

**BEFORE THE WAIKATO DISTRICT COUNCIL**

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of Proposed Private Plan Change 20  
(Lakeside Developments 2017 Limited)  
to the Waikato District Plan

**STATEMENT OF EVIDENCE OF ANDY CARR  
ON BEHALF OF LAKESIDE DEVELOPMENTS 2017 LIMITED**

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## **1. Introduction**

- 1.1 My full name is Andrew (Andy) David Carr.
- 1.2 I am a Chartered Professional Engineer and an International Professional Engineer (New Zealand section of the register). I hold a Masters degree in Transport Engineering and Operations and also a Masters degree in Business Administration.
- 1.3 I served on the national committee of the Resource Management Law Association between 2013-14 and 2015-17, and I am a past Chair of the Canterbury branch of the organisation. I am also a Chartered Member of Engineering New Zealand (formerly the Institution of Professional Engineers New Zealand), and an Associate Member of the New Zealand Planning Institute.
- 1.4 I have more than 28 years' experience in traffic engineering, over which time I have been responsible for investigating and evaluating the traffic and transportation impacts of a wide range of land use developments, both in New Zealand and the United Kingdom.
- 1.5 I am presently a director of Carriageway Consulting Ltd, a specialist traffic engineering and transport planning consultancy which I founded in early 2014. My role primarily involves undertaking and reviewing traffic analyses for both resource consent applications and proposed plan changes for a variety of different development types, for both local authorities and private organisations. I am also a Hearings Commissioner and have acted in that role for Greater Wellington Regional Council, Ashburton District Council, Waimakariri District Council and Christchurch City Council.
- 1.6 Prior to forming Carriageway Consulting Ltd I was employed by traffic engineering consultancies where I had senior roles in developing the business, undertaking technical work and supervising project teams primarily within the South Island.
- 1.7 I have been involved in a number of proposals which have assessed the transportation-related outcomes of large private plan change requests, such as:
  - a. Queenstown Lakes District Plan Change 41 (Shotover Country): the rezoning of 120ha facilitating the development of around 800 residences, a school and a small amount of retail;

- b. Queenstown Lakes District Plan Change 45 (Northlake): the rezoning of 219ha facilitating the development of around 1,600 residences and commercial development;
  - c. Christchurch City District Plan Change 30 (Prestons): the rezoning of 205ha facilitating the development of around 2,500 residences, a primary school and commercial development including a supermarket;
  - d. Waimakariri District Plan Changes 14/15 (West Kaiapoi): the rezoning of 85ha facilitating the development of around 1,100 residences; and
  - e. Selwyn District Plan Change 24 (Darfield): the rezoning of 113ha facilitating the development of around 360 residences.
- 1.8 My experience also includes providing advice for smaller subdivision and land use consents for sites throughout the South Island including Nelson, Blenheim, Rangiora, Christchurch, Rolleston, Ashburton, Twizel, Dunedin, Queenstown, Wanaka and Invercargill.
- 1.9 As a result of my experience, I consider that I am fully familiar with the particular traffic-related issues associated with large residential subdivisions.
- 1.10 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. The matters addressed in this Statement of Evidence are within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

## **2. Scope of Evidence**

- 2.1 In this matter, I have been asked by the plan change proponent, Lakeside Developments 2017 Limited, to prepare evidence on the traffic and transportation aspects of proposed Plan Change 20 (**PPC20**) to the Waikato District Plan. I have also been asked to comment on the submissions received and the issues raised in the Council Officer's Report.
- 2.2 My evidence is structured as follows:
- a. Executive summary;
  - b. A brief overview of the transportation environment, the proposal and its traffic generating characteristics;

- c. An assessment of the submissions that raise traffic-related matters;
  - d. A response to the submissions received;
  - e. Consideration of the Officer's Report; and
  - f. Conclusion
- 2.3 I have been involved with this plan change since September 2016 when I initially provided general advice regarding transportation matters and potential constraints. I subsequently produced a Transportation Assessment for the plan change request, dated April 2017. I have not replicated the full contents of the Transportation Assessment within my evidence as it was included within the application, but have summarised the key matters. I have also reviewed the report to ensure that it is still current, and I comment on any such updates subsequently.
- 2.4 I then produced a response to the Council's request for further information (RFI) dated July 2017 which included a reassessment of the transportation effects insofar as it made allowance for traffic generated by other, consented and potential subdivisions around Te Kauwhata. This document is also included as part of the plan change request and so again, is summarised below.
- 2.5 For clarity, the Transportation Assessment and the RFI response both discussed the effects of the plan change request on the railway level crossing. Subsequent to this, a submission has been made by Kiwirail and the plan change proponent have been in discussions with Kiwirail. As part of this, a more in-depth study of the level crossing was commissioned (the results of which were not included in my assessments as they were carried out at an earlier time). Consequently, I address the matters pertaining to the level crossing within the submissions.

### **3. Executive Summary**

- 3.1 Having evaluated and assessed the various transport and access elements of the proposal, I am of the opinion that the traffic generated by the development facilitated by Proposed Plan change 20 will generally have no adverse effects upon the performance and operation of the adjacent transport networks. Although queues and delays will increase due to the traffic generated, these remain within appropriate levels.

- 3.2 I am largely in agreement with the Officer's Report, other than in respect of the way in which the parking provisions at residential properties will be assessed. In my view the assessment based on 'bedrooms', which in my view is a term that is open to interpretation, will lead to uncertainties and inefficient outcomes. I prefer an approach based on a quantifiable size, which could be either the size of the lot or the size of the residence.
- 3.3 I have reviewed the submissions received. In my view, some of the matters raised are more appropriately addressed at the time that an application is made for a subdivision or land use consent. In other cases, I have carefully considered the particular point(s) made by the submitter, but am satisfied that no changes are required to the plan change provisions. The exceptions to this are:
- a. I support the relief sought that *"the extent to which the design and layout of the road network takes into account the future provision of public transport"* provided that it relates to the primary road network only; and
  - b. I support the plan change proponent's submission to seek a minor realignment of the primary road network at the Scott Road entrance.
- 3.4 Accordingly, from a transport engineering perspective, and subject to the preceding comments, I consider that there are no reasons why proposed Plan Change 20 could not be recommended for approval.

