

Introduction

- 1 My full name is Andrew (“Andy”) David Carr.
- 2 I have prepared a Statement of Evidence dated 13 May 2020. My qualifications and experience are set out in that statement. I confirm that this Supplementary Evidence is also prepared in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014.
- 3 In this Supplementary Evidence I have been asked to consider the expert evidence produced on behalf of the New Zealand Transport Agency (**NZTA**) by Ms Julie McMinn and Mr Matthew Gatenby. Having reviewed the evidence, Ms McMinn relies on the assessment of Mr Gatenby and I therefore solely respond to this.
- 4 I have also been asked to respond to the transportation matters raised by Mr Balderston of Otago Regional Council.
- 5 To assist, in my response I have referenced the particular paragraphs to which my comments relate. My comments are focussed on the main parts of the evidence (that is, I do not respond to the Executive Summary or Conclusions).
- 6 At the outset, I highlight that because this is a plan change request, in accordance with best practice all intersection analyses have been carried out for a design year of ten years’ time. That is, when I refer to the performance of an intersection with the plan change in place, I am describing the expected situation in ten years’ time and not the present day.

Statement of Evidence of Matthew Gatenby

Areas of Agreement

- 7 Having reviewed Mr Gatenby’s evidence, there are a significant number of areas where we agree. These are:
 - a. The description of State Highway 6 (Section 4 of Mr Gatenby’s evidence);
 - b. The State Highway 6 / Ripponvale Road (East) intersection will operate satisfactorily with the traffic generated by the plan change (paragraph 6.7).
 - c. No additional measures are required at the State Highway 6 / State Highway 8B intersection (paragraph 6.24).
 - d. The plan change will have little impact on the operation of the State Highway 6 / McNulty Road intersection (paragraph 6.28).
 - e. The plan change will have little impact on the operation of the State Highway 6 / Ord Road intersection (paragraph 6.29).

- 8 In his paragraph 5.6. Mr Gatenby sets out that he considers the background traffic volumes on the state highway that are used within my analysis are robust. These background volumes were found by taking the average of the past five years (2013 to 2018) growth and allowing for this to continue for the next ten years into the future. In my most recent assessment (my letter to NZTA dated 23 March 2020, Annexure A to my Statement of Evidence) I adopted an annual traffic growth rate of 10.3% projected into the future. In part, this value was also selected in order to demonstrate that even under very high rates of traffic growth, the roading network had sufficient capacity to accommodate the plan change.
- 9 I agree with Mr Gatenby that the effects of COVID-19 will tend to suppress travel demand in the short-term, and as such, with hindsight I consider it is now somewhat fanciful that such a high rate will continue. If I instead select any five-year period that encompasses the last recession in New Zealand (2008 to 2009), the same traffic counter shows an average growth rate of at most 1% per annum. On that basis, I consider that the background traffic volumes are not just robust, but are more likely to be a significant over-estimate.
- 10 In further support of this, I note that the commissioners hearing Plan Change 13 accepted the advice of the traffic engineers that a growth rate of 4.6% per annum on State Highway 6 would be reasonable for the purposes of assessment.

Trip Distribution

- 11 The distribution of trips that I initially used within the Transportation Assessment allowed for 60% of traffic to travel to/from Queenstown. The second distribution used was in response to a Request for Further Information (**RFI**) from the Council, and this allowed for 10% of trips to/from Queenstown. This latter distribution was selected because it was the same distribution that the Council requested to be used for Plan Change 13, which the Council based on the most recent census data from Cromwell relating to movements between a person's home and their employment location.
- 12 The second distribution is also consistent with the distribution used for Plan Change 12 (Wooin Tree). This trip distribution was devised by Mr Gatenby's colleagues at WSP/Opus, who were NZTA's network management consultants at that time. This distribution was not queried by NZTA when they submitted on that plan change.
- 13 Mr Gatenby appears to be critical of the difference in the trip distributions used in the analysis (paragraph 5.13) and that it "*gives concern*" that there is a level of uncertainty that is difficult to manage. On the contrary, in my experience the use of sensitivity tests is a helpful tool to allow for different scenarios to be modelled and assessed.

- 14 That said, after reflecting on Mr Gatenby's comment, I consider that of the two options, greater weight should be given to the Council's trip distribution. This is the distribution adopted for Plan Change 12, which was not opposed by NZTA and which was subsequently approved by the Council. As such, it has been tested and agreed whereas the distribution that I initially used has not subject to the same rigour. It is also relevant to note that residents of the plan change area may need to travel to schools to drop off or pick up children. The closest educational facilities are in Cromwell, meaning that even if the caregiver subsequently travels to Queenstown, they will firstly go into Cromwell.
- 15 That said, I do not consider that the trip distribution is as a significant an issue as Mr Gatenby suggests. I discuss this further below (paragraphs 21 to 26).
- 16 While I agree that the route between the plan change area and Queenstown is 1.6km shorter via Ripponvale Road (west), this is somewhat misleading because the route via Ripponvale Road (east) and State Highway 6 is of a higher quality and drivers are less likely to be obstructed by vehicles turning to/from properties or encounter slower moving-traffic without being able to overtake. As a result, higher speeds are possible. When travel time is considered, the route via Ripponvale Road (west) is less than half a minute faster than via Ripponvale Road (east).

