CCS Disability Action was chosen to conduct the audit as they make a significant contribution to mobility improvements in communities around New Zealand, and is an active partner in Hauraki District Disability work.

While CCS Disability Action recognise that standards such as NZS 4121:2001 and the Department for Building and Housing Building Code Compliance Documents contribute to improving disabled access, there are often relatively small and inexpensive solutions that can remove significant barriers to access that are overlooked.

It is envisaged that this audit will primarily be a tool for use by the Council. However, if accepted we suggest that it be made available to all interested parties.

4 GEOGRAPHIC AREA OF INTEREST

The geographic area of interest defined by HDC covers the urban area of Ngatea.

The boundaries for the Geographic area of interest are, and include:

- Mahana Road;
- Paul Drive – Mahana Rd to Leonard St;
- Leonard Street – Paul Drive to River Road;
- River Road – Leonard St to Orchard West Rd (SH.2);
- Kaihere Road – Orchard West Rd (SH.2) to Benner Dr;
- Benner Drive;
- Darlington Street – End to Harris Pl;
- Harris Place;
- Kohunui Street; and
- Pipiroa Road – Orchard West Rd (SH.2) to Mahana Rd.

A map of the geographic area for the audit is included as Appendix A.

5 AUDIT

5.1 CONSULTATION MEETING AND SITE INSPECTION

Consultation with the community is vital for Council to gain an understanding of how the community use the facilities provided.

A specific community meeting for this project was held on the 7th May 2014 at the War Memorial Hall on SH.2. A small group of people attended the meeting, along with a Councillor and a staff representative from HDC.

Following this meeting, a site inspection was completed. The site inspection looked at:

- Mobility Spaces;
- Lips and grades on kerb ramps;
- Lack of safe road crossing opportunities;
- Lack of footpaths;
- Crossings at intersections and pedestrian crossings; and
- Street clutter (signage, wares for sale and alfresco dining furniture).

5.2 CO-OPERATION WITH NZTA

The Geographic Area of Interest includes SH.2, therefore HDC will need to liaise with NZTA for work on the State Highway and any future funding opportunities in relation to any works in this area.

6 CONTINUATION OF PROCESS

This report is intended to remain a 'living' document. In order to ensure the on-going success of investment in access improvements it is suggested that HDC regularly review the recommendations included within this report.

CCS Disability Action recognises that while all recommendations are important to providing a usable accessible network, cost implications may require the recommendations to be considered in council's long-term planning processes.

6.1 BUDGETS

The recommendations from this audit are seen as a long term investment for HDC to improve accessibility in Ngatea. CCS Disability Action understands that the spending of ratepayer money is a sensitive issue and respects that all recommendations cannot be achieved immediately. By programming the recommendations into the regular maintenance programmes, HDC will be able to take advantage of any NZTA funding to maximise their investment.

CCS Disability Action therefore suggests setting a yearly budget for each section that is affordable and manageable for HDC and then using this audit to prioritise the order of works.

Recommendation 1 Assign annual budgets that are affordable for HDC to undertake the recommendations from this audit over a long term programme. Utilise regular maintenance programmes that maximise Council investment with NZTA subsidies.

6.2 MEASURING ACCESSIBLE JOURNEYS

In order to prioritise access improvements, it would be beneficial for Hauraki District to collect data about the way people travel around Ngatea. Although many Road Controlling Authorities collect traffic data, information about other modes of travel (particularly pedestrian trips) is rarely collected to the same level.

One method of data collection that can help to inform, justify and prioritise investment in accessible infrastructure is to count all people on a footpath or at a road crossing, and to include the proportion of those people who use mobility aids. By counting people on the streets of Ngatea, Hauraki District Council can gain an understanding of pedestrian movements, especially the mobility impaired.

Recommendation 2 Select count sites in the Ngatea urban area to conduct regular pedestrian counts, including the proportion of people who use mobility aids.

7 FURTHER INVESTIGATION

This report covers access in the geographic area of interest as stated in Section 4: Geographic Area of Interest.

Many issues raised during consultation and site inspections were regarding footpaths and kerbs. It is suggested that consideration be given to a more formal method of setting priorities for the provision of kerb ramps and maintenance of footpaths. By identifying a risk and condition rating, a profile target can be developed that allows limited resources to address the most critical barriers first. Poor condition can be tolerated where there is little or no likelihood of use by the disabled and older persons.

Risk Modified Condition Assessment methodology prioritises upgrades to footpaths and kerb ramps so that those on routes used by the disabled on a regular basis are upgraded first. Refer to Appendix B for the calculation assessment.

This assessment designates footpaths and all potential kerb ramp locations within accessible routes a risk profile of Low, Medium or High as a high priority. A relatively simple set of KPI's can be formulated with condition ratings used to determine the profile.

Recommendation 3 Adopt the Risk Modified Condition Assessment methodology as shown in Appendix B as a tool for future maintenance prioritisation.

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8 MOBILITY PARKING

8.1 THE NEED FOR ACCESSIBLE CAR PARKING[13]

Most people with impaired mobility depend on the use of a privately owned motor vehicle or a designated maxi-taxi for their transport needs. Both forms of transport are essential to enable them to participate fully in the everyday working, recreational, educational and social life of the community.

Many wheelchair users are able to drive a car either while still in their wheelchair or by transferring to the driver's seat. When transferring out of the wheelchair and into the driver's seat, the manual wheelchair is either carried inside the car or mounted on a roof hoist. However, a wider than normal car parking space is needed so that space is available to reassemble the wheelchair, if necessary, and place it alongside the car door so that the driver can then transfer to it from the driver's seat.

People who drive their vehicle while seated in their wheelchair generally access their vehicle either by using a side ramp which deploys to the adjacent footpath or by a rear hoist. A side ramp requires an area beside the car which is free from street furniture or other vehicles while a rear hoist requires the length of the hoist and manoeuvring space of the wheelchair behind the parked vehicle.

A pedestrian route that a wheelchair user can travel along without assistance (defined as an 'accessible route') is also needed from the parking space to the associated destination.

8.2 MOBILITY PARKING PERMIT ELIGIBILITY[14]

Having a medical condition or disability does not automatically entitle a person to a mobility parking permit.

The following criteria are used by medical professionals in determining the need for a mobility parking permit:

- The applicant is unable to walk and always require the use of a wheelchair; or
- The ability to walk distances is severely restricted by a medical condition or disability. For example, the applicant requires the use of mobility aids, experiences severe pain or breathlessness; or
- The applicant has a medical condition or disability that requires physical contact or close supervision to safely get around and cannot be left unattended.

[13] Department of Housing and Building with Barrier Free Trust: Accessible car parking spaces
[14] mobilityparking.org.nz/about-mobility-parking-permits/eligible-for-a-permit

8.3 MOBILITY PARKING IN NGATEA

As stated in Section 2: Statistics, there are 65 residents in Ngatea that have a Mobility Parking Permit.

HDC has provided 2 public Mobility Spaces to service the CBD area of Ngatea. These are both located on SH.2 – west of River Road, and outside FVC Veterinary Services at 49 Orchard West Road.

8.4 PARKING REQUIREMENTS[15]

Section 47A of the Building Act covers the need to provide car parks, parking buildings and parking facilities. Parking facilities or premises, whether private or public, shall provide the required number of accessible car park spaces.

Where parking is provided, spaces for people with a mobility permit should be provided to meet requirements defined in NZS 4121:2001. The standard recommends the following parking space ratio is to be provided to meet compliance with the Building Code:

Total number of car parks	Number of mobility spaces
1 - 20	Not less than 1
21 - 50	Not less than 2
For every additional 50 car parking spaces	Not less than 1

Table 1: Mobility parking ratio requirements[16]

Specific building types such as medical centres, entertainment centres and large retail facilities should provide greater numbers of accessible car parks than the minimum required.

There are approximately 144 formal carparks, including the two Mobility Spaces, located SH.2, from Kaihere Rd to Pipiroa Rd. A further 39 carparks are on Pipiroa Road, servicing Ngatea Domain.

Using Table 1 above, two Mobility Spaces does not meet the requirements in NZS 4121:2001 for overall numbers. One more Mobility Space is required on SH.2 while an accessibility audit should be carried out on Ngatea Domain to determine the number of Mobility Spaces required.

The ideal location for the installation of a Mobility Space on SH.2 would be at the western end of the carparks outside NZ Post.

[15] NZS 4121:2001 Section 5: Car parks
[16] NZS 4121:2001 Section 5: Table 1

Figure 1: Proposed location for a Mobility Space on SH.2

Recommendation 4 Install a Mobility Space at the western end of the carparks outside NZ Post to comply with NZS 4121:2001.

8.5 LOCATION OF MOBILITY SPACES

Where car parking is provided by the local authority and not the building owner, then the required spaces shall be in the vicinity of the site or building and shall be connected to the site or building by an accessible route[17].

Orchard West Road (SH.2) is considered the main street of Ngatea. Town Central is situated along SH.2, from River Road to Paul Drive.

Installing a Mobility Space outside NZ Post will improve accessibility to the southern side of SH.2. Re-locating the Mobility Space on the Northern Side of SH.2, west of River Road, to the north-western side of the pedestrian crossing will improve access to the shops on the southern side.

Figure 2: Proposed location for a Mobility Space on SH.2

Recommendation 5 Re-locate the Mobility Space on the northern side of SH.2, west of River Road, to next to the pedestrian crossing on the north-western side.

[17] NZS 4121:2001 Section 5: Carparks - 5.2.2 Council Provision

As HDC cannot control the turnover of businesses in a specific site, as part of the consent process, HDC can explore the options of developers providing Mobility Spaces if the business is considered to have the potential for access customers. Types of businesses that may attract access customers (but not limited to):

- Supermarkets and Fruit and Vegetable Shops;
- Specialist Health Care Centres, Medical Centres, and Chemists;
- Banks;
- Cafes; and
- NZ Post Offices.

Recommendation 6 Consider Mobility Space placement during the consenting process.

8.6 CONNECTION TO FOOTPATH

A common concern with mobility spaces is the lack of access to the footpath. Easy access is important as the user can quickly move to the safety of the footpath.

NZS 4121:2001 states:

"People with disabilities shall not have to pass behind parked cars when moving to an accessible route or when approaching an entrance."[18]

By installing full length kerb ramps, all types of access users will be able to access the footpath quickly and safely, limiting the time needed to use the live traffic lane. Full length kerb ramps also allow vehicle passengers to safely transfer to their wheelchair without risk of 'tip-over' as all wheelchair wheels are able to be placed on a level surface. Drainage channels often prevent wheelchairs from having all four wheels safely on a level surface as wheelchairs frequently move during transfer, even when brakes have been applied.

A common practise in New Zealand is for Mobility Spaces is to use driveways as access to the footpath. This is not ideal due to vehicles using the driveway and the small lip that is often installed. This is the current situation for the Mobility Space outside FVC Veterinary Services. The Mobility Space west of River Road uses a driveway to the west of the Mobility Space.

Figure 3: Mobility Space west of River Road

[18] NZS 4121:2001 – Section 5: Car Parks - 5.7.2 Access from Carpark

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By installing a full length access, both passengers and drivers can safely move to the footpath without having to go into a live traffic lane.

Recommendation 7 Install full length kerb ramps at the Mobility Spaces in Ngatea to provide quick, easy access to the footpath.

8.7 DIMENSIONS

One type of mobility space does not fit all users. Access to the vehicle for an access user can be via the drivers' seat, front passenger seat, rear passenger seat, or rear entry to the vehicle. As such, a combination of parallel and angle parking is advised to cater for as many users as possible.

There are four commonly used methods of transporting people who use wheelchairs:

- Wheelchair user transfers from wheelchair to driver position (independently drives);
- Wheelchair user transfers from wheelchair to front passenger position;
- Wheelchair user remains in wheelchair and uses passenger side entrance to enter vehicle (ramp or hoist); and
- Wheelchair user remains in wheelchair and uses rear of vehicle to enter vehicle (most commonly by hoist).

Figure 4: Rear-Loading Wheelchair Van

By planning and designing a range of mobility spaces which allow for these four methods, barriers and hazards can be minimised for the wheelchair user. Allowance for these methods can be achieved by lengthening parallel parks, widening parking spaces, removing obstacles beside the carpark (gardens, street furniture, signs etc.)

and, for angle parking, allowing space between the rear of the vehicle and the live traffic lane.

There is a conflict of standards between NZS 4121:2001 and the Traffic Control Devices (TCD) Manual when determining the dimensions of a mobility parking space.

NZS 4121:2001 requires an angle parking width of 3.5m[19] and a length of 5m[20]. For vehicles that operate a rear-mounted hoist, a further 1000 – 1300mm is required. The width allows the car and the wheelchair to be on the same level when a person is transferring from one to the other. When two Mobility Spaces are located next to each other, the 'extra' 0.5m width can be shared by the two spaces, allowing a total width of 6.5m.

The TCD Manual allows a 3.0m wide angle space, which does not allow for transferring to the wheelchair, and 5.4m length[21].

For parallel parking, the TCD Manual has adopted the NZS 4121:2001 minimum allowance of 5m in length, and recommends 6m in length as good practice[22].

Recommendation 8 Adopt the recommended minimum length in the TCD Manual Part 13: Parking Control of 6m for parallel parking.

Recommendation 9 Adopt the recommended minimum width in NZS 4121:2001 of 3.5m and the minimum recommended length in the TCD Manual Part 13: Parking Control of 5.4m for angle parking. Allowance of at least 1.5m should be considered between the parking space and the live traffic lane to provide safety for wheelchair users who use rear loading vehicles.

The Mobility Space west of River Road is below the recommended 3.5m in width. Re-locating this as per **Recommendation 5** will eliminate this issue.

8.8 MARKINGS

The Land Transport Rule: TCD Amendment 2010 allows a road controlling authority to mark, on an area of roadway that is reserved for parking by the holders of approved disabled persons' parking permits, a blue surface texture or colour[23].

A report in The Gisborne Herald concluded an approximate 50% reduction was achieved in mobility parking infringements once the blue colouring was installed and

[19] NZS 4121:2001 – Section 5.5.1.2: Angle Parking
[20] NZS 4121:2001 – Section 5.5.2: Length
[21] TCD Manual Part 13: Parking Control – Section 5.3.2 – Table 5.3
[22] TCD Manual Part 13: Parking Control – Section 5.3.1 – Table 5.2
[23] TCD Amendment 2010 Rule 54002/4 – Sections 2.6 and 2.19

infringement fee increased[24]. A similar result was achieved in Hamilton and other district councils have reported similar trends.

While full blue coverage is preferred for marking mobility parking spaces, in the interest of maintenance and costs, consideration could be given to only partially colouring the mobility space as shown in Figure 5.

A 1m strip for the length of the road edge of the carpark will provide visual notice to road users, reduce installation costs, and reduce the need for repair when replacing kerb and channel etc.

During previous consultation processes where this has been suggested, concern was raised about visibility of the mobility parking space from the footpath. Installing a blue coloured metal plate or a blue strip on the top of the kerb will aid pedestrians to 'police' the spaces.

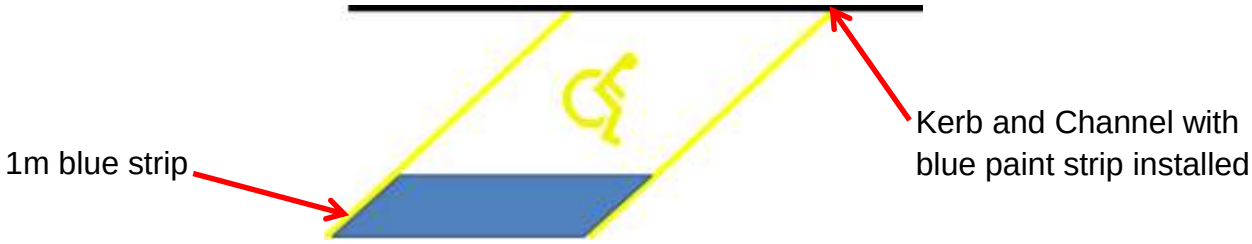


Figure 5: Mobility Space with blue surfacing design

Recommendation 10 Install blue marking as per figure 5 and maintain a non-slip surface with the colour of both the surface and the marking to comply with Land Transport Rule: Traffic Control Devices 2004.

Note: Hauraki District Council has provided blue markings for two Mobility Spaces on SH.2 in Paeroa.

8.9 SURFACE

NZS 4121:2001 states the surface for a Mobility Space shall provide a stable, firm, slip resistant flat surface with a slope not exceeding 1 in 50 (2%)[25]. This slope on on-street spaces is difficult to achieve, so an absolute maximum grade of 1 in 12 (8.3%) should be adhered to.

Overall, the condition of the Mobility Spaces provided in Ngatea is very good with low crossfall on all Mobility Spaces. Ensure future Mobility Spaces installed by developers meet the high standard that HDC has achieved.

[24] Gisborne Herald – 18th June 2012
[25] NZS 4121:2001 Section 5: Car Parks – 5.6 Surface

9 KERB RAMPS

Footpaths for mobility impaired users are just like roads are for vehicles. If one road does not connect to another road, the purpose of the footpath is decreased. Kerb ramps are used just as intersections are used for roads.

Kerb ramps are a vital component for mobility access. As they provide access to the safety of the footpath, a relatively small fault can become a serious hazard. Without them, mobility scooters, pushchairs, and wheelchair users are often forced into live traffic lanes to the nearest driveway before accessing the footpath.

When designing kerb ramps, it is important to ensure that[26]:

- If there is a kerb ramp on one side of the roadway, there is also one on the other to prevent pedestrians being 'stranded' on the roadway itself; and
- There are no low points in the gutter where water and silt can collect.

The Pedestrian Planning and Design Guide (PPDG) states the following guidelines when designing kerb ramps[27]:

- Ramp – Normal maximum gradient 1 in 12 (8.33%), Maximum gradient 1 in 8 (12.5%). A gradient of 12.5% should only be considered for constrained situations where the vertical rise is less than 75mm;
- Maximum crossfall of 2%; and
- Minimum width of 1m, 1.5m is recommended. Maximum width to equal the width of the approaching footpath.

While these guidelines provide a good starting point, some are still not accessible by disabled people with impaired mobility.

While 1 in 12 is recommended by the PPDG, manual wheelchair users still struggle to manage this grade. A desirable maximum grade of 1 in 14 is more usable. A grade of 1 in 8 is not usable by most people using mobility devices so an absolute maximum of 1 in 12 should be adopted instead of 1 in 8.

For the kerb and channel itself:

- Maximum gradient is 5%. Anything greater can cause wheelchair users to lose their balance at the transition; and
- Transition between kerb and channel and ramp or carriageway should be smooth with no vertical face. Milling of the carriageway at the channel may need to be performed so this does not inadvertently happen when the roadway has been resurfaced.

[26] Pedestrian Planning and Design Guide – Section 15.6.1: Kerb ramps
[27] Pedestrian Planning and Design Guide – Table 15.2

Kerb flares (transition from full kerb face to cut-down kerb) is to have a maximum gradient of 1 in 6 (16%).

