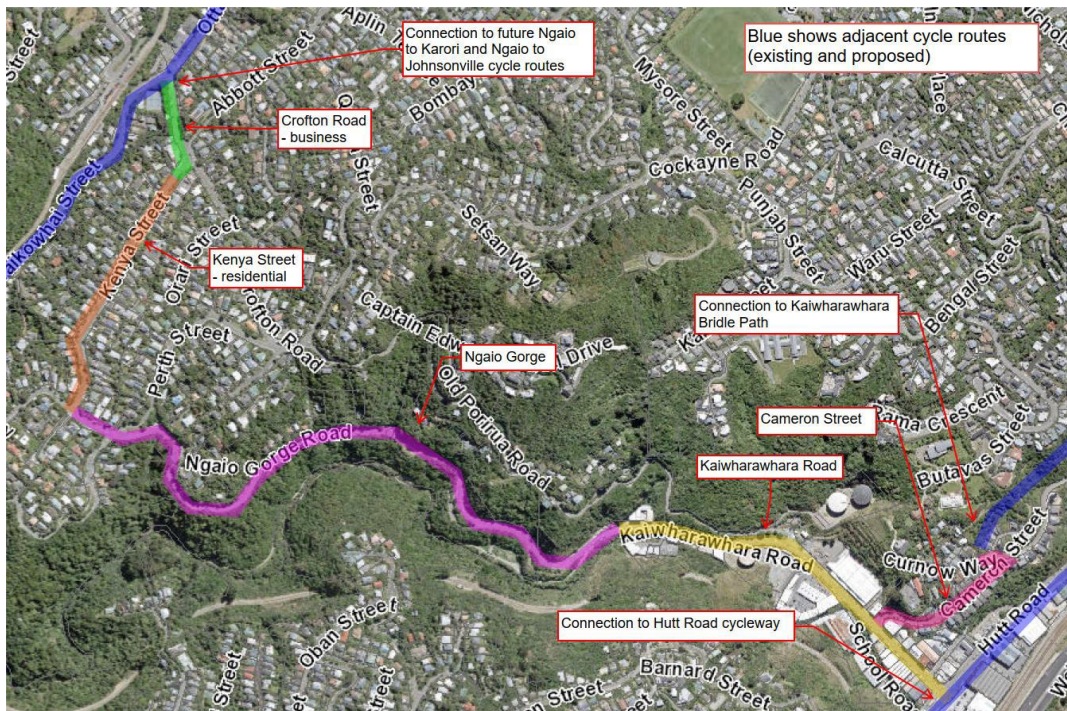


# Ngaio cycleway audit - safety and accessibility

90% design audit



Report prepared for

**Paneke Pōneke**  
 Bike network plan

**Absolutely Positively**  
**Wellington City Council**  
 Me Heke Ki Pōneke

September 2022



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## 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).





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# 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 guidelines

This CASA is for the 90% design stage of Wellington Transitional Cycleways, Ngaio Gorge section.

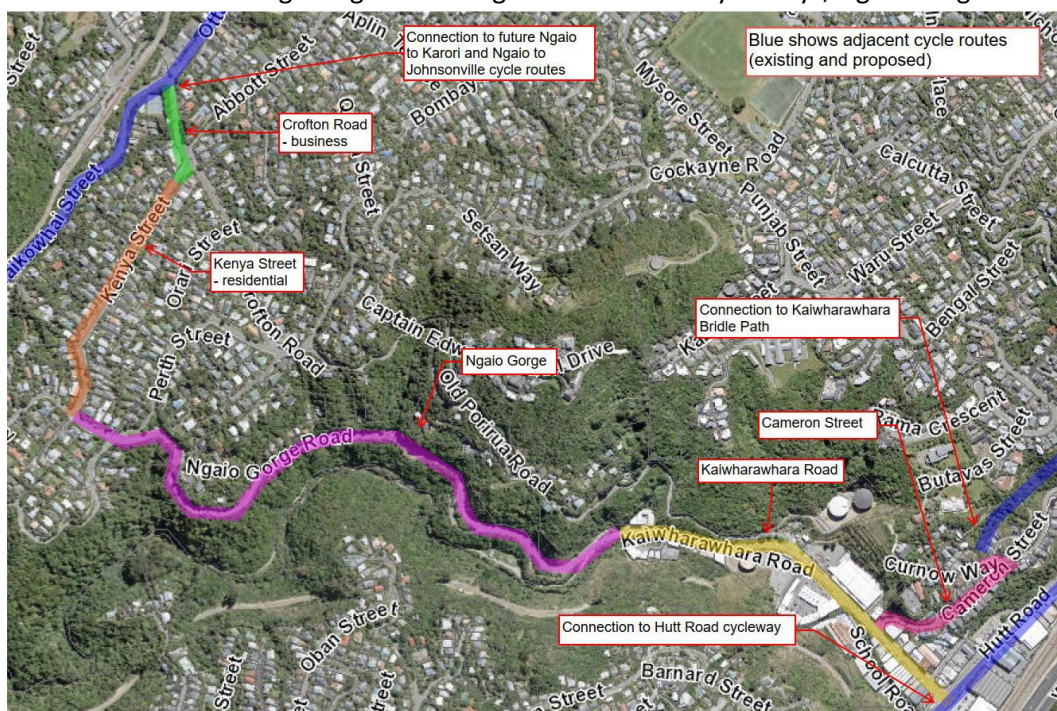


Figure 1-1: Extent of audit

The Ngaio Transitional Cycleway extends 2.7 kilometres along Kaiwharawhara Road, Ngaio Gorge Road, Kenya Street and Crofton Road between the Hutt Road Cycleway (providing a connection to Ngauranga and Thorndon) and Ngaio. It also includes a connection to the Kaiwharawhara Bridle Path via Cameron Street. This corridor is also a bus route.

The transitional Cycleway programme uses interim installations to provide a ‘first cut’ of the whole route by using lower-cost materials that can be adjusted once they are in place. Once installed, the Council gathers feedback via consultation on the changes and can make improvements to things such as signs, street markings, parking and the position of dividers between the bike lanes and traffic.

For this audit, the Ngaio Transitional project has been divided into five sections to reflect the differences in road layout, gradient, character and design along the route. These five sub areas are:

- Kaiwharawhara Road, busy, straight, flat, wide open urban environment with bus stops and on street parking
- Cameron Street, a narrow, steep, winding side road off Kaiwharawhara Road providing access to the Kaiwharawhara Bridle Path.
- Ngaio Gorge, long winding, steep, busy, technical skinny road
- Kenya Street, winding, steep, busy residential street with residents parking on both sides



- Crofton Road, short busy commercial road with lots of on street parking

The proposed treatment for the Ngaio route, whilst being an improvement on the existing situation, is only expected to attract cyclists of the “strong and fearless” or “enthused and confident” categories (according to the Geller classification). This was detailed in the 30% audit and confirmed by the designer and client. This is considered acceptable given the difficulty of providing a temporary treatment on a route with challenging space availability and topography, but a permanent solution in the future should aim to provide more separation from motor traffic to attract a wider cycling audience.

## 1.2 The cycleway audit team

The CASA was carried out in accordance with the [NZTA Road Safety Audit Procedure for Projects Guidelines - Interim release May 2013](#), by the Cycleway Audit Team (CAT) consisting of:

- David McCormick, a cycleway audit team leader, of ViaStrada Ltd
- Axel Wilke, Glen Koorey, and Nick Reid all cycleway audit team members, of ViaStrada Ltd
- John Lieswyn, a cycleway audit team member, of ViaStrada Ltd (and the project manager)

## 1.3 Meetings and site visits

Members of the CAT team and the client team had an online meeting to discuss the CASA scope and project locations on 18 July 2022. John Lieswyn, the CASA project manager, and client liaison, met at The Terrace to review the drawings on 28 July 2022 with Wellington City Council client staff.

The daytime site visit was undertaken on Friday 29 July 2022 from 10:15am to 12:30pm and from 2:00pm to 3:00pm. A night-time site visit was not undertaken. An exit meeting was not held, initial CAT observations were provided to the Wellington City Council project manager on 4 August 2022.

## 1.4 The project team

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. The client decision and action taken against the safety issues will also be recorded. The following people are identified for these roles (Table 1.4-a).

