

**Before Queenstown Lakes District Council Independent Hearings Panel**

**In the Matter** of the Resource Management Act 1991 (**RMA**)

**And**

**In the Matter** of an application for the Te Pūtahi Ladies Mile Variation by Queenstown Lakes District Council to amend the Proposed District Plan in accordance with section 80B and Part 5 of Schedule 1 of the Resource Management Act 1991

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**Evidence of John Douglas Parlane on behalf of Ladies Mile Property Syndicate Limited Partnership**

**(Primary Submission 77 and Further Submission 139)**

**(Transport)**

**Dated 20 October 2023**

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## **1. SUMMARY OF EVIDENCE**

- 1.1 I have reviewed the Te Pūtahi Ladies Mile Variation from a transport perspective. In my view the Transport Assessment and evidence on behalf of the Council are broadly on the right track. There is a need to ensure a well-planned development, that includes a local centre and higher residential densities, to encourage active modes of travel and the use of public transport.
- 1.2 I have been instructed to consider what level of residential density is appropriate as a part of a minimum density rule. In my evidence I have considered the options of 60 houses per hectare gross (as a minimum as proposed by the Council), versus 40 dwellings per hectare gross (as proposed by the Ladies Mile Property Syndicate).
- 1.3 It is my view that the higher density would not necessarily lead to any significant transport advantages. It might result in a slightly higher mode share for public transport but that is far from certain. A downside of a higher minimum density is that it precludes all development if the market finds 40 dwellings per hectare to be viable but not 60 dwellings per hectare. In that case the Council rule would put a stop to development and so the transport benefits that would occur from development with more than 40 dwellings per hectare, but fewer than 60 dwellings per hectare, would be prevented.

## **2. INTRODUCTION**

- 2.1 My full name is John Douglas Parlane. I am a Traffic Engineer, and I am a Director of Parlane and Associates Limited.
- 2.2 I have a Bachelor's Degree in Civil Engineering and Certificates of Proficiency (Masters Level) in Traffic Engineering and Transportation Planning from the University of Auckland. I hold a Bachelor of Applied Economics from Massey University.
- 2.3 I am a Chartered Member of Engineering New Zealand (CMEngNZ).
- 2.4 For the last thirty-five years I have worked as a specialist Traffic Engineer and Transportation Planner, first as a staff member of Auckland City

Council and then North Shore City Council and then in private practice both in London and Auckland. I have been involved in the transport planning for new infrastructure and in providing access to developments on busy roads for most of my career.

2.5 I have read the Code of Conduct for Expert Witnesses in section 9 of the Environment Court Practice Note 2023. I have complied with the Code of Conduct in preparing this statement of evidence and confirm that I will do so in presenting my evidence to the Court. Unless I state otherwise, this evidence is within my sphere of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

### **3. SCOPE OF EVIDENCE**

3.1 This statement addresses the relationship between transport and residential density with a specific focus on what minimum density level is required to achieve mode share targets for the Te Pūtahi Ladies Mile Variation.

3.2 My statement is structured to include:

- (a) The transport background.
- (b) Availability of Public Transport.
- (c) The relationship between density and mode share, and
- (d) What level of minimum density should be included in the rules.

### **4. BACKGROUND**

4.1 Mode share targets have been developed as part of the variation to avoid adverse traffic effects on State Highway 6 (“SH6”) between Lake Hayes and the Frankton turn off.

4.2 I have reviewed traffic patterns on SH6 and while it is reasonably loaded in the morning peak the congestion that occurs is of relatively short duration. Of course traffic congestion is a comparative matter and what might be noticeable in a small town when most people are travelling to