The PPDG recommends kerb crossings should be installed wherever a footpath crosses an intersection and at every pedestrian crossing point[28]. Kerb ramps should be installed at every kerb crossing where the grade changes as pedestrians step onto the roadway. They should guide pedestrians to the safest place to cross.

Tactile paving should be used at kerb crossings so that visually impaired pedestrians are aware of the change from footpath to roadway. This is discussed further in Section 10: Tactiles.

The width of 1.8m for the cut down allows the user to access the footpath without the need for slowing down in the carriageway to negotiate footpath access, particularly if the crossing direction is at an angle to the kerb.

Recommendation 11 Adopt the Pedestrian Planning and Design Guide for Kerb Ramps with the following changes:

- Ramp – Normal maximum gradient to be 1 in 14 (7.14%), with the absolute maximum gradient to be 1 in 12 (8.33%); and
- Minimum cut down width of 1.8m.

Note: Tactiles form an integral part of kerb ramp quality and effectiveness. Tactiles will be discussed in Section 10: Tactiles.

Recommendation 12 Replace all kerb ramps as required during the maintenance programme to a minimum width of 1.8m and a maximum grade of 1 in 14 (7.1%).

9.1 INTERSECTIONS

People with impaired mobility rely on kerb ramps to safely cross the road. They provide the vital link from one footpath to the other. Without them, the link between footpaths is broken and mobility impaired users are then often required to use the live carriageway instead.

A steeply graded kerb ramp or a lip in the channel is often as bad as not having one at all. As stated above, if the grade is to steep, then people in wheelchairs and mobility scooters are not able to safely and quickly negotiate the obstacle. A lip in the channel is when a small vertical face is situated at the invert of the channel and prevents users from being able to use the kerb ramp.

This is particularly important at intersections where drivers have to be aware of multiple actions.

[28] Pedestrian Planning and Design Guide – Section 6.4.5: Kerb crossings

9.2 SH.2 INTERSECTIONS AND CROSSING POINTS

SH.2 is a major highway for the North Island. It provides a connection from Auckland to Tauranga, through to Napier/Hastings, then on to Wellington via the Wairarapa.

NZTA has a Traffic Volume Measuring Station located on SH.2 650m past Orchard East Rd[29]. In 2013, the Annual Average Daily Traffic Count (AADT) was 5,297 vehicles with 12.4% heavy vehicles.

SH.2 runs through the heart of Ngatea. Without proper crossing connections, this can create a severance through the middle of Ngatea. There are a number of intersections along the length of SH.2:

- Kaihere Road;
- River Road;
- Dent Street;
- Stimmy's Lane
- Paul Drive;
- McDuff Lane;
- Darlington Street;
- Kohunui Street; and
- Pipiroa Road.

A number of kerb ramps along SH.2 crossing the side roads have lip kerbs (a small vertical face at the invert of the channel or a steep face of kerb over 1 in 6 (16.7%)):

- Darlington Street – south-west crossing Darlington St;
- Dent Street – north-east crossing Dent St;
- Paul Drive – north-west crossing Paul Dr;
- Pedestrian Crossing opp. Ngatea Meats Ltd – south (refuge island);
- River Road – north-east crossing River Rd; and
- Stimmy's lane – south-east crossing Stimmy's Lane

Recommendation 13 Replace the lip kerbs on SH.2 at the intersections with:

- Darlington Street – south-west crossing Darlington St;
- Dent Street – north-east crossing Dent St;
- Paul Drive – north-west crossing Paul Dr;
- Pedestrian Crossing opp. Ngatea Meats Ltd – south (refuge island);
- River Road – north-east crossing River Rd; and
- Stimmy's Lane – south-east crossing Stimmy's Lane.

[29] State Highway Traffic Data Booklet 2009 - 2013

The kerb ramp on the north side of the Pedestrian Crossing on SH.2 (kerb and refuge island) has a grade of 1 in 7 (14.2%).

Figure 6: Pedestrian Crossing on SH.2

Recommendation 14 Replace the kerb ramp on the north side of the Pedestrian Crossing on SH.2 (kerb and refuge island) to a maximum grade of 1 in 14 (7.1%).

The following kerb ramps on SH.2 have a grade greater than 1 in 12 (8.3%):

- Kaihere Road – south-west (refuge island) crossing Kaihere Rd – 1 in 8.8 (11.3%);
- Pedestrian Crossing opp. Ngatea Meats Ltd – south – 1 in 9.7 (10.3%); and
- Stimmy's Lane – south-west crossing Stimmy's Lane – 1 in 8.3 (12%).

Recommendation 15 Replace the kerb ramps on SH.2 at the south-west side of the refuge island on SH.2/Kaihere Road intersection (crossing Kaihere Rd), the south kerb at the Pedestrian Crossing, and the south-west crossing Stimmy's Lane to a maximum grade of 1 in 14 (7.1%).

Other kerb ramps of concern at intersections along SH.2 are:

- Kaihere Road – south/west crossing Kaihere Rd – grate; and
- Paul Drive – north-east crossing Paul Dr– grade is 1 in 7.4 (13.6%) due to a service cover.

Recommendation 16 Replace the grate on the south-west kerb ramp of SH.2/Kaihere Road (crossing Kaihere Rd) and lower the service cover on the north-east corner of SH.2/Paul Drive (crossing Paul Dr) to achieve a maximum grade of 1 in 14 (7.1%).

A number of intersections with SH.2 do not cater for crossing SH.2. By providing kerb ramps at more intersections to cross SH.2, more crossing opportunities will become available. Further analysis of specific crossing opportunities and treatments for SH.2 is discussed in Section 12: Crossing Opportunities.

9.3 REMAINING INTERSECTIONS AND CROSSING POINTS

A following kerb ramps have lip kerbs (a small vertical face at the invert of the channel or a steep face of kerb over 1 in 6 (16.7%)):

- Darlington Street/Harris Place – refuge island north of Harris St, crossing Darlington St;
- Darlington Street/Harris Place – north-west and south-west crossing Harris St;
- Darlington Street/Hayward Road – south-east crossing Hayward Rd;
- Darlington Street/Walton Street – north-west crossing Walton St;

Figure 7: Darlington Street/Walton Street intersection

- Hayward Road/Miller Place – south-west crossing Miller Pl;
- Mahana Road/Side Road (approx. 285m west of Paul Dr) – north-west and north-east crossing the side road;
- Paul Drive/Mahana Road – north-west and south-east crossing Mahana Rd;

Figure 8: Paul Drive/Mahana Road intersection

- Paul Drive/Pinnock Place – north-west and south-east crossing Pinnock Pl;
- Paul Drive/Ranui Street – north-east and south-east crossing Ranui St;
- River Road/Factory Lane – north-west crossing Factory Lane; and
- River Road/Leonard Street – north-west and south-west crossing Leonard St.

Recommendation 17 Replace or relocate the following lip kerb ramps with a maximum grade of 1 in 14 (7.1%):

- Darlington Street/Harris Place – refuge island north of Harris St, crossing Darlington St;
- Darlington Street/Harris Place – north-west and south-west crossing Harris St;
- Darlington Street/Hayward Road – south-east crossing Hayward Rd;
- Darlington Street/Walton Street – north-west crossing Walton St;
- Hayward Road/Miller Place – south-west crossing Miller Pl;
- Mahana Road/Side Road (approx. 285m west of Paul Dr) – north-west and north-east crossing the side road;
- Paul Drive/Mahana Road – north-west and south-east crossing Mahana Rd;
- Paul Drive/Pinnock Place – north-west and south-east crossing Pinnock Pl;
- Paul Drive/Ranui Street – north-east and south-east crossing Ranui St;
- River Road/Factory Lane – north-west crossing Factory Lane; and
- River Road/Leonard Street – north-west and south-west crossing Leonard St.

The following kerb ramps have a grade greater than 1 in 8 (12.5%):

- Darlington Street/Madgwick Place – north-west crossing Madgwick Pl – 1 in 7.9 (12.6%);
- Dent Street/Hale Place – north-east crossing Hale Pl – 1 in 4.6 (21.8%);
- Darlington Street/Walton Place – south-west crossing Walton Pl – 1 in 7.2 (13.8%);
- Dent Street/Weddell Place – north-east crossing Weddell Pl – 1 in 4.8 (21%);
- Dent Street/Weddell Place – south-east crossing Weddell Pl – 1 in 4 (25%);
- Leonard Street/McClean Place – north-east crossing McClean Pl – 1 in 5.5 (18.2%); and
- Leonard Street/Paul Drive – south-east crossing Paul Dr – 1 in 3.4 (29%).

Figure 9: Darlington Street/Walton Street intersection

Recommendation 18 Replace the kerb ramps to a maximum grade of 1 in 14 (7.1%) at the following intersections:

- Darlington Street/Madgwick Place – north-west crossing Madgwick Pl;
- Dent Street/Hale Place – north-east crossing Hale Pl;
- Darlington Street/Walton Place – south-west crossing Walton Pl;
- Dent Street/Weddell Place – north-east and south-east crossing Weddell Pl;
- Leonard Street/McClean Place – north-east crossing McClean Pl; and
- Leonard Street/Paul Drive – south-east crossing Paul Dr.

The following kerb ramps on SH.26 have a grade greater than 1 in 12 (8.3%):

- Darlington Street/Hayward Road – south-east crossing Hayward Rd – 1 in 9.9 (10.1%);
- Hayward Road/Miller Place – south-east crossing Miller Pl – 1 in 10.1 (9.9%);
- Leonard Street/McClean Place – north-west crossing McClean Pl (both kerb ramps) – 1 in 8.3 (12%);
- Leonard Street/McClean Place – north-east crossing McClean Pl – 1 in 9.3 (10.8%);
- Paul Drive/Arapito Street – north-west crossing Arapito St – 1 in 11.2 (8.9%); and
- Paul Drive/Arapito Street – south-west crossing Arapito St – 1 in 8.9 (11.2%).

Recommendation 19 Replace the kerb ramps to a maximum grade of 1 in 14 (7.1%) at the following intersections:

- Darlington Street/Hayward Road – south-east crossing Hayward Rd;
- Leonard Street/McClean Place – north-west crossing McClean Pl;
- Leonard Street/McClean Place – north-east crossing McClean Pl;
- Paul Drive/Arapito Street – north-west and south-west crossing Arapito St.

For improvement in the access route, the following improvements should be made at the intersection of Arapito St/Amuri Place:

- Remove the kerb ramp on the north-west intersection crossing Arapito St;
- Install two separate kerb ramps on the north-east intersection crossing Amuri Place and Arapito Street; and
- Install a kerb ramp on Arapito Street, directly opposite the north-east intersection with Amuri Pl.

Recommendation 20 Remove the north-west kerb ramp at Arapito Street/Amuri Place and install three separate kerb ramps for crossing Amuri Place and Arapito Street.

The intersection of Darlington Street/Walton Place has a kerb ramp for crossing Darlington St in the middle of the intersection.

Figure 10: Darling Walton Place intersection

Re-locate the kerb ramp north to opposite the north-west intersection to improve access in this location.

Recommendation 21 Re-locate the kerb ramp on the east side of Darlington Street/Walton Place north to opposite the north-west intersection.

9.4 RE-SEALING

Re-sealing the carriageway can create a small lip where joining the kerb channel. This can require a wheelchair user to stop in the channel before negotiating the barrier. Milling the seal edge before re-sealing can eliminate this problem.

Figure 11: Seal edge join after re-sealing

Recommendation 22 Adopt the practise of milling seal edges at the join of the seal and the kerb channel, especially at areas where a flush kerb cut down is present, in maintenance contracts.

10 TACTILES

10.1 USE OF TACTILES[30]

Tactile ground surface indicators (Tactiles) provide pedestrians with visual and sensory information. The two types of Tactiles are Warning Indicators and Directional Indicators.

Warning Indicators alert pedestrians to hazards in the continuous accessible path of travel. They are used to indicate that pedestrians should stop to determine the nature of the hazard before proceeding further. They do not indicate what the hazard will be.

Directional Indicators give directional orientation to blind and vision-impaired people and designate the continuous accessible path of travel when other tactile or environmental cues are insufficient.

When combined with other environmental information, Tactiles assist blind and vision-impaired people with their orientation and awareness of impending obstacles, hazards and changes in the direction of the continuous accessible path of travel.

10.2 VISUAL CONTRAST[31]

Research by Bentzen et al (Accessible design for the blind, May 2000) indicated that the colour 'safety yellow' is so salient, even to persons having very low vision, that it is highly visible even when used in association with adjoining surfaces having a light reflectance value differing by as little as 40%. Their research found that safety yellow Tactiles having a 40% contrast from new concrete was subjectively judged to be more detectable than darker Tactiles having an 86% contrast with new concrete.

Figure 12: Tactiles at SH.2/SH.26 Intersection in Paeroa

[30] RTS 14 Guidelines for Facilities for Blind and Vision-Impaired Pedestrians
[31] RTS 14 Guidelines for Facilities for Blind and Vision-Impaired Pedestrians – Section 4.3: Visual Contrast

Safety yellow is the recommended standard colour for Tactiles and should be the only colour used.

A good option if choosing to install a Tactile paver is to consider a sealed Tactile paver similar to the product Freedom Strategies provide. A sealed paver will hold the colour longer, therefore increasing the life of the paver.

Other options include individual plastic domes which can then be positioned to suit the individual crossing point. If this option is chosen, a guarantee is essential and a regular maintenance programme will need to be developed with the installer to ensure domes are replaced when lost.

Recommendation 23 When installing Tactiles, ensure the Tactiles are safety yellow as recommended by the RTS 14 Guidelines for Facilities for Blind and Vision Impaired Pedestrians.

10.3 INSTALLATION OF WARNING INDICATORS[32]

Warning Indicators alert people who are blind or vision-impaired to pending obstacles or hazards on the continuous accessible path that could not reasonably be expected or anticipated using other tactile and environmental cues.

Warning Indicators shall be installed to inform blind and vision-impaired people of:

- Life threatening hazards where serious falls may occur;
- All pedestrian kerb crossing points (both formal and informal), paths cut through medians, and other places where the footpath is not separated from the roadway by an abrupt change of grade of at least 12.5% (or 1:8) or with a vertical kerb more than 70mm high;
- The presence of level railway crossings; and
- Overhead impediments or hazards other than doorways (e.g., wall mounted objects and archway structures), with a clearance of less than 2m from ground level, in an accessible open public space with no clearly defined continuous accessible path of travel.

Warning Indicators may also be installed to inform blind and vision-impaired people of:

- Vehicle hazards at busy vehicle crossing points such as: Shopping Centres, Bus Stations and large public car parks; and
- Street furniture poorly located in the continuous accessible path of travel and not detectable by a vision-impaired person using the aid of a white cane.

[32] RTS 14 Guidelines for Facilities for Blind and Vision-Impaired Pedestrians – Section 4.4: Where are Tactiles installed

Warning Indicators shall be installed across the full width of all pedestrian kerb crossings (excluding cut down transitions) and paths cut through medians to ensure that all blind and vision-impaired people using these facilities encounter the Warning Indicators. They must also be installed with the front and back edges perpendicular to the crossing direction so that the domes are aligned with the direct line of travel across the road. This will enable blind and vision-impaired people to align themselves correctly with the crossing.

Warning Indicators shall be installed[33]:

- Across the full width of all pedestrian kerb crossings (excluding kerb flares);
- Through medians to ensure that all blind and vision-impaired people using these facilities encounter the warning indicators;
- With the front and back edges perpendicular to the crossing direction to enable blind and vision-impaired people to align themselves correctly;
- So that the domes are aligned with the direct line of travel across the road;
- So that the front edge of the Warning Indicator is no closer than 300mm from the back of kerb;
- So that the front edge of the Warning Indicator is no further than 1000mm from the back of kerb, or to a point where a pedestrian could inadvertently bypass the Warning Indicator and enter the hazard (whichever is closer); and
- To a recommended depth of 600mm (This depth is required to prevent a pedestrian from inadvertently stepping over the Tactiles.)

There are currently no Tactiles installed in Ngatea. Warning Indicators need to be installed at every crossing opportunity, including all intersections and mid-block crossing points. This is a considerable investment, so these should be installed as the intersections are upgraded in Section 9: Kerb Ramps. A partnership with the Royal New Zealand Foundation for the Blind will assist with setting priorities.

10.4 INSTALLATION OF DIRECTIONAL INDICATORS

Directional Indicators shall be used to provide directional guidance where a person must deviate from the continuous accessible path of travel to gain access to:

- A road crossing point;
- Public transport access point; and
- Significant public facility e.g. public toilets or information centre.

[33] RTS 14 Guidelines for Facilities for Blind and Vision-Impaired Pedestrians – Section 4.5.1: Warning Indicators.

Where other environmental cues are insufficient, Directional Indicators may also be used to provide directional guidance:

- Across open space from one point to another; or
- Around obstacles in the continuous accessible path of travel (where warning tiles are not sufficient).

Where required, Directional Indicators shall be installed in conjunction with warning indicators where a road crossing point is not located in the continuous accessible path of travel and directional guidance is required.

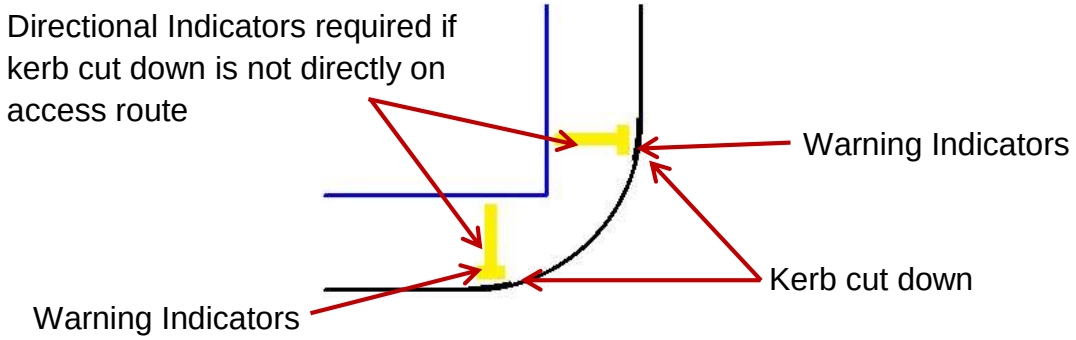


Figure 13: Preferred Layout of crossing points with Tactile Paving

Where required, Directional Indicators shall be installed[34]:

- In conjunction with Warning Indicators where a road crossing point is not located in the continuous accessible path of travel and directional guidance is required; and
- Across the full width of the path, with a minimum depth of 600mm to indicate a change in direction of the continuous accessible path of travel.

In Ngatea, Directional Indicators need to be installed at every crossing opportunity which is not on the continuous access route. This includes all mid-block crossing points discussed in Section 12: Crossing Opportunities and intersection layouts as detailed in Section 9: Kerb Ramps.

10.5 REFUGE ISLANDS AND SPLITTER ISLANDS

Warning Indicators shall be provided at all refuge islands and splitter islands. They shall cover the full width of the median cut through of the island. The layout of the Tactiles in the median will vary depending on the depth of the median and shape of the island cut through. See figure 24 in Section 12: Crossing Opportunities for further details.

