



Poplar Avenue/Te Ara o Whareroa Crossing

Safe System Assessment

Prepared for
Kapiti Coast District Council

Prepared by
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Executive Summary

Background

Kāpiti Coast District Council (KCDC) requested that Tonkin + Taylor carry out a Safe System Assessment (SSA) of the existing crossing point where the Te Ara o Whareroa shared pathway meets Poplar Avenue. The work involved a safety review of the existing situation (including review of existing data and reports), identification of any appropriate short term and long-term safety treatment options and a SSA of these options. As agreed with KCDC, the SSA was carried out in accordance with Waka Kotahi and Austroads SSA guidance and was focussed on pedestrians, cyclists and the Poplar Avenue/Matai Road intersection.

Existing Situation

Other than a pram crossing (with tactile paving), no other facilities are provided for pedestrians and cyclists to cross at this location. The local community have petitioned KCDC for a formal crossing and speed management to reduce the risks to vulnerable road users, especially children.

It is recommended that a detailed survey of pedestrians and cyclists using the crossing is carried out, but in advance of this, users of the crossing point have been estimated at up to 60 pedestrians and 180 cyclists per day. KCDC data for December 2021 indicates 3,560 vehicles on Poplar Avenue and 85thtile vehicle speeds on both approaches to the crossing exceed the existing 40 km/h speed limit. Eastbound vehicles approach the crossing downhill, on a right-hand bend (which restricts forward visibility of the crossing point), past the bus stop and the Matai Road intersection and then, with very little advance warning, pass through the crossing point. Westbound vehicles approach the crossing from a long straight section of 50 km/h road (whose environment does not look and feel like a 50 km/h zone) and the crossing point is not that visible/obvious to drivers.

Although there are no reported crashes at or near the crossing point involving pedestrians or cyclists, the key issues on both approaches to the crossing point are, vehicle approach speeds are high, the crossing point isn't that visible/obvious and drivers could be distracted by other features on the road (e.g. the right bend, the bus stop and the Matai Road intersection).

Improvement Options

As part of this SSA, a number of possible improvement options have been identified for both the short term (i.e., low cost and relatively quick to implement) and longer term (i.e., higher cost with longer KCDC implementation timescales and to allow establishment of suitable budgets).

Short Term Options include:

- Signage – additional/improved static warning signs and/or electronic signs.
- Increase conspicuity of the crossing and reinforce 40 km/h speed limit –use of red markings, use of dragons' teeth markings, painted rumble strips and a gateway treatment.
- Visual narrowing to create perception of a narrow carriageway without physically narrowing the road - additional street trees, lamp columns, street furniture, paving treatment and roadway markings.

Longer term options include:

- Address the crossing point issues –raised (dual/paired cycle) Zebra Crossing is the preferred option.
- Simplify the arrangement with the adjacent Matai Road intersection and reduce vehicle speeds - this could take the form of a raised give way or roundabout intersection.

- Reduce vehicle speeds through the crossing - either through vertical or horizontal traffic calming.

Safe System Assessment

A summary of the Safe System Assessment Matrix scores for pedestrians, cyclists and the intersection is given below

Option	Score
1 Existing conditions	124 / 192
2 Option 1 Short Term options (road markings and signs)	96 / 192
3 Option 2 Long Term Option Raised Zebra Crossing	38 / 192
4 Option 3 - Long term option revised Poplar Avenue/Matai Road intersection layout	71 / 192
5 Option 4 – Long Term Option Traffic Calming	71 / 192

Based on this assessment, short term options (signing and markings) are predicted to provide some limited safety benefits at the crossing.

For the longer term, a raised zebra crossing is predicted to provide the largest safety benefit at the crossing of all of the options considered.

1 Assessment Details

1.1 Type of Assessment

Kāpiti Coast District Council (KCDC) have recently received a petition signed by circa 720 people requesting a safer crossing point where the Te Ara o Whareroa (shared pathway through Queen Elizabeth Park) meets Poplar Avenue. KCDC requested that Tonkin + Taylor carry out a Safe System Assessment (SSA) including:

- A safety review of the existing situation.
- Review of the *Poplar Avenue Shared use path post-construction safety audit* (dated 31/5/18) and the 2015 *Detailed Design Audit*.
- Provide recommendations for any appropriate safety treatments.

Given the scale of the site, indicated timescales and likely cost of any proposed safety improvements, a high level SSA (rather than a detailed SSA) was carried out to cover:

1. **Context** including:
 - Site visit.
 - Start-up meeting with KCDC.
 - Review of the petition request.
 - Review of available KCDC survey data on pedestrians, cyclists (including age profiles) on the shared path, and Poplar Avenue vehicle volumes and vehicle speeds at the location where Te Ara o Whareroa meets Poplar Avenue and including the Poplar Avenue/Matai Road intersection.
 - Review of existing crash data in the surrounding area.
 - Review of previous KCDC safety audit work.
 - Review of any recent or planned improvements in the area.
2. **High level Safe System Matrix evaluation of the existing situation** focussing on pedestrians, cyclists and the Poplar Avenue/Matai Road intersection.
3. **Improvement option(s) identification and assessment including:**
 - Identification of options to improve the existing situation alignment with Safe System principles. This includes identifying quick win/short term tactical low-cost interventions that could show a proactive KCDC approach to managing risks and for KCDC to engage with the community on. Based on this engagement and evaluating the effectiveness of the low-cost treatments, this could then be used to inform decision making on any future longer-term options that may arise from the SSA assessment recommendations.
 - High level Safe System Matrix evaluation of the options with a focus on pedestrians, cyclists and the intersection and compare this to base case.
4. **Reporting**
 - Prepare and submit SSA Report with recommendations on short- and long-term safety improvements.