Capacity of State Highway 6 / Ripponvale Road (East) Intersection

- 17 Mr Gatenby considers that the traffic count undertaken at this intersection should have been factored to a neutral month, to reflect that traffic flows are greater in summer (paragraph 5.5). I confirm that an assessment was carried out in the Transportation Assessment that did increase the traffic flows to allow for a summer month (paragraph 7.1.3 of the Transportation Assessment).
- 18 In his paragraph 5.12. Mr Gatenby highlights that if McNulty Road was to be used by development-related traffic then it will add traffic to the "*critical right turn*" out of the State Highway 6 / Ripponvale Road (East) intersection.
- 19 In view of the comment, I have carried out a further test of simply allowing for all of the traffic generated by the proposed plan change to turn right out of Ripponvale Road, and have re-modelled the State Highway 6 / Ripponvale Road (East) intersection. For this analysis, I have also retained the 10.3% annual growth rate for traffic on the highway although for the reasons set out above, I consider that this is an unrealistically onerous scenario. The results of the modelling are set out below.

| Road and Movement | | Morning Peak Hour | | | Evening Peak Hour | | |
|-------------------|---|-------------------|---------------------|------------------|-------------------|---------------------|------------------|
| | | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service |
| State Highway 6 | L | 8.4 | 0 | A | 8.4 | 0 | A |
| State Highway 6 | R | 9.1 | 0 | A | 10.1 | 0 | B |
| Ripponvale Road | L | 10.1 | 0 | B | 12.1 | 0 | B |
| | R | 21.4 | 1 | C | 20.7 | 1 | C |

Table 1: Performance of State Highway 6 / Ripponvale Road (East) Intersection, With Plan Change Traffic All Turning Right

- 20 Even under this scenario, the intersection has ample spare capacity to accommodate the additional traffic.

Capacity of State Highway 6 / Ripponvale Road (West) Intersection

- 21 In his paragraphs 6.12-6.17, Mr Gatenby sets out that he has modelled the ‘worst case’ scenario of allowing for 60% of all traffic generated by the development of the plan change area to be turning right at the State Highway 6 / Ripponvale Road (West) intersection, and finds that it would provide a poor level of service.
- 22 I do not find this surprising, since it represents a very large proportion of traffic turning right out of the minor road, which is the movement at any priority intersection which has the greatest levels of delay (due to being opposed by the greatest number of traffic streams). However Mr Gatenby’s analysis has also incorporated a traffic growth rate on the highway that is now higher than is likely to occur, as I set out above. Combining a very high right-turn movement and a very high growth rate on the highway is not a scenario that I consider to be likely.
- 23 Following a telephone discussion with NZTA, in August 2019 I carried out an assessment of the State Highway 6 / Ripponvale Road (West) intersection. This analysis allowed for a growth rate of 7.2% per annum on the highway, and also for 60% of the traffic generated by the development in the plan change area to be turning right at the State Highway 6 / Ripponvale Road (West) intersection. It showed that the intersection has ample capacity to accommodate the traffic generated by development within the plan change area.
- 24 To avoid confusion, to date this analysis was only presented to NZTA. However in view of Mr Gatenby’s concerns, I attach it as Appendix A to this supplementary statement.

- 25 In summary then:
- a. Allowing for 10% of the traffic generated by the plan change site to turn right at the State Highway 6 / Ripponvale Road (West) intersection and allowing for an annual growth rate of 10.3% on the highway for the next ten years then the intersection operates satisfactorily (as identified to NZTA in my letter of 23 March 2020);
 - b. Allowing for 60% of the traffic generated by the plan change site to turn right at the State Highway 6 / Ripponvale Road (West) intersection and allowing for an annual growth rate of 7.2% on the highway for the next ten years then the intersection operates satisfactorily (as identified to NZTA in my letter of 26 August 2019);
 - c. Allowing for 60% of the traffic generated by the plan change site to turn right at the State Highway 6 / Ripponvale Road (West) intersection and allowing for an annual growth rate of 10.3% on the highway for the next ten years then the intersection does not operate satisfactorily (as identified by Mr Gatenby)
- 26 As I set out above, I do not now consider that a growth rate of 10.3% per annum for ten years is likely to arise, and that the bias of 60% towards Queenstown is also very much a worst case. As such, I remain of the view that the intersection is able to accommodate the expected traffic arising from the plan change request.