[34] RTS 14 Guidelines for Facilities for Blind and Vision-Impaired Pedestrians – Section 4.5.2: Directional Indicators.

Recommendation 24 Create a long term programme in partnership with the Royal New Zealand Foundation for the Blind to install Warning Indicators and Directional Indicators (as required) at all intersections and mid-block crossing opportunities, including refuge and splitter islands.

10.6 WIDTH AND ALIGNMENT OF WARNING INDICATORS

It is important that the Warning Indicators are across the full width of the crossing point. Any gaps and the Warning Indicators could be missed, along with the vital information they provide.

As mentioned above, correct alignment of Tactiles enables blind and vision-impaired people to align themselves correctly with the crossing.

As all kerb ramps at the intersections are under the recommended width, as **Recommendation 12** is carried out, Warning Indicators should be installed to the full width of the kerb ramp and are aligned with the direct line between the kerb ramps.

Recommendation 25 Ensure all Warning Indicators are installed to the full width of the kerb ramp as required in Recommendation 12 and are aligned with the direct line between the kerb ramps.

10.7 OTHER VISUAL CUES

Sometimes it is necessary to provide contrasting visual guidance without the need for installing Warning or Directional Indicators. A yellow guideline at the boundary or back of footpath of a vehicle crossing can aid visually impaired users to stay on the footpath. The guideline can also remind vehicle users of the footpath and the need to give way to pedestrians. **An excellent example of the use of yellow guidelines is at Caltex on SH.2 in Paeroa and at Newmont Gold Waihi on Martha Street in Waihi.**

The boundary or back of footpath requires delineation at the Gull Service Station on SH.2. Both back and front of footpath is required at #21 River Road and the Hauraki Plains Co-Operating Parish Church.

Recommendation 26 Install a yellow guideline at the back of footpath at the Gull Service Station on SH.2 and back and front of footpath at 21 River Road and the Hauraki Plains Co-Operating Parish Church.

11 FOOTPATHS

11.1 PROVISION OF FOOTPATHS

Footpaths enable pedestrians to get to and from their place of work or school and move around the community to meet in social, sporting, work or cultural events. A safe and effective footpath with continuous connectivity provides good access to the community for the mobility impaired.

A number of improvements have been made to the footpaths in the main shopping centre of Ngatea. As a result, a combination of Asphaltic Concrete with cobblestone strips has been laid to create a softer, more appealing environment.

Figure 14: Footpath surface on Sh.2

Often Local Authorities use cobblestones as a surface to make the main shopping centre a more appealing, pedestrian like environment. Cobblestones are good when newly laid, but after a while lose surface structure either through poor basecourse compaction or repair of underground services. Wheelchair users and mobility scooter users can struggle on the surface due to the jarring of the joins between the cobblestones.

In the situation of Ngatea, care needs to be taken with the joining of the Asphaltic Concrete and cobblestones. Over time, the joints can sink, causing tripping hazards between the two surfaces.

The current footpath surface along SH.2 in the shopping centre of Ngatea is very good with minimal movement between the asphaltic concrete and the cobblestones. Monitor the surface and repair when the surface becomes uneven.

Recommendation 27 Monitor the surface and repair when the surface becomes uneven and potentially create a tripping hazard.

A very common practise in smaller urban settlements in New Zealand is to install footpath on one side only of the road. This is considered as the minimum provision and the road controlling authority should be able to demonstrate clearly why walking is not expected in that area. In the case of new developments, this responsibility passes onto the developer. Retro-fitting is costly to HDC, so the preferred standard is to install them in any new developments.[35]

The PPDG provides guidance for providing footpaths:

<table>
<tr><th rowspan="3">Land Use</th><th colspan="4">Footpath Provision</th></tr>
<tr><th colspan="2">New Roads</th><th colspan="2">Existing Roads</th></tr>
<tr><th>Preferred</th><th>Minimum</th><th>Preferred</th><th>Minimum</th></tr>
<tr><td>Commercial & Industrial</td><td colspan="2" rowspan="4">Both Sides</td><td colspan="2" rowspan="3">Both Sides</td></tr>
<tr><td>Residential (on Arterials)</td></tr>
<tr><td>Residential (on Collector roads)</td></tr>
<tr><td>Residential (on Local Streets</td><td>Both Sides</td><td>One Side</td></tr>
</table>

Table 2: When to Provide Footpaths[36]

For the mobility impaired user, having a footpath on one side often means having to use the road for access. Ideally, footpaths should be provided on both sides of the road for full accessibility. In situations where a footpath is only on one side, regular connections should be made available for access to the footpath.

The existing footpath provisions assessed in the geographic area of interest is listed in Appendix C: Footpath Provisions.

Footpaths should be treated in the same vein as roads are for vehicles. With the increase of mobility scooters, the provision of footpaths are becoming more important as without them, mobility scooters users will often use the road instead of crossing over to the footpath on the other side.

[35] Pedestrian Planning Design Guidelines Section 14.1: Where Footpaths Should Be Provided
[36] Pedestrian Planning Design Guidelines Table 14.1: When to Provide Footpaths

HDC has an excellent footpath network in Ngatea, with no additional footpaths needed at this stage. As further development is undertaken in areas where footpaths are not currently provided (west side of Pipiroa Road and Harris Place for example), consideration is required to install footpath as part of the development, therefore reducing the cost for HDC.

Recommendation 28 Ensure all future development in Ngatea has footpaths installed on both sides of the new road.

11.2 FOOTPATH WIDTH

Footpath width is often under-rated for accessibility. A wider footpath provides a safer passage of use for mobility scooters, wheelchairs, and pushchairs eliminating the requirement to use an uneven surface, such as a grass berm. The PPDG provides the following guidelines for the through route of footpaths:

Location	Maximum pedestrian flow	Through route width
Arterial roads in pedestrian districts; CBD; alongside parks and schools; other major pedestrian generators	80 p/min	>2.4m
Local roads in pedestrian districts; Commercial/ industrial areas outside the CBD; Collector roads	60 p/min	1.8 m
Local roads in residential areas	50 p/min	1.5 m
Absolute minimum*	50 p/min	1.5 m

Table 3: Minimum Footpath Dimensions

*Note: The absolute minimum width is only acceptable in existing constrained conditions and where it is not possible to reallocate road space.

Most of the footpaths in the geographic area of interest are below the absolute minimum of 1.5m. A narrow footpath creates difficulty for mobility scooters and pushchairs to pass. With a steep crossfall, a narrow footpath can also limit recovery time if an access user loses control of their scooter or wheelchair.

Appendix C shows the current widths of footpaths in the Geographic Area of Interest.

The footpath width in the main shopping centre is excellent and allows for good pedestrian flow in this area. The concern for this area is shop signage and wares. This is discussed in Section 13: Street Furniture.

For the remaining area, given the volume of vehicles, a minimum of 1.5m needs to be achieved with the following exceptions:

- Pipiroa Road –The footpath on the east side of Pipiroa Rd should be 1.8m from SH.2 to Mahana Road; and
- Kaihere Road – Due to the location of Hauraki Plains College, the footpath should be 1.8m.

Recommendation 29 Widen the footpath on Pipiroa Road, from SH.2 to Mahana Road, and Kaihere Road, from SH.2 to Brenner Drive, to a width of 1.8m.

Recommendation 30 Widen the footpaths in the geographic area of interest during the regular maintenance programme to a minimum width of 1.5m.

11.3 FOOTPATH LOCATION IN BERM

The footpath location on the berm raises many potentially hazardous situations. Footpaths are generally located:

- On the Boundary;
- In the middle of the berm;
- On the kerbline; or
- Full width

If a footpath is situated on the boundary line, high fences or hedges can lower sight visibility for both vehicles exiting the property and the pedestrian walking along the footpath.

A footpath on the kerbline makes the pedestrian feel vulnerable to the travelling vehicles on the road, especially if the footpath is narrow. Steep crossfall also force mobility scooter and wheelchair users as well as small children on bicycles onto the road if control is lost. Crossfalls are discussed in more detail in Section 11.7: Crossfalls.

The middle of the berm is the ideal location as if provides space from vehicles exiting driveways and provides an area for catching errant mobility devices. This is similar to the concept of clear zones that NZTA has adopted for State Highways.

Full width footpaths are also favourable as this provides a wide surface for mobility impaired users to use safely away from hazards. The placement of signs, rubbish bins, power poles and light poles etc. will need careful consideration so as not installed in an area where visually impaired users and small children will generally walk.

Recommendation 31 Where possible, install future footpaths that are not full width, in the middle of the berm to improve sight visibility at driveways and grassed berm areas for errant mobility devices.

11.4 VEGETATION

When narrower than standard footpaths are provided, extra consideration is required to maintain width by managing vegetation. Also, low hanging branches can cause injury or restrict sight visibility.

Vegetation in Ngatea was a concern at the time of the audit, given the narrow footpaths. Maintaining the vegetation at these locations is vital in ensuring a usable footpath is always provided.

The following locations were identified as having vegetation growing over the footpath:

- Amuri Place - #4, and #6;
- Brenner Drive - #11, and #54;
- Darlington Street – opp. Z Service Station, #7, and #20;
- Hayward Road – Outside Hauraki Plains College, #15;
- Leonard Street – Intersection with Paul Drive;
- McQuarrie Place – 47 Mahana Road, and #2;
- 5 Madgwick Place;
- Mahana Road - #8, #24, and #52;
- 4 Miller Place;
- 38 Paul Drive;
- 6 Parfitt Place;
- 5 Pinnock Place;
- SH.2 – North side (bridge to River Road); and
- 3 Walton Place.

Figure 15: Vegetation outside 20 Darlington Street

Recommendation 32 Liaise with adjoining land owners to trim vegetation extending from the boundary over the footpath as required.

11.5 SURFACE

An uneven surface of concrete and asphaltic concrete, due to tree roots, underground service work and basecourse failure can cause potential tripping hazards and cause injury to mobility users. Uneven surfaces can also cause mobility scooter users and wheelchair users to tip out of their mobility aid and be seriously hurt. Ponding issues can create a slippery surface.

Berms lower than the footpath can also cause problems for mobility users. With the narrow width of the footpath, mobility scooter users and wheelchair users often have to use the berm to pass other users. A low berm can cause the mobility aids to tip over and cause serious injury.

This is a major concern in Ngatea. A large number of streets were identified as having berms lower than the adjoining footpath and these are listed in Appendix C: Table 12 – Footpaths with low berm.

Figure 16: Low berm at 53 Darlington Street

Recommendation 33 Raise the berm level to the adjoining footpath at the following locations listed in Appendix C: Table 12 – Footpaths with low berm.

Lifting of the footpath at joints or by tree roots create tripping hazards, particularly for older persons. Similarly sunken footpath, due to failure in the basecourse, also causes an uneven surface and the potential for older persons to lose their footing.

Figure 17: Lifting footpath on Kohunui Street

The locations identified with lifting or sunken footpaths are listed in Appendix C: Table 13 – Lifting Footpath

Figure 18: Tree root lifting footpath at 14 Madgwick Place

Recommendation 34 Repair the lifting footpath at the locations listed in Appendix C: Table 13 – Lifting Footpath.

Loose metal spilling from private property onto the footpath can be potentially slippery for older persons and mobility scooter and wheelchair users.

The following locations were identified as having loose metal spilling from the neighbouring property:

- Kaihere Road – Hauraki Plains College Entrance;
- Kohunui Street – Autoworks Ltd;
- Pipiroa Road – Ngatea Panelbeaters Ltd, RSA;
- River Road – Central Kids Kindergarten; and
- SH.2 – Hauraki Engineering Ltd, opp. Hauraki Plains College.

Figure 19: Entrance to Hauraki Engineering Ltd

Recommendation 35 Liaise with adjoining land owners to ensure loose metal is not transferred onto the footpath.

There are locations where HDC can repair the surface and eliminate loose metal and broken surfaces:

- Darlington Street – #23, #27, #33, #51;
- 6 Factory Lane;
- 10 Hale Place – subsoil drain connection to kerb;
- Hayward Road – #1 to #3, #8, #60;
- Kaihere Road – Redundant service cover and bolts outside Hauraki Plains College, #18 (PP), #24;
- Leonard Street – joint gaps on both sides, full length;
- McClean Place – #5, #11;
- McQuarrie Place – #6, 47 Mahana Road;
- 5 Madgwick Place;
- 20 Miller Place;
- 15 Paul Drive;
- 1 Ranui Street;
- SH.2 – Z Service Station; and
- 11 Walton Place.

Recommendation 36 Repair the footpaths at the following locations:

- Darlington Street – #23, #27, #33, #51
- 6 Factory Lane;
- 10 Hale Place – subsoil drain connection to kerb;
- Hayward Road – #1 to #3, #8, #60;
- Kaihere Road – Redundant service cover and bolts outside Hauraki Plains College, #18 (PP), #24;
- Leonard Street – joint gaps on both sides, full length;
- McClean Place – #5, #11;
- McQuarrie Place – #6, 47 Mahana Road;
- 5 Madgwick Place;
- 20 Miller Place;
- 15 Paul Drive;
- 1 Ranui Street;
- SH.2 – Z Service Station; and
- 11 Walton Place.

Service covers and repairs can create a tripping hazard by poor reinstatement of the footpath. **At the time of the inspection, no service repairs were identified as a concern.**

Recommendation 37 Ensure Service providers such as Spark, Powerco, and Ultra-fast Broadband etc. reinstate the footpath to a high standard.

A catchpit outside Ngatea Panelbeaters Ltd has a grate cover. Although it is slightly off the direct line of the footpath, this is a minor concern.

Figure 20: Catchpit at Ngatea Panelbeaters Ltd

Recommendation 38 Replace the catchpit cover with a full cover at the edge of the footpath outside Ngatea Panelbeaters Ltd.

11.6 LONGITUDINAL GRADIENT

Longitudinal gradient is a major concern for users with mobility devices.

As with kerb ramps, design standards regard longitudinal grades greater than 1 in 20 (5%) on footpaths as ramps[37]. CCS Disability Action considers '1 in 8 (12.5%) as an absolute maximum' too steep and unable to be independently and safely used by mobility scooters and wheelchairs. An absolute maximum grade of 1 in 12 (8.5%) is permissible on existing key pedestrian routes as grades steeper than this are generally not able to be negotiated.

Recommendation 39 Adopt an absolute maximum longitudinal grade of 1 in 14 (7.1%) for future proposed works.

[37] NZS 4121:2001 Section 6.2.3: Footpaths as ramps

Ngatea has a relatively flat environment. The majority of longitudinal gradient issues occurred at driveways. The following footpaths were identified as having a steep longitudinal gradient:

- Bratlie Place – connection to Ngatea Water Gardens – 1 in 2.5 (40%);
- 8 Harris Place – 1 in 10.1 (9.9%, east);
- 34 Kaihere Road – 1 in 10 (10%) and 1 in 7.1 (14%);

Figure 21: Driveway to 34 Kaihere Road

- River Road – driveways from #33 to #43 – various grades over 1 in 12 (8.3);
- SH.2 – HDC eastern entrance – 1 in 8.9 (11.2%, west), 1 in 6.2 (16.1%, east); and
- SH.2 – HDC western entrance – 1 in 4.6 (21.6%, east).

Other driveways that have a lip kerb between the driveway and the footpath include:

- Hayward Road – Hauraki Co-operating Parish – both sides;
- SH.2 – HDC western entrance – west; and
- SH.2 – Hauraki Plains College entrance – east.

Recommendation 40 Re-grade the tie-in longitudinal grade or lip kerbs between the footpath and driveways at the following locations:

- Bratlie Place – connection to Ngatea Water Gardens;
- 8 Harris Place;
- 34 Kaihere Road;
- River Road – driveways from #33 to #43;
- SH.2 – HDC western and eastern entrance; and
- SH.2 – Hauraki Plains College entrance.

The footpath from the Piako River Bridge on SH.2 to Kaihere Road has a longitudinal grade of 1 in 8.7 (11.5%).

Figure 22: Footpath from Piako River Bridge to Kaihere Road

Recommendation 41 Re-grade the footpath on SH.2 from the Piako River Bridge to Kaihere Road to a maximum grade of 1 in 14 (7.1%).

11.7 CROSSFALL

As with longitudinal gradients, crossfall is a major concern for users with mobility devices. Design standards recommend a crossfall of between 1% and 2%[38]. A grade of greater than 1% requires people using wheelchairs and walking frames to use extra energy to resist the sideways forces. As the majority of footpaths drain to the road, this can lead to the user dropping over the kerb and into the live traffic lane.

Recommendation 42 Adopt 1% as the crossfall standard, and upgrade existing footpaths to this grade when replaced.

The majority of footpaths in the geographic area of interest had a crossfall of greater than 2% with crossfall greater than 1 in 12 (8.3%) measured on:

- 37 Hayward Road – 1 in 8.8 (11.3%); and
- SH.2 – Richardson Real Estate – 1 in 10.9 (9.2%).

Figure 23: Crossfall of footpath at 37 Hayward Road

Recommendation 43 Re-grade the crossfall on SH.2, outside Richardson Real Estate, and 37 Hayward Road, to achieve a grade of between 1% and 2%.

[38] Pedestrian Planning and Design Guidelines Section 14.5: Crossfall and NZS 4121:2001 Section 6: Footpaths, Ramps, and Landings

11.8 VEHICLES PARKING ON FOOTPATH

Cars parking on the footpath are always a concern for mobility users. Not only can they reduce the usable width of the footpath, but they also create sight line issues for people in wheelchairs and mobility users.

Pedestrians require differing spaces within which to manoeuvre. Newer wheelchairs are increasingly wider than their predecessors and this should be considered when designing for pedestrians. Mobility scooters are usually longer but the same width as manual wheelchairs.

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 metres[39].

There were no cars parking on the footpath at the time of the site inspection.

Recommendation 44 Regularly control car parking on the footpath to maintain a clear, usable footpath.

[39] Pedestrian Planning & Design Guide Section 3.3: Physical Space Required

12 STREET CROSSINGS

12.1 PROVISION OF CROSSINGS[40]

Pedestrians cross the road an average of two to three times on every walking trip. Perceptions of the walking experience are focused on difficulties crossing roads. Any problems with this can cause delays and create a sense of insecurity. By providing effective crossings, the walking experience is enhanced and becomes more user-friendly.

There are four main reasons for installing pedestrian crossing facilities:

- Level of service – The crossing opportunities available to pedestrians;
- Safety – Crash records show that specific pedestrian crashes may be reduced by providing crossing assistance, or that perceptions of poor safety are discouraging walking;
- Specific access provisions – A particular group (e.g. young children, vision and mobility impaired people) crossing; and
- Integration – Part of integrating and reinforcing a wider traffic management plan for the area.

12.2 LEVEL OF SERVICE

The level of service for pedestrians is calculated by the time taken to safely cross the road, the volume of traffic, and physical aids to improve crossings. The longer it takes, the more frustrated pedestrians become, and the more likely they are going to take risks.

NZTA has developed a Pedestrian Crossing Facilities Calculation Spreadsheet and is attached as Appendix D. The spreadsheet is also available on NZTA's website.