The SSA was carried out in accordance with Waka Kotahi and Austroads SSA guidance (source [Road to Zero – NZ’s road safety strategy | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](#) and [Safe System Assessment Framework | Austroads](#)).

1.2 Assessment Team

The members of the SSA Team were:

- SSA lead = Colin Shields, Senior Principal Transport Planner, Tonkin + Taylor.
- SSA support = Hala Barakat, Transport Technician, Tonkin + Taylor.
- SSA peer review - Alan Gregory, Principal Transport Planner, Tonkin + Taylor.
- SSA site visit - Ryan Dunn, Discipline Transport Manager, Tonkin + Taylor.

1.3 Site Inspections and meetings

A site inspection was carried out with KCDC on 2/12/21.

A start up meeting with KCDC was held on 10/12/21.

2 Project Context and Description

2.1 Existing Conditions and Project Background

Although there are no reported crashes at or near the crossing point involving pedestrians or cyclists, there does appear to be a number of issues relating to both the vehicle approach speeds and the visibility/conspicuity of the crossing point. The local community have petitioned KCDC for a formal crossing and speed management to reduce the risks to vulnerable road users, especially children.

85th%tile vehicle speeds on the **eastbound** approach are **48 km/h**, which exceeds the speed limit (and these have altered little since the speed limit was reduced from 50km/h to 40 km/h). These speeds also exceed the Austroads indicated speed threshold of 30km/h, which is the maximum that any vulnerable or unprotected road user (particularly pedestrians) can withstand without sustaining death or serious injuries. **Eastbound median** speeds of **42 km/h** also exceed the speed limit and Austroads threshold. Eastbound vehicles approach the crossing downhill, on a right-hand bend (which restricts forward visibility of the crossing), pass the bus stop and the Matai Road intersection and then, with very little advance warning, pass through the crossing point.

For **westbound** vehicles the **85th%tile** vehicle speeds at **45 km/h** exceed the speed limit and the Austroads 30km/h threshold, with a **median** speed of **39 km/h**. Westbound vehicles approach the crossing from a long straight section of 50 km/h road (whose environment does not look and feel like a 50 km/h zone) and the crossing point is not that visible/obvious to drivers.

The key issues on both approaches to the crossing point are, vehicle approach speeds are high, the crossing point isn't that visible/obvious and drivers could be distracted by other features on the road (e.g. the right bend, the bus stop and the Matai Road intersection).

Table 1 below provides further details of the existing conditions and the project background along with some photographs (**Images 1 to 5**).

Table 1: Project Context

Prompts	Comments
What is the reason for the project ? Is there specific crash type risk? Is it addressing specific issues such as poor speed limit compliance, road access, congestion, future traffic growth, freight movement, amenity concerns from the community, maintenance/asset renewal, etc.	<p>A petition consisting of circa 720 members of the local community has been submitted to KCDC requesting a safer crossing point where Te Ara o Whareroa meets Poplar Avenue. The petition states that this is a highly used path which connects Raumati and Paekakariki villages and is used by a wide range of pedestrians and cyclists including local primary and secondary children, dog walkers and commuters. The petition states that the existing crossing point is unsafe due to existing <i>“traffic speeds and the proximity of the crossing to the Matai Rd intersection which complicates the traffic movements”</i>.</p> <p>A review of the Waka Kotahi Crash Analysis System (CAS) indicates that there has only been one recorded crash in the past five years within 50m of the crossing point. This crash was a non-injury crash and was a rear end incident west of the Matai Road intersection and did not involve a pedestrian or cyclist.</p> <p>The petition indicates that there have been a number of near misses observed by the local community.</p> <p>Site observations indicate that some pedestrians and cyclists are crossing Poplar Avenue at the Matai Road intersection, rather than the crossing point (with some continuing northbound onto Matai Road).</p> <p>Te Ara o Whareroa pathway opened in 2018 and the shared path on the north side of Poplar Avenue east of Matai Road was constructed in 2013 and to the west of Matai Road, in 2017.</p>