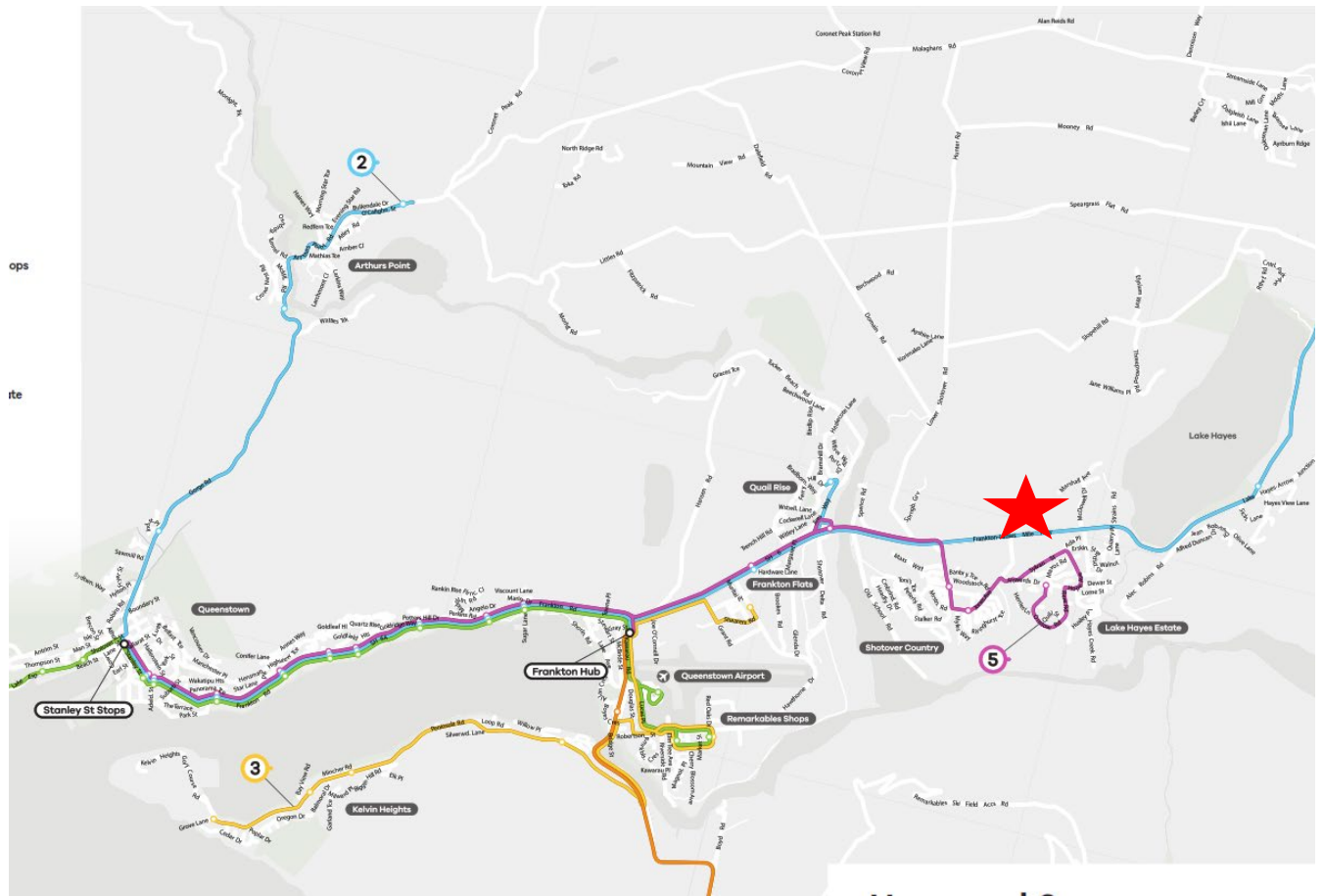
work might be considered insignificant in a larger city. Queenstown is a growing town and while traffic delays of 1 minute or even 8 minutes<sup>1</sup> might seem extreme to some, that level of delay is simply the norm for people living in busy and vibrant cities.

## **5. PUBLIC TRANSPORT**

- 5.1 Queenstown Lakes and the Lake Hayes area in particular are served by 5 existing bus routes as shown in Figure 1. These routes enable residents of the Lake Hayes area to access all of the major employment areas either from a single trip on the Number 2 Arthurs Point to Arrowtown bus (blue route) or by interchanging at the Frankton Hub.
- 5.2 It is expected that if confirmed the Variation area would be served by a bus route running through the development area enabling people to walk for no more than 5 or 10 minutes maximum (400m to 880m) to access the bus.

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<sup>1</sup> McDowal Drive to Frankton roundabout takes 6 minutes off peak and 7 to 14 minutes at 8:35am on 12 October 2023, source Google Traffic.



