Proposed Pak’n Save Supermarket
Transportation Review

Hamilton City Council
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EXECUTIVE SUMMARY

The Proposal

Foodstuffs North Island Limited (the Applicant) has made an application for resource consent for a Pak’n Save supermarket development at 980 Te Rapa Road, Hamilton. The proposal includes:

- Five vehicle crossings on three frontages;
- Partial signalisation of the Karewa Place/ Wairere Drive intersection to facilitate right-in movements from Wairere Drive to mitigate otherwise unacceptable delays;
- Providing a priority controlled intersection at the Karewa Place/ Eagle Way/ Maui St intersection with Give Way control on the Eagle Way approach.

Without the proposal signalisation, the Pak’n Save proposal results in significant increases in delay and queuing at the Te Rapa Road/ Eagle Way/ The Base Parade and Te Rapa Road/ Wairere Drive intersections.

Transportation Impacts

Without significant mitigation, a high trip generating activity has significant adverse effects on the strategic transport network. From a transport perspective, it would be desirable to limit trip generation to the consented level and avoid unexpected effects on the strategic network.

Based on the 2021 VISSIM modelling with Pak’n Save there are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place. The main benefits are at the Wairere Drive/ Te Rapa Road and Te Rapa Road/ Eagle Way where the average intersection delays remain the same as Scenario 1 (baseline) or are slightly improved.

While there are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place, we are concerned that introducing a new intersection onto Wairere Drive will result in adverse safety effects due to the speed environment, close intersection proximity and increased complexity of the road environment. Introducing a signalised intersection in close proximity to other signalised intersections in an 80km/h speed limit is not consistent with the Safe System approach which seeks to ensures that in a crash impact energy remains below the thresholds likely to result in death or serious injury.

We have safety concerns relating to the internal car park layout and the vehicle crossings providing access to the site and consider that further mitigation is necessary. This mitigation will likely require redesign of the car park to avoid manoeuvring vehicles creating off-site queuing effects and to improve safety of the access both for customers accessing the site and pedestrians and cyclists on the shared paths.

Conclusion

Without mitigation to address the safety issues identified in this assessment and the safety audit, the proposal is likely to have adverse safety effects.

With mitigation including a 60km/h speed limit and raised safety platforms the effects are likely to be acceptable. To provide consistency and avoid adverse effects along the corridor, raised safety platforms should also be constructed at the Te Rapa Road/ Wairere Drive and Pukete Road/ Wairere Drive intersections.
1. INTRODUCTION

1.1. Background
Foodstuffs North Island Limited (the Applicant) has made an application for resource consent for a Pak’n Save supermarket development at 980 Te Rapa Road, Hamilton. Hamilton City Council (HCC) engaged Gray Matter Ltd to review the traffic and transportation aspects of the proposed development.

1.2. Purpose and Basis of this Report
The purpose of this report is to provide a technical assessment of the traffic and transportation impact of the proposed development on the surrounding area. This assessment is based on information including:

- Proposed Pak’n Save Supermarket 980 Te Rapa Road, Hamilton, Integrated Transport Assessment (ITA), November 2018, Traffic Planning Consultants Ltd (Ref 17119-r1v3);
- Response to the transportation related items raised in the Councils request for further information, Traffic Planning Consultants Ltd letter dated 28 September 2018;
- Site Plan, Drawing No A024, Wingate Architects, Issue Date: 05/12/2018;
- Preliminary Design Safety Audit, Pak’n Save Supermarket Development, 980 Te Rapa Road, WSP-Opus, 4 March 2019 (Reference 232499.29/00001)

At the time that this report was prepared, the outputs from the revised VISSIM modelling being undertaken by BBO were not available. WSP-Opus will provide comments on the traffic modelling outputs and network performance.

This report presents a review of the likely traffic and transportation issues associated with the proposed supermarket. It comprises:

- Summary of the proposal including traffic generation;
- Discussion of the strategic context of the wider transport network and the Safe System;
- Assessment of safety and efficiency effects at key intersections;
- Assessment of safety and efficiency effects at the site accesses;
- Assessment of the internal layout and proposed parking arrangements;
- Discussion of Preliminary Design Safety Audit (commissioned by HCC);
- Summary of the likely traffic impacts and issues; and
- Conclusions.
2. THE PROPOSAL

2.1. The Proposal

The proposal includes:

- 6,358sq.m GFA including 3,925sq.m retail, 1,671sq.m of service and storage and 607sq.m mezzanine;
- Petrol station with eight filling positions; and
- 300 car parks including 23 staff spaces, seven accessible spaces, five spaces for less mobile users and 2 cycle spaces for staff and visitors; and
- Separate loading area accessed from the proposed Maui Street extension. Staff parking is access from the Maui Street extension.

The site will be accessed as follows:

- Left-in and left-out access from Te Rapa Road. The crossing is proposed to be 7.5m wide at the boundary;
- Left-in and left-out access from Eagle Way. The crossing is proposed to be 11m wide at the boundary with a splitter island separating the movements;
- Two 11m wide crossings to the proposed Maui Street extension that accesses the loading area; and
- One 8m wide crossing to the proposed Maui Street extension that accesses the car park.

The proposed mitigation includes:

- Partial signalisation of the Karewa Place/ Wairere Drive intersection to facilitate right-in movements from Wairere Drive - this is to mitigate unacceptable delays that would otherwise result at Te Rapa Road/ Eagle Way/ The Base Parade and Te Rapa Road/ Wairere Drive;
- A solid median island on Eagle Way, approx. 67m long – this is to prevent right-turns out of the site;
- A left-turn deceleration lane on Eagle Way, approx. 20m long – this is to facilitate access to the site; and
- Providing a priority controlled intersection at the Karewa Place/ Eagle Way/ Maui St intersection with Give Way control on the Eagle Way approach.

2.2. Trip Generation and Distribution

The expected trip generation of 954veh/hr appears reasonable and uses data from existing Pak’n Save stores (15veh/hr/100sq.m GFA) that is similar to that for supermarkets in the NZ Transport Agency Research Report 453 (17.9veh/hr/100sq.m GFA). The trip generation is reduced by 20% (191veh/hr) to account for pass-by trips. This appears reasonable.

The subsequent VISSM modelling presented in the ITA is slightly conservative as it is based on slightly higher trip generation of 975veh/hr (with 196veh/h pass-by trips).

In summary, the trip generation and distribution for the Pak’n Save activity as described in the ITA appears reasonable, noting that the subsequent VISSIM modelling includes an additional 21veh/hr (when compared to the proposed supermarket).
Figure 1: Proposed Site Layout (Wingate Architects, Drawings A024, 05/12/18)
3. STRATEGIC CONTEXT

3.1. Network Context
Wairere Drive forms part of the Hamilton Ring Road and has an important strategic function that is recognised by its classification as a:

- Significant Road Corridor in the Regional Policy Statement (RPS);
- Regional Road Corridor in the 2018 Update to the Regional Land Transport Plan 2015-2045 (RLTP);
- Major arterial transport corridor with a Strategic Network overlay in the District Plan. “The Strategic Network overlay recognises the significant strategic role that these transport corridors perform for moving goods and people as part of the wider national and regional transport network. Protecting the efficient and effective operation of the strategic network so it can continue to provide its wider transport functions is a critical outcome”; and
- Arterial in the One Network Road Classification (ONRC).

In this location, the Network Operating Framework (NOF) classifies Wairere Drive as a ‘Traffic Route’ which is the highest vehicle classification for trips within the City. Therefore, the impact of any intersections/developments on Wairere Drive requires careful consideration as it is undesirable to worsen the level of service for through traffic.

The Regional Policy Statement (RPS) includes a number of objectives and policies for the built environment that are relevant, including:

- Policy 6.3 a) which can be summarised as “Management of the built environment ensures that … new development is co-ordinated … in order to:
  ii) maintain or enhance the operational effectiveness, viability and safety of existing and planned infrastructure;
  iii) protect investment in existing infrastructure; …”

- Policy 6.3 c) the efficient and effective functioning of infrastructure, including transport corridors, is maintained, and the ability to maintain and upgrade that infrastructure is retained; and
- Policy 6.3 e) that where new infrastructure is provided by the private sector, it does not compromise the function of existing, or the planned provision of, infrastructure provided by central, regional and local government agencies.
- Policy 6.16 g) iii) which can be summarised as “New (commercial) centres will avoid adverse effects, both individually and cumulatively on … the efficiency, safety and function of the transportation network.”

The RLTP Investment Logic Mapping process identified the region’s strategic response to transport as:

- invest in strategic corridors and network connectivity
- improve road safety in the region by addressing areas of high risk
- provide greater transport choices.
Figure 2: RLTP Investment Logic Mapping (RLTP, Figure 14)

More specifically, the RLTP priorities for strategic corridors are:

- protecting the function of our interregional and intraregional strategic corridors (road and rail);
- directing investment to priority strategic corridors;
- improving network resilience; and
- growing connected regional cycle trails.

3.2. Road Safety

3.2.1. Vision Zero and the Safe System

Vision Zero refuses to accept that fatalities and serious injuries are inevitable consequences of mobility on the transport network. Vision Zero emphasises shared responsibility between road users and system designers. It challenges system designers to adapt, as contextually needed, the transport system to advance safety for all users. A core principle of the vision is that 'Life and health can never be exchanged for other benefits within society'.

The Vision Zero and the Safe System recognise that people make mistakes and are vulnerable in a crash. Mistakes are inevitable – deaths and serious injuries from road crashes are not. The Safe System approach to road safety ensures that in a crash impact energy remains below the thresholds likely to result in death or serious injury.

The Safe System framework requires that:

- The road transport system is designed, built and maintained so that the forces road users are subjected to in collisions will not result in death or serious injury.
- Roads and roadsides should be improved to reduce the risk of crashes and the severity of impacts when crashes do occur; vulnerable road users must be considered in this process.
= Inclusion of effective active and passive safety systems in vehicles should be encouraged to reduce the number of crashes and reduce the impact forces on occupants and road users outside the vehicle.

= Speeds should be managed, taking account the risks on different parts of the road transport system.

A safe road environment should:

= be forgiving and be designed so that it prevents death or serious injury when a crash occurs;
= warn the driver of any substandard or unusual features;
= inform the driver of conditions ahead;
= guide the driver;
= control the driver’s passage through conflict points or sections; and
= make allowance for the driver’s errant or inappropriate behaviour.

Speed at the time of a crash is the biggest predictor of crash forces. The figure below shows the Safe System collision speeds for vulnerable road users, side impact and head-on crashes. At a collision speed of 50km/h the risk of death and serious injury is low (10%) for vehicle-vehicle impacts but very high (80%) for pedestrian/cyclist-vehicle conflict.

![Figure 3: Probability of a Fatality vs Collision Speed](image)

3.2.2. Regional Road Safety Strategy 2017-2021
The regional vision for road safety is “Working together towards zero deaths and serious injuries on Waikato’s roads”. The policies and actions in the strategy aim to achieve progress toward five outcome areas:

= safe speeds

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1 Vicroads, Road Design Note RDN 03-07 Raised Safety Platforms (RSPs), September 2018
safe roads and roadside
- safe road users, safe vehicles
- leadership, collaboration and accountability.

3.2.3. Access Hamilton Strategy 2017
The update of the Access Hamilton Strategy 2017 seeks to drive positive road safety outcomes in the city. The road safety picture for Hamilton City is that:

- Approximately 50 people are killed or seriously injured in crashes each year (typically nine are pedestrians or cyclists);
- Vulnerable users (pedestrians and cyclists) are over represented in crashes; and
- High speed intersections are a key risk area.

The Strategy has been updated with the Access Hamilton Programme Business Case. Hamilton City Council has adopted Vision Zero as the philosophy for road safety in the city, an aspiration to achieve zero road deaths and serious injuries within Hamilton city. HCC’s 10 year target is a 30% reduction in deaths and serious injuries (DSI) by 2028.

3.3. District Plan Guidance on Safety and Efficiency
The Integrated Transport Assessment Requirements (Appendix 15, Section 15-2, Page 15-11) provide the following guidance on ‘safety’ and ‘efficiency’:

As part of assessing the effects on the transport network the ITA should consider any changes over the relevant assessment period to the:

a. Predicted level of personal risk to individuals (safety) using the network
b. Levels of service (efficiency) of the network.

This should include specific consideration of whether the desirable levels of service below can or should be maintained. This should recognise the pre-proposal levels of service and whether other benefits accrue that could have the potential to offset or otherwise support a lesser level of service. For example longer traffic delays resulting in slower speeds may support a pedestrian-friendly land use environment in the Central City.

It is not a requirement of the Plan that individual proposals mitigate the effects of other proposals in order to achieve the desirable levels of service. Where the pre-proposal desirable levels of service over the assessment period have already been exceeded, it is not expected that a proposal be required to restore the network to the desirable levels of service, rather it is expected that the proposal mitigates its effects to maintain the pre-proposal level of service for the relevant assessment period.

Desirable levels of service:

i. An average delay per vehicle during Peak Periods on the approaches to intersections of no greater than:
   - 55 seconds for the Strategic Network, Major and Minor Arterial transport corridors
   - 80 seconds for all other transport corridors

ii. On the Strategic Network, Major and Minor Arterial transport corridors during Peak Periods:
- Average vehicle speeds between intersections restricted to no less than 90% of the posted speed limit

- Average vehicle speeds, including intersections, constrained to no less than 18 km/h

iii. Unless demonstrated otherwise with site specific data, Peak Periods are taken to be 7am to 9am and 4pm to 6pm Monday to Friday.
4. VISSIM MODELLING

4.1. Background

The ITA relies on the 2021 Te Rapa North VISSIM Model to assess the effects of the development. The District Plan requires that a Broad ITA consider a 20-year assessment period. While the s92 response tested the affected intersections and site accesses with Sidra modelling by applying a percentage increase to passing traffic to allow for growth the results were inconsistent with the previous VISSIM outputs. The Sidra assessment is not adequate for assessment of transport effects in this congested environment.

HCC has subsequently decided to develop a 2031 Te Rapa North VISSIM Model that accurately reflects current and future land use to more better understand the traffic impacts of the proposal. At the time that this report was prepared, the outputs from the revised VISSIM modelling by BBO were not available. This review only consider the 2021 VISSIM outputs included in the Applicant’s ITA.

4.2. 2021 VISSIM Outputs

The 2021 VISSIM modelling includes the underlying consented trips and overestimates trip generation and likely over represents the adverse efficiency effects of the proposal. The detailed VISSIM outputs for 2021 are provided at Appendix B of the ITA. This included three scenarios:

= Scenario 1 (2021 baseline modelling);
= Scenario 2 (2021 with Pak’n Save); and
= Scenario 3 (2021 with Pak’n Save and signalised right turn at Wairere Drive with signalised intersection at Karewa Place/ Eagle Way).

The Karewa Place/ Eagle Way intersection is modelled as a signalised intersection in Scenario 3. This is not consistent with the current priority controlled proposal.

The following table summarises our interpretation of these efficiency related outputs and provides a comparison between the scenarios.