**Table 1.4-a: project team members relevant to this audit**

Role	Name	Organisation
Designer response	B Rodenburg	StepChange
Safety engineer	Dennis Davis	Wellington City Council
Client decision	Jonathan Kennett	Wellington City Council
Action taken by	Transitional Cycleways Team	Wellington City Council

## 1.5 Design vehicles

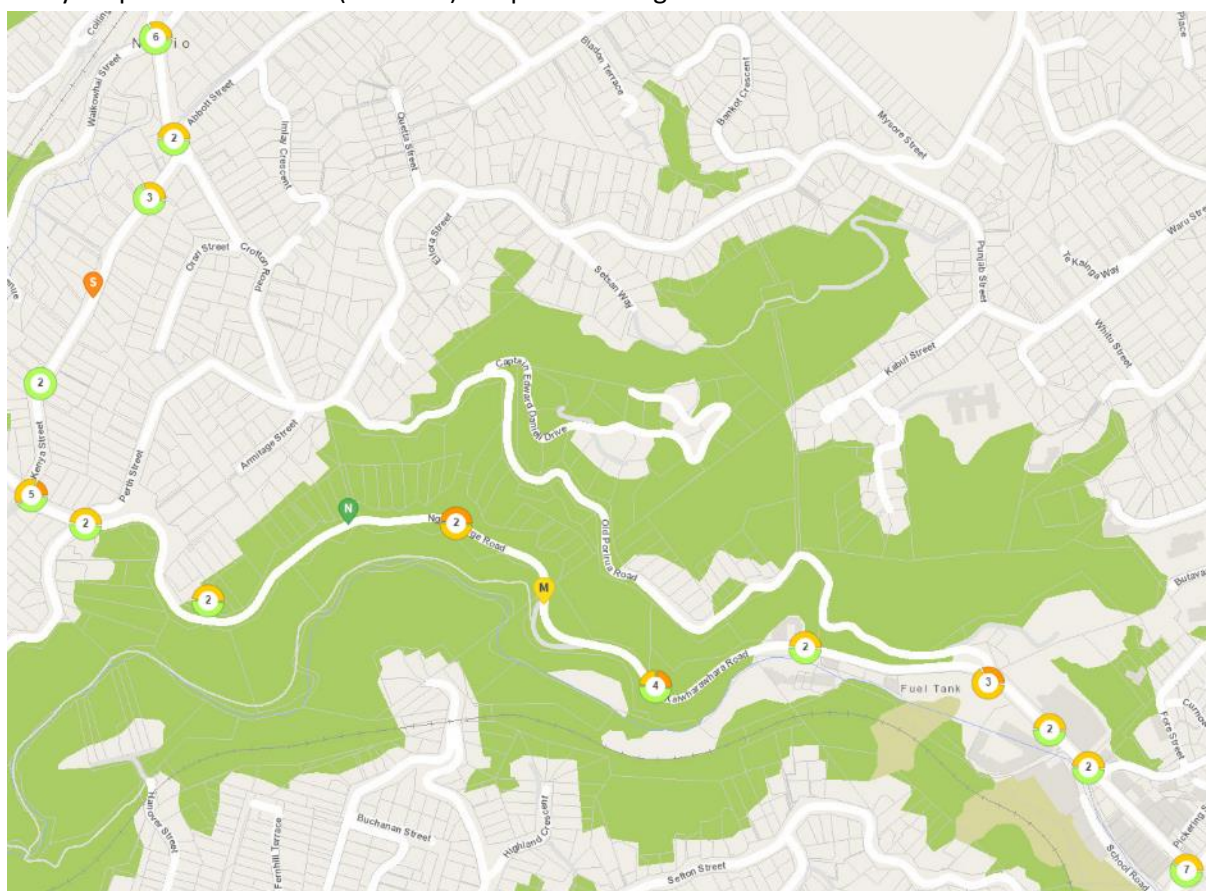
For intersections, Austroads *Guide to Road Design Part 4: Intersections and Crossings: General* (AGR4, 2009) describes a design vehicle as the largest vehicle that can perform any particular turning movement from the appropriate approach lane to the appropriate departure lane with adequate clearances to features such as kerbs and roadside furniture. However, in the context of Wellington’s hills streets, it is normal practice for large vehicles to use some part of the opposing traffic lane to make tight turns on narrow roads.

The design vehicles are:

- 12.6 m Bus (2007 LTSA RTS 18 Tour Coach) for Kaiwharawhara Road, Ngaio Gorge Road and Crofton Road
- 8 m rigid truck for the intersection of Kaiwharawhara Road and Cameron Street
- E-scooters, e-bikes, e-cargo bikes and standard bicycles ridden by people of the “strong and fearless” or “enthused and confident” categories (according to the Geller classification)

## 1.6 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 (including but not limited to those involving cyclists), from CAS over the five-year period 2017-2022 (inclusive) are plotted in Figure 1-2.



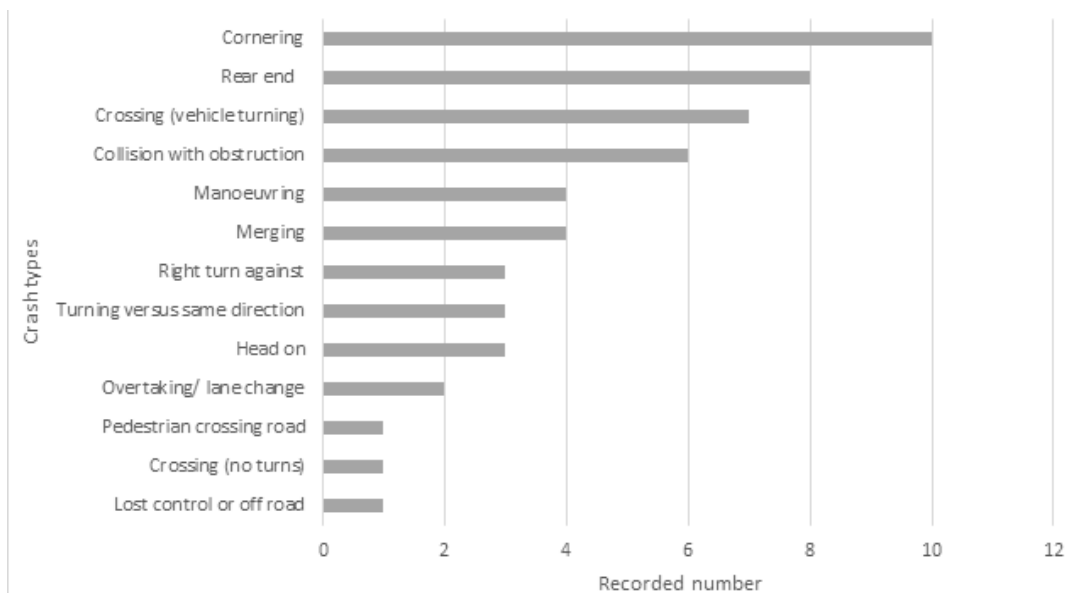
**Figure 1-2: all crashes reported in the proposed Ngaio corridor**

A total of 47 crashes were reported along the proposed Ngaio project corridor over the five-year period. Five of these were serious (four involving cyclists), 22 minor (six involving cyclists) and 26 noninjury (all involving motor vehicles). Of those involving cyclists, two were at the Hutt Road intersection (both causing minor injury), two more were at the intersection with Old Porirua Road (one serious and minor injury), two occurred between this intersection and Trelissick Crescent (both causing serious injury), one at the western Trelissick Crescent intersection (causing serious injury) and one at the Waikowhai Street roundabout (causing minor injury).

Crashes are slightly clustered near Hutt Road, at Trelissick Crescent intersections, and the Waikowhai Street roundabout. While there are clustered no predominant crash pattern or black spots present



aside from typical intersection crash issues. All crash factors by group are presented in Figure 1-3. Each crash may have several factors thus there are more factors at play than just the number of crashes.

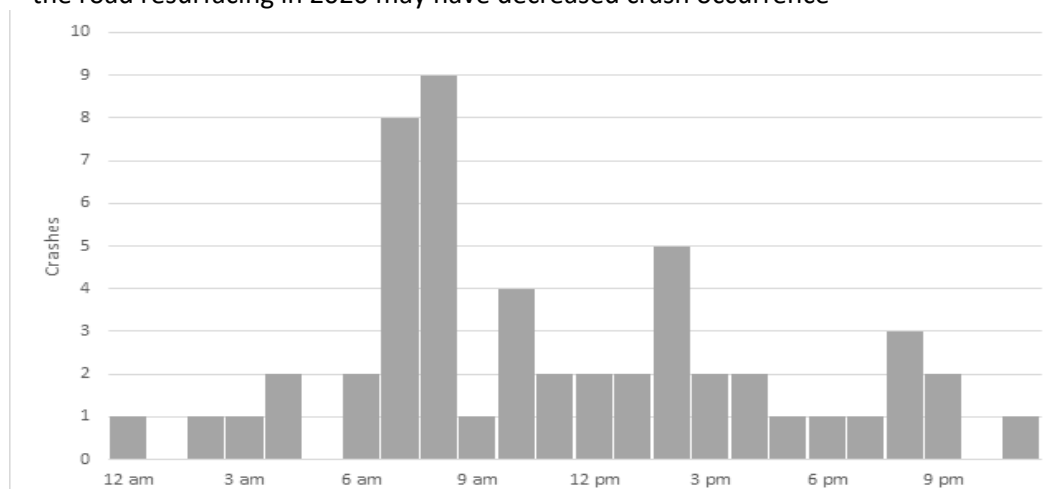


**Figure 1-3: reported crash factors (grouped)**

The top four crash factors (cornering, rear end, crossing (vehicles turning), collision with obstruction) all point to the constricting alignment of the road. Given the lack of alternative options for alignment and the nature of the corridor this is an unavoidable risk that should be addressed through design.

