Before the Independent Commissioners appointed by the Waimakakriri District Council

In the matter of	the Resource Management Act 1991 (**the Act**)
and	
In the matter of	Proposed Private Plan Change 31 (PC31) to the Waimakariri Operative District Plan by Rolleston Industrial Developments Limited

Brief of evidence of Andrew Metherell on behalf of Waimakariri District Council (as Submitter) - Transport

Dated: 21 July 2023

AJS-434615-177-195-V1-e

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Evidence of Andrew Metherell:

Introduction

1. My full name is Andrew Alan Metherell. I am a Chartered Professional Engineer, a Chartered Member of Engineering New Zealand, and am included on the International Professional Engineers Register. I hold a Bachelor of Engineering (Civil) with Honours degree from the University of Canterbury. I am also an Associate Member of the New Zealand Planning Institute.

2. I have twenty-five years' experience, practising as a traffic engineering and transportation planning specialist based in Christchurch. I am currently employed as the Christchurch Traffic Engineering Team Leader at Stantec New Zealand (Stantec), a global multi-disciplinary engineering consultancy. In this role I am responsible for providing transport engineering advice, assessment, and design for a wide range of activities.

3. I have had extensive experience providing transportation engineering advice and assessment for land development projects in the greater Christchurch area. Relevant to this project I am regularly involved in the planning, assessment, and design of the transport networks for residential, commercial, and industrial growth areas.

4. I have carried out transportation assessment and transport design for many land development projects in the greater Christchurch area including:

    4.1. transport assessment and evidence for Applicants and submitters seeking residential, industrial, and large format retail rezoning of rural land as part of Selwyn District Plan Changes and as part of the Selwyn District Plan review;

    4.2. transport assessment for Plan Change 30 to the Waimakariri District Plan to establish additional business zoning and a key activity centre at Ravenswood;

    4.3. transport assessment for Plan Change 29 to the District Plan to establish a revised residential zoning and retirement village on South Belt, Rangiora;

4.4. Concept transport engineering design for the Northern Motorway southbound on-ramp / Tram Road interchange intersection and High Occupancy Vehicle lane;

4.5. transport evidence for a Plan Change to the Waimakariri District Plan to establish residential zoning on the western side of Kaiapoi;

4.6. transport assessment for various residential and commercial developments within Kaiapoi, Rolleston, Woodend, Ravenswood, and Pegasus;

4.7. Transport assessment and traffic modelling for Plan Changes and commercial and residential developments in the north of Christchurch including Northwest Belfast, Northeast Belfast, and Prestons;

5. I have extensive experience with development and application of traffic models at both large and small scales for the purpose of assessing traffic distribution and traffic effects of large scale landuse change associated with Plan Changes, through to assessing localised transport effects of development proposals and integration of development. This has included regional transport models such as development and application of the Christchurch Transport Model, localised transport network models using micro-simulation, and intersection models.

6. I am regularly involved in transport infrastructure design and assessment of transport infrastructure. I have carried out scheme design of the Little River (City End) Major Cycleway, road design particularly in new subdivisions throughout Christchurch and the Selwyn District, and arterial road upgrades and roundabout designs around Wigram to integrate development with the transport network. I have also led various roundabout and signalised intersection designs. I have conducted road safety audits of subdivision road networks, and applied safety risk assessments to transport networks as part of land development planning.

Code of conduct

7. In preparing my evidence I have reviewed and agree to comply with the Code of Conduct for Expert Witnesses contained in Part 9 of the Environment Court Practice Note 2023. This evidence has been prepared in compliance with the Practice note. I confirm that the issues addressed in this statement of evidence are within my area of expertise,

except where relying on the opinion or evidence of other witnesses, which I will specify. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

Scope of evidence

8. Private Plan Change 31 (PC31) proposes a large urban development of land at Ohoka enabling approximately 850 households, a 250 pupil primary school, and a local commercial area anticipated to have approximately 2,700 sqm of Gross Floor Area (GFA). The site is not within or close to an area that has been planned for urban development of this scale, and therefore I consider a full and wide area integrated transport assessment is necessary. PC31 was supported by a range of technical reports, that included an Integrated Transport Assessment by Novo Group.

9. In July 2022 I prepared a memo to Cavell Leitch (Counsel for Waimakariri District Council as submitter) providing transport related comment on the Plan Change and how it was assessed in the Integrated Transport Assessment (included as Appendix H in the notified PC31 application). That memo had road safety inputs from my colleague Mike Smith (Stantec Road Safety Practice Lead), and informed the Waimakariri District Council submission on transport matters related to PC31. A copy of our memo is attached to this evidence as **Attachment 1**.

10. I have now been requested by Cavell Leitch to prepare expert transportation engineering evidence. The primary scope of my evidence is to comment from a transportation perspective on the suitability of the site being rezoned for a large scale urban development.

11. In preparing the evidence I present now, I have reviewed and considered the following:
    11.1. The PC31 application documents and particularly the Integrated Transport Assessment;
    11.2. The evidence of technical experts for Rolleston Industrial Development Limited particularly as they relate to transport matters, or inputs to transport matters, in particular:
        - Nick Fuller – Traffic Effects and Transport Infrastructure
        - Simon Milner – Public Transport
        - Mr Paul Farrelly – Greenhouse Gas Emissions
        - Ms Natalie Hampson – Business 4 Zone Land
        - Dr Garbielle Wall – Education provision
        - Mr Tim Walsh - Planning

11.3. The Council Officer s42A transport and supporting transport report by Mr Shane Binder.

12. As part of preparing evidence, I have visited the site during the morning peak commuter period and observed the primary road connections to the surrounding urban areas and strategic road network.

13. The primary issues I have considered from a transportation perspective are:

13.1. The suitability of the scope of the Integrated Transport Assessment and Applicant evidence in addressing transport matters associated with the rezoning;

13.2. Traffic distribution and potential transport network effects, including efficiency, safety, and suitability of infrastructure;

13.3. Availability of infrastructure and services to support transport modes that offer transport choice for future residents and workers, including by public transport, cycling, and walking;

13.4. Suitability of the location for a residential development of this scale, remote from other comparable and planned urban areas, and whether it can support good transport outcomes.

14. I have discussed aspects of the applicant evidence with other experts from Stantec, including Mr Mike Smith who is the Stantec Road Safety Practice Lead and assisted with the original advice to Council for their submission, and the public transport aspects with the Stantec Public Transport Practice Lead, Mr Doug Weir. I have also instructed Ms Julie Ballantyne, a transport modelling specialist to carry out some high-level traffic modelling which I have set out in my evidence. Whilst I have sought their specialist advice, the evidence I present is my opinion.

Summary of evidence

15. Within my evidence that follows I have identified a range of concerns with PC31 from a transport perspective, that will likely lead to outcomes that are not desirable for new urban development.

16. Firstly, I am concerned that the scope of assessment provided by the Applicant is not sufficiently broad to understand the potential changes in transport patterns within a wider area, particularly to the north via Threlkelds Road and northeast via Mills Road.

17. I also consider that the outcomes of assessment will be sensitive to traffic distribution. I have provided outputs from a strategic transport model that suggests there will be a greater weighting of trips to and from Rangiora and Kaiapoi. The model also indicates there is likely to be background traffic growth on the arterial road network that has not been accounted for in the Applicant assessment. These matters will affect the intersection performance and safety assessments creating uncertainty around how PC31 will integrate with the transport network.

18. The road network includes a range of location specific road safety risks. Some of those areas have resulted in crashes with existing traffic patterns, and in other areas it is likely the step change in traffic volumes could result in increased risk. There are methods to calculate the potential change in risk, and those have not been explored by the Applicant. Given the high speed nature of arterial roads in particular and the deteriorating side road performance, I consider further assessment of safety risk is warranted.

19. I am concerned that there does not appear to be a clear path to providing a bus service that will provide good levels of access. The location of the site away from existing bus routes and arterial roads will require a new or diverted service directly to the site which Mr Milner has indicated is not feasible. That places reliance on potential extension of a commuter Park n Ride service, and/or on demand. On demand services are typically used within urban areas, rather than between urban areas.

20. Cycle connections to urban areas may be available in the future, and the level of infrastructure can be considered in future. I expect PC31 would warrant a higher level of facility than currently considered by Council (based on existing landuse), and I also consider such routes are an integral component of the development given the position in the rural road network.

21. I have used the transport model to better understand the relative travel distances of travel from nearby urban areas. This indicates the travel distance from the development area will result in higher average trip distances than other urban areas. This is a function of the low level of employment within the proposed zone, as well as the location remote from the existing centres.

22. If the PC31 was approved, I consider additional rules are necessary to support future assessment of the various foreseeable transport issues,

which are only likely to be resolved with quite large scale infrastructure improvements. I also consider the ODP should be modified to better manage intersections on Whites Road, and to afford opportunity for some innovation in the internal road design. The suggested cross sections in my opinion have some potential issues.

Scope of Applicant Integrated Transport Assessment

23. As I set out in my July 2022 memo, I have concerns that the PC31 Integrated Transport Assessment provided inadequate scope for a full assessment of how the development can safely and efficiently integrate with the surrounding transport network, and provide options for transport choice. I consider those concerns have not been addressed in a robust assessment by the Applicant evidence.

24. The Integrated Transportation Assessment Guidelines specified in "New Zealand Transport Agency Research Report 422, November 2010" (RR442) include guidance on matters such as the geographical extent of assessment, the future assessment years to be assessed, and the content of the ITA. Although referencing the guidelines, the ITA does not define any rationale for the parameters of the assessment provided.

25. I consider the assessment provided by Mr Fuller is of "Moderate Scope" as set out in RR442. That is, the assessment is at a level where it could be anticipated that there would be an effect over a small area. In my opinion that is too localised, and the assessment should have been at a "Broad" to "Extensive" scope, covering a larger area (eg. Transport considerations and effects expected to cover a wide area). The narrower scope of assessment by Mr Fuller, has in my opinion led him to omit key areas of assessment.

26. To demonstrate the scope of assessment carried out by Mr Fuller, within Figure 1, I have summarised the areas of the road network that were considered at some level by the Novo Group ITA, as well as in Mr Fuller's evidence which covered two additional intersections to the east.