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<tr>
<th>Intersection (baseline volume)</th>
<th>Effects of Pak’n Save - Differences between Scenario 1 and Scenario 2</th>
<th>Effects from introduction of right-turn at Wairere Drive - Difference between Scenario 2 and Scenario 3</th>
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| Te Rapa Road/ Church Road (1,793veh/hr) | • Average intersection delay increases by 8s/veh  
• SB maximum queues increase from 84m to 135m  
• SB average queues increase from 4m to 10m  
• Acceptable | • No significant change with introduction of signalised right-turn |
| Te Rapa Road/ The Base Parade/ Eagle Way (4,214veh/hr) | • Average intersection delay increases by 5s/veh  
• Right-turn into Eagle Way increase from 214veh/h to 265veh/h  
• No change in u-turns (1veh/hr)  
• Acceptable | • Total traffic volume increases by 822veh/hr (or 20%) from Scenario 1, with no change in average delay  
• Right-turns decrease to 172veh/h (less than Scenario 1)  
• U-turns increase from 28veh/h to 45veh/h  
• Acceptable |
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<tr>
<th>Intersection (baseline volume)</th>
<th>Effects of Pak’n Save - Differences between Scenario 1 and Scenario 2</th>
<th>Effects from introduction of right-turn at Wairere Drive - Difference between Scenario 2 and Scenario 3</th>
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| Wairere Drive/ Te Rapa Road/ Avalon Drive (4,920veh/hr) | • Average intersection delay increases by 42s/veh to 102s/veh  
• Delay for right-turn from Wairere Drive to Te Rapa Road increase from 90s/veh to 130s/veh, with an average queue length 45m longer  
• Not acceptable | • Delays and queues are reduced. Average intersection delay decreases to 55s/veh  
• Total traffic volume increases by 312veh/hr (or 6%) from Scenario 1, but delays and queues are reduced  
• Right-turn delays reduce to 80s/veh  
• U-turns associated with Gull Holdings development increase from 25veh/h to 34veh/h  
• Acceptable |
| Wairere Drive/ Karewa Place (0veh/hr) | • N/A | • Right-turn movement is 514veh/hr with maximum queues of 215m extending into westbound lane (average queue = 24m)  
• Average intersection delay is 13s/veh (and excluding the EB through movement)  
• Acceptable |
| Wairere Drive/ Pukete Road (3,993veh/hr) | • Average intersection delay increases by 7s/veh  
• Max. queue length on Wairere Drive (east) increase from 322m to 512m (reaches Te Rapa intersection). Queuing longer than 170m creates queuing on Karewa Place  
• Not acceptable | • Delays and average queues are improved by 6s/veh and 19m respectively when compared to Scenario 2  
• Delays and average queues essentially the same as Scenario 1 – Baseline  
• Acceptable |
| Karewa Place/ Eagle Way | • Model outputs not included | • Modelled as a signalised intersection which is different to the Applicant’s proposed priority controlled intersection.  
• The applicant’s Sidra modelling is discussed in Section 6  
• Acceptable |
| Overall | • Longer delays and queues in Scenario 2  
• Significant increases in delay and queues for some movements  
• Does not achieve HCC minimum desirable LOS (equivalent to 55s/veh on the approaches)  
• Not Acceptable | • Delays and average queues are reduced through introduction of signalised right-turn  
• Delays and average queues are generally similar to Scenario 1 – Baseline  
• Improvements in average intersection delay. Worst is 62s/veh at Te Rapa Road/ The Base Parade/ Eagle Way  
• Acceptable, with improvements at some intersections |

Table 1: Summary of modelling outputs
Karewa Place is located approx. 170m from the Pukete Road intersection (measured limit line to limit line). Eastbound queues on Wairere Drive longer than 170m will cause queueing on Karewa Place. During a site visit in the PM peak (Wednesday 1 August 2018) right-turn queues from Wairere Drive in to Te Rapa Road were observed as 4-6 vehicles long. During a site visit on Saturday 22 March 2019 (11:30am-12:15pm) these queues were variable and reached up to 20 vehicles long (approx. 160m). It was noticeable that queues in the left lane were twice as long as those in the right lane. If this pattern continues once the signalised turn into Karewa Place is introduced, there is a risk queuing in the left lane will be fully utilised, but the right lane underutilised.

The safety auditors observed queues >20 vehicles long on Karewa Place. Submitters also noted long queues for this movement. During my site visits, queues have generally been 5-6 vehicles lone and clear reasonably quickly. During peak times, left-turns rely on motorist behaviour to leave gaps allowing these vehicles to enter Wairere Drive.

Allowing a right-in to Karewa Place increases the likelihood of Karewa Place acting as alternative parallel route through to Church Road/ Maui St. The District Plan hierarchy identifies Karewa Place as a proposed collector fronting Industrial and Business 4 zoned land. Modelling of the signalised right-turn from Wairere Drive indicates a peak hour volume on Karewa Place of approximately 1,182 veh/hr (including 514veh/h turning right in from Wairere Drive), indicating a daily volume of approximately 10,000veh/day (assuming a 10% peak hour).

There are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place. The main benefits are at the Wairere Drive/ Te Rapa Road and Te Rapa Road/ Eagle Way where the average intersection delays are remain the same as Scenario 1 (baseline) or are slightly improved.

4.3. Applicability of SIDRA Modelling

The District Plan requires that Broad ITAs consider a 20-year assessment period. However, the VISSIM model only contains a 2021 scenario. The s92 response included Sidra modelling of the affected intersections based on 10% and 20% increases in background traffic volumes to test a future year.

A number of issues with the outputs of this Sidra modelling have been identified including:

- The isolated Sidra assessments provided by the Applicant do not recognise the need for coordination with adjacent signalised intersections. For example, Sidra modelling of the proposed Karewa Place/ Wairere Drive intersection uses a 40s cycle time, but the adjacent intersections currently operate with 110s cycle times. The short cycle times in the Sidra assessment will likely lead to shorter delays and queues compared to assessments using longer cycle times.

- Inconsistent average delay outputs from the VISSIM and Sidra models. For example, the baseline VISSIM modelling (Scenario 1) delays of 62s/veh which are significantly longer that the Sidra output of 49s/veh. For Scenario 2 (with Pak’n Save), VISSIM has 68s/veh compared to 41s/veh in Sidra.

- Inconsistent queue lengths from the VISSIM and Sidra models. For example, the baseline VISSIM modelling (Scenario 1) has queues on The Base Parade >360m while the Sidra output are average queue lengths of 4-172m.

- The Sidra modelling does not include u-turns at the Wairere Drive/ Te Rapa Road/ Avalon Drive and Te Rapa Road/ The Base Parade/ Eagle Way intersections.
= Sidra modelling uses 2% for heavy vehicles. Mobileroad.org records 6% and 7% HCV on Wairere Drive and Te Rapa Road respectively.

Due to the inconsistency in model outputs, HCC decided to develop a 2031 Te Rapa North VISSIM Model that accurately reflects current and future land use to more better understand the traffic impacts of the proposal. At the time that this report was prepared, the outputs from the revised VISSIM modelling by BBO were not available.

4.4. Summary
Based on the 2021 VISSIM modelling there are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place. The main benefits are at the Wairere Drive/ Te Rapa Road and Te Rapa Road/ Eagle Way intersections where the average intersection delays are remain the same as Scenario 1 (baseline) or are slightly improved.

The future assessment provided by the Applicant is not adequate and further assessment is required once the 2031 Te Rapa North VISSIM model is complete.
5. PROPOSED KAREWA PLACE/ WAIRERE DRIVE INTERSECTION

5.1. The Proposal
To address the adverse effects at the Te Rapa Road/ Eagle Way/ The Base Parade intersection, the Applicant proposes to construct a new partially signalised intersection at the Karewa Place/ Wairere Drive intersection. The right-turn from Wairere Drive into Karewa Place will be signalised, requiring eastbound traffic on Wairere Drive to stop. The proposal reduces the available stacking length for the dual right-turn from Wairere Drive north into Te Rapa Road.

Figure 4: Proposed Karewa Place/ Wairere Drive Intersection

5.2. Intersection Spacing
The proposed signalised right-turn would be located approx. 165m from the existing Wairere Drive/ Pukete Road intersection and 170m from the Wairere Drive/ Te Rapa Road intersection. The HCC ITS (Section 3, Table 4) requires intersection spacing of 90m for collector/arterial road intersections and 200m for industrial roads.

While the proposal does meet these standards when measured from centre to centre, the diverge lane for the signalised right-turn commences 20m west of the Pukete Road intersection. Wairere Drive forms part of the Hamilton Ring Road and has an important strategic function which is recognised by it classification in the District Plan and RLTP. Providing closes spaced intersections risks lowering the effectiveness of the Ring Road. We have review the spacing of existing major intersection (roundabouts and traffic signals) along the Ring Road. A sketch plan with intersection
spacing is provided at Appendix 1. Currently only three major intersections on the Ring Road are <500m apart:

- 280m - Fifth Ave roundabout to Powells Road signals;
- 390m - Te Rapa Road to Pukete Road; and
- 400m – Cobham Drive to Lorne St.

The proposed intersection spacing of approx. 170m, is close for the Ring Road where major intersections are generally >0.5km and typically >1km apart. Overseas guidance\(^2\) indicates that the desirable intersection spacing depends on the cycle time and desirable progression speed. It states that “Progression at reasonable speeds can be achieved at short signal spacings such as at ¼ mile (0.402 km) only so long as the traffic volumes are very low and short cycles (65 seconds or less) are used.”

HCC has confirmed that the current cycle times are 110s for all three of the affected signalised intersections (i.e. Wairere Drive/ Te Rapa Road, Te Rapa Road/ Eagle Way/ The Base Parade and Wairere Drive/ Pukete Road). Wairere Drive is not a low volume road. In 2018\(^3\), HCC recorded the traffic volume on Wairere Drive between Pukete Road and Te Rapa Road as 20,900veh/day. The long cycle times and high traffic volumes indicates there may be adverse operational effects arising from the closely spaced intersections.

The close intersection spacing is likely to have a range of adverse effects including reduced legibility, reduced queuing spaces, safety and efficiency. The safety audit has also identified safety issues arising from concerns over legibility and reduced queuing space.

Introducing an additional intersection risks undermining the return on HCC and NZTA’s $84M investment in the Ring Road.

5.3. Travel Time vs Crash Costs

As discussed above, Vision Zero refuses to accept that fatalities and serious injuries are inevitable consequences of mobility on the transport network. Vision Zero is a shift in thinking that says road deaths are not inevitable and that life and health must never be exchanged for other perceived benefits.

However, the current Economic Evaluation Manual provides methodologies that calculate efficiency and crash benefits.

We have completed a simplified analysis of the travel time benefits and potential crash costs at the Wairere Drive/ Karewa Place intersection. This indicates that Scenario 3 (signalised right-turn at Karewa Place) results in travel time benefits of approximately 23s/veh in peak periods (or $1.77M/year) when compared to Scenario 2 without this new intersection\(^4\). This only includes benefits in the peak period, not the interpeak periods.

The NZTA Crash Estimate Compendium predicts injury crashes. Using the product of flow model for a high speed signalised intersection at Table 17, the crash rate is estimated as 0.85 injury crashes/year or a cost of $479,890. This is likely to over-estimate the crashes that would occur as


\(^3\) [https://www.hamilton.govt.nz/our-services/transport/maintainingimproving/Pages/Traffic-Counts.aspx](https://www.hamilton.govt.nz/our-services/transport/maintainingimproving/Pages/Traffic-Counts.aspx)

\(^4\) This is based on a weighted average of delays at the five affected signalised intersections (excluding the Karewa Place/ Eagle Way intersection)
there are few conflict points at the proposed intersection compared to a more typical signalised t-intersection.

The NZTA Crash Estimate Compendium (Table 24) provides conflicting flow models that allow injury crash rates for specific movements at signalised intersections to be estimated. For right-turn movements into Karewa Place, we estimate the will be approx. 0.2-0.3 injury crashes/year at the signalised right-turn based on a turning volume of 514veh/hr and westbound through volume of 1,071veh/hr on Wairere Drive. The costs of these crashes is $108,540/year. This only considers crashes arising from the right turn movement and does not consider conflict with left-in movement, rear-end or weaving crashes that may occur on Wairere Drive.

Based on this simplified analysis of one intersection in a congested network, it appears likely that the efficiency benefits will outweigh the potential crash costs. A network wide analysis is required to fully understand the potential benefits and costs. However, this approach is contrary to Vision Zero where life and health must never be exchanged for other perceived benefits. To contribute to HCC’ goal of Vision Zero, the proposal should be crash neutral at worst, that is resulting in no additional DSi crashes on the network.

5.4. Function of Karewa Place

Karewa Place currently carries approx. 4,700veh/day with 6% HCV\(^5\) and it identified as a collector corridor in the District Plan hierarchy and as a Primary Collector in the One Network Road Classification (ONRC). The carriageway is 8.5m wide including some on-street parking.

The 2021 VISSIM modelling shows the traffic volume increasing to 1,182veh/hr, or approx. 11,000veh/day (assuming a 10% peak hour). Traffic modelling for the Porters subdivision consent indicated a traffic volume of 840veh/hr or 8,400veh/hr.

The proposal results in approximately 2,500veh/day more on Karewa Place compared to the consented baseline. For properties along Karewa Place this is the sole point of access and submitters have expressed existing concerns about sight distance and vehicle manoeuvering at the property accesses.

While Karewa Place is identified as a collector road it does not meet the District Plan criteria for a collector road (District Plan, Volume 2, Appendix 15, Table 15-7a) which requires 2x4.5m lanes with a 2m flush median and recessed parking. It is narrower than the recently consented Maui Street extension which has an 10m wide carriageway including a flush median.

The increase in traffic on Karewa Place is likely to result in short delays at property accesses, especially for exiting vehicles and increases the risk of crashes at property accesses. Sight distance could be improved and the risk of crashes reduced by introducing additional parking restrictions to remove all on-street parking. This will require consultation by Council through a separate Local Government Act process. We understand that Council’s preference is that consultation on changes to parking restrictions is completed in advance to making decision on resource consent applications.

5.5. Safety Concerns

We have a number of concerns with the proposed signalised intersection which are discussed in the following table and rate on a High/ Medium/ Low scale. The independent safety audit is discussed in more detail at Section 9.

\(^5\) Mobileroad.org
<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closely spaced signalised intersections can result in drivers “looking through” one set of signals to the next and miss-interpret the intersection. In the proposed layout there is the risk that westbound traffic could continue through the red light resulting in crashes with vehicles turning into and out of Karewa Place.</td>
<td>High – no options to retrofit safety improvements to manage this risk once the intersection is constructed</td>
</tr>
<tr>
<td>Partially signalised intersection are uncommon. There is the potential for the new signals to confuse eastbound drivers potentially resulting in sudden breaking or late-lane changes leading to crashes.</td>
<td>Medium – no options to retrofit safety improvements to manage this risk once the intersection is constructed</td>
</tr>
<tr>
<td>The diverge point is located close to the Pukete Road intersection (approx. 20m from the pedestrian crosswalk) and there is the risk of conflict: • Between vehicles decelerating to enter the right-turn lane and following high speed vehicles; and • With vehicles merging and weaving when entering Wairere Drive from Pukete Road.</td>
<td>Medium – frequency of manoeuvre partially managed by signal timing which should minimise the risk of conflict between of vehicles merging from Pukete Road</td>
</tr>
<tr>
<td>The queuing space is shown as 118m (excluding the 27m taper). The VISSM modelling shows average queue length of 24m and maximum queue length of 215m. This leads to a significant risk of queues extending beyond the right-turn bay potential resulting in potentially high speed rear-end crashes.</td>
<td>Medium – no options to provide additional queuing space once the intersection is constructed Potential for high speed rear-end crashes.</td>
</tr>
<tr>
<td>The diverge taper is short (26.9m), and it does not meet MOTSAM guidance (30m) for right-turn bays in raised medians. In urban areas this diverge is not always fully utilised, potentially reducing the effective length of the auxiliary lane. This increases the risk of rear-end type crashes occurring.</td>
<td>Low – review during detailed design.</td>
</tr>
<tr>
<td>There is a risk that introducing the new intersection on Wairere Drive may increase the road safety risk potentially requiring a lower speed limit to manage this risk.</td>
<td>High - reducing the speed limit is inconsistent with the corridor’s strategic movement function, but has safety benefits.</td>
</tr>
<tr>
<td>Given the proximity of the proposed intersections and existing signage (refer photo below) it may be challenging to provide appropriate advanced warning signs to ensure that westbound drivers on Wairere Drive are in the correct lane. This will likely require additional overhead gantry signs on Wairere Drive potentially on both sides of the Wairere Drive/ Pukete Road intersection. Poor advanced directional signage can lead to crashes from late lane changes, or u-turns if the turn is missed.</td>
<td>Low – poorly located signs can create clutter and potentially confuse drivers.</td>
</tr>
<tr>
<td>The proposed Karewa Place/ Wairere Drive intersection includes zebra crossings marking on the left-turn slip lanes with Give Way triangles. HCC does not use zebra crossings at slip lanes due to safety concerns and is increasingly using raised safety platforms to reduce vehicle speeds and improve pedestrian safety.</td>
<td>Low – raised safety platforms could be included in detailed design but requires change in speed limit to 60km/h</td>
</tr>
<tr>
<td>Cycle lanes are provided on Wairere Drive and there is no specific provision in the concept design for cyclists to turn right into Karewa Place. There are grade-separated facilities at the Pukete Road intersection, but additional signage is required to provide advanced guidance to cyclists so they use the underpass rather than the signalised intersection. Potentially serious consequences if there are on-road cyclists who do not use the grade-separate facility.</td>
<td>Low – signage could be provided at detailed design.</td>
</tr>
</tbody>
</table>
The queuing space for vehicles turning right from Wairere Drive north in to Te Rapa Road will be reduced by 20m to approx. 140m. The modelled queues are 64m (average) and 192m (max) indicating there will be some periods where the queues extend into the through lanes. Currently queues in the Saturday afternoon peak are observed approx. 160m long. On Saturday afternoon, it is noticeable that queues in the left lane are twice as long as those in the right lane. If this pattern continues once the signalised turn into Karewa Place is introduced, there is a risk queuing in the left lane will be fully utilised, but the right lane underutilised.

Table 2: Concerns at the proposed Karewa Place/ Wairere Drive Intersection

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The queuing space for vehicles turning right from Wairere Drive north in to Te Rapa Road will be reduced by 20m to approx. 140m. The modelled queues are 64m (average) and 192m (max) indicating there will be some periods where the queues extend into the through lanes. Currently queues in the Saturday afternoon peak are observed approx. 160m long. On Saturday afternoon, it is noticeable that queues in the left lane are twice as long as those in the right lane. If this pattern continues once the signalised turn into Karewa Place is introduced, there is a risk queuing in the left lane will be fully utilised, but the right lane underutilised.</td>
<td>Low risk of high speed rear end crashes during peak periods</td>
</tr>
</tbody>
</table>

Figure 5: Looking west along Wairere Drive

Increasingly raised safety platforms are being used at signalised intersections to lower the speed of vehicles to a Safe System collision speed. One is currently being constructed at the Thomas Road/ Gordonton Road intersection. Due to the high speed limit (80km/h), high proportion of heavy vehicles and low pedestrian demand a raised safety platform is not appropriate.