There are clusters of crashes at all intersections along the corridor. The clusters at the western Trelissick Crescent intersection, Waikowhai Street roundabout and Hutt Road are particularly notable. Appendix A of the 30% design audit provided more information. In addition to these crash factors, the data show some common trends:

- crashes most commonly on Tuesday, Wednesday and Friday
- crashes peak with some traffic volume peaks (Figure 1-4)
- crashes resulting in serious injury often involved cyclists
- crashes were more frequent in winter
- the road resurfacing in 2020 may have decreased crash occurrence



**Figure 1-4: crashes over time of day**





## 1.7 Project information

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

**Table 1.7-a: Documents reviewed**

Document	Date	Description
90% Design SCH-TC-NGAIOT-DRG-TR-COMBINED_Optimized	12/09/2022	Ngaio Transitional Cycleway 90% design plans
DRAFT-Transitional Cycleways Ngaio Design Decisions Report 9 Sept 2022	12/09/2022	for background information only

## 1.8 Items not covered

This 90% Ngaio CASA does not cover the aspects of sharrows. Alternative conversations are being had between ViaStrada and WCC about sharrows. Until plans are provided that are agreeable by all parties, sharrows are excluded from the report.

## 1.9 Audit procedure

The audit follows the NZ Transport Agency Road Safety Audit procedures for projects. The expected crash frequency is qualitatively assessed based on expected exposure (how many road users will be exposed to a safety issue) and the likelihood of a crash resulting from the presence of the issue. The severity of a crash outcome is qualitatively assessed based on factors such as expected speeds, type of collision, and type of vehicle/object involved. The audited facility caters for pedestrians and cyclists who are “vulnerable road users” with a higher likelihood of death or serious injury if involved in a conflict with a motor vehicle.

The frequency and severity ratings are used together to develop a combined qualitative risk ranking for each safety issue using the NZTA Concern Assessment Rating Matrix in Table 1.9-a. The qualitative assessment requires professional judgement and experience from a wide range of projects of varying sizes and locations.

**Table 1.9-a: Severity rating matrix**

Likelihood of death or serious injury	Frequency (probability of a crash)			
	Frequent	Common	Occasional	Infrequent
Very likely	Serious	Serious	Significant	Moderate
Likely	Serious	Significant	Moderate	Moderate
Unlikely	Significant	Moderate	Minor	Minor
Very unlikely	Moderate	Minor	Minor	Minor

It should be noted that the severity rating assigned to the likelihood assigned to ‘Death or Serious Injury’ is often “Likely” or “Very likely” because crashes between non-motorised users and motor vehicles often result in serious injury or fatality.

The ranking of the frequency of crashes has been assessed in accordance with Table 1.9-b.



**Table 1.9-b: Indicative crash frequency**

Crash Frequency	Indicative description
Frequent	Multiple crashes (more than 1 per year)
Common	1 every 1 – 5 years
Occasional	1 every 5 – 10 years
Infrequent	Less than 1 every 10 years

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 1.9-c.

**Table 1.9-c: 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.

We invite our clients to suggest changes for our consideration as part of a client review process. Our preference for this is to use the track changes function of the editing software. We do not consent to any changes, however small they may appear, to be made to any of our writings in the main audit section of our report. This restriction includes our CAT responses.














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



### 1.10 Audit report format

The following section(s) of this report detail the issues identified in the audit. The severity rating of each issue (see explanation in section 1.9) is included to the right of the issue heading. The issue headings also include letters to denote the main user groups affected, plus icons to denote possible sub-groups:

**Table 1.10: 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	Enthusied & 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 3 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

### 2.1 Kaiwharawhara Road part time cycleway – **C** Moderate

	Probability of crash occurring	Infrequent
	Likelihood of serious / fatal injury	Likely

Kaiwharawhara Road is proposed to have the transitional cycleway completed over three stages, these three stages involve different level of implementation. Stage 1 restricts parking on the Ngaio bound lane during the evening peak. Outside of the evening peak the cyclists are expected to travel along the traffic lane, popping in and out of where the parking lane is occupied. The CASA does not believe this is a safe option and suggests not completing stage 1 and 2 of the implementation stages. Once able to complete Stage 3 as per the decisions report, then it is safe to do so. Cyclists travelling outside of the hours of 4-7pm will experience an unpleasant feeling of being in between the parking lane and traffic lane. The southern side of Figure 2-1 shows the shared bus lane.

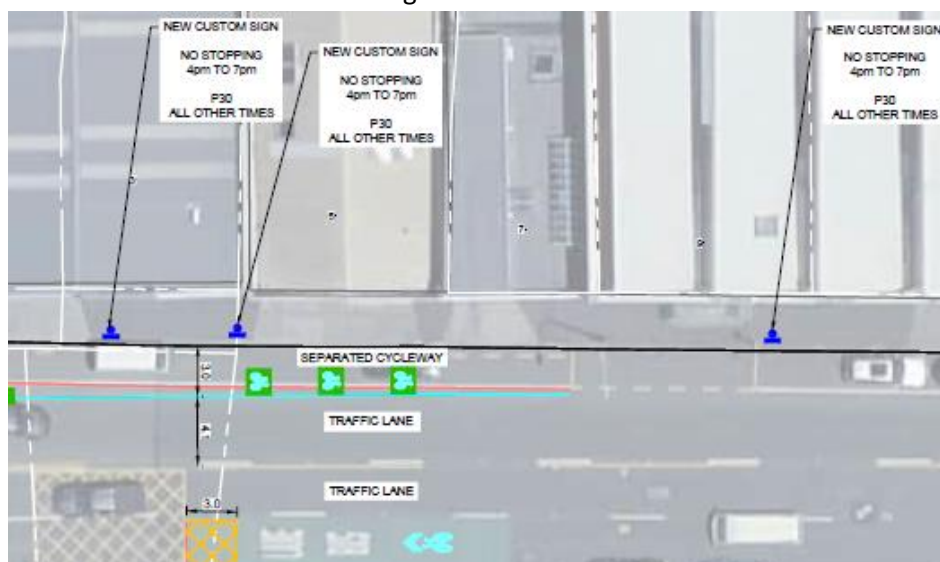


Figure 2-1: Plan showing proposed off peak parking lane and peak time cycle way

#### Recommendations

2.1.1	Consider proceeding directly to stage 3
2.1.2	Provide either full time cycling facility or full-time parking facility. Do not mix both treatments.

#### Responses

<b>Designer</b>	Staging has been directed by WCC in response to community engagement for the project. While we agree with the CAT that Stage 3 provides the best safety improvements for cyclists, we also consider that Stages 1 and 2 provide safety improvements over the existing situation.
<b>Safety Engineer</b>	Agree with Designer. Monitor behaviour outside of pm peak and modify as necessary.
<b>Client</b>	Agree with designer. Stages 1 and 2 are an improvement.
<b>Action</b>	Continue with staged approach and add to monitoring plan.

## 2.2 Kaiwharawhara Road part time shared lane– **C** Moderate

	Probability of crash occurring	Infrequent
	Likelihood of serious / fatal injury	Likely

Similarly to 2.1, the shared bike / bus lane during peak hours does not align with CNG and other guidance. CNG states “Wide bus lanes can be part time, ie allow parking during non-bus lane hours. Narrow bus lanes must be permanent (ie no parking), because when parking were to be permitted, people on bikes would be forced to ride within the door opening zone. Best practice in NZ is that bus lanes should be either: wide enough for cyclists to ride adjacent to buses, 4.2 m or wider, narrow enough that cyclists and buses must travel in single file, 3.2 m or narrower.” Plans show a part-time bus lane <3.2m with parking during off-peak periods – this is not safe for cycling then.

