

**Before Independent Commissioners  
At Palmerston North**

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Under the Resource Management Act 1991 (the Act)

In the matter of Proposed Plan Change G to the Operative District Plan for  
Palmerston North

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**Statement of evidence of Glenn Connelly for Waka Kotahi New  
Zealand Transport Agency Limited -Transport**

Dated 27 October 2023

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## **Statement of Evidence of Glenn Connelly**

### **1 Qualifications & Experience**

- 1.1. My full name is Glenn Connelly. I am a Senior Safety Engineer at Waka Kotahi New Zealand Transport Agency (Waka Kotahi), a position I have held since August 2022. My role involves providing traffic, transportation and safety advice for the state highway transport network and specialist transportation advice for land use consents.
- 1.2. Prior to joining Waka Kotahi I worked in both the public and private sectors. I have experience and strengths in design, safety auditing, crash reduction, land use and transport planning, and assessing effects for all road users.
- 1.3. I hold a Bachelor of Engineering (Civil) from Auckland University, New Zealand. I am a Member of Engineering New Zealand (MEngNZ) and have over 30 years' experience in traffic engineering. I have worked and been a resident in Palmerston North for over 30 years and am familiar with the environment, including 20 years' service for Palmerston North City Council (PNCC) as a traffic engineer.
- 1.4. My evidence relates to the Proposed Plan Change G: Aokautere Urban Growth (PPCG). I am providing advice on traffic safety-related matters on behalf of Waka Kotahi.

### **2 Executive Summary**

- 2.1 The Aokautere area has grown resulting in increased residential development and associated traffic. The road environment is mixed, transitioning from rural to urban areas with pockets of recreational gullies and reserves. The road environment has been developed and represents a historic State Highway use and higher speed limit.
  - 2.2 There are current plans to reduce the speed limit to recognise a national objective to prioritise safety for all road users. A lower speed limit would also better suit the increasingly urban development. Waka Kotahi in partnership with PNCC has plans to install connected protected cycleways along the highway. This along with some minor improvements for pedestrians would address many of the existing safety issues on the state highway route, with the underlying objective of these works being to provide safe speeds and mitigate the risk of serious injury.
  - 2.3 Given planned growth PNCC should be working with Waka Kotahi to plan and holistically review the operation of the state highway to balance competing demands and achieve key outcomes, of which safety would be a key component. This in my view should include consideration of the speed limit, along with the provision for cyclists and pedestrians on SH57, between the rear entrance to Massey and Titirangi Drive. This would then provide a sound basis to consider the existing issues on SH57 and how to plan and integrate the proposed growth of PPCG.
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- 2.4 Initial growth associated with PPCG would not necessarily create an immediate significant adverse impact on safety, if the currently planned improvements are made and mitigate the risk of serious injury for all road users. It is however accepted that the PPCG development will create a substantial amount of traffic, and at some stage require a fundamental change to the control of some the state highway intersections. Ultimately, it is accepted that the installation of traffic signals or a roundabout is likely to be needed for the suggested state highway intersections. The consideration of when to upgrade an intersection is however involved and should be considered holistically, balancing the competing demands and considering the needs of all road users. The drivers and timing of when the intersections would need upgrading is currently unclear, especially when planned changes on the state highway could effectively mitigate some safety concerns.
- 2.5 It is my opinion to avoid significant adverse effects from PPCG the risk of serious injury should be mitigated. This can primarily be addressed by managing conflicts and achieving safe collision speeds. I also agree that excessive delay should be avoided, to mitigate the risk that safety will deteriorate as delays increase and drivers are less cautious. I therefore suggest the following strategy be considered and represented in the provisions of the Plan.
- a The speed limit is lowered on the state highway, as this is the primary means of improving safety.
  - b Improvements are made to walking and cycling infrastructure on the state highway to mitigate the risk of serious injury.
  - c Intersections are upgraded to avoid excessive delays, at the appropriate time.

### **3 Scope of Evidence**

- 3.1 I have undertaken the following in preparing my evidence:
- a. I visited the proposed site on several occasions. I drove around the PPCG area and cycled along State Highway 57 (SH57) on the 26<sup>th</sup> September 2023.
  - b. I reviewed the following information.
    - i. Section 42A Report – Strategic Planning
    - ii. Section 42A Report – Transport
    - iii. Appendix 5: Traffic Assessment Aokautere
  - c. I attended a pre-application meeting at PNCC's offices of Tuesday 26 September 2023, where traffic and transportation matters were discussed.

## **4 CODE OF CONDUCT**

- 4.1 I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This evidence has been prepared in compliance with that Code, as if it were evidence being given in Environment Court proceedings. Unless I state otherwise, this assessment is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

## **5 PURPOSE AND SCOPE OF THE EVIDENCE**

- 5.1 The purpose of my evidence is to assess the key traffic and transportation safety effects of PPCG as they relate to the State Highway and respond to the evidence submitted by the Council. I have focussed on matters that in my opinion need clarification or further assessment.
- 5.2 The transport matters of PPCG have been considered in the Aokautere Structure Plan Assessment (H Fraser 28 July 2022) and S42A Technical Report – Transportation (H Fraser, 15 Sept 2023). These assessments are of greatest relevance to traffic safety on the state highway and will thus be my main area of focus.
- 5.3 My evidence addresses the following matters:
- a. A brief description of the proposal.
  - b. A summary of areas of agreement.
  - c. Consideration of traffic volumes and growth on the state highway in more depth
  - d. Consideration of crash information to develop insights into safety on the state highway.
  - e. A response to the Council's Section 42A Report for Transportation, as it relates to safety on the State Highway.
  - f. A response to the Safe System Audit for the state highway.
  - g. A consideration of mitigation and plan provisions.

## **6 THE PROPOSAL**

- 6.1 The proposal is as described in the S42A planning and transportation reports, and is summarised as follows.
- 6.2 The plan change will enable some up 1020 to 1,064<sup>1</sup> dwellings at varying densities. It will also include a modest scaled retail / commercial area to provide local services and amenities. The assessments include some minor variation in scale of the development, however in my view this does not make a material difference in assessing the growth-related transport effects on SH57.

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<sup>1</sup> S42a Transportation – Section 5

6.3 The proposal is best depicted in the structure plans as contained in the S42A planning reports, one of which is include below for context and convenience.

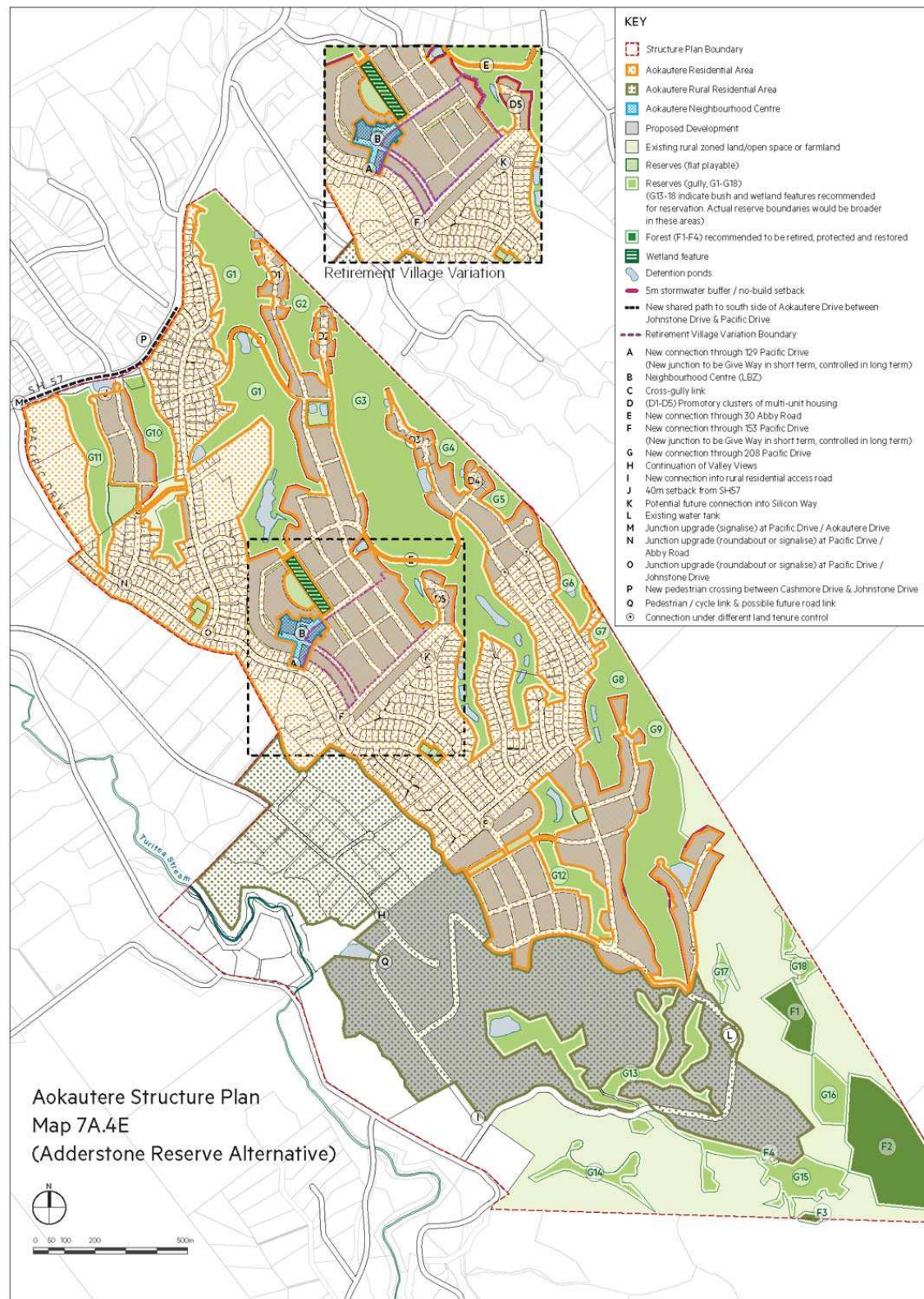


Figure 1 Aokautere Structure Plan

## 7 AREAS OF AGREEMENT & AREAS TO BE DEVELOPED

7.1 I generally agree with the following matters, noting that I provide further information where relevant in subsequent paragraphs of this statement of evidence.