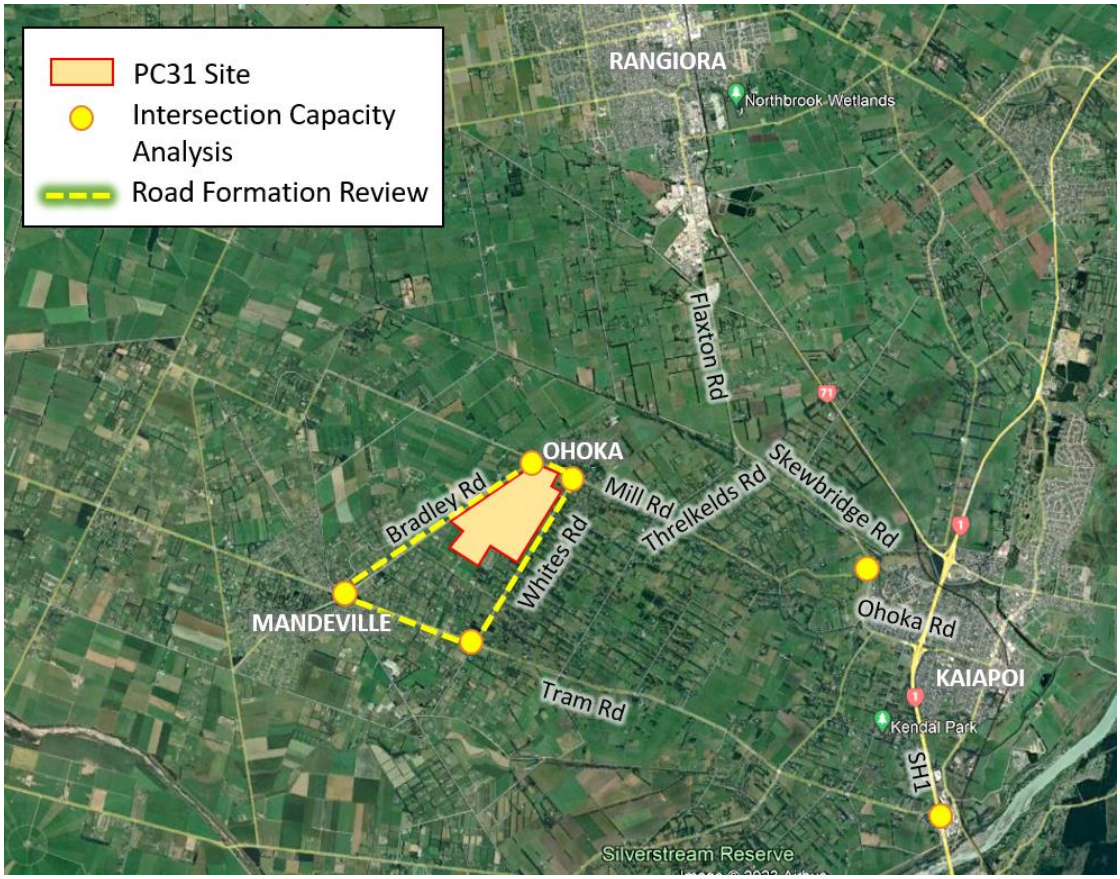


Figure 1: Indicative Extent of Transport Assessment of Road Network by Applicant

27. The development is forecast by Mr Fuller to generate approximately 7,400 vehicle movements per day representing significant expansion of traffic movement from the Ohoka / Mandeville area. The site has rural road connections to all but the most local trip origin and destinations. As I describe later, I consider those rural roads can be sensitive to large changes in traffic, including from road safety, and efficiency perspectives.

28. In my opinion, strategic transport assessment of the suitability of the location for urban development at the scale and intensity proposed should have considered the potential for effects over the full length of connections to other urban centres and connection to the strategic state highway network. That would require assessment of additional parts of the road network, as generally indicated by Figure 2.

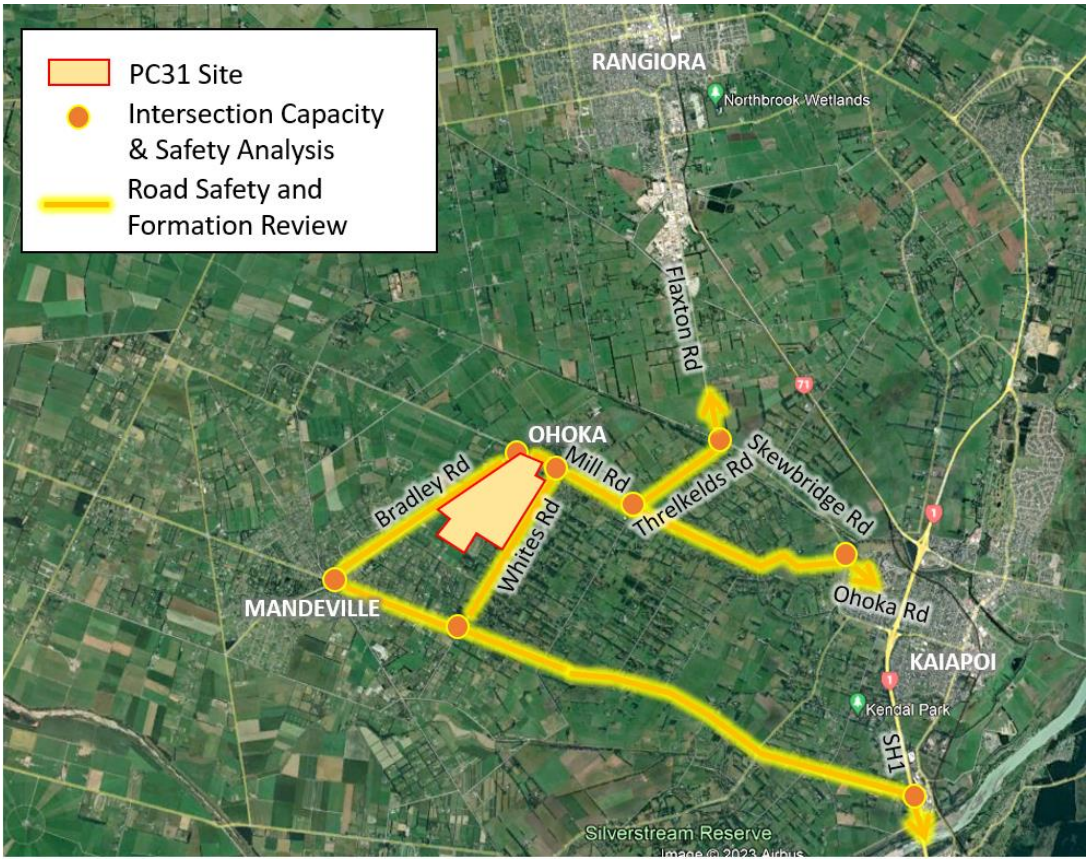


Figure 2: Typical Extent of Transport Assessment for a Significant Development

29. The clear omissions in Mr Fuller's assessment are consideration of:

    29.1. connection to Rangiora (via Threkelds Road and its intersections with Mill Road and Skewbridge Road),

    29.2. connection to Kaiapoi (including via Mill Road and its intersection with Skewbridge Road / Ohoka Road), and

    29.3. connection along Tram Road to SH1 at the Northern Motorway via Tram Road.

30. I will address the potential significance of these omissions later in my evidence.

Future Assessment Year and Traffic Growth

31. The ITA does not provide any indication of future year assessment of the road network, except for minor local changes in traffic patterns that could occur as part of infill development of existing zoned land in the vicinity. In my opinion this creates a concern that any assessment will not consider a foreseeable future transport environment as a result of general traffic growth and changes in traffic patterns over time.

32. In my experience major developments and transport infrastructure projects in the greater Christchurch region consider a longer-term horizon to identify whether the suitability of the transport network changes over time. For Plan Changes, this is typically at least 10 years into the future, and often further in the future for major rezoning proposals. To forecast that far ahead, there are traffic models available that respond to changes in landuse and transport network changes. Mr Fuller has not applied any of the available traffic models in his assessment. This creates a high likelihood that the transport conditions he has assessed will not be reflective of conditions that could be expected in the next 10 to 15 years. The effect of the Plan Change and the necessary supporting infrastructure is then likely underestimated.

33. I have accessed the Christchurch Transport Model ("CTM"), a strategic model developed by Waka Kotahi and local Councils, and regularly updated to reflect forecast landuse patterns. I have considered the 2021 and 2038[1] model traffic volumes to understand the potential for change in traffic volumes that could occur due to expected growth, without the rezoning. I note that there is an additional more refined model (CAST) that could also be considered for this purpose, which I did not have access to for preparation of evidence although would ideally be investigated for consideration of finer grain traffic volume changes.

34. The CTM shows modelled[2] traffic volumes on surrounding arterial roads increasing indicatively as follows:

Road	**2021 Modelled***	**2038 Modelled***	**Growth Per Annum**
Tram Road east of Whites Road	690vph	940vph	36 % increase (2% per annum)
Skewbridge Road east of Threlkelds Road	940vph	1,500vph	60% increase (3.5% per annum)

Table 1: Modelled Traffic Volume Changes from 2021 to 2038

35. The change in volume on Skewbridge Road will reflect the change due to landuse changes. The changes on Tram Road will also reflect general infill and demand from the west, although I acknowledge as this volume is near the outer limit of the traffic model, it is also subject to some

[1] The model enables assessment of a range of future years, including 2028, 2038 and 2048.
[2] Modelled traffic volumes are the average of the AM and PM peak hours

growth assumptions on the external connections informed by historical growth patterns.

36. These increases will change how traffic from local roads and collector roads in the Ohoka area can safely connect to these arterial roads, as well as influencing the performance of the intersections.

37. The analysis by Mr Fuller already indicates that there are likely to be some high delays from side roads with Plan Change traffic added to traffic volumes that are almost comparable to existing. Without further assessment, I have little confidence that the assessment provides a suitable analysis of traffic network performance from a capacity perspective in the foreseeable future.