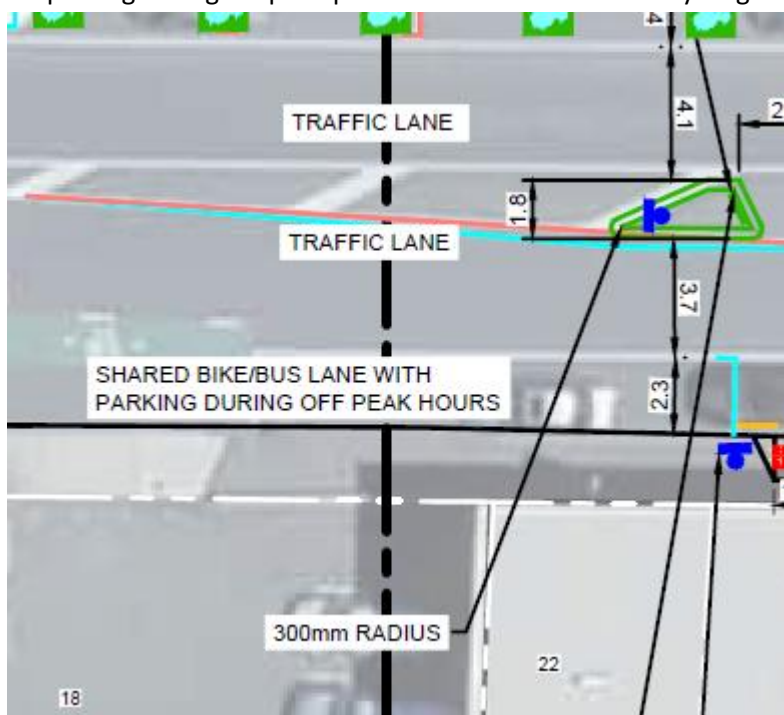


Figure 2-2: Plan showing proposed 2.3m wide shared bus / bike lane and off peak parking lane

### Recommendations

2.2.1	Not implement stages 1 and 2 due to increased risk for cyclists. Implement only stage 3
2.2.2	Increase lane width to allow for parking and cycle facility in off peak hours

### Responses

<b>Designer</b>	<p>For Recommendation 2.2.1 refer to response to Finding 2.1</p> <p>The design shows the existing bus lane markings generally being retained for Stage 1 prior to the shared bike/bus lane being increased to 4.2m wide during Stage 3. There is insufficient width to provide this 4.2m width in Stage 1 due to off-peak parking remaining on the south side of Kaiwharawhara Road. The pedestrian refuge at Cameron Street also constrains lane widths.</p>
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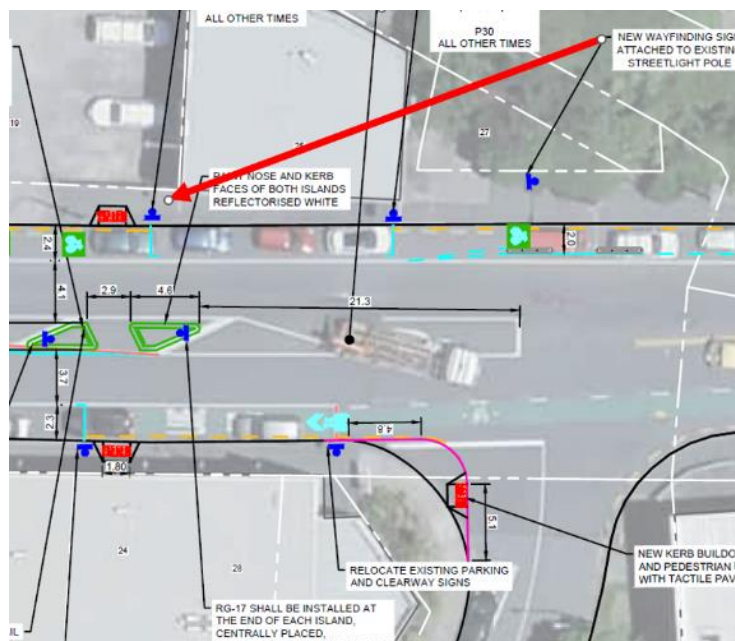
	Given these constraints the length of lane less than 3.0m that could be widened to 3.2m in Stage 1 is around 70m outside 36 Kaiwharawhara Road (current shared bus/bike lane width is 2.6m). We feel this provides limited gains while introducing additional ghost markings, and recommend it is delayed until Stage 3 or when the road is resealed.
<b>Safety Engineer</b>	Agree with Designer. Monitor behaviour outside of pm peak and modify as necessary.
<b>Client</b>	Agree with designer
<b>Action</b>	Continue with staged approach and add to monitoring plan.

### 2.3 Cameron Street wayfinding – P C Comment



Probability of crash occurring	N/A
Likelihood of serious / fatal injury	N/A

New wayfinding signage is proposed to be installed at Kaiwharawhara Road and Cameron Street intersection. Signage is proposed at the top of the intersection; a crossing point has been provided on the approach to the intersection and the CASA believes the wayfinding needs to be provided at crossing point. Cyclists using Cameron Street and following wayfinding signage are required to use the turning bay.



**Figure 2-3: Plan showing proposed extra location for wayfinding signage**

#### Recommendations

2.3.1 Provide wayfinding at the proposed crossing along Kaiwharawhara road.

#### Responses

**Designer** Agree with the CAT recommendation. This also aligns with other feedback received for the 90% design reviews.



<b>Safety Engineer</b>	Agree with CAT and Designer.
<b>Client</b>	Agree with CAT
<b>Action</b>	Provide wayfinding at proposed crossing

## 2.4 Cameron Street speed repeat signage – **C M** Comment

	Probability of crash occurring	N/A
	Likelihood of serious / fatal injury	N/A

Cameron Street is proposed to have a speed reduction to 30 km/h. Repeat signage is proposed throughout the length of Cameron Street. The *Setting of speed limits 2022 Rule* no longer requires repeaters to be installed on speeds other than 50 km/h and 100 km/h. The CASA ponders the use of road marking at the locations for repeaters instead of signage.

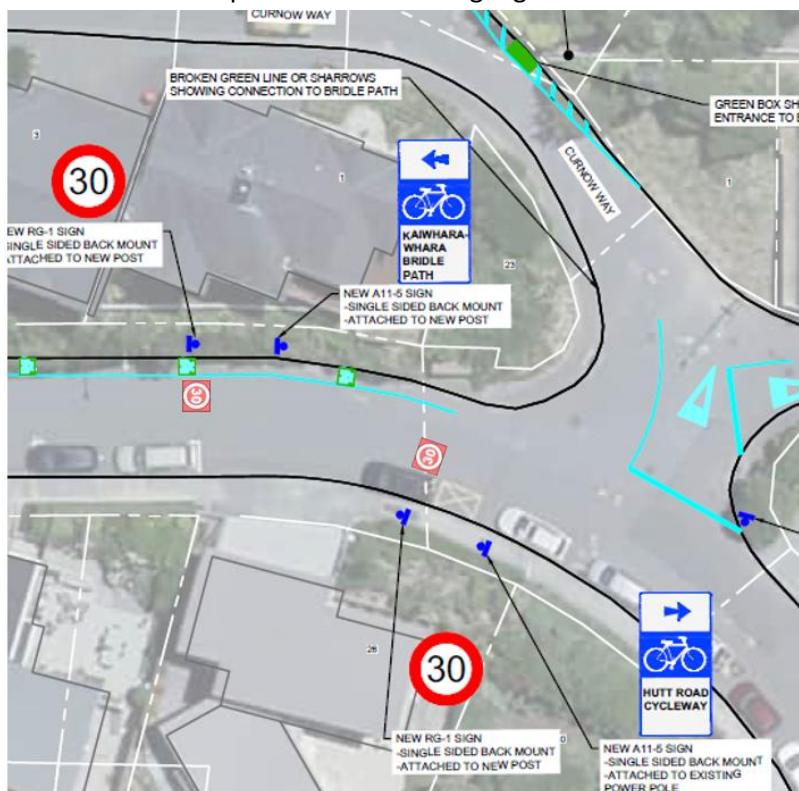


Figure 2-4: Plan showing road marking option for speed repeaters along Cameron Street

### Recommendations

2.4.1 Consider the use of road marking for speed repeaters.

### Responses

<b>Designer</b>	<p>Agree with the CAT recommendation.</p> <p>A general theme identified across all feedback received for the 90% design is a desire to reduce the number of signs and reduce clutter in the road environment which aligns well with this recommendation.</p>
<b>Safety Engineer</b>	Agree with CAT and Designer.
<b>Client</b>	Agree with CAT
<b>Action</b>	Use road markings rather than signs for speed repeaters



2.5 Cameron Street intersection traffic calming – **P M** Minor



Probability of crash occurring	Infrequent
Likelihood of serious / fatal injury	Unlikely

Cameron Street is proposed to have kerb build-outs installed on the downhill lane. The CASA believes kerb build-outs should be completed on both sides of the road. Reducing the radius of both corners will help reduce the speed into and out of Cameron Street. The pedestrian ramp is proposed within one car length from the give way limit line. The CASA suggests putting the pedestrian ramp one car length back from the limit line. This will allow vehicles to be parked at the limit line and pedestrians to still cross.