#### **4. Overview of Transportation Assessment**

##### **Site Overview and Current Transportation Networks (Transportation Assessment Sections 3 and 4)**

- 4.1 The plan change area has been described by others and I adopt their descriptions for the purposes of my evidence.
- 4.2 From a transportation perspective, Te Kauwhata Road is classified in the District Plan as an Arterial Road, which has the role of linking the township with State Highway 1. An Arterial Road is one which *"forms a strategic network of district importance (and) provides for the collection and distribution of goods significant to the district's economy"* and where *"the through traffic function needs to be balanced against the property access function"* (Waikato District Plan Part 3, Appendix A, Table 7).

- 4.3 Scott Road, Mahi Road, Rata Street and Rimu Street are all Local Roads in the hierarchy, which have a primary function of property access.

*Adjacent to the Site*

- 4.4 Scott Road has a relatively straight horizontal alignment and presently the seal is some 5.5m in width with a grassed berm on each side which falls away into a swale. For much of its length, Scott Road has rural or rural residential land uses on either side and is subject to a 100km/h speed limit, although in practice the road geometry means that this speed is unlikely to be achieved.
- 4.5 At its northern extremity, Scott Road becomes more urbanised and the speed limit reduces to 50km/h. It meets Te Kauwhata Road at a priority ('give-way') intersection, which does not have any auxiliary turning lanes although there is some minor shoulder widening present. The posts for the fencing of the Village Green, a reserve located to the immediate northwest of the intersection, are only 1.5m from the edge of the widened seal.
- 4.6 Te Kauwhata Road itself has two traffic lanes and a narrow sealed shoulder. West of the intersection with Scott Road, it has a rural formation with shoulders and berms, rather than kerbs, and the road reserve is 20m wide.

*Towards the West*

- 4.7 Te Kauwhata Road crosses the North Island Main Trunk Railway Line some 60m west of the Te Kauwhata Road / Scott Road intersection. The railway has three tracks in this location, and the level crossing has flashing lights and bells, plus half-arm barriers (the highest level of warning equipment). There is an advisory 15km/h speed limit at the crossing.
- 4.8 To the immediate west of the level crossing the road ascends and turns northwards at a 90-degree curve before turning westwards again through 100-degrees. Beyond the second curve, Te Kauwhata Road has a gently rolling alignment for around 1.6km, and commensurate with the increasingly rural nature of the frontage activities, the speed limit increases to 100km/h.
- 4.9 Te Kauwhata Road terminates at a roundabout with Wayside Road, where connections are provided onto the Waikato Expressway towards the north and south.

### *Towards the East*

- 4.10 To the immediate east of the Te Kauwhata Road / Scott Road, there is a series of 90-degree parking spaces on Te Kauwhata Road associated with the Village Green.
- 4.11 Around 120m north of Scott Road, Mahi Road meets Te Kauwhata Road from the east at a priority ('give-way') intersection. The intersection does not have any auxiliary turning lanes, although the shoulder of Te Kauwhata Road is 2m wide and could be used by one vehicle passing another that is turning right. There is a 25m long raised median island on Mahi Road at the intersection, which channelises the eastbound and westbound traffic streams.
- 4.12 Just north of Mahi Road, Saleyard Road joins Te Kauwhata Road from the west at a priority intersection. Te Kauwhata Road then turns towards the northeast and changes name to Main Road. Main Road passes through the main commercial area of the township and although two traffic lanes continue to be provided, there is angled parking along both sides and the traffic lanes are separated by a flush median.
- 4.13 Mahi Road generally has a flat and straight alignment, with parking permitted on both sides. There is also an 11m wide grassed verge on the southern side of the carriageway meaning that the road reserve is some 31m wide.
- 4.14 An un-named roadway leading to the domain joins Mahi Road from the south approximately 430m to the east of the intersection with Te Kauwhata Road. Rata Street is a further 185m east of the domain access with Rimu Street being 230m further east again. Both Rata and Rimu Streets serve a mix of light industrial activities and residential properties.
- 4.15 Both the Mahi Road / Rata Street and Mahi Road / Rimu Street intersections are priority ('give-way') controlled but neither have auxiliary turning lanes. Both are crossroads, as Rata Street and Rimu Street continue to the north of Mahi Road. The flat and straight alignment of Mahi Road means that sight distances at both intersections are excellent.

### *Non-Car Modes of Travel*

- 4.16 Although there is a pedestrian network in the immediate area, this is of variable quality. Provision for pedestrians within the rural areas (such as on Scott Road) is negligible, but this is due to the very low numbers of pedestrians and vehicles that are present which means that pedestrians can safely share the road. However, within the urban areas there is typically at least one

footpath on each road. This is 1m wide in most locations, which is less than the current best practice minimum width of 1.2m.

- 4.17 There is no specific infrastructure provided for cyclists in the immediate area.
- 4.18 To assist pedestrian and cyclists to cross the railway, there is an at-grade crossing approximately 120m north of the road level crossing. This is constructed as a 'maze' where pedestrians are turned from one way to the other to ensure that they look both ways along the tracks. There are also fenced areas between the tracks which are safe for pedestrians to wait within, while a train passes.
- 4.19 There is no frequent, scheduled public transport service to Te Kauwhata. The Hamilton – Te Kauwhata – Meremere – Pukekohe route is operated every second Thursday, but in view of the limited service, there is no bus infrastructure in the immediate area of the site.