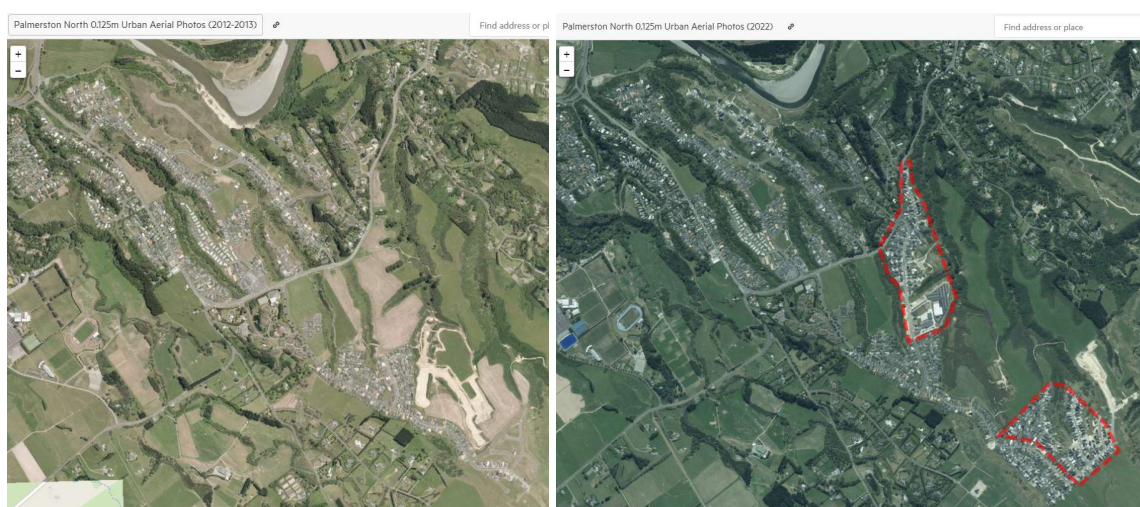
Topic	Assessment
Traffic Environment	<p>The traffic environment is described in Section 3 of Ms Fraser's initial Transportation Assessment (July 2022) (TA) with which I generally agree. Noting that this may be developed when further considering site specific matters on the State Highway.</p> <p>The existing intersection performance (TA Section 3.3) identifies intersection overall performance as very good as they have the best of the five classes of operating characteristics (Level of Service A). Ms Fraser notes the risk of increased / excessive delay if right turning traffic has to yield to both directions of traffic on the main road, as has been observed to be the case for most drivers.</p> <p>In my opinion it would be useful and prudent for the modelling to be correlated to observed queue lengths. This may have been done but it is not clear from the assessments. The calibrated modelling along with some interpretation could then be used to give a better indication of likely effects when development occurs. I note this is likely to be less relevant in terms of the ultimate outcome, however, may be more relevant for consideration for timing of upgrades.</p>
Traffic Flows	<p>The traffic flows present a sound basis for assessment.</p> <p>There has been significant growth on the state highway in the vicinity of PPCG, and I discuss this further in paragraphs 8.1 to 8.3 of this statement of evidence.</p>
Trip Rate	<p>The estimated trip rates are considered an appropriate basis for assessment. They have been based on a survey of local traffic, which is best practice. They are also within the typical ranges for trip generation which are as follows.</p> <ul style="list-style-type: none"> <li>• 7.8 to 10.9 vehicle movements / day / household</li> <li>• 0.9 – 1.2 vehicle movements / day / household</li> </ul> <p>In my opinion, the trip rate adopted by Ms Fraser is at the lower end of the scale, however increasing the trip rate (by say 10%) would not generally change the conclusions or recommendations. Additionally, where traffic growth may be of concern it can be considered in more detail with its sensitivity to variations in traffic growth tested.</p>
Crash History	<p>I agree with the crash information presented in the TA and in Ms Fraser's S42A report. I have however provided further information in paragraphs 8.4 to 8.9 of this statement, to give greater insight into the operation and risks on SH57 Aokautere Drive.</p>



## 8 BACKGROUND & CONTEXT

### Historical Traffic Growth

- 8.1 The base traffic volumes are included in Ms Fraser's s42A report and Transportation Assessment. In my opinion, however, it is useful to further examine increase in traffic volumes.
- 8.2 Land development in the vicinity has intensified significantly in the last 10 years. Based on aerial photos from LINZ, I estimate that the number of residential dwellings has increased by over 400 dwellings between 2013 and 2022. In my experience, this would generate some 3,200 vehicle movements per day, using the 8 vehicle movements per day per household trip rate derived from the traffic counts on Pacific Drive in the TA<sup>2</sup>.



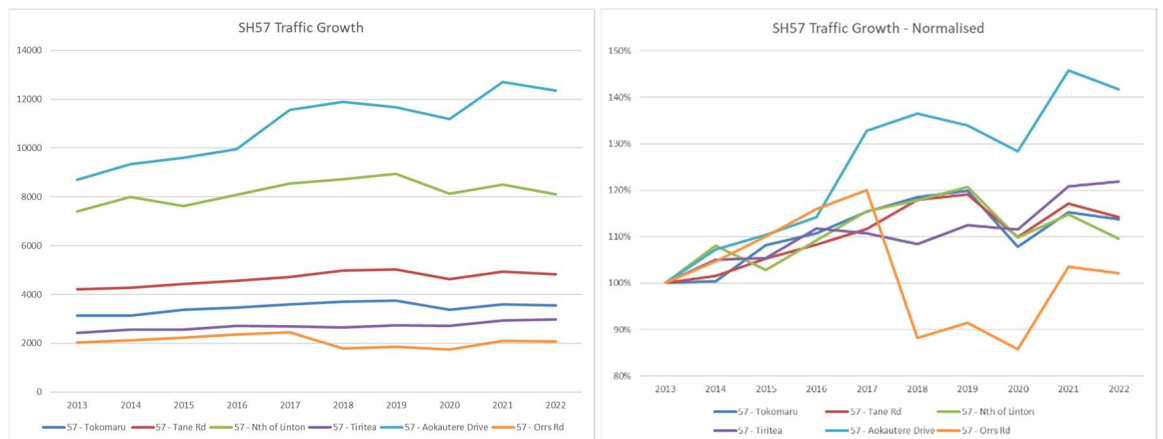
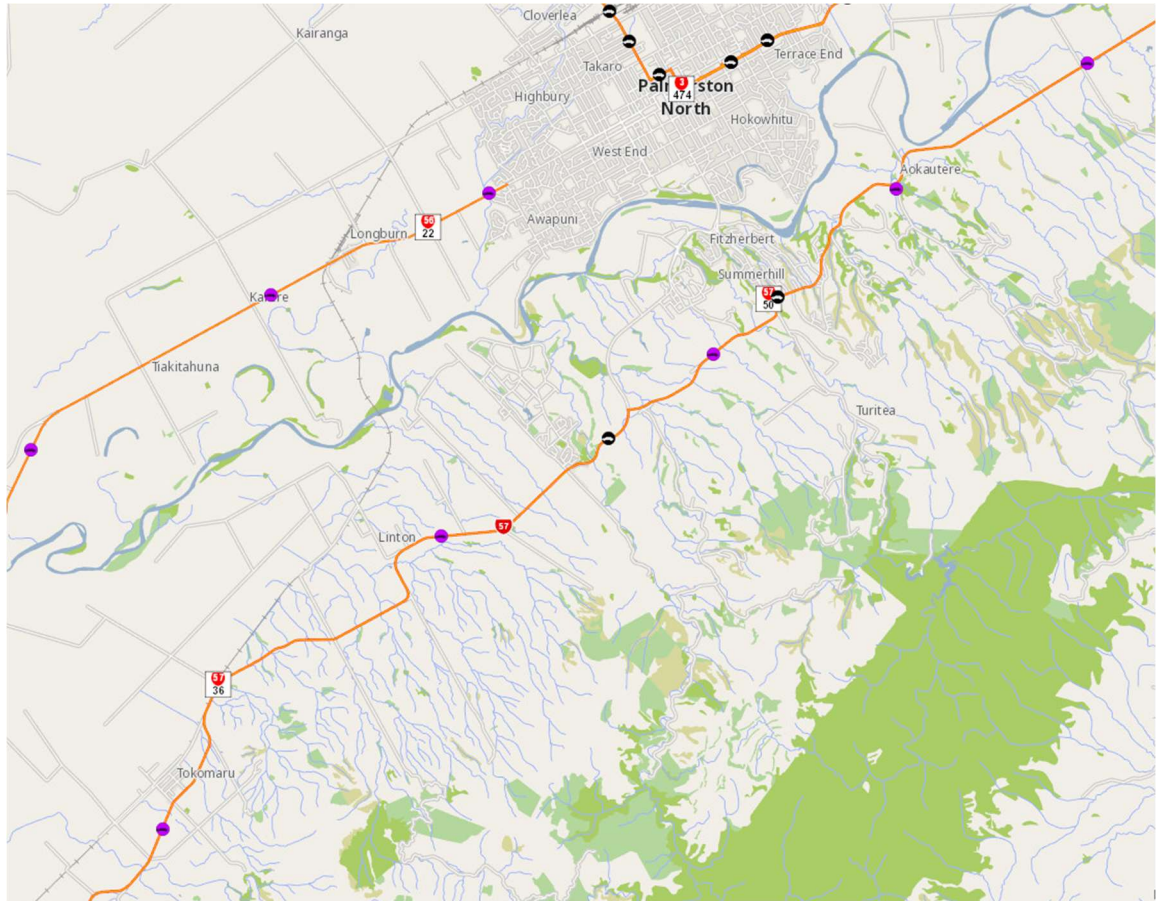
**Figure 2** 2013 Aerial Photo in comparison to 2022 Aerial Photo (LINZ)

- 8.3 The following table and figures (Figure 3) compare traffic volumes and growth on SH57 from Tokomaru to SH3 and demonstrate the increase in traffic resulting from growth already established in the Aokautere area. The SH57 Aokautere site is located east of the Summerhill / Turitea Road intersection and shows an increase of 3,633 vehicles per day between 2013 and 2022. This is over five times the increase in volumes observed elsewhere, and two to four times greater than other growth rates along SH57, as demonstrated in vehicles per day (vpd) and percentage (%) columns in Figure 3. This reinforces the substantial amount of growth in traffic on SH57 east of Summerhill Drive.