Prompts	Comments
What is the function of the road? Consider location, roadside land use, area type, speed limit, intersection type, presence of parking, public transport services and vehicle flows. What traffic features exist nearby (e.g. upstream and downstream)? What alternative routes exist?	<p>Poplar Avenue is classified as a Major Community Connector in the KCDC District Plan. It connects SH1 to suburbs on Kapiti Coast including Raumati South. Many amenities and residences are dependent on Poplar Avenue to be reached from SH1 expressway (via south facing ramps). The closest alternative entry from SH1 to serve this area is circa 3.7 km away on Kapiti Road.</p> <p>Access to old SH1 is also possible via Poplar Avenue.</p> <p>There is an eastbound bus stop circa 20m away from the intersection between Poplar Avenue and Matai Road. This bus stop includes bus routes 250 and 251, both of which go to Paraparaumu Station.</p> <p>Poplar Avenue is used as an access road to Te Rā Waldorf Primary School and Te Rāwhiti Kindergarten plus other local schools, such as Raumati Primary School on Matai Road and Kapiti College on Hillcrest Road</p>
What is the speed environment? What is the current speed limit? Has it changed recently? Is it similar to other roads of this type? How does it compare to Safe System speeds? What is the acceptability of lowering the speed limit at this location?	<p>There is a speed limit of 40km/h at the crossing point (which was changed from 50 km/h in August 2018).</p> <p>Prior to reaching the crossing point, the Poplar Avenue eastbound approach to the crossing is downhill on a right-hand bend with a bus stop and then the Matai Road intersection is on the left. There is a cyclist crossing warning sign before the bus stop, the view of which is blocked by overhanging trees. There is an electronic bend/slow down sign (installed in 2021) on the eastbound approach to Matai Road and there is an electronic 50 km/h school zone sign on the eastbound approach to the 50 km/h speed limit change (installed May 2021).</p> <p>Prior to reaching the crossing point, the Poplar Avenue westbound approach to the crossing is on a straight road with a 50 km/h speed limit (passing the Te Rā Waldorf Primary School and Te Rāwhiti Kindergarten) which then changes to 40 km/h circa 60m from the crossing point. The 50 km/h speed limit was changed from 60 km/h in August 2018. Just beyond the 40 km/h speed limit sign there is a cyclist crossing warning sign.</p> <p>Speed survey data provided by KCDC (measured in December 2021) indicated 85thtile speeds of 48 km/h eastbound and 45 km/h westbound either side of the crossing point.</p>

What **road users** are present? Consider the presence of elderly pedestrians, school children and cyclists. Also note what facilities are available to vulnerable road users (e.g. signalised crossings, bicycle lanes, school speed limits, etc.)

At the time of preparing this SSA there was no detailed survey data of pedestrians and cyclists available.

A December 2021 KCDC snapshot AM (0815-0830) and PM (1415-1430) survey of pedestrians and cyclists at the crossing point indicated low numbers using the crossing. In the AM peak there were 3 school age cyclists (with 1 not using the crossing point since they were then cycling northbound on Matai Road) and in the PM peak 1 cyclist over 65. However, this snapshot survey was carried out on the penultimate school day before the Christmas holiday for Te Rā Woldorf Primary School, whilst other schools in the area were known to have already closed for the Christmas holiday.

The 2018 Poplar Avenue Shared User Path Post Construction Safety Audit Report indicated that for a snapshot 20-minute survey period between 0840-0900 there were 6 cyclists and 2 adult pedestrians using this crossing. This survey also noted that 9 cyclists, 3 child pedestrians, 2 adult pedestrians and 2 skateboarders crossed Matai Road. Also, there was 1 cyclist travelling ahead westbound on Poplar Avenue and 4 cyclists travelling ahead eastbound, with 6 cyclists turning left from Poplar Avenue into Matai Road. This survey indicated that vehicles were predominantly light vehicles, with trucks = 0.5% of the total flow. Two buses were observed turning left into Matai Road from Poplar Avenue.

The petition indicates that there are a large number of pedestrians and cyclists of all ages using this crossing point.

The site observations also noted that some pedestrians and cyclists were crossing Poplar Avenue away from the crossing point at the Poplar Avenue/Matai Road intersection.

Taking all of the above information into account, then users of the crossing point has been estimated at up to:

- 60 pedestrians/day
- 180 cyclists/day.

It is recommended that a pedestrian and cycle crossing survey is carried out to confirm the actual numbers (and age profiles) crossing Poplar Avenue.

Sight distance in both directions from the crossing point is slightly limited and is worse for pedestrians/cyclists coming from south out of the path

Prompts	Comments
	<p>looking west up the hill along Poplar Avenue. The visibility for eastbound drivers of the crossing point is also restricted.</p> <p>A KCDC survey of users of the Te Ara o Whareroa shared path indicates that the trail is predominantly used by pedestrians and cyclists for recreational purposes with other uses including:</p> <ul style="list-style-type: none"> • 12% of users are to/from work. • 4% of users are to/from school. • 1% of users are using a mobility device. <p>In terms of frequency of use, 5% of users are > 5 times a week , 30% are 2 to 5 times a week and 21.5% are once a week.</p> <p>In terms of the age profile of users:</p> <ul style="list-style-type: none"> • 4% are < 18. • 9% are 18-35. • 74% are 35-65. • 13% are >65. <p>Other than a pram crossing (with tactile paving), no other facilities are provided for pedestrians and cyclists to cross at this location.</p>
What is the vehicle composition? Consider the presence of heavy vehicles (and what type), motorcyclists and other vehicles using the roadway.	<p>KCDC data for December 2021 indicates 3,560 vehicles (2 way) per weekday. Vehicles are predominantly light vehicles with buses not passing through the crossing point and there are very low numbers of heavy vehicles.</p>

Image 1 – Westbound approach to crossing point



Image 2 – Westbound approach to crossing point



Image 3 – Eastbound approach to crossing point and bend/slow down electronic sign



Image 4 – Eastbound approach to crossing point



Image 5 – Westbound approach to school zone



2.2 Possible Improvement Options

2.2.1 Introduction

As part of this SSA, a number of possible improvement options have been identified for both the short term (i.e. low cost and relatively quick to implement) and longer term (i.e. higher cost with longer KCDC implementation timescales and to allow establishment of suitable budgets).

