File Note

By:	Caron Greenough	**Date:**	25 June 2019
Subject:	Peer Review for Wairau Estate SH45	**Our Ref:**	3820866/300

1 Introduction

Beca Ltd (Beca) has been commissioned by NZTA (the "Agency") to review the Integrated Transport Assessment (ITA) completed by AMTRANZ Ltd (7 November 2017) and the follow up Private Plan Change 48 Assessment of SH45 Access (25 March 2019). The follow up report has been developed in response to submissions received on the plan change and at pre-hearing meetings.

The ITA was for the proposal to develop 58ha of land immediately south west of Oakura is currently zoned rural and Future Urban Development. When fully developed it is intended to create some 399 residential lots.

The ITA proposes that all trips would access the development via Upper Wairau Road, which is a no exit road and there are currently 145 existing dwellings on Upper Wairau Road. Access to the development will be via Upper Wairau Road however all traffic associated with the proposed development, and the existing traffic, must then travel through the SH45/Wairau Road intersection.

The SH45/Wairau Road intersection is a typical rural crossroads however the side roads are stop controlled as there are some restrictions to visibility. The speed limit along SH45 changes from 50kph to 100kph some 50m to the west of the intersection and as such speeds remain high at the intersection. The 85%ile speed is 70.9kph at the threshold and 67.7kph 140m east of the intersection.

The trip generation rate attributed to the proposed development is 8.5 trips per lot per day, which is lower than that recommended in the NZTA Planning Policy Manual, however the assessment has been undertaken using both values.

The crash history for the intersection is moderate with no particularly pattern of crashes or concerns resulting from the visibility of the intersection from any direction.

The original TIA tested a number of potential land use scenarios and concluded that a roundabout would be appropriate to manage all of the traffic generated.

Following the notification of the plan change it is stated that in submissions and in pre-hearing meetings, it was suggested an alternative access directly onto the State highway would be beneficial and concluded that this would have positive effects, outweighing the disbenefits. The roundabout option at the SH45/Upper Wairau Road was removed in this proposal.

For this review the Agency have concerns about the benefits and disbenefits of this additional access and have asked Beca to review and make comment on them.

To respond to the above some discussion needs to be included on some of the details in the original ITA, and follow up report, and these are documented below, however we have focused our conclusions on the statements above rather than any wider issues that have been raised.

2 Existing TIA Discussion

2.1 Land Use Scenarios

The original (ITA) assessed a number of land use scenarios that included 10 year growth rates on the State highway and the inclusion of growth within the other FUD zones in the area.

As far as can be concluded none of these additional sites have any notified development proposed. While the TIA is more than comprehensive in its intent, it is difficult to conclude as to the impact of just the proposed development. Any assessment or impact of development in Oakura, as a whole, should really be the role of the Council to assess. Notwithstanding, in the follow up report, Section 3 states that the land use scenario for the plan change is a "maximum theoretical yield for the area" and the yield is closer to 277 lots rather than the original 399. If this is the likely case for the proposal it seems reasonable to suggest this might be the case for the other FUD sites, if developed at all.

Based on this, the trips generated for the site could be considered significantly exaggerated.

2.2 Trip Generation Rates

The number of trips that might be generated by the development has been determined from surveying the current intersection and basing it on the existing dwellings. This is a reasonable methodology and does align with best practise research, however in New Zealand, the Trips Database Bureau's database is typically referred too for reference, along with other globally recognised databases such as TRICS or the ITE trips database. In this particular instance, also of interest is the New Zealand Transport Agency Research Report 453 - Trips and Parking related to Land Use (November 2011) known as RR453.

RR453 report showed that for residential developments there is some variation in trip making by sub-groups of houses, divided between household size or car ownership, and within each of the subdivisions surveyed, but it was not determined why this variation occurred. The 85th percentile figure of 10.4 vpd (in + out) per household was recommended as an appropriate figure for design and assessment purposes when considering the full range of households within a city. However, there are many suburbs where a lower figure is appropriate and suitable rates per household may need to be selected in different urban areas.

It was noteworthy that car ownership did not appear to be the sole dictator of household trip making: for households with 1.8 cars, the trip rate varied widely, from about four to 13 trips per household per day.