Suitability of Traffic Distribution Assessment

38. The assessment of traffic distribution by Mr Fuller is directly based on commuter journey to work data sourced from 2018 Census data. As noted by Mr Binder, this method can sometimes provide a suitable estimate for AM and PM peak periods where many trips are related to commuter travel and is usually reasonable for smaller developments. However, as highlighted in the evidence of Mr Farrelly, journey to / from work trips only make up a portion of all trips made, and the significance of that is pronounced for a large development. This leads to a concern I have that many of the local day to day trips for the likes of shopping, education, recreation and personal business have not been allowed for in the traffic distributions set out in the ITA.

39. In turn, given the location separated from the arterial road network, and also separated from Rangiora and Kaiapoi which are the closest urban areas, I would expect a higher proportion of all trips to those destinations than assessed by commuter trips only assessment of the ITA. That influences the routes that are assessed.

40. The CTM calculates trips by a range of trip types, and considers the relative location of residential and employment areas to assess trip distributions. The model is based on an extensive data collection exercise, that included many travel surveys in the Waimakariri District. For that reason, I have carried out a CTM model assessment to better understand the potential trip distribution.

41. I have input the expected PC31 landuse for the Plan Change at 2038, with corresponding reductions in the growth of other Waimakariri District urban areas. The resultant traffic distributions are set out below:

Route / Direction	ITA	CTM	
		AM Peak	PM Peak
Whites Rd / Tram Rd / SH1 (S)	65%	41%	36%
Mill Rd / Ohoka Rd (NE)	6%	16%	15%
Threlkelds Rd / Flaxton Rd (N)	18%	23%	25%
Mill Rd (W)	-	3%	3%
Bradleys Rd (SW)	10%	10%	10%
Internal	-	7%	8%

Table 2: Modelled Traffic Distribution

42. I consider the ITA method of assessing traffic distribution has underestimated the proportion of traffic that will use the Mill Road-Ohoka Road route to Kaiapoi, and the Threlkelds Road-Flaxton Road to Rangiora. The directionality of traffic also varies on different routes, with a high commuter bias on Tram Road, and more balanced movement on other routes reflective of the multiple trip purposes served. Whilst I have not investigated the inter peak period (the day time period between morning and afternoon peaks) I would expect they will show an even stronger demand for connection to Rangiora and Kaiapoi.

Summary of Traffic Volume Changes

43. I consider Mr Fuller has not clearly summarised the extent of change in traffic volumes that will be experienced on the surrounding roads. Table 3 shows that PC31 will contribute at 49%-79% of all traffic on the surrounding local and collector rural roads that connect to the arterial road network, which is a significant proportion. Even on the existing arterial road network, contributions are high at 10%-26% of all traffic.

Route / Direction	Existing Traffic Volume (from ITA and mobileroad.org)	Indicative CTM Distribution of All Trips	Traffic Distribution (based on trip generation 7,400vpd)	Total Traffic Volume (existing no growth + PC31)	PC31 as % of Total Traffic Volume
Tram Road (E)	8,000vpd	38%	2,850vpd	10,850vpd	26%
Whites Rd (S)	750vpd			3,600vpd	79%
Mill Rd (east of Threlkelds Rd) (NE)	1,000vpd (est)	15%	1,150vpd	2,150vpd	53%
Ohoka Rd (south of Mill Rd)	10,500vpd (est)			11,650vpd	10%
Threlkelds Rd (N)	1,960vpd	25%	1,850vpd	3,810vpd	49%
Flaxton Road	10,500vpd (est)			12,350vpd	15%
Mill Rd west of Bradleys Rd (W)	1,000vpd (est)	3%	250vpd	1,250vpd	20%
Bradleys Rd (SW)	1,400vpd	10%	750vpd	2,150vpd	35%

Table 3: Forecast Traffic Volume Change with Plan Change

44. In my opinion, the step change in traffic volumes will alter the function of Whites Road, Threlkelds Road, and part of Mill Road. Whereas Whites Road is classified a local road in the District Plan, it will take on a strong Collector Road function, or even lower-level rural Arterial function. Similarly, Threlkelds Road which is already a Collector Road is likely to have a lower-level rural arterial function as a key connection between the expanded Ohoka area and Rangiora. Traffic volumes on these roads will be higher than other rural collector roads in the surrounding District. The ITA and evidence have not addressed these potential changes in road hierarchy which can have flow on impacts on how roads are accessed, and the level of infrastructure provided.

Influence of Distribution on Transport Network Performance

45. The absolute turning traffic volumes at downstream intersections resulting from the higher percentages the traffic model forecasts to the

northeast and north is likely to be material when assessed in intersection models. These changes and intersection performance will be further influenced by the higher background traffic growth forecast for the arterial Ohoka – Skewbridge – Flaxton road corridor by 2038 with otherwise anticipated land development. Mr Fuller has not undertaken any assessment of the Threlkelds Road intersection with Flaxton Road, where future traffic volumes will be high, and remain in a rural high speed environment.

46. The Tram Road traffic volume generated by development is likely to be overestimated in the ITA. However, as I discussed earlier, the absence of any allowance for traffic growth on Tram Road will again likely result in an underestimation of future intersection delay.

47. This leads me to conclude that the intersection modelling assessment by Mr Fuller will be underestimating delay at side road intersections to the high speed arterial road network, and is likely an unreliable assessment of future intersection performance.

48. I recommend that Applicant carry out testing of future traffic scenarios allowing for traffic growth and adjustments to traffic distributions.

Tram Road / Motorway Interchange

49. Mr Fuller has identified capacity constraints at the Tram Road on ramp intersection. In order to address that he has recommended that the overbridge could have an additional traffic lane added in the eastbound direction. In my opinion that is not physically straightforward. He has also calculated a threshold level of development at which effects would be unacceptable.

50. I understand no traffic growth from non-PC31 traffic has been allowed for in the analysis which I consider to be concerning. I also consider modelling of the interchange with SIDRA Intersection is not appropriate given the interaction with closely spaced intersections. I would typically expect a micro-simulation model to be used to analyse an interchange like Tram Road, as it provides for the dynamic interactions between intersections.

51. When I investigated the same scheme as a concept improvement for the interchange as part of the northern corridor work, we identified that the existing kerb to kerb width is 9.75m. There is a need for clearances between the edge of lane and those kerbs, which then places all traffic lanes below the typical minimum width. It also reduces visibility for

those turning from the off ramp to those travelling westbound on Tram Road. The space between kerbs and edge rails is currently available for pedestrians / cyclists, and I would anticipate Waka Kotahi and the Council would seek to retain that space. To accommodate all of the elements for an additional traffic lane, I expect the bridge requires widening. In my opinion, that can not be relied on as a response to the capacity issues.

Road Safety Considerations

52. Mr Mike Smith and myself have considered the road safety assessment of Novo Group. I have also reviewed the evidence of Mr Binder where he discusses assessment of safety risk as an additional measure to consider.

53. We have identified that the local road network includes a range of location specific risks. These were generally outlined in the memo of Mr Smith that formed part of the original advice for the Council submission (Appendix A of **Attachment 1**). I agree with that assessment. Roads in the vicinity of the site connecting to arterial roads have been developed from a very low traffic volume base, are rural in nature, with low levels of edge delineation, lighting, and often have unprotected road side hazards including deep drains.

54. I agree with Mr Binder that in this rural location and for this scale of development, a wider network road safety risk assessment can be carried out. That would use risk calculation methods to identify areas that may be subject to potentially high road safety risk that may not yet be obvious from existing crash history. This is particularly relevant where there is a step change in the order of magnitude of traffic volumes, as I indicated will occur on many roads in this area. A particular focus should be placed on the intersections of the connecting roads with arterial intersections.

55. Whilst Mr Binder's Infrastructure Risk diagram highlights existing levels of infrastructure related risk, I note that can also change with increasing traffic volume.

Road Formation

56. In considering the suitability of the existing road network, Mr Fuller in his ITA considers the changes based on cross section width guidance. That is only one aspect that contributes to the safety of the road network. As I mentioned previously other matters relate to road

delineation (markings and signage) and lighting, hazard protection, and speed management.

57. Mr Fuller suggests that upgrades to the typical standard expected from guidance documents can be managed through existing planned improvements and development contributions. In my opinion PC31 directly creates a significant step change in traffic volume, and based on the assessment of potential road network deficiencies that already exist (as previously specified in Mr Smith's Appendix 1), likely resulting in degradation in safety performance.

58. A direct financial contribution or requirement to upgrade ahead of or as part of staged development is likely to be necessary to ensure the roads are fit for purpose for the traffic volumes they will be expected to carry. Until road upgrades are planned in the Long Term Plan, development contributions may not be able to be collected for the upgrades which could be a large undertaking.

59. From a District Plan perspective, to address the uncertainty that the roads will be upgraded, I consider that a District Plan rule would be necessary for subdivision that requires further and more specific safety assessment of the ability of each of the roads connecting to the arterial road network, as well as their intersections. The rule should cover assessment of planned upgrades, and the suitability of the road formation and alignment to accommodate additional traffic by way of assessing carriageway width, road delineation, road side hazards, and intersection safety.

60. I also remain concerned that there is a high reliance on Tram Road generally for access, and I consider a similar rule would be necessary. The step change of a 26% increase in traffic volume on an already very high 8,000vpd for a rural arterial is likely to substantially increase crash frequency on that road. It could influence the level of improvement already being considered by Council. The volumes also generate higher delays and consequential safety risk for all downstream intersections. Given the high speed nature of the road, crashes often result in high severity casualties. With some of its characteristics with the likes of risk of sun strike, I consider there will likely be a notable change in safety risk. I consider that needs to be investigated further.

Public Transport Connections

61. I have considered the public transport evidence of Mr Milner. The site is not well located near existing bus routes or near to arterial routes, which creates issues with servicing by public transport.

62. My understanding from Mr Milner's evidence is that the Plan Change would best be serviced by an "on demand" service. I understand the cost of on demand services are known to be higher than fixed routes in urban areas, and for that reason are typically best implemented for basic access requirements in urban areas where fixed routes don't reach. In this case, PC31 site is a considerable distance from the urban areas that an on demand service would be required to connect to so there will be an ongoing tension between cost and service availability.