With the decreased intersection spacing it would be appropriate to review the operating speed and review the speed limit to manage travel speed and potential impact speeds. Lowering the speed limit to 60km/h is unlikely to have a noticeable efficiency effect during peak periods when congestion generally manages travel speeds. There may be slightly longer travel times during inter-peak and off-peak periods, but over a 400m length the change in travel time is negligible (<1s/veh). For 60km/h speed limits, the Land Transport Rule Setting of Speed Limits 2017 (Rule 54001/2017) requires a minimum length of 500m, but there is only 400m between the Pukete Road and Te Rapa Road intersections. Currently there is insufficient information to determine the extent of any speed limit change.

Once the intersection has been constructed there are few options to retrofit safety improvements.
5.6. Summary

We are concerned that introducing a new intersection onto Wairere Drive will result in adverse safety effects due to the speed environment, close intersection proximity and increased complexity of the road environment. Introducing a signalised intersection in an 80km/h speed limit is not consistent with the Safe System approach which seeks to ensure that in a crash impact energy remains below the thresholds likely to result in death or serious injury. The signalised intersection introduces the potential for high-speed crossing/turning crashes on the strategic network.

Without further mitigation the safety effects of the proposal partial signalisation appear unacceptable. With mitigation including a lower 60km/h speed limit and raised safety platforms at the Wairere Drive/ Karewa Place, Te Rapa Road/ Wairere Drive and Pukete Road/ Wairere Drive intersections the safety effects are likely to be acceptable.
6. PROPOSED KAREWA PLACE/ EAGLE WAY/ MAUI ST INTERSECTION

6.1. Background
A separate subdivision consent by Porter Developments Ltd (Porters) proposed construction of the Maui Street Extension to form a T-intersection with Eagle Way and Karewa Place. The transport assessment (Porter Developments – Subdivision Consent, Te Rapa, TDG, letter dated 14 May 2018, Ref 14768.006) for this application is based on full development of the currently consented activities on the Porters site.

That assessment assessed the impact of consented development on a priority controlled intersection and tested a future signalised intersection. The assessment of a future signalised intersection included additional traffic from the proposed supermarket using the 2021 VISSIM model. It stated that the “risk of queues forming back to the (Te Rapa Road) signals rules out the possibility of Eagle Way being the minor approach” to a priority controlled intersection. However, this is the layout proposed as part of the Pak’n Save development.

Granted land use consent (010.2018.10068.001) confirms that a priority controlled intersection is appropriate with the ability to upgrade to traffic signals at a later time.

6.2. Proposed Layout
The proposal is based on the Karewa Place/ Eagle Way/ Maui St intersection being a priority controlled intersection, with Give Way control on the Eagle Way approach.

Figure 6: Proposed Karewa Place/ Eagle Way/ Maui St Intersection

The proposed Pak’n Save access is located 60m away and the existing Countdown access 100m away.
The applicant’s Sidra modelling indicates that the intersection will perform at an acceptable level as both a priority controlled and signalised intersection. Queuing on the Eagle Way approach is generally less than 30m.

The 2021 VISSIM modelling includes this as a signalised intersection with average queue lengths <10m and maximum queue lengths of 116m (right-turn) and 40m (left-turn). There appears to be a low risk of right-turning queues on Eagle Way adversely impacting on the Pak’n Save or Countdown accesses.

6.3. Safety Concerns
We have safety concerns with the proposed priority controlled intersection which are discussed in the following table. The safety audit raised similar safety concerns with the proposed intersection which have not been resolved.

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to the alignment of Karewa Place and the provision of a left-turn slip lane there is a risk that left-turning vehicles will shadow following vehicles resulting in crashes at the intersection.</td>
<td>High – concerns over sight distance would be resolved through a change to a roundabout or traffic signals</td>
</tr>
<tr>
<td>The need for a left-slip lane from Karewa Place into Eagle Way has not been demonstrated. The VISSIM modelling shows 141veh/hr making this movement with 214 veh/hr making the southbound right turn into Eagle Way.</td>
<td>Medium</td>
</tr>
<tr>
<td>No specific facilities are provided for pedestrians crossing the three lanes on Eagle Way or across Karewa Place. Pak’n Save unlikely to create significantly more pedestrian demand than consented land use.</td>
<td>High – intersection should be modified to included pedestrian facilities</td>
</tr>
<tr>
<td>No facilities are provided for cyclists. Pak’n Save unlikely to create significantly more cyclist demand than consented land use. As discussed elsewhere, the cycle lane on Eagle Way terminates east of the Pak’n Save exit which increases the risk for crashes for cyclists. It is unclear if cyclists are to use the shared path or continue on-road.</td>
<td>High – intersection should be modified to included cycle facilities</td>
</tr>
<tr>
<td>It is unclear how the exit from Couplands Bakery will be integrated into the proposed intersection. It would be more easily accommodated as the fourth leg to a roundabout or signalised intersection.</td>
<td>Low – noting the low frequency of exiting vehicles as it is a service vehicle exit (not customers)</td>
</tr>
<tr>
<td>The left-turn lane on Eagle Way is shown as very narrow immediately east of the Pak’n Save vehicle crossing. Unclear if heavy vehicles can be accommodated</td>
<td>Low – lane width could be increased at detailed design.</td>
</tr>
<tr>
<td>Potential u-turns at the intersection due to right-turn out ban at Pak’n Save exit. U-turns would potentially conflict with traffic turning left from Karewa Palace into Eagle Way as they would be unexpected.</td>
<td>Low – multiple access points should avoid the need for u-turns.</td>
</tr>
</tbody>
</table>

Table 3: Concerns at the proposed Karewa Place/ Eagle Way/ Maui St Intersection

It is acknowledged that the consented intersection does not specifically provide pedestrian or cycle facilities at the priority controlled intersection. The proposed supermarket is unlikely to create significantly more demand for pedestrians and cyclists compared to the consented land use (refer Section 7.1) and improved facilities are not specifically required to mitigate the effects of Pak’n Save. These facilities are desirable and it would be more cost effective to provide safe facilities during construction of the intersection, rather than having to retro-fit them at a later date.
6.4. Roundabout Concept

The safety auditors identified that some of their safety concerns related to right-turns at this intersection and at Pak’n Save access on Eagle Way access could be addressed by providing a roundabout at the intersection of Karewa Place/ Eagle Way/ Maui St intersection.

The NZTA High-risk Intersections Guide (Section 6.6.1) states that:

“Roundabouts have consistently good safety performance and are inherently Safe System compliant, so they are generally the preferred option considered for transformation treatments, subject to space considerations. Despite their often higher non-injury crash rates, their superior Safe System performance is achieved by controlling crash forces to occupants of motor vehicles to below Safe System thresholds. .... Compared to urban crossroads, their performance was typically better than signals but similar on average to priority control, but with more consistent performance.

Traffic signals at urban T-junctions also show little advantage over priority control, despite being most effective at reducing crashes involving vehicles entering from the side road colliding with main road traffic. They however increase right turn against and pedestrian crash risk.

Channelised priority junctions theoretically improve safety as traffic islands provide a degree of separation between through and turning traffic, and they enable vehicles turning right to cross one direction of traffic at a time. However, in practice these layouts typically result in an elevated crash record.”

This is reinforced by the relationship between the product of minor and major road flow and the expected number of fatal and serious crashes. The figure below illustrates that roundabouts have a better safety performance for a wide range of traffic volumes.

![Figure 6](image1.png)

![Figure 7](image2.png)

Figure 7: Relationship between the flow and fatal and serious crashes

We have prepared a concept design for a roundabout at this intersection to determine whether a roundabout could be accommodated (refer Appendix 2). The roundabout concept is based on a complying design for 50km/h design speed and includes an 8m central island radius and 8.5m...
circulating lane. A roundabout at this intersection appears feasible, but a number of issues would need to be confirmed through detailed design and safety audit. The following comments are relevant to the concept:

- Pedestrian and cycle paths are not shown and is likely to require additional land or for the roundabout diameter to be reduced;
- The roundabout could be shifted north-west to avoid impacts on the Countdown site; and
- A fourth leg could be provided for the Couplands Bakery exit (but is not shown).

Table 4: Concept Design for Roundabout at Karewa Place/ Eagle Way/ Maui St Intersection

Benefits of a roundabout at this intersection include:

- Superior Safe System performance;
- Provides u-turn facility that better provides for the right-turn exit from Pak’n Save;
- Avoids visibility issues with priority controlled intersection; and
- Provides an intersection on Karewa Place which may assist in reducing rat-running behaviour on this corridor.

6.5. Summary

Modelling of a priority controlled and signalised options at the Karewa Place/ Eagle Way/ Maui St intersection in Sidra indicates that the intersection will perform at an acceptable level in 2021. Modelling of a signalised intersection at 2021 in VISSIM reaches the same conclusion. The future 2031 VISSIM assessment is currently unavailable.

We have safety concerns at the priority controlled intersection including lack of pedestrian/ cycle facilities, lack of integration with Couplands and potential visibility limitations. These concerns are compounded by the restricted movements at the Pak’n Save exit leading to a low risk of u-turns. Without mitigation to address these issues, a priority-controlled intersection is likely to have adverse
safety effects. The risk of death or serious injury occurring from vehicle-vehicle conflict is low due to the likely collision speed, the risk is higher for pedestrians and cyclists.

A roundabout at this location would provide superior Safe System performance and better facilitate any demand for u-turns/right-turns from Pak’n Save when compared to traffic signals and priority controlled intersections. Due to the 50km/h speed limit, traffic signals would be consistent with the Safe System approach.
7. SITE ACCESS

7.1. Introduction

The Porters land use consent (10.2014.7726-001) includes a master plan showing the proposed layout for the office, large format retail and drive-through service activities included in that consent. The site layout is shown in two stages with slightly different access arrangements. Stage 2 includes three crossings to the Maui St Extension and one each to Te Rapa Road and Eagle Way. All crossings provide for all movements.

Figure 8: Porter Land Use Consented Site Layout (left = stage 1, right = stage 2)

The proposed layout provides a total of five access points - three access points to the public car park, plus two more for deliveries. Pedestrian access is provided from Te Rapa Road and the Maui St Extension. Movements at the Te Rapa Road and Eagle Way accesses are restricted potentially creating confusion and leading to unsafe manoeuvres (e.g. u-turns and weaving) on Eagle Way and Te Rapa Road.

While the proposed access is in general accordance with the site layout shown in Figure 7, transportation planning principles indicate that direct access from properties adjoining roads of higher classification should desirably be limited in recognition of their through-traffic function, and for traffic safety and flow reasons. Based on this there should be no access to Te Rapa Road (a major arterial and part of the strategic network) with access from Eagle Way (local road) and Maui St Extension (collector road).

HCC’s preference is that all vehicle crossings to the site are designed with pedestrian priority and a continuous footpath as illustrated in Waikato Regional Infrastructure Technical Specification (RITS) Figure D3.3.1. This should be specifically included in any consent conditions.

7.2. Te Rapa Road

7.2.1. Discussion

While the Te Rapa Road access (left-in/ left-out) is located as far north as possible within the site the ITA does not justify why an access is required to the strategic network when other access is available. Further modelling without this access would identify what other mitigation would be required.

The location of the vehicle crossing complies with the District Plan standards for separation to:

- other vehicle crossings: 7.5m required and 16m provided at the property boundary; and
an intersection: 30m required and approx. 83m is provided to the limit line. 150m sight distance is required from a point 5m from the centre of the nearest lane. This location is close to the property boundary so that boundary fence and transformer do not appear to obstruct the sight distance. This should be confirmed during detailed design.

Figure 9: Te Rapa Road Site Access

The applicant’s modelling indicates 271veh/h (or one vehicle every 13s) making a left-turn into the site which requires them to slow in the southbound through lane, where the left-turn lane into Eagle Way commences. The ITA considers that the risk of confusion and safety effects is negligible based on the past performance of seven other vehicle crossings to Te Rapa Road. These crossings include:

- A dedicated slip lane entry to Jim Wright Nissan;
- Three gated vehicle crossings to the former Porters yard. It should be noted that Porters have been reducing their activities at the site since late-2016;
- Access to David Irving Motors; and
- Access to Highway Supplies Fruit & Vege.

None of these activities generates traffic volumes similar to the proposed Pak’n Save. With the exception of Highway Supplies Fruit & Vege, none are located near the diverge point to a slip lane and all are further away from a signalised intersection.

We consider there is the potential for confusion and crashes as drivers slow to turn left into Pak’n Save from:

- Confusion on whether drivers on Te Rapa Road are turning left into Pak’n Save or Eagle Way. There is a risk that drivers may exit Pak’n Save when the approaching vehicle is continuing past to turn left at Eagle Way. This has the potential to result in crossing type crashes.
- Vehicles turning left into Pak’n Save will be decelerating in the shoulder shadowing any following vehicles that are continuing south on Te Rapa Road. There is a risk that drivers may exit Pak’n Save without seeing these following vehicles resulting in crossing type crashes.
Confusion for following drivers on whether drivers are slowing to access Highway Supplies Fruit & Vege immediately north of the site, Pak’n Save or Eagle Way. This could result in rear-end crashes.

Providing a left-turn deceleration lane for Pak’n Save would reduce the risk of rear-end crashes, but would require land from the adjacent property.

There is a risk of merging and weaving crashes from vehicles turning left out of Pak’n Save onto Te Rapa Road before crossing the two southbound lanes to turn right into The Base Parade. The s92 response makes a general comparison to crash records for the existing crossings north of the site. None of these crossings generates similar levels of traffic and understates the potential risks associated with the high trip generating activity.

The proposed vehicle crossing is located where the existing shared path exits to join the on-road cycle lane. It is unclear how the vehicle crossing will be designed to accommodate cycling. Relocating the cycle cutdown further north has the potential to result in crashes between departing vehicles and cyclists. Relocating the crossing further north is likely to result in conflict with out vehicle crossings. I understand that HCC’s preference is to retain the shared path past the site and provide a raised platform at the crossing of the left-turn slip lane. The raised platform will manage vehicle speeds, provide a safer crossing facility for pedestrians and cyclists and allow cyclists to change from the off-road to on-road facilities.

Traffic exiting the site is required to turn left, meaning the driver is likely to be looking to the right for a gap in on-coming traffic. The applicant’s modelling indicates 277veh/h (or one vehicle every 13s) making this turn. Drivers looking right, means that pedestrians and cyclists on the shared path are vulnerable to conflict with vehicles (NC type crashes)

The pedestrian connection to Te Rapa Road connects midway along this frontage providing an indirect connection to the Te Rapa Road/ Eagle Way/ The Base Parade intersection. This creates longer and less desirable pedestrian connections, which is likely to lead to pedestrians walking through the car park at risk of conflict with vehicles.

7.2.2. Te Rapa Road Access Summary
At peak time there will be approx. 540veh/hr using this access, or one vehicle movement every 6-7s. The location of the access close to a signalised intersection and deceleration lane combined with the relatively high traffic volumes increases the risk of safety and efficiency effects on a major arterial.

Our safety concerns with this access are summarised below.

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access is provided to a major arterial along with access to a local road and collector road. This is undesirable from a transport planning perspective. The safety effects described below could be avoided by removing this access.</td>
<td>High</td>
</tr>
<tr>
<td>Confusion on whether drivers on Te Rapa Road are turning left into Pak’n Save or Eagle Way. This has the potential to result in crossing type crashes.</td>
<td>Medium</td>
</tr>
<tr>
<td>Vehicles turning left into Pak’n Save will be decelerating in the shoulder shadowing any following vehicles that are continuing south on Te Rapa Road. There is a risk that drivers may exit Pak’n Save without seeing these following vehicles resulting in crossing type crashes.</td>
<td>Medium</td>
</tr>
<tr>
<td>Concern</td>
<td>Significance</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Confusion for following drivers on whether drivers are slowing to access Highway Supplies Fruit &amp; Vege immediately north of the site, Pak’n Save or Eagle Way. This could result in rear-end crashes.</td>
<td>Medium</td>
</tr>
<tr>
<td>Risk of merging and weaving crashes from vehicles turning left out of Pak’n Save onto Te Rapa Road before crossing the two southbound lanes to turn right into The Base Parade.</td>
<td>Medium</td>
</tr>
<tr>
<td>Pedestrian/ cycle conflict with departing drivers - departing drivers will be looking right for approaching vehicles increasing the risk of conflict with pedestrians and cyclists approaching from the drivers left.</td>
<td>Medium</td>
</tr>
<tr>
<td>Car parks are located close to the vehicle crossing. It is likely that vehicle manoeuvring at these parking spaces will lead to off-site queuing on to Te Rapa Road. This issue is discussed in more detail at Section 8.</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 5: Safety Concerns at Te Rapa Road Access

Without mitigation to address these issues, the access is likely to have adverse safety effects.

