

RESOURCE CONSENT APPLICATION

APPLICANT: QUATTRO PROPERTY HOLDINGS LIMITED

CONSENT AUTHORITY: Waikato District Council

STATEMENT OF EVIDENCE OF JUDITH VICTORIA MAKINSON

Dated: 6 November 2020

Introduction

1. My full name is Judith Victoria Makinson.
2. I am a Transportation Engineer employed by CKL NZ Ltd. I am their Transportation Engineering Manager and am based in their Hamilton office.

Qualifications and Experience

3. I have the qualifications and experience described in the following paragraphs.
4. I hold a Bachelor's degree in civil engineering and a Master's degree in transport engineering and planning from the University of Salford (UK). I am a Chartered Professional Engineer and am a Chartered Member of Engineering New Zealand. I am also a Chartered Engineer in the United Kingdom and a Member of the Institution of Civil Engineers. I have over 20 years' experience working as a transportation engineer in both New Zealand and the United Kingdom with Arup, WSP Group, Gifford, TDG, Stantec and CKL.
5. I have acted as an expert witness at a number of Council hearings over the almost 10 years I have been working in New Zealand. These have included:
 - a. Auckland Unitary Plan hearings on behalf of Auckland Airport in relation to the Future Urban Zone and Rural Urban Boundary in the Puhinui Peninsula precincts
 - b. Thomas Road mixed use development, Hamilton
 - c. Mainland Poultry Limited, Orini
 - d. Kotuku chicken farm, Springdale
 - e. Z Energy service station, Hautapu
 - f. River Road residential subdivision, Ngaruawahia
 - g. Mixed use development, 38 Thornton Road, Cambridge
 - h. Plan Change 1, South Waikato District Plan
6. I have also fulfilled a similar role in the United Kingdom and have prepared and presented evidence for a number of Public Inquiries involving cross examination by barristers.

7. I am also qualified as an Independent Hearing Commissioner and recently sat on the panel considering the Te Ahu a Turanga State Highway 3 Manawatu Gorge Road replacement project.

Code of Conduct

8. I have read the Environment Court's Code of Conduct for Expert Witnesses in the Environment Court of New Zealand and I agree to comply with it. My qualifications and experience as an expert are set out above. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.
9. The evidence that I give in these proceedings is within my area of expertise, except when I rely on the evidence of another witness or other evidence, in which case I have explained that reliance.
10. I confirm that I have visited the site and surrounding area.

Scope of evidence

11. I supervised the preparation of the Integrated Transport Assessment ("ITA") report prepared in February 2019 for the application, which included an assessment of the traffic issues associated with the proposed activity.
12. I have also read the Section 42A report, paying particular regard to Section 8.5 Transportation Network and Parking Effects. I have also reviewed the draft consent conditions (2 November 2020) and have commented accordingly.
13. In this matter I have been asked by the Applicant to review the traffic and transport matters raised by the following submitters:
 - a. Delwyn Brunt (Submitter # 2)
 - b. Shirong Tang (#5)
 - c. Tait Mitchell (#8)
 - d. Amanda Ravlich (#14)
 - e. Edward and Andrea Stocks (#16)
 - f. Peter Scott (#19)

- g. Pauline Hendrikse (#20)
- h. Jeff Stewart (#24)

13. In my evidence I therefore address the following matters:

- a. Traffic volumes
- b. Intersection capacity and queuing
- c. Crash history
- d. Visibility

Traffic volumes

14. A number of submitters have raised increase in traffic as a matter of concern (Delwyn Brunt (#2), Edward and Andrea Stocks (#16), and Jeffrey Stewart (#24)). Only Ms Ravlich (#14) was specific in her comments and I have therefore based my considerations on those matters, trusting that this will also address the interests of others.
15. Shirong Tang (#5) raised concerns that there would not be enough traffic to support the development. I consider this to be an economic viability matter and have therefore not considered it further as it lies outside my area of expertise. I also note that Ms Carmine has recommended in the Section 42A report that this submission be struck out on the grounds of trade competition.