**Figure 1 – Existing Bus Routes**

5.3 Current bus frequencies on the Number 2 route are every 30 minutes during the peak periods and hourly during the day. Similarly the Lake Hayes Estate service to Queenstown (which could easily be modified slightly to serve the area) runs at 30 min frequencies and hourly during the day. I would expect that going forward these frequencies would improve as patronage increases (particularly during the peak periods), otherwise we can expect buses to become overloaded.

**6. MODE SHARE AND DENSITY**

6.1 The Council is seeking to control development as part of the Variation to increase the usage of public transport. The method chosen is to set a minimum density for development of 60 dwellings per hectare.

6.2 I have reviewed the Transport Strategy and the evidence of Mr Shields and at paragraph 33 of his statement he notes that international research shows that at 40 units/ha there is a 20% reduction in car use, and at 60 units/ha there is a 33% reduction in car use, compared to

areas that have 20 units/ha. This is similar to the international research mentioned in the Transport Strategy, however neither the evidence nor the Transport Strategy cite specific studies, so I have not been able to verify the source of this information.

#### Density is only one Driver of Mode Share

6.3 My understanding of mode share research is that it is not quite so clear cut as suggested in the evidence of Mr Shields. There is a need to differentiate between the effects of a particular provision of public transport on mode share, and the effects of density itself. Many areas served by public transport consisting of heavy rail systems or metro rail systems have high density. This is because a rail system can only have a limited number of stops and so densities within the catchment of the rail station are increased in order to ensure a sufficient walk-up population to support the rail. However areas that are served by public transport in the form of high frequency bus systems or light rail systems can have several stops within a neighbourhood and so more moderate density can be spread over a larger catchment.

6.4 The important thing is to distinguish the effects of the transport provision on mode share from the effects of density itself. Paul Mees was one of the leading researchers on the effects of density who examined the evidence in detail and concluded:

*“All other things being equal, density does have an impact on transport patterns. But all other things are definitely not equal, and the effect of density is outweighed by other factors unless the differences in density are huge.”<sup>2</sup>*

6.5 Mees’ conclusion was that transport policy makes a bigger difference to mode share than urban form. In the case of the Variation there is an implied policy that the capacity of SH6 and the Shotover Bridge are fixed in the short and medium term and that additional person trips out of

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<sup>2</sup> Mees, Paul, How dense are we? Another look at urban density and transport patterns in Australia, Canada and the USA, RMIT, Melbourne 2009.

the area will be dealt with through improved bus services. I fully support this approach.

#### Diminishing Returns to Density

- 6.6 To the extent that density does influence Mode Share we know from published research that density has diminishing returns. This simply means that the effect that density has on mode share declines as density increases in a residential location.
- 6.7 Haider<sup>3</sup> (2019) showed how density increases at lower levels are important but the impact declines at much higher densities, using data from Toronto, Montreal and Vancouver. These three large Canadian cities all have very good public transit systems, but Haider's study included census 'tracts' or areas not well served by the main rail system. Interestingly his study also showed that higher density also increased active mode use.
- 6.8 The important point of the research was that it showed increases in density have their greatest effect in less dense areas, and density increases in high density areas had less effect. In the case of Vancouver there was actually a point where increasing density reduced public transport use. (That point is well beyond what is being proposed in the Variation).
- 6.9 Nevertheless we know from the research that the impact of increasing density to 40 dwellings per hectare will have a greater impact on alternative modes than further increasing density from 40 up to 60 dwellings per hectare.
- 6.10 I have looked for further research on public transport mode share to see if there is a significant benefit to changes in density. There is little research available on bus based systems. I did find an interesting research paper by Cooke and Behrens<sup>4</sup> (2016) which used international

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<sup>3</sup> Haider, Murtaza. 2019. "Diminishing Returns to Density and Public Transit." *Transport Findings*, October. <https://doi.org/10.32866/10679>.

<sup>4</sup> Cooke, S. & Behrens, R., 2016. Correlation or cause? The limitations of population density as an indicator for public transport viability in the context of a rapidly growing developing city. *Transportation Research Procedia* 25 (2017) 3003–3016.

data from the Millenium Cities Database. Their graph is reproduced below. (Note the x-axis is in terms of persons per hectare rather than dwellings per hectare.) If we assume 2.3 people per dwelling<sup>5</sup> then 40 dwellings per hectare would be 92 people per hectare, and 60 dwellings per hectare would be 138 people. Looking at the graph below we see the difference in cost to the passengers and transport authority sits on the flatter part of the line and is therefore inconsequential.