Options to mitigate these adverse effects include:

- Removing this access and providing an all movements access to Eagle Way;
- Providing a left-turn deceleration lane on Te Rapa Road;
- Restricting this access to left-in only. This avoids the effects associated with departing vehicles, e.g. potential for weaving crashes and reducing exposure for pedestrians and cyclists, while retaining the entry to minimise the number of vehicle movement and potential for conflict at the adjacent signalised intersection; or
- Redesigning the car parking to avoid spaces close to the access to minimise the risk of off-site queuing. This is likely to require removal of some car parks, but the site currently has a surplus of 43 spaces.

If this access is not removed or further restricted, the safety audit recommends a number of changes to the form of the access. The designer’s response does not address or resolve these concerns.

7.3. Eagle Way

7.3.1. Proposed Layout

The Eagle Way access (left-in/ left-out) will be located approx. 17m (measured edge to edge) from the all-movements access to Countdown and K-Mart. The minimum vehicle crossing spacing on a local road is 15m. While the crossing spacing complies, both sites are high generating activities and there is the potential for conflict between right-turn movements.

As stated above, HCC’s preference is that all vehicle crossings to the site are designed to provide pedestrian priority and a continuous footpath. The current site plans show this access designed as an intersection, rather than a vehicle crossing.
Figure 10: Proposed Access to Eagle Way

During a site visit on Saturday 22 March 2019 (12:15-12:30pm) queuing was observed at the existing Countdown access. This included queues of 4-5 vehicles on Eagle Way waiting to turn right into Countdown and queues of exiting vehicles. Queues on Eagle Way did not appear to extend into the signalised intersection. Most traffic exiting Countdown appeared to be turning left. Photos are provided at Appendix 3.

We have a number of concerns with the proposed access which are discussed in the following table.

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The small splitter island and solid median are likely to deter right-turns out, but we are concerned that the potential for drivers to turn right into Pak’n Save from Eagle Way remains. The frequency of these movements should be low as these vehicles are likely to have arrived from Karewa Place and under the proposal these vehicles would have priority through the intersection to turn left in from the Maui St Extension.</td>
<td>Medium</td>
</tr>
<tr>
<td>60m sight distance is required, but vehicles slowing in the left-turn lane will obscure following vehicles leading to an increase risk of crashes, particularly if departing vehicles are weaving to access the right-turn lane at the intersection further east.</td>
<td>High</td>
</tr>
<tr>
<td>The Give Way for departing vehicles is provided after vehicles have crossed the shared path. This reinforces the car-centric design of this access and incorrectly reinforce that vehicles have priority over pedestrians and cyclists. This layout will require that pedestrians and cyclists will need to walk between queued vehicles or wait for a driver to leave a gap.</td>
<td>Low – any crashes that do occur should be low speed.</td>
</tr>
<tr>
<td>The left-turn deceleration lane is designed to facilitate and prioritise access by left-turning vehicles. The current design appears likely to result in relatively high speed movements and does not provide for vulnerable users on the shared path.</td>
<td>Medium – potential for higher severity pedestrian and cyclist crashes</td>
</tr>
<tr>
<td>This vehicle crossing provides entry for the fuel tanker which results in a vehicle crossing that is approx. 11m wide at the property boundary. The access should be redesigned to provide pedestrian priority and a continuous footpath.</td>
<td>Low – any crashes that do occur should be low speed</td>
</tr>
</tbody>
</table>
The pavement marking arrows indicates the vehicles entering the site should turn left to access the car parking, but the fuel tanker turns right to access the fuel station.

There is the potential for vehicles to turn right at this intersection potentially leading to queuing back onto Eagle Way if they give way to other vehicles or if a queue of exiting vehicles block this maneuver.

It is unclear how a ban on right-turns could be effectively enforced.

The VISSIM modelling shows no change in traffic volume of Eagle Way with the introduction of the Pak’n’Save, indicating the change in exposure for vehicles using the Countdown access is unchanged.

However, the Proposal introduces a left-turn deceleration lane at the point where vehicles are turning right into and out of Countdown and Eagle Way begins to form two lane just east of the Countdown access. The plans indicate a 3m wide flush median and 4.5m wide westbound lane on Eagle Way.

This layout is potentially very confusing for drivers, especially those maneuvering at the Countdown access. Figure 9 illustrates the potentially conflicting manoeuvres near the Countdown access.

Parking spaces are located close to the access point and are likely to result in queues that could extend back to Eagle Way creating off-site effects.

The crossing is 10.6m wide at the boundary and does not comply with the District Plan standard (max = 7.5m). This increase the exposure of pedestrians to conflict with vehicles.

Pedestrian/ cycle conflict with departing drivers – departing drivers will be looking right for approaching vehicles increasing the risk of conflict with pedestrians and cyclists approaching from the drivers left.

The on-road cycle lane suddenly terminates east of the crossing which could lead to confusion for cyclists and crashes with vehicles as they form lanes for the intersection further east.

Could be mitigated by:
- Relocating the cycle cutdown further north of the site;
- Retaining the off-road shared path past the site on Te Rapa Road; and
- Provided a raised safety platform at the crossing of the left-turn slip-lane.

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pavement marking arrows indicates the vehicles entering the site...</td>
<td>High – queuing has the potential to impact on Eagle Way.</td>
</tr>
<tr>
<td>The VISSIM modelling shows no change in traffic volume of Eagle Way...</td>
<td>High</td>
</tr>
<tr>
<td>Parking spaces are located close to the access point and are likely...</td>
<td>High – car park redesign required</td>
</tr>
<tr>
<td>The crossing is 10.6m wide at the boundary and does not comply...</td>
<td>Medium – potential for high severity crashes</td>
</tr>
<tr>
<td>Pedestrian/ cycle conflict with departing drivers – departing drivers...</td>
<td>Medium</td>
</tr>
<tr>
<td>The on-road cycle lane suddenly terminates east of the crossing...</td>
<td>Medium - this could be resolved during detailed design.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The crossing is 10.6m wide at the boundary and does not comply...</td>
<td>Medium – potential for high severity crashes</td>
</tr>
<tr>
<td>Pedestrian/ cycle conflict with departing drivers – departing drivers...</td>
<td>Medium</td>
</tr>
<tr>
<td>The on-road cycle lane suddenly terminates east of the crossing...</td>
<td>Medium - this could be resolved during detailed design.</td>
</tr>
</tbody>
</table>

**Table 6: Safety Concerns at Eagle Way Access**

The proposed Pak’n Save access results in approximately twice as many conflict points on this section of Eagle Way when compared to the existing environment. The proposed layout on Eagle Way is similar to the consented Porters development. The conflicting vehicle movements are illustrated are on Figure 9 as follows:

- The black arrows indicate the existing diverge associated with the turns into Countdown;
- The dark blue arrow indicates the diverge associated with access into Pak’n Save (proposed);
- The orange arrows show the diverge for Eagle Way traffic approaching the Karewa Place intersection (proposed as part of the Porters subdivision); and

- Relocating the cycle cutdown further north of the site;
- Retaining the off-road shared path past the site on Te Rapa Road; and
- Provided a raised safety platform at the crossing of the left-turn slip-lane.
The purple arrows show the existing diverge for Eagle Way traffic approaching the Te Rapa Road Place intersection; and

The light blue arrow indicates that u-turns into Pak’n Save are possible.

Figure 11: Vehicle conflicts near existing Countdown access

The potential adverse effects could be mitigated by:

- Creating a combined access with Countdown that better provided for all movements – refer Section 7.3.2 for discussion on a combined roundabout.
- Reviewing the lane arrangements and widths on Eagle Way to reduce the number of conflict points.
- Redesigning the access to provide a full range of movements at the internal intersection reducing the risk of queues developing.
- Redesigning the car parking to avoid spaces close to the access to minimise the risk of off-site queuing. This is likely to require removal of some car parks, but the site currently has a surplus of 43 spaces.
- Replacing the hatched markings with a raised area (approx. 50mm lip) including a different colour/texture to allow tracking by the fuel tanker, but discourage higher speed movements by cars.

7.3.2. Alternative Roundabout

Providing two high volume property accesses in close proximity is potentially confusing for drivers and results in a high number of conflict points. One option to address safety concerns at the Te Rapa Road access is to create a combined access/intersection serving both the Pak’n Save and Countdown sites. This option was raised by the safety auditors for consideration.
Figure 12: Potential Combined Access

The concept above has not been fully developed and further refinement is necessary to:

- Optimise the size of the roundabout island. Currently the island has a 16m diameter, HCC has implemented mini-roundabouts with 11m diameter islands (this includes a mountable collar);
- Review the sight lines;
- Review the internal parking layouts of Pak’n Save and Countdown;
- Minimise the property impact on the Pak’n Save and Countdown sites;
- Consider how pedestrians and cyclists are accommodated; and
- Consider how any access changes may affect the consent for Countdown.

In summary, there appear to be safety benefits from providing a combined access by specifically providing for right-turns at both sites and managing vehicles speeds at two high volume supermarket accesses. However, this option has not been modelled in VISSIM and there is a risk of queuing back from the roundabout to Te Rapa Road. The concept above provides 55m queuing space between the roundabout limit line and the signalised pedestrian crosswalk at the Te Rapa Road intersection.

Access to the Clyde Street shopping centre and car yard opposite is restricted through a modified seagull arrangement the limits the car yard to left-in/left-out and bans the right-turns out of the shopping centre.
A similar arrangement could be implemented on Eagle Way but would ban the right-out of Countdown. Currently drivers exiting right-out can only travel south along Karewa Place. As Countdown has an all movements access to Karewa Place the effects appear minimal (but have not been assessed) as departing drivers could travel south along Karewa Place or turn left and travel south along Te Rapa Road.

7.3.3. Eagle Way Access Summary
While the modelling outputs illustrate that the Pak’n Save access should operate efficiently there are a number of safety concerns particularly for vulnerable road users, increased conflict for users of the Countdown access and concerns with the internal layout that are likely to result in offsite queuing.

The potential adverse effects could be mitigated by:

- Redesigning the access and car park to provide a full range of movements at the internal intersection reducing the risk of queues developing.
- Redesigning the car parking to avoid spaces close to the access to minimise the risk of off-site queuing. This is likely to require removal of some car parks, but the site currently has a surplus of 43 spaces.
- Replacing the hatched markings with a raised area (approx. 50mm lip) including a different colour/texture to allow tracking by the fuel tanker, but discourage higher speed movements by cars.

7.4. Maui St Extension
Three vehicle crossings are proposed to the Maui St Extension – two for deliveries and staff access, and one providing access to the car park and egress for the fuel tanker.
7.4.1. Discussion

All three vehicle crossings are wider than the 7.5m maximum allowable under the District Plan standards but based on the current site layout they appear necessary to provide sufficient manoeuvring space for heavy vehicles. Provided that they are designed to provide pedestrian priority and a continuous footpath the risk of adverse effects appears acceptable.

Modelling indicates 223veh/h will use the car park access, equivalent to 3-4 movements/min. Pak’n Save customers will be turning right to and from the flush median/ right-turn bay which increases the risk of:

- Rear-end crashes as following vehicles may be expecting vehicles to turning at Eagle Way (not Pak’n Save).
- Crossing crashes if departing vehicles pass through the right-turn queue to access the southbound lane. The frequency of this manoeuvre should be low as there is an alternative egress to Eagle Way but this has safety concerns associated with weaving.
- Long delays for exiting vehicles which can leave to poor driver behaviour, e.g. turning left-out prior to u-turning elsewhere on Maui St to travel south.

While vehicles can turn right out to Maui St this will be adversely impacted by right-turning queues from the Eagle Way intersection that are longer than 50m. The VISSIM modelling of a signalised intersection indicates queue lengths of 183m (average) and 303m (max) which are significantly longer than the Applicant’s modelling of traffic signals (24m and 39m). The applicant’s Sidra modelling indicates a right turn queue at a give way intersection has queue lengths of 10m and 25m.

To travel south along Karewa Place and avoid a right-turn at this vehicle crossing, drivers can exit to Eagle Way but this requires them to weave across the cycle lane and left-turn lane to access the right-turn lane at the priority controlled intersection.

Vehicle tracking for the fuel tanker (ITA, Figure 19) indicates that a departing fuel tanker turning right-out of Pak’n Save will:

- Occupy the full 8m width of the car park vehicle crossing; and
- Cross both of the southbound lanes on the Maui St Extension.
There is a risk that the fuel tanker will block the vehicle crossing creating delays and queuing and potentially resulting in crashes with southbound vehicles on the Maui St Extension. It is desirable for the layout to be reviewed to improve manoeuvring for the tanker. The ITA states that “fuel tankers will visit the site on perhaps two to three occasions per week and generally outside of busy supermarket periods …”. Busy supermarket periods have not been defined and it is unclear if this restriction is intended as a condition of consent.

HCC has advised that fuel tanker movements at some other supermarkets are limited through conditions. For example, “deliveries from fuel trucks to the fuel facility will occur between the hours of 10pm and 6am and shall be undertaken as part the route specified on the plan submitted with the traffic impact study”.

We have safety concerns with the proposed access which are discussed in the following table.

<table>
<thead>
<tr>
<th>Concern</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple accesses to Maui St create the potential for driver confusion when entering the site.</td>
<td>Low – the customer accesses should be clearly signed</td>
</tr>
<tr>
<td>Queues on Maui St can impact on the ability for drivers to turn right onto Maui St. This is likely to increase the use of the Eagle Way access and the frequency of weaving movements to access the</td>
<td>Queues are unclear from various model outputs. Queues longer than 50m will impact Pak’n Save access</td>
</tr>
<tr>
<td>Customers will be turning right to and from the median/right-turn bay which increases the risk of crashes - Rear-end crashes as following vehicles may be expecting vehicles to turning at Eagle Way (not Pak’n Save). - Crossing crashes if departing vehicles pass through the right-turn queue to access the southbound lane. The frequency of this manoeuvre should be low as there is an alternative egress to Eagle Way but this has safety concerns associated with weaving. - Long delays for exiting vehicles which can leave to poor driver behaviour, e.g. turning left-out prior to u-turning elsewhere on Maui St to travel south.</td>
<td>High – potential for crashes, especially if Eagle Way is priority controlled. If needed, speeds could be managed through raised safety platform.</td>
</tr>
<tr>
<td>Tracking by fuel tanker: - blocks internal aisles when manoeuvring - blocks the car park access when departing the site - blocks the car park access when departing the site</td>
<td>Low - Tanker deliveries should be infrequent and in off-peak periods High - if tanker movements take place during peak periods</td>
</tr>
<tr>
<td>Could be addressed through a condition of consent.</td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Safety Concerns at Maui St Extension Access

7.4.2. Maui St Access Summary

In summary, the Maui St access is located close to the Eagle Way intersection and creates the potential for confusion and crashes, particularly at peak times when there are likely to be queues extending back from the intersection. There could be an increase in traffic movements and weaving on Eagle Way if customers avoid the right-turn out to the Maui St Extension.

Vehicle tracking for the fuel tanker will block the vehicle crossing creating delays and queuing and potentially resulting in crashes with southbound vehicles on the Maui St Extension. Desirably the site layout would be revised to improve manoeuvring for the tanker. If the layout is not revised,
consent conditions should restrict tanker movements to off-peak periods to minimise the risk of off-site effects.

7.5. Site Access Summary
We have safety concerns with the proposed accesses. Four of the five vehicle crossings are wider than the 7.5m maximum allowable under the District Plan standards but based on the current site layout they appear necessary to provide sufficient manoeuvring space for heavy vehicles. Provided that they are designed to provide pedestrian priority and a continuous footpath the risk of adverse effects appears acceptable.

At peak time there will be approx. 540veh/hr using Te Rapa Road access, or one vehicle movement every 6-7s. The location of the access is close to a signalised intersection and deceleration lane combined with the relatively high traffic volumes increases the risk of safety and efficiency effects on a major arterial. Design of the Te Rapa Road access increases the risk to pedestrians and cyclists. Departing drivers will be looking right for approaching vehicles increasing the risk of conflict with pedestrians and cyclists approaching from the drivers left.

The access to Eagle Way prioritises vehicle movements and increases the risk of conflict with other traffic, pedestrians and cyclists. It does not provide pedestrian priority or continuous cycle facilities increasing the risk of conflict with vulnerable road users. The layout is potentially confusing for drivers, especially those manoeuvring at the Countdown access. Our concerns relating to the layout of the access are discussed in more detail at Section 7.3.

The Maui St access is located close to the Eagle Way intersection and creates the potential for confusion and crashes, particularly at peak times when there are likely to be queues extending back from the intersection. There could be an increase in traffic movements and weaving on Eagle Way if customer avoid the right-turn out to the Maui St Extension.

Car parks are located close to the Te Rapa Road and Eagle Way vehicle crossings which increases the risk of off-site queuing as vehicles manoeuvring at these spaces will block other vehicles from entering the site. The car park layout should be revised to avoid the risk of off-site queuing.