63. Mr Milner suggests the potential to extend the existing route 92 peak period express bus service to Ohoka could be considered. As I have set out elsewhere, I consider the estimated traffic distribution which Mr Fuller has carried out is incorrect. Nevertheless, in the morning peak hour, I have estimated 48% of all peak hour trips will be from the site to Kaiapoi or Christchurch. The return PM peak period those origins only make up 37% of all peak hour trips. While there may still be some demand for the peak period service for work trips, the overall quantity may be less than assumed by Mr Milner.

64. The extension of route 92 is via a route that involves right turn from Mill Road onto Ohoka Road which is a high speed intersection with high existing and future traffic volumes. In my opinion, safety and efficiency of that route would require further consideration. The potential for developer funded trial services is discussed by Mr Milner. I agree that could assist with providing some accessibility to public transport. I understand such trials can lead to community expectations for ongoing funding, even if it is not a cost effective service.

65. In summary I have some concerns that reasonable public transport accessibility is unlikely to feasible for the PC31 site. I would prefer to have some comfort that the bus funders/operators consider there is an available and cost effective option. Nevertheless, whilst some options possibly exist, I recommend the ODP will need to include provision to ensure the options for bus routing and / or turnaround are available, maximising the catchment of houses within 400m of the route.

66. I also read the evidence of Ms Wall. She noted that there would be demand for approximately 75 high school students to travel to Kaiapoi High School. Whilst I agree that there are existing services through Ohoka, the additional students will likely generate the need for an additional bus to be on the route, which is a cost to the Ministry of Education.

Cycling Connections

67. I acknowledge that Council has proposed a walking and cycling network plan 2022[3] with a possible off-road network in the area which includes "Grade 2" unsealed paths connecting Ohoka to Rangiora and Kaiapoi. The distance to urban areas will restrict the number of cyclists, although as noted by Mr Fuller the PC31 will increase demand including with the increasing use of e-bikes.

68. In my opinion this will warrant reconsideration of whether the existing strategy is sufficient to accommodate the demand, with Grade 1 facilities potentially being preferred as they provide a "critical link" between main towns. They are facilities that have an asphalt surface and provide the highest level of comfort, and is suitable for novice users. Routes on rural roads require safe separation from high speed traffic and provide safe road crossings. Further investigation would be required to determine if the improved standard of facility is achievable.

69. I consider the cycle routes to Kaiapoi and Rangiora would be an integral requirement for the development to support travel mode choice, given the challenges with safe cycling on the existing rural road network in the area. In addition, an off road connection to Mandeville via Bradleys Road will be necessary. I am unclear whether the use of development contributions as suggested by Mr Fuller would enable the necessary infrastructure to be delivered in a timely manner given the step change in demand that the development will make. A rule with specific requirements would seem more suitable.

Site Layout and Connections

70. In my earlier advice to Council for their submission, I raised concerns that the development will be serviced by a large number of intersections on frontage roads that will retain a largely rural character on the

[3] https://www.waimakariri.govt.nz/__data/assets/pdf_file/0016/136330/Walking-and-Cycling-Network-Plan-Recommended-Network-Plan.pdf

opposite side of the road. The traffic generation of approximately 7,400vpd is serviced by eight intersections to the frontage road.

71. Based on the landscape concepts provided for Whites Road which appear to retain a rural feel, my preference would be to reduce the number of intersections onto Whites Road from four to two to protect the function and safety of the road. That would involve removal of the lower level Local Road B connections. Cycle and pedestrian connections can provide intermediate access to the road. Positioning of roads relative to existing driveways opposite should also be considered given the rural function of the roads.

72. In my experience the use of bespoke road cross sections in an Outline Development Plan, which I have on occasion provided for Plan Changes, can create outcomes that are unexpected and undesirable, as standards and best practice evolve. It reduces opportunities for detailed consideration of the various factors that make a good street network through the subdivision design process. What appears sensible in a cross-section, can be challenging to implement in practice or provide a lesser standard. My preference would be to either rely on standard District Plan provisions as a baseline, or the ODP provides high level guidance only or sufficient flexibility for Council to require adjustments so that the bespoke provisions are considered through the subdivision process. For example, on review of the proposed cross-sections:

    72.1. The collector road has a footpath of 1.5m, whereas current best practice is to adopt minimum widths of 1.8m

    72.2. The carriageway of the Collector Road has no on-street parking (7m is generally considered insufficient for parking and two-way traffic), yet lots will directly front the road and generate parking demand. The width of carriageway at 7m is likely to be higher speed where parking does not exist, and traffic volumes on many roads will be low. That combination is not conducive to safe speeds.

    72.3. The local road carriageways at 6.4m do not provide for parking, or provide parking on one side and a single through lane. I understand this arrangement has created some issues for Councils that have applied that arrangement as drivers park straddling the carriageway.

Comparison of Vehicle Travel Characteristics with Established Urban Areas

73. The CTM model provides some useful insights into the length of travel for different urban areas. I have analysed average trip length for zones in the Waimakariri District, and also the modelled population to employment ratio for each town. The table below shows a summary of these statistics:

Urban Centre	**Ratio Employment (people) to Population (people)**	**Average Trip Length Residential Zones[4]**
PC31	0.03	17.1km
Kaiapoi	0.27	12.5km
Rangiora	0.37	10.1km
Pegasus/Ravenswood/Woodend	0.09	15.5km

74. It is apparent that the combination of low employment and general location of the Ohoka development contributes to longer average trip lengths which influence vehicle kilometers travelled in the wider transport network.

75. Whilst it could be assumed that Rangiora is further from Christchurch and therefore generates extra vehicle travel, this appears to be balanced by the proximity to higher levels of local employment (and day to day services). The Pegasus/Ravenswood/Woodend area has lower employment ratios, although there are large areas of recently zoned commercial land at the key activity centre that will contribute to increasing self sufficiency over time.

76. The lower travel distance outcomes for the established urban centres are generally consistent with the centres based approach that greater Christchurch authorities have sought to achieve[5] to minimise travel distance and provide travel mode choice for residents.

[4] This is an indicative statistic based on averages of zones without substantial employment, modelled for future year AM period outbound, and PM period inbound.
[5] Mr Binder para 22

Conclusions

77. I have considered the transport assessment and related evidence provided by the Applicant and Council officers.

78. I have identified that the proposed PC31 site is likely to lead to higher average travel distances by private vehicle than in and adjacent to other urban residential areas in Waimakariri District.

79. There is likely to be poor access to public transport unless funding of how bus services are provided is changed (where high-cost services are accepted).

80. A planned cycle network may be available in the future to connect the site to the existing urban areas. I consider currently planned quality of infrastructure should be reviewed to determine if PC31 warrants a higher standard for the critical connections to Rangiora and Kaiapoi.

81. The impact of development on the existing road network is uncertain, as in my opinion the assessments carried out are not sufficiently robust to understand all the implications of PC31 for the surrounding road network. That uncertainty relates to safety of the road network, capacity of intersections, and suitability of existing road infrastructure and how that will be upgraded.

82. Whilst these matters raise concerns from a transport perspective as to whether PC31 is the most suitable use of the land, I recognise that the panel may consider approval. If PC31 is approved, I consider the potential effects of development of the site warrant additional targeted future transport assessment rules addressing:

    82.1. Whether the development is making provision for integration with existing or future public transport services;

    82.2. Suitability of each of the cycle connections to the urban centres to best support travel mode choice;

    82.3. The expected change in function of the surrounding road network as a result of development, and whether changes to the road hierarchy for assessment are necessary;

    82.4. The level of transport infrastructure improvement that is planned or has been carried out to understand effects of development and ensure safe use of the connecting rural road

environment, including specifically Whites Road, Mill Road, Threlkelds Road and Bradleys Road. That would also need to consider at least the intersections of those roads with the arterial road network, and potentially the impact on parts of the arterial road network such as Tram Road through to its SH1 interchange.

83. I also consider the ODP should remove two of the minor intersections for vehicles on Whites Road. The positions of intersections relative to driveways should also be enabled as part of consent processes (ie some flexibility in intersection positions is generally desirable). Irecommend that flexibility is retained for application of road cross-sections to enable discretion to assess road layouts against best practice.

Date: 21 July 2023

Andrew Metherell

Attachment 1: Previous Transport Advice Provided to Cavell Leitch to aid the Council Submission

Stantec

Memo

To:	Andrew Schulte Cavell Leitch	From:	Mike Smith and Andrew Metherell Stantec
Project/File:	310205390	Date:	18 July 2022

Reference: WDC Private Plan Change Request 31 Transport Peer Review

1 Scope of Assessment

Rolleston Industrial Developments Limited has proposed a private plan change seeking rezoning in the Operative Waimakariri District Plan of 155ha of rural land to a mixture of residential and business zones, supported by an Outline Development Plan. Waimakariri District Council seeks external peer review to determine if a submission should be made, including on transportation and infrastructure matters.

The scope of this assessment is to provide a peer review of the private plan change request with a focus on the Integrated Transport Assessment (Appendix H of the s32 assessment). A separate memo will provide an assessment of the infrastructure elements of the submission (Appendix G of the s32 assessment).

The intent is that this memo will comment on:

- the suitability of assessments undertaken, and
- highlight key gaps and/or potential issues for the transportation topics.

This memo takes a broad view of the suitability of the information for the submission process. Further discussions and clarifications of the matters raised may be required at a future stage.