There are a number of pedestrian crossing facilities that are available to provide safe and effective opportunities for pedestrians to cross the road.

[40] Pedestrian Planning and Design Guidelines – Section 15: Crossings

The Pedestrian Crossing Facilities Calculation Spreadsheet considers the following methods of providing safety when crossing the road:

- Without Crossing Facility;
- Platform;
- Kerb extensions;
- Median Refuge;
- Combining Kerb extensions and median refuge;
- Zebra crossings;
- Traffic signals; and
- Grade separation.

The Pedestrian Crossing Facilities Calculation Spreadsheet is available from the NZTA website.

Recommendation 45 Adopt the Pedestrian Crossing Facilities Calculation Spreadsheet for use when determining pedestrian crossing facilities.

12.3 KERB EXTENSIONS[41]

Kerb extensions are created by widening the footpath at intersections or mid-blocks, and extending it into and across parking lanes to the edge of the traffic lane. This improves visibility of pedestrians by traffic and reduces the distance to cross the road.

Advantages for kerb extensions are:

- Pedestrian safety is improved by kerb extensions – with an estimated pedestrian crash reduction of 36 percent (twice that of pedestrian islands alone). This is because pedestrians are more visible to oncoming drivers and pedestrians get a better view of approaching traffic;
- Pedestrian delay is reduced due to the shorter crossing distance and, therefore, crossing time which permits pedestrians to select a smaller gap (but to a much lesser extent than pedestrian islands);
- They can be retrofitted to existing roads;
- They create space for pedestrians to wait without blocking others walking past;
- They create space for installing kerb ramps;
- They physically prevent drivers from parking (and blocking) the crossing point;

[41] Pedestrian Planning Design Guide: Section 6.7.3 – Kerb Extensions

- Road berms gain additional space which can be used for landscaping, cycle racks and street furniture (as long as visibility is maintained);
- The can help slow vehicle speeds;
- They ensure that car parking does not obscure visibility for vehicles at intersections; and
- Signs and traffic signal displays can be located where they are easily seen by approaching traffic.

Disadvantages for kerb extensions are that they:

- Reduce on-street parking;
- Can force cyclists closer to motorised traffic on narrow roads;
- Can create drainage problems and rubbish can accumulate;
- Can create an obstruction that may be struck by cyclists and motorised vehicles.

Kerb extensions have particular safety benefits and also result in less delay for pedestrians. They will be most beneficial on roads with flows less than 500 vehicles per hour. They can be used on any class of road and can be retrofitted as necessary.

They are particularly useful when combined with pedestrian platforms, zebra crossings, traffic signals and, where there is sufficient room, pedestrian refuge islands.

12.4 PEDESTRIAN PLATFORMS[42]

Pedestrian platforms are raised and sometimes specially textured areas of roadway that act as a focus for crossings. However, they are part of the roadway and pedestrians have to give way to vehicles unless the platform is also marked as a zebra crossing.

Advantages of Pedestrian Platforms include:

- Emphasising pedestrian movements at the expense of vehicular traffic;
- Helping to focus traffic on pedestrians crossing;
- Being aesthetically pleasing;
- Reinforcing the slow speed message to drivers;
- Being highly effective at reducing vehicle speeds;
- Eliminating grade changes from the pedestrian route and, therefore, the need for kerb ramps; and
- More drivers yielding to pedestrians.

[42] Pedestrian Planning Design Guide: Section 6.7.4 – Pedestrian Platforms

Disadvantages for Pedestrian Platforms are that they:

- Only work effectively when vehicle speeds can be reduced to where drivers are able and prepared to slow or stop;
- Although still part of the roadway, may cause confusion as to who has the right of way;
- Can create discomfort for vehicle occupants, especially those in heavy vehicles (while platforms are less suited to bus routes, they can be designed to accommodate buses);
- Should preferably not be used in isolation; but form part of a larger (area-wide) scheme;
- May increase noise as vehicles brake, slow, pass over them and accelerate; and
- Vision impaired pedestrians and children may not be aware they are entering the roadway on a raised platform, so there needs to be clear discrimination between the road and footpath.

Platforms are generally installed on local roads and sometimes on collector roads. They are not installed on arterial roads except in major shopping areas where the need for traffic calming and pedestrian assistance exceeds the arterial function. They can be retrofitted at both intersections and mid-block and are particularly useful in traffic calmed areas (where they serve the same purpose as road humps). Where motorists need to stop and give way, the platforms should be marked as zebra crossings. In areas where heavy vehicles are part of the traffic, careful design and liaison will be necessary.

Do not use where traffic approach speeds exceed 50 km/h.

12.5 PEDESTRIAN REFUGE ISLANDS[43]

Pedestrian Refuge Islands are elongated, raised portions of pavement within the roadway that provide a place for pedestrians to wait before crossing the next part of the road. Crossing pedestrians only need to find a gap in one stream of traffic, meaning larger and more frequent gaps and significantly reduced crossing times.

Advantages for Refuge Islands are:

- Reduce the crossing area where pedestrians are in conflict with traffic;
- Can considerably reduce delays for pedestrians (by up to 90 percent);
- Can be retrofitted to existing roads;
- Are particularly helpful to pedestrians unable to judge distances accurately or who have slower walking speeds;

[43] Pedestrian Planning Design Guide: Section 6.7.1 – Pedestrian Islands

- Can improve safety with an estimated pedestrian crash reduction of 18% (or 32% when combined with kerb extensions);
- Pedestrians on the island are more visible to oncoming drivers, and pedestrians can see oncoming traffic better; and
- The localised roadway narrowing encourages lower vehicle speeds.

Disadvantages of Refuge Islands are that they:

- Restrict vehicle access to adjacent driveways;
- Can force cyclists closer to motorised traffic on narrower roads;
- Can disrupt drainage causing water to pond within the island or adjacent kerb ramps;
- Need a wide roadway to ensure adequate space after installation;
- Can be an obstacle which may be struck by motorised traffic if not particularly conspicuous.

Because the main effect of pedestrian islands is reduction in pedestrian delay, they are most useful where traffic flows exceed 500 vehicles per hour.

Pedestrian islands are nearly always highly cost effective in improving pedestrian safety and reducing delay. They can be incorporated whenever a raised island is created as part of a roading scheme, for example deflection and splitter islands.

Pedestrian islands can be combined with kerb extensions and platforms.

Flush medians should include regular pedestrian islands to reduce inappropriate motor vehicle use of the medians and to improve pedestrian feelings of security on them. Although they can be retrofitted, they should be considered as a matter of course in all new/improved roading schemes.

Pedestrian refuge islands should ideally be at least 1.8 metres wide (narrow refuge islands put pedestrians at risk of being hit by truck side mirrors) and can be part of an un-signalised pedestrian crossing[44]. This width also allows for a mobility scooter to fully park on the refuge island (most mobility scooters range from 1.3m to 1.5m in length).

Figure 24: Ideal pedestrian refuge island crossing facility

[44] International Road Assessment Programme – Road Safety Toolkit

Pedestrian refuge islands can be used where there is a demand for pedestrians to cross the road, but where the numbers of pedestrians are not high enough to warrant a signalised pedestrian crossing[45].

12.6 PEDESTRIAN ZEBRA CROSSINGS[46]

A pedestrian zebra crossing is a section of roadway running from kerb to kerb and marked with longitudinal markings. Drivers are required to give way to pedestrians on both sides of all zebra crossings unless the crossing is divided by a raised traffic island.

Advantages of a zebra crossing are that they:

- Provide the least delay for pedestrians;
- Can be retrofitted to existing roads;
- Create a clear focus for crossings; and
- If raised (as a platform), slow vehicle speeds and can improve safety.

Disadvantages are:

- On their own, do not improve pedestrian safety and may even decrease it;
- Can lead to an increase in 'nose-to-tail' vehicle accidents.
- Drivers may not stop when pedestrians expect them to.
- High pedestrian flows can dominate the crossing and cause severe traffic disruptions.
- Wide markings can be slippery when wet for cyclists and motorcyclists.
- Pedestrians may step out without checking properly whether approaching vehicles are too close to stop.

Zebra crossings need to be combined with other measures to enhance their safety. Do not use zebra crossings on roads with speed limits over 50 km/h unless approval is obtained from Land Transport NZ as required by the Traffic Control Devices Rule.

Do not use zebra crossings for locations with fewer than 50 pedestrians per hour.

12.7 MID BLOCK PEDESTRIAN SIGNALS[47]

Mid-block pedestrian signals are installations that stop traffic so pedestrians can cross unimpeded. The signals are activated by pedestrians, vehicles are stopped, pedestrians cross and then vehicles are allowed to proceed.

[45] International Road Assessment Programme – Road Safety Toolkit
[46] Pedestrian Planning Design Guide: Section 6.7.5 – Pedestrian zebra crossings
[47] Pedestrian Planning Design Guide: Section 6.7.6 Mid-block Pedestrian Signals

Mid-block pedestrian signals can include intelligent features, such as extending the pedestrian phase for slow pedestrians and detecting that pedestrians have already crossed prior to the pedestrian phase being displayed.

Advantages for Mid-block Pedestrian Signals:

- Clearly show when to cross;
- Balance the delays to pedestrians and traffic;
- Can reduce community severance;
- Are very safe for pedestrians when used properly. Signals take the decision on when it is safe to cross away from the pedestrian. Pedestrians group together, rather than crossing intermittently.

Disadvantages for Mid-Block Pedestrian Signals include:

- Delaying pedestrians more than zebra crossings;
- Being more costly to install, operate and maintain than other crossing types;
- Being more disruptive to traffic flows than other crossing types apart from zebra crossings;
- Being more dangerous when crossing near the signals or against the signals.
- Slower pedestrians may find it difficult to cross within the allotted time. Intelligent features can assist this.
- Signal timings are frequently based on minimising vehicle delays which results in a poor level of service to pedestrians. Pedestrians having to wait for what seems to them an excessive time will take risks and cross against the signals. If all pedestrians have crossed before receiving a green signal, vehicles are required to stop anyway. Intelligent features can reduce this.

Figure 25: Pedestrian crossing warning sign

Use a traffic signals analysis package to model the expected delays to pedestrians and other users under signal operation. Compare the delay and safety performance with other options calculated using the Pedestrian crossing facilities calculation spreadsheet.

While pedestrian traffic signals would greatly enhance safe crossing, the practicalities of installing signals would be a huge investment by HDC.

An alternative solution would be the installation of an electronic pedestrian warning sign. Similar to cycle warning signs, the pedestrian warning signs can be activated by the pedestrian to warn on-coming motorists.

A number of options are available, and any sign installed would need to be approved by NZTA before installation.

12.8 DECISION PROCESS

There are four main reasons for choosing to improve facilities for pedestrians to cross roads[48]:

- Level of service: the crossing opportunities available to pedestrians are below the desired level of service.
- Safety: crash records show that specific pedestrian crashes may be reduced by providing crossing assistance, or that perceptions of poor safety are discouraging walking.
- Specific access provisions: a particular group (e.g. young children, vision and mobility impaired people) needs the improvements.
- Integration: it is part of integrating and reinforcing a wider traffic management plan for the area.

When considering how to best provide for pedestrians, consider the following questions (in this order):

- What is the road environment and the land use context, and who uses it?
- What are the appropriate physical aids to crossing?
- Is the control of the crossing point appropriate?
- How do we design the facility to fit into the environment?

This approach should be followed in all cases when providing crossing assistance for children.

12.9 VOLUME OF TRAFFIC IN NGATEA ON STATE HIGHWAYS

The volume of traffic is a major contributor to the safety of pedestrians crossing the road. The higher the volume, the fewer gaps are available for pedestrians.

Average Daily Traffic (ADT) volume is recorded by NZTA. These record either an estimate or actual measurement of vehicles over a period of 7 days, which is then calculated for the whole year.

As stated in Section 9: Kerb Ramps, in 2013, the Annual Average Daily Traffic Count (AADT) was approx. 5,300 vehicles for SH.2 with 12.4% heavy vehicles.

[48] Pedestrian Planning Design Guide: Section 6.5 – Selecting the appropriate crossing facility.

12.10 EXISTING CROSSING OPPORTUNITIES

There are three different designated road crossing opportunities in the geographic area of interest:

- Kerb ramps at intersections (discussed in Section 9: Kerb Ramps and Section 10: Tactiles);
- Pedestrian refuge/splitter islands (visual appearance discussed in Section 10: Tactiles); and
- Pedestrian zebra crossings.

As discussed earlier, a splitter and refuge island should be 1.8m wide as a mobility scooter varies from 1.3m to 1.5m in length. Mothers with pushchairs also require the extra length for safety.

Recommendation 46 As splitter and refuge islands are replaced under normal maintenance, ensure they are replaced with islands that are at least 1.8m wide.

As discussed in Section 9: Kerb ramps and Section 10: Tactiles, the alignment of crossing points is important for visually impaired users to safely cross the carriageway.

Appendix D contains typical layouts to improve crossing opportunities at intersections. Each intersection should be upgraded as the kerb ramps are replaced.

Recommendation 47 Relocate the crossing points as per layouts in Appendix D when kerb ramps are replaced.

12.11 NEW CROSSING OPPORTUNITIES

Crossing opportunities provide linkage for pedestrians to each side of the road. In some cases, they complete links between footpaths, particularly if the street has a footpath on one side only. By providing kerb ramps, pedestrian refuge islands, and/or pedestrian crossings, safer connectivity can be provided for mobility impaired pedestrians.

Figure 26: Pedestrian Crossing on SH.2

There are very limited crossing opportunities along the State Highways away from the main shopping centre. Most intersections with side roads do not have crossing points to cross the State Highways.

The site inspection noted the following locations that require the investigation of new crossing opportunities on SH.2:

- Dent Street/Paul Drive – Install a mid-block crossing opportunity with a refuge island to provide connection at the western end of the main shopping centre; and
- Darlington Street/Pipiroa Road – Install a mid-block crossing opportunity with a refuge island to provide a connection at the western end of the urban area for students of Ngatea Primary School.

As these are State Highways, discussions with NZTA will be required for the installation of any refuge islands on the State Highway. A programme of the installation of one Refuge Island a year is recommended to manage costs.

Recommendation 48 Liaise with NZTA for the installation of mid-block crossing opportunities with refuge islands on SH.2 between Dent Street/Paul Drive and Darlington Street/Pipiroa Road.

Installing refuge islands at these points will also aid in the management of traffic speed along the State Highways.

Other locations where the installation of crossing opportunities will be of benefit include the intersections of side roads with Hayward Road, Darlington Street at Paul Drive. By using the Pedestrian Crossing Facilities Calculation Spreadsheet, HDC can install the appropriate crossing facility, whether it is just kerb ramps or a refuge island.

Recommendation 49 Use the Pedestrian Crossing Facilities Calculation Spreadsheet to determine and install the most efficient crossing facility at the intersections of the side roads with Hayward Road, Darlington Street at Paul Drive.

Crossing connections need to be provided when footpaths switch sides of the road or when a side road joins the road with the footpath on the other side. This occurs on Harris Place where the footpath ends at #16 on the south side. Installing kerb ramps at this location will improve access between the two footpaths.

Recommendation 50 Install kerb ramps at 16 Harris Place to complete a continous access route between footpaths.

13 STREET FURNITURE

Well-designed public spaces play a decisive role in the comfort and safety of users. Street furnishings support people walking, cycling and those taking rest on their journey[49].

Street furniture should avoid interrupting pedestrian desire lines and be carefully selected and positioned to avoid cluttering the street. It needs to be mounted at a height that is usable for all users.

Street furniture includes rubbish bins, light and power poles, signage, seats, bus shelters, fencing etc.

13.1 PERMANENT SIGNAGE[50]

Signage plays a key role in access in the community. It provides confidence to the user that they are heading in the right direction and informs them of access conditions.

All road users need helpful guidance and direction to inform and warn them of the environment ahead. As pedestrians have different characteristics and routes from other road users, the following four specific measures are required:

- Providing directional information to pedestrians;
- Channelling pedestrian flows;
- Informing other road users of the presence of pedestrians; and
- Indicating to pedestrians and other road users who has priority at crossing points.

A planned and cohesive strategy for pedestrian signage usually reduces the number of signs and locations and minimises maintenance costs, clutter/obstruction and visual blight. Signage strategies should be based on locating signs at the following specific ‘decision points’ on the pedestrian network:

- Likely trip origins, that is, places where people join the pedestrian network such as transport interchanges/stops, car parks and key approaches.
- Likely trip destinations, as when visits to these locations are over they become trip origins. Examples include tourist attractions, community facilities and retail areas.

[49] North Shore City Council – Design of Streets: How should street furnishings be incorporated into street design?
[50] Pedestrian Planning and Design Guide – Section 16:Measures to Guide Pedestrians

- Locations with possible route ambiguity, including major junctions and open areas.
- On long routes where pedestrians may be uncertain that they have chosen the correct direction and need confirmation.

It can be used to identify barriers and inform users of other ways of accessing their destination.

A walking and cycling signage strategy can provide direction for the implementation and installation of signage, including location, height and font type/size criteria. Consultation with interested parties will assist in the implementation of such a policy.

Recommendation 51 Adopt a Pedestrian Signage Policy to inform users of their choices in accessing destination points.

13.2 TEMPORARY SIGNAGE, STOCK and AL-FRESCO DINING

Visually impaired access users require a clear access path to successfully negotiate an area. They generally use building and boundary lines to guide their way.

Businesses along SH.2 regularly install street signage, stock and tables and chairs outside of their premises. This has implications for people with significant visual impairment as they frequently use environmental cues such as buildings to navigate around a community and they won't necessarily see stock that are low to the ground, they become a trip hazard.

Figure 27: Shop wares and signage on SH.2

By having obstacles on the shop boundary, visually impaired people are forced to use the kerb line as a navigation aid.

Recommendation 52 Liaise with business owners to retain clear access route widths and keeping the building line clear of al-fresco dining furniture, signage and stock for sale.

13.3 SEATING

Seating is helpful for access users who are unsteady on their feet. There is limited seating along SH.2 in the main shopping centre. This is mainly at kerb build outs, near pedestrian crossings.

The availability of seating areas is generally viewed as a necessary urban feature for older people. It is difficult for many older people to walk around their local area without somewhere to rest[51].

The Inclusive Design for Getting Outdoors suggests the following requirements are beneficial for older persons[52]:

- The seat itself – There is a range of guidance on the style of seat and the appropriateness of a seat in meeting user needs especially given that users in public spaces will be so varied. There is a general consensus about: the provision of a back rest; mixture of seating with and without arm rests; the height of the seat from the floor (450 to 475mm, plus other heights where multiple seating permits this); constructed from a material which does not retain heat / cold; colour and luminance to contrast with the background environment.
- Positioning of the seat – The seating should be set back from a footway such that it does not cause an obstruction; there should be space for a wheelchair user to pull up alongside a companion; end parking on a firm surface for a wheelchair or scooter. The Department for Transport (UK) (2007) suggests that seating should be located where there is good lighting and natural surveillance because it can sometimes attract anti-social behaviour, and that consideration should be given to pedestrian desire lines.

There is seating available at the reserves in Ngatea. No public seating was identified in the main shopping centre of Ngatea.