The location of the fuel station results in undesirable movements by the fuel tanker that require it to:

- Turn right at the Eagle Way access, where all other vehicles are required to turn left; and
- Occupy the full 8m width of the car park vehicle crossing to the Maui St Extension.

If the layout is not revised to improve manoeuvring for the fuel tanker, consent conditions should restrict tanker movements to off-peak periods to minimise the risk of off-site effects.

Without mitigation to address the safety issues, the proposed access arrangement is likely to have adverse safety effects. Mitigation should include a left-turn deceleration lane on Te Rapa Road, constructing the site accesses to provide pedestrian priority and limiting the hours of fuel tanker deliveries.
8. SITE LAYOUT AND PARKING

8.1. Parking

In general, the proposed parking meets the District Plan requirements. However, no motorcycle spaces are shown on the site plan. The ITA and s92 response indicates that these spaces can be provided.

We recommend that the applicant provide an updated site plan showing the cycle and motorcycle parking and that the minimum parking numbers are clearly stated in any consent conditions.

<table>
<thead>
<tr>
<th>Type</th>
<th>District Plan Rate</th>
<th>District Plan Requirement</th>
<th>Proposed</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car Parks</td>
<td>1 space per 20sq.m (retail) + 1 per 40sq.m (other)</td>
<td>257 (3,925sq.m retail and 2,433sq.m other)</td>
<td>265 + 23 staff</td>
<td>Complies – surplus of 43 spaces (based on current site plan)</td>
</tr>
<tr>
<td>Accessible</td>
<td>Table 15-2d</td>
<td>7</td>
<td>7</td>
<td>Complies</td>
</tr>
<tr>
<td>Less Mobile Users</td>
<td>Table 15-2e</td>
<td>5</td>
<td>5</td>
<td>Complies</td>
</tr>
<tr>
<td>Cycle</td>
<td>Staff = 1 per 10 FTE staff Visitor = 1 per 500sq.m GLFA</td>
<td>Staff = not stated in application Visitor = 13 (based on 6,358sq.m)</td>
<td>Staff = 15 Visitor = 13</td>
<td>FTE staff not stated, 15 spaces is adequate for 150 FTE staff Visitor parking complies</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>Table 15-2f</td>
<td>8</td>
<td>0</td>
<td>Does not comply – none included on site plan</td>
</tr>
</tbody>
</table>

Table 8: Parking Assessment

There is some discrepancy between the ITA and site plan. The ITA describes the car park spaces as 2.6m wide, but the parking schedule on the site plan describes them as 2.5m wide. NZS2890.1 indicates the 2.5m spaces are appropriate for long term parking, and 2.6m wide spaces are appropriate for short-term, high turnover spaces. We recommend that 2.6m wide spaces are provided.

8.2. Internal Site Layout

At the Te Rapa Road vehicle crossing, the nearest car park is located within 5m of the property boundary and has the potential result in queuing, delays and crashes as vehicle manoeuvring at the car park prevent other vehicles from entering or exiting the site.

District Plan Rule 25.14.4.2n requires vehicle queuing space be provided. The ITA (Table 2) expects that 20.9% of trips will approach from Te Rapa Road north. Assuming that 20.9% of parking spaces are also accessed from this crossing 18m queuing space is required (20.9% x 300 spaces x 0.03 = 1.8 vehicles; 2 vehicles x 6m = 12m) and only 5m is provided. The parking layout should be revised to provide at least 12m queuing space, this will require removal of approximately four parking spaces adjacent to this vehicle crossing.

Similarly, at the Eagle Way vehicle crossing, the nearest vehicle control point (the internal intersection) is located approx. 10m from the property boundary. The ITA (Table 2) expects that 20.9% of trips will approach from Te Rapa Road north. Assuming that 65% of parking spaces are accessed from this crossing 36m queuing space is required (65% x 300 spaces x 0.03 = 5.9 vehicles; 6 vehicles x 6m = 36m) and only 10m is provided.
Car parks are located close to the Te Rapa Road and Eagle Way vehicle crossings which increases the risk of off-site queuing as vehicles manoeuvering at these spaces will block other vehicles from entering the site. The car park layout should be revised to avoid the risk of off-site queuing.

8.3. Site Layout Summary
The proposed number of parking spaces complies with the District Plan standards. The spaces are 2.5m wide and we would prefer that 2.6m wide spaces are provided to better accommodate the short term, high turnover parking expected at a supermarket.

Parking spaces are located close to all three car park access points. This increases the risk of off-site queuing, delays and crashes as a vehicle manoeuvering at these car parks prevent other vehicles from entering or exiting the site. The risk of adverse effects appears greatest at the Te Rapa Road and Eagle Way vehicle crossings and could be avoided by redesigning the car parking to avoid spaces close to these vehicle crossings. This is likely require removal of some car parks, but the site currently has a surplus of 43 spaces.

The access to Eagle Way prioritises vehicle movements and increases the risk of conflict with other traffic, pedestrians and cyclists. Our detailed concerns relating to the layout of the access are discussed in more detail at Section 7.3.

In summary, we have safety concerns relating to the internal car park layout and consider that further mitigation is necessary to avoid adverse effects. This will require redesign of the car park to avoid manoeuvering vehicles creating off-site queuing effects and to improve safety both for customers accessing the site and pedestrians and cyclists on the shared paths.

Without mitigation to address the safety and queuing effects arising from the proposed internal layout issues, the proposal is likely to have adverse safety effects on Te Rapa Road and Eagle Way.
9. PRELIMINARY DESIGN SAFETY AUDIT

Following receipt of the s92 response, HCC commissioned an independent preliminary design safety audit for the proposal. WSP-Opus completed the audit in March 2019. The auditors raised safety concerns that are aligned with our assessment.

The safety audit report including the Designer (Applicant) Response and Safety Engineer (HCC) is included at Appendix 4.

The Designer’s responses do not address or resolve the safety concerns raised by the safety auditors.

Figure 15: Concerns with Internal Layout

- Car parks leading to off-site queuing = unacceptable
- Tanker manoeuvering blocks vehicle crossing = acceptable with conditions
- Potentially confusing and unenforceable right-turn ban = unacceptable
- Crossing and deceleration lane designed to prioritise vehicle movements = unacceptable
- Pedestrian access does not match likely desire line to/from signalised intersection = undesirable (but not unsafe)
- Three crossings to Maui St extension = undesirable, clear signage of customer access required
10. SUBMISSIONS

10.1. Overview

Four submissions include transport comments, including the submissions from:

- J McCracken (139 Karewa Place);
- S Jones (9 Karewa Place);
- The Base Te Awa Ltd; and
- Woolworths NZ Ltd.

The submissions raise a number of transport related issues mainly relating to safety and efficiency. The specific issues identified include:

- Safety concerns from increased traffic on Eagle Way;
- Safety concerns from increased traffic on Karewa Place where parked vehicles currently limit sight distance at property accesses;
- Form of the Eagle Way/ Karewa Place intersection;
- Safety concerns for traffic exiting Pak’n Save and weaving cross Te Rapa Road to access The Base Parade;
- Failure to consider trips generated by the additional commercial activities to be established within The Base sub-regional centre;
- Increased queuing resulting in adverse traffic effects on the operation and safety of the Countdown site and Te Rapa Road; and
- Concerns around access and trip generation on Eagle Way including the potential adverse safety effects on customers accessing the Countdown site; and
- Support for signalised right-turn intersection on Wairere Drive.

10.2. Discussion

The following table summarises the key transport submission topics, summarises our discussion and indicates whether we consider if further mitigation is required.

<table>
<thead>
<tr>
<th>Submitter Concerns</th>
<th>Discussion</th>
<th>Report Reference</th>
<th>Reviewer’s opinion on whether further mitigation is required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety concerns from increased traffic on Eagle Way</td>
<td>Agree there is an increase in the number of conflict points and risk of driver confusion from closely spaced, high volume vehicle crossings</td>
<td>Section 6, Section 7.3</td>
<td>Yes – crossing should provide pedestrian priority, continuous cycle routes and address the potential for vehicle conflict.</td>
</tr>
<tr>
<td>Safety concerns from increased traffic on Karewa Place where parked vehicles currently limit sight distance at property accesses</td>
<td>Currently on-street parking limited to the western side of Karewa Place and approx. 200m on eastern side (40% of total length) Potential for further parking restrictions to manage on-street parking</td>
<td>N/A</td>
<td>The traffic volume is expected to increase to approx. 1,100veh/hr. Parking restrictions could be introduced by Council, through a separate LGA process.</td>
</tr>
<tr>
<td>Submitter Concerns</td>
<td>Discussion</td>
<td>Report Reference</td>
<td>Reviewer’s opinion on whether further mitigation is required?</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Form of the Eagle Way/ Karewa Place intersection</td>
<td>Agree with submission point, there are concerns with safety of proposed priority controlled intersection. No pedestrian facilities provided (consistent with consented layout).</td>
<td>Section 6</td>
<td>Desirable to include pedestrian and cycle facilities, but demand unlikely to be significantly different from consented environment.</td>
</tr>
<tr>
<td>Safety concerns for traffic exiting Pak’n Save and weaving cross Te Rapa Road to access The Base Parade</td>
<td>Agree there is a safety concern with departing traffic weaving across Te Rapa Road to access The Base.</td>
<td>Section 7.2</td>
<td>Yes – effects could be avoided by removing the left-out movement</td>
</tr>
<tr>
<td>Failure to consider trips generated by the additional commercial activities to be established within The Base sub-regional centre</td>
<td>VISSIM modelling has included the consented development at The Base, including development not yet established. Unclear what additional development could occur.</td>
<td>Section 4</td>
<td>No – the assessment has included all consented development at The Base</td>
</tr>
<tr>
<td>Increased queuing resulting in adverse traffic effects on the operation and safety of the Countdown site and Te Rapa Road</td>
<td>VISSIM modelling for 2021 show no significant change in queuing on Eagle Way that would affect the Countdown access. Left-turn queues increase slightly from 376m to 390m, through queues increase from 156m 10 161m.</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>Concerns around access and trip generation on Eagle Way including the potential adverse safety effects on customers accessing the Countdown site.</td>
<td>Agree there is a significant increase in vehicle movements and risk of conflict immediately adjacent to the Countdown access.</td>
<td>Section 7.3</td>
<td>Yes – Options are discussed at Section 7.3.</td>
</tr>
</tbody>
</table>

Table 9: Transportation Submission Summary
11. CONCLUSION

11.1. Intersection Effects

Without the proposal signalisation, the Pak’n Save results in significant increases in delay and queuing at the Te Rapa Road/ Eagle Way/ The Base Parade and Te Rapa Road/ Wairere Drive intersections.

There are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place. The main benefits are at the Wairere Drive/ Te Rapa Road and Te Rapa Road/ Eagle Way intersections where average intersection delays are remain the same as Scenario 1 (baseline) or are slightly improved.

We are concerned that introducing a new intersection onto Wairere Drive will result in adverse safety effects due to 80km/h speed limit, the close intersection proximity and increased complexity of the road environment. Introducing a signalised intersection in close proximity to other signalised intersection is not consistent with the Safe System approach to road safety which seeks to ensures that in a crash impact energy remains below the thresholds likely to result in death or serious injury. With mitigation including a 60km/h speed limit and raised safety platforms the effects are likely to be acceptable. To provide consistency and avoid adverse effects, raised safety platforms should also be constructed at the Te Rapa Road/ Wairere Drive and Pukete Road/ Wairere Drive intersections.

Based on the modelling completed to date, the efficiency effects of priority controlled and signalised intersections at the Eagle Way/ Karewa Place/ Maui Street extension intersection are acceptable. We have safety concerns with the priority controlled intersection layout including lack of pedestrian/ cycle facilities, lack of integration with Couplands and potential visibility limitations. The risk of death or serious injury occurring from vehicle-vehicle conflict is low due to the likely collision speed, the risk is higher for pedestrians and cyclists.

Based on the 2021 VISSIM modelling the likely effects at the Te Rapa Road/ The Base Parade/ Eagle Way intersection are acceptable. A review of the 2031 VISSIM modelling is necessary to confirm the effects remain acceptable in the future.

11.2. Site Access and Internal Layout

We have safety concerns relating to the internal car park layout and the vehicle crossings providing access to the site which are detailed in Sections 7 and 8.

At peak times, there will be approx. one vehicle movement every 6-7s at the Te Rapa Road access. The location of the access close to a signalised intersection and deceleration lane combined with the relatively high traffic volumes increases the risk of safety and efficiency effects on a major arterial. The potential adverse effects arising from the location of the access and its interaction with pedestrians and cyclists is unacceptable.

The proposed access on Eagle Way results in an increased potential for conflict near the existing Countdown access. The safety effects are unlikely to be significant due to the likelihood of low severity crashes due to the low speed environment.

The Maui St access is located close to the Eagle Way intersection and creates the potential for confusion and crashes, particularly at peak times when there are likely to be queues extending back from the intersection. There could be an increase in traffic movements and weaving on Eagle Way if customers avoid the right-turn out to the Maui St Extension.
Redesign of the car park layout is necessary to avoid manoeuvring vehicles creating off-site queuing effects on both Te Rapa Road and Eagle Way and to improve safety of the access both for customers accessing the site and pedestrians and cyclists on the shared paths.

Manoeuvring of the fuel tanker has the potential to block the internal aisles, block the access to the Maui Street extension and create confusion at the Eagle Way access. The potential for adverse effects from the fuel tanker manoeuvring could be managed by redesigning the car park and through conditions that limit the hours of deliveries to outside shop opening hours (i.e. fuel deliveries between 10pm and 7am).

Without mitigation to address the safety issues identified in this assessment and the safety audit, the proposal is likely to have significant adverse safety effects

**11.3. Summary**

Without significant mitigation, a high trip generating activity has significant adverse effects on the strategic transport network. From a transport perspective, it would be desirable to limit trip generation to the consented level and avoid unexpected effects on the strategic network.

While there are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place, we are concerned that introducing a new intersection onto Wairere Drive will result in adverse safety effects due to the speed environment, close intersection proximity and increased complexity of the road environment. Introducing a signalised intersection in close proximity to other signalised intersections in an 80km/h speed limit is not consistent with the Safe System approach to road safety which seeks to ensures that in a crash impact energy remains below the thresholds likely to result in death or serious injury.

Redesign of the car park layout and accesses is necessary to avoid manoeuvring vehicles creating off-site queuing effects and to improve safety of the access both for customers accessing the site and pedestrians and cyclists on the shared paths.

**11.4. Draft Conditions**

If Council decides to approve the application, it should be subject to conditions that require:

- Construction of the signalised right-turn at Wairere Drive/ Karewa Place including a 60km/h speed limit and construction of a raised safety platform.
- Construction of raised safety platforms at Te Rapa Road/ Wairere Drive and Pukete Road/ Wairere Drive intersections.
- Construction of a left-turn deceleration lane for the Te Rapa Road access.
- Redesigning the car park layout to avoid manoeuvring vehicles creating off-site queuing effects on both Te Rapa Road and Eagle Way.
- Constructing all site accesses to provide pedestrian priority and a continuous footpath as illustrated in Waikato Regional Infrastructure Technical Specification (RITS) Figure D3.3.1.
- Limiting the hours of fuel tanker deliveries to outside shop opening hours (i.e. fuel deliveries between 10pm and 7am).
- Parking restrictions (no stopping lines) on Karewa Place
11.5. Conclusion
There are efficiency benefits for the wider transport network from providing the signalised right-turn into Karewa Place. The main benefits are at the Wairere Drive/ Te Rapa Road and Te Rapa Road/ Eagle Way intersections.

Without mitigation to address the safety issues identified in this assessment and the safety audit, the proposal is likely to have significant adverse safety effects, inconsistent with Vision Zero and Safe System principles.
APPENDICES

Appendix 1: Hamilton Ring Road Intersection Spacing
Appendix 2: Preliminary Roundabout Design - Karewa Place/ Eagle Way/ Maui St Intersection.
NOTES:

1. THIS DRAWING IS A CONCEPT DESIGN BASED ON AERIAL PHOTOS FOR FEASIBILITY PURPOSES ONLY.
2. FINAL INTERSECTION LAYOUT SUBJECT TO DETAILED DESIGN INCLUDING:
   - TOPOGRAPHIC SURVEY
   - PAVEMENT DESIGN
   - STORMWATER TREATMENT AND DISCHARGE
   - STREETLIGHTING DESIGN
   - EXISTING SERVICE LOCATIONS
   - PROVISION OF PEDESTRIAN AND CYCLIST FACILITIES
   - ROAD SAFETY AUDIT
3. CONCEPT DESIGN BASED ON 50km/h DESIGN SPEED.