These are detailed in **section 2.2.2** under the headings of:

- Short term options e.g. road markings and signage improvements.
- Long term options to improve the crossing point e.g. zebra crossings, mid-block traffic signals.
- Long term options to improve the Matai Road intersection and crossing point e.g. raised give way intersection table, roundabout.
- Long term options to address the speed environment e.g. vertical and horizontal traffic calming.

2.2.2 Short Term Options

These are summarised below and are assessed (combined) in **Table 4** in **section 3** below.

- Signage – additional/improved static warning signs (e.g. larger signs with backing boards) on both approaches of the crossing and/or electronic signs (similar to the existing signs warning of the bend) on both approaches providing advanced warning of the crossing.

- Increase conspicuity of the crossing and reinforce 40 km/h speed limit - options include use of red markings at, and repeated, on both approaches to the crossing. Other options include use of dragons' teeth markings (currently under NZ trial) and painted rumble strips on both approaches to the crossing. A gateway treatment of the eastbound 40 km/h could also be created through coloured road markings.
- Visual narrowing to create perception of a narrow carriageway without physically narrowing the road. This could be achieved through additional street trees, lamp columns, street furniture, paving treatment and roadway markings.
- Reduce the speed limit to 30 km/h – without any physical speed reducing features i.e. traffic calming, it is not considered that simply lowering the speed limit will have any impact on actual vehicle speeds and therefore this has been rejected as a short-term option.

2.2.3 Longer Term Options

Three longer term options have been identified to:

- Address the crossing point issues.
- Simplify the arrangement with the adjacent Matai Road intersection and reduce vehicle speeds.
- Reduce vehicle speeds through the crossing.

2.2.3.1 Crossing point – options considered included:

- The preferred option that has been assessed in **Table 5** is a raised (dual/paired cycle) Zebra Crossing (see example in **Image 6** below) - this would give clear pedestrian and cyclist priority when crossing Poplar Avenue, would increase conspicuity of the crossing, would provide a level access crossing facility and would slow vehicle speeds through the crossing. Additional street lighting would be recommended to aid conspicuity and general awareness of the crossing. The Waka Kotahi Pedestrian Planning Guide (source [Pedestrian planning and design guide | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](#)) indicates that raised zebra crossings have by far the largest typical crash reduction factor for pedestrian crashes.

Image 6 –raised dual cycle/zebra crossing example - Carrington Road/Sutherland Road, Mount Albert, Auckland (source [Unsignalised crossings | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](https://www.nzta.govt.nz/unsignalised-crossings/)).



Rejected crossing point improvement options included:

- At grade Zebra Crossing (no raised table) - see example in **Image 7** below. This would give pedestrians and cyclists priority when crossing Poplar Avenue and would increase conspicuity of the crossing. This option was rejected since vehicle approach speeds would be unchanged with an unraised zebra and the Waka Kotahi Pedestrian Planning Guide indicates that unraised zebra crossings have a negative typical crash reduction factor for pedestrian crashes and some NZ guidance indicates that new zebra crossings should not be provided unraised.

Image 7 zebra crossing (no raised table) example - Margaret Road Paraparaumu (source Google maps).



- Provide a raised pedestrian platform (no zebra “courtesy crossing” see example in **Image 8** below). In this option pedestrians/cyclists would have to give way to vehicles. Although reducing traffic speeds and providing level access for pedestrians and cyclists, this option was rejected because it could cause confusion for drivers as well as pedestrians and cyclists as to who has right of way.

Image 8 Raised Courtesy Crossing example – London Street, Hamilton (Source NZ Herald 6/4/21).



- Mid-block traffic signal controlled dual/paired crossing (see example in **Image 9** below). This would give pedestrians and cyclists priority when crossing and would slow vehicle speeds. The signal crossing could be raised or unraised (although a raised crossing will be a more effective safe system treatment). This option was rejected since the Waka Kotahi Pedestrian Planning Guide indicates that the mid-block traffic signals typical crash reduction factor for pedestrian crashes is much lower than that of a raised zebra crossing. Furthermore, traffic signals at this location would be out of character for the surrounding area and also may introduce delays to traffic.

Image 9 Mid-block traffic signal controlled crossing example – Wilsons Road, Christchurch (Source [Signalised crossings | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](https://www.nzta.govt.nz/signals/signals/crossings/))



- Provide a pedestrian refuge (1.4m to 2m width and 4m running lanes) – example in **Image 10** below. As well as providing a half way point for pedestrians/cyclists to safely stop at, this would also be a form of horizontal traffic calming by narrowing the carriageway. This option was rejected because Poplar Avenue, at circa 8.5m in width at the crossing point, is not wide enough and also this would create a pinch point for cyclists riding on Poplar Avenue. The Waka Kotahi Pedestrian Planning Guide indicates that refuges have one of the lowest typical crash reduction factors for pedestrian crashes.

