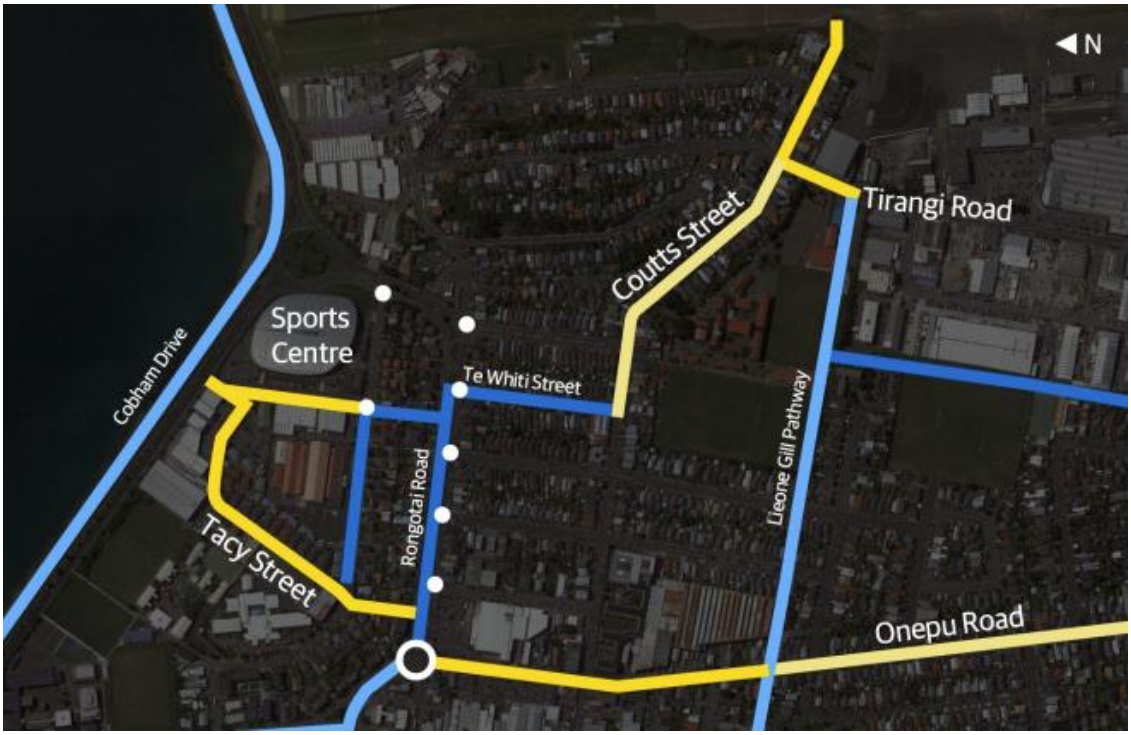
Transport Planning and Design
Level 1, 284 Kilmore Street
www.viastrada.nz

Wellington Transitional Cycleways Kilbirnie Connections cycleway audit – safety and accessibility

90% design audit



Report prepared for

Paneke Pōneke
Bike network plan

Absolutely Positively Wellington City Council
Me Heke Ki Pōneke

January 2023

This document has been prepared for the benefit of Wellington City Council. No liability is accepted by ViaStrada Ltd, or any of its employees or sub-consultants with respect to its use by any other party.

<table>
<tr><th colspan="3">Quality Assurance Statement</th></tr>
<tr><td rowspan="3">ViaStrada Ltd
Level 1,
284 Kilmore Street
PO Box 22 458
Christchurch 8140
New Zealand
Phone: (03) 366-7605
www.viastrada.nz
info@viastrada.nz</td><td>Project manager:</td><td>Axel Downard-Wilke, ME (Civil), BE (Civil)
Director – Senior Transportation Engineer & Transportation Planner
027 292 9810
axel@viastrada.nz</td></tr>
<tr><td>Prepared by:</td><td>David McCormick,
Transportation Engineer
021 400 232
David@viastrada.nz</td></tr>
<tr><td>Reviewed by:</td><td>Glen Koorey, BE, ME (Civil), BSc, PhD
Director – Senior Transportation Engineer & Transportation Planner
027 739 6905
glen@viastrada.nz</td></tr>
<tr><td>Project number:
Project name:</td><td colspan="2">1135-03-10
Wellington Transitional Cycleways Kilbirnie Connections cycleway audit – safety and accessibility</td></tr>
<tr><th colspan="2">Document version</th><th>Date</th></tr>
<tr><td colspan="2">Final</td><td>13/01/2023</td></tr>
</table>

Disclaimer

The findings and recommendations in this report are based on the site visit undertaken by the cycleway audit team (CAT), an examination of available relevant plans, the specified road and environs, and the CAT's professional knowledge and experience. However, it must be recognised that no audit can guarantee the elimination of all possible safety concerns as all traffic environments consist of a multitude of elements that are never completely within the control of engineering design.

Safety and accessibility audits, by nature, focus on aspects relating to safety and accessibility and therefore do not constitute a complete review of design or assessment of standards with respect to engineering or planning documents. Similarly, the safety audit focuses on the plans provided and the relevant design stage.

This audit applies to the stated project. Whilst some issues covered are general and might be applicable to other locations, the CAT does not take any responsibility for transferral of concepts to other projects or locations.

While every effort has been made to ensure the accuracy of the report, it is made available on the basis that anyone relying on it does so at their own risk without any liability to the CAT or their organisation(s).

Table of Contents

1 Introduction

1.1 Brief and project description

ViaStrada (the cycleway audit team, a.k.a. CAT) have been commissioned by the client to audit for Paneke Pōneke – Wellington's transitional cycle network. The audit is to be a combination of road safety and accessibility audits and is henceforth referred to as a CASA – i.e. "Cycleway audit – safety and accessibility". A number of CASAs will be undertaken on the various routes / packages at various design stages. The CASA process complies with Waka Kotahi NZ Transport Agency *Safe System audit guidelines* (2022).

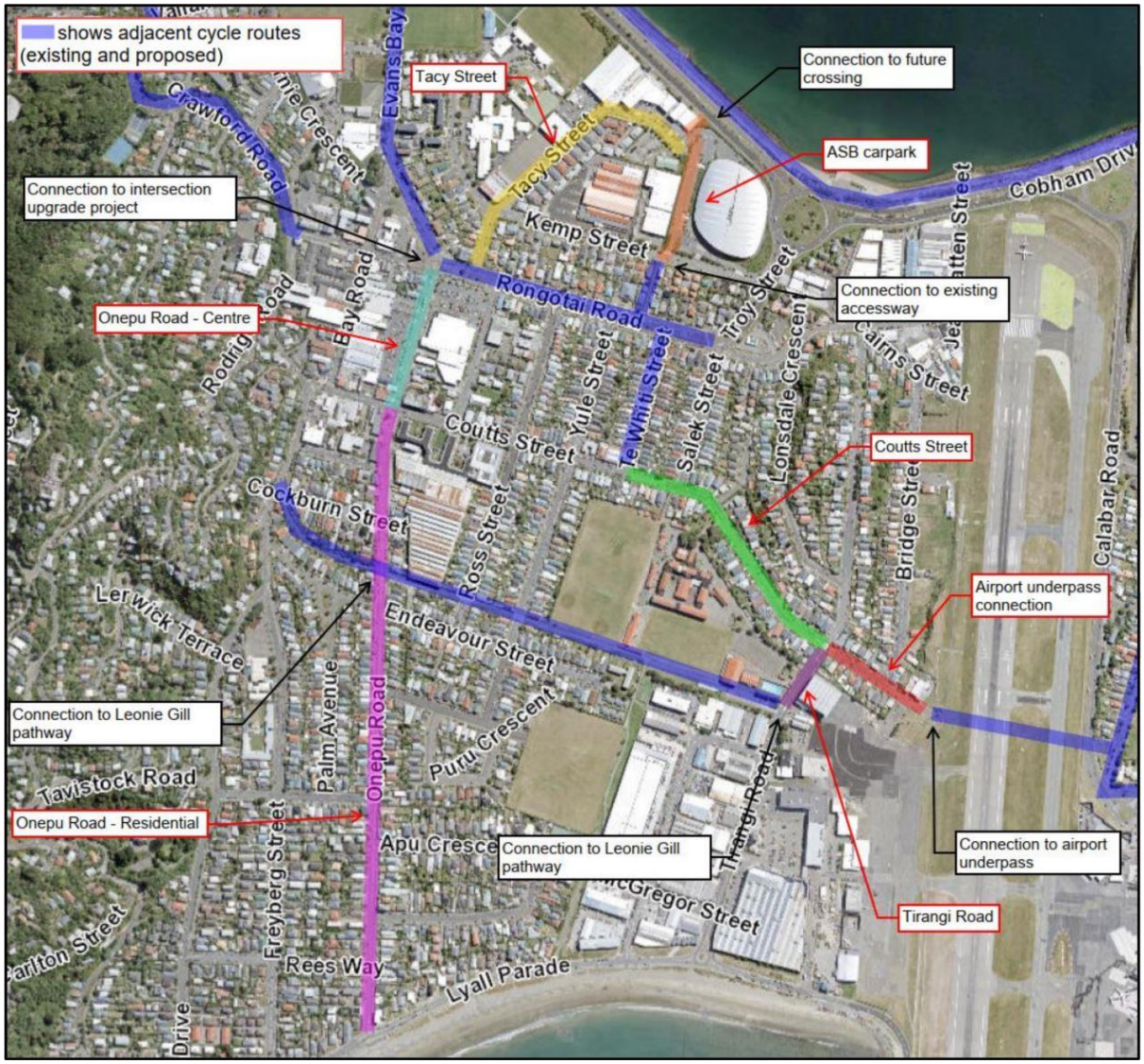


Figure 1-1: Extent of audit

This CASA is for the 90% stage of Kilbirnie connections as shown in Figure 1-1.

The 30% design stage of Kilbirnie Connections Transitional Cycleways audit has previously been completed on this package.

The infrastructure assessed in this audit includes:

- Onepu Road, Tirangi Road, and Coutts Street (Tirangi to Te Whiti): uni-directional separated cycleways
- Coutts Street (Tirangi to airport underpass): cycle lanes
- Tacy Street (cul-de-sac end to Rongotai): shared road
- Ākau Tangi – Shared Path

There is a separate upgrade project for the Evans Bay / Onepu / Rongotai intersection. The intersection is not part of the scope of this audit but there are issues impacting on adjacent routes, and this is discussed in this report.

1.2 The cycleway audit team

The CASA was carried out by the Cycleway Audit Team (CAT) consisting of:

- David McCormick, the cycleway audit team leader, of ViaStrada Ltd
- Luca Ware, Axel Downard-Wilke and Glen Koorey, cycleway audit team members, of ViaStrada Ltd

1.3 Meetings and site visits

The CAT had its safety camp on 28 and 29 July 2022. Progress plans were received on 20 September and a site visit was undertaken by the client project manager, Nicola Mitchell, and ViaStrada's audit project manager, Axel Downard-Wilke the following day. This was a daytime visit.

The 90% plans were received on 12 December. ViaStrada submitted some high-level issues to the client on 21 December.

1.4 Project team response process

In accordance with the procedures set down in the Waka Kotahi NZ Transport Agency *Safe System Audit Guidelines* (2022) the audit report will be submitted to the client who will instruct the wider project team to respond.

No changes, however small they may appear, may be made to any of our writings in the main audit section of our report without our express review and consent. This restriction includes our CAT responses.