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<sup>2</sup> Structure Plan Transport Assessment (H Fraser) July 2022 - Section 3.2, Page 10

Location	Traffic Count (AADT) Year											2022-2013	
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		vpd	%
57 - Tokomaru	3,125	3,137	3,380	3,459	3,604	3,705	3,746	3,371	3,601	3,556		431	14%
57 - Tane Rd	4,219	4,287	4,440	4,567	4,713	4,978	5,024	4,637	4,940	4,820		601	14%
57 - Nth of Linton	7,402	7,998	7,616	8,087	8,551	8,719	8,939	8,124	8,500	8,111		709	10%
57 - Tiritea	2,435	2,559	2,565	2,723	2,695	2,641	2,740	2,717	2,943	2,967		532	22%
57 - Aokautere Drive	8,712	9,345	9,612	9,946	11,569	11,892	11,666	11,186	12,705	12,345		3,633	42%
57 - Orrs Rd	2,033	2,129	2,236	2,357	2,440	1,794	1,859	1,743	2,105	2,076		43	2%

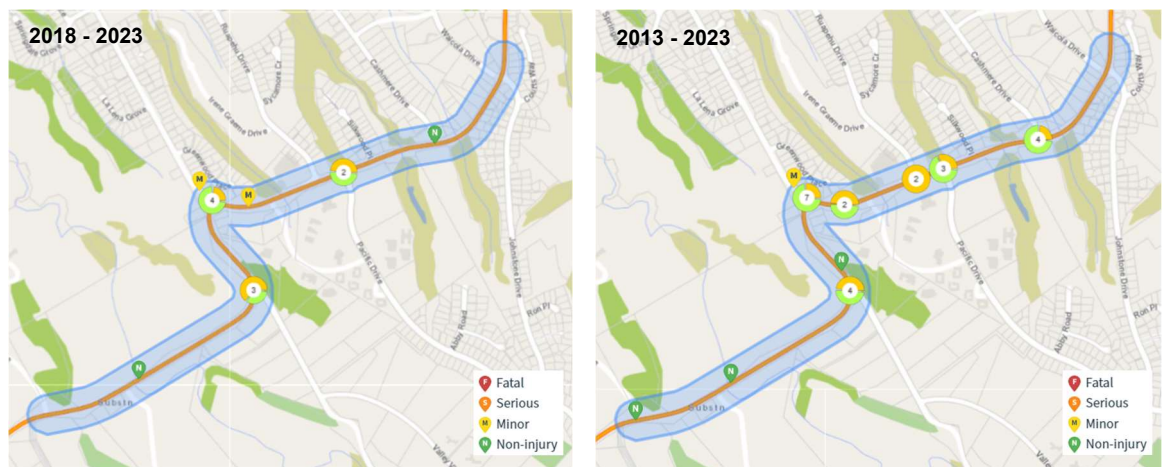


**Figure 3 SH57 Traffic Counts by Year & Site Locations**

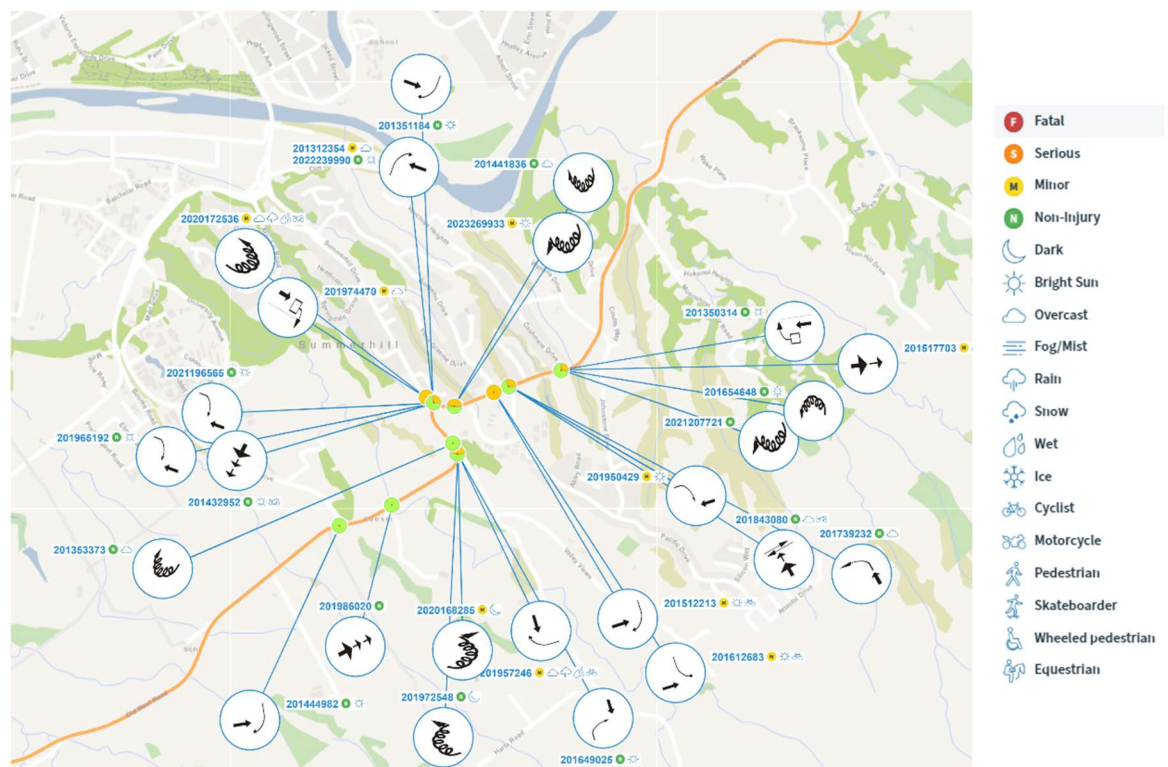


## SH57 Aokautere Crash Information

- 8.4 The traffic on SH57 near the Summerhill Drive is substantial and has seen significant growth due to increased development. Despite the increase in traffic this part of SH57 has a relatively low number of crashes and risk.
- 8.5 The following diagrams show the crash location and severity along SH57 between Johnston Drive and the rear access to Massey (as depicted by the blue buffer / polygon). I reviewed the latest five and ten years' crash history, with the longer period potentially giving better insight where crash numbers may be statistically low as is often the case for crashes involving cyclists and pedestrians.



**Figure 4** Crash Locations & Numbers (5 & 10 Year)  
As at October 2023



**Figure 5** Collision Diagram

- 8.6 The latest 10 years' crashes on or near the State Highway can be summarised as follows.
- There have been no fatal or serious crashes.
  - There have been 10 minor injury crashes and 16 non injury crashes.
  - The crash numbers appear consistent, possibly including a modest decline, but have not increased with the increase in traffic.
  - Crashes in the later afternoon are overrepresented.
  - There have been 4 crashes involving cyclist, 1 involving a motorcyclist and none involving pedestrians.
  - There have been 22 crashes at or near intersections, and 4 midblock crashes.
  - The main crash factors are: failed to give way (10), poor observation (9), speed (6), and incorrect lane position (6).
- 8.7 The 'Collective Risk' is a measure that is used to compare the number of fatal and serious crashes, and is useful in determining where road safety gains can be made. SH57 (Summerhill to Johnston) has low medium collective risk<sup>3</sup>, which is below average being the second lowest of the five risk categories.
- 8.8 'Personal Risk' is a measure that accounts for traffic volume and is an indication of the risk to a road user being involved in a death or serious injury crash. SH57 (Summerhill Drive to Johnstone Drive) has low personal risk<sup>1</sup>, which is the lowest level of the five risk categories.
- 8.9 These crash metrics demonstrate that the crash numbers and risk are low. These are key indicators when considering safety improvements and indicate that Waka Kotahi would prioritise treating other areas where crash numbers and risks are higher.



**Figure 6: Collective & Personal Risk <sup>1</sup>**

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<sup>3</sup> Source: Megamaps <https://maphub.nzta.govt.nz/MegaMaps/> and crash data 2017 – 2021.

## **9 RESPONSE TO COUNCIL'S SECTION 42A REPORT – TRANSPORTATION**

- 9.1 I agree that there is the potential for the plan change to result in significant additional vehicle traffic [ S42A 1(a)].
- 9.2 I generally agree that ultimately Ms Fraser's recommended mitigation measures (Table 12 of the Transportation Assessment) are likely to mitigate potential safety risks associated with the growth enabled by PPCG. It would however be better to understand how these measures will be integrated with the planned operation of the state highway; that is to clearly understand how the mitigation measures will manage the competing demands and achieve expected outcomes which are needed to support investment. Ms Fraser throughout the assessments refers to existing issues needing to be addressed. It would be beneficial in my view to inform PPCG to have a better understanding of: the need for the existing issues to be addressed, whether they will be addressed by planned improvements, if there are alternative treatments, when intervention would be needed, as well as if and when they might be funded.