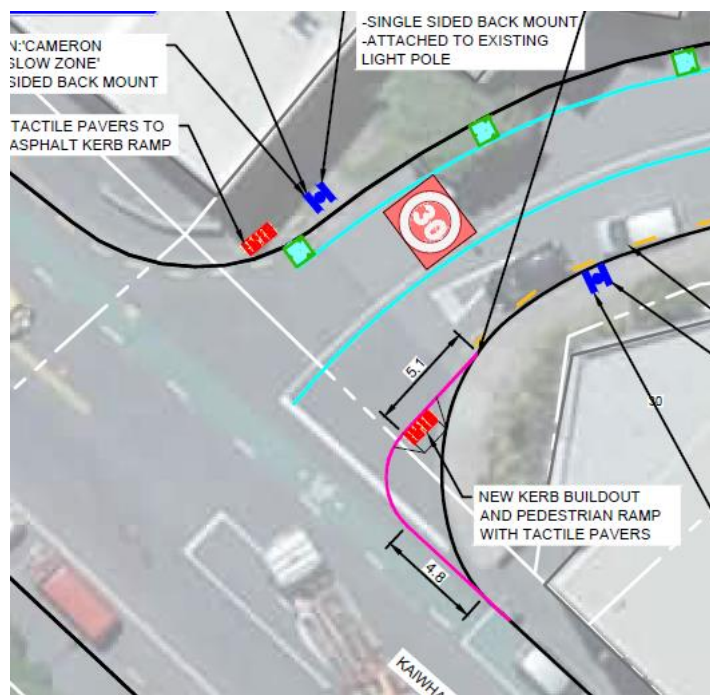


Figure 2-5: Plan showing proposed intersection kerb changes

**Recommendations**


2.5.1	Install kerb build-outs on both sides of Cameron Street
2.5.2	Provide pedestrians a crossing location while one vehicle is stopped at the limit line.

**Responses**

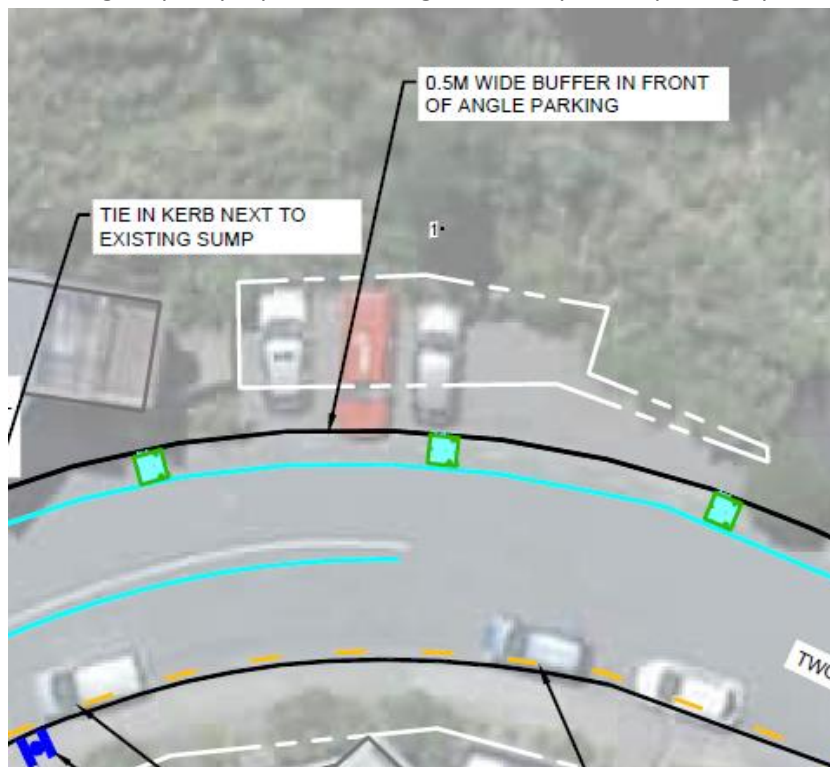
<b>Designer</b>	<p>The transitional cycleway approach is to minimise physical works. The kerb buildout proposed is considered beneficial to control exit speeds from Cameron Street.</p> <p>The footpath along Kaiwharawhara Road to the north side of Cameron Street ends at the existing pedestrian ramp. A kerb buildout or changes to extend the footpath and provide a new kerb ramp on the north side of Cameron Street is considered beyond our current scope.</p> <p>The pedestrian ramp on the south side of Cameron Street has been aligned with the existing ramp on the north side. This location also provides good visibility along Kaiwharawhara Road in either direction and aligns with the pedestrian desire line. On</p>
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	this basis we consider that the design location for the pedestrian ramp provides the best outcome
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer. There is a kerb ramp and this is out of scope.
<b>Action</b>	No change to plans.

**2.6**      **1 Cameron Street parking location – M** **Minor**

	Probability of crash occurring	Infrequent
	Likelihood of serious / fatal injury	Very unlikely

We agree with the design report proposal to change these to parallel parking spaces.



**Figure 2-6: 1 Cameron Street parking location**

**Recommendations**

2.6.1      Reconfigure parking bay to parallel spaces as per design report.

**Responses**

**Designer**      Client direction required to confirm if a change to parallel parking as described in Section 2.3 of the design decisions report can be implemented within this project’s scope.

**Safety Engineer**      Agree with the change to parallel parking.



<b>Client</b>	Agree with Safety Engineer.
<b>Action</b>	Change the angle parking to parallel parking.

## 2.7 Fore Street access (Hutt Road to Cameron Street) – **C** Moderate



Probability of crash occurring	Infrequent
Likelihood of serious / fatal injury	Likely

Sheet 3 has several issues:

- The central bollard should be carefully designed as per [Access control devices on paths](#). For example, the height of the bollard is not specified. For riders who are following other riders, they may not see the bollard until it is too late. The bollard is specified to be 10 m from the corner; however, this would permit up to two vehicles to park in the pathway - why not shift the bollard closer to Pickering Street. *The placement and height of the bollard (if less than a rider height) may occasionally cause a crash resulting in likely serious injury.*
- The “shared path begins and ends” signage may be placed there as an additional vehicle access control method; however, there is a full height kerb at the Hutt Road end. The sign is not technically required, and path markings would reduce cost and sign clutter, as well as make it easier to negotiate the corner.
- There does not seem to be provision to cross the full height kerb to access the Hutt Road cycleway. *The full height kerb may occasionally result in riders falling while trying to mount it, resulting in minor injury.*
- The Hutt Road Cycleway sign has the arrow pointing the wrong direction for the majority of the route; preferably this would be a dual headed arrow.
- The bus shelter appears to be placed in conflict with the existing streetlight pole and should be indicated slightly further from the Fore Street path.

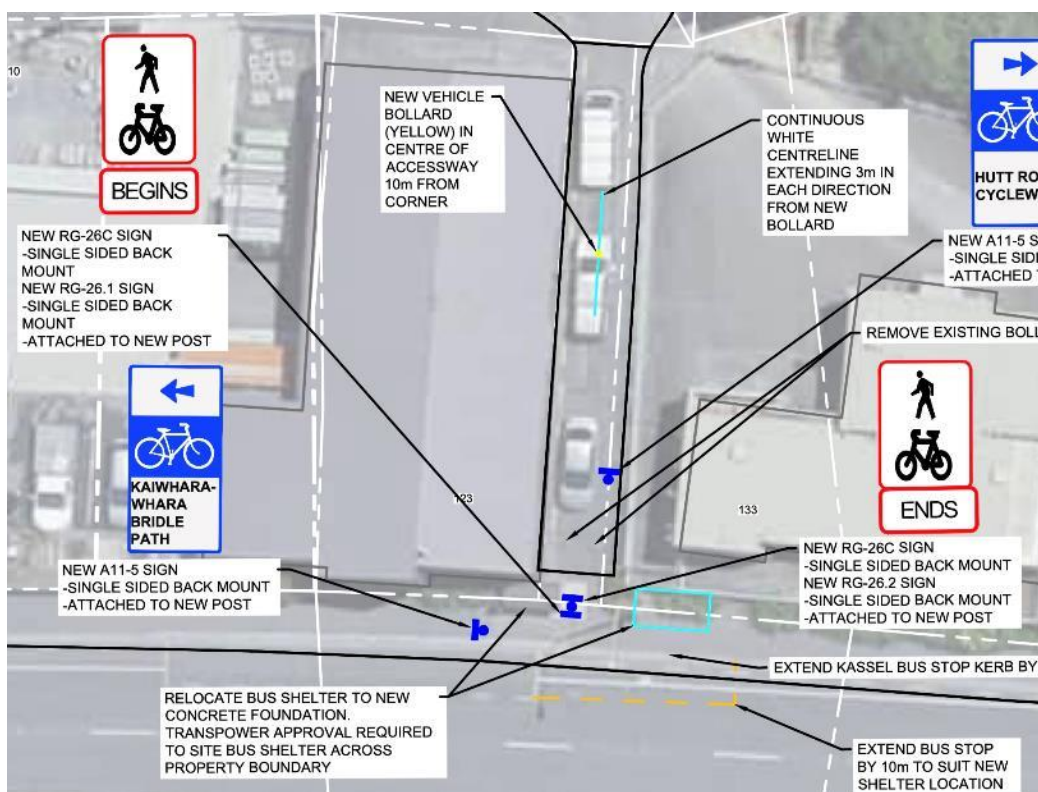


Figure 2-7: 1 Fore Street access signage



**Recommendations**

2.7.1	Increase height of central bollard on Fore Street and/or length of line markings with lane direction arrows to reduce chance of riders striking the bollard
2.7.2	Consider shifting the bollard closer to Pickering Street to minimise parking in the pathway
2.7.3	Consider need for and placement of the shared path sign at the Hutt Road end of Fore Street
2.7.4	Consider how riders will enter/exit Fore Street from Hutt Road – there does not appear to be any kerb ramp (or plan for a temporary one)
2.7.5	Add a dual head arrow to the Hutt Road Cycleway sign
2.7.6	Shift the bus shelter to not conflict with the street light pole