> We do not consent to any changes … to be made to the main audit section of our report.

The safety issues raised in this audit will require responses from the designer and, after the CAT has had a chance to clarify issues further, the project safety engineer. Finally, the client decision and action taken against the safety issues will also be recorded.

The following people have been identified by the client for these roles (Table 1-1).

Table 1-1: project team members relevant to this audit (to be completed by the client)

Role	Name	Organisation
Designer response	Ebrahim Sangsefidi, Simeon du Preez	StepChange
Safety engineer	Dennis Davis	WCC
Client decision	Brad Singh	WCC
Action taken by		

1.5 Design vehicles

For intersections, Austroads *Guide to Road Design Part 4: Intersections and Crossings: General* (AGRD4, 2017) describes a design vehicle as the largest vehicle that can perform any particular turning movement from the appropriate approach lane to the appropriate departure lane with adequate clearances to features such as kerbs and roadside furniture.

The CAT has assumed the following design vehicles for this project:

- 19 m semi-trailer is the maximum design vehicle expected to use roads connecting to the commercial area.
- 11.5 m rigid truck or urban bus on the main subdivision road network.
- People on bikes are anticipated to be confident riders with at least cycling competency of Grade 2 intermediate skills

1.6 Project information provided

The CAT has received the following plans and information on the roads and traffic within the audit area:

Table 1-2: plans reviewed

Document	Date	Description	Organisation
Ākau Tangi Design Decisions Report CS	12 Dec	Ākau Tangi shared path and crossing details design decisions report	WSP / Waka Kotahi
Ākau Tangi Shared Path Detailed Design Drawings_Optimized	12 Dec	Ākau Tangi shared path and crossing detailed design drawings	WSP / Waka Kotahi
DRAFT-Transitional Cycleways Kilbirnie Connections Design Decisions Report_Rev 2 90% design issue	12 Dec	Draft 90% Kilbirnie Connections Design Decisions Report	T+T
SCH-TC-KILBCO-DRG-TR-COMBINED_VS-comments	12 Dec	90% design drawings for Kilbirnie Connections (used as the basis of the audit)	T+T & Abley & Isthmus
Waka Kotahi Cobham Drive Crossing Plans 20211105 (1)	13 Dec	Cobham Drive Crossing Plans including Tacy Street connection	WSP / Waka Kotahi

- Also provided for background information only: Reports and drawings from 30% design audit.
- 712814-C102-GA-A - Rongotai Road – Onepu Road intersection upgrade preliminary design drawings

Where relevant, we have also referred to guidance in Waka Kotahi's *Cycling Network Guidance* (CNG) and *Traffic Control Devices (TCD) Manual*.

1.7 Crash history

Waka Kotahi holds a national database of crashes (CAS) for New Zealand. Crashes are generally investigated for the previous five years to ensure a crash pattern is monitored, rather than one off events.

All reported crashes along the proposed corridor (including but not limited to those involving cyclists), from Waka Kotahi, New Zealand Transport Agencies Crash Analysis System (CAS) over the five-year period 2017–2021 (inclusive) are plotted in Figure 1-2.

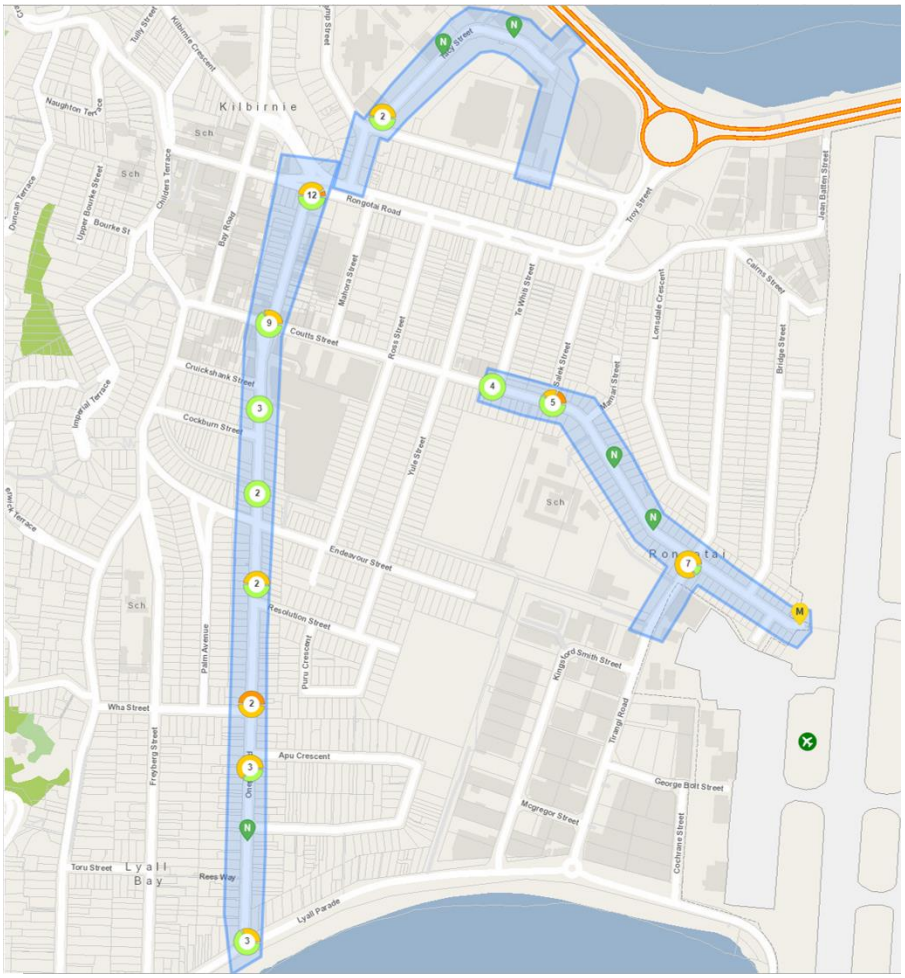


Figure 1-2: all crashes reported in the proposed Kilbirnie corridor

A total of 60 crashes were reported along the proposed Kilbirnie project corridor over the five-year period. Three of these were serious (two involving cyclists), 22 minor (eight involving cyclists) and 35 non-injury (one involving a cyclist). Of those involving cyclists, five were at the Tirangi Road roundabout (all causing minor injury), one was at Salek Street (causing serious injury), two at the Coutts Street and Onepu Road intersection and three more on Onepu Road unrelated to an intersection (two resulting in minor and one in serious injuries).

Crash clusters are present at Tirangi Road / Coutts Street, Coutts / Salek Street, Coutts Street / Onepu Road, and Rongotai Road, Evans Bay Parade and Onepu Road intersections. Of these clusters, the Tirangi Road / Coutts Street and Coutts Street / Onepu Road should be addressed through design.

All crash factors by group are presented in Figure 1-3. Each crash may have several factors thus there are more factors at play then just the number of crashes.

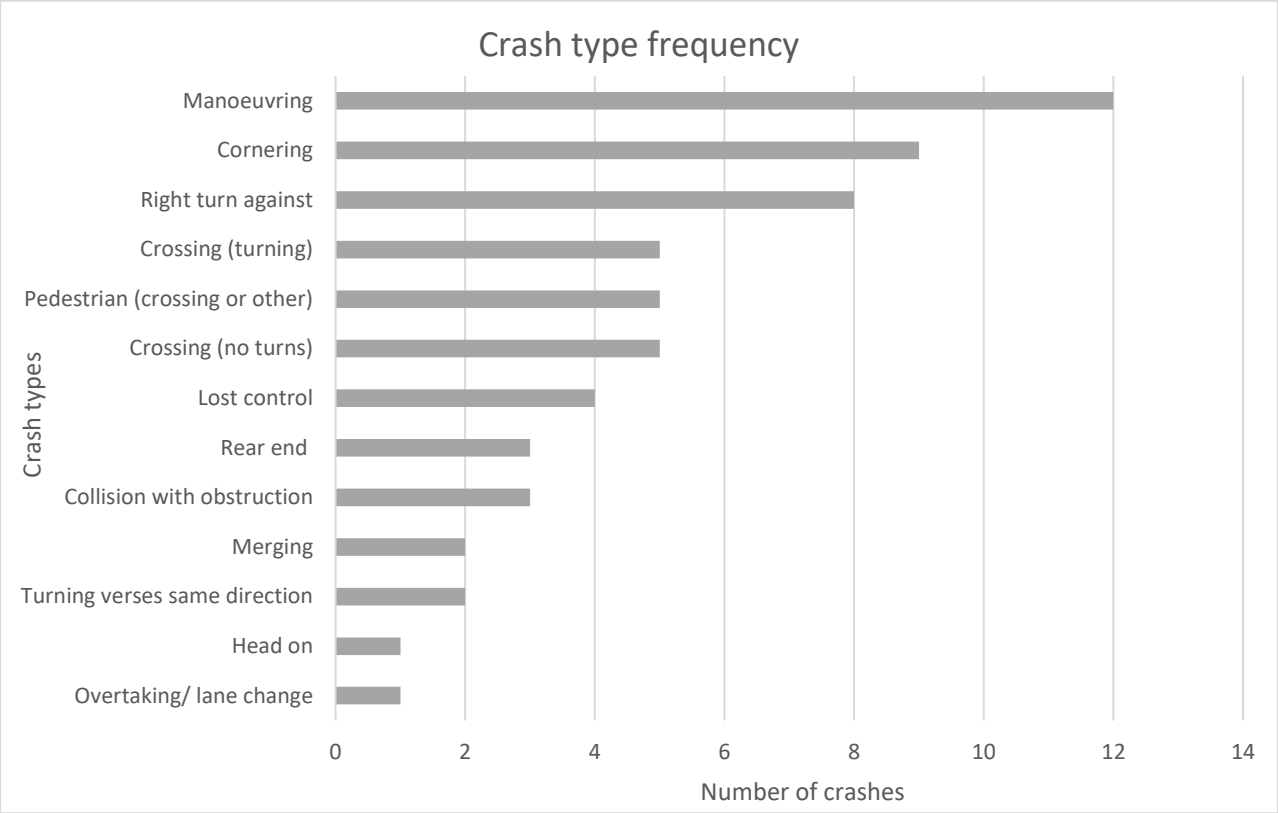


Figure 1-3: Reported crash factors (grouped)

The top four crash factors (manoeuvring, cornering, right turn against and crossing (turning and not turning) and pedestrians) all point to the constricting environment of the road and amount of traffic on the route. Given the lack of alternative options, lack of space and the busy nature of the corridor these are unavoidable risks that should be minimised through design.