Recommendation 53 Adopt the Inclusive Design for Getting Outdoors as part of its design for public seating and install seating in the main shopping centre of Ngatea.

[51] World Health Organisation – Global Age-Friendly Cities: A Guide
[52] Inclusive Design for Getting Outdoors: Design Guidelines

13.4 OBSTRUCTIONS AT CROSSING OPPORTUNITIES

It is common practise to locate rubbish bins, gardens, and light and power poles on the side of the crossing opportunity that the traffic is approaching. This leads to limited sight visibility for both the mobility user and the vehicle user.

HDC has placed a garden at the pedestrian crossing in the main shopping centre. The garden is placed on the side of the approaching traffic from the west. Low shrubs have been planted to maintain sight visibility. Given the height of a Mobility Scooter or Wheelchair User, sight visibility can be impaired for both vehicle users and mobility users if the garden gets too tall (above 300mm).

Recommendation 54 Maintain low level planting (below 300mm in height) in the garden at the pedestrian crossing on SH.2.

14 TEMPORARY TRAFFIC MANAGEMENT

Where work activities in the road corridor affect pedestrians or cyclists, the Temporary Traffic Management (TTM) must ensure that[53]:

- Pedestrians are not led into direct conflict with the work operation or traffic moving through or around the worksite.
- If pedestrians are directed into live lanes they should be adequately protected from traffic by delineation and/or barriers and suitable warning signs.
- Safe impediment free temporary paths are provided where footpaths are blocked by the activity.

Pedestrians, including those with impaired vision or wheelchair users must be considered as part of the design, preparation, approval and implementation of the Traffic Management Plan (TMP).

Pedestrian management of the Code of Practise for Temporary Traffic Management (CoPTTM) is a nationwide problem which NZTA focuses on when training users of this manual.

Recommendation 55 Enforce Code of Practice for Temporary Traffic Management standards for pedestrian control as part of the TMP approval process and supervision.

There were no identified Temporary Traffic Management concerns at the time of the site inspection.

Recommendation 56 Conduct regular 'random' audits of Temporary Traffic Management as part of the supervision process of Traffic Management Plans.

[53] Code of practice for temporary traffic management (COPTTM): Part 8 of the Traffic Control Devices manual (TCD Manual)

15 RECOMMENDATIONS

The following tables list the recommendations in order as set out in the report. Table 6 shows the general recommendations while Tables 5, 6, and 7 showing the site specific recommendations.

The specific recommendations are split into three categories:

- Serious Safety Risk – Where it is considered serious injury may occur
- Significant Concern – Major inconveniences
- Minor Concern – Minor inconveniences

The total estimated costs for the three categories are:

- Serious Safety Risk $25,000
- Significant Concerns $50,000
- Minor Concerns $32,500

Consideration should be given to a more formal method of setting priorities for provision of kerb ramps and maintenance of footpaths over a wider area as members of the disability community will clearly have preferred routes into the areas covered by this report. By identifying a risk and condition rating, a profile target can be developed that allows limited resources to address the most critical barriers first. Poor condition can be tolerated where there is little or no likelihood of use by the disabled and elderly.

We suggest HDC designate footpaths and all potential kerb ramp locations within a risk profile of minor, significant or serious with accessible routes as high priority. A relatively simple set of KPI's could then be formulated with condition ratings say 1 - 5 used to determine the profile.

Costs shown in Tables 5, 6, and 7 are indicative construction costs only and should only be used as a guide[54].They do not include Traffic Management Costs, consultation with affected parties, or design costs. All project costs will need to be finalised as design is completed for each.

[54] Costs are based on rates from Rawlinsons New Zealand Construction Handbook 2013/14 – 28th Edition

15.1 GENERAL RECOMMENDATIONS

Table 4: General Recommendations

It is recommended HDC:

No.	Pg.	Description
1.	9	Assign annual budgets that are affordable for HDC to undertake the recommendations from this audit over a long term programme. Utilise regular maintenance programmes that maximise Council investment with NZTA subsidies.
2.	9	Select count sites in the Ngatea urban area to conduct regular pedestrian counts, including the proportion of people who use mobility aids.
3.	10	Adopt the Risk Modified Condition Assessment methodology as shown in Appendix B as a tool for future maintenance prioritisation.
6.	14	Consider Mobility Space placement during the consenting process.
8.	16	Adopt the recommended minimum length in the TCD Manual Part 13: Parking Control of 6m for parallel parking.
9.	16	Adopt the recommended minimum width in NZS 4121:2001 of 3.5m and the minimum recommended length in the TCD Manual Part 13: Parking Control of 5.4m for angle parking. Allowance of at least 1.5m should be considered between the parking space and the live traffic lane to provide safety for wheelchair users who use rear loading vehicles.
12.	19	Replace all kerb ramps as required during the maintenance programme to a minimum width of 1.8m and a maximum grade of 1 in 14 (7.1%).
22.	25	Adopt the practise of milling seal edges at the join of the seal and the kerb channel, especially at areas where a flush kerb cut down is present, in maintenance contracts.
23.	27	When installing Tactiles, ensure the Tactiles are safety yellow as recommended by the RTS 14 Guidelines for Facilities for Blind and Vision Impaired Pedestrians.
24.	30	Create a long term programme in partnership with the Royal New Zealand Foundation for the Blind to install Warning Indicators and Directional Indicators (as required) at all intersections and mid-block crossing opportunities, including refuge and splitter islands.
25.	30	Ensure all Warning Indicators are installed to the full width of the kerb ramp as required in Recommendation 12 and are aligned with the direct line between the kerb ramps.

No.	Pg.	Description
27.	31	Monitor the surface and repair when the surface becomes uneven and potentially create a tripping hazard.
28.	33	Ensure all future development in Ngatea has footpaths installed on both sides of the new road.
31.	35	Where possible, install future footpaths that are not full width, in the middle of the berm to improve sight visibility at driveways and grassed berm areas for errant mobility devices.
37.	39	Ensure Service providers such as Spark, Powerco, and Ultra-fast Broadband etc. reinstate the footpath to a high standard.
39.	39	Adopt an absolute maximum longitudinal grade of 1 in 14 (7.1%) for future proposed works.
44.	42	Regularly control car parking on the footpath to maintain a clear, usable footpath.
45.	44	Adopt the Pedestrian Crossing Facilities Calculation Spreadsheet for use when determining pedestrian crossing facilities.
51.	54	Adopt a Pedestrian Signage Policy to inform users of their choices in accessing destination points.
55.	57	Enforce Code of Practice for Temporary Traffic Management standards for pedestrian control as part of the TMP approval process and supervision.
56.	57	Conduct regular ‘random’ audits of Temporary Traffic Management as part of the supervision process of Traffic Management Plans.

15.2 SPECIFIC RECOMMENDATIONS

Table 5: Specific Recommendations – Serious Safety Risks

It is recommended HDC: **Total = $25,000**

No.	Pg.	Description	Indicative Cost
13.	20	Replace the lip kerbs on SH.2 at the intersections with: • Darlington Street – south-west crossing Darlington St; • Dent Street – north-east crossing Dent St; • Paul Drive – north-west crossing Paul Dr; • Pedestrian Crossing opp. Ngatea Meats Ltd – south (refuge island); • River Road – north-east crossing River Rd; and • Stimmy's Lane – south-east crossing Stimmy's Lane.	$4,500
17.	23	Replace or relocate the following lip kerb ramps with a maximum grade of 1 in 14 (7.1%): • Darlington Street/Harris Place – refuge island north of Harris St, crossing Darlington St; • Darlington Street/Harris Place – north-west and south-west crossing Harris St; • Darlington Street/Hayward Road – south-east crossing Hayward Rd; • Darlington Street/Walton Street – north-west crossing Walton St; • Hayward Road/Miller Place – south-west crossing Miller Pl; • Mahana Road/Side Road (approx. 285m west of Paul Dr) – north-west and north-east crossing the side road; • Paul Drive/Mahana Road – north-west and south-east crossing Mahana Rd; • Paul Drive/Pinnock Place – north-west and south-east crossing Pinnock Pl; • Paul Drive/Ranui Street – north-east and south-east crossing Ranui St; • River Road/Factory Lane – north-west crossing Factory Lane; and • River Road/Leonard Street – north-west and south-west crossing Leonard St.	$12,500

No.	Pg.	Description	Indicative Cost
33.	36	Raise the berm level to the adjoining footpath at the following locations listed in Appendix C: Table 12 – Footpaths with low berm.	$8,000
52.	54	Liaise with business owners to retain clear access route widths and keeping the building line clear of al-fresco dining furniture, signage and stock for sale.	$0

Table 6: Specific Recommendations – Significant Concerns

It is recommended HDC: **Total = $50,000**

No.	Pg.	Description	Indicative Cost
5.	13	Re-locate the Mobility Space on the northern side of SH.2, west of River Road, to next to the pedestrian crossing on the north-western side.	$1,500
7.	15	Install full length kerb ramps at the Mobility Spaces in Ngatea to provide quick, easy access to the footpath.	$1,000
10.	17	Install blue marking as per figure 5 and maintain a non-slip surface with the colour of both the surface and the marking to comply with Land Transport Rule: Traffic Control Devices 2004.	$1,500
14.	21	Replace the kerb ramp on the north side of the Pedestrian Crossing on SH.2 (kerb and refuge island) to a maximum grade of 1 in 14 (7.1%).	$1,000
18.	24	Replace the kerb ramps to a maximum grade of 1 in 14 (7.1%) at the following intersections: • Darlington Street/Madgwick Place – north-west crossing Madgwick Pl; • Dent Street/Hale Place – north-east crossing Hale Pl; • Darlington Street/Walton Place – south-west crossing Walton Pl; • Dent Street/Weddell Place – north-east and south-east crossing Weddell Pl; • Leonard Street/McClean Place – north-east crossing McClean Pl; and • Leonard Street/Paul Drive – south-east crossing Paul Dr.	$3,500
21.	25	Re-locate the kerb ramp on the east side of Darlington Street/Walton Place north to opposite the north-west intersection.	$1,000

No.	Pg.	Description	Indicative Cost
26.	30	Install a yellow guideline at the back of footpath at the Gull Service Station on SH.2 and back and front of footpath at 21 River Road and the Hauraki Plains Co-Operating Parish Church.	$500
29.	34	Widen the footpath on Pipiroa Road, from SH.2 to Mahana Road, and Kaihere Road, from SH.2 to Brenner Drive, to a width of 1.8m.	$25,000
32.	35	Liaise with adjoining land owners to trim vegetation extending from the boundary over the footpath as required.	$0
34.	37	Repair the lifting footpath at the locations listed in Appendix C: Table 13 – Lifting Footpath.	$15,000
35.	38	Liaise with adjoining land owners to ensure loose metal is not transferred onto the footpath.	$0
46.	51	As splitter and refuge islands are replaced under normal maintenance, ensure they are replaced with islands that are at least 1.8m wide.	$0
47.	51	Relocate the crossing points as per layouts in Appendix D when kerb ramps are replaced.	$0
48.	52	Liaise with NZTA for the installation of mid-block crossing opportunities with refuge islands on SH.2 between Dent Street/Paul Drive and Darlington Street/Pipiroa Road.	$0
54.	56	Maintain low level planting (below 300mm in height) in the garden at the pedestrian crossing on SH.2.	$0

Table 7: Specific Recommendations – Minor Concerns

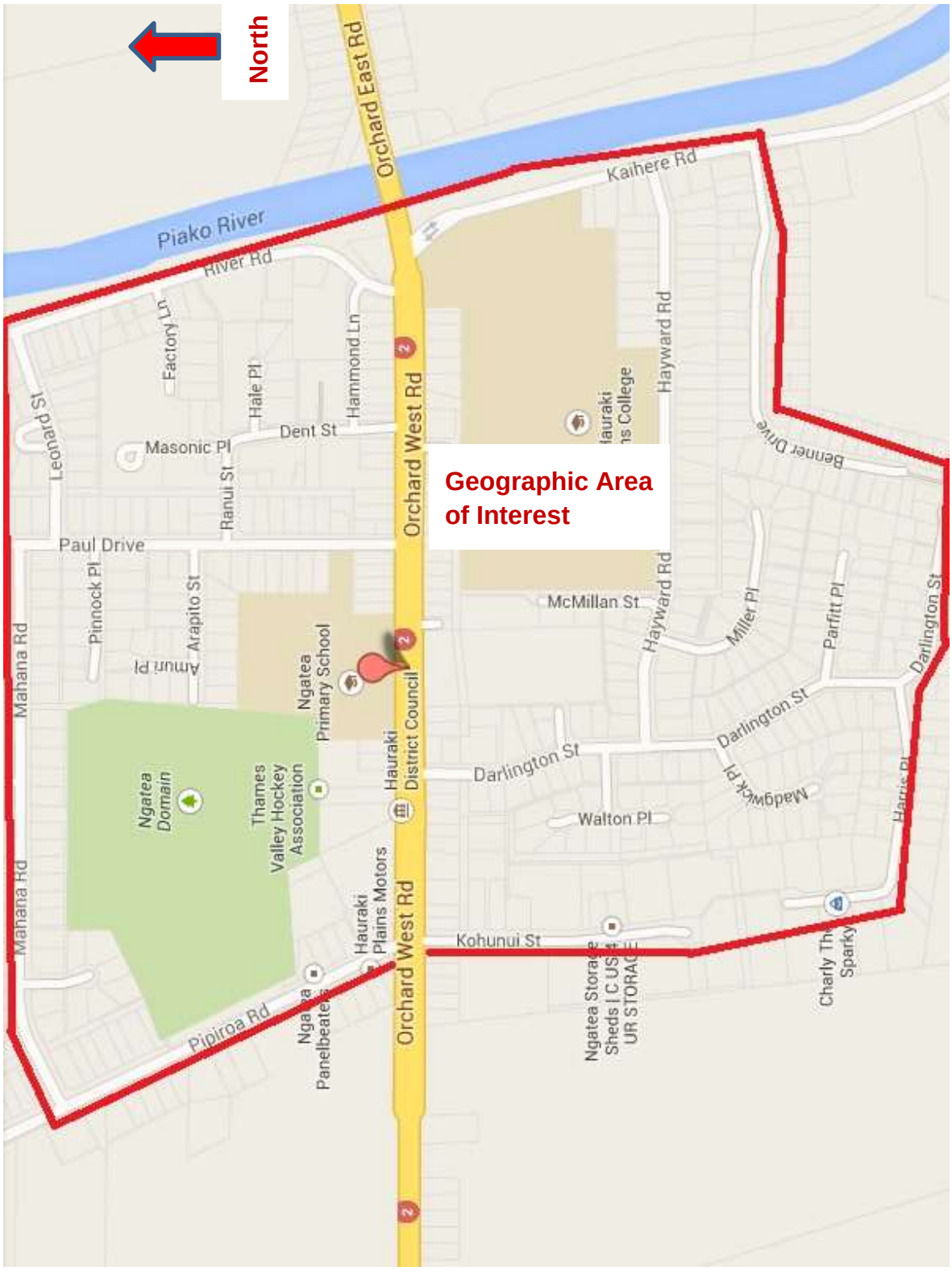
It is recommended HDC: **Total = $32,500**

No.	Pg.	Description	Indicative Cost
4.	13	Install a Mobility Space at the western end of the carparks outside NZ Post to comply with NZS 4121:2001.	$1,500
15.	21	Replace the kerb ramps on SH.2 at the south-west side of the refuge island on SH.2/Kaihere Road intersection (crossing Kaihere Rd), the south kerb at the Pedestrian Crossing, and the south-west crossing Stimmy's Lane to a maximum grade of 1 in 14 (7.1%).	$1,000

No.	Pg.	Description	Indicative Cost
16.	21	Replace the grate on the south-west kerb ramp of SH.2/Kaihere Road (crossing Kaihere Rd) and lower the service cover on the north-east corner of SH.2/Paul Drive (crossing Paul Dr) to achieve a maximum grade of 1 in 14 (7.1%).	$500
19.	24	Replace the kerb ramps to a maximum grade of 1 in 14 (7.1%) at the following intersections: • Darlington Street/Hayward Road – south-east crossing Hayward Rd; • Leonard Street/McClean Place – north-west crossing McClean Pl; • Leonard Street/McClean Place – north-east crossing McClean Pl; • Paul Drive/Arapito Street – north-west and south-west crossing Arapito St.	$2,500
20.	24	Remove the north-west kerb ramp at Arapito Street/Amuri Place and install three separate kerb ramps for crossing Amuri Place and Arapito Street.	$2,500
30.	34	Widen the footpaths in the geographic area of interest during the regular maintenance programme to a minimum width of 1.5m.	$0
36.	38	Repair the footpaths at the following locations: • Darlington Street – #23, #27, #33, #51 • 6 Factory Lane; • 10 Hale Place – subsoil drain connection to kerb; • Hayward Road – #1 to #3, #8, #60; • Kaihere Road – Redundant service cover and bolts outside Hauraki Plains College, #18 (PP), #24; • Leonard Street – joint gaps on both sides, full length; • McClean Place – #5, #11; • McQuarrie Place – #6, 47 Mahana Road; • 5 Madgwick Place; • 20 Miller Place; • 15 Paul Drive; • 1 Ranui Street; • SH.2 – Z Service Station; and • 11 Walton Place.	$10,000
38.	39	Replace the catchpit cover with a full cover at the edge of the footpath outside Ngatea Panelbeaters Ltd.	$500

No.	Pg.	Description	Indicative Cost
40.	40	Re-grade the tie-in longitudinal grade or lip kerbs between the footpath and driveways at the following locations: • Bratlie Place – connection to Ngatea Water Gardens; • 8 Harris Place; • 34 Kaihere Road; • River Road – driveways from #33 to #43; • SH.2 – HDC western and eastern entrance; and • SH.2 – Hauraki Plains College entrance.	$3,000
41.	41	Re-grade the footpath on SH.2 from the Piako River Bridge to Kaihere Road to a maximum grade of 1 in 14 (7.1%).	$6,000
43.	41	Re-grade the crossfall on SH.2, outside Richardson Real Estate, and 37 Hayward Road, to achieve a grade of between 1% and 2%.	$2,000
49.	52	Use the Pedestrian Crossing Facilities Calculation Spreadsheet to determine and install the most efficient crossing facility at the intersections of the side roads with Hayward Road, Darlington Street at Paul Drive.	$0
50.	52	Install kerb ramps at 16 Harris Place to complete a continous access route between footpaths.	$1,000
53.	55	Adopt the Inclusive Design for Getting Outdoors as part of its design for public seating and install seating in the main shopping centre of Ngatea.	$2,000

APPENDIX A: LOCATION MAP



NGATEA GEOGRAPHIC AREA OF INTEREST

Date: May 2014

Scale: Not to Scale

APPENDIX B: RISK MODIFIED CONDITION PROFILE

RISK MODIFIED CONDITION PROFILE

In order to provide a performance measure of the condition of footpaths and kerb ramps, it is necessary to combine the condition rating with a risk assessment to ensure the limited resources available achieve the maximum benefit for residents and other users.