Road Safety

- 27 Mr Gatenby sets out that since no 'safe systems' approach has been presented for the State Highway 6 / Ripponvale Road (East) intersection, then no conclusions can be drawn about whether improvements are needed at the intersection to meet road safety concerns (his paragraphs 6.8-6.10).
- 28 The 'safe systems' approach is one where all parts of the physical and personnel networks are considered together to ensure that the roading network operates in the safest way possible. Speed management is at the core of the Safe System approach, and the speeds on the highway and on Ripponvale Road cannot be changed by the plan change requestors (in the same way as no plan change or resource consent can change speed limits).
- 29 Moreover, the 'safe systems' documentation sets out that maximum speeds should be no greater than 70km/h (Table A.5 of Austroads Research Report AP-R509-16) and if there are higher speeds then turning flows needs to be physically separated from one another. This is demonstrably not provided at the vast majority of 100km/h priority intersections along State Highway 6, and as such they already do not achieve the outcomes of a 'safe system' approach.

- 30 The approach which I took within my previous analyses was therefore to consider the change created by the plan change. In that regard I used the NZTA crash prediction equations to calculate the change in crash numbers at the intersection (Annexure A to my Statement of Evidence) and showed that the change in traffic flows does not result in a major difference in crashes.
- 31 I note that Mr Gatenby sets out that the Council's previous peer reviewer considered that a sightline at the State Highway 6 / Ripponvale Road (West) intersection did not meet the appropriate distance. I specifically addressed this matter in correspondence with NZTA (dated 26 August 2019) and again in Annexure A of my Statement of Evidence, noting that the sightline was adequate but was simply overgrown with tall weeds. In other words, it is a matter that can easily be addressed by the road controlling authority as party of their maintenance schedule.

Changes to Ripponvale Road and the Potential Underpass

- 32 Mr Gatenby considers the plan change should make specific provision for improvements to the eastern section of Ripponvale Road between the site and the highway (paragraphs 7.3 to 7.5). As set out in my Statement of Evidence, I do not consider that a specific Rule is required in the plan change for this, but that it can be considered at the time of subdivision since the works are within the legal road reserve. In my view, the point of difference between myself and Mr Gatenby is therefore simply one of timing and the way in which the matter is addressed.
- 33 He also appears to suggest that he prefers an underpass solution for people to cross the highway (paragraphs 7.6 to 7.9). Within my Statement of Evidence I set out that the relatively low usage and small scale of development proposed within the plan change area meant that in my view an underpass was not justified. However I also set out that if an underpass (or some other formal crossing point of the highway) was found to be necessary by the road controlling authorities, the appropriate approach would be for the plan change proponents to make a financial contribution towards the cost of the underpass based upon the number of titles created within the plan change area, with other parties who would use the underpass also making a contribution. I remain of this view.

Statement of Evidence of Julie McMinn

- 34 Having read through Ms McMinn's Statement of Evidence, the matters she raises are addressed above in my consideration of Mr Gatenby's evidence.

Statement of Evidence of Kyle Balderston

- 35 Mt Balderston's evidence focusses on higher-level 'policy' type matters. In summary however, he considers that the proposal should better provide for walking and cycling, and identifies that crossing the highway is a "*significant hurdle*" to this.
- 36 As set above and in my Statement of Evidence, there are two relevant matters that address this – one is the provision of an upgrade to Ripponvale Road (east) which could include a walking and/or cycling route, and the other is the provision of a formal crossing of the highway (such as an underpass). I have set out that these are not necessarily points of disagreement, but rather, the issue is whether there can (or should be) specific Rules in the plan change provisions or whether they are matters that are best considered at a later time and/or through a different mechanism.

Andy Carr

25 May 2020

26 August 2019

Julie McMinn
New Zealand Transport Agency

By e-mail only: Julie.McMinn@nzta.govt.nz

Dear Julie

Proposed Plan Change, Ripponvale Road, Cromwell: Response to NZTA Comments

Further to our telephone discussion on 14 August with yourself, Richard Shaw and Roy Johnston, we have undertaken further analysis at the westernmost State Highway 6 / Ripponvale Road intersection, as requested. Our assessment is set out below.

Intersection Layout

An aerial photograph of the layout is shown below.



Figure 1: Aerial Photograph of State Highway 6 / Ripponvale Road Intersection

State Highway 6 runs with a broadly east-west alignment in this location, being very straight and flat towards the east, while descending and curving slightly towards the west. The northern approach is Ripponvale Road, and as described in previous correspondence, this serves rural and rural residential activities. Ripponvale Road curves and rejoins State Highway 6 around 3.8m to the northeast of this intersection.