**Figure 2 – Public transport motorised modal split for developing (n=24) and developed (n=104) cities from Cooke and Behrens (Note the green line is the relevant part for NZ where GDP/person > US\$10,000) Red Box added**

6.11 We can see that the difference between 40 dwellings per hectare and 60 dwellings per hectare sits on an upward sloping part of the graph so the higher density would result in a higher mode share. However the range does not sit at the lower sharply increasing part of the graph

<sup>5</sup> The Queenstown Lakes DC average at the 2018 census based on 47,025 people and 20,403 dwellings.



where a difference would be major. The difference is about an extra 5% of the total.

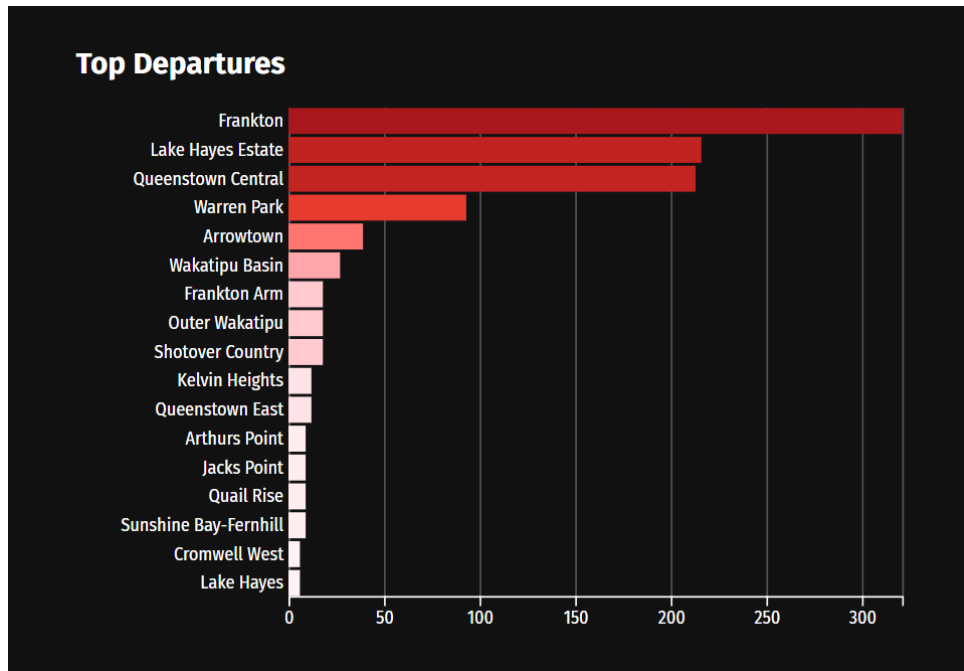
- 6.12 The red box could slide slightly to the left or right without changing the result. This means that the conclusion is not very sensitive to our assumption of 2.3 people per dwelling.

#### The Other End of the Trip Matters

- 6.13 One of the biggest determinants of mode share for any residential area is where the other end of the trip is located, and which alternative modes are available to reach that point. That might seem obvious, but it can be over-looked when we start focusing our attention on numbers and models. One of the key drivers of mode share for the Variation will be the number of people who work at home or work within their own local area. The neighbouring Lake Hayes Estate Statistical Area has some 177 people working at home out of 1344 resident workers (or 13% of the resident working population)<sup>6</sup>. We can expect similarly high numbers in the Variation land.
- 6.14 For public transport share it makes a huge difference if most of the jobs and shops are located in a strong centre or if conversely, they are spread out through a large area. Queenstown has been growing steadily, particularly outside the Queenstown and Warren Park statistical areas. However looking again at the Lake Hayes Estate census data for 2018 we can see that 216 people or 16% of the workers don't leave Lake Hayes Estate. This includes both those working at home and those working elsewhere in the same Statistical Area. The biggest employment zone for Lakes Hayes Estate workers is Frankton (321 people) which is on the way to both Queenstown Central (213) and Warren Park (93) statistical areas. This means a bus system can successfully serve the majority of work destinations in this area.