#### **Current Transportation Patterns and Levels of Service (Transportation Assessment Section 5)**

- 4.20 The closest count site on the state highway is at Rangiriri, approximately 1.8km south of the State Highway 1 / Te Kauwhata intersection. In this location, the Annual Average Daily Traffic in 2015 was 21,700 vehicles (two-way). The most recent data (for 2016) shows that this has increased to 23,120 vehicles (two-way). A more detailed assessment of the data shows that the weekday traffic volumes have a distinct evening peak, but there is very little tidality in the flows. In essence, there is broadly the same amount of traffic heading in each direction throughout the day.
- 4.21 Taking into account the traffic flows and number of lanes, and using the process set out in the Austroads Guide to Traffic Management Part 3 ('Traffic Studies and Analysis'), State Highway 1 in this location provides Level of Service D. This is described in the Austroads Guide as being in a zone of stable flow, but close to the upper limit where drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. That said, I consider it is not an unreasonable level of service for a highway in the peak hours.
- 4.22 Traffic flows on the district roads are much lower, with volumes of 2,800 vehicles per day on Te Kauwhata towards the west of the township and 3,350 vehicles per day at the railway level crossing, to around 500 vehicles per day

on Rimu and Rata Streets. These equate to Level of Service C or better, being in a zone of stable flow.

- 4.23 I carried out additional traffic surveys at the Te Kauwhata Road / Scott Road intersection and the Te Kauwhata Road / Wayside Road roundabout during March 2017, and modelled the intersections using the computer software package Sidra Intersection. The results showed that the intersections currently provide an excellent level of service with low queues and delays.
- 4.24 Given that the site is predominantly rural, I expect that pedestrian and cyclist volumes are currently very low. However pedestrian volumes were notably higher within the urban area of Te Kauwhata, and as would be expected they were greatest on Main Road within the commercial area. No cyclists were observed during my site visits.
- 4.25 In my view the current levels of infrastructure provided for both pedestrians and cyclists are appropriate for the likely volumes.
- 4.26 I used the NZTA Crash Analysis System has been used to establish the location and nature of the recorded traffic crashes in the vicinity of the site. In the Transportation Assessment I discussed all reported crashes between 2012 and 2016 and highlighted that only two crashes had been reported. One occurred at the Te Kauwhata Road / Mahi Road intersection, when a driver turning right into Mahi Road turned across the path of a southbound vehicle. It resulted in minor injuries. The other crash occurred at the curve on Te Kauwhata Road just east of Eccles Avenue, and was due to a driver travelling too quickly who failed to negotiate the curve and struck a powerpole. It resulted in minor injuries, and “lack of sleep” was noted as being a contributing factor.
- 4.27 I have examined the crash records in the same area for the year of 2017, and this shows that no further crashes have been recorded.

**Potential Development within the Plan Change Area (Transportation Assessment Section 6)**

- 4.28 The details of the proposed plan change have been described by others. For the purposes of my assessments, I have allowed for the provisions to permit the development of up to 1,600 residential dwellings with up to 1,432 of these being typical residential lots and up to 148 units being retirement village villas.

## **Traffic Generation and Distribution (Transportation Assessment Section 7)**

- 4.29 Typical residential dwellings generate 8-10 vehicle movements per day per residence, dwellings and I used the mid-range rate within this assessment. I also made an allowance for each dwelling to generate 1 vehicle movement in the peak hours.
- 4.30 With regard to the retirement units, occupants have less need to travel at peak times and thus the traffic generation rates are lower. I anticipate that the villas will each generate 2 vehicle movements per day (allowing for both residents and guests) and of these, 20% of vehicle movements (0.4 movements per villa) will occur in the peak hours.
- 4.31 Ultimately the extent of movements that are made externally to the township will depend on the amount of employment and community services provided locally, and this cannot be confirmed at present. For the purposes of this assessment, I have allowed for 25% of peak hour movements to be wholly within the town (such as for employment, travel to school and travel to community facilities) and 75% of movements to be external.
- 4.32 Table 5 of the Transportation Assessment sets out the traffic generation of the plan change area when fully developed. This indicates that in the peak hours, increases in traffic flows of up to 1,120 vehicles (two-way) can be expected towards the west of the township with around 370 vehicle movements (two-way) occurring towards the north and east.

## **Effects on the Transportation Networks (Transportation Assessment Section 8)**

### *Capacity of the Roading Network*

- 4.33 Allowing for the traffic generation figures and distribution noted previously, full development of the plan change area would result in the peak hour traffic volume on Te Kauwhata Road increasing from 521 vehicles (two-way) to 1,640 vehicles (two-way). Using the procedure in the Austroads Guide to Traffic Management Part 3 ('Traffic Studies and Analysis'), this would fall into Level of Service D, being noted in the Austroads Guide as a zone of stable flow, but approaching unstable flow
- 4.34 However this level of service D will arise with an increase of just 700 vehicle movements per hour on Te Kauwhata Road (that is, equivalent to the traffic generation of 700 houses). The District Plan sets out that the population of Te

Kauwhata is expected to grow “significantly” over the next 50 years, and the expected increase to 7,800 people (from the current 1,500 people counted in the 2013 census) will certainly mean that more than 700 houses will be required. Consequently, I consider that Level of Service D on Te Kauwhata Road is a necessary outcome of the growth strategy regardless of where that growth in the township occurs. On this basis, I am able to support the expected Level of Service D on Te Kauwhata Road.

- 4.35 The current formation of Scott Road would not be suitable to accommodate the increase in traffic flows arising from full development of the plan change area and would need to be improved to meet the current Subdivision Code. In my experience such provision is typically addressed at the time of an application for subdivision.
- 4.36 Once vehicles reach State Highway 1, drivers will turn north or south depending on their ultimate destination. I have assessed the effects of this allowing for 70% of generated vehicles to turn either to the north or to the south, but in each case the level of service on the highway remains the same as at present (Level of Service D).