Image 10 – Pedestrian refuge example, Linwood Avenue, Christchurch (source [Pedestrian / median refuges | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](#)).



2.2.3.2 Simplify the arrangement with the adjacent Matai Road intersection and reduce vehicle speeds

Option 1 Raised give way intersection

Realign the crossing point further west to Matai Road and provide a raised give way intersection table at Matai Road/Poplar Avenue with an uncontrolled/courtesy pedestrian/cycle crossing (example of raised give way intersection shown in **Image 11** below). This would simplify the crossing location and the adjacent intersection arrangement, would provide a level access crossing facility and would slow vehicle speeds through the crossing. Additional street lighting would be recommended to aid conspicuity and general awareness of the raised intersection and crossing. However, it could cause confusion for drivers as well as pedestrians and cyclists as to who has right of way and it would not increase the conspicuity of the crossing.

Image 11 Example raised give way intersection table, Auckland (source [Speed calming measures \(at.govt.nz\)](https://www.at.govt.nz/))



Option 2 – Roundabout

The October 2015 Poplar Avenue Shared Use Path Detailed Design Safety Audit Report recommended consideration of providing a roundabout at the Poplar Avenue/Matai Road intersection with the shared pathway “*being accommodated as a special fourth (southern) leg*”. A roundabout on its own would be a traffic calming device and could slow vehicle speeds on Poplar Avenue. Best practice guidance within the Auckland Transport Cycle Infrastructure section of the Transport Design Manual (TDM) indicates that “*the roundabout should be designed to achieve low entry and circulating speeds, not exceeding 30 km/h anywhere for cars. People on bikes should be able to claim the lane, enter and circulate safely with other traffic. Width of entry and circulating lanes should be limited, so that cars do not pass alongside people on bikes. Over-run aprons for large vehicles should be used if needed*”. **Image 12** below shows the type of roundabout design that TDM indicates would be safe to accommodate cyclists to create a slow (15 km/h to 20 km/h) speed environment. Therefore, a raised roundabout intersection would be required to achieve these safe vehicle speeds to accommodate cyclists.

There are a number of concerns with creating a roundabout at this intersection, including:

- The Waka Kotahi Pedestrian Planning Guide indicates that the roundabout typical crash reduction factor for pedestrian crashes is much lower than that of a raised zebra crossing (but comparable to that of mid-block traffic signals). However, roundabouts without any formal cycle facilities have a poor safety record for cyclists.
- Furthermore, suitable crossing facilities within the roundabout (either controlled or uncontrolled) would need to be provided for pedestrians and cyclists to cross Poplar Avenue.
- It is questionable whether there is sufficient existing road reserve to accommodate both a raised roundabout and safe pedestrian and cycle crossing facilities at this location without acquisition of additional land.

Image 12 Example raised roundabout Custom Street West/ Pakenham Street, Auckland (source google maps).



Revised intersection assessment

Table 6 assesses the impact of a revised Poplar Avenue/Matai Road intersection to incorporate the crossing point (either option 1 or option 2).

2.2.3.3 Reduce vehicle speeds through the crossing point

An alternative option to address the issues specifically at the crossing point is to introduce physical measures to reduce eastbound and westbound vehicle speeds and thus improve safety for pedestrians and cyclists at the crossing point. Options include:

- Vertical traffic calming (e.g. speed tables, cushions etc) on the approaches to the crossing – there might be though an issue with comfort for bus passengers. See example in **Image 13** below.
- Horizontal traffic calming on the approaches to the crossing (e.g. kerb extensions, chicanes etc) – there might be issues with existing insufficient road reserve widths and also the desirability of having such features on Poplar Avenue.

The Waka Kotahi Pedestrian Planning Guide indicates that for the horizontal type of traffic calming, the typical crash reduction factor for pedestrian crashes is much lower than that of a raised zebra crossing, a midblock traffic signal crossing or a roundabout.

Table 7 assesses the impact of traffic calming (vertical or horizontal) on its own, but it could well be that traffic calming is used to complement any improvements to the crossing or the intersection.

Image 13 Dual (un-raised) zebra crossing with vertical traffic calming example– Ilam Road, Christchurch (source [Unsignalised crossings | Waka Kotahi NZ Transport Agency \(nzta.govt.nz\)](https://nzta.govt.nz/unsignalised-crossings))



3 Assessment of Project and Design Options

3.1 Assessment Summary

A summary of the Safe System Assessment Matrix scores is given in **Table 2** below, with the detailed assessments presented in **Section 3.2**.