The risk ratings are defined as follows:

Risk Level	Definitions	Risk Multiplier, R (%)
High	High level of foot traffic (commercial centre). Regular presence of people using walking aids, scooters or wheelchairs. Part of an accessible route for the disabled. Possible use by visually impaired	100
Medium	Regular presence of people using walking aids, scooters or wheelchairs. Presence of community facilities likely to be accessed by pedestrians. Part of an accessible route for the disabled.	60
Low	Very low pedestrian use. Absence of community destinations. No through traffic or low traffic count. Alternative routes available (e.g. opposite side of road)	30

Table 8: Risk Ratings

There are two measures to be analysed, being the footpaths and kerb ramps, with a minimum of 100 locations, selected in the same proportions as those within the defined risk categories, with the locations being chosen at random for assessment. Footpath sections should be at least 10m in length and kerb ramps should include the adjacent waiting area. Where a kerb ramp or footpath (for all or any part of a 10m section), is desirable but not built, a condition rating of 5 applies.

The profile score Pf for footpaths or Pk for kerb ramps for the defined area, with a total of “n” assessed sites is determined as follows:

$$Pf = \Sigma(1...n) / n \left| \frac{R_1}{C_1} .....\frac{R_n}{C_n} \right| \text{ x } 100\%$$

The maximum score will depend on the proportions of sections within the various risk categories and a further normalisation can be undertaken if desired. For example with a 40/30/30 % allocation to the high medium and low risk categories, the maximum score would be 67% (0.4x100% + 0.3x60% +0.3x30%) and normalisation could be undertaken to set the maximum at 100%.

FOOTPATH CONDITION RATING

Table 9: Footpath Condition Rating

Rating	Conditions
1	• Surface in good condition; • Kerb well defined; • Surface in good condition; • No trip hazards; and • No attention required.
2	• Good surface; • Minor Wear and Tear; • Crossfall evident; and • No immediate concerns.
3	• Surface adequate; • Trip hazard removed; • Minor defects; and • No immediate attention required.
4	• Poor surface condition; • Limited width; • Cracks appearing; and • No major trip hazards.
5	• Concrete cracked and likely to lift; • Surface Poor; and • Potential for trip hazards.

KERB RAMP CONDITION RATING

Table 10: Kerb Ramp Condition Rating

Rating	Conditions
1	• Good surfaces; • No trip hazards; and • No defects.
2	• Generally Complies with DBH D-1 Fig 9 and NZS 4121; • Minor wear and tear on concrete; and • No immediate attention required.
3	• Good level crossing; • Minor repair required; and • No immediate concerns.
4	• Rough concrete surface; • Steep ramp; • Inadequate waiting space; and • No major trip hazards.
5	• Poor surface condition • No defined waiting area • Potential trip hazards • Excessive slopes

APPENDIX C: FOOTPATHS

Table 11: Provision of Footpath in the Geographic Area of Interest

Road Name	Provision of Footpath
Amuri Place	Both sides – full length (<1.5m width)
Arapito Street	Both sides – full length (≈1.5m width)
Benner Drive	Both sides – full length (≈1.5m width)
Bratlie Place	North – full length (≈1.5m width)
Darlington Street	Both sides – full length (generally ≈1.5m width)
Dent Street	Both sides – full length (≈1.5m width)
Factory Lane	Both sides – full length (<1.5m width)
Hale Place	Both sides – full length (<1.5m width)
Hammond Lane	No footpath
Harris Place	North – full length (<1.5m width) South – Darlington Street to #16 (<1.5m width)
Hayward Road	Both sides – full length (≈1.5m width)
Kaihere Road	West – SH.2 to Hayward Road (≈1.7m), Hayward Road to Brenner Drive (≈1.5m width)
Kohunui Street	East – full length (≈1.5m width)
Leonard Street	Both sides – full length (≈1.5m width)
McDuff Lane	Both sides – full length (<1.5m width)
McClean Place	North – full length (≈1.5m width) South – N/A
McMillan Street	West – full length (<1.5m width)
McQuarrie Place	Both sides – full length (<1.5m width)
Madgwick Place	Both sides – full length (<1.5m width)
Mahana Road	Both sides – full length (≈1.5m width)

Road Name	Provision of Footpath
Masonic Place	No footpath
Miller Place	Both sides – full length (<1.5m width)
Orchard West Road (SH.2)	Both sides – full length (generally >2.4m width)
Parfitt Place	Both sides – full length (<1.5m width)
Paul Drive	Both sides – full length (≈1.5m width)
Pinnock Place	Both sides – SH.2 to #9 (<1.5m width)
Pipiroa Road	East – SH.2 to Mahana Road (≈1.5m width)
Ranui Street	Both sides – full length (≈1.5m width)
River Road	West – SH.2 to Leonard Street (≈1.5m width)
Side Road off Mahana Road	No footpath
Stimmy's Lane	No footpath
Walton Place	Both sides – full length (<1.5m width)
Weddell Place	No footpath

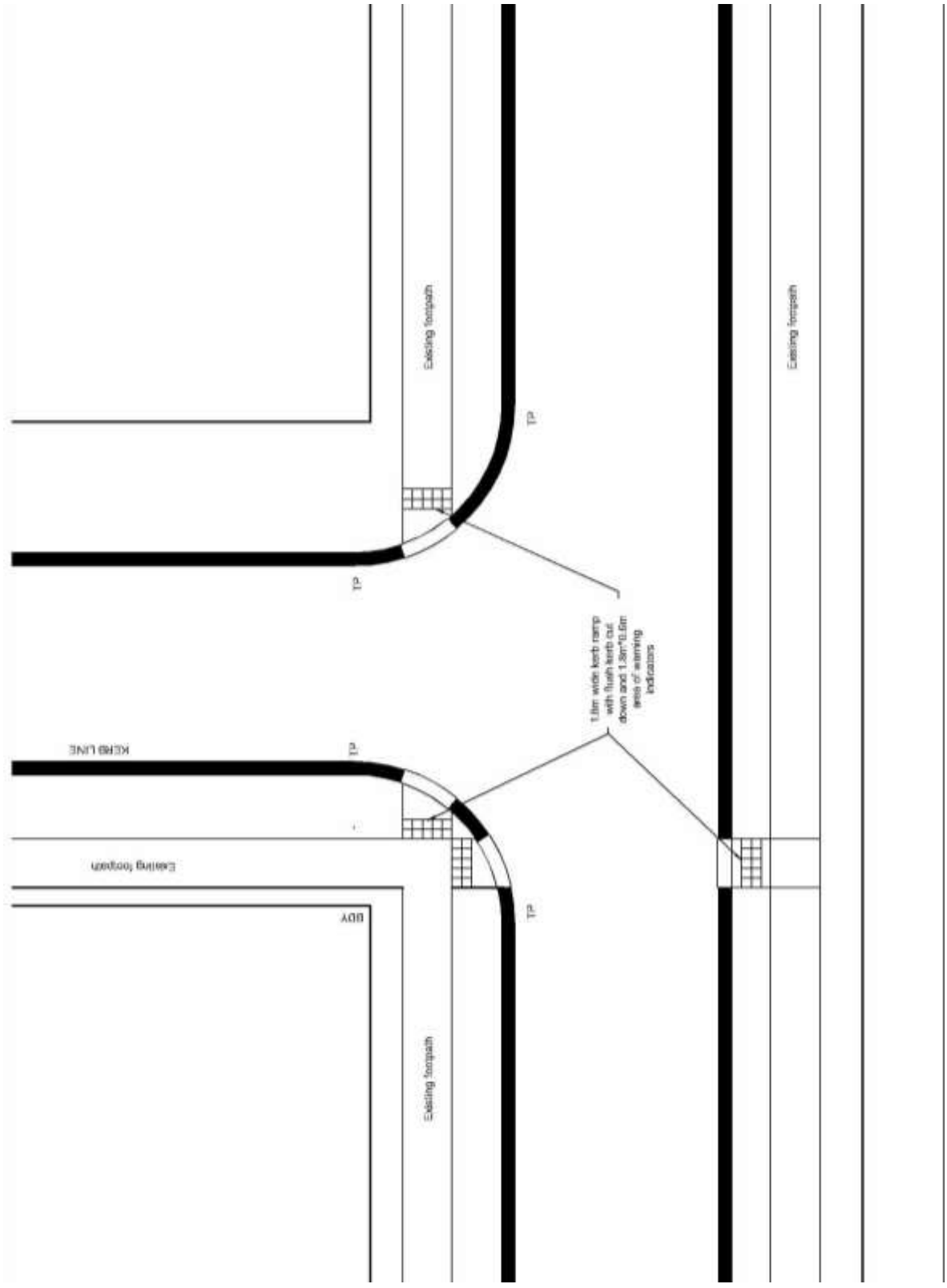
Table 12: Footpaths with low berm

Road Name	Location of Low Berm
Amuri Place	#2
Arapito Road	#2 to #4, #7 to #13
Brenner Drive	#1, #5, #8, #9 to #11, #12, #16, #19 to #21, #22, #25, #26 to #28, #29 to #39, #32, #36, #52 to #54
Darlington Street	Outside church, #2a and #2b, #7 to #11, #8, #12 to #20, #15 to #17, #23, #24, #28 to #30,#31, #34, #37 to #39, #38 to #52, #43a to #47, #53, #57, #68
Hale Place	#1c, #4 to #10
Harris Place	#2 to #4, #3 to #11,, #12, #17 to #19
Hayward Road	#1a, #7 to #13, #17 to #27, #37, #43 to #45, #53, #54, #57
Kaihere Road	#32 to #34
Leonard Street	Open drain approx. 60m east of Paul Dr
McClean Place	#1, #5, #7
Madgwick Place	#1, #5, #14 to #16
Mahana Road	#2 to #22, #3 to #7, #11 to #21, #25 to #29, #30, #33 to #35, #34 to #40, #39, #43, #47, #48 to #58
Miller Place	#2 , #12 to #14, #18, #22, #3 to #15
Parfitt Place	#3 to #7, #8
Paul Drive	#1, #2 to #4, #5 to #17, #12 to #20, #26 to #28, #34 to #38
Pinnock Place	#1 to #3, #6 to #8, #12a
Pipiroa Road	#30 to #32, #42
Ranui Place	#5
River Road	Outside S & L Decorations Ltd
Walton Place	#2 to #7, #14 to #16

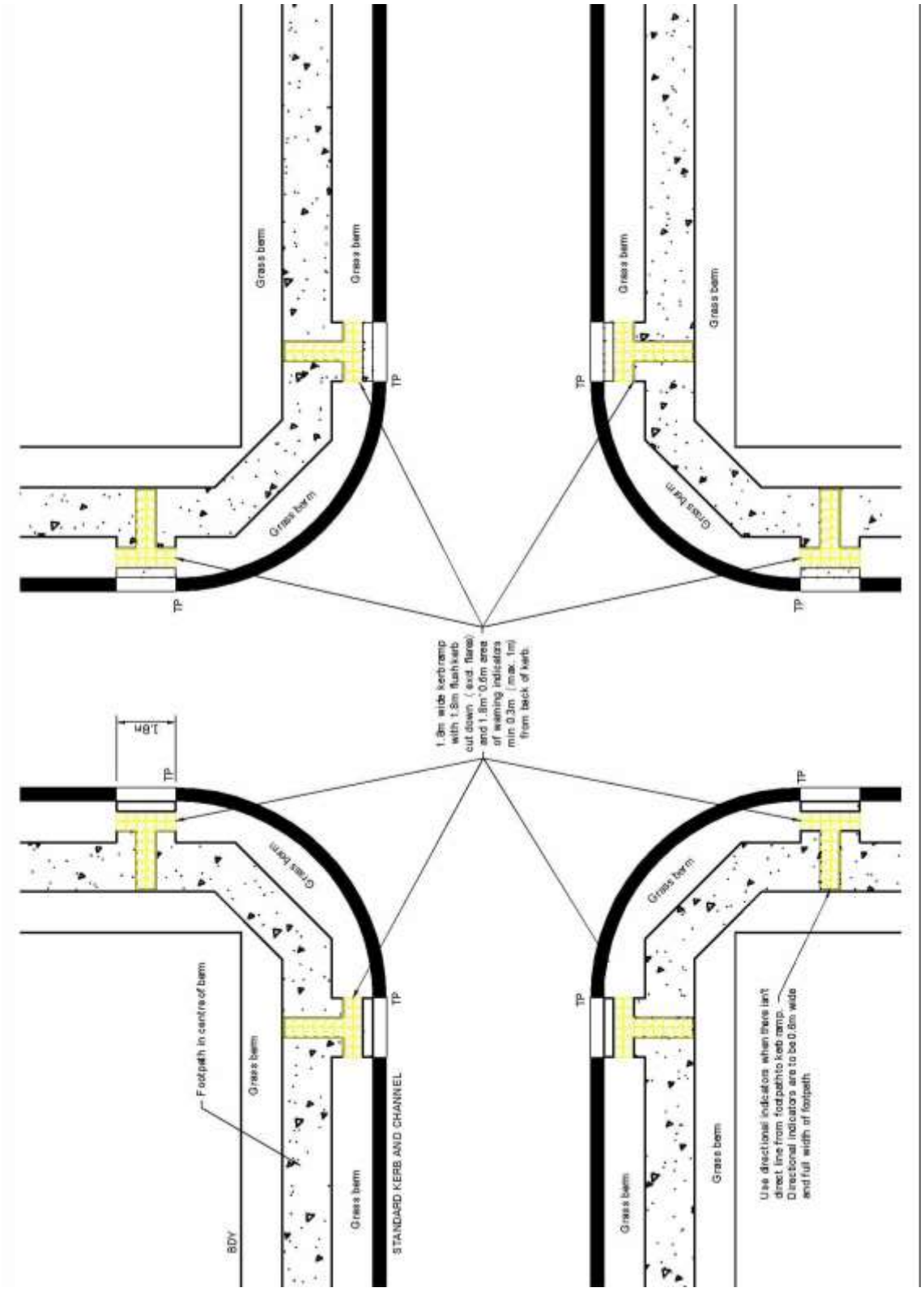
Table 13: Lifting Footpath

Road Name	Location of Lifting Footpath
Amuri Place	#1
Benner Drive	#23, #24, #33, #36, #43, #47
Darlington Street	#2a, #8, #19, #20
Harris Place	#10, #14
Hayward Road	#21, #25 to #27, #31
Kaihere Road	#22 to #26, #36
Kohunui Street	Autoworks Ltd
Leonard Street	#8 to #14, #51
McMillan Street	#1
McQuarrie Place	#43 Mahana Road to #1
Madgwick Place	#14
Mahana Road	#10, #20, #43, #56, #58
Miller Place	53 Hayward Road to #3
Paul Drive	#2, #7, #11, #38
Pipiroa Road	Ngatea Panelbeaters Ltd
SH.2	Gull Service Station
Walton Place	#15

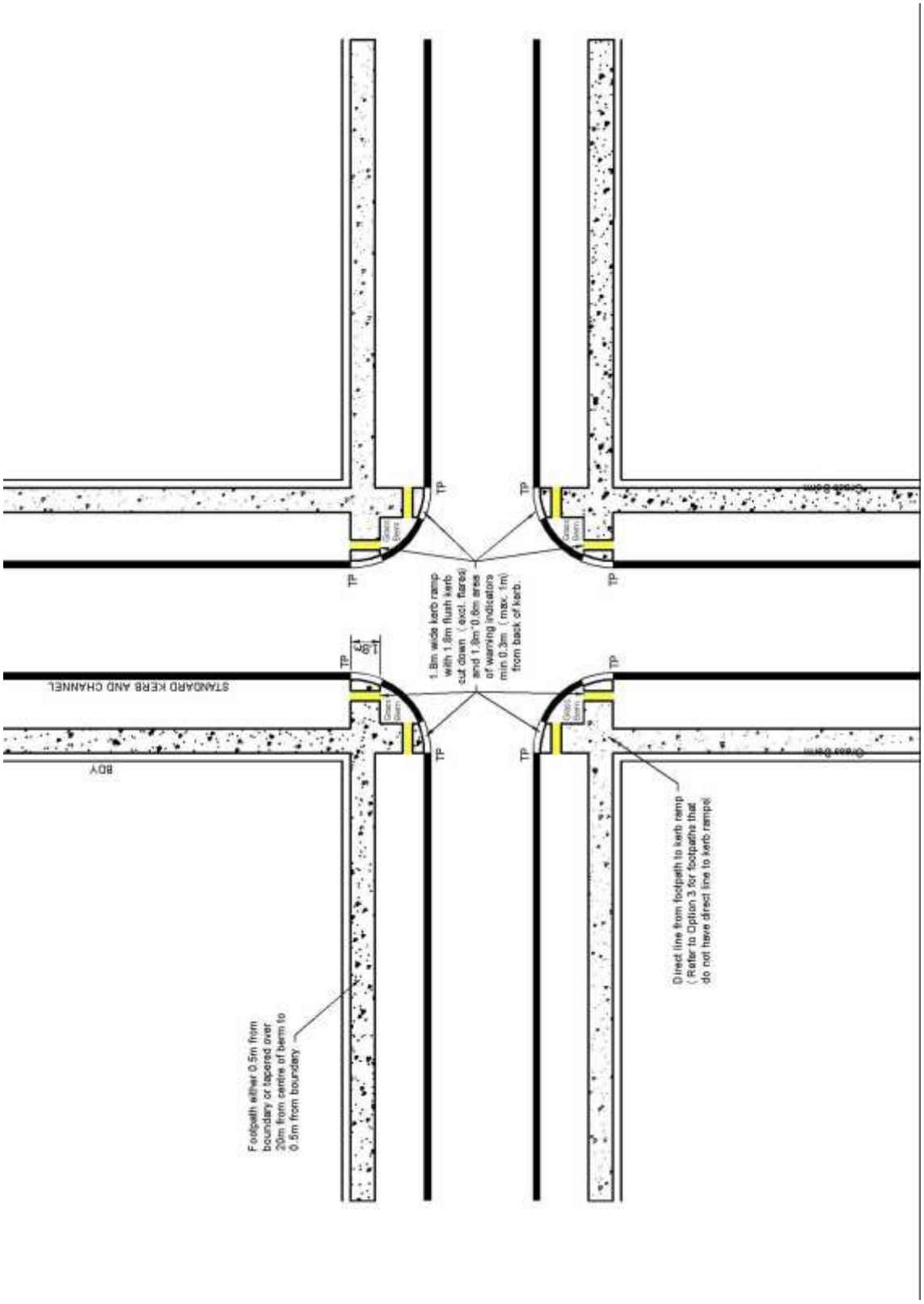
APPENDIX D: INTERSECTION LAYOUTS



Layout A – 'Tee' Intersection



Layout B – Cross Intersection with crossing points at the TP of the curves



Layout C – 'Cross' Intersection with crossing points at the direct line of footpath

APPENDIX E: NZTA PEDESTRIAN CROSSING FACILITIES CALCULATION SPREADSHEET

Pedestrian Crossing Facilities Survey Sheet Page _____ of _____

Survey Location: _____
Surveyor(s): _____
Survey Date: _____
Uninterrupted/Interrupted Traffic Flow (Circle one)
85th % Vehicle Speed est/measured: _____
General Comments: _____

Drawing (include cross section, lanes, median, parking, etc)

Pedestrian Crossing Facilities Survey Sheet

Survey Location: _____ Page _____ of _____

Survey Date: _____

Time of Day (15min Intervals)	Vehicle Volume		Pedestrian Flow			Comments:
	Direction 1:	Direction 2:	Adults	Children (<12years)	Elderly/ Sensitive	

Pedestrian Crossing Facilities Calculation Spreadsheet

Summary Sheet

Project Name		**Date of Assessment**	
Project Location			

Field Data

Road Layout	(select an option)
Speed Limit (Environment)	(select an option)
Approach Speed (85th Percentile)	(select an option)

	Traffic Volume Average Peak (veh/hr)	No. of Trafficked Lanes	Flow Type	Crossing Distance, Without Aids (m)	Pedestrian Volume Average Peak Hour (ped/hr)
Direction 1	EnterNo.	(select an option)	select an optior		
Direction 2		(select an option)	select an optior		
Total	EnterNo.	(select an option)	select an optior		EnterNo.