*Capacity of the Te Kauwhata Road / Scott Road Intersection*

- 4.37 This intersection is critical in ensuring that appropriate access to the site can be achieved and I therefore carried out a series of analyses.
- 4.38 My assessments showed that the limiting factor for the capacity of the intersection was the extent of queuing for the right-turn movement into Scott Road in the weekday evening peak hour, and in particular the need to ensure that the queue of vehicles did not reach the railway level crossing. The analysis indicated that 80% of the site could be developed before the queue reached this length (this would equate to 1,150 residences plus 120 retirement units, or 1,200 residences).
- 4.39 I then assessed the morning peak hour using the same number of residences and retirement units. This showed that although a queue of around 60m would develop for the left-turn out of Scott Road, delays were low meaning that this was a ‘rolling’ queue where drivers are constantly moving forwards at a slow speed rather than stopping and starting.
- 4.40 Beyond this threshold of 80% development, the current intersection layout could not accommodate the expected traffic due to the queue extending over

the railway level crossing in the evening peak hour. I therefore tested potential alternative layouts for the intersection.

- 4.41 The first option tested was providing an auxiliary right-turn lane into Scott Road. This worked well in the evening peak hour and the queue of vehicles turning right into Scott Road did not reach the level crossing. However in the morning, the volume of vehicles exiting Scott Road means that very large queues lengths arise, and in the evening, the delays for vehicles turning right out of Scott Road were over a minute.
- 4.42 With this in mind, I then evaluated a scenario with the right-turn lane in place but reducing the right-turn movement out of, and the left-turn movement into, Scott Road, by 50%. This reflects a scenario where a second site access is provided towards the northeast of the plan change area. The model results showed that under this scenario, all levels of service are good with low queue lengths, other than in respect of the left-turn movement out of Scott Road in the morning peak hour. However, this again would be a rolling queue with drivers not being required to stop.
- 4.43 I then tested two scenarios with a more substantive improvement scheme. The first of these was to change the priority at the intersection such that the Te Kauwhata Road (west) / Scott Road movement had priority and vehicles turning to and from Te Kauwhata Road (east) had to give-way. The results showed that due to the amount of traffic emerging from Scott Road in the morning, there would be negligible opportunity for any traffic to emerge from Te Kauwhata Road (east) and this resulted in significant delays.
- 4.44 Finally, I evaluated a possible roundabout arrangement. This performed similarly to the option of changing the priorities, but it did not create sufficient capacity to accommodate full development of the plan change area and thus the second access was still required.
- 4.45 In summary then, at the Te Kauwhata Road / Scott Road intersection, my analysis showed:
  - a. The existing intersection form was able to accommodate the traffic arising from 80% development of the plan change area, equivalent to 1,150 residences plus 120 retirement units (or around 1,200 residences);
  - b. Beyond this, the intersection layout would need to be amended to provide an auxiliary right-turn lane;

- c. Although the right-turn lane meant that queuing in the evening was reduced, it did not assist in the morning peak hour when queues on Scott Road were significant, and thus when 80% development of the plan change area occurs, a second point of access is required for the site (towards the east of Scott Road);
- d. A roundabout option does not create significantly greater capacity and there is still a need for a second point of access at more than 80% development of the plan change area.

#### *Capacity of the Second Site Access Intersection*

- 4.46 Assuming that there is a second point of access formed towards the northeast of the site, then this will ultimately link to Mahi Road. Mahi Road in the vicinity of the potential second access carries no more than 80 vehicles (two-way) in the peak hours. The site access itself would carry up to 490 vehicles, and the resultant combination of traffic volume is such that the intersection will operate with a very high level of service irrespective of where it is located.

#### *Capacity of the Te Kauwhata Road / Wayside Road Roundabout*

- 4.47 I reassessed the roundabout using the traffic flows at full development of the plan change area. The results showed that queues and delays remained low, with a good level of service provided on all approaches. The greatest queue occurred in the morning peak hour on Te Kauwhata Road, but the low delay per vehicle indicates that this is a rolling queue.

#### *Capacity of other Intersections*

- 4.48 Towards the north of the site, traffic flows generated by the development of the plan change area will be much lower than the additional traffic to the west and the prevailing traffic flows are also lower. As a result, road capacity issues are unlikely to arise within the Te Kauwhata township.
- 4.49 To the west, there will be a much higher traffic volume on the main route through several priority intersections. One outcome of this is that there is less opportunity for vehicles on the minor approach to emerge and hence there is likely to be an increase in the queues and delays. To evaluate this, I carried out an assessment of the Te Kauwhata Road / Eccles Avenue intersection.
- 4.50 The results showed that the intersection will operate satisfactorily in the evening peak hour with full development of the plan change area, and that the

maximum delay for vehicles turning right out of Eccles Avenue is around 30 seconds per vehicle with short queues.

- 4.51 In the morning peak hour, the delay for vehicles turning right out of Eccles Avenue is 53 seconds, and Level of Service F. Level of Service F is lower than would typically be expected and so I carried out further testing on the intersection. This showed that a reduction of just 50 vehicles on Te Kauwhata Road in the morning peak hour would result in delays decreasing to 44 seconds and Level of Service E, which is not unreasonable for an urban area in the weekday peak period. As such, the model appears to be highly sensitive to small changes on Te Kauwhata Road.