Existing traffic volumes

16. Existing traffic volumes can be obtained from the Mobile Roads website (mobilieroad.org), which is gathered from Council RAMM¹ data. This data is regularly updated and I have reviewed and refreshed the traffic volume data presented in Section 3.2 of the Integrated Transportation Assessment (“ITA”). The latest data gives an estimated average daily traffic (“ADT”) two-way volume at the site frontage of 4,260 vehicles per day (“vpd”) as at 23 January 2020, with a heavy vehicle content of 4%, i.e. 170vpd.

¹ Road Asset and Maintenance Management

17. As set out in Section 3.2 of the ITA, peak hour traffic typically represents between 8% and 12% of ADT. On that basis, I assess the existing peak hour traffic volumes on Horotiu Road as being approximately 340 vehicles per hour (“vph”) to 510vph.
18. To the north, Horotiu Road has an ADT of 1,094vpd with 4% heavy vehicle content and Ngaruawahia Road has an ADT of 1,994vpd and again 4% heavy vehicle content. This equates to hourly traffic volumes of around 88vph to 240vph.
19. Horotiu Road is also identified as a Primary Collector Road as defined under the One Network Road Classification (“ONRC”). Primary collector roads are defined by Waka Kotahi New Zealand Transport Agency (“Waka Kotahi”) as:

“...locally important roads that provide a primary distributor/collector function, linking significant local economic areas or population areas”²

This means that Horotiu Road is expected to provide a linkage to goods and services and combines a through traffic movement function with a property access function.

20. The Waikato District Council Operative District Plan (“ODP”) road hierarchy identifies Horotiu Road as an ‘arterial road’³. Arterial roads are described as roads that provide:

“...links between residential commercial, industrial or recreational land use activities. Alternative links between centres of population or are significant for the movement of goods or produce within the district”⁴.

21. The ODP also notes⁵ that the through traffic function of arterial roads needs to be balanced against the property access function. Given the traffic volumes expected on Horotiu Road, I consider this locally defined arterial function is consistent with the national ONRC function of a Primary Collector road. I also note that this section of road has previously been designated as State Highway 39.

² NZTA “ONRC performance measures: a general guide”, page 5

³ Waikato District Council Operative District Plan Waikato Section, Part 3 Appendices, A Traffic, Table 8 Road Hierarchy

⁴ Waikato District Council Operative District Plan Waikato Section, Part 3 Appendices, A Traffic, Table 7 Functions of Roads with the Road Hierarchy

⁵ Waikato District Council Operative District Plan Waikato Section, Part 3 Appendices, A Traffic, Table 7 Functions of Roads with the Road Hierarchy

Generated traffic

22. The volume of traffic assessed as being generated by the proposed development is presented in Section 6.4 of the ITA and is identified as being 156vph to 186vph and 984vpd to 1,388vpd. The peak hour traffic represents some 13% to 15% of the daily traffic demands and is only likely occur for one to two hours per day. Traffic during the rest of the operating hours (7am - 10pm) would be expected to be significantly less than these values.
23. The ITA makes a robust assessment that all of this traffic would be new to the network and takes no account of pass-by or diverted traffic effects. Pass-by traffic is where people are already driving past site on Horotiu Road and then choose to turn in.
24. The Institution of Transportation Engineers (“ITE”) provides data on the extent of pass-by and diverted traffic for shopping centres⁶. This shows that typically 33% of traffic to a shopping centre is pass-by. This means that it is reasonable to expect that approximately 61vph of the total 186vph visiting the site is already on Horotiu Road and driving past the site. This represents around 12% - 18% of the existing traffic on Horotiu Road.
25. For robustness, I have continued to assess traffic volumes and effects based on the worst case of assuming all 186vph trips are new to Horotiu Road, although the more reliable number of new traffic trips would be 125vph.
26. I acknowledge that the level of change from the existing to future traffic volumes represents a significant percentage increase of around 30% - 50% traffic during the peak hour of the proposed activity. Assuming the activity peak demand and the road network traffic demand occur at the same time, at present, during the peak hours, a vehicle could be expected to pass the site every 7 to 11 seconds. With the development in place, I would expect this to change to around every 5 to 7 seconds.
27. The capacity of a traffic lane is affected by a range of factors such as width, speed limit, horizontal and vertical alignment, the presence of on-street parking, and the number of vehicle crossings. The typical range of lane capacity is around 800vph -