**Responses**

<b>Designer</b>	<p>2.7.1 Agree with CAT recommendation. This also aligns with other feedback received for the 90% design reviews. We suggest extending the line markings aligns best with the feedback received.</p> <p>2.7.2 The bollard was located part way down Fore Street to improve the length of lead in for cyclists and provide a T turning area for industrial lanes as shown in Plan R-9-706 in the WCC Code of Practice for Land Development. This also links to Recommendation 2.7.1 (extended markings shouldn't extend across Pickering Street). The distance from Pickering Street could be reduced to 5.5m if WCC accept a turning area for residential streets instead</p> <p>2.7.3 A general theme identified across all feedback received for the 90% design is a desire to reduce the number of signs and reduce clutter in the road environment which aligns well with this recommendation. Design can be updated to show markings rather than a sign</p> <p>2.7.4 &amp; 2.7.5 The footpath along Hutt Road ends just beyond Fore Street, and there is no crossing facility for cyclists or pedestrians across the four lane wide Hutt Road. All users are required to divert approximately 75m to the signalised crossing at Kaiwharawhara Road. We note that the majority of cyclists are travelling south towards the city resulting in minimal delay.</p> <p>2.7.6 Agree with CAT recommendation</p>
<b>Safety Engineer</b>	<p>Agree with Designer's responses.</p> <p>Ensure adequate wayfinding signage to the signalised crossing at Kaiwharawhara Road.</p>
<b>Client</b>	<p>As the footpath along the Hutt Road is too narrow for too long to be a shared path, the Fore Street option should be removed from the plans.</p>
<b>Action</b>	<p>Remove Fore Street option from the plans, and therefore no other action required.</p>

2.8 Cameron / Pickering Street shared path signage – **P C** Comment



Probability of crash occurring	N/A
Likelihood of serious / fatal injury	N/A

Proposed shared path signage needs reviewing. Figure 2-8 shows the extents of shared path requiring signage to demarcate the start and end of shared path.

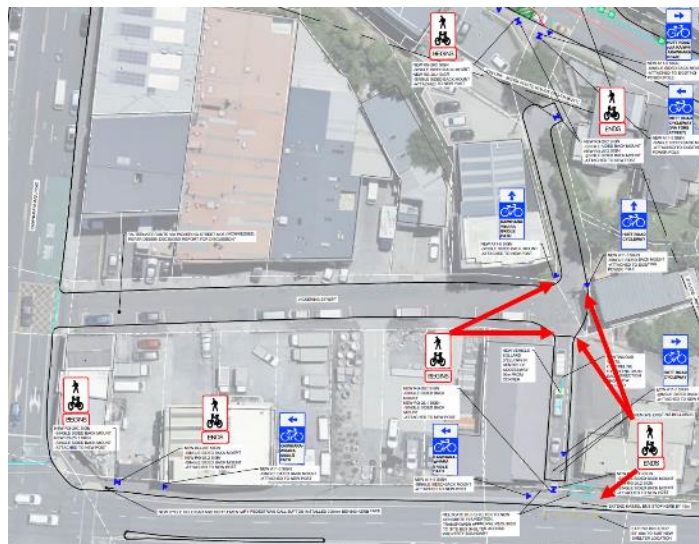


Figure 2-8: Cameron / Pickering Street shared path map marked up with proposed locations for signage

**Recommendations**

2.8.1 Revise general arrangement plan sheet 3 to include more “begins” and “ends” signage.

**Responses**

<b>Designer</b>	A general theme identified across all feedback received for the 90% design is a desire to reduce the number of signs and reduce clutter in the road environment. This will result in changes to replace some or all of these signs with markings.
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer, however, this section is to be removed from plans.
<b>Action</b>	Remove signs at Cameron/Pickering streets.

## 2.9 Alternative route wayfinding signage – **P C M** Comment

	Probability of crash occurring	N/A
	Likelihood of serious / fatal injury	N/A

The location of wayfinding signage for the alternative route up Ngaio Gorge diagrammatically looks to be away from the line of sight of uphill cyclists. The CAT suggests moving the alternative route sign to the decision point upstream.

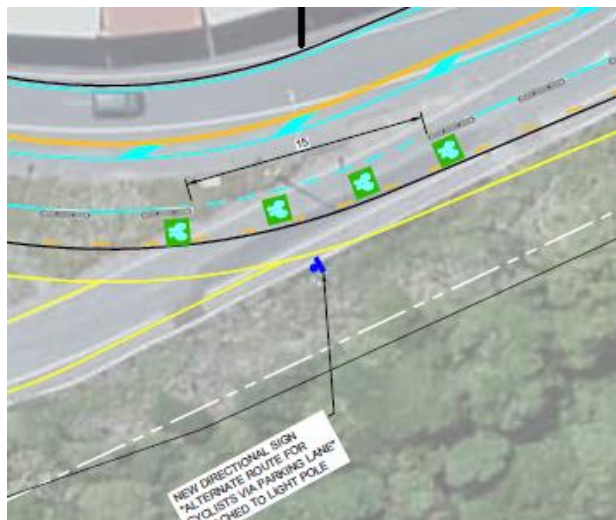


Figure 2-9: Insert of plan showing entry into alternative route

### Recommendations

2.9.1	Consider moving the alternative route sign upstream to the decision point upstream
<b>Responses</b>	
<b>Designer</b>	Agree with the CAT
<b>Safety Engineer</b>	Agree with CAT and Designer.
<b>Client</b>	Agree.
<b>Action</b>	Move the sign.

## 2.10 Audio tactile profiled road marking – **C** Moderate

	Probability of crash occurring	Infrequent
	Likelihood of serious / fatal injury	Likely

Audio tactile profiled road markings are proposed as edge lines for the buffered cycle lanes as part of the 90% design report in response to the 30% audit for Type of separation along Ngaio Gorge. It is assumed that [MOTSAM 4.08.02 ATP EDGE LINES](#) are proposed for the buffered cycle lanes. The CASA notes that there are various types of ATPs and assumes [Guidelines for using audio tactile profiled \(ATP\) road markings](#) is followed.

### Recommendations

2.10.1	Follow guidelines for using audio tactile profiled (ATP) road markings to determine the right type of ATP.
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Responses	
<b>Designer</b>	<p>The ATP proposed are longitudinal edge line ATPs are defined Waka Kotahi P30 Section 8.2.1.</p> <p>To clarify this will be Audio Tactile Profiled (ATP) Edge Line Markings;</p> <ul style="list-style-type: none"> <li>• Refer to NZTA Specifications M24 and P30 and their Notes for full details</li> <li>• Laid along the outside of the normal edge line within the buffer</li> <li>• 250mm pitch</li> <li>• For the extents shown on the drawings</li> </ul>
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer
<b>Action</b>	Use ATP selected by designer.

### 2.11 Very narrow cycle lane – **C**

Moderate



Probability of crash occurring	Occasional
Likelihood of serious / fatal injury	Likely

A section of the cycle lane uphill on Ngaio Gorge Road shows very narrow lane on the inside of a bend. The CAT suggests altering the type of buffer to allow more space for cycling.