Traffic Volume (AADT)		veh/day	Pedestrian Volume	peds/day

Physical Aid Benefits

	Total Crossing Distance (m)	Mean Pedestrian Delay (sec/ped)	LOS	NPV Pedestrian Delay Cost	NPV Safety Cost Saving	NPV Geometric Vehicle Occupant Delay	Appropriateness for Road Type & Speed
Without Crossing Facility					-	-	-
Platform					elect and optic		(select an option)
Kerb Extensions					elect and optic	-	(select an option)
Median Refuge						-	(select an option)
Kerb Extensions & Median Refuge						-	See result for individual facilities above

Facility Considered	(select an option)
NPV Total Benefits for Facility Considered	(select an option)
Construction Cost for Facility Considered	$ -
Benefit Cost Ratio for Facility Considered	

Zebra Crossings

Does the crossing meet the minimum volume requirement of 50 peds/hr?	Yes
Does the crossing meet the requirement of having less than two lanes in each direction?	(select an option)
Appropriateness of Zebra for Road Type & Speed	(select an option)

	Mean Pedestrian Delay (sec/ped)	NPV Safety Cost Saving	NPV Geometric Vehicle Occupant Delay	Appropriateness of Zebra, & of Physical Aid for Road Type & Speed
Without Crossing Facility		-	-	-
Zebra Only	-	select and optior	-	Yes
Zebra + Platform	-	select and optior		See result for individual facilities above
Zebra + Kerb Extensions	-	select and optior	-	See result for individual facilities above
Zebra + Median Refuge	-		-	See result for individual facilities above
Zebra + Kerb Extensions & Median Refuge	-		-	See result for individual facilities above

Facility Considered	(select an option)
NPV Total Vehicle Occupant Delay	
NPV Total Benefits for Facility Considered	(select an option)
Construction Cost for Facility Considered	$ -
Benefit Cost Ratio for Facility Considered	

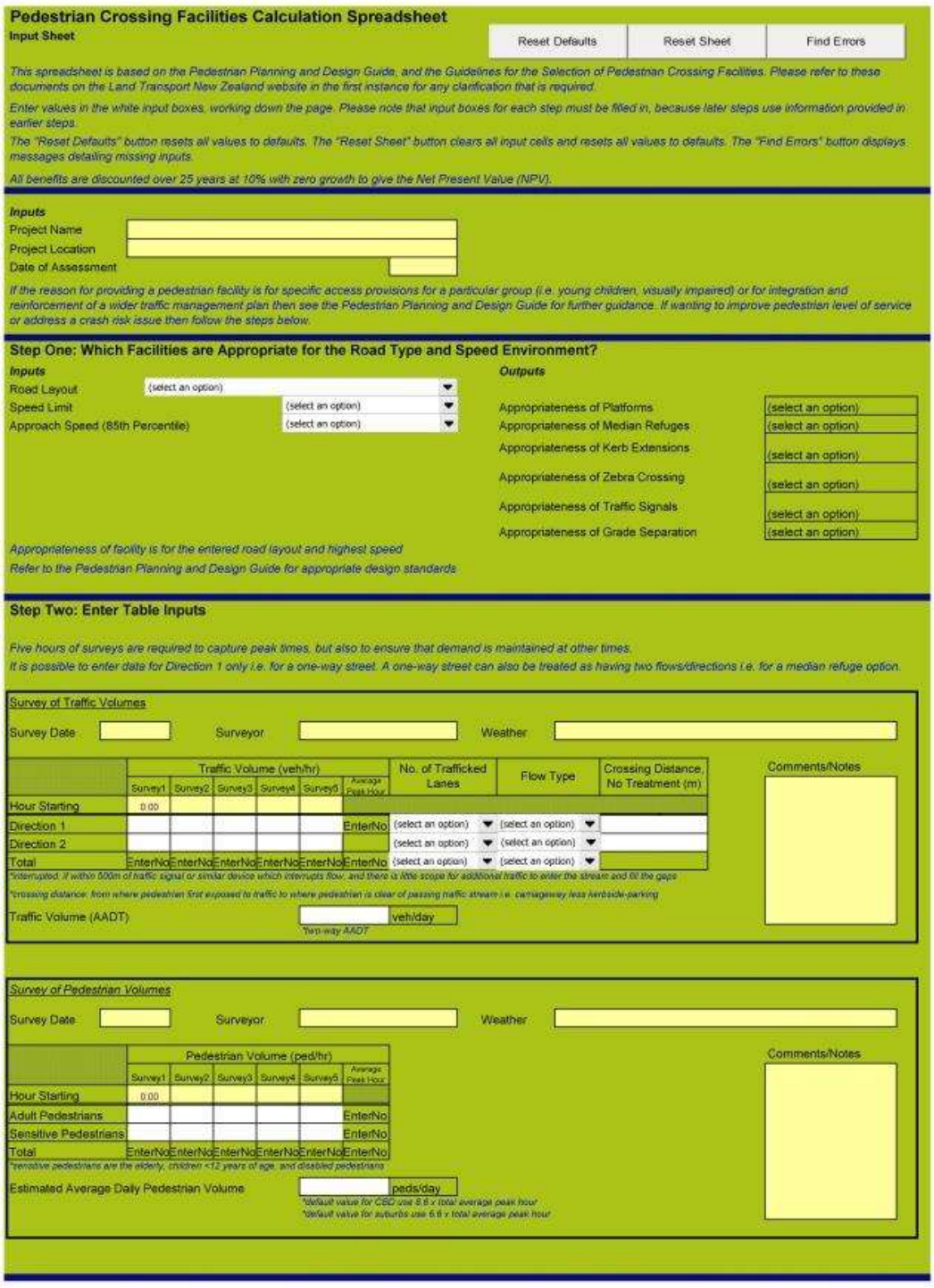
Traffic Signals

Appropriateness for Road Type & Speed	(select an option)	
Pedestrian Delay (Average Peak)		hours/hour
Vehicle Occupant Delay (Average Peak)		hours/hour
NPV Pedestrian Delay Without Facility		
NPV Pedestrian Delay With Signals		
NPV Vehicle Occupant Delay With Signals		
NPV Safety Cost Savings With Signals	(select an option)	
NPV Total Benefits for Traffic Signals		
Benefit Cost Ratio for Facility Considered		

Grade Separation

Appropriateness for Road Type & Speed	(select an option)

Pedestrian Crossing Facilities Selection Guideline Spreadsheet Version 1.2 February 2007



Pedestrian Crossing Facilities Calculation Spreadsheet

Input Sheet

Reset Defaults | Reset Sheet | Find Errors

This spreadsheet is based on the Pedestrian Planning and Design Guide, and the Guidelines for the Selection of Pedestrian Crossing Facilities. Please refer to these documents on the Land Transport New Zealand website in the first instance for any clarification that is required.

Enter values in the white input boxes, working down the page. Please note that input boxes for each step must be filled in, because later steps use information provided in earlier steps.

The "Reset Defaults" button resets all values to defaults. The "Reset Sheet" button clears all input cells and resets all values to defaults. The "Find Errors" button displays messages detailing missing inputs.

All benefits are discounted over 25 years at 10% with zero growth to give the Net Present Value (NPV).

Inputs

Project Name

Project Location

Date of Assessment

If the reason for providing a pedestrian facility is for specific access provisions for a particular group (i.e. young children, visually impaired) or for integration and reinforcement of a wider traffic management plan then see the Pedestrian Planning and Design Guide for further guidance. If wanting to improve pedestrian level of service or address a crash risk issue then follow the steps below.

Step One: Which Facilities are Appropriate for the Road Type and Speed Environment?

Inputs

Road Layout: (select an option)

Speed Limit: (select an option)

Approach Speed (85th Percentile): (select an option)

Outputs

Appropriateness of Platforms	(select an option)
Appropriateness of Median Refuges	(select an option)
Appropriateness of Kerb Extensions	(select an option)
Appropriateness of Zebra Crossing	(select an option)
Appropriateness of Traffic Signals	(select an option)
Appropriateness of Grade Separation	(select an option)

Appropriateness of facility is for the entered road layout and highest speed

Refer to the Pedestrian Planning and Design Guide for appropriate design standards

Step Two: Enter Table Inputs

Five hours of surveys are required to capture peak times, but also to ensure that demand is maintained at other times.

It is possible to enter data for Direction 1 only i.e. for a one-way street. A one-way street can also be treated as having two flows/directions i.e. for a median refuge option.

Survey of Traffic Volumes

Survey Date | Surveyor | Weather

	Traffic Volume (veh/hr) Survey1	Survey2	Survey3	Survey4	Survey5	Average Peak Hour	No. of Trafficked Lanes	Flow Type	Crossing Distance, No Treatment (m)
Hour Starting	0.00								
Direction 1						EnterNo	(select an option)	(select an option)	
Direction 2							(select an option)	(select an option)	
Total	EnterNo	EnterNo	EnterNo	EnterNo	EnterNo	EnterNo	(select an option)	(select an option)	

Comments/Notes

**Interrupted: if within 500m of traffic signal or similar device which interrupts flow, and there is little scope for additional traffic to enter the stream and fill the gaps*

**crossing distance: from where pedestrian first exposed to traffic to where pedestrian is clear of passing traffic stream i.e. carriageway less kerbside parking*

Traffic Volume (AADT): veh/day

**two-way AADT*

Survey of Pedestrian Volumes

Survey Date | Surveyor | Weather

	Pedestrian Volume (ped/hr) Survey1	Survey2	Survey3	Survey4	Survey5	Average Peak Hour
Hour Starting	0.00					
Adult Pedestrians						EnterNo
Sensitive Pedestrians						EnterNo
Total	EnterNo	EnterNo	EnterNo	EnterNo	EnterNo	EnterNo

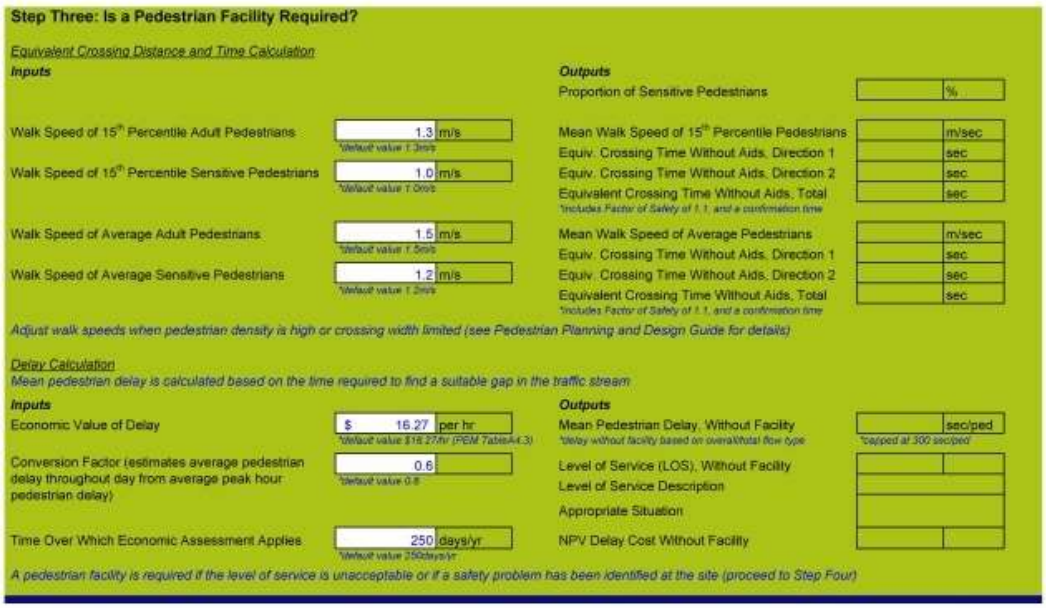
Comments/Notes

**sensitive pedestrians are the elderly, children <12 years of age, and disabled pedestrians*

Estimated Average Daily Pedestrian Volume: peds/day

**default value for CBD use 8.6 x total average peak hour*

**default value for suburbs use 6.6 x total average peak hour*



Step Three: Is a Pedestrian Facility Required?

Equivalent Crossing Distance and Time Calculation

Inputs

		Outputs Proportion of Sensitive Pedestrians	%
Walk Speed of 15th Percentile Adult Pedestrians	1.3 m/s *default value 1.3m/s	Mean Walk Speed of 15th Percentile Pedestrians	m/sec
		Equiv. Crossing Time Without Aids, Direction 1	sec
Walk Speed of 15th Percentile Sensitive Pedestrians	1.0 m/s *default value 1.0m/s	Equiv. Crossing Time Without Aids, Direction 2	sec
		Equivalent Crossing Time Without Aids, Total *includes Factor of Safety of 1.1, and a confirmation time	sec
Walk Speed of Average Adult Pedestrians	1.5 m/s *default value 1.5m/s	Mean Walk Speed of Average Pedestrians	m/sec
		Equiv. Crossing Time Without Aids, Direction 1	sec
Walk Speed of Average Sensitive Pedestrians	1.2 m/s *default value 1.2m/s	Equiv. Crossing Time Without Aids, Direction 2	sec
		Equivalent Crossing Time Without Aids, Total *includes Factor of Safety of 1.1, and a confirmation time	sec

Adjust walk speeds when pedestrian density is high or crossing width limited (see Pedestrian Planning and Design Guide for details)

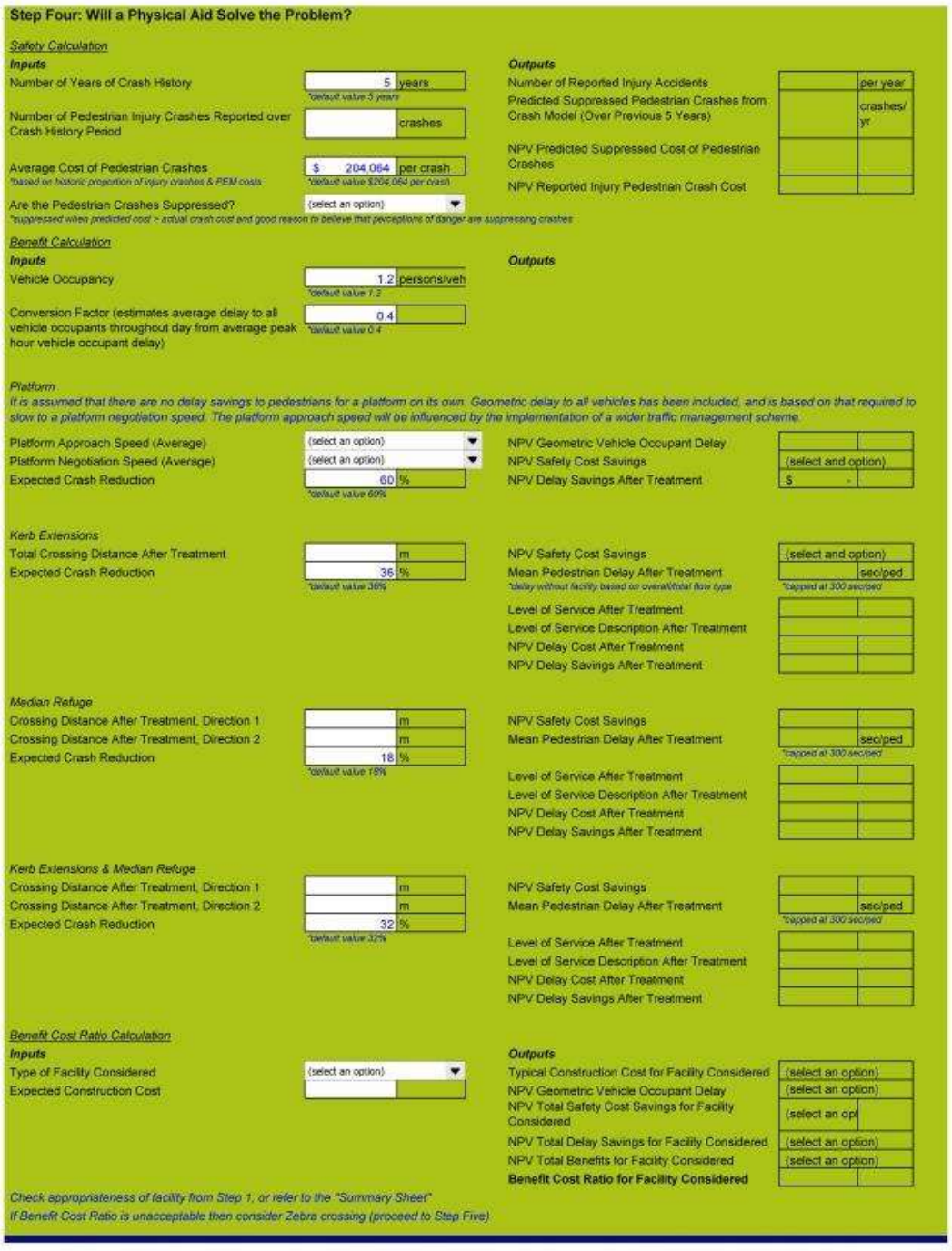
Delay Calculation

Mean pedestrian delay is calculated based on the time required to find a suitable gap in the traffic stream

Inputs

Economic Value of Delay	$ 16.27 per hr *default value $16.27/hr (PEM Table A4.3)	Mean Pedestrian Delay, Without Facility *delay without facility based on overall/total flow type	sec/ped *capped at 300 sec/ped
Conversion Factor (estimates average pedestrian delay throughout day from average peak hour pedestrian delay)	0.6 *default value 0.6	Level of Service (LOS), Without Facility	
		Level of Service Description	
		Appropriate Situation	
Time Over Which Economic Assessment Applies	250 days/yr *default value 250days/yr	NPV Delay Cost Without Facility	

A pedestrian facility is required if the level of service is unacceptable or if a safety problem has been identified at the site (proceed to Step Four)



Step Four: Will a Physical Aid Solve the Problem?