⁶ ITE Trip Generation Handbook 3rd Edition Table E9 Pass-by and Non Pass-by Trips Weekday PM Peak Period Land Use Code 820 - Shopping Centre

1,500vph. With the development in place, I assess the two-way peak hour traffic demand as being 476vph to 696vph. I have taken a simplistic approach and assumed that all traffic to and from site travels from a single direction and therefore maximises the traffic passing a single point on Horotiu Road. Even under this robust assumption, the upper estimate of future two-way traffic demand of 696vph is below the lower end of the typical capacity of a single traffic lane of 800vph. As such, I consider that Horotiu Road is capable of accommodating the change in traffic volume and that the future level of demand is consistent with what I would expect a Primary Collector (ONRC definition) or arterial road to carry.

Intersection Capacity and Queueing

28. Ms Ravlich has voiced concerns regarding the likelihood that site traffic will block driveways serving nearby residential properties. Mr Tait has voiced concerns that there is insufficient road width to allow through traffic to pass a right turning vehicle.
29. Separation distances of the proposed crossings to existing crossings were assessed in Section 7.1 of the ITA and the results presented in Table 1 and 2 of that document. I have reproduced these below for ease of reference for the current 50km/h speed limit. These were measured conservatively from closest edge to closest edge rather than from centreline to centreline and therefore represent a worst case.

Northern Vehicle Crossing distance to:	Distance to vehicle crossing / intersection	50km/hr speed environment
Horotiu Road and Ngaruawahia Road intersection	130m	30m
Horotiu Road and Westvale Lane	105m	30m
561 Horotiu Road (residential vehicle crossing)	50m	15m
560 Horotiu Road (residential vehicle crossing)	0m	15m
564 Horotiu Road (residential vehicle crossing)	42m	15m
Proposed entrance to the consented café located immediately south	100m	15m

Table 1: Separation Distances for the Northern Vehicle Crossing

Southern Vehicle Crossing distance to:	Distance to vehicle crossing / intersection	50km/hr speed environment
Horotiu Road and Ngaruawahia Road intersection	170m	30m
Horotiu Road and Westvale Lane	57m	30m
561 Horotiu Road (residential vehicle crossing)	105m	15m
560 Horotiu Road (residential vehicle crossing)	52m	15m
564 Horotiu Road (residential vehicle crossing)	8m	15m
Proposed entrance to the consent café located immediately south	60m	15m

Table 2: Separation Distances for the Southern Vehicle Crossing (service vehicle exit only)

30. These tables confirm that the separation distance requirements of the ODP⁷ are met in all except two cases.
31. I have used the SIDRA⁸ intersection modelling software to assess the operation of the proposed site access and have updated the analysis presented in the Section 92 response⁹. I have made no allowance for any form of right turn bay or median facility, which adds robustness to the analysis as this maximises the potential for through traffic to be delayed by having to wait behind right turning traffic. I have also included the driveway to 560 Horotiu Road and allowed for a traffic volume of 60vph i.e. 30vph out and 30vph in. This is equivalent of the upper end of the range of daily traffic demands typically arising from six residential dwellings¹⁰ and therefore allows for the proximity of other driveways as well as all traffic to and from 560 Horotiu Road occurring in a single hour of the day. The results of my analysis are provided in Table 3 and the layout of the intersection assessed is shown in Figure 1.