There are clusters of crashes at some of the intersections along the corridor. The clusters at Tirangi Road/ Coutts Street, Coutts/ Salek Street, Coutts Street/ Onepu Road and Rongotai Road, Evans Bay Parade and Onepu Road intersections are further detailed in

Recorded crashes showed some common trends:

- crashes occurred most on Monday, Thursday, Friday, and Sunday
- crashes peak with expected increases in traffic volumes (Figure 1-4):
    - 7am-9am (morning)
    - 10am-11am (morning) – significant
    - 5pm-7pm (evening)
    - 9pm – 11pm (night-time) – slight
- as stated above, crashes were most often caused by manoeuvring or cornering followed by three other causes all with the same frequencies
- crashes involving cyclists most often resulted in minor injury (eight minor, two serious and one non-injury)
- crashes occurred most between October – December
- crashes have been increasing slightly in frequency since 2017

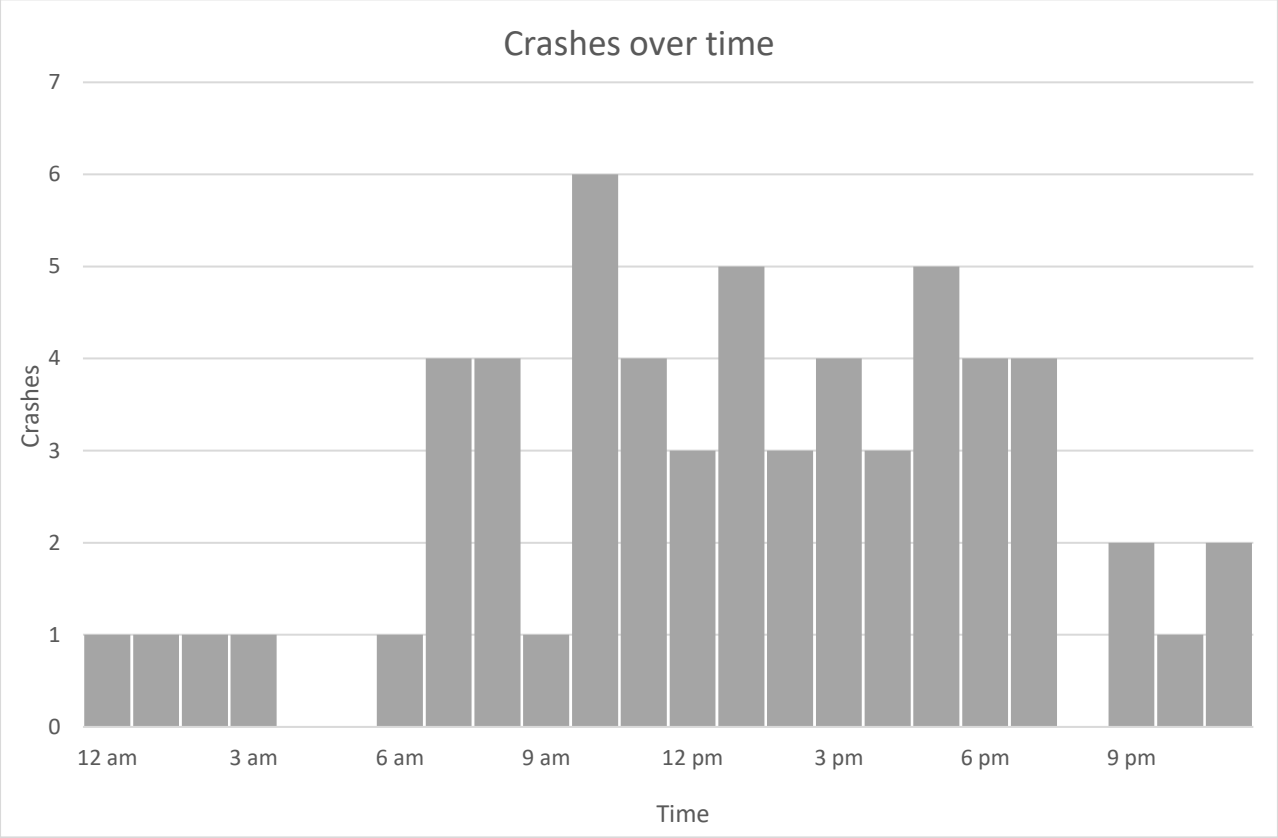


Figure 1-4: crashes by time

1.8 Audit procedure and report format

This audit follows the Waka Kotahi NZ Transport Agency *Safe System Audit Guidelines* (2022). The primary objective of a Safe System audit is to deliver a project that achieves an outcome consistent with the Safe System approach, that is, minimisation of death and serious injury.

The following section(s) of this report detail the issues identified in the audit.

1.8.1 Crash probability

The probability of a crash is qualitatively assessed based on expected exposure (how many road users will be exposed to the site) and the likelihood of a crash resulting from the presence of the particular safety issue. Probability ranges from "very likely" to "very unlikely", and have been based on the categories in the Austroads *Guide to Road Safety part 6: Road Safety Audit* (2022) but adapted for the 4-tier probability structure used in the NZ guide (Waka Kotahi, 2022).

Table 1-3: Relationship between crash probability and frequency

Probability of a crash occurring	**Frequency of crashes expected**
Very likely	One crash every 3 months (4+ crashes / year)
Likely	One crash every 3-12 months (1-4 crashes / year)
Unlikely	One crash every 1-7 years (0.1-1 crashes / year)
Very unlikely	One crash every 7+ years (<0.1 crashes / year)

1.8.2 Crash severity

The expected severity outcome of a crash is qualitatively assessed based on factors such as expected speeds, type of collision, and type of user/vehicle/object involved; **Error! Reference source not found.**, which is based on Austroads *Guide to Road Safety part 6: Road Safety Audit* (2022) but in colour instead of greyscale, gives an indication of the expected crash severity based on these factors. Table 1-4describes the four crash severities used.

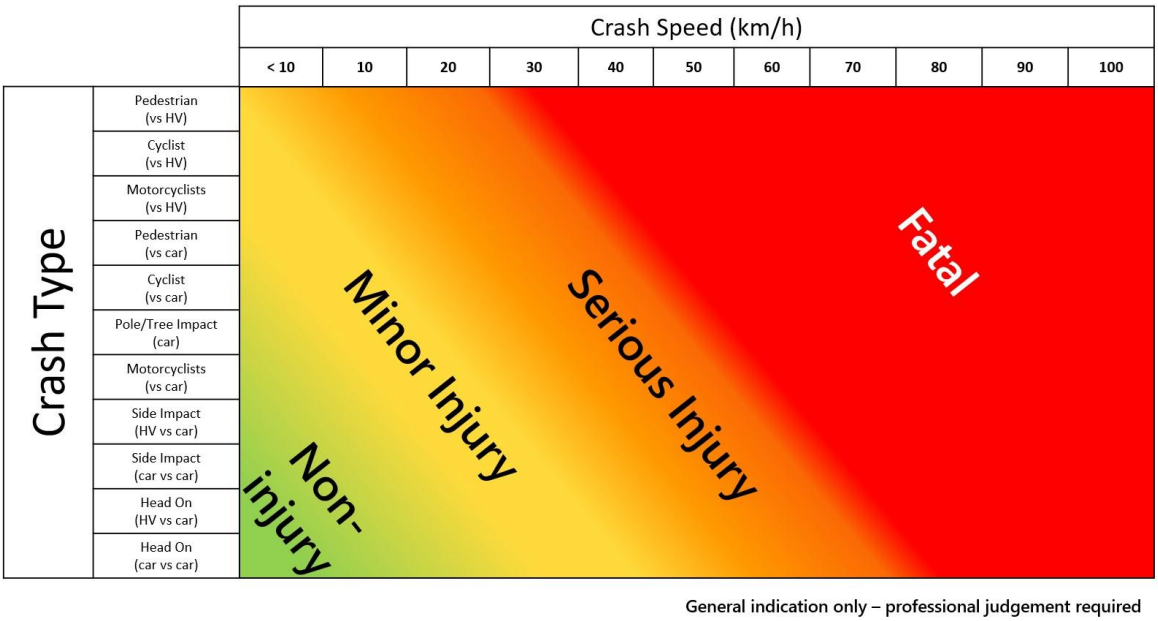


Figure 1-5: Expected crash severity by crash type and crash speed (adapted from Austroads GRS6, 2002)

Table 1-4: Crash severity descriptions (adapted from Waka Kotahi Safe Systems Audit Guidelines, 2022)

Severity outcome	Description
Fatal	Where Safe System boundary conditions are exceeded. A death occurring as the result of injuries sustained in a road crash within 30 days of the crash.
Serious	Where Safe System boundary conditions are exceeded. Injury (fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital.
Minor	Where Safe System boundary conditions are met. Injury which is not 'serious' but requires first aid, or which causes discomfort or pain to the person injured.
Non-injury	Where Safe System boundary conditions are met. Property damage crashes.

Reference to historic crash data or other research for similar elements of projects, or projects as a whole, have been drawn on where appropriate to assist in understanding the likely crash types, probability and severity that may result from a particular concern.

1.9 Crash risk rating

The probability and severity ratings are used together to develop a combined qualitative risk ranking for each safety issue using the Waka Kotahi Safety Concern Risk Rating Matrix shown in Table 1-3. The qualitative assessment requires professional judgement and experience from a wide range of projects of varying sizes and locations.

Table 1-5: Safety concern risk rating matrix (from Waka Kotahi Safe Systems Audit Guidelines, 2022)

		Severity outcome			
		Non-injury	**Minor**	**Serious**	**Fatal**
		Property damage only (PDO)	Injury which is not 'serious' but requires first aid, or which causes discomfort or pain to the person injured.	Injury (fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital.	A death occurring as the result of injuries sustained in a road crash within 30 days of the crash.
Probability of a crash	**Very likely**	Minor	Moderate	Serious	Serious
	Likely	Minor	Moderate	Serious	Serious
	Unlikely	Minor	Minor	Significant	Serious
	Very unlikely	Minor	Minor	Significant	Significant

Safe System injury threshold

While all safety concerns should be considered for action, the client will make the decision as to what action will be adopted. This report gives safety ranking guidance and it is acknowledged the client must consider factors other than safety alone. The suggested action for each concern category is given in Table 1-5.

Table 1-6: Concern categories

Risk	Suggested Action
Serious	Safety concern that must be addressed and requires changes to avoid serious safety consequences.
Significant	Significant concern that should be addressed and requires changes to avoid serious safety consequences.
Moderate	Moderate concern that should be addressed to improve safety
Minor	Minor concern that should be addressed where practical to improve safety.

In addition to the ranked safety issues, it is appropriate for the CAT to provide additional comments about items that may have a safety implication but lie outside the scope of the CASA. A comment may include: items where the safety implications are not yet clear due to insufficient detail for the stage of project; items outside the scope of the audit such as existing issues not impacted by the project; an opportunity for improved safety that is not necessarily linked to the project itself, or drawing/signage issues that should be addressed but are not necessarily safety related. While typically comments do not require a specific recommendation, in some instances suggestions may be given by the CAT.

1.10 Recommendations

Each issue is accompanied by a list of recommendations to address the issue. As per the safe systems framework, these are classified as relating to either:

- Primary treatments – i.e. those capable of virtually eliminating death or serious injury resulting from the particular safety issue; or
- Supporting treatments – reduce the overall harm caused by the safety issue.

The following section(s) of this report detail the issues identified in the audit.

1.11 Affected user groups

For ease of interpretation, each issue heading in this CASA report includes the severity rating, as well as include letters to denote the main user groups affected. The first row in the table also includes icons to denote possible sub-groups. The user letters and icons are presented in Table 1-7:

Table 1-7: User groups included

Main user group	Heading letter	Possible sub-groups
Pedestrians	P	Vision impaired pedestrians 
		Mobility impaired pedestrians 
		Wheelchair users 
		Bus patrons (waiting / alighting) 
		All pedestrians 
Cyclists	C	Enthused & confident cyclists 
		Interested but concerned cyclists 
		Cyclists using electric bikes 
		All cyclists 
E-scooter / device users	E	E-scooter users; other electric small-wheeled devices 
Motorists	M	Drivers 
		Buses 
		Motorcyclists / moped users 

Section 6 presents a summary of the issues identified and the audit statement to be signed by the designer, responding auditor, safety engineer, project manager and project sponsor.