14_201_100_I
EAGLE WAY/KAREWA PLACE INTERSECTION
ROUNDABOUT CONCEPT
PROJECT SHEET TITLE
SCALE 1:500 (@ A3)
PLAN NUMBER
REVISION
SHEET STATUS
CLIENT:
OFFICE:
ORIGINAL SIZE A3

---

DRAFT EAGLE WAY RAB CONCEPT.DWG
CAD FILE

GEODETIC & VERTICAL DATUM
NZGD2000 (Mount Eden)/NO VERTICAL DATUM

---

100mm
0mm
200mm

---

EXISTING PROPERTY BOUNDARY
INDICATIVE FUTURE PROPERTY BOUNDARY

NEW ROAD EXTENSION

INDICATIVE ROUNDABOUT BASED ON 8.0m CENTRAL ISLAND RADIUS AND 8.5m CIRCULATING LANE (ABSOLUTE MINIMUM DIMENSIONS RECOMMENDED BY AUSTROADS GUIDE TO ROAD DESIGN PART 4B: ROUNDABOUTS FOR 50km/h DESIGN SPEED)

KAREWA PLACE
INDICATIVE ROUNDABOUT BASED ON 8.0m CENTRAL ISLAND RADIUS AND 8.5m CIRCULATING LANE (ABSOLUTE MINIMUM DIMENSIONS RECOMMENDED BY AUSTROADS GUIDE TO ROAD DESIGN PART 4B: ROUNDABOUTS FOR 50km/h DESIGN SPEED)

EAGLE WAY
NEW ROAD EXTENSION

EXISTING PROPERTY BOUNDARY

KAREWA PLACE

---

EAGLE WAY
NEW ROAD EXTENSION

INDICATIVE ROUNDABOUT BASED ON 8.0m CENTRAL ISLAND RADIUS AND 8.5m CIRCULATING LANE (ABSOLUTE MINIMUM DIMENSIONS RECOMMENDED BY AUSTROADS GUIDE TO ROAD DESIGN PART 4B: ROUNDABOUTS FOR 50km/h DESIGN SPEED)
Appendix 3: Countdown Access (Saturday 22 March, 12:15-12:30pm)
Appendix 4: Preliminary Design Safety Audit (WSP-Opus)
Pak ‘n Save Supermarket Development
980 Te Rapa Road

Preliminary Design Safety Audit
Prepared for: Hamilton City Council
Contact Details

Name: Keith Moyes
Opus House
Princes Street
Hamilton

Telephone: 07 838 9344

Document Details

Date: March 2019
Reference: 232499.29/00001
Status: Final v2

Prepared by:
Keith Moyes
Senior Safety Engineer
Paul Addy
Principal ITS Engineer

Reviewed by:
Cherie Mason
Technical Principal Transportation
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Appendix A:

Documents Examined During the Audit
# Document History and Status

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## Revision Details

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<td>2</td>
<td>Additional clarification of severity outcomes identified</td>
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1 Background

1.1 Safety Audit Procedure

A road safety audit is a term used internationally to describe an independent review of a future road project to identify any safety concerns that may affect the safety performance. The audit team considers the safety of all road users and qualitatively reports on road safety issues or opportunities for safety improvement.

A road safety audit is therefore a formal examination of a road project, or any type of project which affects road users (including cyclists, pedestrians, mobility impaired etc.), carried out by an independent competent team who identify and document road safety concerns.

A road safety audit is intended to help deliver a safe road system and is not a review of compliance with standards.

The primary objective of a road safety audit is to deliver a project that achieves an outcome consistent with Safer Journeys and the Safe System approach, that is, minimisation of death and serious injury. The road safety audit is a safety review used to identify all areas of a project that are inconsistent with a safe system and bring those concerns to the attention of the client in order that the client can make a value judgement as to appropriate action(s) based on the risk guidance provided by the safety audit team.

The key objective of a road safety audit is summarised as:

*To deliver completed projects that contribute towards a safe road system that is increasingly free of death and serious injury by identifying and ranking potential safety concerns for all road users and others affected by a road project.*

A road safety audit should desirably be undertaken at project milestones such as:

- Stage 1 - Concept Stage (part of Business Case).
- Stage 2 - Scheme or Preliminary Design Stage (part of Pre-Implementation).
- Stage 3 - Detailed Design Stage (Pre-implementation / Implementation).
- Stage 4 - Pre-Opening / Post-Construction Stage (Implementation / Post-Implementation).

A road safety audit is not intended as a technical or financial audit and does not substitute for a design check on standards or guidelines. Any recommended treatment of an identified safety concern is intended to be indicative only, and to focus the designer 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.

In accordance with the procedures set down in the “NZTA Road Safety Audit Procedures for Projects Guidelines - Interim release May 2013” the audit report should be submitted to the client who will instruct the designer to respond. The designer should consider the report and comment to the client on each of any concerns identified, including their cost implications where appropriate, and make a recommendation to either accept or reject the audit report recommendation.

For each audit team recommendation that is accepted, the client shall make the final decision and brief the designer to make the necessary changes and/or additions. As a result of this instruction the designer shall action the approved amendments. The client may involve a safety engineer to provide commentary to aid with the decision.

Decision tracking is an important part of the road safety audit process. A decision tracking table is embedded into the report format at the end of each set of recommendations to be completed by the designer, safety engineer and client for each issue documenting the designer response, client decision (and asset manager’s comments in the case where the client and asset manager are not one and the same) and action taken.

A copy of the report including the designer’s response to the client and the client’s decision on each recommendation shall be given to the road safety audit team leader as part of the important feedback loop. The road safety audit team leader will disseminate this to team members.
A road safety audit does not replace or substitute for the project designers Health and Safety in Design audit and check required by current Health and Safety legislation.

1.2 Safety Audit Methodology

The road safety audit was carried by:

- Keith Moyes – Senior Safety Engineer WSP Opus - Hamilton Office (Team Leader),
- Paul Addy – Principal ITS Engineer – WSP Opus – Auckland Office (Team Member).

The detailed design safety audit was carried on Wednesday 30th January 2019 in fine conditions (daytime audit only).

The audit was carried out using the Stage 2 Preliminary Design Stage Safety Audit checklists and was in accordance with requirements set out in the NZ Transport Agency’s Safety Audit Procedures for Projects document (May 2013). The main audit involved examining the design drawings, driving the site in both directions and then inspecting particular parts of the road on foot.

1.3 Report Format

The potential road safety problems identified have been ranked as follows:

- The expected crash frequency is qualitatively assessed on the basis of expected exposure (how many road users will be exposed to a safety issue) and the likelihood of a crash resulting from the presence of the issue. The severity of a crash outcome is qualitatively assessed on the basis of factors such as expected speeds, type of collision, and type of vehicle involved.
- Reference to historic crash rates or other research for similar elements of projects, or projects as a whole, have been drawn on where appropriate to assist in understanding the likely crash types, frequency and likely severity that may result from a particular concern.
- The frequency and severity ratings are used together to develop a combined qualitative risk ranking for each safety issue using the Concern Assessment Rating Matrix in Table 1-1 below. The qualitative assessment requires professional judgement and a wide range of experience in projects of all sizes and locations.
Table 1-1: Concern Assessment Rating Matrix

<table>
<thead>
<tr>
<th>Severity (likelihood of death or serious injury)</th>
<th>Frequency (probability of a crash)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequent 10 or more crashes per 10 years</td>
</tr>
<tr>
<td>Very likely</td>
<td>Serious</td>
</tr>
<tr>
<td>Likely</td>
<td>Serious</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Significant</td>
</tr>
<tr>
<td>Very unlikely</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

While all safety concerns should be considered for action, the client or nominated project manager will make the decision as to what course of action will be adopted based on the guidance given in this ranking process with consideration to factors other than safety alone. As a guide a suggested action for each concern category is given in Table 1-2.

Table 1-2: Concern Categories

<table>
<thead>
<tr>
<th>Concern</th>
<th>Suggested Action</th>
</tr>
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<tbody>
<tr>
<td>Serious</td>
<td>A major safety concern that must be addressed and requires changes to avoid serious safety consequences.</td>
</tr>
<tr>
<td>Significant</td>
<td>Significant concern that should be addressed and requires changes to avoid serious safety consequences.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Moderate concern that should be addressed to improve safety.</td>
</tr>
<tr>
<td>Minor</td>
<td>Minor concern that should be addressed where practical to improve safety.</td>
</tr>
</tbody>
</table>

In addition to the ranked safety issues it is appropriate for the safety audit team (SAT) to provide additional comments with respect to items that may have a safety implication but lie outside the scope of the safety audit. A comment may include items where the safety implications are not yet clear due to insufficient detail for the stage of project, items outside the scope of the audit such as existing issues not impacted by the project or an opportunity for improved safety but not necessarily linked to the project itself. While typically comments do not require a specific recommendation, in some instances suggestions may be given by the auditors.

1.4 Scope of Audit

This audit is a Stage 2: Preliminary Design Stage Safety Audit of the proposed Pak ‘n Save development at 980 Te Rapa Road and the associated intersections at Te Rapa Road/Eagle Way, Eagle Way/Karewa Place and Wairere Drive/Karewa Place. The designs and drawings were produced by Wingate Architects and Traffic Planning Consultants (TPC) on behalf of Foodstuffs Ltd.
1.5 Documents Provided

The Road Safety Audit Team (SAT) were provided with the following documents for this audit:

- Wingate Architects Feasibility Study: Site Plan drawing No A024:
- Traffic Planning Consultants Ltd Integrated Transport Assessment report including Intersection Layout Drawings: 17119 - sheets 01 to 07.

The impact of this project includes a number of other intersections. The SAT understands other reports detailed these impacts (such as traffic modelling and traffic impact assessments) are being completed. These report were not available to the SAT for this audit. The SAT therefore have made a number of assessments and commentary based on potential impacts from a high-level assessment.

1.6 Disclaimer

The findings and recommendations in this report are based on an examination of available relevant plans, the specified road and its environs, and the opinions of the SAT. However, it must be recognised that eliminating safety concerns cannot be guaranteed since no road can be regarded as absolutely safe and no warranty is implied that all safety issues have been identified in this report. Safety audits do not constitute a design review nor an assessment of standards with respect to engineering or planning documents.

Readers are urged to seek specific technical advice on matters raised and not rely solely on the report.

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

1.7 Project Description

The proposal includes the development of a new Pak ‘n Save supermarket at 980 Te Rapa Road Hamilton. The site is located on the land on the northern side of Eagle Way between the intersections of Te Rapa Road/Eagle Way and Karewa Place/Eagle Way.

The project is located within Hamilton City with the following roads and speed limits:

- Te Rapa Road – 60km/h
- Eagle Way and Karewa Place - 50km/h; and
- Wairere Drive – 80km/h.

The project provides:

- A left turn in, left turn out entrance to Pak ‘n Save for light vehicles on Te Rapa Road,
- A left turn in (with slip lane), left turn out entrance to Pak ‘n Save for light vehicles on Eagle Way,
- A light vehicle entrance to Pak ‘n Save with all movements catered for on the new road extension (Kawera Place),
- Two delivery entrances (one right and left in and one right and left out) to Pak ‘n Save on the new road extension (Kawera Place) catering for heavy vehicles,
- Give way control on Eagle Way at the Karewa Place intersection,
- A right turn bay into Eagle Way on the new road extension (Kawera Place),
- A traffic signalised right turn movement from Wairere Drive into Karewa Place.

2 Safety Audit Findings

The SAT noted that the drawings provided had limited details and more details will be required to enable the works to be constructed. The following safety issues were identified by the SAT and in order to make the proposed development safer for all users they need to be addressed.
2.1 Wider Safety Concept Considerations – General

The SAT have considered that the project will generate additional traffic volumes on the surrounding roading network. The addition of numerous entrances to the site, a new signalised intersection at Wairere Drive/Kawera Place and the new intersection layout at Karewa Place/Eagle Way is likely increase congestion and the likelihood of more crashes at these locations and the surrounding roading network.

The SAT are unaware of the actual potential traffic volumes that will increase (as a result to the development) on the wider roading network as this is currently being modelled. However, we have raised some potential wider safety concerns relating to the proposal.

2.1.1 Surrounding Intersections

The SAT believe that further work needs to be completed on the wider traffic impacts within this area and understand this is being done. Although the SAT have not received this report, investigation of the flow on effects of those intersection forms needs to be explored further. As with a number of access, intersections within a network, modifications can be made (such as phasing, stacking lengths between intersections) which may lead to increases in both all and high severity outcomes, rear end crashes, red light running, weaving and unsafe manoeuvres to avoid queues and access the proposed development.

Recommendation

Undertake a review of the traffic modelling report and any other traffic impact assessments to better understand and consider the safety impacts that the proposed development could have on the wider network and potential mitigation measures needed.

---

**Frequency Rating:** Crashes are likely to be Common  
**Severity Rating:** Death or serious injury is Likely  
**Risk Rating:** Significant

---

**Designer Response:** BBO undertook VISSIM modelling to determine the key traffic movements in the wider road network affected by the proposed development, and the effects at the intersections identified by BBO have been addressed in the Integrated Transport Assessment (ITA) report. This should have given the SAT sufficient information to identify any safety concerns in the wider road network. There seems no justification for a review of the network modelling for a road safety audit.

**Safety Engineer:** Further traffic modelling is being completed and should be reviewed by the Designer.

---

**Client Decision:** Click here to enter text.

**Action Taken:** Click here to enter text.

---

2.1.2 Speed Management

As with the above comments, with the potential increases to traffic and the introduction of a new intersections, a review of the surrounding speed limits based on function and risk should be completed to improve safety. The output of that review should provide a consistent route and network approach for all road users. This review will help form an opinion on the appropriate form and function of the Karewa and Wairere Drive Intersection.

Recommendation:

Review Safe and appropriate speeds in the surrounding network.

---

**Frequency Rating:**  
**Severity Rating:**  
**Risk Rating:**
2.2 Te Rapa Road Entrance

The SAT noted the following issues associated with the proposed entrance on Te Rapa Road.

2.2.1 Shared Path and Kerb Let Down

There is a shared cycle/pedestrian path (located on the south side of the proposed Pak ‘n Save entrance) that has an existing kerb let down allowing cyclists to exit or enter the cycle lane on Te Rapa Road. This. Traffic volumes using the Eagle Way left turn slip lane to access Pak ‘n Save are expected to increase and therefore, it is likely that cyclists’ exposure to risk with increases with less opportunities to safely join the SH1 Te Rapa Road on road cycle lane at this location.

It is essential that cyclists have a safe location to enter or exit the shared path and on-road facilities and are not required to use the Pak ‘n Save entrance. The drawings do not show if the cyclist kerb let down is to be relocated and remarked.

![Image of Te Rapa Road entrance]

Figure 1: View of existing Te Rapa Road kerb let down for cyclists

Recommendation:
Show the location of the cyclist kerb let down and markings and ensure it is located where it does not cause conflict with the proposed entrance to Pak ’n Save.

<table>
<thead>
<tr>
<th>Frequency Rating:</th>
<th>Severity Rating:</th>
<th>Risk Rating:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crashes are likely to be Infrequent</td>
<td>Death or serious injury is Likely</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Designer Response:** The cyclist kerb let down is to be located immediately past the proposed Pak ‘n Save driveway. The precise layout will be shown in the detailed design. It is suggested that a consent condition require the engineering design plans for all vehicle crossings and other road works to be approved by Hamilton City Council prior to any work on the road being undertaken.

**Safety Engineer:** The Designer response does not address the location of the crossing or safety impacts on cyclists and pedestrians. It remains unclear if a safe location can be provided.

Assuming that the cycle cutdown is to be located south of the vehicle crossing, there is a risk that drivers will be looking north towards oncoming traffic and not give way to cyclists and pedestrians approaching from the south resulting in a crash.

**Client Decision:**

**Action Taken:**

### 2.2.2 Location, Visibility and Access to ‘The Base’ from Proposed Entrance

*Moderate*

The SAT noted the following issues at the proposed left turn in left turn out entrance on Te Rapa Road at the northern end of the site.

1. Sight line visibility from the proposed entrance is restricted to north by a transformer and a fence with advertising hoardings on top of it. A specimen tree is also proposed on the north side of the entrance which has the potential to obstruct sight lines (depending on type). This will make it difficult for vehicles exiting the site to see approaching traffic on Te Rapa Road or cyclists and pedestrians on the shared path.

2. The entrance is located where the existing shoulder width is 1.5 m. Left turning traffic into the site will be slowing and occupying part of the southbound through lane. This has the potential for rear end crashes and for through vehicles to overtake and weave into the adjacent through lane.

3. Some vehicles exiting this entrance onto Te Rapa are likely to ignore the left turn and want to travel to ‘The Base’. This movement will require them to cross the shoulder/cycleway and two straight through lanes to enter the right turn lane to ‘The Base’. Depending on the queue lengths at the traffic signals some traffic may start this manoeuvre and find they are stranded in the straight through lanes. This manoeuvre has the potential to cause side impact crashes and other weaving type crashes.
Recommendations:

1. Consider relocating the transformer, shortening the fence, removing advertising hoardings and the proposed tree to maximise sight lines from the proposed entrance. In conjunction with these measures paint a limit line to reinforce the location of the shared path.