⁷ Operative District Plan Waikato Section, Appendix A Traffic Table 5

⁸ SIDRA Network version 9

⁹ CKL letter dated 12 July 2019

¹⁰ NZTA 'Trips and parking related to land use' Research Report 453, Table C3, daily trip rate for Dwelling (Rural)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Horotiu South														
1	L2	10	0.0	11	0.0	0.224	6.0	LOS A	0.9	6.5	0.30	0.18	0.30	47.8
2	T1	250	0.0	263	0.0	0.224	0.7	LOS A	0.9	6.5	0.30	0.18	0.30	48.3
3	R2	100	0.0	105	0.0	0.224	6.1	LOS A	0.9	6.5	0.30	0.18	0.30	45.1
Approach		360	0.0	379	0.0	0.224	2.4	NA	0.9	6.5	0.30	0.18	0.30	47.7
East: Site														
4	L2	93	0.0	98	0.0	0.287	3.7	LOS A	1.2	8.3	0.49	0.69	0.53	42.4
5	T1	10	0.0	11	0.0	0.287	6.3	LOS A	1.2	8.3	0.49	0.69	0.53	42.5
6	R2	93	0.0	98	0.0	0.287	8.5	LOS A	1.2	8.3	0.49	0.69	0.53	41.8
Approach		196	0.0	206	0.0	0.287	6.1	LOS A	1.2	8.3	0.49	0.69	0.53	42.1
North: Horotiu North														
7	L2	86	0.0	91	0.0	0.191	4.7	LOS A	0.1	0.9	0.04	0.15	0.04	24.9
8	T1	250	0.0	263	0.0	0.191	0.1	LOS A	0.1	0.9	0.04	0.15	0.04	49.0
9	R2	10	0.0	11	0.0	0.191	5.8	LOS A	0.1	0.9	0.04	0.15	0.04	48.0
Approach		346	0.0	364	0.0	0.191	1.4	NA	0.1	0.9	0.04	0.15	0.04	42.8
West: RoadName														
10	L2	15	0.0	16	0.0	0.047	5.4	LOS A	0.2	1.1	0.44	0.65	0.44	44.8
11	T1	1	0.0	1	0.0	0.047	7.3	LOS A	0.2	1.1	0.44	0.65	0.44	24.7
12	R2	15	0.0	16	0.0	0.047	10.0	LOS B	0.2	1.1	0.44	0.65	0.44	44.4
Approach		31	0.0	33	0.0	0.047	7.7	LOS A	0.2	1.1	0.44	0.65	0.44	44.0
All Vehicles		933	0.0	982	0.0	0.287	3.0	NA	1.2	8.3	0.25	0.29	0.26	44.7