#### *Non-Car Modes of Travel*

- 4.52 The presence of additional vehicles will mean that the opportunities for pedestrians to cross the road (notably Te Kauwhata Road) will be diminished. The NZTA 'Pedestrian Planning and Design Guide' sets out a process whereby the level of service provided for pedestrians crossing the road can be calculated, and my analysis showed that in the peak hours, Level of Service E would be provided. This is described as being "inappropriate under all circumstances".
- 4.53 The process also enables the assessment of potential improvement measures. This shows that the addition of kerb extensions to form a formalised crossing point will result Level of Service D arising ("some concern"), but that a median refuge will result in Level of Service A ("excellent").
- 4.54 Given that Te Kauwhata is a compact settlement, walking is a viable mode of travel and road crossing is an integral part of this. As such, I consider that there may be a requirement for the construction of formal crossing places as a result of the higher traffic flows associated with the development of the plan change area. However the road reserves are sufficiently wide to accommodate such measures and with the introduction of kerb build-outs or refuges, pedestrians will be provided with an appropriate outcome.
- 4.55 Many of the existing footpaths within Te Kauwhata are just 1m wide, whereas a width of at least 1.2m and preferably 1.5m is more suitable to provide for pedestrian movements. However in my view the development of the plan change area will not generate such large pedestrian volumes that an immediate improvement of the footpaths is justified.

- 4.56 Numbers of cyclists will be similarly modest. I consider that it is likely that most cyclists will be travelling to/from the north of the site rather than towards the west, where the traffic generation arising from development is much lower. I do not therefore consider that specific provision will be required for cyclists on the existing road network within Te Kauwhata.
- 4.57 The number of residences may mean that there is a greater demand for public transport services. The operation of such a service is not within the remit of a plan change, but in my view it is appropriate to make provision made for a possible future public transport service to operate through the site. This has been done

#### *Road Safety*

- 4.58 The absence of any significant crash history in the vicinity of the site does not indicate that there are any particular features or factors that would affect or be affected by the development of the plan change area. The sight distances presently provided at the affected intersections will be appropriate, since it is not expected that the prevailing vehicle speeds will increase under the proposal.

#### **Conclusions (Transportation Assessment Section 9)**

- 4.59 Within the conclusions of the Transportation Assessment, I set out that
- a. With the increase in traffic due to full development of the plan change area, Te Kauwhata Road would provide Level of Service D, which is the level of service typically expected for a road in the peak hours.
  - b. The current formation of Scott Road would require upgrading to accommodate the extra traffic, but this can be carried out within the existing road reserve.
  - c. Levels of service on State Highway 1 are likely to be unchanged as a result of the full development of the plan change area.
  - d. With more than 80% development, the queue of vehicles turning right into Scott Road from Te Kauwhata Road in the evening peak hour would reach the railway level crossing and create a safety hazard. At this point an upgrade is required, but even then, the traffic flows emerging from the site in the morning peak hour are such that large queues would develop. Accordingly, 80% development of the plan

change area is the maximum amount which can be accommodated before a second point of access is required.

- e. The traffic flows on the second site access and on Mahi Road are such that no capacity issues are likely to arise at the second site access intersection.
- f. The Te Kauwhata Road / Wayside Road roundabout is able to accommodate the traffic flows generated by full development of the plan change area and although in the morning peak hour, the queue of vehicles on Te Kauwhata Road reaches 107m in length, the low delays per vehicle show that this is a rolling queue, and the level of service remains very good.
- g. There will be increases in delays for vehicles emerging from minor roads at priority intersections to the immediate west of the township due to the much higher traffic flows on Te Kauwhata Road, but the expected levels of service are reasonable for intersections in an urban area at peak periods.
- h. The presence of additional vehicles will mean that the opportunities for pedestrians to cross the road are reduced (notably on Te Kauwhata Road). It is likely that formal crossings such as kerb build-outs and/or refuges will be required to ensure a suitable level of service is provided for crossing pedestrians.
- i. The absence of any significant accident history in the vicinity of the site does not indicate that there are any particular features or factors that would affect or be affected by the development of the plan change area.

4.60 I remain of this opinion, subject to the comments below regarding the response to the RFI.

## **5. Further Information Request**

- 5.1 In response to queries raised by the District Council, I prepared a letter which clarified a number of issues arising from the Transportation Assessment.
- 5.2 In the first instance, I re-assessed the traffic effects of PPC20 taking into account consented subdivisions within and around Te Kauwhata that could generate traffic on the same roads. The analysis of the Te Kauwhata Road /

Scott Road intersection and Te Kauwhata Road / Wayside Road roundabout were repeated but allowing for the expected traffic generation and distribution of residences that were consented but unconstructed, and potential additional residences (which were not consented).

- 5.3 The analysis showed that the threshold of 80% development at which the queue of right-turning vehicles into Scott Road in the evening peak hour would reach to the railway level crossing was slightly too high and that a value of 73% would be more appropriate. The difference between the two values equates to 100 fewer residences.
- 5.4 The assessment of the Te Kauwhata Road / Wayside Road roundabout showed that poor levels of service would arise with full development of the plan change area. Accordingly I carried out an assessment which did not include the potential additional residences that were unconsented. This showed that up to 1,400 residences could be constructed within the plan change area before poor levels of service arose.
- 5.5 Although the extent of development is lower than would arise from PPC20, it represents more than threefold increase in the current size of the town. In my view it is unlikely that this will be achieved for some time. Further, at this point there are low-cost measures that can be used to create additional capacity at the roundabout and reduce delays, such as auxiliary left-turn lanes.
- 5.6 The matter of the secondary access was also discussed within the RFI response. Notably, a matter arose about the appropriate extent of development that could reasonably be served by one access, taking into account the resilience of the transportation linkages. I recommended that a limit of 400 residences was the practical maximum, and the plan change provisions now include this as a threshold whereby a second point of access should be implemented (otherwise further development becomes a non-complying activity).
- 5.7 The RFI response also addressed road safety. I reconfirmed that there was no evidence of any deficiencies in the roading environment, with the exception of an apparent cluster at one of the sharp curves in Te Kauwhata Road where six crashes had been recorded in a period of ten years. I concluded that a remediation scheme in this location would be of benefit, such as antiskid surfacing or enhanced signage for the curve. However this is an existing situation, separate to the plan change request.

- 5.8 Finally, the RFI response confirmed that no deviations were sought from the Council's typical road cross-sections within the plan changes provisions, but that if these were sought in future, appropriate consents would need to be applied for at the time.