The surveys showed that lower trip generation rates were typically found in more rural subdivisions. Surveys near Queenstown and Christchurch indicated daily rates of between 6 and 8vpd (in + out) per household, which could reflect an increase in trip linking which might occur when the primary employment trip is longer, e.g. greater than 20 minutes, as with rural lifestyle properties located in the outskirts of an urban area.

The research also looked at Census data from various centres (2006 data) and is shown in Figure 1 below. The Census data for New Plymouth shows that household car ownership is as high as centres such as Christchurch, Auckland, Palmerston North and Nelson.

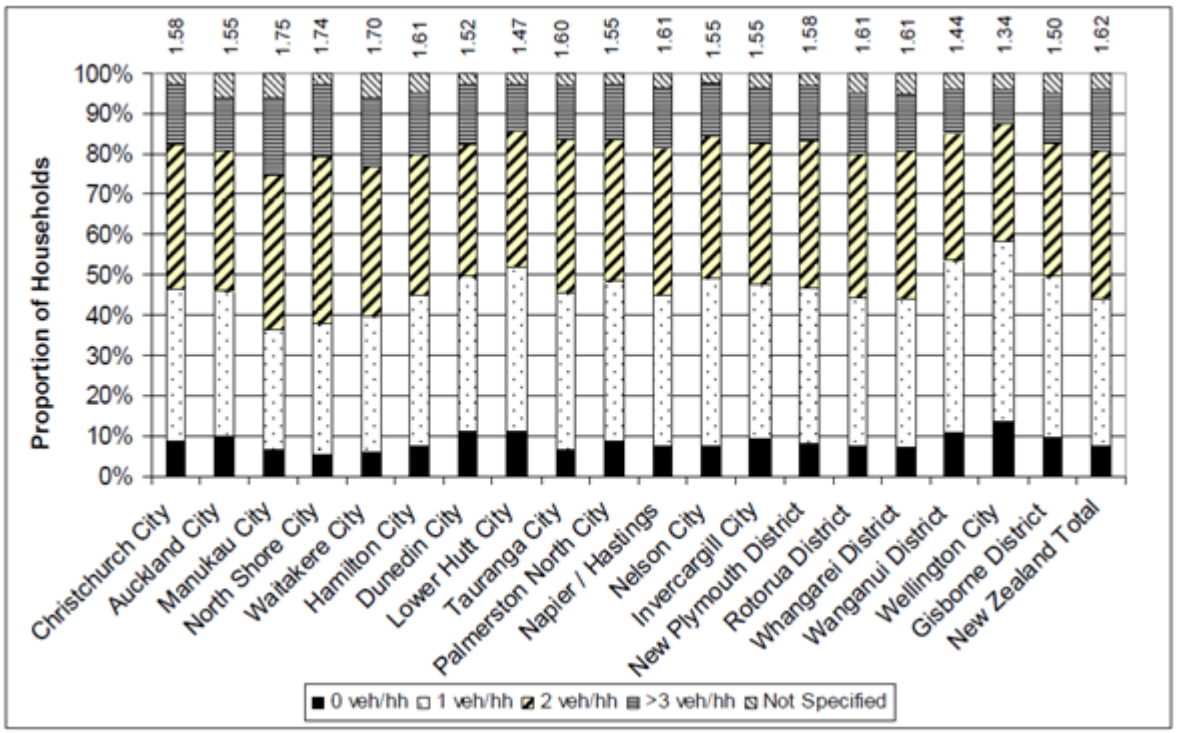

Figure 1 - Car Ownership (2006)

This indicates that the lower end of the trip generation rates used in the assessment may be more appropriate for Oakura due to the employment distances being greater than 20 minutes.

2.3 Peak Hour

The existing traffic volumes are presented in Section 3 and show the Average Daily Traffic, Average AM Peak Hour and Average PM Peak Hour. The Average AM peak hour is clearly lower than the Average PM Peak hour, however it is the AM peak hour that was assessed. While the difference is not significant and the conflict in turning vehicles are likely to be greater in the AM Peak, for completeness both periods should have been assessed.

This is unlikely to result in any change in conclusion however there is no discussion as to why this is done and it is not possible to determine if there are likely to be any issues.