Table 3: SIDRA analysis

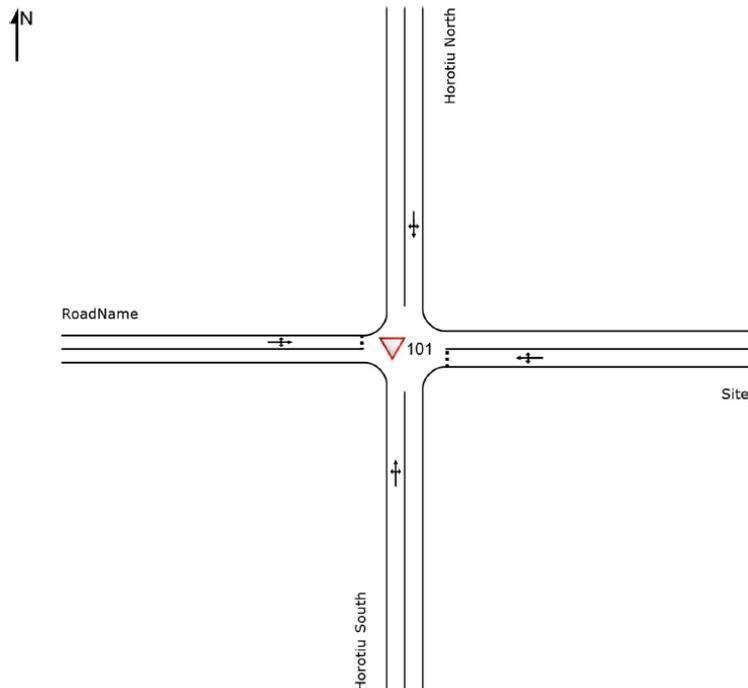


Figure 1: SIDRA Model Intersection Layout

32. In common with the Section 92 assessment, I have doubled site generated traffic to allow for 186vph inbound and 186vph outbound. This gives significant robustness to my assessment and shows that with double the likely amount of traffic, the ability of residents at 560 Horotiu Road and other nearby driveways to enter or leave their properties is not affected to any significant degree. Level of service remains at 'A' in the main, and reduces to B in one instance. Delays associated with this are no more than 10 seconds and a queue of no more than 1 vehicle is anticipated. I consider this to be a less than minor level of delay or congestion, particularly given the robustness of the analysis and also that it is highly unlikely that any property will have their driveway blocked by the operation of the new site access. I also conclude that the effect of the non-compliances in relation to separation distances between driveways is negligible. I am therefore satisfied that the effects of development traffic on the ROW are less than minor.
33. During consultation with Waikato District Council, I agreed with their advisor, Mr Alasdair Black of Gray Matter that the provision of a painted median on Horotiu Road serving the proposed development would be a suitable mitigation measure. This is on the basis of there already being a flush median to both the north and south of the proposed development, and its continuation provides a more consistent road environment for drivers. This is a fundamental principle of road safety and is not a recognition of either expected capacity or road safety issues. The existing extents of flush median are shown on my Figure 2 below.

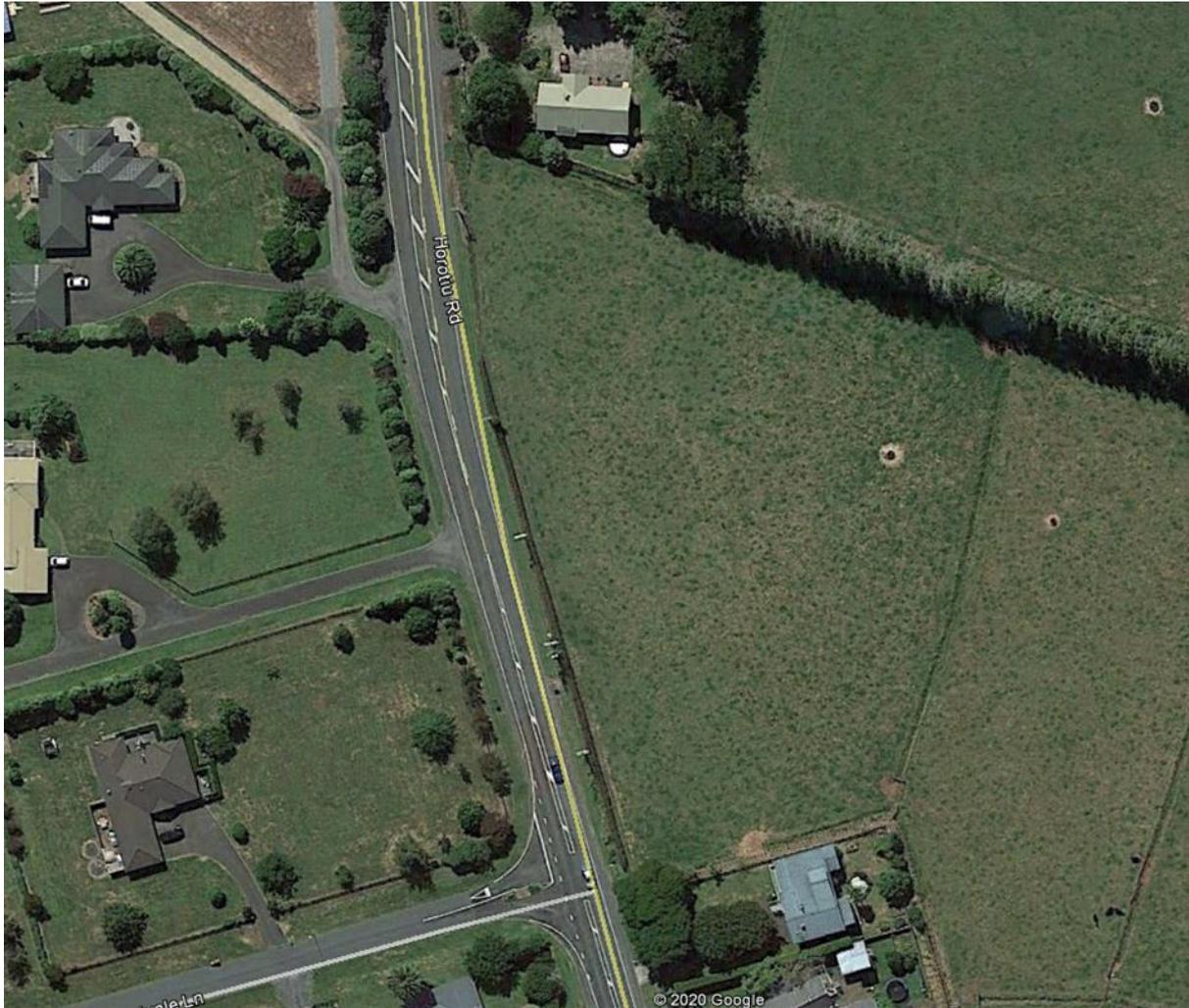


Figure 2: Aerial Imagery of Horotiu Road Along Site Frontage Showing Existing Painted Median