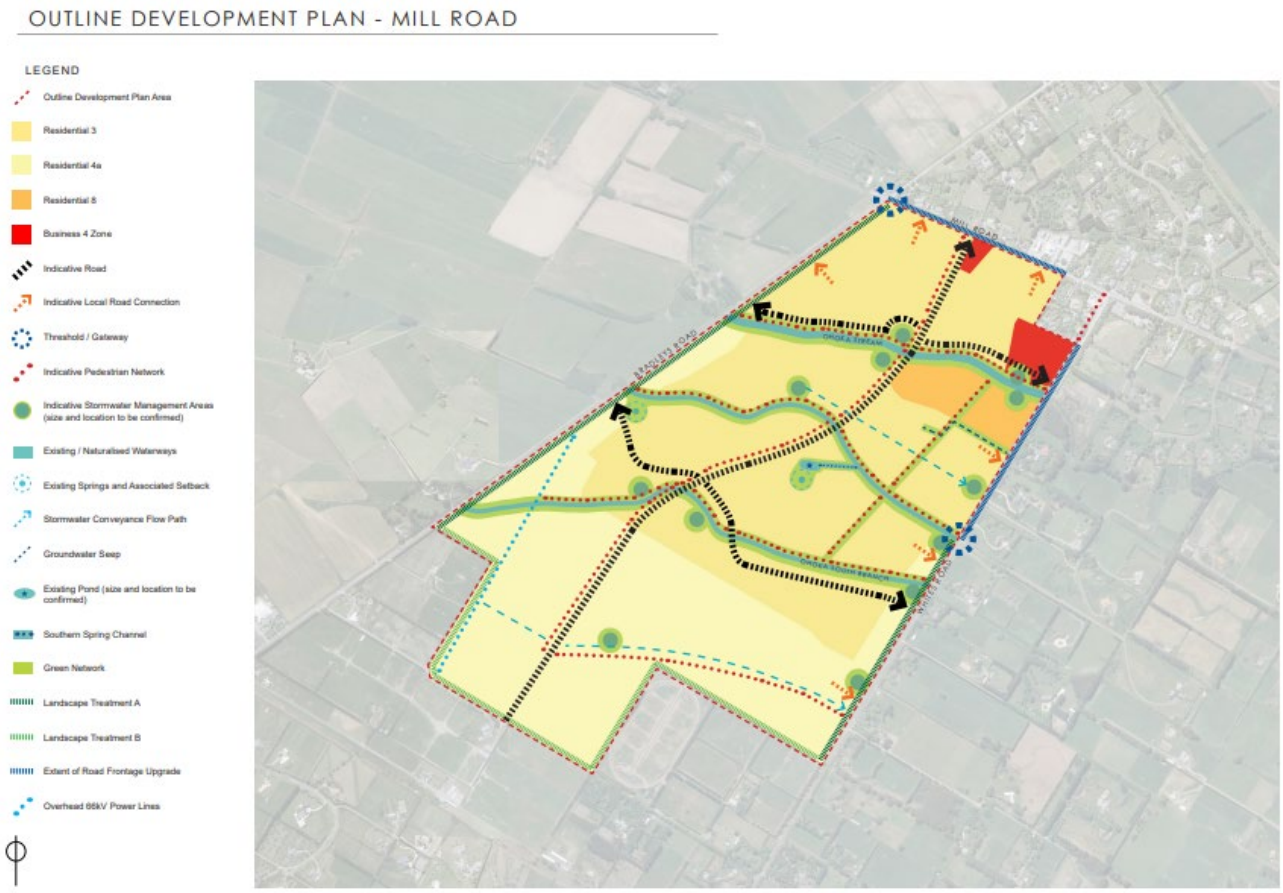
2 Background

Novo Group were engaged by Rolleston Industrial Developments Ltd to complete an Infrastructure Assessment[1] considering the suitability of rezoning the land defined within the Private Plan Change application. This proposed 156ha residential subdivision at Ohoka[2] is intended to support approximately 850 new residential lots, 2 small commercial areas and a special purpose area.

The outline plan for the site in presented in Figure 1 showing the proposed land use zoning, roading network, and stormwater flow paths through the development.

[1] 'Integrated Transport Assessment Prepared for Rolleston Industrial Developments Ltd, 535 Mill Road Ohoka" Novo Group Ltd, 2 March 2022
[2] Land located at 511, 531, 535 and 547 Mill Road and 290 and 344 Bradleys Road

Figure 1 Outline Development Plan (PDP Stormwater Management Report)



The structure of the memo will broadly align with the sections of the Novo Group Ltd Integrated Transport Assessment Report (referred to herein as the 'ITA') with comments provided accordingly.

3 Scope of Integrated Transport Assessment

3.1 Guidance for ITA

The Introduction to the ITA states that the assessment is "broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research Report 422, November 2010". Those guidelines provide guidance on matters such as the geographical extent of assessment, the future assessment years, and the content of the ITA. The ITA submitted does not define any rationale for the parameters of the assessment provided.

3.2 Geographic Extent of Assessment

With respect to geographic area of assessment, the ITA focuses on the Ohoka area, which can be considered a local level assessment. It does not provide a District Wide or Regional context to transport integration. We understand that the area of proposed development has not been identified

previously through spatial planning for the District or Region, and Ohoka is also not identified as a settlement for notable growth.

It is important then that the Plan Change assessments consider a wide area assessment within a robustly established larger area of influence. The development is forecast by Novo Group to generate approximately 8,000 vehicle movements per day (approximate) representing significant expansion of traffic movement from the Ohoka / Mandeville area. The site has rural road connections to most trip origin and destinations which can be sensitive to large changes in traffic, including from road safety, and efficiency perspectives. As a minimum we suggest assessment of the full length of transport connections to Rangiora, Kaiapoi, Christchurch, and Mandeville.

Strategic transport assessment of the suitability of the location for urban development at the scale and intensity proposed has not been provided in the ITA. That has potential consequences for understanding the flow on changes required to transport infrastructure and service provision locally and in the wider area; and how the development may contribute to transport network safety, efficiency, and contributions to vehicle emissions.

3.3 Future Assessment Years

The assessment does not provide any indication of future year assessment, except for minor local changes in traffic patterns that could occur as part of infill development of existing zoned land in the vicinity.

Major developments and transport infrastructure projects in the greater Christchurch region are typically assessed with the assistance of transport models that provide forecasts of future traffic patterns based on forecast land use. Models enable consideration of potential changes in land use, transport networks and performance over periods well into the future. Use of a traffic model approach provides additional confidence in how future transport networks will operate, and routes that will be taken by generated traffic, and the impact on longer term traffic volumes. We consider a traffic modelling approach is justified in this case to understand wider transport network impacts such as connections to and impacts on the arterial road network. Existing models provide some coverage of the area (although additional local calibration may be required).

In addition to modelling of the road network, the ITA has minimal discussion of future public transport and cycling networks, and how the development could integrate with those networks and achieve sustainable transport outcomes.

3.4 Content of ITA

The NZTA guidance for ITA's sets out suggested content, with reference to the ITA scope. A summary table taken from the guidance is reproduced below. The Novo Group ITA content appears to be at a Moderate scope, whereas the potential matters to be considered for this location are likely to warrant a Broad to Extensive assessment, particularly due to the need for a strategic level transport assessment as a result of the broader policy considerations for intensification of development at the location proposed. Our review of transport matters that follows also suggests that a Broad / Extensive assessment is warranted from a geographic perspective.

ITA scope	Geographic	Policy
Simple	Expected to have an effect within the site and at the interface with the transport network.	Expected to be compliant with statutory rules
Moderate	Expected to have an effect over a small area or neighbourhood	Expected to align with local policies
Broad	Expected to have an effect over a larger area, eg part of or a whole suburb	Expected to align with local and regional policies and objectives
Extensive	Expected to have impacts over a wide area, district or region	Expected to align with regional and national policies, objectives and visions.

Table 1: Extract on ITA Scope from NZTA Research Report 422

We recommend that reference is made to Table 6.3 and Appendix A of Research Report 422 for further guidance on the potential gaps in assessment that should be addressed to provide an Integrated Transport Assessment for the site that will enable more robust consideration of how well the site integrates with the transport network.

3.5 Summary

In summary, it is considered that the scope of the ITA supplied with the Plan Change request is inadequate. It does not enable a full understanding of the level of integration achievable between the proposed Plan Change site and the wider transport network, or whether sustainable transport outcomes can be achieved consistent with transport policy, or that the traffic effects are acceptable (as concluded by Novo Group).

4 Existing and Planned Transport Environment

We have reviewed the local transport network and consider that the ITA descriptions of the transport network are particularly brief. As described earlier, there is an absence of description of the strategic location and function of the surrounding transport network for each of the transport modes, and routes to existing urban areas. Traffic generated by the site will involve travel to each of the nearby urban areas, as well as towards Christchurch and we anticipate there will be influences on the road network beyond the roads that descriptions are provided for.

We consider there are existing road safety concerns and constraints in the local area that are either not well described, or not identified. Appendix A of this memo highlights some of the locations that road safety constraints have been identified, and which could be exacerbated by future development requiring additional changes to the transport network planning and investment.

There is no discussion on cycling routes available or planned that connect to other urban areas and that the site could integrate with. As a major residential development remote from urban areas, it is considered important to understand how cycle connections can be made in the future. Rangiora is some 9 km from the proposed development, whilst Kaiapoi is some 6 km from the proposed development. This makes the proposed subdivision within reach of work commute by bicycle, especially with the fast uptake of e-bikes etc, should there be safe and effective infrastructure.

The public transport description only comments on the park and ride facilities to Christchurch. The proposed development will generate demand for public transport service within the Waimakariri District, and we consider a full description of existing and planned infrastructure and services is necessary. That would then enable further consideration of whether a suitable public transport service is likely to be achievable.

5 Proposed Development and Site Layout

The ITA does not discuss the function and geometry of the internal road and cycle network proposed in the ODP, or the rationale for the location of proposed new intersection locations. We note that the expected distribution of traffic should be an important consideration to establish a suitable internal road network and road hierarchy, and to confirm the need for local road intersections onto existing higher order frontage roads.

There are five new intersections proposed on Whites Road (1.3km frontage), three on Mill Road (500m frontage and in close proximity to existing intersections), and three intersections on Bradleys Road (1.5km frontage). The need for eleven intersections to service the 8,000 vehicle per day traffic generation should be justified, as unnecessary intersections could impact the legibility of the existing adjacent roads, and potentially the ability to provide safe intersection treatments such as turn treatments.

In a rural area the proposed intersection location positions are an important consideration with reference to other intersections and existing driveways. The constructability of intersection treatments has not been demonstrated, noting that there are some existing constraints such as power poles and water/drainage channels. We consider that further investigation to feasibility construct accesses and a suitable frontage road upgrade should be carried out to make it clear what type of standard is likely to be required.