2 CASA findings – general

2.1 Driveway treatments – C E

Minor

Proposed busy driveways have speed bumps used as separator devices between the vehicle lane and the separated cycle path. These provide minimal protection from motor vehicles as there is no vertical device on the property side shown in Figure 2-1.

Figure 2-2 provides guidance of how to install speed humps leaving the private driveway and crossing into a separated cycleway. This provides vertical deflection with the speed hump on the private property side to reduce speeds of cars entering the separated cycleway.

Figure 2-3 shows driveways having no road marking or vertical elements with the separators. Roading marking the cycle symbol at 100m exactly (indicative number) could be altered to provide the closest driveway with road marking. Depending on whether the separators are mountable or not, providing a vertical element for drivers leaving driveways will help to identify where the extents of the separators are.

Figure 2-1: Proposed commercial driveways

Figure 2-2: Driveway treatment solution

Figure 2-3: Coutts Street crossings with no markings

Probability of crash occurring	Unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
2.1.1	Provide vertical elements to low separators
Supporting treatment recommendations:	
2.1.2	Investigate use of speed humps on approach to separated cycleway

Responses:	
Designer	We agree with CAT on installing speed humps on commercial driveways. We recommend that the client engage in communication with business owners to determine if it is feasible to install the speed humps within the boundaries of their property. However, we believe that it is not an appropriate solution for residential properties given the lower vehicle volumes.

	We also agree with the other recommendation regarding moving the proposed cycle symbols to align them with driveways.
Safety Engineer	Agree with CAT and Designer, noting that cycle symbols to align with all driveways.
Proposed action	Agree with CAT and designer – please note that there are some properties down Onepu Rd south at 154 175 and 192 that could be fairly high use – can we look into this treatment on those driveways too please.
Client decision	Agree with proposed action
Action taken	

2.2 Way-finding signage location – P C E

Several way-finding signs are indicated on the departure side of intersections (e.g. Figure 2-4). It is unclear if this is a repeater (confirmation) way-finding sign or not; providing the way-finding sign after the intersection will not help users determine their route initially.

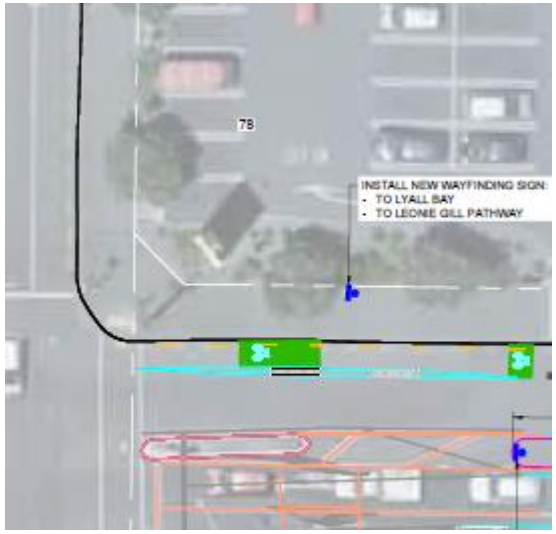


Figure 2-4: Location of way-finding sign

Comment

Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
2.2.1	Designer to make sure way-finding is provided on approaches to intersections and the shown way-finding is only repeater confirmation.
Supporting treatment recommendations:	
2.2.2	N/a

Responses:	
Designer	We agree with CAT finding. The location of wayfinding signs will be reviewed and updated for the Traffic Resolution drawing set and the signs will be relocated on the approach to decision points at intersections.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

2.3 Way-finding information – P C E

Some of the proposed way-finding signage lists up to three destinations (e.g. Figure 2-5). Draft guidance to Waka Kotahi on cycle way-finding for the CNG discusses the amount of information to be provided on a way-finding fingerboard sign to a maximum of two lines. Therefore, we assume that the signs in question will be in the form of an advance destination or confirmation destination sign.

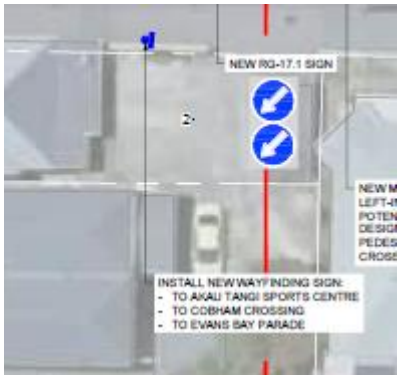


Figure 2-5: Way-finding signage with three locations

Comment

Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
2.3.1	Investigate the use of appropriate destination signs for the three lines of information
Supporting treatment recommendations:	
2.3.2	N/a

Responses:	
Designer	Published Waka Kotahi cycle wayfinding guidance will be followed when designing the wayfinding signs. If necessary, advance destination or confirmation destination signs will be used if there are more than two lines of information required on the sign.

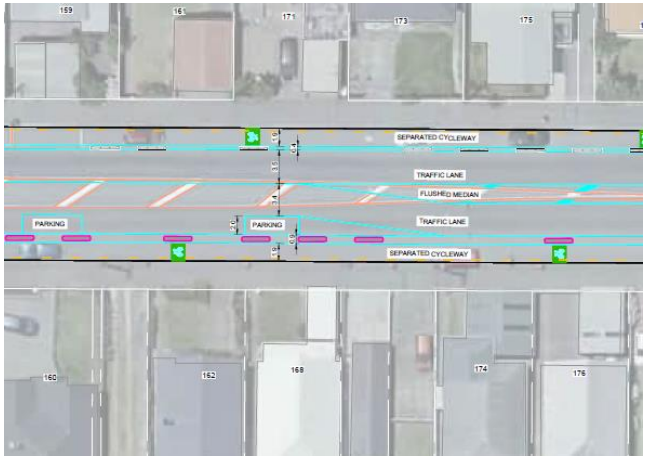
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and the Designer.
Client decision	Agree with proposed action
Action taken	

2.4 Spacing of traffic control devices for quick build cycleways – P C E M Significant

Some of the plans show spacings between cycleway separators of more than 5 m apart (e.g. Figure 2-6).

The relevant guidance is *Waka Kotahi Research note 006 - Infrastructure-for-quick-build-cycleways*. This guidance discusses multiple types of low raised separators, with **a spacing of 1-5m** within NZ. The spacing of less than 5m is to stop vehicles parking / driving in between the separators.

In the CNG – *Choice of separator or protection* provides guidance on the permeability of the separators with "The gap width in continuous separators should be limited to providing for the required design vehicle at a slow turning speed (typically **no more than 4-5 m gap** for single private accesses)."



Probability of crash occurring	Unlikely
Expected crash severity	Serious injury
Primary treatment recommendations:	
2.4.1	Reduce the of spacing of TCDs to <5m where applicable.
Supporting treatment recommendations:	
2.4.2	N/a

	Figure 2-6: Plans showing various spacing between separators		
Responses:			
Designer	A typical 3.0m gap will be applied between separators throughout the project. However, the gap will be increased to accommodate openings for residential/commercial driveways to allow for slow turning movements aiming for a maximum gap of 4-5m for single private accesses. It is acknowledged that commercial accesses may require a wider gap between separators given the width of the access and to accommodate turning movements. In some locations adjacent driveways means that this gap increases in length. For longer gaps we could add traversable speed humps to separate the cycle lane while still allowing vehicles to enter and exit.		
Safety Engineer	Agree with Designer.		
Proposed action	Agree with Designer		
Client decision	Agree with proposed action		
Action taken			

2.5 Full width ramps at bus stop platforms – P C E

Minor

Although typically marked only with a cycleway on the kerbside half, the proposed bus stop platform ramps still allow cyclists to use the full width (see Figure 2-7). The safety issue is cyclists can enter the step-down space for pedestrians.

The crash type/s expected is cyclists striking pedestrians.

The risk factors are volume of cyclists, volume of bus users, cyclist understanding of the step-down space.

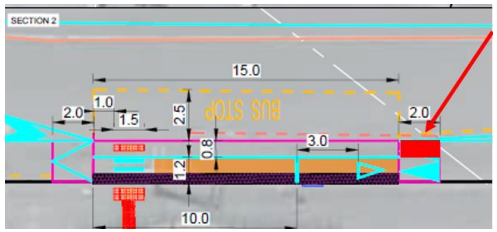


Figure 2-7: Diagram showing the removal of the ramp for the approach

Figure 2-8: Riddiford Street bus platform

Probability of crash occurring	Very unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
2.5.1	Remove the ability for cyclists to enter the 0.8m area for bus users to step down into. (Similar to bollards in Figure 2-8)
Supporting treatment recommendations:	
2.5.2	

Responses:	
Designer	We agree with CAT recommendation and will apply this to the bus stop platform designs.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

2.6 Tactile ground surface indicators at dual crossings – P

Several dual crossings are proposed in the plans (e.g. Figure 2-9). It is not clear whether all of their TCD details are correctly prescribed.

The CNG – *Unsignalised crossings* provides design considerations on the use of dual crossings.

Traffic control devices manual (TCD) Part 4 – at Intersections (draft for consultation) provides guidance on the type and location of traffic control devices for dual crossings.

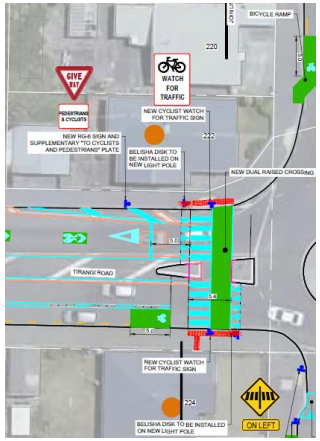


Figure 2-9: Layout of dual crossings

Figure 2-10: Photo showing existing dual crossing as per CNG document.

Comment

Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
2.6.1	Provide green and yellow tactile ground surface indicators
2.6.2	Install signage in line with TCD part 4
Supporting treatment recommendations:	
2.6.3	N/a

Responses:	
Designer	The tactile pavers and signage at the proposed dual crossings will be applied in accordance with Waka Kotahi guidance and the TCD manual.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

3 CASA findings – Onepu Road

3.1 Location of proposed median island – M

The location of the proposed island out of Pak n Save driveway to supplement the left-in left-out (LILO) treatment is close to the proposed right-turning bay of the Rongotai Road intersection. The indicative plans for the proposed intersection treatment suggest that the island may limit the available room for turning traffic to queue (see Figure 3-1).