34. The extent of future painted median is to be governed by a consent condition which I will discuss later.

Crash history

35. Waka Kotahi collects data on crashes around New Zealand and provides access to the information via the Crash Analysis System (“CAS”). CAS data is updated regularly and I have therefore refreshed the analysis previously presented in Section 3.3 of the ITA. The following information represents the full five-year crash record of 2015 - 2019 as well as the 2020 information to date. The search area I have considered includes 100m north and east of the Horotiu Road / Te Kowhai Road intersection to 100m south of the proposed development.

- a. one no-injury crash reported at the Horotiu Road / Te Kowhai Road intersection in 2018. This crash involved a single vehicle only, which veered off the road as the driver turned left from Horoitu Road into Te Kowhai Road. The crash occurred in wet and dark conditions in the early hours of a Saturday morning, when the speed limit was 100km/h.
36. Both Ms Ravlich (#14) and Mr Scott (#19) have raised concerns about the increased risk to road safety as a result of the proposed development and also existing issues with speeding vehicles.
37. The change in speed limit from 100km/h to the village speed limit of 50km/h occurs some 340m to the north and east of the Horoitu Road / Ngaruawahia Road intersection. This itself lies some 100m north of the proposed northern vehicle crossing serving site. This allows for over 400m between the change in speed limit and the site itself.
38. Whilst on site, I observed that southbound traffic tended to exceed the speed limit near the change but had slowed significantly as they reached the residential properties north of the Horotiu Road / Ngaruawahia Road intersection. Those turning out of the intersection had already slowed to negotiate the turn and did not significantly increase speed again. I have not undertaken a specific speed survey to confirm compliance and in my experience, it is typical to observe some drivers travelling significantly above the posted speed limit. From my site visit, I assess that the 85th percentile speed of vehicles passing through Te Kowhai village would be around 60km/h.
39. I accept that not all crashes are reported, however, these tend to be non-injury crashes. Whilst any crash can be distressing to those involved and is to be avoided, the Vision Zero approach to road safety is to remove deaths and serious injuries from our roads, not to remove any risk whatsoever. I consider that the existing road safety environment is good, with there being no evidence of significant risk. I see no pattern of existing crashes to raise concerns and also consider that vehicle speeds are what I would typically expect in this environment. As such, I do not consider that there would be a significant increase in road safety risk arising from the proposed development.

40. I also note that the draft conditions now require a detailed design Road Safety Audit to be undertaken. This is a process whereby an independent expert assesses the risk to road safety both in terms of likelihood of occurrence and severity of outcome. I would expect this process to apply to the proposed development and this provides a further layer of road safety assessment to the project. As such, I consider that any road safety effects will be more than adequately addressed.

Visibility

41. Mr Scott (#19) has raised concerns regarding the bend in Horotiu Road and how this may affect visibility at the vehicle crossings to site.
42. Visibility requirements are set out in the ODP. It identifies the distance a driver needs to be able to see in order to undertake a safe manoeuvre when pulling out of a vehicle crossing, as well as identifying the distance an approaching driver needs to be able to see to such an emerging vehicle should they suddenly stall or breakdown. I have included a screenshot of the ODP, Appendix A Traffic, Table 6 below for ease of reference.

Table 6 Minimum Sight Distances

Speed Environment (km/h)	From a vehicle entrance generating up to and including 40 vehicle movements per day	From a vehicle entrance generating more than 40 vehicle movements per day	
		Rural Areas	Urban Areas
40	40m	70m	60m
50	60m	90m	80m
60	80m	115m	105m
70	100m	140m	130m
80	130m	175m	165m
90	160m	210m	
100	200m	250m	
110	240m	290m	
120		330m	

Notes to Table 6

(a) Sight distances are measured as illustrated in [Figure 9](#).