The ODP proposes a bespoke set of road cross-sections and these do not relate to the road types on the ODP. No technical justification for the cross-sections is provided in the ITA. We note that one of the cross-sections includes one footpath only, and one cross section has no footpath. In the absence of supporting information the cross-section should be removed and the standard District Plan provisions relied on.

The ODP proposes a pedestrian network in addition to facilities on new roads. The ODP does not show pedestrian routes on the existing frontage roads, and does not show cycle routes or how connections will be made to existing or planned facilities. The ITA discusses some existing and proposed shared path provision on Mills Road and Whites Road although suitability for potential demand is not discussed. We consider a more comprehensive pedestrian and cycle network plan is required, including suitable cross sections, to demonstrate suitable outcomes for active mode travel can be achieved at a local level. A wider area cycle network plan demonstrating connections and how they will be provided to Mandeville, Kaiapoi, and Rangiora should also be included in the assessment and potentially the ODP to demonstrate how integration will be achieved.

The ODP does not include any notations on how public transport could service the site directly, and if it did the walkability to bus stops noting standard accessible walk distances to a regular bus service are usually 400m.

A high school or retirement village is indicated as a possible use for the Residential 8 land, which is bordered by Ohoka Stream and Whites Road. The suitability of connectivity provided by the ODP for a range of modes of travel is not addressed in the ITA. We consider concept plans should be developed to demonstrate that the proposed network is suitable to support those activities.

The ODP does not set out a staging plan, which is likely to be necessary in the Ohoka environment to enable sustainable expansion and integration of transport infrastructure over the period of subdivision development.

6 Traffic Generation and Traffic Distribution

No traffic surveys have been provided to demonstrate the potential traffic generation and distribution is robust, or the potential demand for use of modes of travel other than private vehicle. Nevertheless, the traffic generation appears to be in the correct order of magnitude. We are concerned that the traffic distribution is developed for peak hours only and relies on journey to work. Even at peak times there are a range of other journey types, with a likely underestimation of trips between the site and other origins/destinations in the Waimakariri District.

The traffic distribution plots have not been collated into a format that the general public will be able to easily understand.

As noted earlier, we recommend a more robust and wider area assessment of traffic distribution is carried out, including reference to a traffic model. There are large changes in traffic volumes on the few roads that the change in traffic volume has been described. A wider area assessment may highlight other areas of concern with changes in traffic patterns.

7 Site Accesses

We consider direct vehicle access from lots to existing frontage roads should only be permitted to roads that will have an urban configuration and operating speed. As discussed earlier, we consider constructability of the proposed access arrangements should be demonstrated at a concept level at this stage of the process. We also consider intersection separation should be assessed against the need for and function of the road intersection, as a proliferation of intersections can reduce network legibility and safety.

8 Wide Area Effects

As described earlier we are concerned that the wide area assessment has insufficient geographic coverage. It should extend to each of the other nearby Waimakariri District towns, or as justified by a robust assessment of traffic volume change and availability of suitable infrastructure. There is inadequate assessment of the connectivity of the development to other urban areas for any of the modes of travel, and the likes of the SH1 / Tram Road interchange and routes to Kaiapoi and Rangiora has not been assessed at all. For example, the route Whites Road / Mill Road / Threkelds Road is a key route from Ohoka to Rangiora.

Our review of the existing transport network as set out in Appendix A demonstrates many local features of the road network which are already potentially deficient and would likely require upgrades brought forward or additional unplanned upgrade. In some cases that involves third party land acquisition. The section 32 report indicates that costs of additional infrastructure would be borne by the developer, however, the ITA has not identified the extent of improvements that would be necessary to support safe transport connections to other urban areas to enable an integrated development.

The changes in transport patterns could lead to a change in the function of roads in the District Plan road hierarchy. There is no discussion of changes to the road hierarchy that may be necessary to support ongoing safe development on roads with changed characteristics as a result of the development. It is noted that Bradley Road, Whites Road, Mill Road and Threlkelds Road all have

MEDIUM [3]personal risk ratings. Tram Road is assessed as having a MEDIUM collective risk rating, while the Tram Road / Bradleys Road and Tram Road / Giles Road intersection has a MEDIUM HIGH Intersection Collective Risk Rating.

We consider the Plan Change as proposed has a high likelihood of significant adverse impacts on the sustainable and safe use of the Waimakariri District transport network.

9 Strategic Transport Planning Considerations

The ITA does not address strategic planning matters, and we consider this has led to gaps in the ITA assessment provided. We have concerns that the proposed development would likely conflict with a detailed review of higher-level transport planning objectives and policies.

We note the Section 32 report does include an assessment against District Plan Objectives and Policies. However, in relying on the ITA, it also has gaps in its assessment as noted earlier. Examples include:

- District Plan Objective 11.2.1 – we consider there will be safety effects that require upgrades to transport network infrastructure not identified in the ITA, and are not otherwise programmed.
- District Plan Policy 13.1.1.4 – The location of development is remote from existing urban areas where planning and funding for transport is centred. This will lead to reliance on private vehicles for many trips, whereas comparable trips could be contemplated by other modes of travel for the larger centres due to the availability of safe and more efficient connections and infrastructure. The road network servicing Ohoka has existing pressures from a road safety perspective, and upgrades will likely be required on many roads (beyond what is identified by the ITA), such that efficient use of the existing road network is diminished. Whilst clean emission vehicles are increasing, the extent of uptake is still uncertain and overall travel distance will still likely be higher at the proposed development location than expansion or consolidation of existing urban centres where employment, retail/commercial, social, and recreational facilities are located.
- NPS-UD 2020 Policy 1 c) – The connections for active and public transport between Ohoka and the main urban centres of Kaiapoi and Rangiora do not exist or are not well developed, and the Plan Change does not propose improvements beyond the immediate frontage. Public transport is not anticipated to service Ohoka directly, so there will be reliance on private vehicle for most trips.

10 Conclusion

Our review has raised concerns with the scope and aspects of assessment of the ITA that is provided to support the Plan Change request. In the absence of more rigorous assessment and consideration of transport matters we consider there is the potential for adverse transport outcomes.

[3] KiwiRap Assessment process https://roadsafetyrisk.co.nz

Stantec

Memo

To:	Andrew Schulte Cavell Leitch	From:	Mike Smith Stantec
Project/File:	310205390	Date:	27 July 2022

Reference: WDC Private Plan Change Request 31 Transport Peer Review

APPENDIX A - Local Road Safety Review

1 Scope of Assessment

The following sections provide an assessment of the routes and intersections that would be affected by the proposed Private Plan Change (PC31) to the Operative Waimakariri District Plan.

This review concentrates on the immediate road network, and where applicable, makes commentary on the greater road network where it is considered that the proposed development area may have impact on the safe operation of the existing road network.

2 KiwiRAP Assessment

In undertaking this assessment, I have considered the KiwiRAP assessment analysis for the surrounding road network. Screen shots of this assessment are provided in Figure 1 and Figure 2 below. Superimposed is the general location of the proposed development site.

For clarity, I provide the the definitions of Personal and Collective Risk respectively.

Personal risk : is a person's chance of being killed or seriously injured on the road per 100 million kilometres travelled.

Collective risk : is the overall number of fatal and serious injury crashes per kilometre travelled

Reference: WDC Private Plan Change Request 31 Transport Peer Review – Appendix A

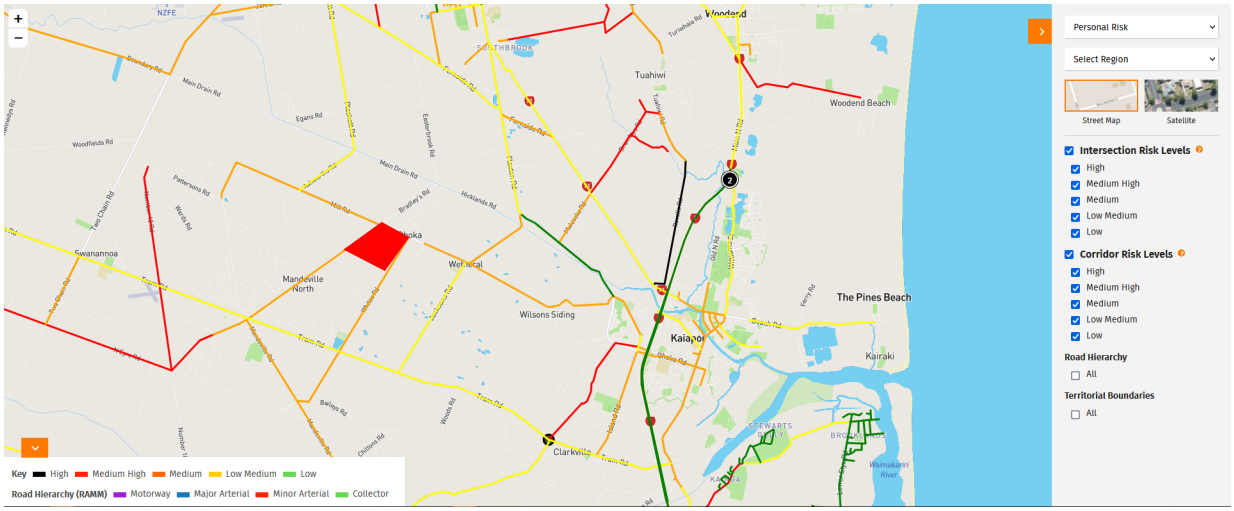


Figure 1: Personal Risk. Source : KiwiRAP (https://roadsafetyrisk.co.nz)