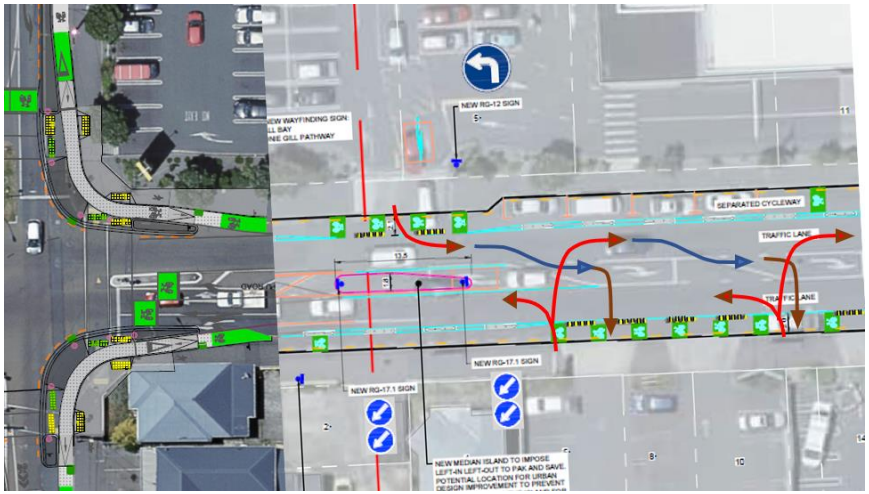


Figure 3-1: Merge of both plans to show proposed layout

Comment	
Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
3.1.1	Determine the length required for the right-turning bay
Supporting treatment recommendations:	
3.1.2	

Responses:	
Designer	We agree with the CAT finding and the length of the central island may need to be reduced to provide an appropriate right turning bay length. This will be reviewed for the TR design.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer
Client decision	Agree with proposed action
Action taken	

3.2 Bus Stop 6327 platform – P C E M

Bus stop 6327 is being moved to accommodate the installation of the separated cycleway. As this stretch of Onepu Road has many driveways, the new location has been determined.

Having the vehicle traversing over the back of the bus platform will require the vehicle to yield behind a stopped bus. The platform will act as a speed hump for drivers entering their property by crossing through the separated cycleway (see Figure 3-2).

The use of metal grating is proposed to allow for storm water to flow requires a gap to be left between the pavement and top of ramp (see Figure 3-3).

Allowing for vehicles to traffic over the platform could also lead to the metal grating being damaged / removed and become a bigger hazard.

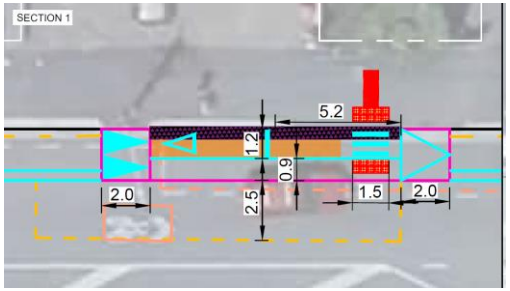


Figure 3-2: Proposed bus platform layout

Figure 3-3: Gap left between steel plate for storm water

Comment	
Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
3.2.1	Determine the right installation method of the metal grating to make sure no hazard is created.
Supporting treatment recommendations:	
3.2.2	

Responses:	
Designer	We agree with CAT finding. We recommend the client considers the most appropriate way to address this issue.
Safety Engineer	Agree with CAT and Designer. Issue to be referred to Transport and Delivery – Maintenance for input.
Proposed action	Agree with CAT and Designer – will check in with T&I for input
Client decision	Agree with proposed action

Action taken	

3.3 Visibility from driveways and minor roads due to new parking location– C E M Minor

Cyclists travelling along the cycleway are used to continuing straight in line with the kerb and channel.

The cycle way has been moved laterally to allow for the give way limit lines to stay in the existing locations due to desktop study of required visibility intersection (see Figure 3-4).

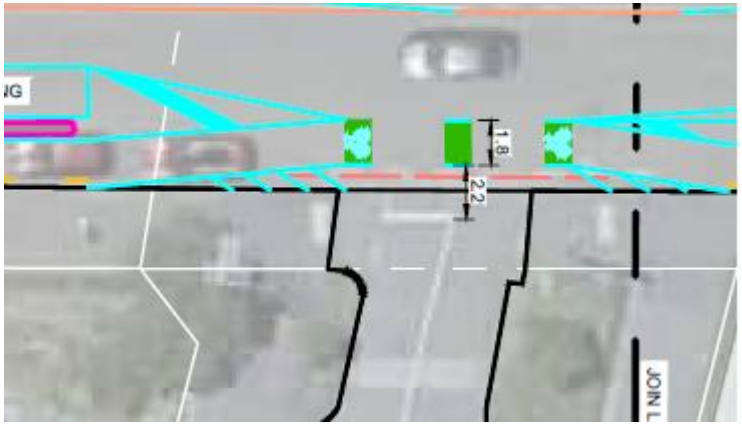


Figure 3-4: Separated cycleway moves laterally from minor road limit line

The safety issue is that cyclists are likely to continue straight and not move laterally as the cycle lane shifts and vehicles will encroach into the setback distance.

The crash type/s expected is motor vehicles impacting cyclists.

The risk factors are cyclists riding straight and motor vehicles encroaching past the give way limit line.

Relevant standard is CNG – TN002, which provides guidance in Table 1: Parking setbacks (as shown in Figure 3-5)

Probability of crash occurring	Unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
3.3.1	Determine if all intersections and driveways have enough visibility to push the limit lines back
Supporting treatment recommendations:	
3.3.2	

Table 1: Parking setbacks based on parking provision

Number of effective parking spaces on approach to driveway*	Required setback of first parking space from driveway
1-2	3 m **
3-4	5 m
> 4	8 m

Figure 3-5: Table 1 from CNG – TN002

Responses:	
Designer	We agree with CAT finding that some cyclists will not obey the proposed line marking. In the worst-case scenario, these cyclists may be riding adjacent to the channel lip line, which provides a relatively safe gap between car bumper and the edge of the cycleway. It should be noted that pushing the limit line further back, which would move vehicles further away from the edge of the traffic lane, results in an increase in travel time for turning vehicles in conflict areas. The required setbacks will be implemented in accordance with CNG-TN002, however, due to existing constraints in certain areas slightly shorter setbacks have been applied in some locations with consideration of the safety risk.
Safety Engineer	Agree with Designer. Behaviour at this location to be monitored and further mitigation considered if necessary.
Proposed action	Agree with designer and safety engineer
Client decision	Agree with proposed action
Action taken	

3.4 Location of 30km/h road marking at Coutts Street slip lane C E M

Significant

The speed limit signage and road marking are situated in different locations. The signage is gated on the approach to the shopping area, but the road marking is within the slip lane.

The safety issue is that cyclists will be merging with motor vehicles in a 30km/h area with motorist still doing closer to 50km/h due to the signage being small and lost in the background (see Figure 3-6).

The crash type/s expected is cyclists rear-ended and side-struck by motor vehicles.

Probability of crash occurring	Unlikely
Expected crash severity	Serious injury

Primary treatment recommendations:

The risk factors are speed of motor vehicles, volumes of turning vehicles and volumes of cyclists.

Figure 3-6: Approach to 30km/h speed zone in Kilbirnie

3.4.1	Provide threshold road marking on Onepu Road
3.4.2	Install larger 30km/h speed signs, not the minimum sizing
Supporting treatment recommendations:	
3.4.3	Install "Kilbirnie Village – 30km/h" signage, to provide better threshold

Responses:	
Designer	We agree with CAT treatment recommendations 3.4.1 and 3.4.2.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

3.5 Rumble Strips in shoulder bar – C E Serious

The safety issue is cyclists are expected to own the lane through the shared lane area outside of the existing bus hub (see Figure 3-7).

The crash type/s expected is motor vehicle and cyclist rear-end and side-swipe crashes.
The risk factors are lane width, volume of motor vehicles and cyclists, speed of motor vehicles and volume of buses.

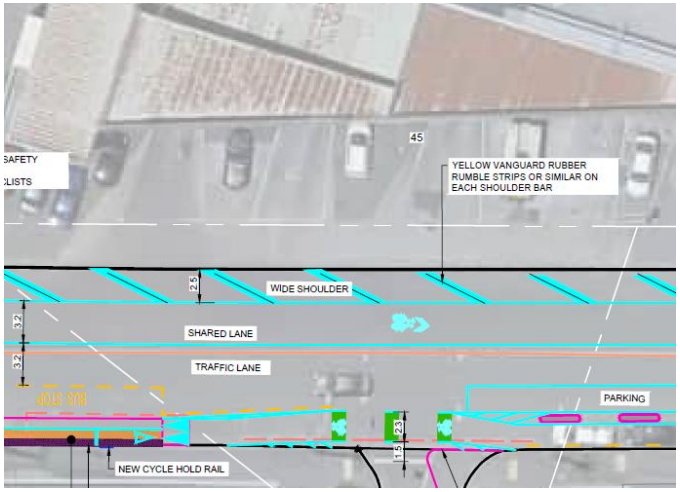


Figure 3-7: Rumble strips proposed along wide shoulder

Probability of crash occurring	Likely
Expected crash severity	Serious injury
Primary treatment recommendations:	
3.5.1	Remove proposed rumble strips
3.5.2	Provide cyclist head start movement at Onepu Road and Coutts Street
Supporting treatment recommendations:	
3.5.3	Provide a gap in the rumble strips to allow cyclists to traffic through while buses are not stationary in the wide shoulder
3.5.4	Provide the minimum lane width for mixed traffic lane and per CNG of 4.2m

Responses:	
Designer	We agree with CAT finding. We also agree with CAT recommendation 3.5.1 and suggest this is implemented for the TR designs. The investigation of cyclist head start movement at the intersection of Onepu Road and Coutts Street, as outlined in recommendation 3.5.2, is considered as a part of the design and needs to be confirmed by the WCC signals team. It also must be noted that it is not feasible to increase the width of the shared lane, as the proposed 2.5m shoulder is intended to be utilised by stationary buses.
Safety Engineer	Agree with CAT and Designer. Confirm adequacy of cyclist head start time with WCC signals team.
Proposed action	Advance cycle light ahead of the Barnes Dance phase will give cyclists plenty of time to get ahead of traffic. Design being updated to remove rumble strips and hatching and replace it with a cycle lane and then a shared bus bike lane – TR drawings are being updated
Client decision	Agree with proposed action
Action taken	

3.6 Missing Advance warning diamond– P C E M — Minor

The safety issue is the Advance warning diamond outside 90 Onepu Road

The crash type/s expected is motor vehicles striking both pedestrians and cyclists on the crossing.

The risk factors are volume of traffic, volume of pedestrians, volume of cyclists, distraction, and speed of vehicle.

The relevant standards is https://www.nzta.govt.nz/roads-and-rail/traffic-control-devices-manual/part-5-traffic-control-devices-for-general-use-between-intersections/pedestrian-facilities/pedestrian-crossings-zebra/.

Noted the northern approach has the diamond included.

Probability of crash occurring	Very unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
3.6.1	Provide advanced warning diamond on south approach to crossing
Supporting treatment recommendations:	
3.6.2	N/a

Responses:	
Designer	We agree with CAT finding and will implement recommendation 3.6.1.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

3.7 Visibility from Endeavour Street due to new bus stop location– M — Minor

The safety issue is blocked visibility while a bus is parked in proposed bus stop 7328 (see Figure 3-8).

The crash type expected is side impact of motor vehicles.

The risk factors are frequency of the bus stopping, volume of passengers, volume of traffic and speed of traffic.

Probability of crash occurring	Very unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	

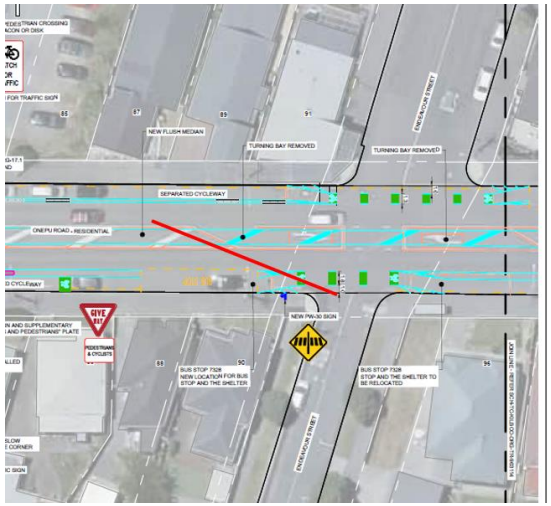


Figure 3-8: Extract showing visibility for right-turning traffic if bus stop is occupied.