2.4 Intersection Design

Other than retaining the existing layout a roundabout was the only intersection layout considered. There was reference to installing right-turn bays and realigning the centreline of the side roads within the Safety section in Section 5, however this was discounted due to the “negative impact on the straight through movements on the side road”, however this was purely a statement and no reference or analysis as to why this was the case was presented in the report.

A roundabout design has been indicatively sketched at the intersection, however the inscribed circle is at the minimum for a single lane roundabout and this is for an approach speed of 60kph. The desirable minimum central island radius would be 12 metres for a 60kph approach speed according to Table 4.1 in the Austroads Guide to Road Design Part 4B.

Given the approach speeds are currently around 70kph either additional treatment is required to reduce the speed or the roundabout needs to be designed for much higher speeds. The roundabout is also out of context for what is a long straight road, with large distances between urban areas.

There is mention in the report of moving the thresholds further west but this alone is unlikely to reduce the approach speed of vehicles, the posted speed limit has been reduced in the past 5 years with little change in behaviour, and using a roundabout as a traffic calming feature is not recommended.

2.5 Intersection Performance

2.5.1 Capacity

The existing performance of the intersection was assessed in the original TIA for each land use scenario including existing, and against a roundabout design only. As mentioned above, a roundabout was the only alternative design assessed.

The conclusion indicated that other than the ultimate land use scenario, the existing intersection performed well, having a level of service of between and A and a C.

2.5.2 Safety

Based on the existing layout of the intersection the crash rate is calculated to be 0.1 injury crashes per year against an expected annual injury crash rate of 0.25. As stated by AMTANZ, the existing intersection is performing better than expected.

The report mentions that restricted sight distance is restricted for some approaches but does not confirm what the sight distance requirements are, only that they are met. Given the 85% speed is 70km/h at the intersection, using Austroads Part 3: Geometric Design the sight distance required for vehicles at the SH45/Wairau intersection would be 92 metres (70km/h, Rt=2) ignoring minor grade corrections.

With the additional traffic generated by the ultimate land use scenario, the annual injury crash rate is calculated as 0.72 injury crashes per year.

The addition of a roundabout would reduce the crash rate to 0.39 injury crashes per year.

We generally concur with this assessment however, typical crash rates are based on historical crash models and according to the EEM (page 5-298) need to be adjusted for crash trends.

This reduces the reported crash rates to 0.22 for the existing intersection, 0.55 with the additional traffic and 0.30 for the roundabout.

Speed surveys show there is clearly a speeding issue at the intersection. With the speed thresholds just 50 metres south of the intersection, the measured speeds presented in the report, show that speeds are well above the 50kph (85%ile = 70.0kph at threshold). This is not eventuating in crashes but the risk is clearly there, and will increase with the additional traffic.

As commented in Section 2.4 there is mention of reducing the speed by moving the thresholds further west, however speed management is about achieving safe and appropriate speeds that reflect the road function, design, safety and use. Just relocating a sign/lowering the speed, is unlikely to achieve the above and so additional features and improvements would need to be incorporated to reduce the speed in advance of whatever intersection treatment is finally recommended.

While the high speeds at the intersection do not appear to be a factor in any of the reported crashes, with the increased traffic the crash risk will also increase and any improvements should seek to reduce these speeds.

2.6 Vulnerable Road Users

The original TIA proposed an underpass at some location north of the intersection to accommodate pedestrians and cyclists. Other than a brief discussion about the advantages and disadvantages of crossroads versus roundabouts, in terms of safety for vulnerable road users, there was no discussion on the demand or feasibility of providing an underpass. It is not clear if an underpass can be practically built.

While we don't disagree with the discussion regarding crossroads v roundabouts we believe that there may be more appropriate treatment. This could be in combination with reducing the approach speed at the intersection.

Traffic volumes are lower than similar villages within New Zealand that do not have formal or grade separated crossing facilities, such as Taihape or Bulls, because the form and function is clear to users. This is linked to drivers understanding that they need to slow down within an urban environment. The urban design treatment of Oakura on the approach and past the Donnelly Street/The Outlook intersection clearly indicates to drivers that there are vulnerable road users around and there is a zebra crossing installed here to demonstrate that – this treatment could be continued further west.

2.7 Conclusion

Based on the discussions above it is generally concluded that it is unlikely that the ultimate land use scenario would eventuate and that even with the higher end of the trip generation rate the intersection performs in terms of capacity.