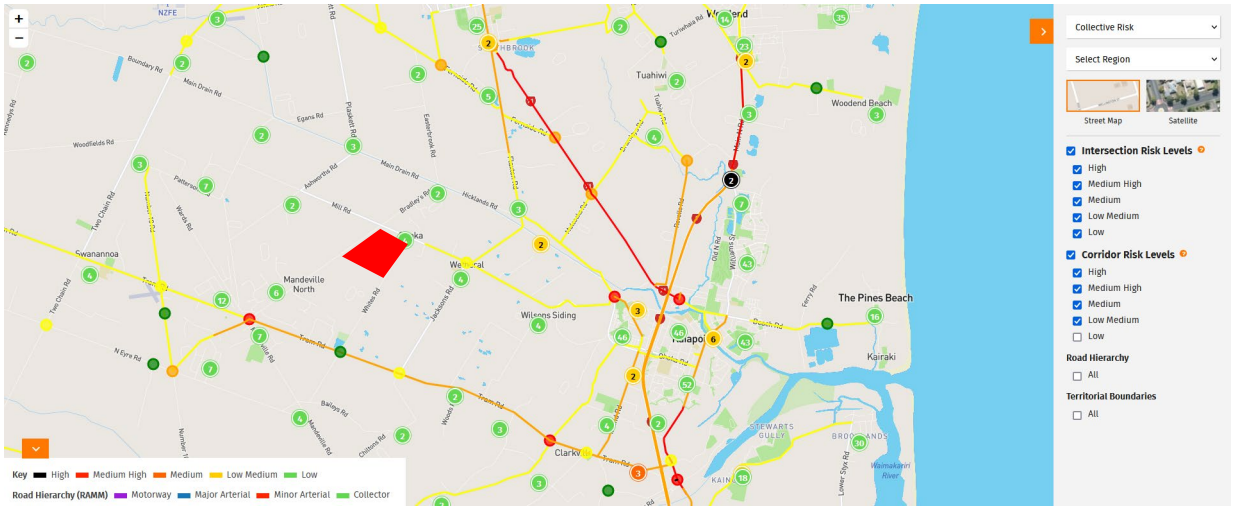


Figure 2: Collective Risk. Source : KiwiRAP (https://roadsafetyrisk.co.nz)

This review details routes and intersections surrounding the proposed development area that have existing Road Safety concerns.

3 Road Assessment

The following sections detail an assessment of existing road sections, with a brief narrative on potential impacts of the proposed development on the road operation / use.

3.1 Tram Road (Bradley Road to Whites Road)

Formation details:

Width : 8.5 metres

Classification: Arterial

ADT: 6626 vpd (@Bradleys Road) - 7372 vpd (@ Whites Road)

WDC ECOP requires: 2 * 3.5 m lanes with 1.5 m sealed shoulders

Impact of proposed development on existing use:

Limited sealed shoulder in midblock sections, localised widening at larger access points as required under District Plan

Not suitable for general cycle use

Legal speed limit 80 km/hr – car following exercise – operating more like 90 km/hr

Impacts on Tram / SH1 not presented / modelled

3.2 Mill Road

Formation details:

Width : 7.5 metres

Classification: Primary Collector

ADT: 1625 vpd

WDC ECOP requires: 2 * 3.5 m lanes with 1.0 m sealed shoulders

Impact of proposed development on existing use:

Rural village look and feel. No sealed shoulders. Heavy road shoulder parking, especially around Farmers Market. Sight lines affected by road shoulder parking.

60 km/hr for general area of Ohoka village. High speed carried through from Mill Road (west approach)

Poorly defined speed limit threshold (signs only; Centreline marking only). Poor awareness of Bradley Road intersection. Sporadic roadside tree planting. Poorly formed ped / cycle path on south side of road. Narrow lanes not suitable for general cycle use (listed as medium confidence use only – not catering for school / child movement)

Potential clash with new access onto Mill Road and existing large accesses within the Village (north side)

Deep side drain (south side; east of Whites Road). Ped / cycle path alongside side drain

Mill Road forms link to Rangiora via Threlkelds Road

Increase in traffic volumes for Rangiora movement may require upgrade to Whites / Jacksons / Threlkelds intersections. Existing development areas to north of Mill Road may require intersection upgrades to comply with turn movement / volume density with new traffic generation and distribution

There is a risk that the Mill Road route to Ohoka Road / Skewbridge Road may become attractive as it bypasses Tram Road SH 1 onramp constraints, (Tram Rd on-ramp already site of high interest with DSI crashes), may increase exposure to DSI crashes and potential intersection upgrades to Ohoka on-ramp (to that of Tram Road on-ramp).

Effects of key alternate routes that could be utilised, especially when considering access to passenger transport or cycle connectivity are not presented in Applicants submission.

3.3 Bradleys Road

Formation details:

Width : 6.5 metres

Classification: Primary Collector

ADT: 1351 vpd

WDC ECOP requires: 2 * 3.5 m lanes with 1.0 m sealed shoulders

Impact of proposed development on existing use:

Side drain / water race west side (unprotected) / large utility pole – limits ability to widen west side

Existing road does not meet District Plan width / formation requirements – road safety would be compounded if new development were to go ahead, increased traffic volume to / from Mandeville

Not suitable for general cyclist (listed as proposed medium confidence only). Movement to / from Mandeville for school children (cyclable distance – 4 km)

Mixed speed limits – 80 km/hr Mandeville end, 60 km/hr Ohoka end. Development one sided only – does not fit general warrant model for lower speeds / speed reduction. Speed limit @ Ohoka – needs to be gated for maximum effect – utilise village threshold signing if development to proceed

Concrete tomb stone headwalls (narrow) at culverts – roadside hazard (culvert widening etc if development to proceed and higher volumes

Advance STOP 200 m signs installed to assist with driver overshoot issue at Mill Road – highlights current stress that Mill Road / Bradley intersection is under. (Requires to be gated to maximise safety)

3.4 Whites Road

Formation details:

Width : 7.0 metres

Classification: Secondary Collector

ADT: 714 vpd

WDC ECOP requires: 2 * 3.5 m lanes with 1.0 m sealed shoulders

Impact of proposed development on existing use:

Road width does not meet requirements for classification, additional traffic will increase stress on safe movement, potential for additional side swipe / rear end type crashes, especially at new access points

Extensive roadside parking during Farmers Market; Perpendicular parking that requires reversing back into live lanes with poor observations / intervisibility. Pedestrians walking along edge of traffic lane exposed to through movement traffic. No footpaths etc. Long vehicles overhanging into edge of traffic lane – reduced road width

Road narrows at Ohoka Stream – safety barrier installed. New development road proposed in this location – issues with turn movement / road width / suitable facilities for new road volumes.

Separation of access (same side / opposite side) – may be difficult to comply with WDC separation stds if direct access to Whites Road is permitted.

Concrete tomb stone headwalls (narrow) at culverts – roadside hazard (culvert widening etc if development to proceed and higher volumes

Whites Road reserve – reserve land at intersection with Tram Road – limits capacity to undertake intersection improvements

Advance STOP 200 m signs installed to assist with driver overshoot issue at Tram Road Intersection – highlights current stress that Whites Road / Tram Road intersection is under. (Requires to be gated to maximise safety)

3.5 Jacksons Road

Formation details:

Width : 8.5 metres

Classification: Secondary Collector

ADT: 789 vpd

WDC ECOP requires: 2 * 3.5 m lanes with 1.0 m sealed shoulders

Impact of proposed development on existing use:

Jacksons Road is alternate access out to Tram Road, especially when considering drop off of school children as part of journey to work etc.

Narrow, no road markings in rural section.

Side drain / water race west side (unprotected) / large utility pole – limits ability to widen west side

Concrete tomb stone headwalls (narrow) at culverts – roadside hazard (culvert widening etc if development to proceed and higher volumes

Deep side drains / large utility poles western side – roadside hazard

3.6 Threlkelds Road

Formation details:

Width : 7.0 metres

Classification: Primary Collector

ADT: 1714 vpd

WDC ECOP requires: 2 * 3.5 m lanes with 1.0 m sealed shoulders

Impact of proposed development on existing use:

88 metre separation from Threlkelds Road – below WDC required separation distance (60 km/hr = 160 metres)

Historic road alignment, increase in volumes would result in additional stress at intersections; need for high-cost intersection improvements

Table 30.7: Minimum Distance Between Intersections

Legal Speed Limit (km/hr)	Distance (m)
100	800
80	550
70	220
60	160
50	125

3.7 Other locations of Note

Skewbridge

Currently source of significant concern with WDC – Project underway for replacement – issues with funding etc from Waka Kotahi. WDC staff have flagged in LTP

Crash History – ongoing crash history; realignment and speed limit changes have provided some relief, but underlying issues remain. Not suitable for increased traffic volumes

Any projects for improvement / replacement are many years out

LTP – what are the commitments to this project??

Threlkelds Road Bridge

Has a historic DSI crash history; MEDIUM Personal Risk rating; High Motorcycle Risk Rating

Pressure on existing traffic movement if traffic distribution increases on the Mill / Threlkelds / Flaxton Rd. Bridge curved with superelevation, narrow, not suitable for cycles.

Listed as being for high confidence users (cyclist) only

Flaxton Road

DSI crash history; MEDIUM Collective Risk rating

Constrained road – deep spring fed side watercourse, large (600 mm) utility poles

Proposed development is within cycle distance of Rangiora / Southbrook (industrial). Flaxton Road not suitable for general cycle commute. Significant cost to improve cycle infrastructure along Flaxton Road

4 Intersection Operations

An on-site assessment has been undertaken on Friday 15th July 2022, to allow an assessment of the existing road and intersection forms. This site inspection concentrated on the form of the intersection, and any elements in and around the intersection that would create concern in operation, both current, and considering the future development.

I have assessed the supplied material and considered the transport / intersection model material submitted.

SIDRA Analysis indicates that intersections may function at a suitable level, however, the traffic distribution should be considered against traffic distributions and background growth forecasts from established traffic models. The intersection assessment does not take into account Road Safety assessment for intersections.

Doubt that SIDRA analysis includes greater land development upstream effects

For many intersections, issues are common. The following table provides a brief narrative of the Intersections assessed.