### **Planned & Operational Improvements**

- 9.3 There are plans to reduce the speed limit through the 2024-27 speed management plan which will have broad safety benefits. A lower speed limit could largely address the safety of motor vehicle occupants for the existing intersections and the risk of impact with hazards, as it could achieve impact speeds of 50kph or less. The proposed installation of protected cycle ways will also be of benefit to cyclists and other road users, including for example improvements to the pedestrian crossing point. The benefit of these two measures is demonstrated in the Safe System Audit which Ms Fraser recognises at Para 13 Page 23 of her evidence, noting that these changes would provide a safer environment than currently exists albeit some risk for pedestrians would remain. The Safe System Audit (Table 4) indicates that the planned corridor upgrades would result in a safer environment than existing, and that these safety benefits would be more beneficial than the installation of traffic signals or a roundabout<sup>4</sup>.
- 9.4 The Safe System Audit and transport assessments suggest additional improvements including: another crossing point on the highway near the Adderstone Reserve, additional footpath between Johnston Drive and Pacific Drive, and improvements to sight lines. These are relatively routine matters that can be addressed in collaboration with PNCC as needed.

### **Need for Suggested Mitigation – Response to S42A – Transportation**

- 9.5 Ms Fraser's Transport and S42A Assessments suggests traffic signals or a roundabout are needed at several intersections along the state highway. This potentially provides the safest outcome and is ultimately expected to be the best holistic solution once the PPCG area is fully

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<sup>4</sup> Status Quo score of 166, reduces to 89 for the upgraded corridor, and 106 for the upgraded corridor with additional PPCG use.

developed. A better understanding of the need, strategic fit, integration, timing, relation to other planned work, funding and delivery would be useful to inform the Plan Change.

- 9.6 The reasons for suggesting signals or a roundabout are brief and summarised in the transport assessment tables (TA Section 6 - Table 12, and S42A Transportation: Section J – Table 7). These are summarised and further considered in the following table.

**Table 1**                      **Discussion of Suggested Traffic Signals or Roundabout Intersections of SH57/Turitea/Summerhill, SH57/Pacific, & SH57/Johnstone**

Council TA Comments	Context & Further Consideration
a. Signals or a roundabout will mitigate the safety risks.	<p>Signals and roundabouts control conflicts in different ways however it is necessary for both to reduce collision speeds to 30 kph or less to mitigate the risk of serious injury to vulnerable road users, such as pedestrians or cyclists.</p> <p>Raised platforms are now being used with traffic signals and the geometric design of roundabouts can achieve 30 kph operating speeds.</p> <p>Traffic signals can better accommodate cyclists whereas roundabouts can be a challenge for cyclists and / or require a large amount of space to provide separate facilities.</p> <p>Traffic signals in my view are likely to be the best solution all considered. They have benefits beyond safety such as being able to prioritise through traffic and requiring less space. The type and need for intersection upgrade however is not simple and should be part of a holistic review.</p>
<p>b. Modelled delays are excessive, for Old West Road right turn.</p> <p>c. Safety will deteriorate as delays become excessive.</p> <p>d. Right turns could be facilitated with improved turn facilities / median.</p>	<p>All existing intersections are modelled and observed to be operating well; within the best class operating characteristics (Level of service A). State highway traffic has right of way and experiences little to no delay at most intersections except at Turitea Road, where state highway traffic have to turn right. It is suggested that the right turn delays could be excessive based on modelling.</p> <p>The modelled delays should be put in context of observed behaviour particularly as drivers can adapt where delays become excessive.</p> <p>The planned lower speed limit will help and may result in more drivers using the existing flush median.</p> <p>Installing signals at Ruapehu Drive / Summerhill Drive would create platoons and gaps in traffic on the main road.</p> <p>I agreed that improvements could be made to the turn facilities to help reduce delays for right turns. Any</p>

Council TA Comments	Context & Further Consideration
	<p>substantial alterations should also be considered strategically.</p> <p>Intersections on the southern side of the State Highway will have modest right turn volumes with the majority of traffic heading to and from the city.</p> <p>Cashmere Drive on the northern side of SH57 connects to Ruapehu Drive, which provides an alternative route potentially avoiding the need to make a right turn.</p> <p>Silkwood Place has a flush median which could allow a right turn in two stages. It is a cul de sac with limited development and road users will generally be familiar with the environment.</p> <p>Furthermore, the lower speed limit will improve safety, and potentially provide a safe system outcome for motorists.</p> <p>There has also been no serious crashes in the last 10 years on the highway. Whilst this is not guaranteed to continue it provides a useful context when considering priorities.</p>
<p>e. The possible signalisation of the intersection would be driven by safety rather than the traffic carrying performance of the intersection with a particular consideration being the safe passage of citybound cyclists across the Old West Road approach</p>	<p>The turning movements at the intersection already moderate speed to a degree, which could be improved with the proposed protect cycleways. If a collision speed of 30 kph is achieved this would achieve a safe system outcome for cyclists. This could negate the safety need that is suggested to drive the need for the intersection to be upgraded.</p> <p>The proposed protected cycleways will improve the awareness of motorists to the presence of cyclists.</p> <p>The planned lower speed limit would also assist.</p>
<p>f. There are no existing facilities for pedestrians or cyclists to cross SH57 at Pacific Drive.</p> <p>g. The majority of the traffic will use SH57.</p>	<p>The crossing point in front of the Summerhill Retail Precinct provides a crossing facility which is convenient for access to the retail precinct. It is somewhat less convenient for access to Ruapehu Drive given it is 40m beyond the intersection.</p> <p>Pedestrian movement data (S42A Transport – Figure 6 - Strava Heatmap) shows that the existing crossing point by the Summerhill Shops is used. Additionally the pedestrian data shows there are few pedestrians crossing near Pacific Drive which could be due to the lack of crossing facilities, but more likely that there is little activity directly opposite on the northern side of the highway. The pedestrian movement data does highlight that pedestrians cross the highway near Adderstone Reserve east of Silkwood Place where there are no facilities. Noting that this relates to use of the recreational walkways.</p>



Council TA Comments	Context & Further Consideration
	<p>It is agreed that most of the traffic will use SH57. This will increase the flow of traffic along the state highway and reduce the number of gaps in traffic making it more difficult for pedestrians to cross the highway. Whilst traffic signals or a roundabout at Pacific Drive might address this, pedestrian refuges or crossing points could in the interim be used to achieve a similar outcome.</p>
<p>h. The SSA has shown that either a roundabout or signals would be able to mitigate the adverse safety effects associated with the additional traffic.</p>	<p>I agree that signals or a roundabout could mitigate the safety risks on the State Highway for the existing environment and with the development proposed in PCG.</p> <p>The Safe System Audit is a tool that focuses on safety issues and possible treatments. It is not the role of the Safety Auditor to decide on the solution or timing of any safety intervention. The Safety Audit is provided to the RCA for consideration and how to respond to the safety issues raised. This is normally considered and documented in Safety Audit in the table following each safety concern, where each recommendation is considered by the designer and safety engineer, prior to the client deciding what action is to be taken. The Safe System Audit would have provided a better context for the safety concerns raised if this the response had been completed.</p> <p>Section 4 of the SSA compares the existing state highway intersection with the installation of traffic signals or a roundabout, for both the current and expected PPCG traffic flows. The results reinforce that the signals or roundabout would provide a safer solution which is to be expected, as these are accepted standard safety interventions.</p> <p>The SSA considers the impact of planned improvements for the corridor (Section 4.1.1) and notes that the planned reduction in speed limit and protected cycleways will result safety improvements that match or exceed that of installing a roundabout or traffic signals. This reinforces the current strategy and priorities Waka Kotahi has for the state highway in this area.</p> <p>It would be interesting to see how signals and / or a roundabout measure with the planned lower speed and protected cycleways. A SSA is however a tool and would nonetheless be considered when holistically reviewing the how and when to upgrade the intersection.</p> <p>I also note the SSA in Section 5 .1 does not recommend the installation of traffic signals or a roundabout. It recommends 'that both the speed limit is reduced, and that infrastructure is upgraded (e.g. by changing</p>

Council TA Comments	Context & Further Consideration
	intersection form) to manage speeds below the survivability threshold speeds. This could potentially be achieved with the planned speed limit review, separated cycles, along with other minor improvements. The immediate need for signals or a roundabout might thus be mitigated.
i. I recommend that the Structure Plan is annotated with 'intersection upgrade' in this location with the timing as previously recommended.	<p>I agree that it is useful to identify the need to upgrade the intersections.</p> <p>I am of the view that it would be ideal to have the intersections upgraded as soon as possible, however I am concerned that this may not be practical or as easily achieved as implied.</p>

- 9.7 I reiterate that ultimately traffic signals or a roundabout are most likely to provide the most appropriate holistic solution. They would mitigate existing issues and could cater for the planned growth. It is not a simple decision or process to install traffic signals or a roundabout, particularly when considering the planned interventions will improve safety, the roads are performing well.

**Table 2                      Discussion of Suggested Path & Crossing                      SH57 between Johnstone & Pacific Drives**

Council TA Comments	Context & Further Consideration
a. Existing lack of connectivity and safety for pedestrians and cyclists along this section of SH57 will be exacerbated by additional vehicle traffic	<p>Cyclists and pedestrians can use the existing shoulder albeit it is narrower than desirable in some places.</p> <p>The shoulder width can be improved in conjunction with the planned protected cycleways and resurfacing, particularly between Adderstone Reserve and Pacific Drive. A shared pathway could be designated potentially with some protection where sufficient shoulder width is available and / or can be obtained.</p> <p>The section between Cashmere Drive and Johnstone Drive is narrower, and the gully/s presents some challenges to provide a simple cost effective solution. Shared pathways could be an option and more feasible with the planned lower speed limit.</p>
b. A pedestrian crossing facility, most likely in the form of dropped kerbs and a median island, is also needed at a point along the section of SH57 Aokautere Drive between	<p>It is agreed that a centre refuge would be of benefit.</p> <p>The lower speed limit planned will be of benefit however the collision speed would ideally be managed to 30 kph to avoid the risk of serious injury. This would typically be done by have a raised safety platform, the impact of which is best considered</p>

Council TA Comments	Context & Further Consideration
Cashmere Drive and Johnstone Drive.	holistically and in context with the planned use and competing demands of the SH.
c. The SSA, Road Safety Audit and the Strava data all demonstrate the need for improved facilities for active modes along and across SH57 Aokautere Drive. This should be progressed as soon as possible. I am of the view that the improvements are needed regardless of PPCG	<p>The pedestrian activity heatmap (S42A Transportation – Figure 6) shows heavy use of the Adderstone Reserve and that most pedestrians use the footpath on the northern side of the SH.</p> <p>It is agreed that improved pedestrian facilities would be useful, particularly to support recreational access to the reserve. This could be achieved by providing better crossing facilities to access the footpath on the northern side of the SH, and / or by allocating some of the existing seal shoulder space and / or providing shared pathways as discussed above.</p>

## 10 Response to SSA Report

- 10.1 The key objective of Safe System Audit undertaken by WSP (August 2023) is as follows.