While the safety record is currently good, the increase in trips will increase the risk of an injury crash and in addition the speeds at the intersection are high and this increases the risk, particularly for vulnerable road users.

A roundabout is one option that could mitigate the risk for right turn traffic however the design would need to be of a higher standard than proposed as the current approach speed is high.

The management of speed would need to be incorporated into the design for whatever intersection treatment is finally recommended and this would also assist with the safety for vulnerable road users.

3 Alternative Access

3.1 Land Use Scenarios

As mentioned previously, Section 3 of the March 2019 report states that the land use scenario for the plan change is a "maximum theoretical yield for the area" and the yield is closer to 277 lots rather than the original 399. If this is the likely case for the proposal it seems reasonable to suggest this might be the case for the other FUD sites, if developed at all, and that the ultimate land use scenario is significantly exaggerated.

For the alternative proposal the distribution of trips is split between two access points, the first being as the original proposal, onto Upper Wairau Road and then SH45, but now with a second access directly onto SH45, to the west of the original intersection.

The split is proposed to be 60:40 however the developments design does not create any restrictions to prevent vehicles using either access point – this is just based on distance.

If this proposal is to proceed then some form of restriction is recommended to manage this distribution.

3.2 Limited Access Road

The new access location is directly onto SH45, however at this point SH45 is classified as a Limited Access Road in the Operative District Plan and is shown on the extract from Planning Map A61 below (Figure 2).

Note this was not mentioned in the any of the reports and a discussion on the implications of this follows in Section 3.2.1.

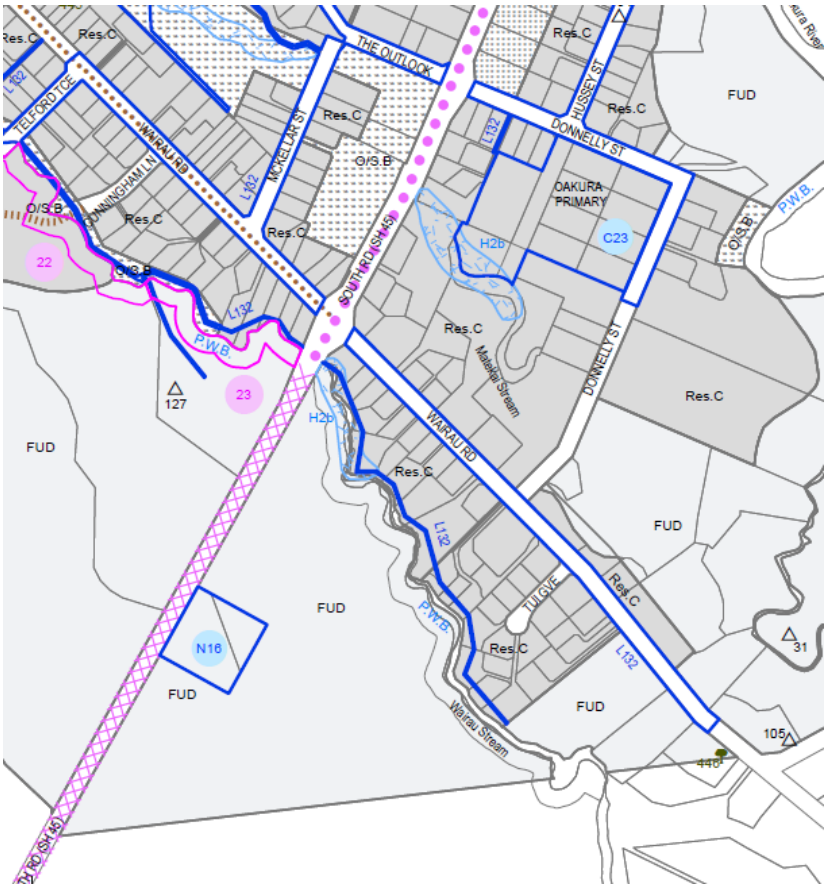

Figure 2 - Extract from Planning Map A61 (NPDC Operative District Plan)

3.2.1 New Zealand Transport Agency – Planning Policy Manual

The Planning Policy Manual was developed in 2007 to assist with Transit, now the NZ Transport Agency, to meet its objective of having regard to the effects of individual developments on the state highway network, as these can positively or negatively affect the safety and sustainability of state highways.