Table 2 Summary of the Safe System Assessment Matrix scores

Option		Score
1.	Existing conditions	124/ 192
2.	Option 1 Short Term Options (e.g. road markings and signs)	96 / 192
3.	Option 2 Long Term Option - Raised Zebra Crossing	38 / 192
4.	Option 3 - Long Term Option - revised Poplar Avenue/Matai Road intersection and pedestrian crossing layout	71 / 192
5.	Option 4 – Long Term Option - Traffic Calming	71 / 192

3.2 Safe System Assessment Matrices

Tables 3 to 6 below summarise the Safe System Assessment Matrix scores for the existing conditions and the 4 options:

Table 3: SSA Matrix – Existing Conditions

	Intersection	Pedestrian	Cyclist
Exposure Comments:	3560 vpd on Poplar Avenue, main alignment (Austroads trigger 1000-5000 vpd)	Estimated 60 Pedestrians/day although could be higher given residential/ recreational/ education nature. More survey data required. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger 50- 100 pedestrians)	Estimated 180 on the crossing point, although could be higher given residential/ recreational/ education nature. More survey data required. Other cyclists are on the road. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger >100 cyclists)
Exposure Score:	2/4	3/4	4/4
Likelihood Comments:	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Intersection is a give way priority with no restriction in movement, no specific turning facilities are provided. Intersection width with relatively large radii/shoulder width is likely to encourage higher speed approach and manoeuvring, particularly for left turn from Poplar Avenue. Visibility to right from Matai Road obstructed when there is a bus stopped – otherwise good visibility. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue, therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing (south side) to the left (looking west) restricted. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue -therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing (south side) to the left (looking west) restricted.

	<ul style="list-style-type: none"> High approach speeds recorded on Poplar Avenue 48Km/h westbound and 47 km/h eastbound. Limited street lighting. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Visibility of the Poplar Avenue/Matai Road Intersection is, on the whole, good. 	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some pedestrians cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path and footpath are present for the majority of the alignment so approaching drivers will be more aware of the presence of vulnerable road users. 	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some cyclists cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path is present for the majority of the alignment.
Likelihood Score:	2/4	4/4	4/4
Severity Comments:	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> 85th %tile speeds on Poplar Avenue exceed the posted speed limit as the road eastbound is downhill and westbound relatively straight with little side friction, any crash is potentially close to the survivability threshold of 50 Km/h. Collision angle – all turning manoeuvres will expose vehicles to the highest risk angles, around 90 degrees (side on). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> Speeds are unlikely to be excessive on Matai Road approach. Low heavy vehicle numbers. 	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30 km/h (85th %tile = 48 km/h and 47 km/h). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None 	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30 km/h (85th %tile = 48 km/h and 47 km/h) <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None

Severity Score:	3/4	4/4	4/4
Product (Multiply scores above for crash type)	12/64	48/64	64/64
124/192			

Table 4: SSA Matrix – Option 1 – Short Term Options (e.g. road markings and signs)

Black text: Common factor between the “existing conditions” and this option

~~Strikethrough~~: Factor that is removed or significantly diminished between the “existing conditions” and this option

Red text: New or significantly altered in this option compared to the “existing conditions”

	Intersection	Pedestrian	Cyclist
Exposure Comments:	3560 vpd on Poplar Avenue, main alignment (Austroads trigger 1000-5000 vpd)	Estimated 60 Pedestrians/day although could be higher given residential/ recreational/ education nature. More survey data required. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger 50- 100 pedestrians)	Estimated 180 on the crossing point, although could be higher given residential/ recreational/ education nature. More survey data required. Other cyclists are on the road. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger >100 cyclists)
Exposure Score:	2/4	3/4	4/4
Likelihood Comments:	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Intersection is a give way priority with no restriction in movement, no specific turning facilities are provided. Intersection width with relatively large radii/shoulder width is likely to encourage higher speed approach and manoeuvring, particularly for left turn from Poplar Avenue. Visibility to right from Matai Road obstructed when there is a bus stopped – otherwise good visibility. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue, therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted. Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue -therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted. Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue.

	<ul style="list-style-type: none"> High approach speeds on Poplar Avenue 48 km/h westbound and 47 km/h eastbound. Limited street lighting. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Visibility of the Poplar Avenue/Matai Road Intersection is, on the whole, good. <p>Reduced approach speeds with short term options but not an existing crash problem at intersection.</p>	<ul style="list-style-type: none"> High approach speeds on Poplar Avenue. Site observations indicate that some pedestrians cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path and footpath are present for the majority of the alignment. Petition indicates there are near misses, but CAS has no reported crashes. <p>Raising awareness of the crossing and speed limit may slightly improve the conspicuity of the crossing.</p>	<ul style="list-style-type: none"> Site observations indicate that some cyclists cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path is present for the majority of the alignment. Petition indicates there are near misses, but CAS has no reported crashes. <p>Raising awareness of the crossing and speed limit may reduce slightly improve the conspicuity of the crossing</p>
Likelihood Score:	2/4	3.5/4	3.5/4
Severity Comments:	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> 85th %tile speeds on Poplar Avenue exceed the posted speed limit as the road eastbound is downhill and westbound relatively straight with little side friction, any crash is potentially close to the survivability threshold of 50 Km/h. Collision angle – all turning manoeuvres will expose vehicles to the highest risk angles, around 90 degrees (side on). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> Speeds are unlikely to be excessive on Matai Road approach. Low heavy vehicle numbers. <p>Raising awareness of the speed limit may reduce slightly the approach vehicle speeds.</p>	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Raising awareness of the crossing and speed limit may reduce slightly the approach vehicle speeds and slightly improve the conspicuity of the crossing</p>	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h) <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Raising awareness of the crossing and speed limit may reduce slightly the approach vehicle speeds</p>