## **6. Additional Modelling**

- 6.1 At the time of the earlier analyses, there were roadworks at the Te Kauwhata Road / Wayside Road roundabout associated with the Expressway. In such circumstances there is a risk that traffic volumes will be distorted and present an inaccurate picture of the operation of an intersection. As a result, I carried out fresh surveys in November 2017 when there were no roadworks in the immediate vicinity of the roundabout.
- 6.2 Using these traffic flows, I retested the modelled scenarios from the RFI. A similar pattern of results was obtained, in that the roundabout operated well under current traffic conditions, but once the traffic associated with consented residences and those associated with potential development were included, queues and delays increased (although the largest of these remained 'rolling queues' where drivers could remain travelling at slow speed).
- 6.3 Finally, I reassessed the roundabout to identify the point at which improvement schemes would be required (the nature of which are outlined previously). The transition from Level of Service D on any approach to Level of Service E occurred when 1,325 residences were developed, compared to 1,400 residences under the earlier evaluation.

## **7. Submissions**

- 7.1 I have read the submissions that address transportation-related matters, and comment on these below. For clarity, they are not set out in any particular order, and I have consolidated submissions where the same matter has been raised.

### **Submitter Concern: The roading network will not be able to cope with the increased traffic flows**

- 7.2 I have reviewed the roading network in some detail in the Transportation Assessment and the subsequent response to the Request for Further Information. My analysis has shown that prior to the full development of the

site, there will be amendments required to the roading network to accommodate the traffic that would be generated. In particular, Scott Road and its connection to Te Kauwhata Road will need to be upgraded, and a connection will need to be provided towards the northeast of the site. Provisions are made within the plan change request to ensure that these occur.

- 7.3 However subject to this, my analyses show that the roading network will be able to accommodate the higher volumes expected.

**Submitter Concern: The density of development should be reduced**

- 7.4 Although this is not strictly a transportation-related concern, I highlight that if there were to be fewer residences within the plan change area than has been allowed for within my Transportation Assessment, then the associated traffic generation would reduce. In turn, this means that any queues and delays that are described in my analyses would diminish.

**Submitter Concern: The design of the road network should take into account the potential for a future public transport service**

- 7.5 The particular relief sought in the submission is for the inclusion of an additional assessment criteria within section 21E.4 of *“the extent to which the design and layout of the road network takes into account the future provision of public transport”*.
- 7.6 Making suitable provision for public transport is aligned with a number of regional strategies. I have reviewed the transportation precinct plan (21E.3.2 of the plan change provisions) and note that an indicative public transport route is shown which uses the northern and central parts of the primary roads within the site, and connecting to Scott Road and the proposed northeastern roading link towards Rata Street (these being two of the three roading connections to the site).
- 7.7 The outcome of this indicative route is that a through-route is provided through much of the higher residential area. In general terms, through-routes are preferred for public transport because they avoid dead-running, whereby a bus has to double-back on itself (and where any passengers have already been picked up and dropped off, meaning that this part of the route does not generate any fares). Similarly, bus routes typically pass through denser residential areas because these are the locations with the greatest concentration of passengers.

- 7.8 One particular issue with public transport is that until development is present, it is extremely difficult to be prescriptive as to the route(s) that will be used. Rather, the implementation of the route follows the development. Moreover, routes may change over time. In the case of a plan change, routes might also use some secondary roads if there is a benefit in so doing, the location of which have not yet been defined. On this basis, I support the notation on the precinct plan of the public transport route being “*indicative*”.
- 7.9 I also understand the underlying point made by the submission, that the ability to use other routes outside the indicative route should not be closed off. The practical difficulty with this in my view is that until a public transport route is determined, which will not be for some time, the relief sought could lead to every road being designed in a manner suitable for buses even when ultimately the bus service does not use them. I consider that this would not be an efficient outcome because in many cases it could lead to over-design of the roads.
- 7.10 That said, I also acknowledge that the public transport routes should not be unduly constrained. Consequently I would support the relief sought provided that it is limited to only the primary roads within the plan change area.

**Submitter Concern: The cycling and walking network should integrate with the existing settlement of Te Kauwhata**

- 7.11 The particular relief sought in the submission is for the walking and cycling network identified on the precinct plans to be reviewed and amended to ensure that they are connected to the existing settlement, and for the inclusion of policies to address the integration of walking and cycling with the existing township.
- 7.12 I have reviewed the precinct plans and note that the walkways and cycleways are shown as linking to the connection towards the northeast and towards Rata Street. There are no connections shown towards the northwest (Scott Road) or towards the domain, where there are primary road links shown.
- 7.13 The plan change provisions do not specify the level of provision to be made by the primary roads, but I expect that they will meet the requirements of the District Council specifications. This means that they will include footpaths and potentially also on-road cycle lanes. Consequently, although specific provision is not noted on the precinct plans, in my view there will be an appropriate provision made for walking and cycling. This would not preclude further provision from being made (such as a shared walkway/cycleway) on

those routes if desired. However at an overarching level, in my view the walking and cycling connections within the plan change area should connect with either a destination or a comparable level of pedestrian/cyclists provision external to the site.

**Submitter Concern: Scott Road should be upgraded to accommodate the expected increase in traffic**

- 7.14 In paragraph 8.1.3 of the Transportation Assessment, I noted that the current formation of Scott Road would not be suitable for the increased traffic volumes, and that it would be required to be upgraded to current standards. I remain of this view. The legal width of Scott Road is 20m which is ample to accommodate a greater formed carriageway width, plus footpaths.