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<sup>6</sup> Statistics NZ Census Journey to Work data 2018 based on resident address for Lake Hayes Estate (note not based on work address).



**Figure 3 – Work Destinations for Lakes Hayes Estate Residents 2018**

## **7. DENSITY REQUIRED FOR PUBLIC TRANSPORT TO BE VIABLE**

7.1 There is general agreement that there is a level of density that is required to enable public transport to be viable. But there is strong disagreement among experts over what that level actually is. Kenworthy and Newman<sup>7</sup> (1989) say that 30 dwellings per hectare are required to have viable public transport services. But Paul Mees disagreed with that view and claimed it was unsupported by evidence, his view being that the comparative attractiveness of competing modes is far more important. He noted as an example that Melbourne has an average density of 14.9 persons per hectare and yet it does have viable public transport.

7.2 Regardless of that debate, we can conclude that the proposed density of the Variation land will be adequate to support public transport whether it is developed at a minimum of 60 dwellings per hectare

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<sup>7</sup> Kenworthy, J. & Newman, P., 1989. Cities and automobile dependence: An international sourcebook. Adlershot, UK: Gower Technical.

proposed by the Council, or 40 dwellings per hectare as proposed by the Submitter.

## **8. THE EFFECT OF 40 DWELLINGS PER HECTARE ON TRANSPORT AND MODE SHARE IN QUEENSTOWN LAKES**

8.1 The Variation would allow for a high density residential development where local shops would provide for many of the needs of the residents. This enables a number of potential trips to be internalised and not require travel on the wider network. Specifically the design of the area would encourage walking and cycling.

8.2 As noted earlier the form of development in Queenstown means that many of the jobs available to residents will either be within their own local area (including working at home) or in the Frankton, Queenstown and Warren Park area which can all be accessed by bus.

8.3 Having reviewed the available research on the impact of density on mode share I note the following:

- There is practically no New Zealand data available that we can use.
- International data does not always distinguish between the effect of high quality public transport and the effect of the density that has been built around those systems.
- The debate on what density is required to support public transport and the importance of density is open and has not been resolved.
- At a practical level we should aim to create rules that are achievable in the local setting.

8.4 As to the question of whether there will be any noticeable difference in future mode share if the net yield in the area is 40 dwellings per hectare or 60 dwellings per hectare, my view is that we have no reason to believe the additional density will make any significant change. I have

formed that view because we are looking at a new community that will have easy access to local shops and services without needing to leave the area and because the neighbourhood will always be served by buses.

- 8.5 Essentially an area that is developed to 40 dwellings per hectare and has two or three bus stops can achieve similar results to a neighbourhood that has a higher density and fewer stops.
- 8.6 In my view it is important to not be confused by overseas studies where there is a major heavy rail system connecting a new village to a dense city CBD that contains the major share of jobs in a region. If Queenstown's situation were like that then much higher minimum densities would be desirable.
- 8.7 For clarity, I do support higher densities forming within the Variation area, however I believe the minimum required density should be set lower.
- 8.8 There is a risk that if the minimum density rule is set too high, the market simply doesn't take up the development opportunity. There are numerous examples of this effect around New Zealand. These matters are addressed in the evidence of Ms Carleton, with respect to specific data and examples in Auckland and Queenstown relating to apartment and higher density developments.
- 8.9 From a transport perspective, if the minimum density rule is set higher than the market can bear, then we end up with an 'all or nothing' situation where instead of getting 40 dwellings per hectare, we get none.

## **9. CONCLUSIONS**

- 9.1 I have reviewed the Transport Assessment prepared for the Variation and the evidence of the Council Transport witnesses. In my view the proposed Variation makes sense from a transport planning perspective and the proposal to set a minimum density rule to achieve better mode share represents best practice.
- 9.2 However I am not convinced that a minimum of 60 dwellings per hectare gross makes sense for the Lake Hayes area. My understanding of the situation is that it might be a level of density that will not be supported by the market. I have relied on the evidence of Ms Carleton, Mr Wallace and Mr Anderson to inform my opinion. In my view a better minimum would be 40 dwellings per hectare gross because that is a level that still provides for most of the transport advantages that come with density. Of course if the market supports higher densities, then that can still occur.

**John Douglas Parlane**

Dated 20 October 2023