Severity Score:	2.5/4	3.5/4	3.5/4
Product (Multiply scores above for crash type)	10/64	36.75/64	49/64
96/192			

Table 5: SSA Matrix – Option 2 Long Term Option Raised Zebra Crossing

Black text: Common factor between the “existing conditions” and this option

~~Strikethrough~~: Factor that is removed or significantly diminished between the “existing conditions” and this option

Red text: New or significantly altered in this option compared to the “existing conditions”

	Intersection	Pedestrian	Cyclist
Exposure Comments:	3560 vpd on Poplar Avenue, main alignment (Austroads trigger 1000-5000 vpd)	Estimated 60 Pedestrians/day although could be higher given residential/ recreational/ education nature. More survey data required. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger 50- 100 pedestrians)	Estimated 180 on the crossing point, although could be higher given residential/ recreational/ education nature. More survey data required. Other cyclists are on the road. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger >100 cyclists)
Exposure Score:	2/4	3/4	4/4
Likelihood Comments:	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Intersection is a give way priority with no restriction in movement, no specific turning facilities are provided. Intersection width with relatively large radii/shoulder width is likely to encourage higher speed approach and manoeuvring, particularly for left turn from Poplar Avenue. Visibility to right from Matai Road obstructed when there is a bus stopped – otherwise good visibility. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound – forward visibility and downhill speed for eastbound vehicles on Poplar Avenue, therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound – forward visibility and downhill speed for eastbound vehicles on Poplar Avenue – therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted.

	<ul style="list-style-type: none"> High approach speeds on Poplar Avenue 48 km/h westbound and 47 km/h eastbound. Limited street lighting. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Visibility of the Poplar Avenue/Matai Road Intersection is, on the whole, good. <p>Reduced approach speeds with raised zebra but not an existing crash problem at intersection.</p>	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some pedestrians cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path and footpath are present for the majority of the alignment. <p>Conspicuity of crossing significantly improved</p> <p>Controlled crossing gives drivers mandatory give way</p>	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some cyclists cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path is present for the majority of the alignment. <p>Conspicuity of crossing significantly improved</p> <p>Controlled crossing gives drivers mandatory give way</p>
Likelihood Score:	2/4	2/4	2/4
Severity Comments:	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> 85th %tile speeds on Poplar Avenue exceed the posted speed limit as the road eastbound is downhill and westbound relatively straight with little side friction, any crash is potentially close to the survivability threshold of 50 km/h. Collision angle – all turning manoeuvres will expose vehicles to the highest risk angles, around 90 degrees (side on). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> Speeds are unlikely to be excessive on Matai Road approach. Low heavy vehicle numbers. 	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Speeds controlled to below threshold for survivability</p>	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h) <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Speeds controlled to below threshold for survivability</p>

	Approach speeds will be reduced with raised zebra.		
Severity Score:	2.5/4	2/4	2/4
Product (Multiply scores above for crash type)	10/64	12/64	16/64
38/192			

Table 6: SSA Matrix – Option 3 - Long term option revised Poplar Avenue/Matai Road intersection layout

Black text: Common factor between the “existing conditions” and this option

~~Strikethrough~~: Factor that is removed or significantly diminished between the “existing conditions” and this option

Red text: New or significantly altered in this option compared to the “existing conditions”

	Intersection	Pedestrian	Cyclist
Exposure Comments:	3560 vpd on Poplar Avenue, main alignment (Austroads trigger 1000-5000 vpd)	Estimated 60 Pedestrians/day although could be higher given residential/ recreational/ education nature. More survey data required. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger 50- 100 pedestrians)	Estimated 180 on the crossing point, although could be higher given residential/ recreational/ education nature. More survey data required. Other cyclists are on the road. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger >100 cyclists)
Exposure Score:	2/4	3/4	4/4
Likelihood Comments:	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Intersection is a give way priority with no restriction in movement, no specific turning facilities are provided. Intersection width with relatively large radii/shoulder width is likely to encourage higher speed approach and manoeuvring, particularly for left turn from Poplar Avenue. Visibility to right from Matai Road obstructed when there is a bus stopped – otherwise good visibility. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue, therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue -therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted.