3.7.1	Determine if adequate visibility is provided. Relocate bus stop if necessary
Supporting treatment recommendations:	
3.7.2	N/a

Responses:	
Designer	We acknowledge that a stationary bus will reduce the visibility. We will determine if there will be adequate visibility for vehicles exiting Endeavour St when a bus is stopped. If there is insufficient visibility the bus stop will be repositioned to a new location, provided that a full kerb height can be established at the bus doors, and that the new location does not conflict with nearby driveways.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer – update designs where necessary
Client decision	Agree with proposed action
Action taken	

3.8 Advanced stop boxes for cyclists – C E M

Minor

In relation to the desired Barnes Dance phasing, the safety issue is right-turning cyclists may be required to either own the traffic lane or else they need to wait within the cycle lanes

until the Barnes dance phase to turn right. Cyclists could arrive at the limit line just having missed the Barnes Dance phase (i.e. when the Barnes Dance phase is in the process of terminating, without the succeeding vehicle phase having started yet). In that case, the next phase during which cyclists can enter the intersection is one of the vehicle phases. There should thus be ASBs for all approaches so that cyclists have somewhere safe and appropriate to wait until their movement can occur.

The crash type/s expected are motor vehicles side-swiping cyclists and cyclists rear-ending other cyclists.

The risk factors are volume of motor vehicles, volume of heavy vehicles, volume of cyclists, phasing, and prioritisation of Barnes dance phase.

The relevant guidance is Cycling network guidance – *Cyclist waiting facilities at intersections* and Design Guidance Note – Buffered Advance stop box

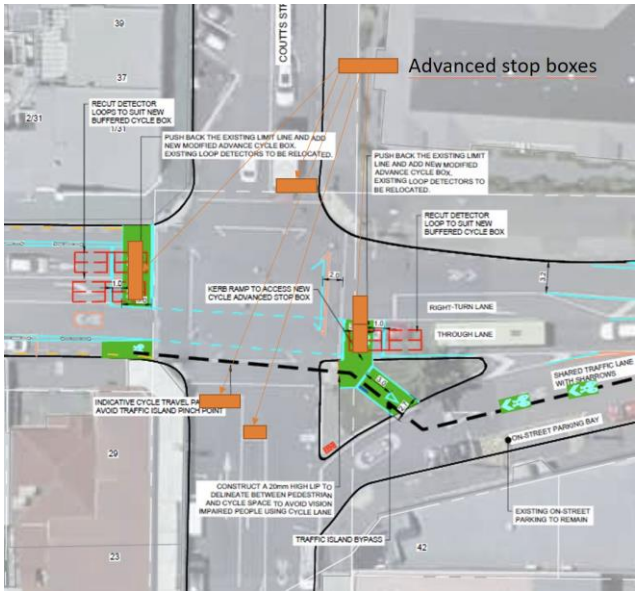


Figure 3-9: Diagram showing potential advanced stop box locations

Probability of crash occurring	Unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
3.8.1	Provide advanced stop boxes for all legs to provide cyclists the opportunity to turn outside of the Barnes dance phase (see Figure 3-9).
Supporting treatment recommendations:	
3.8.2	N/a

Responses:	
Designer	We agree with the CAT recommendation. ASBs on the side road are out of our current scope. We also note that that installing ASBs on staggered right turn lanes impact traffic signal timing, resulting in increased delay, and capacity of the lane. According to Austroads Part 4A, it is recommended to consider the sight distance requirement on signalised intersections, as signals may not always function due to power outages or damage to the controller. Therefore, it is imperative to verify the sight distance requirement prior to implementing ASBs.
Safety Engineer	Agree with CAT and Designer. However, the current scope should be reconsidered to include ASBs on side road. Verify the sight distance requirements prior to implementing the ASBs.
Proposed action	Agree – expanding scope to include ASBs on side road
Client decision	Agree with proposed action
Action taken	

4 CASA findings – Tacy Street

4.1 Non-standard signage – C E

Non *TCD manual* signs are proposed in the drawings.

"On Left" supplementary sign (see Figure 4-1) is not included within the TCD manual. It does provide guidance on where the location of the pedestrian crossing should be.

The draft consultation document for TCD manual part 4 – in between intersections provides guidance on the colours to provide the additional signs for cycle path crossings (see Figure 4-2).

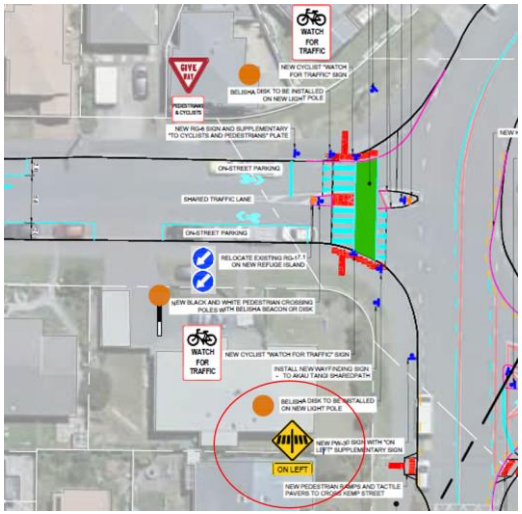


Figure 4-1: "On Left" sign

Table 8-1: Additional signs for cycle path crossings.

Sign code	Example	Description/Use
R2-2.5 Give way – supplementary - to cyclists	TO CYCLISTS	R2-2.5 and R2-2.6 reinforces requirement for drivers to give way to cyclists and pedestrians crossing the road on a priority controlled shared path, in accordance with subclause 11.4(5) of the TCD Rule.
R2-2.6 Give way – supplementary - to cyclists and pedestrians	TO CYCLISTS & PEDESTRIANS	R2-9.1 reinforces requirement to give way to cyclists on a cycle path when turning at a give way sign, stop sign or traffic signals, in accordance with clause 3.2 or 4.1 of the Land Transport (Road User) Rule 2004. This sign may supplement R2-1 or R2-2 signs or traffic signals and may be installed on the same pole.
R2-9.1 Turning traffic give way to cyclists	TURNING TRAFFIC GIVE WAY TO CYCLISTS	R2-9.2 reinforces requirements to give way to cyclists on a cycle path when proceeding straight ahead from a give way or stop sign, in accordance with clause 4.1 of the Land Transport (Road User) Rule 2004. This sign may supplement R2-1 or R2-2 signs and may be installed on the same pole.
R2-9.2 Straight ahead traffic give way to cyclists	STRAIGHT AHEAD TRAFFIC GIVE WAY TO CYCLISTS	
A43-7 Cyclists watch for traffic	WATCH FOR TRAFFIC	A43-7 should be used at cycle path crossings where traffic on the road is controlled. The sign should be, located to face approaching cyclists. The sign may be located at the crossing or at a location in advance of the crossing where the crossing is clearly visible to approaching cyclists. This sign must not be mounted on the same pole as a regulatory sign or traffic signal.

Figure 4-2: Table 6-1 from Draft TCD Part 4

Comment	
	
Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
4.1.1	Install signage complying with TCD manual
Supporting treatment recommendations:	
4.1.2	N/a

Responses:	
Designer	We agree with CAT that "On Left" supplementary sign is not included in TCD manual. However, it should be noted that none of the regulatory signs in TCD manual, Part 4 (Table 8-1), effectively convey the proposed condition. Considering that installing W16-2 is mandatory we still recommend retaining "On Left" supplementary sign in the design for better communication and clarity.

	We will ensure the other signs and markings comply with the TCD Manual.
Safety Engineer	Agree with CAT and Designer. However, the proposed configuration should be discussed with Waka Kotahi.
Proposed action	Agree with safety engineer – to check with Waka Kotahi
Client decision	Agree with proposed action
Action taken	

4.2 Missing speed limit return signage – M

Minor

A 50 km/h speed limit sign is missing from the western leg of Kemp St (see Figure 4-3). The safety issue is some drivers will be unaware they are driving reasonably slower than the posted speed limit.

The crash type/s expected is rear-end crashes.

The risk factors are volumes of motor vehicles and speed of motor vehicles.

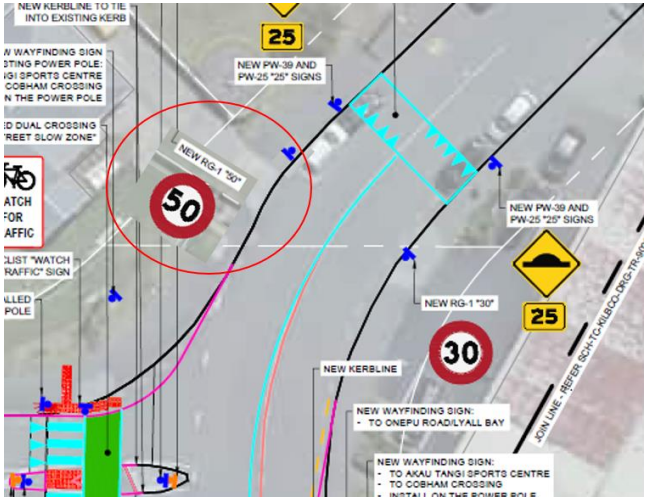


Figure 4-3: Circled 50km/h sign missing within drawing

Probability of crash occurring	Very unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
4.2.1	Install missing speed limit sign
Supporting treatment recommendations:	
4.2.2	N/a

Responses:	
Designer	We agree with CAT recommendation and will include the missing sign.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

4.3 Angled parking without buffer – C E M

Minor

90-degree angled parking along Tacy Street has been provided a buffer between the parking and shared lane but further along the 60-degree parking has not been provided a buffer (see Figure 4-4). The CNG table in Figure 4-5 summarises desirable clear space.

The safety issue is that no space is provided between the angled parking and shared lane.

The crash type/s expected is motor vehicles reversing into cyclists or other drivers.

The risk factors are angle of parks, volume of cyclists, time restriction of parking areas and speed of cyclists.

Figure 4-4: Angled parking being retained without buffer to the road

Table: Cycle lane clearance from angle parking

	Clear space between parked vehicles and cycle lanes (m)		
Parking Angle	45	60	90
Desirable Minimum	2.0	2.5	3.0
Minimum	1.5	2.0	2.5[3]

Figure 4-5: CNG table for clear space from parking

Probability of crash occurring	Unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
4.3.1	Provide buffer between parking and shared lane
Supporting treatment recommendations:	
4.3.2	Install sharrows further away from the edge of the shared lane to advise cyclists to not travel along the edge

Responses:	
Designer	We agree with CAT recommendation. A buffer will be implemented between the 60-degree parking spaces and the shared lane, however, due to the road width , it will still not comply with the standards outlined in the CNG table. Sharrow marking will be placed according to new edge line marking.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer
Client decision	Agree with proposed action
Action taken	

4.4 Crossing point at Kemp Street intersection – P C E M

The pedestrians using the crossing across Kemp Street (Figure 4-6) only have a crossing point whereas all the other crossings in the area are prioritised pedestrian crossing points.