*To deliver completed projects that contribute towards a Safe System by identifying and ranking potential safety concerns for all road users and others affected by a transport project. SSA Section 1.1*

- 10.2 The SSA is independent review which reviews safety for all roads and bring all areas that are inconsistent with a Safe System along with an assessment of their risk. It is not intended to be prescriptive regarding any safety treatments or interventions.

*Any recommended treatment of an identified safety concern is intended to be indicative only, and to focus the design team on the type of improvements that might be appropriate. It is not intended to be prescriptive and other ways of improving the road safety or operational problems identified should also be considered. SSA Section 1.1*

- 10.3 Additionally, the SSA should be presented to client for a decision if and how a safety matter is to be addressed, with input from the designer and their safety engineer. This is an important part of the process which is tracked and recorded in the SSA in Section 5 in a table after the recommendation for each safety concern. This has yet to be completed for the SSA but I note that a summarised response is provided by Ms Fraser for each of the matters in Table 2 of the Section 42A – Transportation Assessment. It is a core part of my role at Waka Kotahi to provide the safety engineer's response to the Safety Audit to assist with decision making.
- 10.4 The following is a summary of what I understand to be the key messages from the SSA. Further consideration of each of the matters raised on the State Highway can be found in Appendix 2.

#### *Section 4 – Assessment of Safe System Alignment*

- a. Increasing traffic volumes will result in the environment being less safe.  
This is in my view primarily as a result of increased traffic volumes and exposure, albeit as movements approach capacity there may also an increase in risk.
- b. The planned corridor upgrade (lower speed limit and protected cycleways) results in a safer outcome than existing situation, even with the addition of the PPCG traffic<sup>5</sup>. Thus whilst the increase in traffic from PPCG may increase the number of crashes, the planned lower speed limit and protected cycleways will offset this with potentially reduced crash numbers and severity.
- c. Signals and / or a roundabout perform better in terms of safety than the existing priority controlled intersections. This is not surprising as these are standard and accepted safety interventions.
- d. The proposed corridor upgrade provides a similar or better safety outcomes as installing traffic signals or a roundabout<sup>6</sup>.
- e. Attention needs to be to be given to ensure safety of vulnerable roads users.  
Cyclists and motorcyclists benefit from the proposed corridor upgrade (lower speed limit and protected cycle lanes). Safety for pedestrian is the only matter that would decline with the additional traffic from PPCG. This demonstrates the relative need for crossings to be provided in the right location, where conflict speeds are moderated to a safe level. I agree with this and note that this could be done with the installation of refuge islands and / or road safety platforms.

#### *Section 5 – Safety Concerns*

- f. A lower speed limit is recommended along with infrastructure that manages speed to below the survivability threshold. I agree with this and note that a reduction in speed limit is planned. Whilst changing the intersection form is referenced, which could include traffic signals, a roundabout or other treatments the key is to provide safe speeds for all users where a conflict might occur (as per the SSA 5.1.1). This may for example include the use of raised platforms to supplement traffic signals.
- g. Additional facilities for pedestrians to cross and walk along the road corridor were recommended. A refuge island could be used to facilitate crossing the highway but should include a raised safety platform to achieve safe system outcomes (collision speed of 30 kph or below). A pedestrian pathway could be provided on the southern side of the state highway between Johnstone Dr and Pacific Drive by widening shoulder / reallocating seal space, potentially with some separation for improved safety. Shared

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<sup>5</sup> The score the existing environment of 166 improves to 89 with the corridor upgrade, then declines to 106 with the additional traffic from PPCG.

<sup>6</sup> SSA Scores (Section 4.1.1 and 4.1.2) for current and future PCG flows, where lower scores are safer. Corridor Upgrade - 89 / 106, Traffic Signals - 100 / 122, Roundabout - 104 / 122

pathways could also be considered where space is limited. This should be considered as part of developing a safe pedestrian network within the wider management of the corridor.

- h. Wider shoulders are suggested to improve cyclist safety. The busier and more urban areas of the state highway are planned to have protected cycles ways. The transitional areas and more somewhat rural areas could be reviewed to see if seal widening is feasible. The needs of pedestrians should also be considered to see if shared pathways would be needed. This should be considered as part of developing a safe cycling and pedestrian network within management of the wider SH corridor.
- i. Improvements to sight lines, delineation, removal of hazards, signs maintenance and other such matters can be addressed under the routine day to day maintenance and management of the SH.

- 10.5 I have reviewed the outcome of the Safe Systems Audit provided as Attachment 2 to Ms Fraser's s42A report, and her summary in paragraphs 8-16 of her report.
- 10.6 I have considered the specific audit items in Section 5 of the SSA and replicated in the table on pages 24-26 of Ms Frasier's s42A report. While some of these items are existing issues, they do not necessarily require actioning in order for Proposed PPCG to occur. The SSA in my opinion is a useful tool identifying matters that need to be taken into account, but does not necessarily dictate that matters need to be addressed or work undertaken.
- 10.7 In my opinion; based on my experience and role at Waka Kotahi, the safety concerns identified in the SSA, which associated with existing traffic volumes in part generated by growth enabled in the Operative District Plan, will be addressed by projects that Waka Kotahi is already progressing. These projects are described in Ms Downs' evidence at paragraph 10.2.

## **11 Mitigation & Plan Provisions**

- 11.1 The Council's transportation assessments have suggested provisions for inclusion in the District Plan (S42A – Section J Table 7) which are conservative and avoid any further safety risks on the State Highway, particularly for pedestrians and cyclists. The following summarises the suggested provisions.
  - a. Installation of signals or roundabout prior to any development at the following intersections is recommended as part of the District Plan's provisions.
    - i. SH57 - Turitea / Summerhill
    - ii. SH57 - Aokautere / Ruapehu
    - iii. SH57 - Aokautere / Pacific



- b. The following upgrades are also recommended as part of the plan's provisions when two-way traffic flows on SH57 between Johnstone Dr and Cashmere Drive exceed 1,000 vehicle per hour
    - i. Provision of an active mode pathway between Johnston Drive and Pacific Drive.
    - ii. SH57 - Aokautere / Johnstone intersection is upgrade to traffic signals or a roundabout.
    - iii. Provision of a pedestrian / cyclist refuge between Adderstone Reserve entry and Silkwood Place.
- 11.2 It is accepted that the provisions would mitigate safety risks. They would achieve the ultimate outcome from the outset and provide a high level of safety and convenience for all users. I am thus fully supportive of this approach, however it is also useful to have a more pragmatic perspective knowing infrastructure improvements to the State Highway network require strategic alignment and prioritisation.
- 11.3 The planned lower speed limit and protected cycleways with some additional pedestrian facilities could in my opinion mitigate the risk of serious injury for all road users. These in my view should be the precursor to any development as this is what is needed to address the safety risk; that is to mitigate the risk of serious injury.
- 11.4 Consideration of when to upgrade an intersection is involved and should be considered holistically, balancing the competing needs, and taking into account the needs of all road users. The drivers and timing of when the intersections would need upgrading is unclear, particularly given planned changes to the network, other potential mitigation measures, the relatively good safety performance, and prioritisation. It is however agreed from a safety perspective that excessive delays should be avoided, to mitigate the risk of safety declining. Assuming there are no other practical mitigation measures the I suggest the thresholds for intervention could be: when the intersections overall performance deteriorates to Level of Service C/D, or when a particular movement is under significant stress as would be described as Level of Service E/F.
- 11.5 It is anticipated that this approach will be discussed with PNCC to review and develop the Plan's provisions, with the planners coordinating all expert advice.
- 11.6 The use of the Structure Plan is supported which provides a queue to necessary upgrade and connectivity.

## **12 CONCLUSION**

- 12.1 The Aokautere area has grown, and a substantial residential expansion proposed with PPCG. There are existing safety issues on the network with planned improvements able to address many of these concerns. The lower speed limit, protected cycles ways and associate improvements will provide a sound basis for further growth, with additional mitigation able to provide when needed

in response to the substantial growth proposed in PPCG. The structure plan is an appropriate tool to guide development and it is expected that the Plan's provisions can be developed to mitigate safety risks.