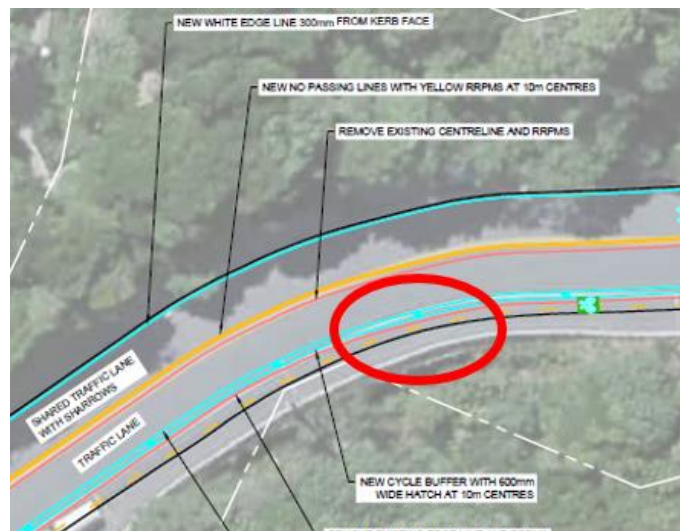


Figure 2-10: sheet 5 extract highlighting narrow cycle lane

#### Recommendations

2.11.1	Investigate the layout through the corner to determine if the cycle lane width can be increased.
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#### Responses

<b>Designer</b>	The lane and edge lines have been set to achieve vehicle tracking. Increasing the cycle lane width in this location would require buses and other vehicles to track across the cycle lane or centreline around this corner.
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	<p>The buffer is painted and has ATP markings, so should not unnecessarily constrain cyclists.</p> <p>We recommend additional green cycle blocks around each corner to further highlight the cycle lane.</p>
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer.
<b>Action</b>	Add green blocks around this corner.

2.12 Bus stop #5405 cycle treatment – **C**

Minor



Probability of crash occurring	Infrequent
Likelihood of serious / fatal injury	Likely

Plans show cyclists are expected to follow the kerb and channel alignment and travel through the existing bus stop. The CAT believes allowing cyclists to continue between the buffer and bus park would be consistent to other treatments throughout NZ.



Figure 2-11: Wide transit lane bus stop treatment



Figure 2-12: Proposed layout for bus stop #5405

**Recommendations**

2.12.1 Investigate alignment of cycleway route through bus stop #5405.

**Responses**

**Designer** Agree with the CAT

**Safety Engineer** Agree with CAT and Designer.

**Client** Agree.

**Action** Realign cycleway to go between bus stop and buffer.

## 2.13 Signage at proposed pedestrian crossing **P C M**

Minor

	Probability of crash occurring	Infrequent
	Likelihood of serious / fatal injury	Unlikely

The TCD manual doesn't allow for the use of PW-24 (NEXT xxx m) supplementary signs on a PW-39 hump sign. In discussions with Waka Kotahi, the CAT team has been informed that a single PW-39 sign preceding the first speed management device is sufficient if the devices are closely spaced. No advisory speed (PW-25) has been provided for the PW-39. PW-25 are allowable in the TCD manual and may be considered.

The pedestrian crossing PW-30 sign is located before the speed cushion signage. Between the distance of this sign to the crossing and the plethora of signs, the CAT considers that drivers may not remember the key message (pedestrian crossing ahead). The CAT recommends that it is shifted to the position of the first hump sign, and that there be only one hump sign at the cushion.

A long as the raised platform is used, the speed of traffic involved in any collisions that do occur is going to be low and therefore the likelihood of serious /fatal injury unlikely.

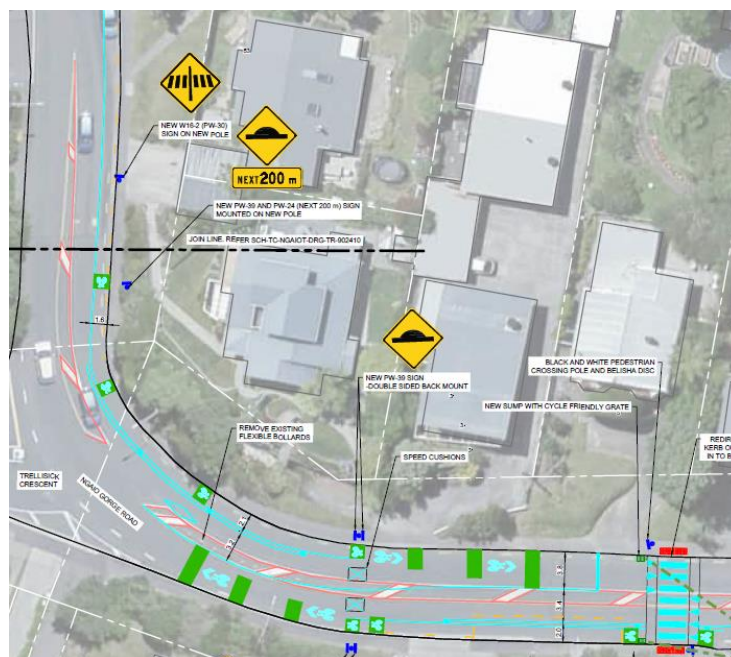


Figure 2-13: Ngaio Gorge Road sheet 8 extract

### Recommendations

2.13.1	Consider moving the PW-30 pedestrian crossing sign to the position where the first speed hump sign is currently proposed
2.13.2	Retain only one PW-39 hump sign adjacent to the cushion and supplement it with an advisory speed applicable to the cushion and the RSP pedestrian crossing.

### Responses

<b>Designer</b>	Agree with the CAT recommendation.
	A general theme identified across all feedback received for the 90% design is a desire to reduce the number of signs and reduce clutter in the road environment which aligns well with this recommendation.
<b>Safety Engineer</b>	Agree with CAT and Designer.
<b>Client</b>	Agree.
<b>Action</b>	Move signs and add speed advisory sign.

2.14 Cycleway buffers start and stop location – **C M**

Moderate



Probability of crash occurring	Occasional
Likelihood of serious / fatal injury	Likely

90% design plans show cycleway buffer to start at the start of a bend and stop early of speed cushions. The CAT ponders the need for starting the buffer in the bend and not on the approach to the bend. The exit of the buffer before the speed cushions diagrammatically looks to create an easy path for vehicles to skip travelling over the speed cushions.

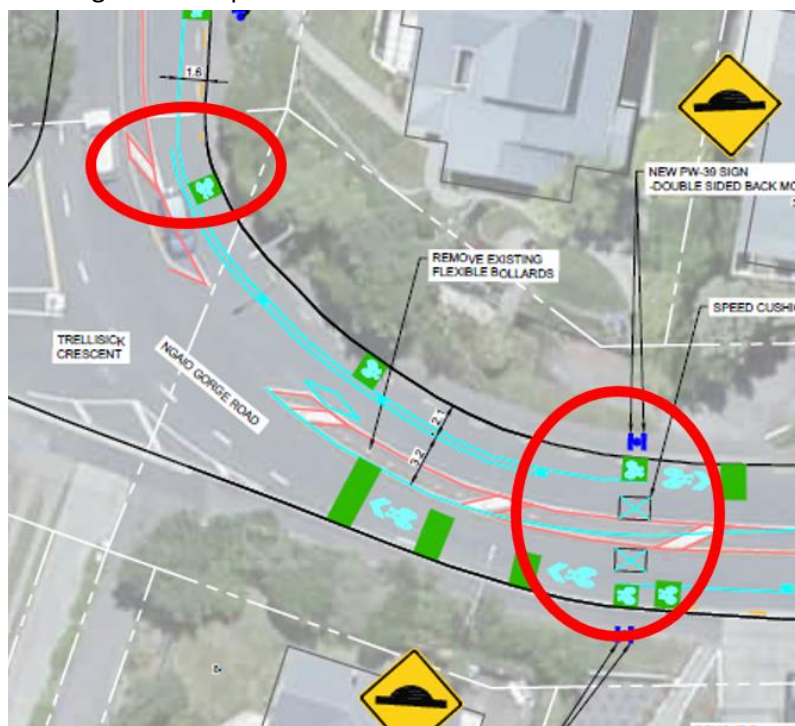


Figure 2-14: Ngaio Gorge Road General arrangement plan sheet 8 extract

**Recommendations**

2.14.1 Increase the use of cycle way buffer on the approach and exit.

**Responses**

**Designer** Feedback received for the 90% design recommended extending the buffer along Kenya Street which will be updated on the plans.

Feedback also recommended that the speed cushions are changed to speed humps. Providing speed humps across the full width of the carriageway will address the CAT finding regarding vehicles trying to skip around the speed cushions.

With regard to the markings the width is very constrained in this section, with the combined traffic and cycle lane width in each direction at the speed cushions only 4.4m. Extending the buffer would reduce the cycle lane to 1.0m wide, although we note that the buffer is flush and rideable so wouldn't constrain cyclists. We recommend the

	markings stay as shown with the addition of a taper line from the buffer back to the cycle lane.
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer.
<b>Action</b>	Extend cycle lane past Trelissick Cres, change speed cushions to humps.