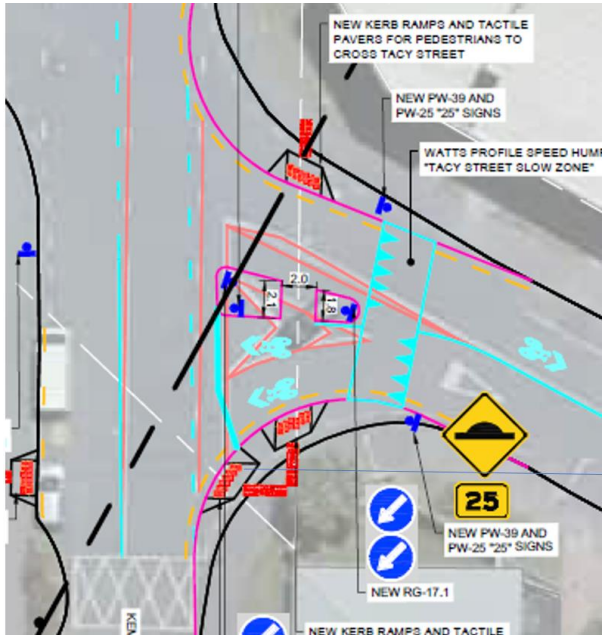


Figure 4-6: Kemp Street crossing point

Comment	
Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
4.4.1	Consider installation of a pedestrian crossing / dual crossing
Supporting treatment recommendations:	
4.4.2	

Responses:	
Designer	Adding a pedestrian / dual crossing is outside the current project scope. We recommend the client considers the most appropriate way to address this finding.
Safety Engineer	Agree with CAT and Designer. Safer pedestrian/cyclist behaviour requires consistent treatment. This should be revisited.

Proposed action	This is outside the current scope of the project and will be handed over to the transformational team to consider when making the transitional changes permanent.
Client decision	Agree with proposed action
Action taken	

4.5 Sharrow marking at Kemp Street Intersection – C M

Installation of dual Sharrows within one lane so close to the limit line is confusing. At a roundabout approach only one Sharrow is installed even though cyclists can turn in any direction.

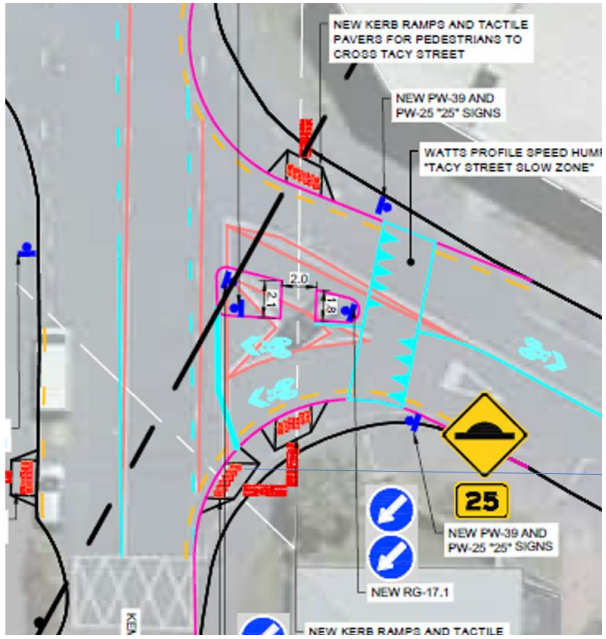


Figure 4-7: Kemp Street Intersection

Comment

Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
4.5.1	Consider installation of only a central single Sharrow
Supporting treatment recommendations:	
4.5.2	

Responses:	
Designer	We agree with CAT recommendation and will implement 4.5.1.

Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

5 CASA findings – Coutts Street

5.1 Extending broken yellow lines – C E M

A parking space near Te Whiti Street is proposed for removal (Figure 5-1). Like other locations where existing parks are to be removed, installation of broken yellow lines (BYL) highlights the removal of parking.

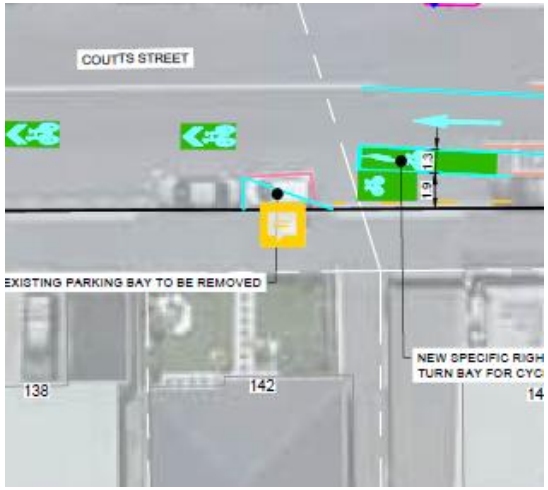


Figure 5-1: 142 Coutts Street parking removed

Comment	
Probability of crash occurring	N/A
Expected crash severity	N/A
Primary treatment recommendations:	
5.1.1	Install BYL
Supporting treatment recommendations:	
5.1.2	N/a

Responses:	
Designer	We agree with CAT recommendation.
Safety Engineer	Agree with CAT and Designer response.
Proposed action	Agree with CAT and Designer – follow recommendation.
Client decision	Agree with proposed action
Action taken	

5.2 End of traffic lane treatment – P C E M — Minor

Despite the installation of a new median island (Figure 5-2), there is still room for a motor vehicle to get past.

The safety issue is motor vehicles can illegally continue past the end of traffic lane.

The crash type/s expected is motor vehicles hitting cyclists.

The risk factors are proposed gap allowing vehicles to continue past the median island.

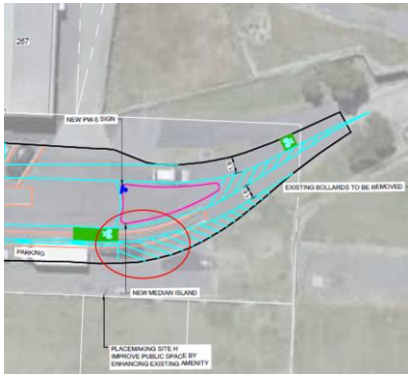


Figure 5-2: Proposed median island treatment with gap >2m circled

Figure 5-3: Christchurch pop-up example of closing road to vehicles only

Probability of crash occurring	Very unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
5.2.1	Install a physical barrier on the southern side to block all vehicles trafficking through (e.g. Figure 5-3)
Supporting treatment recommendations:	
5.2.2	Provide signage informing vehicles that road has ended.
5.2.3	Install flexi posts to deter users from driving through.

Responses:	
Designer	We agree with this finding. Following discussion with WCC we have agreed to use planter boxes in order to restrict vehicular access to the area. Furthermore, two chevron board signs will be installed to clearly indicate the termination of the roadway for vehicles. This will be updated on the TR design.
Safety Engineer	Agree with CAT and Designer response.
Proposed action	Agree and planter boxes to be used.
Client decision	Agree with proposed action
Action taken	

6 CASA findings – Ākau Tangi

6.1 Shared path width C E P

Moderate

The safety issue is the width of the proposed shared path (Figure 6-1) at 3.0 m is too narrow.

The crash type expected is pedestrian and cyclists.

The risk factors include users from Ākau Tangi Stadium, volume of pedestrians and volume of cyclists.

The CNG provides information regarding both Cycle-only paths and Shared Paths.

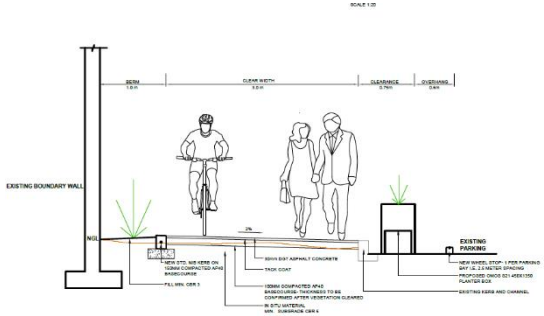


Figure *6-1*: ***Proposed shared path width***

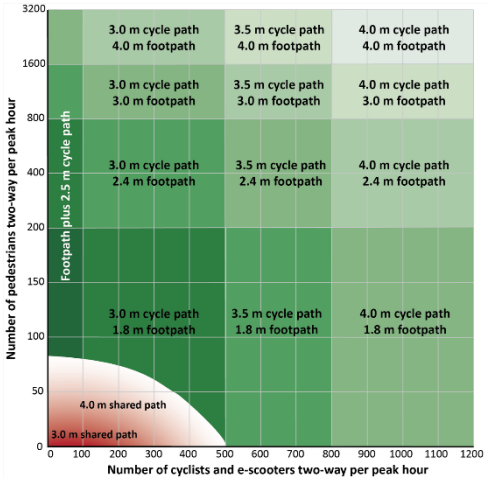


Figure 6-2*: *CNG draft update to Austroads 6A-Figure 5.4

Probability of crash occurring	Likely
Expected crash severity	Minor injury
Primary treatment recommendations:	
6.1.1	N/a
Supporting treatment recommendations:	
6.1.2	Increase width of shared path
6.1.3	Provide directional separation

Responses:	
Designer	3m complies with minimum widths for local access shared paths specified in Austroads Part 6A Table 5.3 (Waka Kotahi standard for shared path widths).
Safety Engineer	Agree with Designer response.
Proposed action	Agree with CAT and the Designer. No action required

Client decision	Agree with proposed action
Action taken	

6.2 Non-compliant crossing – C E P Serious

The safety issue is the crossing has just been drawn to fit into the car park (Figure 6-3), irrespective of best practice requirements.

The crash type expected is pedestrians and cyclists.

The risk factors include poor visibility, no lighting, no signage, incorrect road marking, and incorrect use of TGSI.

Relevant standards are TCD manual – Pedestrian crossings (Zebra) and Pedestrian network guidance – *Zebra crossing*. Both help to discuss all the design requirements of a pedestrian crossing.

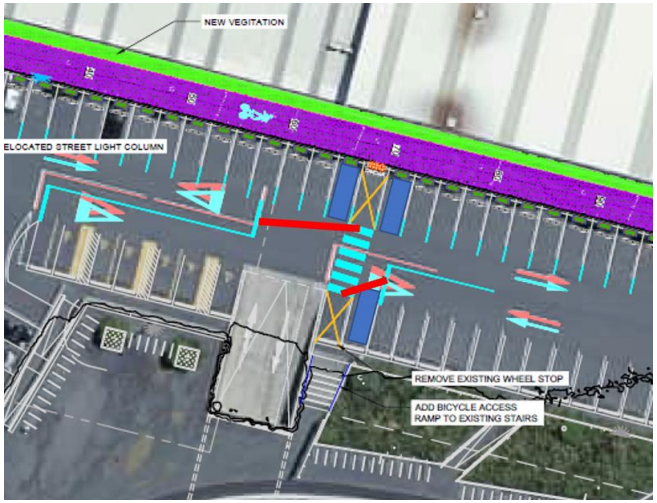


Figure 6-3: Diagram showing parked cars blocking visibility of pedestrians

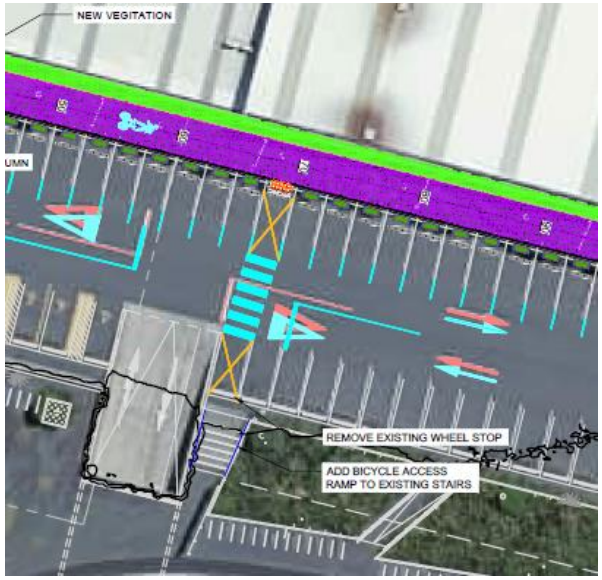
Probability of crash occurring	Very likely
Expected crash severity	Serious injury
Primary treatment recommendations:	
6.2.1	Remove crossing point
6.2.2	Provide all required accompanying infrastructure for pedestrian crossings.
Supporting treatment recommendations:	
6.2.3	Reduce speed of carpark and turn into shared zone
6.2.4	Install the crossing on a raised safety platform