Development brings benefits to New Zealand by creating wealth, jobs and improved economic performance. However, new development usually generates additional traffic and this can potentially create adverse effects by:

1. reducing average vehicle speeds, increasing journey times and delays and trip variability;
2. increasing the number and/or severity of road accidents;
3. accelerating the need to upgrade the state highway network;
4. complicating future plans to upgrade a road, for example by adding new lanes or a central median barrier; and/or
5. creating environmental and social effects, such as increased pollution from vehicle emissions.

The cumulative effects of small-scale development are particularly difficult to manage within the provisions of the RMA. This is a concern for transport systems where each development may adversely impact levels of service, congestion and safety by only a small amount, but where the combination of a number of developments can result in significant adverse effects.

There are a number of tools that can be used to manage the effects. One of these is Limited Access Roads.

The Government Roading Powers Act 1989 (TNZA) gives the Transport Agency powers to declare state highways to be Limited Access Roads (LAR). No person can lawfully drive or move a vehicle onto or from a LAR except at a road intersection that existed prior to the state highway being declared a LAR, a road intersection with a LAR that has been authorised by the Agency, or an identified crossing place that has been authorised by the Agency.

The Agency is required to authorise such a crossing place to and from a parcel of land that does not have reasonably practicable alternative legal access to some other road. However, even in those circumstances the Agency is only required to grant one crossing place, will specify the location of that accessway and can impose appropriate conditions on that accessway.

The Agency may use the LAR powers to prevent access to and/or from a LAR, including where the accessway is sought for a new development, where this may have an unacceptable adverse effect on the safety or functioning of the state highway. However, where the Agency considers a new accessway onto a LAR should not be authorised, it may still be possible for the development to proceed if alternative access arrangements via the local road network can be found.

Essentially there is an acceptable alternative access arrangement via Upper Wairau Road.

3.3 Safety

No safety assessment has been provided within the March 2019 report although the recommendations acknowledge that the speed limit should be reduced.

We are aware that this section of State highway was identified by NZTA two years ago as part of their BOOST 1 programme. These were corridors that fell outside of the larger capital programmes.

The programme aimed was to treat high risk corridors with lower traffic volumes (<5000). On these routes the primary crash type is run off road, but the crash location is hard to predict so a low cost treatment was installed cost effectively across long lengths of corridor. Audible Tactile Pavement (ATP) was the typical treatment recommended.

SH45 Oakura to Hawera was identified in the top 30 high risk corridors. Unfortunately, the treatment has not yet been installed along this corridor but the corridor remains a medium risk.

In addition, as with the discussion for in Section 2.3.2 above, just relocating a sign is unlikely to improve safety and additional features and improvements would need to be incorporated to reduce the speed in advance of whatever intersection treatment is recommended.

3.4 Conclusion

Given the fact that this is a limited access road, there is an alternative access and that safety has been demonstrated by the Agency as being low, it has not been demonstrated that this access would not have adverse affects on the state highway. Specifically it does not demonstrate that the development brings benefits to New Zealand by creating wealth, jobs and improving economic performance without:

- reducing average vehicle speeds, increasing journey times and delays and trip variability - through the reduction in posted speed limit and additional turning movements;
- increasing the number and/or severity of road accidents - through addition turning movements;
- accelerating the need to upgrade the state highway network – through speed management measures or should there be an increase in crashes etc;
- complicating future plans to upgrade a road, for example by adding new lanes or a central median barrier.

Summary

In general, the trips generated by the development is likely overestimated and therefore it can be demonstrated that the existing intersection would perform to an acceptable level even with 10 years of growth.

However, the safety risk of the SH45/Upper Wairau intersection is likely to increase with the additional development traffic and, in particular with, the existing approach speed. Regardless of the treatment type improvements are recommended to reduce the speed at the intersection that are in context for Oakura.

Further, the provision of an additional access directly onto SH45 is contrary the designation of the highway as a limited access road and it has not been demonstrated that the benefits outweigh the disbenefits to performance of the state highway and that the original access is not appropriate. In addition, the safety record for this section of SH45 is already low and there has been no demonstration as to how this will be mitigated, other than through some form of speed management, which is again contrary to the LAR.

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