2. Consider closing the Te Rapa Road entrance and require all traffic to use the Eagle Way entrance.

3. If item 2 is not viable, consider relocating the Te Rapa Road entrance further south within the left turn slip lane and extending the existing concrete splitter island. This will ensure it is a true left turn out movement and prevents traffic using the Te Rapa Road through lanes and the right turn bay into ‘The Base’. At this location vehicles will already be slowing and the likelihood of nose to tail crashes will be reduced, turning traffic will not affect the Te Rapa Road through lane traffic and there is good visibility of pedestrians and cyclists.

Frequency Rating: Crashes are likely to be Occasional
Severity Rating: Death or serious injury is Likely
Risk Rating: Moderate

Designer Responses:

1. Road and Traffic Guideline RTS 6 Guidelines for Visibility at Driveways indicates that the point from which driveway sight distance should be measured is a point 5 metres in from the centre of the lane nearest the driveway. Neither the transformer, the fence, nor the advertising hoardings pictured above impede visibility when measured from the correct point. We agree that it is important that amenity planting similarly does not obstruct visibility from the proposed driveway.

2. There are seven existing driveways on Te Rapa Road north of Eagle Way where motorists turn left off Te Rapa Road, and so motorists travelling southbound on Te Rapa Road should expect to encounter such slowing and left turning traffic. Between 2013 and 2017 there have been no crashes reported involving motorists turning left off Te Rapa Road at these driveways. Consequently, the safety effects of traffic turning left into the proposed supermarket are expected to be negligible.

3. The distribution of traffic used in the ITA was based on a customer catchment analysis undertaken by Foodstuffs. This indicates that some 21% of traffic departing from the site will proceed south on Te Rapa Road, and it is important that the left turn exit onto Te Rapa Road cater for this. No significant proportion of departing trips are expected to travel on to The Base, but any traffic wishing to do so can use the site exit onto the new road link and then turn right onto Eagle Way.
Safety Engineer:
1. Agree that when measured correctly, sight distance is not obstructed by the transformer or fence. The effects of landscaping should be considered during detailed design.
2. The seven driveways and activities north of the site are very different to the proposed access and activity. None of these activities generates traffic volumes similar to the proposed Pak’n Save. With the exception of Highway Supplies Fruit & Vege, none are located near the diverge point to a slip lane and all are further away from a signalised intersection. The designer does not appear to have considered relocating the vehicle crossing as recommended by the SAT.
3. The designer does not appear to have considered relocating the vehicle crossing as recommended by the SAT.

Client Decision: 

Action Taken: 

2.3 Eagle Way Entrance

The SAT noted the following issues associated with the Eagle Way entrance:

2.3.1 Parking on South Side and Other Eagle Way Concerns

Moderate

1. Vehicles are currently permitted to park on the south side of Eagle Way. The installation of a central splitter island from Karewa Place will prevent right turning out of Pak ‘n Save and may reduce the available shoulder width. Any reduction in shoulder width will make it difficult to accommodate parking and will require cyclists to use the traffic lane to pass parked vehicles.

2. The SAT noted the Eagle Way entrance into Countdown Supermarket/K Mart has tailbacks which extend into the Eagle Way through-lane at times. This can increase the likelihood of nose to tail crashes, albeit, this will beat low speed. In addition, vehicles that currently right turn out of this entrance have limited opportunities to find a break in the traffic to perform this manoeuvre. With increased traffic volumes on Eagle Way, the likelihood of side impact crashes at this entrance increases.

3. The SAT also noted some southbound Te Rapa Road vehicles are avoiding delays at the Te Rapa Road/ Eagle Way/Base Parade traffic signals by using the Eagle Way left turn slip lane and then performing a U turn at the end of the Eagle Way/Te Rapa splitter island before left turning out of Eagle Way and continuing south on Te Rapa Road. This traffic movement is undesirable as the majority of vehicles on Eagle Way are not expecting a vehicle to U turn at this location. The SAT are concerned Eagle Way and Karewa Place could have additional ‘rat running’ on local streets with increased traffic volumes depending on the effects of the Pak ‘n Save development on the surrounding roading network.

4. The internal carpark layout near the entrance is tight and may mean traffic accessing and manoeuvring into these parks could restrict traffic entering from Eagle Way causing tailbacks. This problem currently exists with the Countdown carpark opposite the proposed Pak ‘n Save entrance and the proposed entrance could make the situation worse.
Figure 3: View showing vehicles parking on south side of Eagle Way

Recommendations:

1. Consider removing the parking on the south side of Eagle Way or ensure that design of the new splitter island on Eagle Way/Karewa Place allows adequate shoulder width on the south side for parking and cyclists.

2. Consider installing a central island from Te Rapa Road to Karewa Place with roundabouts at Countdown/Pak ‘n Save/Eagle Way and at Eagle Way/Karewa Place intersections. This will ensure vehicles using both Pak ‘n Save and the Countdown/K Mart entrances will be able to execute all turning manoeuvres safely. However, this will need to be modelled to ensure that queuing does not occur for vehicles out on to Te Rapa Road.

3. Install a central island from Te Rapa Road to Karewa Place with the roundabouts as recommended in item 2 above to prevent U turns in Eagle Way.

4. Ensure the internal carpark layout does not restrict the flow of traffic entering the site from Eagle Way and cause tail backs.

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<th>Risk Rating:</th>
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<tr>
<td>Crashes are likely to be</td>
<td>Death or serious injury is Unlikely</td>
<td>Moderate</td>
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<tr>
<td>Occasional</td>
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Designer Responses:

1. We agree that there would be merit in removing the parking on the south side of Eagle Way outside the Countdown site access. There seems no need for this on-street parking and it may limit visibility for traffic leaving the Countdown site.

2. If there are safety concerns with vehicle manoeuvres at the Countdown access, these should be addressed in consultation with the owners of that site. The proposed Pak ‘n Save development will not generate right turn movements on Eagle Way, and there are no reported traffic crashes to indicate that U-turns on Eagle Way as identified by the SAT are a safety problem.

3. Vehicles entering the Pak ‘n Save site access off Eagle Way will be required to turn left, with no conflict or potential delay from other traffic movements at the internal carpark intersection. There is a distance of some 40 metres between the point where vehicles turn off from through traffic on Eagle Way and the point within the site where these vehicles might potentially be delayed by a vehicle entering or exiting a parking space on the site. This is considered to be an ample separation to ensure that there will be no off-site effects caused by entering vehicles.
Safety Engineer:

1. Agree with removal of parking, noting that this requires review and decision making by HCC through the Local Government Act.

2. The Designer has not consider the option (central island and roundabouts) recommended by the SAT. Designer has not considered the impact of the proposal on vehicles using Eagle Way to avoid the Te Rapa Road signals.

Disagree with the Designer. The proposal changes the road layout and while not permitted u-turn/right-turns into Pak’n Save are possible and increase the risk of conflict at the Countdown access. Right-turns out of Countdown will be exposed to traffic exiting Pak’n Save with a risk of weaving crashes on Eagle Way as vehicles change lanes to turn left or right at the Karewa Place intersection.

3. Disagree. It is unclear which approach has priority at the internal intersection. Any queuing should be contained within the site. While the deceleration lane may provide some additional space, it is unlikely that approaching drivers will be expecting a queue to form outside the site increasing the risk of rear-end crashes.

Client Decision:  

Action Taken:  

2.3.2 Cycle Lane

The drawing shows that the existing on-road cycleway on the northern side of Eagle Way terminates by the left-turn out of the Pak’n Save entrance. The SAT are concerned that cyclists have no on-road or off-road facilities on Eagle Way or Karewa Place as they approach the new Eagle Way/Karewa Place intersection.

Recommendation:

Extend the Eagle Way cycle lane and provide facilities for cyclists at the intersection with Karewa Place. Consider extending shared path the entire length of Eagle Way to accommodate cyclists who are not confident to use the on-road facility.

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<td>Death or serious injury is Likely</td>
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Designer Response: The layout of Eagle Way east of the proposed Pak’n Save exit shown in Figure 15 of the ITA report is based on the Eagle Way / Karewa Place intersection layout proposed in the subdivision application by Porter Developments Ltd (refer to Figure 17 of the ITA report) which precedes this application for a supermarket. The provision of cycle lanes should be addressed in the context of the subdivision.

Safety Engineer:  

Disagree, the proposal results in a new high volume vehicle crossing and conflict points with the cycle facility. The effects on the cycle lane and cyclists should be addressed in the design of this new vehicle crossing taking into account the proposed traffic volumes.

I consider that the Designer should show how the proposed cycle facilities will be safe for cyclists.

Client Decision:  

Action Taken:  

2.3.3 Right Turn from Entrance

The proposed entrance on Eagle Way is left turn in, left turn out, and the central splitter island reinforces that the right turn in or out from this entrance is not permitted. The SAT are concerned some traffic will want to turn right, and it is likely they will attempt U turns at the new tee intersection at Eagle Way/ Karewa Place. The U turn movement at this tee intersection is undesirable and creates an increased risk for those using the intersection.
Recommendation:

Consider changing the Eagle Way/Karewa Place intersection from a tee intersection to a roundabout to cater for the right turning traffic movement. A roundabout at this location will also address the issues raised in item 2.3.1 above.

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<td>Crashes are likely to be Occasional</td>
<td>Death or serious injury is Unlikely</td>
<td>Minor</td>
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**Designer Response:** It is not agreed that every site access point should provide for all traffic movements. The proposed site access provisions do, however, give options to safely approach and depart from the site from all directions. Any traffic leaving the site wishing to proceed west on Eagle Way can use the site exit onto the new road extension (Karewa Place to Church Road) and then turn right onto Eagle Way. Any traffic wishing to proceed south from the site can either do the same, or else turn left from the site exit onto Te Rapa Road.

**Safety Engineer:** The proposal relies on exiting drivers making multiple right-turns against opposing traffic to reach some destinations. This may be confusing for some drivers. This increases the exposure of drivers to a crash, the risk of crashes occurring and is not consistent with the Safe System approach.

The Designer has not considered the potential for u-turns at the Eagle Way/ Karewa Place intersection.

**Client Decision:**

**Action Taken:**

2.4 Entrances on New Road Extension (Karewa Place)

2.4.1 Lack of Shoulders

**Moderate**

The drawing does not show any shoulders on the new road extension (Karewa Place to Church Road) and this design does not cater for cyclists. The lack of shoulders will also cause traffic left turning in and out of these entrances to remain in the traffic lane until they have completed these manoeuvres.

**Recommendation:**

Amend the design to provide 1.5 m minimum shoulder width on the new road extension.

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<td>Death or serious injury is Likely</td>
<td>Moderate</td>
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**Designer Response:** The layout of the new road extension (Karewa Place to Church Road) shown in Figure 15 of the ITA report is based on the layout proposed in the subdivision application by Porter Developments Ltd (refer to Figure 17 of the ITA report) which precedes this application for a supermarket. The provision of cycle lanes near this intersection should be addressed in the context of the subdivision.

**Safety Engineer:** Disagree. The proposal results in a new vehicle crossing with additional traffic and the designer should consider effects on all road users. This should include the appropriate provision of shoulders. I consider 1.5m shoulders on Eagle Way appropriate.

**Client Decision:**

**Action Taken:**

2.4.2 Exit from Couplands Property at Intersection

**Minor**
The proposed design does not show how the existing exit from Couplands Bakery property will be catered for at the new Eagle Way/Karewa Place intersection. As the property is a commercial bakery it will be used regularly by heavy vehicles and the design needs to cater for these vehicles.

**Recommendation:**

Ensure the design caters for commercial traffic exiting Couplands Bakery at Eagle Way/ Karewa Place intersection. Consider linking the property entrance to suggested roundabout at Eagle Way/Karewa Place intersection.

**Frequency Rating:** Crashes are likely to be Occasional  
**Severity Rating:** Death or serious injury is Unlikely  
**Risk Rating:** Minor

**Designer Response:** The layout of the Eagle Way / Karewa Place intersection shown in Figure 15 of the ITA report is based on the Eagle Way / Karewa Place intersection layout proposed in the subdivision application by Porter Developments Ltd (refer to Figure 17 of the ITA report) which precedes this application for a supermarket. Commercial vehicle egress from the Couplands Bakery should be addressed in the context of the subdivision.

**Safety Engineer:** Disagree, the proposal results in a new vehicle crossing with additional traffic increasing the risk of conflict at the Couplands exit.

**Client Decision:** Click here to enter text.  
**Action Taken:** Click here to enter text.

### 2.4.3 Lighting

**Minor**

The drawings do not show any lighting and the installation of physical islands will require them to be adequately lit.

**Recommendation:**

Ensure the design provides adequate lighting of all new traffic islands.

**Frequency Rating:** Crashes are likely to be Occasional  
**Severity Rating:** Death or serious injury is Unlikely  
**Risk Rating:** Minor
Designer Response: Agree that the detailed design must provide adequate lighting of all new traffic islands proposed for this development. We suggest that this be a Council requirement for Engineering Design approval.

Safety Engineer: Agree that street lighting can be addressed during detailed design review and approval by Council. This should include lighting of islands and intersections.

Client Decision: Click here to enter text.
Action Taken: Click here to enter text.

2.4.4 Vegetation at Eagle Way/Karewa Place

Minor

There is some existing vegetation on the inside of the proposed left turn slip lane from Karewa Place. The SAT are concerned that this vegetation may obstruct the sightlines of Karewa Place through traffic when traffic are at the proposed Eagle Way give way control.

![Figure 5: View looking along Karewa Place from Eagle Way showing vegetation that may obstruct visibility with new intersection layout](image)

Recommendation:
Check existing vegetation does not obstruct sightlines at the new Eagle Way/Karewa Place intersection.

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<td>Death or serious injury is Unlikely</td>
<td>Minor</td>
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Designer Response: The layout of the Eagle Way / Karewa Place intersection shown in Figure 15 of the ITA report is based on the Eagle Way / Karewa Place intersection layout proposed in the subdivision application by Porter Developments Ltd (refer to Figure 17 of the ITA report) which precedes this application for a supermarket. Ensuring that there is adequate intersection sight distance should be addressed in the context of the subdivision.

Safety Engineer: Disagree. The Designer has not confirmed that adequate sight distance is available or if design changes are necessary to safely accommodate traffic from the development.

Client Decision: Click here to enter text.
Action Taken: Click here to enter text.
2.5 Wairere Drive/Karewa Place Intersection

The applicant’s proposal is to signalise the right turn movement from Wairere Drive into Karewa Place and the SAT noted that although this proposal may help mitigate the additional traffic volumes at other surrounding intersections on the network it raises various safety concerns at this location.

2.5.1 Type of Intersection and Speed Limit on Wairere Drive

From a higher level we understand that all Pak N Save traffic coming from Pukete Road direction will need access, so there is a need for them to use a junction of some form. Whilst these movements can be completed at the Intersections of Te Rapa Road through to Eagle Way, the SAT understand that these intersections are already at capacity, and adding further traffic only increases the issues. However, this will need to be confirmed by the traffic modelling and wider traffic impact assessments.

The proposed intersection is a signalised right turn only at-grade tee intersection on an arterial route with an 80 km/h posted speed limit. The SAT have concerns with introducing a signalised intersection to a network along an 80km/h corridor which could result in some high severity outcomes. However, the movements are restricted and mitigation could be put in place to help reduce risk which the designers need to consider moving in the next phase of the design.

Although the traffic signals could be developed further to reduce risk, the SAT believe that, given the early phase of this design, consideration should be given to ‘optioneering’ a range of intersection forms to determine the best approach to providing for access and range of roads users whilst considering a high level of safety.

Recommendation:

Designer to consider all various intersection layouts e.g. left in, left out, traffic signals, traffic signals with raised platform (with speed management), roundabout, grade separation and determine the best option to meet safety requirements and accommodate a range of road users along with an understanding of the impacts of using certain intersection facilities. For example, if a road safety platform was proposed in conjunction with the traffic signals, consideration of whether this is appropriate within an 80km/h speed environment. And, if a set of signals proposed how does it link in to the two complex signals on either side of the intersection and what are the likely effects of this on safety (such as queuing back across other intersections). Therefore, any investigation of this site for appropriate intersection form also needs to consider speed limits and how it would meet current and future traffic volumes.

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<th>Frequency Rating:</th>
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<tr>
<td>Crashes are likely to be Common</td>
<td>Death or serious injury is Very Likely</td>
<td>Serious</td>
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**Designer Response:** As explained in the ITA report, providing for the right turn from Wairere Drive to Karewa Place is a mitigation measure to relieve potential congestion arising from turns that would otherwise need to be made at the Te Rapa Road intersections with Wairere Drive and Eagle Way. The intersections on Wairere Drive to the east (at Pukete Rd) and the west (at Te Rapa Road) are signalised, and so signalising right turns at the Karewa Place intersection is considered to be appropriate. Refer also to designer response to 2.5.3.

**Safety Engineer:** The Designer has not addressed the safety concerns raised by the SAT or considered other options to mitigate the risk of crashes and has relied on efficiency improvements to justify the form of intersection. This is not consistent with the Safe System approach.