Responses:	
Designer	During design meetings with WCC, it was agreed that the standards outlined in the TCD Manual and Waka Kotahi Pedestrian Network Guidance do not strictly need to be adhered to since the crossing is not on a legal road. However, there are several safety features incorporated into the design which will ensure the safe operation of the crossing including: • Removal of 4 parking spaces to improve sight lines. • Provision of road markings. • Provision of TGSI. • Judder bars on the approach to the crossing. • Existing lighting within the car park. • Reduced speed limit signs and roundel markings within the car park
Safety Engineer	Agree with Designer response. Behaviour should be monitored. If there is an issue consider further mitigation.
Proposed action	Agree with Designer and Safety Engineer responses. Behaviour will be monitored, and further mitigation considered if necessary
Client decision	Agree with proposed action
Action taken	

6.3 Cycling crossing facility within car park – C E P Serious

The safety issue is no cycle crossing provided from shared path through the car park (see Figure 6-4).

Probability of crash occurring	Likely
Expected crash severity	Serious injury
Primary treatment recommendations:	
6.3.1	Provide compliant dual cycle / zebra crossing
Supporting treatment recommendations:	

The crash type expected is pedestrians and cyclists. The risk factors include volume of cyclists and pedestrians. Waka Kotahi Cycling network guidance provides guidance on minimum widths required for dual cycle / zebra crossing markings.  *Figure 6-4: Crossing facility in car park*	6.3.2	Install crossing on a raised safety platform.

Responses:	
Designer	As agreed with WCC the intention is for cyclists to dismount and cross the pedestrian crossing, since the crossing starts/ends at stairs cyclists will not need to cycle across the parking.
Safety Engineer	Agree with Designer response. Behaviour should be monitored. If this is an issue consider further mitigation.
Proposed action	Agree with Designer and Safety Engineer responses. Include cyclists dismount signs in the design. Behaviour will be monitored, and further mitigation considered if necessary
Client decision	Agree with proposed action
Action taken	

6.4 Gradient of path from Tacy Street – P C E Moderate

The safety issue is steep gradient of Tacy Street

The crash type/s expected are pedestrian and cyclist crashes, including cyclists entering the roadway.

The risk factors are gradient of path, width of path, volume of pedestrians and cyclists, and the area of stopping place.

The relevant guidance is CNG draft guidance, which states maximum gradients (up to 10m) and downhill gradients for interested but concerned riders is 8%. With a note stating “the maximum downhill gradient is applicable only if cycleway is to be ridden in the downhill direction only.

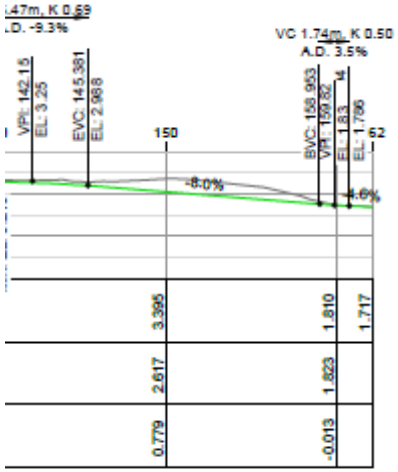


Figure 6-5: Indicative elevation along Tacy Street

Probability of crash occurring	Likely
Expected crash severity	Minor injury
Primary treatment recommendations:	
6.4.1	Decrease gradient to less <6%
6.4.2	Provide alternative uphill and downhill routes
Supporting treatment recommendations:	
6.4.3	Provide more area at bottom of downhill

Responses:	
Designer	The 8% grade is limited to a section of circa 14m, which is marginally longer than the minimum requirement. Reducing the grade further will cause issues with levels at the existing kerb tie in and will increase the depth of the embankment which we have tried to minimise to avoid the need for retaining infrastructure. The limited available space does not lend itself to alternative routes or additional landing space as recommended (6.4.2 and 6.4.3). We propose to add bollards at both ends of the path which will reduce speeds and prevent vehicles from accessing the path.
Safety Engineer	Agree with Designer response.
Proposed action	Agree with Designer and Safety Engineer responses, however make sure to install bollards at the edges of the path and not in the path.
Client decision	Agree with proposed action
Action taken	

6.5 Tacy Street footpath width – P C E

Minor

The safety issue is that the footpath is only wide enough for one user (see Figure 6-6). It is acknowledged that there is an existing utility box that cannot be relocated but apart from this localised constriction, the rest of the pathway should be provided at an appropriate width.

The crash type/s expected are pedestrian and cyclist crashes, including pedestrians walking onto the road being struck by motor vehicles.

The risk factors are volume of pedestrians and volume of cyclists, visibility of shared path and speed of cyclists.

The relevant standards are PNG footpath width discusses an absolute minimum of 1.5m for a through route, with 1.8 m minimum generally preferred.

Probability of crash occurring	Unlikely
Expected crash severity	Minor injury
Primary treatment recommendations:	
6.5.1	Install a compliant footpath width
Supporting treatment recommendations:	
6.5.2	N/a

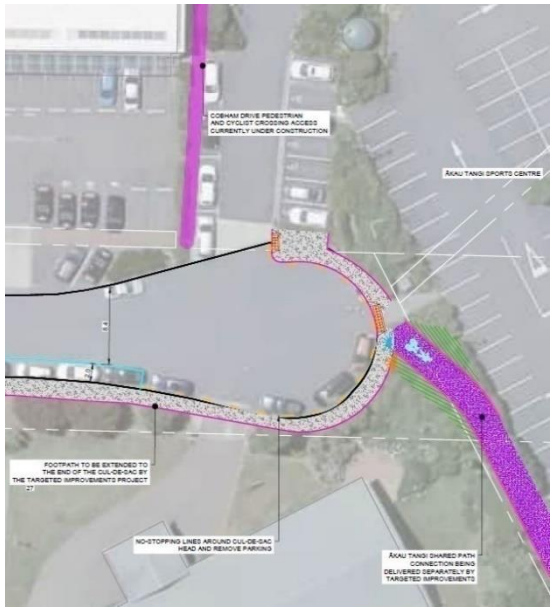


Figure 6-6: Diagram showing proposed footpath

Responses:	
Designer	Footpath will be 1.5m as far as possible. Narrower sections will only be used if existing services or trees cannot be moved.
Safety Engineer	Agree with Designer. The extent of less than 1.5m should be reported back in the final design for confirmation by the Safety Engineer and Client.
Proposed action	Agree with Designer and Safety Engineer responses. The extent of less than 1.5m should be reported back in the final design for confirmation by the Safety Engineer and Client.
Client decision	Agree with proposed action
Action taken	

6.6 Speed limit throughout Ākau Tangi sports centre car park – P C E M Serious

The safety issue is that the speed limit through the car park (currently 50 km/h) exceeds the human tolerance for surviving crashes.

The crash type/s expected is motor vehicles striking pedestrians and cyclists.

The risk factors are speed limit, volume of vehicles, volume of pedestrians and cyclists, visibility, and space between vehicles.

The relevant guidance is Setting of speed limits 2022 Rule and Waka Kotahi PNG Safe system design.

The Setting of speed limits 2022 Rule allows for entities like Ākau Tangi sports centre as a road controlling authority to have legal speed limits entered into the National speed limit register and be enforceable by New Zealand Police.

Probability of crash occurring	Likely
Expected crash severity	Serious injury
Primary treatment recommendations:	
6.6.1	Reduce speed limit to <30km/h where vulnerable users are present
Supporting treatment recommendations:	
6.6.2	Provide traffic calming devices throughout carpark to reduce speeds

Responses:	
Designer	Speed limits (or associated signage) in private car parks are not usually formalised. We will propose signage or road markings to implement a lower speed limit to the centre management and implement accordingly. We will also propose including bolt down speed humps (Judderbars) at the zebra crossing.
Safety Engineer	Agree with CAT and Designer.
Proposed action	Agree with CAT and Designer.
Client decision	Agree with proposed action
Action taken	

7 Audit statement

We certify that we have used the available plans, and have examined the specified roads and their environment, to identify features of the project we have been asked to look at that could be changed, removed or modified to improve safety.

The safety issues identified and noted in this report are summarised in Table 7-1.

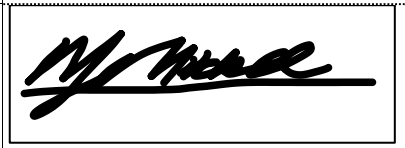
Table 7-1: Summary of Issues

Serious	*Significant*	*Moderate*	*Minor*	*Comments*	*Total*
4	*2*	*2*	*10*	*9*	*27*

Issue	*Ranking*
2.1 Driveway treatments	Comment
2.2 Way-finding signage location	Comment
2.3 Way-finding information	Minor
2.4 Spacing of traffic control devices for quick build cycleways	Significant
2.5 Full width ramps at bus stop platforms	Minor
2.6 Tactile ground surface indicators at dual crossings	Comment
3.1 Location of proposed median island	Comment
3.2 Bus Stop 6327 platform	Comment
3.3 Visibility from driveways and minor roads due to new parking location	Minor
3.4 Location of 30km/h road marking at Coutts Street slip lane	Significant
3.5 Rumble Strips in shoulder bar	Serious
3.6 Missing Advance warning diamond	Minor
3.7 Visibility from Endeavour Street due to new bus stop location	Minor
3.8 Advanced stop boxes for cyclists	Minor

4.1 Non-standard signage	Comment
4.2 Missing speed limit return signage	Minor
4.3 Angled parking without buffer	Minor
4.4 Crossing point at Kemp Street intersection	Comment
4.5 Sharrow marking at Kemp Street Intersection	Comment
5.1 Extending broken yellow lines	Comment
5.2 End of traffic lane treatment	Minor
6.1 Shared path width	Moderate
6.2 Non-compliant crossing	Serious
6.3 Cycling crossing facility within car park	Serious
6.4 Gradient of path from Tacy Street	Moderate
6.5 Tacy Street footpath width	Minor
6.6 Speed limit throughout Ākau Tangi sports centre car park	Serious

Document Signoff:

Designer:	Billy Rodenburg	Position	Transport Engineer
Signature		Date	27/01/2023
Safety Engineer:	Dennis Davis	Position	Principal Transport Engineer, WCC
Signature		Date	27/01/23
Project Team:	Nicola Mitchell	Position	Project Manager
Signature		Date	2/02/23
Client Approval:	Brad Singh	Position	Manager – Transport & Infrastructure
Signature		Date	17/02/2023
Project Manager - action completed:		Position	
Signature		Date	
Audit report distributed on:		Date	