Crash Information

Appendix 1

Crash Listing 2013-2023

Crash road	Distance	Dt'n	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Casualty Fatal	Casualty Serious	Casualty Minor
1 SH 57		I	SOUTH ACCESS ROAD	20144982	1/10/2014	Wed	16:44	Car/Wagon1 EDB on SH 57 hit Car/Wagon2 turning right onto AROAD from the left	Car/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Give way			
2 OLD WEST ROAD	330 E		ALBANY DRIVE	20198620	23/11/2019	Sat	11:00	Car/Wagon1 DIRN on OLD WEST ROAD hit rear end of Car/Wagon2 stop/slow for queue	Car/WAGON1, following too closely	Null	Unknown	Null	Ni (Default)	Nil			
3 SUMMERHILL DRIVE	40 N		TURITEA ROAD	20197470	11/11/2019	Mon	19:00	Car/Wagon1 NDB on SUMMERHILL DRIVE hit rear of Car/Wagon2 EDB on SUMMERHILL DRIVE turning right from centre line	Car/WAGON1, alcohol test above limit or test refused	Dry	Overcast	Fine	Driveaway	Nil			1
4 AOKAUTERE DRIVE	I		TURITEA ROAD	20196532	20/04/2019	Sat	15:10	Car/Wagon2 turning right hit by oncoming Car/Wagon1 WDB on AOKAUTERE DRIVE	Car/WAGON2, driver unfamiliar with vehicle/towing, failed to give way turning to non-turning traffic, misjudged another vehicle	Dry	Bright sun	Fine	T Junction	Give way			
5 AOKAUTERE DRIVE	I		TURITEA ROAD	202223990	10/11/2022	Thu	16:40	SUV1 WDB on AOKAUTERE DRIVE hit Car/Wagon2 turning right onto AROAD from the left	Car/WAGON2, didnt look/notice other party - visibility o batic, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Give way			
6 AOKAUTERE DRIVE	I		TURITEA ROAD	202119656	13/07/2021	Tue	11:38	Car/Wagon2 turning right hit by oncoming Van1 NDB on AOKAUTERE DRIVE	Car/WAGON2, alcohol test below limit, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic VAN1, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Give way			
7 SH 57 AOKAUTERE DRIVE	I		OLD WEST ROAD	201312354	6/08/2013	Tue	11:15	Car/Wagon1 WDB on SH 57 AOKAUTERE DRIVE hit Car/Wagon2 turning right onto AROAD from the left	Car/WAGON1, alcohol test below limit, failed to give way at priority traffic control	Dry	Overcast	Fine	T Junction	Give way			2
8 SH 57 AOKAUTERE DRIVE	5 E		SUMMERHILL DRIVE	201351184	22/02/2013	Fri	16:05	Car/Wagon1 SDB on SH 57 AOKAUTERE DRIVE hit SUV2 turning right onto AROAD from the left	SUV2, failed to give way entering roadway from driveway, ENV, entering or leaving land use	Dry	Bright sun	Fine	Driveaway	Nil			
9 SH 57 TURITEA	10 S		AOKAUTERE DRIVE	201432952	9/03/2014	Sun		Motorcycle1 SDB on SH 57 TURITEA hit rear end of Car/Wagon2 stop/slow for queue	Car/WAGON2, suddenly braked MOTORCYCLE1, following too closely	Dry	Bright sun	Fine	T Junction	Give way			
10 TURITEA ROAD	I		SUMMERHILL DRIVE	202072536	9/12/2020	Wed	10:45	Motorcycle1 NDB on TURITEA ROAD lost control turning left, went off road to left	MOTORCYCLE1, alcohol test below limit, lost control when turning, new driver/under instruction	Wet	Overcast	Heavy rain	T Junction	Give way			1
11 SH 57 OLD WEST ROAD E	300 W		TURITEA ROAD	201353373	1/08/2013	Thu	15:33	Car/Wagon1 NDB on SH 57 OLD WEST ROAD E lost control turning right	Car/WAGON1, speed entering corner/curve, while returning to seal from unsealed shoulder	Dry	Overcast	Fine	Ni (Default)	Nil			
12 AOKAUTERE DRIVE	441 E		TURITEA ROAD	202326993	5/10/2023	Thu	14:15	Car/Wagon1 WDB on AOKAUTERE DRIVE lost control turning right, went off road to left, Car/Wagon2 turning right onto AROAD from the left	Car/WAGON1, alcohol test below limit, too far left	Dry	Bright sun	Fine	Ni (Default)	Nil			1
13 SH 57	230 W		RUAPEHU DRIVE	201441836	15/08/2014	Fri	16:25	Car/Wagon1 WDB on SH 57 lost control turning right, Car/Wagon1 hit non specific pole	Car/WAGON1, fatigue due to lack of sleep	Dry	Overcast	Fine	Ni (Default)	Unknown			
14 OLD WEST ROAD	I		TURITEA ROAD	201972548	28/06/2019	Fri	21:55	Car/Wagon1 NDB on OLD WEST ROAD lost control turning left, went off road to left, Car/Wagon1 hit ditch	Car/WAGON1, alcohol test below limit, lost control when turning, speed entering corner/curve	Dry	Dark	Fine	T Junction	Give way			
15 OLD WEST ROAD	I		TURITEA ROAD	2020168285	17/10/2020	Sat	03:36	Car/Wagon1 NDB on OLD WEST ROAD lost control turning left, went off road to right, Car/Wagon1 hit bank, tree	Car/WAGON1, alcohol test below limit, attention diverted by passengers, lost control when turning, speed entering corner/curve	Dry	Dark	Fine	T Junction	Give way			2
16 SH 57	I		TURITEA ROAD	201649025	23/09/2016	Fri	8:00	Car/Wagon2 turning right hit by oncoming Car/Wagon1 SDB on SUMMERHILL DRIVE	Car/WAGON2, failed to give way turning to non-turning traffic	Dry	Bright sun	Fine	T Junction	Give way			
17 SH 57	I		TURITEA ROAD	201957246	10/06/2019	Mon	10:25	Cyclist on SH 57 hit Car/Wagon2 turning right onto AROAD from the left	Car/WAGON2, alcohol test below limit, did not check/notice another party from other dirn, lost control under braking, ENV, road slippery (painted markings)	Wet	Overcast	Light rain	T Junction	Give way			1
18 SH 57	I		RUAPEHU DRIVE	201512213	30/03/2015	Mon	17:10	Cyclist EDB on SH 57 hit Car/Wagon2 turning right onto AROAD from the left	Car/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Give way			1
19 SH 57	I		RUAPEHU DRIVE	201612683	15/05/2016	Sun	15:40	Cyclist EDB on SH 57 hit Van2 merging from the left	Van2, blind spot, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Give way			1
20 AOKAUTERE DRIVE	I		PACIFIC DRIVE	201950429	22/01/2019	Tue	16:58	Car/Wagon2 turning right hit by oncoming Car/Wagon1 WDB on AOKAUTERE DRIVE	Car/WAGON2, alcohol test below limit, failed to give way at priority traffic control Car/WAGON1, alcohol test below limit	Dry	Bright sun	Fine	T Junction	Stop			2
21 PACIFIC DRIVE	I		SH 57	201739332	28/04/2017	Fri	16:55	Car/Wagon1 NDB on PACIFIC DRIVE hit rear of left turning SUV2 NDB on PACIFIC DRIVE	Car/WAGON1, speed entering corner/curve, following too closely	Dry	Overcast	Fine	T Junction	Give way			
22 PACIFIC DRIVE	I		SH 57	201843080	14/06/2018	Thu	12:25	Car/Wagon1 NDB on PACIFIC DRIVE hit rear end of Motorcycle2 stop/slow for cross traffic	Car/WAGON1, misjudged intentions of another party	Dry	Overcast	Null	T Junction	Stop			
23 AOKAUTERE DRIVE	I		CASHMERE DRIVE	202120721	15/04/2021	Thu	19:30	Car/Wagon1 WDB on AOKAUTERE DRIVE lost control turning right, went off road to left, Car/Wagon1 hit tree, substantial vegetation (causing vehicle damage or stopping the vehicle)	Car/WAGON1, speed entering corner/curve, swung wide at intersection	Null	Unknown	Null	T Junction	Give way			
24 SH 57	I		CASHMERE DRIVE	201654648	3/12/2016	Sat	12:05	Car/Wagon1 WDB on Aokautere Drive lost control turning left, Car/Wagon1 hit non specific traffic sign	Car/WAGON1, emergency vehicle attending emergency, speed entering corner/curve, swung wide at intersection	Dry	Bright sun	Fine	T Junction	Give way			
25 SH 57	70 E		CASHMERE DRIVE	201517703	9/11/2015	Mon	17:30	Truck1 EDB on SH 57 hit rear end of Cyclist2 (Age 16)	Cyclist2, swerved to avoid vehicle THUG1, misjudged intentions of another party	Dry	Overcast	Fine	Ni (Default)	Nil			1
26 SH 57 AOKAUTERE DRIVE	I		CASHMERE DRIVE	201350314	18/01/2013	Fri	15:45	Van1 WDB on SH 57 AOKAUTERE DRIVE hit rear of Car/Wagon2 WDB on SH 57 AOKAUTERE DRIVE turning right from left side	Car/WAGON2, didnt look/notice other party - misjudged another vehicle, turned from incorrect position on road VAN1, misjudged intentions of another party	Dry	Bright sun	Fine	T Junction	Nil			

## Crash Summary Tables

### ^ Crash factors

Crash factors	Crash numbers	% All crashes
#N/A	8	30.77
Alcohol	1	3.85
Disabled, old age or illness	0	0.00
Failed to give way or stop	10	38.46
Fatigue	1	3.85
Incorrect lanes or position	6	23.08
Miscellaneous factors	3	11.54
Overtaking	0	0.00
Pedestrian factors	0	0.00
Poor handling	5	19.23
Poor judgement	4	15.38
Poor observation	9	34.62
Position on Road	2	7.69
Road factors	1	3.85
Travel Speed	6	23.08
Unknown	0	0.00
Vehicle factors	2	7.69
Weather	0	0.00
TOTAL	58	223.08

### ^ Crash numbers

Year	Fatal	Serious	Minor	Non-injury
2013	0	0	1	3
2014	0	0	0	3
2015	0	0	2	0
2016	0	0	1	2
2017	0	0	0	1
2018	0	0	0	1
2019	0	0	3	3
2020	0	0	2	0
2021	0	0	0	2
2022	0	0	0	1
2023	0	0	1	0
TOTAL	0	0	10	16
Percent	0	0	38.47	61.55

### ^ Casualty types

Casualty types	Fatalities	Serious injuries	Minor injuries
Cyclists	0	0	4
Drivers	0	0	7
Motorcycle pillion	0	0	0
Motorcycle riders	0	0	1
Passengers	0	0	1
Pedestrians	0	0	0
Other	0	0	0
TOTAL	0	0	13

Note: Motorcycle stats include Mopeds.