**Client Decision:** Click here to enter text.

**Action Taken:** Click here to enter text.

2.5.2 Right Turn Queue Length

Significant
There is the potential for Karewa Place/Wairere Drive right turn lane to queue back through the Pukete Road intersection and block the through lanes. The microsim model results show an average queue of 24 m and a maximum queue of 215 m. The Sidra modelling shows a maximum queue of 89 m. The right turn lane shown in the preliminary design is 118.2 m long. It is not clear why this mismatch occurs, but it is most likely the mismatch is caused by using different cycle times in the Sidra and microsim models.

The SAT are concerned there is a chance that the right turn lane queue may tail back through the intersection causing vehicles to brake suddenly when trying to make a through movement on Pukete Road.

**Recommendation:**

Check the modelling and ensure that the length of the Wairere Drive right turn bay is adequate and does not cause traffic to tail back through the Pukete Road intersection.

Suggest that the microsim and Sidra models are set up with the same cycle time of 120 seconds that is currently running at the existing intersection. The output of the model should confirm if the length of the Wairere Drive right turn bay is adequate.

---

**Frequency Rating:** Crashes are likely to be Common  
**Severity Rating:** Death or serious injury is Likely  
**Risk Rating:** Significant

---

**Designer Response:** The SIDRA modelling used optimised signal timings for these intersections. If a cycle time of 120s is used for the SIDRA modelling of the Karewa Place/Wairere Drive intersection, the resultant predicted maximum queue length is 185m, which is comparable to the VISSIM modelled maximum queue of 215m. However, for the reasons outlined in our response to item 2.5.3, adopting common cycle times at these intersections is neither necessary nor desirable. As long as the cycle time adopted for the Karewa Place/Wairere Drive intersection is suitably low, to efficiently manage the expected volumes of turning movements, the length of the Wairere Drive right turn bay will be adequate and will not cause traffic to tail back through the Pukete Road intersection.

---

**Safety Engineer:** A queue length of 185m exceeds the available storage length (118m) and the Designer has not recognised or addressed the potential for rear-end crashes. The cycle time needs to match (or be a multiple of) the adjacent signals to ensure the progression of eastbound traffic is safe and efficient. Appropriate timing of signals is necessary to avoid eastbound drivers arriving as the lights change red which could lead to red light running and crashes.

---

**Client Decision:**  
**Action Taken:**

---

**2.5.3 Traffic Signal Cycle Time**  

**Significant**

The SAT noted there is the potential increased risk of rear end crashes due to un-optimized signal timings.

The Sidra model for Wairere/Kawera is set up with a 40 second cycle time which does not match the adjacent intersections on either side i.e. Wairere/Te Rapa was running a 120 second cycle and Wairere/Pukete was running an 80 second cycle at the time of the site visit. These intersections are separated by 400 m which is sufficient distance for platoon dispersal to occur and therefore cycle time optimisation would be of reduced benefit. With the introduction of a new intersection the distance between intersections is reduced to 200 m and ideally closely associated intersections on a corridor would run the same cycle time so that the offset between intersections could be optimised to provide progression along the corridor.

If cycle times are not optimised then this could increase the risk of rear end crashes if a vehicle has to stop multiple times for red signals along a short length of corridor.

**Recommendation:**
Designer to ensure the cycle times at adjacent signalised intersections are electronically interlinked and optimised to reduce the chances of rear end crashes occurring.

Suggest that the Sidra model is updated with the correct cycle time to confirm the actual queue lengths that can be expected if this intersection is installed. Also suggest that the Sidra is expanded to include the intersections either side of the proposed new intersection to check if there is interaction between the expected queues that impacts the operation and safety of the existing intersections.

**Frequency Rating:**
Crashes are likely to be Common

**Severity Rating:**
Death or serious injury is Likely

**Risk Rating:**
Significant

**Designer Response:** Westbound traffic on Wairere Drive is not stopped at the proposed Karewa Place signals, and so westbound co-ordination is not an issue. In terms of eastbound co-ordination, signalised intersections do not need to have the same cycle time to provide progression along the corridor. What is required is a progression of green phases for the through traffic flow at successive intersections. The SIDRA modelling optimised the signal timings for these intersections to better manage the new expected traffic demands. The SIDRA modelling suggested a new cycle time of 150s for the Te Rapa/Wairere intersection, with a 20s green time for eastbound through traffic from The Base. If a cycle time of 50s was adopted the Wairere/Kawera intersection, and a 20s green time for eastbound traffic on Wairere Drive, the Wairere/Kawera intersection would cycle three times for one cycle of the Wairere/Te Rapa intersection, and the signal offset could be set to ensure that the platoon of eastbound through traffic from The Base is met with a green phase as it arrives at the Wairere/Kawera intersection. These signal timings at the Wairere/Kawera intersection retain the LOS for all movements as those recorded in the ITA report. The maximum queue for the right turn into Karewa Place would be 109m, which is still within the 118.2 m long right turn lane length shown in the preliminary design.

**Safety Engineer:**
A cycle time of 150s is likely to lead to poor level of service for pedestrians and is longer than current cycle times used by HCC (typically 110s at peak periods and max = 120s). Desirable for modelling to demonstrate performance at 110s which is used by Wairere/Pukete and Wairere/Te Rapa intersections.

For much of the day cycle times are below 100s and it is unclear how signal timing will be coordinated and issues such as residual queues adaptive phases and inter-green times will be managed.

**Client Decision:**
Click here to enter text.

**Action Taken:**
Click here to enter text.

### 2.5.4 Intersection Signs

**Minor**

1. There is potential for undertaking late lane changes for drivers wanting to access the right turn bay into Karewa Place. It is not clear from the preliminary design where the advance signing will be placed to indicate that vehicles need to use this lane to turn right into Karewa Place. It is essential that drivers are given sufficient information to use the correct lanes, and to discourage late lane changing manoeuvres. The location of the existing westbound Advance Destination Sign (ADS) for Wairere Drive/Te Rapa Road will need to be considered in conjunction with any new ADS in this area to ensure it does not cause confusion with the new intersection.

2. The existing eastbound ADS for Wairere Drive/Pukete Road (Chartwell, University, and Pukete) is located within the existing central median island. When the Kawera Place right turn bay is constructed this sign will need to be relocated.
Figure 6: View of existing ADS in central island on the eastbound approach to Wairere Drive/Pukete Road

Recommendations:

1. Show the location of the Wairere Drive/Karewa Place ADS on the drawings and check if the existing Wairere Drive/Te Rapa Road ADS needs to be relocated.
2. Show the new location of the existing eastbound ADS for Wairere Drive/Pukete Road (Chartwell, University, and Pukete) on the drawings.

**Frequency Rating:**
Crashes are likely to be Occasional

**Severity Rating:**
Death or serious injury is Unlikely

**Risk Rating:**
Minor

Designer Response: The location of the ADS signs on Wairere Drive for the Te Rapa Road and Pukete Road intersections are shown on attached drawing 17119-01. As noted by the SAT, the location of the eastbound ADS sign may need slight adjustment to remain within the narrower median island. The eastbound ADS sign indicates the direction of travel to Chartwell, the University, and Pukete while the westbound ADS sign gives guidance to the city centre, Auckland, Te Rapa, Wintec, the Hamilton Zoo and Taupo. No such major destination relates to Karewa Place. It is self-evident that should westbound motorists wish to turn right into Karewa Place, they need to be in the right lane, and we are not convinced that a sign explaining this is necessary. Nevertheless, should Council wish, a “Karewa Place traffic use right lane” sign could be installed for westbound traffic in advance of the Karewa Place intersection.

Safety Engineer: The island where the eastbound ADS sign is located is shown as reducing to 1.5m on the drawings. This reduces clearance from the column to the kerb face. MOTSAM requires 500mm clearance to a sign where mountable kerbs are provided. It is unclear what clearance will be provided and if there is an increase in risk of the sign column being struck by vehicles. The sign should be relocated and/or have the appropriate level of protection.

Client Decision: Click here to enter text.

Action Taken: Click here to enter text.

### 2.5.5 Shorter Right Turn Stacking Length for Te Rapa Road Right Turn

#### Significant

The introduction of a right turn lane on Wairere Drive for Karewa Place will reduce the double right turn lane stacking length for the Wairere / Te Rapa intersection by 50 m to 150 m. The SAT are concerned that there a risk that this reduction in right turn stacking space could impede the utilisation of the 2nd right turn lane and queues could overflow into the through lanes leading to nose to tail crashes.

Recommendation:
Check the traffic model to determine if Wairere Drive has adequate capacity for right turning traffic into Te Rapa Road and the queue does not encroach into the through lanes. If the right turn capacity is inadequate the Designer to determine suitable mitigation measures.

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<td>Death or serious injury is Likely</td>
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<th>Risk Rating:</th>
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**Designer Response:** As indicated in page 5 of the BBO Traffic Modelling Report, with the addition of a signalised right turn from Wairere Drive to Karewa Place “the right turn volume from Wairere Drive to Te Rapa Road reduces by 280 vph, resulting in the average delay reducing from 130s to 80s and the maximum queue reducing from 360m to 192m, which now fits in the available lane storage length.”

**Safety Engineer:** Agree that the queuing spaces appears adequate for 2021. However, to date the VISSIM modelling has only considered 2021, not a future period. The effects of queuing at 2031 should be considered by the Designer.

**Client Decision:**

**Action Taken:**

2.5.6 **Turning at Karewa Place at Peak Times**

**Minor**

During the pm peak the SAT observed, that when there are high volumes of traffic on Wairere Drive, the queue waiting to turn left onto Wairere Drive from Karewa Place exceeds 20 vehicles due to a tail back on Wairere Drive (goes west beyond Te Rapa Road). Wairere Drive traffic is currently stationary at the intersection and depending on motorist behaviour, the new signalised right turn into Karewa Place may not be able to operate due to the tail back through the intersection. This will lead to driver frustration and has the potential to cause crashes.

![Image of Karewa Place/Wairere Drive intersection showing stationary traffic during pm peak.](image)

**Recommendation:**

Check wider transport model for flow on effects of the proposed Wairere Drive/Kawera Place intersection. Consider marking hatched no stopping area on Wairere Drive to minimise the chances of the tail back blocking the Karewa Place intersection.

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2.5.7 Turning Paths

Moderate

The proposed design for the left turn out of Karewa Place into Wairere Drive shows semi-trailers tracking across into the adjacent eastbound lane. This is a safety concern as the lane is used by eastbound straight through traffic and often there is not room to carry out this manoeuvre (particularly when there are high volumes of traffic on Wairere Drive e.g. PM peak).

Recommendation:

Redesign the island layout to ensure a semi-trailer right turning from Karewa Place can be accommodated within the Wairere Drive left hand lane and not encroach into the adjacent lane.

2.5.8 Lighting of Intersection and Island

Minor

The drawings do not show any changes to the existing lights. The SAT are concerned that new intersection layout may require additional lighting to ensure good night time visibility.

Recommendation:

Check the lighting design and ensure the island and intersection have adequate lighting.
2.5.9 Right Turn Bay Lane Widths

**Moderate**

The drawings do not show the lane width of the proposed right turn pocket and it does not appear to cater for cyclists who want to right turn at this intersection.

**Recommendation:**

Show the proposed lane width of the right turn bay and determine if the width needs to cater for cyclists at this intersection.

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<th>Death or serious injury is Likely</th>
<th>Risk Rating:</th>
<th>Moderate</th>
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**Designer Response:** In using any right turn lane, cyclists should “claim the lane” and not attempt to travel alongside other vehicles when making the turn. As shown in the attached drawing 17119-02, the proposed right turn bay width is 4.4m. This is within the acceptable range of 4.3m to 5m width specified in Table 4.4 of Austroads “Cycling Aspects of Road Design”.

**Safety Engineer:** While the width of the turn lane complies, it is unclear how cyclists are meant to safely access the right turn lane from the eastbound shoulder.

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<tr>
<td>Action Taken:</td>
<td>Click here to enter text.</td>
</tr>
</tbody>
</table>

2.5.10 Pedestrian Facilities on Karewa Place

**Moderate**

The drawings have limited details of the proposed pedestrian facilities at the Kawera Place/Wairere Drive intersection. It appears that pedestrians will be required to cross the slip lane using pedestrian crossings then wait on the splitter islands for the traffic signal phase that allows pedestrians to cross Karewa Place.

The SAT are concerned that the new development may encourage additional pedestrians and mobility scooters in this area. The size of the splitter islands between the pedestrian crossings on the Karewa Place left in and left out slip lanes may not be large enough to cater for mobility scooters.

**Recommendation:**

Provide details of the pedestrian crossing phasing on Karewa Place and ensure the facility caters for both pedestrians and mobility scooters.

<table>
<thead>
<tr>
<th>Frequency Rating:</th>
<th>Crashes are likely to be Occasional</th>
<th>Severity Rating:</th>
<th>Death or serious injury is Likely</th>
<th>Risk Rating:</th>
<th>Moderate</th>
</tr>
</thead>
</table>

**Designer Response:** Table D1 of NZS 4121:2001 indicates that a mobility scooter is typically 0.61m to 0.65m wide and 1.12m to 1.6m long. The attached drawing 17119-08 shows that the splitter islands can accommodate a mobility scooter.

**Safety Engineer:** Agreed that mobility scooters are adequately provided for.

<table>
<thead>
<tr>
<th>Client Decision:</th>
<th>Click here to enter text.</th>
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</thead>
<tbody>
<tr>
<td>Action Taken:</td>
<td>Click here to enter text.</td>
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</tbody>
</table>
2.5.11 Central Island Infill

The drawings do not show the type of infill to be placed in the central island. Currently the island is planted, and the SAT are concerned that if this remains it will be difficult to maintain and could lead to health and Safety in Design (SID) issues. This is because the proposed island is much narrower than the existing island. The existing island infill consists of flaxes on the western side of Karewa Place and could reduce the visibility of approaching traffic and obscure the traffic signals.

`Figure 8: View of existing planting in central island`

Recommendation:

Ensure the island infill is easy and safe to maintain and won’t obscure the traffic signals.

<table>
<thead>
<tr>
<th>Frequency Rating:</th>
<th>Severity Rating:</th>
<th>Risk Rating:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crashes are likely to be Infrequent</td>
<td>Death or serious injury is Very Likely</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Designer Response: Given the height of traffic signal aspects above ground level, it is difficult to see how flax could obscure traffic signals. It is agreed that the detailed design of the Kawera Place/Wairere Drive intersection should ensure appropriate visibility is provided.

Safety Engineer: The Designer has not addressed the SID issues related to future maintenance. I prefer that the island has a paved surface to minimise the need for future maintenance. The extent of paving should be confirmed during detailed design to ensure that the traffic signals are not obstructed.

Client Decision: Click here to enter text.

Action Taken: Click here to enter text.
3 Audit Team Statement

We declare that we remain independent of the design team and have not been influenced in any way by any party during this road safety audit.

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

We have noted the safety concerns that have been evident in this audit, and have made recommendations that may be used to assist in improving safety.

Signed  Date  6/3/19

Keith Moyes, NZCE (Civil), CM Eng NZ, Senior Safety Engineer, WSP Opus

Signed  Date  6/3/19

Paul Addy, HND MCIHT, MIHT Principal ITS Engineer WSP Opus
4  Response and Decision Statements

System designers and the people who use the roads must all share responsibility for creating a road system where crash forces do not result in death or serious injury.

4.1  Designer’s Responses - Design Manager TPC Design Team

I have studied and considered the auditors’ safety concerns and recommendations for safety improvements set out in this road safety audit report and I have responded accordingly to each safety concern with the most appropriate and practical solutions and actions, which are to be considered further by the safety engineer (if applicable) and project manager.

Anatole Sergejew BE, M Eng, M Pub Pol
Signed
Senior Associate, Traffic Planning Consultants Ltd
Date 14th March 2019

[Designer’s name, qualification, position, company]

4.2  Safety Engineer’s Comments - HCC Safety Engineer

I have studied and considered the auditors’ safety concerns and recommendations for safety improvements set out in this road safety audit report together with the designer’s responses. Where appropriate, I have added comments to be taken into consideration by the project manager when deciding on the action to be taken.

Signed

Date

[Safety Engineer’s name, qualification, position, company]

4.3  Clients Decision

I have studied and considered the auditors’ safety concerns and recommendations for safety improvements set out in this road safety audit report, together with the designer’s responses and the comments of the safety engineer (if applicable), and having been guided by the auditor’s ranking of concerns have decided the most appropriate and practical action to be taken to address each of the safety concerns.

Signed

Date

[Project Manager’s name, qualification, position, company]

4.4  Action Taken – HCC Project Manager

I certify that the project manager’s decisions and directions for action to be taken to improve safety for each of the safety concerns have been carried out.

Signed

Date

[Designer’s name, qualification, position, company]
4.5 Safety Audit Close Out

The project manager is to distribute the audit report incorporating the decisions to the designer, safety audit team leader, safety engineer, and project file.

Date:.................................
Appendix A
Pak ‘n Save Supermarket Development
980 Te Rapa Road

Documents Examined During the Audit

Wingate Architects Feasibility Study: Site Plan drawing No A024:
Traffic Planning Consultants Ltd Integrated Transport Assessment report including Intersection
Layout Drawings: 17119 - sheets 01 to 07.