**2.15 Speed cushion placement – C Moderate**



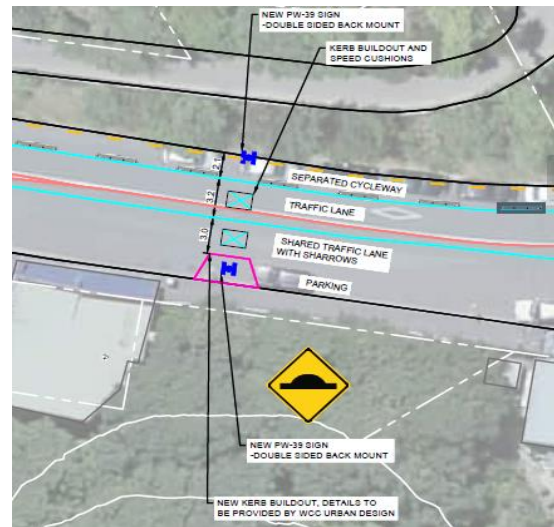
Probability of crash occurring	Infrequent
Likelihood of serious / fatal injury	Likely

The 30% audit mentioned extending the 30 km/h speed limit from Ngaio village; from this recommendation the location has been moved back to the Crofton Road shops. This is favourable but the CAT believes speed cushions should be installed to assist with the speed change.

The pedestrian crossing being installed on Ngaio Gorge Road has speed cushions on both approaches but the existing Crofton Road pedestrian crossing only has one; to be consistent and help with the speed limit change it is recommended to install speed cushions on both.



**Figure 2-15: Speed limit change location along Kenya Street**



**Figure 2-16: Proposed traffic calming on Crofton Road**

**Recommendations**

2.15.1 Provide physical traffic calming at the Kenya Street speed limit change

**Responses**

**Designer** Traffic cushions were not proposed for this section due to the narrow two-way traffic lane width of 5.5m.

As described in the response to Finding 2.14 feedback received for the 90% design has recommended that the speed cushions are changed to speed humps.



	<p>Providing an additional hump in this location was highlighted in the feedback, and addresses positioning issues with the speed cushions.</p> <p>On this basis a speed hump will be added in this location addressing the CAT recommendation.</p>
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer.
<b>Action</b>	Add speed hump.

2.16 Locations and treatment of 30 km/h – **C M**

Moderate



Probability of crash occurring	Occasional
Likelihood of serious / fatal injury	Likely

Figure 2-17 shows the location of Collingwood Street speed reduction; the CAT ponders if the speed change should occur after the entry into the train station.

No red road marking is included on side roads, the CAT ponders with the speed reduction in these areas that red road marking should be used on each change location to highlight the change in speed.

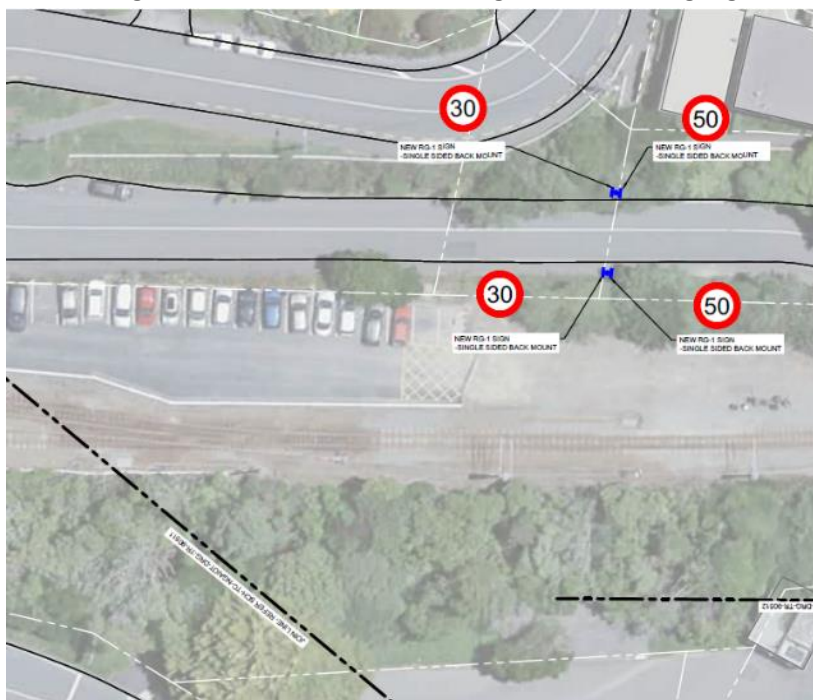


Figure 2-17: Collingwood Road proposed speed limit change location and treatment

**Recommendations**

2.16.1	Investigate moving location of speed change along Collingwood Road
2.16.2	Use of road marking to be consistent through locations of speed limit changes

**Responses**

<b>Designer</b>	<p>2.16.1 The speed change has been located at the first point from the roundabout with sufficient sight distance. Extending the 30km/hr speed area beyond the extent of the proposed cycle facility is beyond the current project scope.</p> <p>2.16.2 Road markings are used to supplement the speed change on the Principal Roads. For local roads only signs have been shown, this aligns with the treatment for Awarua Street and Colway Street at the north end of Ngaio Village.</p>
<b>Safety Engineer</b>	Agree with Designer.
<b>Client</b>	Agree with designer.
<b>Action</b>	No change to plans.







## 2.17 Bus stops lead in and pull out – **C M** Comment

	Probability of crash occurring	N/A
	Likelihood of serious / fatal injury	N/A

Refer 90% design decisions report, section 2: Design adjustments discusses the use of a typical 11.5m bus with a 8m lead into the bus box and 5m to pull out. This guidance is taken from an Interim consultation draft from April 2014. [Waka Kotahi public transport kerbside bus stop](#) guidance provides 15m on the lead in and 9m to pull out.

### Recommendations

2.17.1	Increase lead in and pull-out lengths for bus stops to align with Waka Kotahi public transport design guidance document
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### Responses

<b>Designer</b>	Agree with the CAT. This also aligns with other feedback received for the Kilbirnie design reviews
<b>Safety Engineer</b>	Agree with CAT and Designer.
<b>Client</b>	Agree.
<b>Action</b>	Where practical, increase bus stop lead in and pull out to meet Waka Kotahi guidance.

## 2.18 Streetlighting consideration – **P C** Minor



	Probability of crash occurring	Infrequent
	Likelihood of serious / fatal injury	Likely

As per the 90% design decisions report stating that lighting is not considered for this route, the CAT ponders the need for investigating the current streetlighting level due to increased use of paths by pedestrians.

### Recommendations

2.18.1	Investigate lighting level along proposed shared path
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### Responses

<b>Designer</b>	Outside of current scope. We recommend the client refers this to the Thorndon Quay Hutt Road project currently being delivered by LGWM.
<b>Safety Engineer</b>	Agree with Designer. However, if LGWM does not agree there should be further discussion and resolution by the Project Team.
<b>Client</b>	Proposed shared path has been removed from the scope.
<b>Action</b>	No action required.



### 3 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 2-18.

**Table 2.18: Summary of Issues**

	<i>Serious</i>	<i>Significant</i>	<i>Moderate</i>	<i>Minor</i>	<i>Comments</i>	<i>Total</i>
	0	0	8	5	5	18
<i>Issue</i>						<i>Ranking</i>
2.1 Kaiwharawhara Road part time cycleway – C						Moderate
2.2 Kaiwharawhara Road part time shared lane – C						Moderate
2.3 Cameron Street wayfinding – P C						Comment
2.4 Cameron Street speed repeat signage – C M						Comment
2.5 Cameron Street intersection traffic calming – P M						Minor
2.6 1 Cameron Street parking location – M						Minor
2.7 Fore Street access (Hutt Road to Cameron Street) – C						Moderate
2.8 Cameron / Pickering Street shared path signage – P C						Comment
2.9 Alternative route wayfinding signage – P C M						Comment
2.10 Audio tactile profiled road marking – C						Moderate
2.11 Very narrow cycle lane – C						Moderate
2.12 Bus stop #5405 cycle treatment – C						Minor
2.13 Signage at proposed pedestrian crossing – P C M						Minor
2.14 Cycleway buffers start and stop location – C M						Moderate
2.15 Speed cushion placement – C						Moderate
2.16 Locations and treatment of 30 km/h – C M						Moderate
2.17 Bus stops lead in and pull out – C M						Comment
2.18 Streetlighting consideration – P C						Minor



**Designer:** Billy Rodenburg Position Transport Engineer

Signature \_\_\_\_\_ Date 30/09/2022


**Safety Engineer:** Dennis Davis Position Principal Transport Engineer, WCC

Signature  Date 06/10/2022

**Project Manager:** Jonathan Kennett Position Project Lead

Signature 1  Date 31/10/2022

**Project sponsor - action completed:** Claire Pascoe Position Transitional Programme Manager

Signature  Date 31/10/2022

Audit report distributed on: \_\_\_\_\_ Date 31/10/2022