### ^ Crash type

Crash type	Crash numbers	% All crashes
Overtaking crashes	0	0
Straight road lost control/head on	0	0
Bend - lost control/Head on	8	30.77
Rear end/obstruction	6	23.08
Crossing/turning	12	46.15
Pedestrian crashes	0	0
Miscellaneous crashes	0	0
TOTAL	26	100

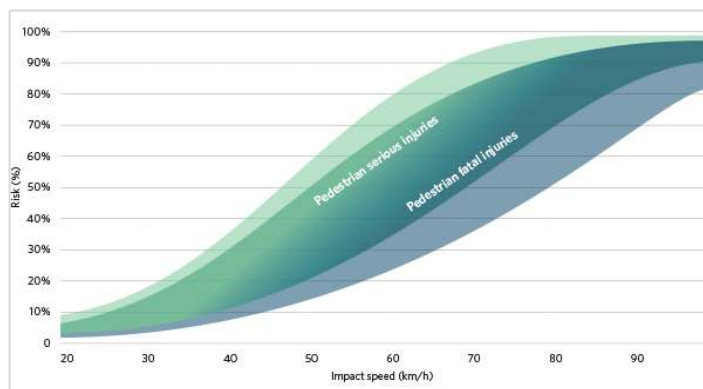
### ^ Day/period by hour

Day/Period	00:00 - 02:59	03:00 - 05:59	06:00 - 08:59	09:00 - 11:59	12:00 - 14:59	15:00 - 17:59	18:00 - 20:59	21:00 - 23:59	Total
Weekday	0	0	1	4	2	10	2	0	19
Weekend	1	0	0	1	1	2	0	1	6
TOTAL	1	0	1	5	3	12	2	1	25

### Speed

#### SSA Safety Concern 5.1

1. The main crash risk along the highway is speed, as it presents the greatest risk of death or serious injury. The existing 70 kph speed limit places all road users at risk with an elevated risk of injury for car drivers with side impact crashes<sup>7</sup>, and for all crashes involving vulnerable road users<sup>8</sup>.



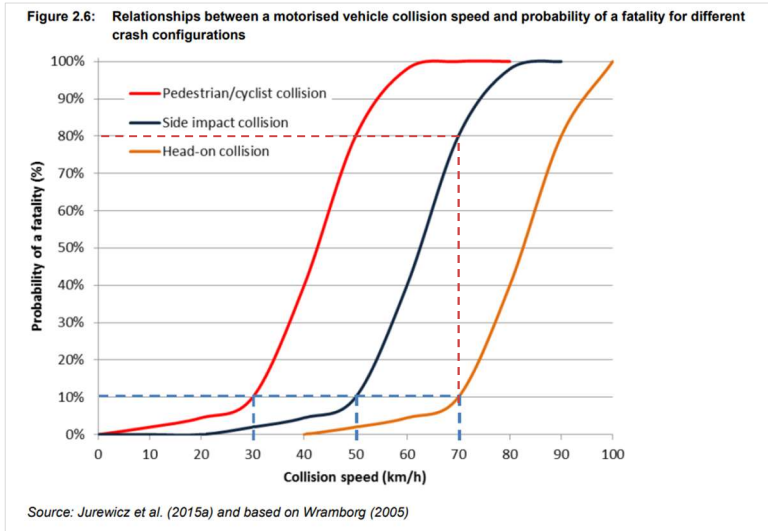
**Figure 7: Collision Speed & Risk of Pedestrian Death or Serious Injury<sup>4</sup>**

2. The speed limit will be reviewed in the 2024-27 State Highway Speed Management Plan. 70kph speed zones are being reviewed as a priority as their use is being phased out. The increasingly urban development in the PPCG area would see the speed limit reduce to 60 or 50kph. This will improve safety in many ways; by providing more reaction and observation time and greater recovery time. It is also likely to achieve side impact speeds of 50 kph or less and which would align with safe system outcomes of having a low risk of death or serious injury.

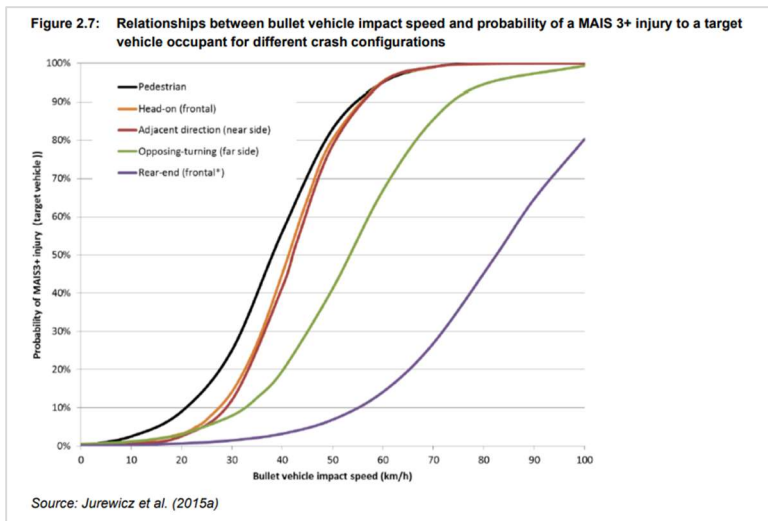
<sup>7</sup> The chance of fatality for a motorist is 10% with an impact at 50 kph however this increases to and 80% chance of fatality at 70 kph, as per Figure 8.

<sup>8</sup> The chance of fatality for a pedestrian is 10% with an impact at 30 kph however this increases to and 65% or more chance of fatality at 70 kph, as per Figure 7 and 8.

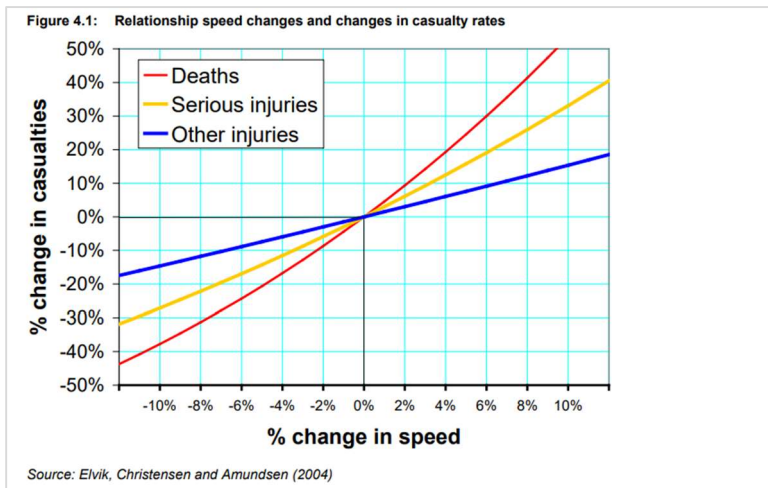




**Figure 8: Fatal Injury Crash Risks**  
Austroads – Guide to Road Safety: Part 3 – Road Safety



**Figure 9: Serious Injury Crash Risks**  
Austroads – Guide to Road Safety: Part 3 – Road Safety



**Figure 10: Change in Casualties vs Change in Crash Speed**  
Austroads – Guide to Road Safety: Part 3 – Road Safety

## Cashmere Drive Intersection

### SSA Safety Concern 5.2.1

3. The Safe System Audit identified a safety risk with the Cashmere Drive intersection and recommended the installation of advance warning signs, a chevron board, and median island. The signs can be addressed as a maintenance. An island on the side road might better be considered under a walking strategy that addressed issues along the route.
4. A submitter raised concern about the lack of right turning facilities for Cashmere Drive. Whilst these could be provided by reallocating existing seal space this would narrow the shoulders and potentially put cyclists at risk. There is enough shoulder space to allow a through vehicle to pass a right turning vehicle at reduced speed. The concern however is likely to be the speed of westbound traffic and the limited sight distance given the curvature of the road. Whilst there is enough sight distance for the existing 70kph it may feel uncomfortable if drivers are travelling more than this.
5. Sight lines are also limited to the east due to the bend when turning right from the intersection. This could be improved with removal of some of the vegetation that may be encroaching into the road reserve.
6. The reduced speed limit will improve safety, provide more time and the existing sight line would exceed the recommended desirable minimum<sup>9</sup>.



**Figure 11** Sightline from Cashmere Drive – Looking East toward Johnstone Drive

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#### <sup>9</sup> **Estimated Sight Distances**

Right turn in: There appears to be some 120m excluding the planting / over the back of the footpath, which could be increased to 165m if all the vegetation is trimmed / removed within the road reserve.

Right turn out: There appears to be some 115m of visibility over the low vegetation, which could be increased to 145m if all the vegetation is trimmed / removed within the road reserve.

#### **Safe Intersection Sight Distance**

151- 181m for 70 - 80 kph operating speeds

97 – 123m for 50 - 60 kph operating speeds

## **Pacific Drive Sightline**

### **SSA Safety Concern 5.2.3**

7. The visibility to the east from the Pacific Drive intersection was raised as a concern in the Safe System Audit. The intersection is controlled with a 'STOP' sign. It appears that adequate sight distance is or could readily be achieved in accordance with guidance (SISD would be 180m for 80 kph operating speed, 2 second reaction time, and driver eye position 7m from the centre of the lane). The sight distance could be improved if some of the fallen embankment and vegetation were removed. The sight distance would also reduce with a lower speed limit (90 to 137m for 50 to 65kph operating speeds).
8. Additionally, the area is being resealed in the coming season and in conjunction with the separated cycleways the traffic lane is to be shifted away from the embankment, which will allow drivers to pull further forward and improve the sight lines.



**Figure 12 Pacific Drive Sight Line at SH57 – Looking East**

## **Turitea Road Intersection – Conspicuity & Super Elevation**

### **SSA Safety Concern 5.3.1.& 5.3.2**

9. The Safe System Audit identified safety risks associated with hazards, delineation, identifying the intersection, and superelevation. Whilst delineation and barriers are suggested a broader review could also be beneficial.
10. Options to make the intersection more visible can be considered. This could include improved delineation and possibly the installation of an island. Lighting has been improved and can be reviewed. The superelevation is inherent and most readily addressed when the road is reconstructed.