43. From Section 7.1.6 of the ITA, visibility at the proposed northern crossing has been identified as being in excess of 250m to both north and south. This complies with the ODP visibility requirement for a vehicle crossing generating more than 40 vehicle movements per day in a rural 100km/h speed zone. This is significantly in excess of

the 50km/ requirement of 80m. This is the vehicle crossing where all vehicles except heavy commercial vehicles will enter and leave site.

44. I have further assessed visibility for those waiting to turn right into site and measure this also being in excess of 250m.
45. For the southern crossing, the ITA identified that 60m visibility would be required to comply with the ODP. Visibility to the north was assessed as being 73m, with visibility to the south being in excess of 200m. Again, the visibility available meets the requirements of the ODP of 60m.
46. I conclude that the available visibility meets the required standards and that there is unlikely to be a detrimental effect on road safety arising from the design and use of the proposed vehicle crossings.

Other matters

47. Mr Scott (#19) has raised a query as to why traffic management is required during construction activities but not during operation of the site. In this context, traffic management refers to the provision of measures such as warning signs, cones and temporary speed limits typically associated with road works, temporary events, and construction site access. It is industry best practice to apply a nationally consistent approach to management of circumstances where the road environment is temporarily different to its permanent form. How this is done is set out in the New Zealand Code of Practice for Temporary Traffic Management. This type of traffic management is temporary by its very definition and is not suitable for permanent operational situations, which may require permanent measures such as the proposed flush median extension
48. Mr Scott also raised that the site would generate less traffic if developed as Country Living in accordance with its zoning. I have assessed likely traffic generation under such an alternative development option. I have been advised that under the Country Living zone, the site would most likely accommodate 1 dwelling. The RR453 trip rate for this is 1.1vph - 1.4vph and 8.5vpd - 10vpd. I agree that this is significantly lower than the level of traffic likely to be generated by the proposed commercial development.
49. Ms Hendrikse (# 20) requests that should the development be approved, that service and heavy vehicle access to site be limited so that it cannot occur between 11pm and

6am. I note this matter has now been addressed in the draft consent conditions, which I discuss below.

Draft consent conditions

50. I have reviewed the draft consent conditions dated 2 November 2020.
51. I agree with the wording of Condition 8 Rooding and Condition 34 On-site Parking. I also support the inclusion of road safety audit requirements (in general accordance with the Waka Kotahi NZTA guidelines) under Condition 8.
52. I consider that Condition 36 relating to hours during which service vehicles can access site is suitable.

Section 42A report

53. I have read the Section 42A report, paying particular regard to Section 8.5 Transportation Network and Parking Effects. I agree with the assessment presented in this section of the report and the conclusions presented. In my opinion these conclusions remain valid in light of the updated traffic volumes and road safety information I have presented in my evidence. As such, I have no further comment on this matter.

Summary and Conclusions

54. I have carefully considered the traffic and transportation matters raised by submitters and conclude the following:
 - a. the volume of traffic likely to be generated by the proposed development is a robust assessment that takes no account of pass by or linked trips. The higher estimate of 186vph and 1,388vpd can readily be accommodated by the existing road network and is in keeping with its function as a Primary Collector road. The intersection analysis includes significant robustness in the assumptions I have used and demonstrates that a high level of service can be maintained for all users. I assess that delays and queues at the site accesses will be minimal and that the effect on the operation of private driveways opposite the site will be less than minor.

b. There is nothing in the existing road safety record to suggest a significant road safety issue. I also assess that there is suitable visibility available from both of the proposed vehicle crossings to meet the relevant standards.

c. The draft consent conditions requiring the widening of the flush median to 1.5m and the extension of the existing footpath are, in my opinion, suitable measures to promote a safe means of access to the development.

55. Overall, it is my opinion that the traffic and transportation effects of the proposed development will be less than minor, with the proposed conditions of consent in place.

6 November 2020

A handwritten signature in black ink, appearing to read 'Judith Makinson', written in a cursive style.

Judith Makinson