Safety Calculation

Inputs

Number of Years of Crash History: 5 years (*default value 5 years*)

Number of Pedestrian Injury Crashes Reported over Crash History Period: crashes

Average Cost of Pedestrian Crashes: $ 204,064 per crash (*based on historic proportion of injury crashes & PEM costs; default value $204,064 per crash*)

Are the Pedestrian Crashes Suppressed? (select an option) (*suppressed when predicted cost > actual crash cost and good reason to believe that perceptions of danger are suppressing crashes*)

Outputs

Number of Reported Injury Accidents	per year
Predicted Suppressed Pedestrian Crashes from Crash Model (Over Previous 5 Years)	crashes/yr
NPV Predicted Suppressed Cost of Pedestrian Crashes	
NPV Reported Injury Pedestrian Crash Cost	

Benefit Calculation

Inputs

Vehicle Occupancy: 1.2 persons/veh (*default value 1.2*)

Conversion Factor (estimates average delay to all vehicle occupants throughout day from average peak hour vehicle occupant delay): 0.4 (*default value 0.4*)

Outputs

Platform

It is assumed that there are no delay savings to pedestrians for a platform on its own. Geometric delay to all vehicles has been included, and is based on that required to slow to a platform negotiation speed. The platform approach speed will be influenced by the implementation of a wider traffic management scheme.

Platform Approach Speed (Average): (select an option)

Platform Negotiation Speed (Average): (select an option)

Expected Crash Reduction: 60 % (*default value 60%*)

NPV Geometric Vehicle Occupant Delay	
NPV Safety Cost Savings	(select and option)
NPV Delay Savings After Treatment	$ -

Kerb Extensions

Total Crossing Distance After Treatment: m

Expected Crash Reduction: 36 % (*default value 36%*)

NPV Safety Cost Savings	(select and option)
Mean Pedestrian Delay After Treatment (*delay without facility based on overall/total flow type*)	sec/ped (*capped at 300 sec/ped*)
Level of Service After Treatment	
Level of Service Description After Treatment	
NPV Delay Cost After Treatment	
NPV Delay Savings After Treatment	

Median Refuge

Crossing Distance After Treatment, Direction 1: m

Crossing Distance After Treatment, Direction 2: m

Expected Crash Reduction: 18 % (*default value 18%*)

NPV Safety Cost Savings	
Mean Pedestrian Delay After Treatment	sec/ped (*capped at 300 sec/ped*)
Level of Service After Treatment	
Level of Service Description After Treatment	
NPV Delay Cost After Treatment	
NPV Delay Savings After Treatment	

Kerb Extensions & Median Refuge

Crossing Distance After Treatment, Direction 1: m

Crossing Distance After Treatment, Direction 2: m

Expected Crash Reduction: 32 % (*default value 32%*)

NPV Safety Cost Savings	
Mean Pedestrian Delay After Treatment	sec/ped (*capped at 300 sec/ped*)
Level of Service After Treatment	
Level of Service Description After Treatment	
NPV Delay Cost After Treatment	
NPV Delay Savings After Treatment	

Benefit Cost Ratio Calculation

Inputs

Type of Facility Considered: (select an option)

Expected Construction Cost:

Outputs

Typical Construction Cost for Facility Considered	(select an option)
NPV Geometric Vehicle Occupant Delay	(select an option)
NPV Total Safety Cost Savings for Facility Considered	(select an op
NPV Total Delay Savings for Facility Considered	(select an option)
NPV Total Benefits for Facility Considered	(select an option)
Benefit Cost Ratio for Facility Considered	

Check appropriateness of facility from Step 1, or refer to the "Summary Sheet"

If Benefit Cost Ratio is unacceptable then consider Zebra crossing (proceed to Step Five)

Step Five: Will a Zebra Crossing Solve the Problem?

Inputs

Outputs

Is the crossing likely to be self enforcing (recommended numbers crossing >50ped/hr)?	Yes
Does the crossing meet the requirement of having less than two lanes in each direction?	(select an option)

Do not use zebra crossing if inappropriate (see Step 1), or if the above requirements are not met. Outputs are not provided if the above requirements are not met. Zebra crossings should not be used in isolation, and should only be used as part of an integrated traffic management plan. See Pedestrian Planning and Design Guide for details.

Benefit Calculation

Inputs

It has been assumed that there is no delay to pedestrians for a zebra crossing

Outputs

NPV Total Pedestrian Delay Savings	
NPV Vehicle Occupant Delay	

Zebra Only

Crash Reduction	-28 %	*default value -28%*
NPV Safety Cost Savings	(select and option)	
Vehicle Delay (Average Peak)		sec/veh
NPV Benefits After Treatment		

Zebra + Platform

Crash Reduction	88 %	*default value 88%*
NPV Safety Cost Savings	(select and option)	
NPV Geometric Vehicle Occupant Delay		
Vehicle Delay (Average Peak)		sec/veh
NPV Benefits After Treatment		

Zebra + Kerb Extensions

Crash Reduction	44 %	*default value 29%*
NPV Safety Cost Savings	(select and option)	
Vehicle Delay (Average Peak)		sec/veh
NPV Benefits After Treatment		

Zebra + Median Refuge

Crash Reduction	18 %	*default value -6%*
NPV Safety Cost Savings		
Vehicle Delay (Average Peak)		sec/veh
NPV Benefits After Treatment		

Zebra + Kerb Extensions & Median Refuge

Crash Reduction	32 %	*default value 13%*
NPV Safety Cost Savings		
Vehicle Delay (Average Peak)		sec/veh
NPV Benefits After Treatment		

Benefit Cost Ratio Calculation

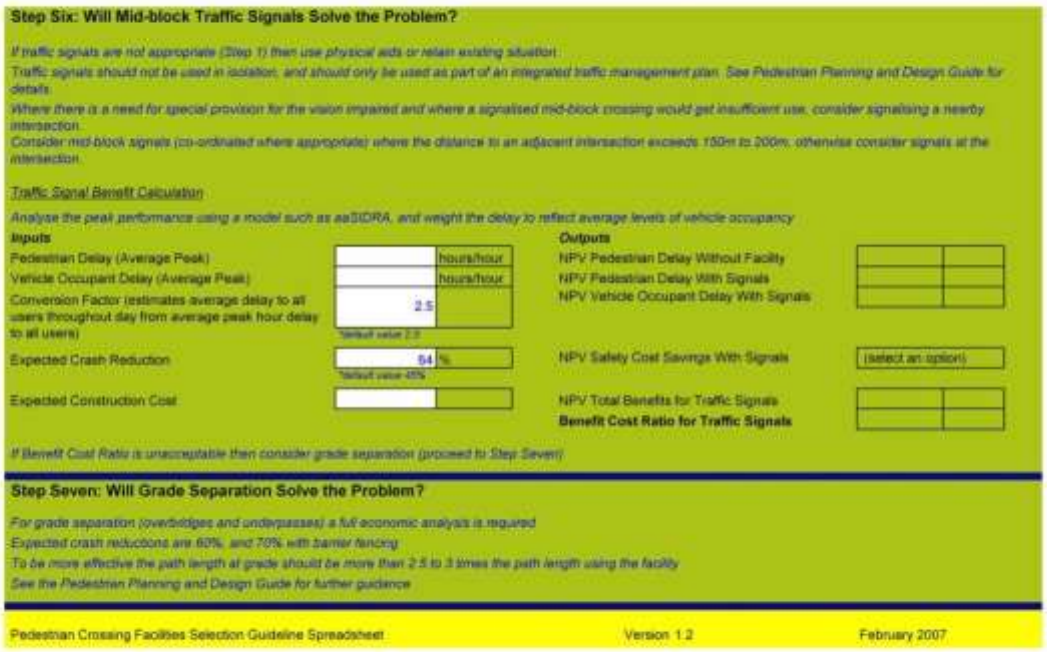
Inputs

Type of Facility Considered	(select an option)
Expected Construction Cost	

Outputs

Typical Construction Cost for Facility Considered	(select an option)
NPV Total Pedestrian Delay Savings	
NPV Total Vehicle Occupant Delay	
NPV Total Safety Cost Savings for Facility Considered	(select an option)
NPV Total Benefits for Facility Considered	(select an option)
Benefit Cost Ratio for Facility Considered	

Check appropriateness of facility(ies) from Step 1, or refer to "Summary Sheet"
If Benefit Cost Ratio is unacceptable then consider traffic signals (proceed to Step Six)



Step Six: Will Mid-block Traffic Signals Solve the Problem?

If traffic signals are not appropriate (Step 1) then use physical aids or retain existing situation
Traffic signals should not be used in isolation, and should only be used as part of an integrated traffic management plan. See Pedestrian Planning and Design Guide for details
Where there is a need for special provision for the vision impaired and where a signalised mid-block crossing would get insufficient use, consider signalising a nearby intersection
Consider mid-block signals (co-ordinated where appropriate) where the distance to an adjacent intersection exceeds 150m to 200m, otherwise consider signals at the intersection

Traffic Signal Benefit Calculation

Analyse the peak performance using a model such as aaSIDRA, and weight the delay to reflect average levels of vehicle occupancy

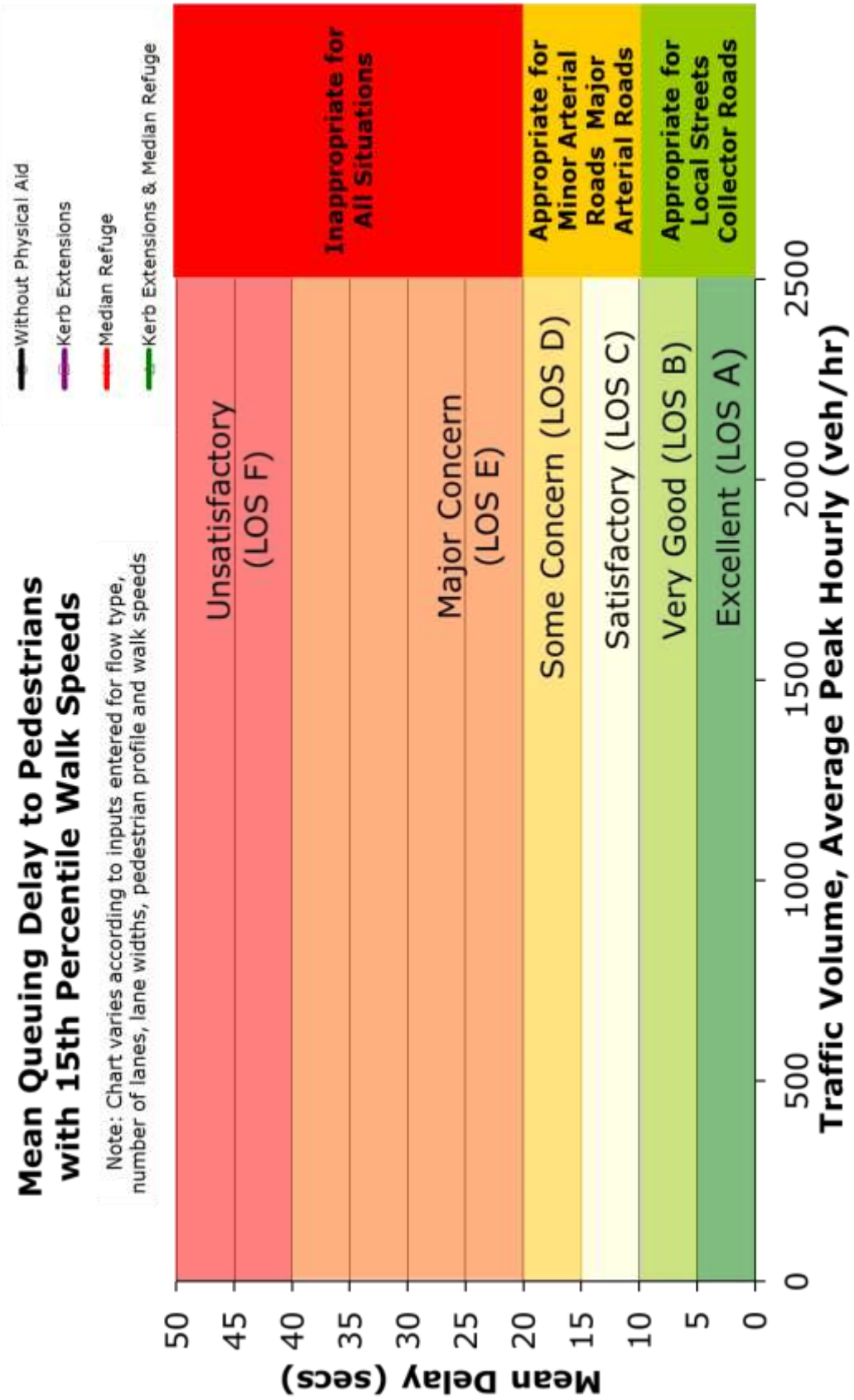
Inputs			**Outputs**	
Pedestrian Delay (Average Peak)		hours/hour	NPV Pedestrian Delay Without Facility	
Vehicle Occupant Delay (Average Peak)		hours/hour	NPV Pedestrian Delay With Signals	
Conversion Factor (estimates average delay to all users throughout day from average peak hour delay to all users)	2.5		NPV Vehicle Occupant Delay With Signals	
	Default value 2.5			
Expected Crash Reduction	64	%	NPV Safety Cost Savings With Signals	(select an option)
	Default value 45%			
Expected Construction Cost			NPV Total Benefits for Traffic Signals	
			Benefit Cost Ratio for Traffic Signals	

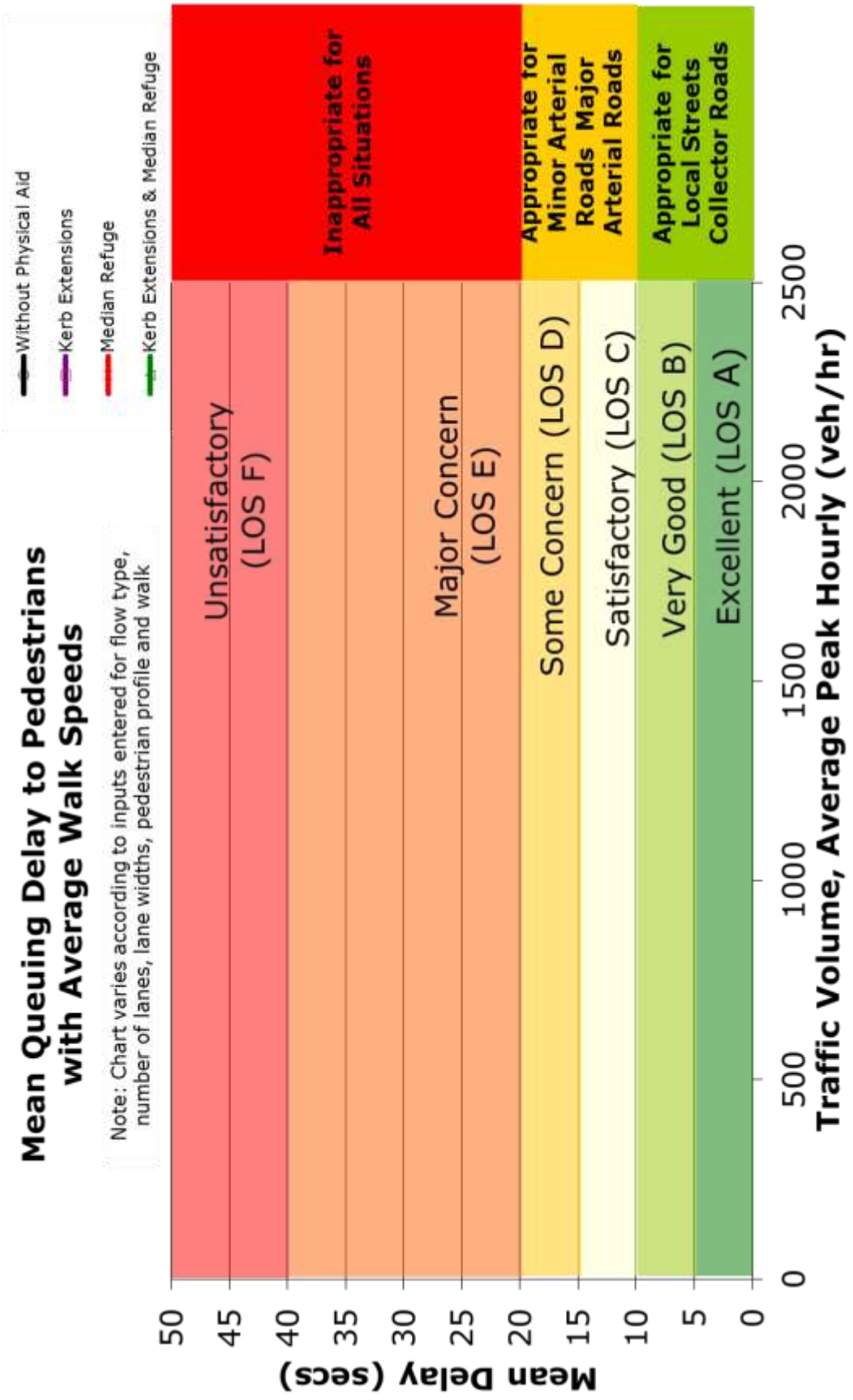
If Benefit Cost Ratio is unacceptable then consider grade separation (proceed to Step Seven)

Step Seven: Will Grade Separation Solve the Problem?

For grade separation (overbridges and underpasses) a full economic analysis is required
Expected crash reductions are 60%, and 70% with barrier fencing
To be more effective the path length at grade should be more than 2.5 to 3 times the path length using the facility
See the Pedestrian Planning and Design Guide for further guidance

Pedestrian Crossing Facilities Selection Guideline Spreadsheet Version 1.2 February 2007


Mean Queuing Delay to Pedestrians with 15th Percentile Walk Speeds
Note: Chart varies according to inputs entered for flow type, number of lanes, lane widths, pedestrian profile and walk speeds
Without Physical Aid
Kerb Extensions
Median Refuge
Kerb Extensions & Median Refuge
Inappropriate for All Situations
Appropriate for Minor Arterial Roads Major Arterial Roads
Appropriate for Local Streets Collector Roads
Unsatisfactory (LOS F)
Major Concern (LOS E)
Some Concern (LOS D)
Satisfactory (LOS C)
Very Good (LOS B)
Excellent (LOS A)
Mean Delay (secs)
0
5
10
15
20
25
30
35
40
45
50
0
500
1000
1500
2000
2500
Traffic Volume, Average Peak Hourly (veh/hr)


Mean Queuing Delay to Pedestrians with Average Walk Speeds
Note: Chart varies according to inputs entered for flow type, number of lanes, lane widths, pedestrian profile and walk
Without Physical Aid
Kerb Extensions
Median Refuge
Kerb Extensions & Median Refuge
Inappropriate for All Situations
Appropriate for Minor Arterial Roads Major Arterial Roads
Appropriate for Local Streets Collector Roads
Unsatisfactory (LOS F)
Major Concern (LOS E)
Some Concern (LOS D)
Satisfactory (LOS C)
Very Good (LOS B)
Excellent (LOS A)
Mean Delay (secs)
0
5
10
15
20
25
30
35
40
45
50
0
500
1000
1500
2000
2500
Traffic Volume, Average Peak Hourly (veh/hr)