11. There is pedestrian and cycling activity in and around the SH57 / Turitea Road intersection which is likely to increase with additional development in the Turitea Road catchment as proposed under PPCG.
12. A lower speed limit in this area would improve safety and may be better suited to the recreational and potentially increasing number of pedestrians and cyclists. The speed, design and improvements should thus be considered in holistic review of the route, including provisions for walking and cycling.

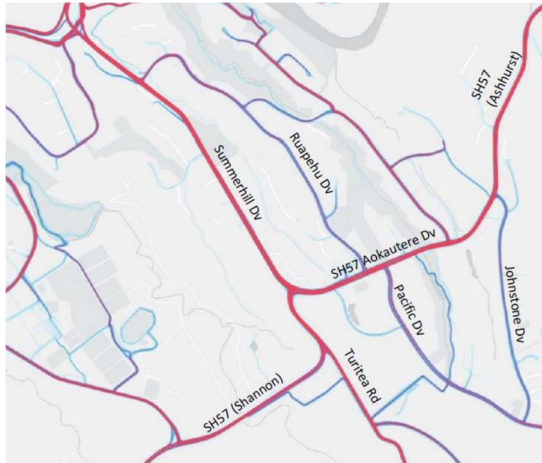


Figure 5: Strava Heatmap of Cyclist Activity

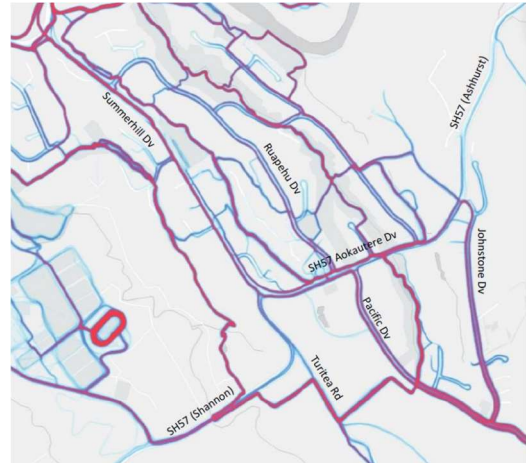


Figure 6: Strava Heatmap of Pedestrian Activity

**Figure 13 Strava Heatmaps**



**Figure 14 View of SH57 – Pedestrian Facility South of Turitea Road**

### Cashmere Drive Intersection – Conspicuity

SSA Safety Concern 5.3.3

13. Options to make the intersection more visible can be considered. This could include improved delineation and possibly the installation of an island as suggested. Chevron boards could be considered however these may not be needed in a lower speed environment.

#### **Pedestrians Crossing – South of Johnstone Dr**

##### **SSA Safety Concern 5.3.3**

14. There is a need for additional crossing points, potentially near Johnstone Drive to connect to the footpath on the northern side of the highway, and at Adderstone Reserve where it appears walkers following the recreational paths cross the highway. Additional crossing points could be considered in these locations as a minor improvement but would ideally be coordinated with the planned development of the transport network.
15. Pedestrian refuges however on their own do not provide a safe system outcome. Even with a lower speed limit of 50 or 60 kph, impact speeds would be higher than the 30kph safe system collision speed for pedestrians. It would thus be necessary to supplement the crossing point with other treatments, such as a raised platform. The installation of raised safety platforms should be considered in context with the strategic and planned use of the highway. This for example would consider the proximity and integration with current and future intersections.

#### **Lack of Footpath – Johnstone Dr to Pacific Dr**

##### **SSA Safety Concern 5.4.2**

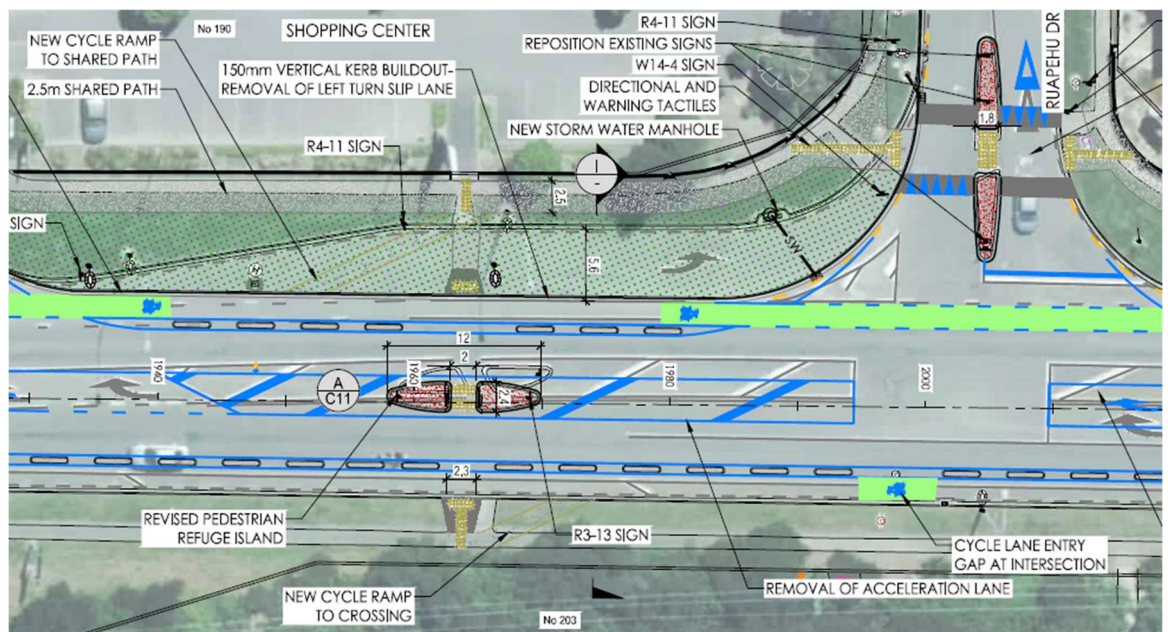
16. The Safe System Audit identified a lack of footpath along the southern side of SH57 east of Pacific Drive. It is agreed that providing a footpath would be desirable to avoid the need to cross the road and / or encourage pedestrians to cross at an appropriate location. It would be beneficial to provide better access to the Adderstone Reserve.
17. The construction of a footpath has been investigated and found to be expensive given the need to construct a bridging structure over the gully/s and potentially retain the embankment. The provision of pedestrian facilities is thus best considered as part of a coordinated strategy, to target areas of greatest benefit as a priority.
18. It may be beneficial to reallocate some of the existing seal space and this is being considered with the cycleway improvements and resurfacing of the road this coming summer. This would provide wider shoulders that could potentially be used by pedestrians and / or cyclists. An option may also include some sort of separator.
19. Care would be needed if constructing formal footpath to avoid adversely affecting the provision for cyclists. The suggestion that the speed limit is lowered is supported and provide a context for any changes to the infrastructure.

#### **Pedestrians Crossing – Near Ruapehu**

##### **SSA Safety Concern 5.4.3**



20. The traffic volumes, width of the road and speed present a challenge and safety risk for pedestrians wanting to cross the highway. This is referred to as severance. There is only one crossing facility located in front of the Summerhill Shopping Complex. It is in the form of a centre refuge island, has higher motorist speeds, and longer crossing distances over multiple lanes.
21. A Transport Choices project has been approved with the detailed design well progressed for the installation of separated cycleways along the SH. This will see improvements made to the existing crossing point. The lowering of the speed limit with a broader review of pedestrian safety and provisions should address safety concerns.



**Figure 15: Transport Choices Separated Cycle Ways – Aokautere**

## **Pedestrians Visibility at Intersections**

### **SSA Safety Concern 5.4.5**

22. Vegetation and other minor matters that impeded visibility can be addressed under maintenance. The location of the pram crossings, centre islands and other mitigation measures can be review in conjunction with PNCC and a wider review of pedestrian facilities. Turning speeds would typically be modest at intersections, moderating the risk of serious injury.

## **Cycle Lane & Shoulder Widths**

### **SSA Safety Concern 5.5.1**

23. The existing cycle lanes between Summerhill Dr and Pacific Drive are less than recommended in places, with 1.9m suggested as t24. The desirable minimum kerbside cycle lane width in a 70kph zone. This will be addressed with the installation of the proposed separated cycleways, with construction anticipated this financial year (prior to July 2024). A reduced speed limit would

also see the desirable cycle lane width reduced to a minimum of 1.6m if there were a 50 kph speed limit.

24. The shoulder on SH57 east of Pacific Drive varies and is narrow in places. Whilst some reallocation space may be feasible and provide some benefit, space is limited, and shared facilities may need to be considered.
25. It is agreed that the shoulder widths on SH57 Turitea Road and Old West are modest and do not adequately cater for cyclists. The provision for cyclists should be considered in conjunction with the speed management and coordinated with the provisions for pedestrians.
26. It is agreed that the shoulder widths on SH57 Turitea Road and Old West are modest and do not adequately cater for cyclists. The provision for cyclists should be considered in conjunction with the speed management and coordinated with the provisions for pedestrians.

### **Lighting**

#### **SSA Safety Concern 5.6**

27. Lack of consistency in lighting was raised as an issue in the Safe System Audit. It is noted that the number of night time crashes is very low as a proportion of all crashes, with only 8% of crashes occurring in the dark which is much less than the 30 to 35%<sup>10</sup> which is typical.

### **Hazards**

#### **SSA Safety Concern 5.7**

28. The Safe System Audit identified a variety of hazards and recommended they be treated. Ideally the hazards would be removed or barriers installed. This can be reviewed as a routine matter noting that a reduced speed limit could address the risk of serious injury of colliding with

### **Signs Maintenance – Speed Signs**

#### **SSA Safety Concern 5.8**

29. The missing or misaligned speed signs are to be passed on to Waka Kotahi maintenance and operations team.

### **Service Covers**

#### **SSA Safety Concern 5.9.1**

30. These matters should be addressed with the proposed protected cycleways. Elsewhere the matter can be discussed and prioritised with the Waka Kotahi's maintenance and operations team.

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<sup>10</sup> How does the level of road lighting affect crashes in New Zealand— A pilot study  
Opus – Jacket & Frith July 2012