**Submitter Concern: The Te Kauwhata Road / Scott Road intersection should be upgraded to minimise queues and delays**

- 7.15 My previous analyses assessed the performance of this intersection in some depth. In Section 8.2 of the Transportation Assessment, I concluded that around 80% of the site could be developed but at that point, the intersection would need to be upgraded. This threshold equates to 1,150 residences plus 120 retirement units, or 1,200 residences.
- 7.16 This was revisited through the RFI response, where taking into account other committed development, I concluded that the appropriate threshold was 73% (equating to 1,050 residences plus 120 retirement units, or 1,100 residences).
- 7.17 Under the Assessment Criteria for approvals of a comprehensive subdivision consent or a comprehensive land development consent (section 21E.4 of the plan change provisions), Criteria 15 is *“any necessary upgrade to the Scott Road and Te Kauwhata Road intersection to ensure safe operation and access to existing Scott Road properties is maintained”*. In my view, this enables an assessment to be made at the time that a subdivision or land use consent is sought of the appropriate form for this intersection, and ensures that it will operate safely and efficiently.

**Submitter Concern: The increase in traffic will result in an increase in crashes**

- 7.18 With regard to road safety, the increase in traffic volume will inevitably lead to an increase in exposure to crashes. However this does not mean that the roads will become more ‘unsafe’, but rather that as more vehicles use any road, the greater the risk of a conflict. This is recognised in the NZTA accident

prediction equations, which show a direct relationship between traffic volumes and the expected number of crashes. Overall then, I expect that there will be an increase in the number of crashes (over and above current numbers) as a result of higher traffic flows, which will be proportional to the increase in volume.

- 7.19 Set against this though is that the historic crash records do not indicate any inherent road safety issues on the existing road network that would be exacerbated by the proposal. As such, I expect that the number of crashes will remain relatively low. Moreover, the new roads and improvements to existing roads and intersections will be designed to meet current guides/standards and as such can be expected to perform with an excellent road safety record. They will also make appropriate provision for non-car modes of transport.

**Submitter Concern: The speed limit of Scott Road should be changed to 50km/h**

- 7.20 The setting of a speed limit is a process that is outside the Resource Management Act and is carried out under the Setting of Speed Limits Rule (2017). As such, it is not possible for it to form part of a plan change request.
- 7.21 However, the criteria for reducing a speed limit include the extent of frontage development. If PPC20 is approved then there will be an increase, and this then enables the Council (as the road controlling authority) to reduce the speed limit. For completeness, there is nothing within the plan change provisions that preclude the Council from making such a change.

**Submitter Concern: A second point of access into the site should be secured**

- 7.22 The provisions of the plan change (such as set out in 21E.2.1.1, 21E.2.3.1 and others) make it clear that a secondary access roading connection into the Te Kauwhata Lakeside Precinct Plan Area must be open for traffic once the number of new lots and/or dwellings in the Lakeside Precinct Plan Area exceeds 400. If this is not provided, then any development beyond this becomes a non-complying activity (such as set out in 21E.2.1.5, 21E.2.3.4 and others). I consider that this provides an appropriate mechanism by which the second point of access will be provided.

**Submitter Concern: Construction traffic should be carefully managed**

- 7.23 In my experience, the management of construction traffic is not a matter that is typically dealt with through a plan change request but rather is addressed at the time that the site comes to be developed. In this regard, there are safeguards in place to ensure that any effects arising from construction traffic are suitably managed.
- 7.24 The primary way in which construction traffic is managed is via the Code of Conduct for Temporary Traffic Management. Every road controlling authority (in this case the District Council) has a statutory duty to ensure as far as reasonably practical the safe and efficient operation of the roading network under their authority. Consequently, when there is an activity that varies the normal operating conditions on a road (such as the movement of construction vehicles), a Traffic Management Plan is required to be submitted to the Council. This Plan sets out the measures that will be used to ensure the safety of all people affected by the activity, including other roads users and residents as well as those undertaking the activity. The Plan must be approved by the District Council as being appropriate for the nature and scale of the activity before activity can take place.

**Submitter Concern: The increase in traffic has the potential to impact upon the functioning of the Waikato Expressway**

- 7.25 The Transportation Assessment evaluated the effects of the traffic generation on the state highway network. This assessed two scenarios, one where 70% of generated traffic turned towards the north and the other where 70% of the generated traffic turned south. In both cases, the level of service provided by the expressway remained at Level of Service D, the same as at present.

**Submitter Concern: The proposal for a minimum of one car parking space per dwelling on sites of 300sqm or less will lead to on-street congestion**

- 7.26 In general, car ownership at residential properties is related to the size of those properties. Where a property is larger, car ownership tends to be higher and where a property is smaller, car ownership is less. This is typically because smaller houses have fewer residents and thus there is a reduced need for multiple motor vehicles.

- 7.27 In this instance, the smaller lot sizes will limit the size of the associated residence. Consequently, I consider that there will be a bias towards households having only one motor vehicle.
- 7.28 I acknowledge that there will be some residences where there is more than one car. In my view these will be in the minority, but I anticipate that the additional vehicles would be likely parked on-street. That said, any on-street parking would not be extensive, and in fact is not necessarily an adverse effect when properly assessed and accommodated. For example, parked cars can play an important role in ensuring that vehicle speeds are kept to a minimum.
- 7.29 I also note that this particular plan change provision does not preclude more than one parking space from being provided, but rather simply sets out that at least one will be available.
- 7.30 As a result, I do not agree that there will be an extensive amount of cars that will need to be accommodated on-street, nor that congestion from parked vehicles will arise.

#### **Kiwirail Submission**

- 7.31 I note that Kiwirail has made a wide-ranging submission which addresses a number of matters. From a transportation perspective, the key issue is the extent to which the railway level crossing will be affected by the increase in traffic volumes.
- 7.32 I discussed this issue in some depth in the Transportation Assessment (section 8.2) and the RFI response. In summary, the proposed improvements to the Te Kauwhata Road / Scott Road intersection are primarily based around the need to ensure that the queue of right-turning vehicles into Scott Road in the weekday evening peak hour does not extend onto the level crossing. This occurs when more than 73% of the site is developed, and hence it is important that before this time, improvements are made to the intersection to avoid vehicles becoming 'stranded' on the railway lines.
- 7.33 In addition to this, the plan change proponent commissioned an independent Level Crossing Safety Impact Assessment which was carried out by Beca in conjunction with Kiwirail staff, and using a methodology supported by Kiwirail. The report was peer reviewed by Kiwirail staff and no changes were made.
- 7.34 The report considered three scenarios, existing (taking into account current characteristics, controls, and traffic volumes of the crossing), future with no development (which allows for a 3% per annum increase in traffic flows across

the railway line) and future with development (which allows for the increase in traffic flows resulting from development of the plan change area).