Table 4-1: Intersection Assessment Summary

Intersection	Sightlines		Comments	Land take required?	Utilities	Rural Road Elements
	L	R				
Tram / Bradley (southbound)	✗	✓	Applicant states that roundabout is considered by WDC, but not in LTP. No certainty on when this would go ahead, no security of funding for WDC	Potentially if fully compliant rural roundabout is formed	Improved intersection lighting already installed	Avenue effect formed by overhead utility lines
Bradley / Mill	✗	✓	Acute angle approach to intersection requires driver to observe traffic to left through B pillar / passengers seat	Potentially if desire to improve intersection approach angles / maintain appropriate sight lines Long radius for some turn movements – enables high speed turn. Negative affect on pedestrian / cycle use	Large utility poles to be relocated to remove roadside hazards for improved intersection form	Avenue effect formed by overhead utility lines Rural village – effective thresholds to be formed to moderate approach speed

Reference: **WDC Private Plan Change Request 31 Transport Peer Review – Appendix A**

Intersection	Sightlines		Comments	Land take required?	Utilities	Rural Road Elements
	L	R				
Whites (northbound) / Mill	✗	⚠	Roadside parking at peak use times (Framers Market) results in obstructed sight lines. Parking controls etc required Culvert headwall (east side) blocks road widening Service station close to intersection – traffic movement	No, but roadside parking will require stopping to maintain intervisibility sight lines. Potential sub-standard walking / cycle paths due to intersection improvements to tidy form and function		Rural village – effective thresholds to be formed to moderate approach speed
Mill / Jacksons	✓	✗	Close proximity to Threlkelds Rd intersection	Limited sight line to right (northbound) on Jackson Long radius for some turn movements – enables high speed turn. Negative affect on pedestrian / cycle use		Low density development surrounding – looks like typical rural road, additional threshold / speed moderation treatments required to calm
Mill / Threlkelds	✓	⚠	Close proximity of Jacksons Road intersection results in potential turning conflicts. Increase in volumes on Mill – Threlkelds route may require establishment of right turn	Potentially, dependant on design		

Intersection	Sightlines		Comments	Land take required?	Utilities	Rural Road Elements
	L	R				
			facilities; will require upgrade to two intersections due to close proximity to establish uniform treatment			
Tram / Whites	✗	✗	Intersection islands installed Visibility to left (southbound) obstructed by vegetation / hedge; visibility to right obstructed by vegetation in reserve	Reserve boundary prohibits improvements unless land taken, will require amendment to land under Reserves Act Hedge (east side) on private property	Large poles in close proximity to existing kerb	High speed through lane Right turn facilities already installed, pushes through traffic close to road boundaries Avenue effect due to hedges along road, intersection central islands installed to counter

For clarity, I have made comment for exemplar intersections, noting issues that also relate to road safety operations of the intersection.

4.1 Bradley Road / Mill Road Intersection

Bradley Road intersects with Mill Road at an acute angle. The intersection has a priority STOP control for both legs of Bradley Road.

Figure 3: Bradley Road / Mill Road Intersection Aerial

The Bradley Road / Mill Road intersection is characterised by:

1. An acute approach angle of 60 degrees
2. Large utility poles within the shoulder, obstructing intervisibility to the left (northbound; Bradley Road (south))
3. Drivers undertaking observations to their left (northbound; Bradley Road (south)), having intervisibility sight lines obstructed by the B pillar and headrest of the passenger's seat,
4. Avenue effect is created by the adjacent fence lines and utility pole lines. The driver's eye is drawn through the intersection.

5. Long radius left turn due to obtuse approach angle for left turn movement. This encourages high speed left turn.
6. Right turn movements from Mill Road will occur from within the through lane.
7. Roadside features currently prevent any slip movement around a stationary right turn vehicle on Mill Road.
8. A poorly maintained off road crusher dust pedestrian / cyclist path commences some 35 metres east of the intersection, and is located on the south side of Mill Road.

Figure 4: Left turn movement – long radius encouraging high turn speed

Figure 5:: Bradley Road (northbound) approach to Mill Road

Figure 6:: Bradley Road (northbound) intervisibility sight line to left impeded by large utility poles

Figure 7:: Bradley Road (northbound) intervisibility sight to right on exit appropriate

The traffic analysis provided by Novo Group indicates that the current intersection is operating at a low Level of Service (LoS), being LoS A. LoS A is defined as being less than 10 seconds delay for a movement. I concur with the assessment of the current road LoS presented by Novo Group.

However, this analysis does not consider inherent road safety risk that are present at this intersection. These include:

- ⌘ Poor visibility to left, driver required to look through B Pillar
- ⌘ High speed left turn movements possible – risk to vulnerable user
- ⌘ Large poles
- ⌘ Avenue Effect

4.2 Whites Road / Mill Road Intersection

Whites Road intersects with Mill Road at an acute angle. The intersection has a priority STOP control for Whites Road.

Figure 8 : Whites Road / Mill Road Intersection Aerial

The Bradley Road / Mill Road intersection is characterised by:

1. An approach angle of near 90 degrees
2. 60 km/hr speed limit
3. Commercial business (Service Station) located in the western quadrant
4. At the time of inspection (Friday) the market was operating – heavy roadside parking on Mill Road (west) and Whites Road. Impacting on drivers intervisibility at the STOP controlled intersection
5. Intervisibility to right (Whites northbound) is impeded due to roadside parking on grass when market is operating
6. Whites Road heavily parked with market – lack of parking facilities and formation. Perpendicular parking resulting in vehicles reversing back into live lane with poor sight of approaching traffic on Whites Road, or of traffic turning into Whites Road from Mill Road

Figure 9-Observed roadside parking - Mill Road

Figure 10: Heavy roadside parking (Source: Google Earth™)

Figure 11: Service Station (RHS), large tomb stone headwall (LHS)

Figure 12: Whites Road (southbound) Heavy roadside parking, pedestrians on edge of trafficable lane.

4.3 Whites Road / Tram Road Intersection

Whites Road forms a STOP priority controlled cross road intersection with Tram Road. Central intersection islands have been formed for both approaches to Tram Road, as a response to historic overshoot / side impact crashes. Avenue effect created by adjacent hedge lines on Whites Road.

Reference: WDC Private Plan Change Request 31 Transport Peer Review – Appendix A

Figure 13: Tram Road / Whites Road Intersection, boundary lines shown

The Whites Road / Tram Road intersection is characterised by:

1. An approach angle of near 90 degrees
2. An 80 km/hr legal speed limit
3. A rural cross road intersection
4. Reserve land with boundaries out to current kerb lines. Reserve land will prohibit capacity to widen
5. Large utility poles within the shoulder, obstructing intervisibility to the left (northbound; Bradley Road (south))

Figure 14: Whites Road (southbound) looking right at Tram Road intersection

Figure 15: Whites Road (southbound) looking left at Tram Road intersection

Figure 16: Whites Road (southbound) avenue effect created by trees. Intersection position arrowed.

4.4 Bradley Road / Tram Road Intersection

The Tram Road / Bradleys Road / McHughs Road historically scene of high crash rate; work done to improve approach alignment to break avenue effect, and to channelise crossing / turn movements.

Listed as MEDIUM HIGH collective intersection risk (KiwiRAP).

Figure 17: Tram Road / Bradleys Road intersection form and surrounding development

The Bradley Road / Tram Road intersection is characterised by:

1. An approach angle of near 90 degrees at intersection, but near 60 degree approach angles on long approach
2. An 80 km/hr legal speed limit, operating speed close to 90 km/hr (car following)
3. A rural cross road intersection

4. Formal left turn lanes for movement into side roads off Tram Road. Old design type that creates Dynamic Visual Obstruction – masking of following vehicles by left turn vehicle.
5. Split through / right and left turn facilities (McHughs Road exit). This results in vehicle in left exit lane blocking long view to approaching traffic from through / right turn lane.
6. Reserve land with boundaries out to current kerb lines. Reserve land will prohibit capacity to widen
7. Good level of intersection lighting
8. All movement access to service station (NPD) / shops in close proximity to intersection
9. Left / right out from complex 132 metres from intersection. May induce movements from service station direct into right turn pocket for Bradleys Road movement. This could impact on PM peak movement if volumes are high on through / right turn

Note: Likely service centre with petrol station and shops – acknowledge that proposed subdivision could introduce new facilities – then that would attract trips not already associated with current development areas. Reverse impact on local road network.

5 Public Transport

The transport assessment by Novo Group outline the following with regard to Passenger Transport:

Passenger Transport

98. Although the Plan Change does not have access to passenger transport services, drivers are able to travel to / from the Park and Ride facility at Kaiapoi south. Residents could also cycle on Mill Road to the northern Kaiapoi Park and Ride site (approximately 25 to 30 minutes cycle). These in turn provides access to a direct bus service to / from Christchurch City centre. As such, residents of the Plan Change site will be able to make use of the wider public transport as part of their travel patterns.

99. The Greater Christchurch Public Transport Futures interim report (June 2021) indicates that Kaiapoi and Southbrook could be a heavy rail passenger transport route. Kaiapoi is indicated as potentially being on a 'street running corridor focussed' route, with Ohoka Road and Tram Road stops illustrated on a 'street running limited stops' route. These stop locations are likely to become the focus for park and ride sites and the residents of the Plan Change site would be able to make use of these.

100. Passenger transport services could be routed through (or near) the site in the future, should ECan choose to do so. This could include routes that are to / from Oxford linking to the Park & Ride site at Kaiapoi (or other destinations as ECan chooses).

Reference: WDC Private Plan Change Request 31 Transport Peer Review – Appendix A

In reviewing this, it appears that emphasis is placed on future residents driving to unidentified services with park and ride facilities. Of note is the need for people to travel to either Southbrook, or Kaiapoi to engage with a yet to be determined service.

Our review concludes that such travel would place a higher demand on the following routes that have not been assessed in the application:

Southbrook: Ohoka – Mill Road – Threlkelds Road – Flaxton Road – Southbrook Road

Kaiapoi: Ohoka – Mill Road – Skewbridge / Ohoka Road – Ohoka Overbridge OR

Ohoka – Mill Road – Whites Road – Tram Road – Island Road – Ohoka Road

All of these route's pass through known locations with road safety concerns.

Other than a mention of school bus stops, there has been no analysis of impacts of the proposed new development on school bus demand, especially high school (Rangiora & Kaiapoi). This may place an additional burden on demand for Ministry of Education

Ngā mihi nui,

Stantec New Zealand

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Attachment: [Attachment]