	<ul style="list-style-type: none"> High approach speeds on Poplar Avenue 48 km/h westbound and 47 km/h eastbound. Limited street lighting. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Visibility of the Poplar Avenue/Matai Road Intersection is, on the whole, good. <p>Reduced approach speeds with roundabout or raised table but not an existing crash problem at intersection.</p>	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some pedestrians cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path and footpath are present for the majority of the alignment. Petition indicates there are near misses, but CAS has no reported crashes. <p>Reduced vehicle speeds and the crossing point combined with intersection - however no formal crossing facilities provided and hence possible conspicuity issues?</p>	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some cyclists cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path is present for the majority of the alignment. Petition indicates there are near misses, but CAS has no reported crashes. <p>Reduced vehicle speeds and the crossing point combined with intersection - however no formal crossing facilities provided and hence possible conspicuity issues?</p>
Likelihood Score:	2/4	3/4	3/4
Severity Comments:	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> 85th %tile speeds on Poplar Avenue exceed the posted speed limit as the road eastbound is downhill and westbound relatively straight with little side friction, any crash is potentially close to the survivability threshold of 50 Km/h. Collision angle – all turning manoeuvres will expose vehicles to the highest risk angles, around 90 degrees (side on). 	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Reduced vehicle speeds</p>	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h) <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Reduced vehicle speeds</p>

	<p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> • Speeds are unlikely to be excessive on Matai Road approach. • Low heavy vehicle numbers. <p>Reduced speeds on the approach and through the intersection</p>		
Severity Score:	2/4	3/4	3/4
Product (Multiply scores above for crash type)	8/64	27/64	36/64
71/192			

Table 7: SSA Matrix – Option 5 – Long Term Option Traffic Calming

Black text: Common factor between the “existing conditions” and this option

~~Strikethrough~~: Factor that is removed or significantly diminished between the “existing conditions” and this option

Red text: New or significantly altered in this option compared to the “existing conditions”

	Intersection	Pedestrian	Cyclist
Exposure Comments:	3560 vpd on Poplar Avenue, main alignment (Austroads trigger 1000-5000 vpd)	Estimated 60 Pedestrians/day although could be higher given residential/ recreational/ education nature. More survey data required. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger 50- 100 pedestrians)	Estimated 180 on the crossing point, although could be higher given residential/ recreational/ education nature. More survey data required. Other cyclists are on the road. Lack of formal crossing could have a negative effect on active travel uptake – potential for suppressed demand but it is difficult to quantify this. (Austroads trigger >100 cyclists)
Exposure Score:	2/4	3/4	4/4
Likelihood Comments:	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Intersection is a give way priority with no restriction in movement, no specific turning facilities are provided. Intersection width with relatively large radii/shoulder width is likely to encourage higher speed approach and manoeuvring, particularly for left turn from Poplar Avenue. Visibility to right from Matai Road obstructed when there is a bus stopped – otherwise good visibility. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue, therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted. 	<p><i>Factors that increase the likelihood include:</i></p> <ul style="list-style-type: none"> Limited advance crossing conspicuity eastbound - forward visibility and downhill speed for eastbound vehicles on Poplar Avenue -therefore drivers may be unaware of crossing. Limited advance crossing conspicuity for westbound drivers who approach from a long straight from a 50 km/h road that doesn't look or feel like 50 km/h. Visibility from crossing to the left restricted.

	<ul style="list-style-type: none"> High approach speeds on Poplar Avenue 48 km/h westbound and 47 km/h eastbound. Limited street lighting. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Visibility of the Poplar Avenue/Matai Road Intersection is, on the whole, good. <p>Reduced approach speeds with traffic calming but not an existing crash problem at intersection.</p>	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some pedestrians cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path and footpath are present for the majority of the alignment. Petition indicates there are near misses, but CAS has no reported crashes. <p>Reduced approach speeds with traffic calming. Heightened road user awareness of change in road environment and likely presence of vulnerable road users</p>	<ul style="list-style-type: none"> Eastbound warning sign is for bend only, not the crossing – limited warning of crossing point in both directions. High approach speeds on Poplar Avenue. Site observations indicate that some cyclists cross away from the crossing point within the Matai Road intersection. Crossing facilities are very basic. <p><i>Factors that decrease the likelihood include:</i></p> <ul style="list-style-type: none"> Shared path is present for the majority of the alignment. Petition indicates there are near misses, but CAS has no reported crashes. <p>Reduced approach speeds with traffic calming Heightened road user awareness of change in road environment and likely presence of vulnerable road users</p>
Likelihood Score:	2/4	3/4	3/4
Severity Comments:	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> 85th %tile speeds on Poplar Avenue exceed the posted speed limit as the road eastbound is downhill and westbound relatively straight with little side friction, any crash is potentially close to the survivability threshold of 50 km/h. Collision angle – all turning manoeuvres will expose vehicles to the highest risk angles, around 90 degrees (side on). 	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h). <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Reduced approach speeds with traffic calming.</p>	<p><i>Factors that increase the severity include:</i></p> <ul style="list-style-type: none"> Vehicle speeds are over 30km/h (85th %tile = 48 km/h and 47 km/h) <p><i>Factors that decrease the severity include:</i></p> <ul style="list-style-type: none"> None <p>Reduced approach speeds with traffic calming.</p>

	<i>Factors that decrease the severity include:</i> <ul style="list-style-type: none"> • Speeds are unlikely to be excessive on Matai Road approach. • Low heavy vehicle numbers. Approach vehicle speeds reduced.		
Severity Score:	2/4	3/4	3/4
Product (Multiply scores above for crash type)	8/64	27/64	36/64
71/192			

4 Applicability

This report has been prepared for the exclusive use of our client Kapiti Coast District Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd

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