7.35 The detail of this report is addressed by others, but Beca suggested that five treatments could be put in place through the plan change, and which would result in an improvement in road safety compared to the existing situation. These were:

- a. Adjustments to gradients on approaches to level crossing, such as smoothing out of the approach surfacing or adding a concrete slab to the level crossing;
- b. Yellow cross hatch clear zone markings with 'Keep Track Clear' signs;
- c. Train activated warning sign (WX31) on south west approach;
- d. Red surface threshold treatments on both approaches;
- e. Installation of duplicated large passive advanced warning signs.

7.36 I understand that the plan change proponent has agreed to support and fund items (b) to (e). Item (a) is a more complex matter because it involves the assessment and selection of the most appropriate intervention, the design of this, and any consequential works arising (such as changes to the vertical profile of Te Kauwhata Road).

#### **Lakeside Developments Limited Submission**

7.37 A submission has also been made by the plan change proponent, which seeks a small realignment of the primary road network at the Scott Road entrance. The purpose of this is to replace the earlier iteration of two offset priority intersections by realigning the two minor approaches.

7.38 I assessed the implications of this amendment, and my review is attached to the submission and hence is not repeated here. Overall, I carried out modelling of the intersection under different configurations and concluded that the revised layout could be supported, and that significant queues and delays would not arise under either a crossroads and roundabout layout (although the delays for a crossroads was towards the upper end of what might be expected). I was therefore able to support the submission, and I remain of this opinion.

## **8. Council Officers Report**

- 8.1 I have read the Council Officer's report and reviewed it for those matters which relate to transportation issues. In practice, I largely agree with the Officer's conclusions, other than in respect of the proposed car parking provision (Section 4.5.4 of their report, page 118).
- 8.2 The particular issue raised is the number of on-site car parking spaces required for lots that are less than 300sqm in size. The plan change provisions sought to provide one car parking space for these, whereas the Officer accepts the submission of the Te Kauwhata Community Committee that each residence should provide two on-site car parking spaces. The particular revision proposed by the Council is that:
- a. residences with one bedroom should be required to provide a minimum of one on-site car parking space; and
  - b. residences with two or more bedrooms should be required to provide a minimum of two on-site car parking spaces.
- 8.3 At a high level, both the Officer's suggestion and my own thinking are aligned. We are both of the same view that as residences become smaller, the number of cars owned per household reduces. The difference relates to the way that this is expressed in the rules package.
- 8.4 I am aware that this issue has been considered by other local authorities previously. Of particular relevance in my view, although dating from 2005, Is Plan Change 8 initiated Queenstown Lakes District Council. This specifically considered the matter of parking ratios and whether they could (or should) be expressed in terms of the number of bedrooms. Ultimately, it was concluded that the word 'bedroom' was extremely difficult to define in a way that was robust (in a planning sense).
- 8.5 Put another way, if a unit was shown on plans to have one bedroom and a study or home office, it is extremely likely that there would be some considerable debate about whether this should be considered as a one bedroom unit since that is shown on the plans, or a two bedroom unit because the study / home office could easily be converted into sleeping accommodation. This would not lead to certainty for any stakeholder. In this regard, I was unable to find a definition for a 'bedroom' in the Waikato District Plan and none is proposed as part of the present plan change request,

meaning that it would appear to be open to the interpretation of the processing officer at the time.

- 8.6 I therefore strongly prefer an approach which does not require a qualitative assessment at the time of an application but rather, one where there can be certainty in advance of an application being made. For that reason, I remain of the view that a rule based upon a physical size is the more appropriate. In essence, the physical size acts as a robust proxy for the number of residents at the property and hence for car ownership.
- 8.7 I consider that this is achieved by the proponent's provisions. In the alternative though, I would support an approach which is based on the floor area of the building to be constructed rather than the lot size. This is the approach which is taken in the Christchurch District Plan where parking is required at a rate of 1 space per (residential) unit where that unit has less than 150sqm GFA, and 2 spaces per unit otherwise.
- 8.8 I accept that there will be a limited number of units of less than 150sqm where the residents have two cars (just as there will be larger units where there is only one car). In this respect, I consider that anticipating some degree of on-street parking would be an appropriate approach, subject to the efficiency and safety of the road not being adversely affected. As I noted previously in this evidence, on-street parking is not necessarily an adverse effect when properly assessed and accommodated.

## **9. Conclusions**

- 9.1 Based on the preceding analyses, and having identified, evaluated and assessed the various transport and access elements of the plan change request, I am of the opinion that the traffic generated by the development facilitated by PPC20 will generally have no adverse effects upon the performance and operation of the adjacent transport networks. Although queues and delays will increase due to the traffic generated, these remain within appropriate levels.
- 9.2 I am largely in agreement with the Officer's Report, other than in respect of the way in which the parking provisions at residential properties will be assessed. In my view the assessment based on 'bedrooms', which in my view is a term that is open to interpretation, will lead to uncertainties and inefficient

outcomes. I prefer an approach based on a quantifiable size, which could be either the size of the lot or the size of the residence.

- 9.3 Accordingly from a transport engineering perspective, and subject to the preceding comments, I consider that there are no reasons why proposed Plan Change 20 could not be recommended for approval.

**Andy Carr**

**Carriageway Consulting Limited**

**February 2017**