Pearson Road forms the southern approach to the intersection. This provides a link to the settlement of Bannockburn and to rural residential property to the south of Cromwell. It also connects to the southern parts of Cromwell, via Bannockburn Road, although this route is more indirect than using the highway (it is around 2km longer).



Both Ripponvale Road and Pearson Road have been realigned at some point in the past such that they meet State Highway 6 at 90 degrees by way of a short deviation over the last 20m prior to meeting the highway. The intersection therefore appears as a two offset priority intersections.

The intersection is give-way controlled, with traffic on the highway retaining priority, and there are auxiliary lanes for the right-turn and left-turn movement from the highway. There are large painted islands on the carriageway to delineate the left-turn lanes.

Traffic Characteristics

Traffic Volumes

There is a traffic counter located immediately to the west of the intersection on the state highway. The average volumes by weekday and weekend were set out in our previous Transportation Assessment but we repeat it here for convenience.

The New Zealand Transport Agency (“NZTA”) carries out regular traffic counts on the state highway network. The closest count site on the state highway is site 00600947 which is located to the south of the State Highway 6 / State Highway 8B intersection, and around 1.3km northeast of Ripponvale Road. In 2017, the highway had an Annual Average Daily Traffic of 4,887 vehicles (two-way). By way of a check on this, the traffic counter in the Gibbston Valley further south carried an almost-identical traffic flow (to within 1.5%), which is as would be expected due to the lack of development and roading connections for vehicles to leave or join the highway between the two locations. It can therefore be concluded that the recorded data represents the traffic flows past the site.

The survey station counts data continuously, and the following graph shows a breakdown of the daily flows for the past 12 months:

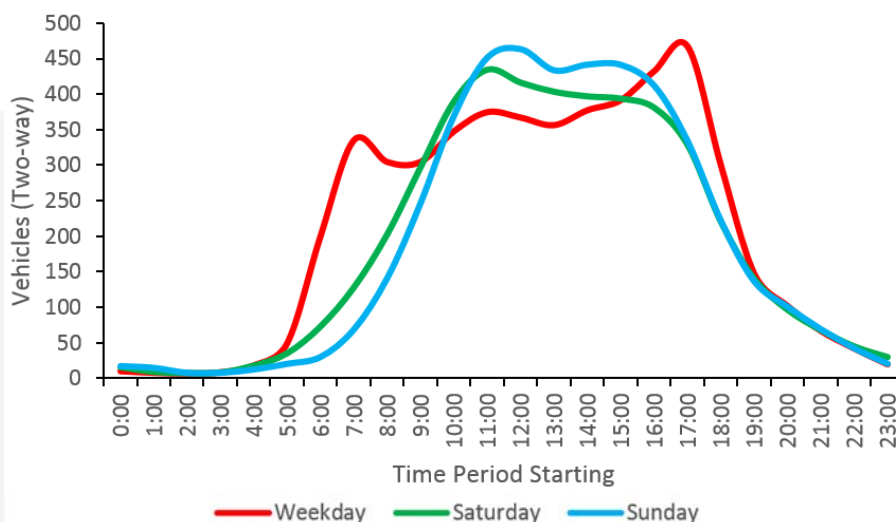


Figure: Traffic Flows on State Highway 6

As shown above, the weekday traffic flows display a morning and evening peak hour. The average recorded traffic flows were:

- Morning peak hour, 7am to 8am: 254 vehicles southbound, 77 vehicles northbound; and
- Evening peak hour, 5pm to 6pm: 171 vehicles southbound, 290 vehicles northbound



This indicates a tidal flow on the highway, towards the direction of Queenstown in the morning and away from Queenstown in the evening. Other surveys in the area have indicated a similar direction of travel.

The data also shows that the traffic flows during the weekend are relatively high, and approach that of the weekday evening peak. This pattern of traffic flows is typical of a highway carrying recreational traffic. Further evidence of recreational traffic is shown in the seasonality of the highway. The average daily traffic volume during the summer months (December, January and February) was 5,910 vehicles (two-way), compared to 4,190 vehicles (two-way) during June, July and August, some 29% lower.

Over the past five years, volumes on the highway have increased from 3,130 vehicles per day to 4,887 vehicles per day (that is, a growth of 351 vehicles per day in each year). This equates to an annual growth of 7.2%, expressed as a percentage of the 2017 volumes.

The MobileRoad website sets out that Ripponvale Road carries 250 vehicles per day with Pearson Road carrying 450 vehicles per day.

However, as part of addressing the matters we discussed, we have carried out our own survey at the intersection. This showed the following turning volumes¹:

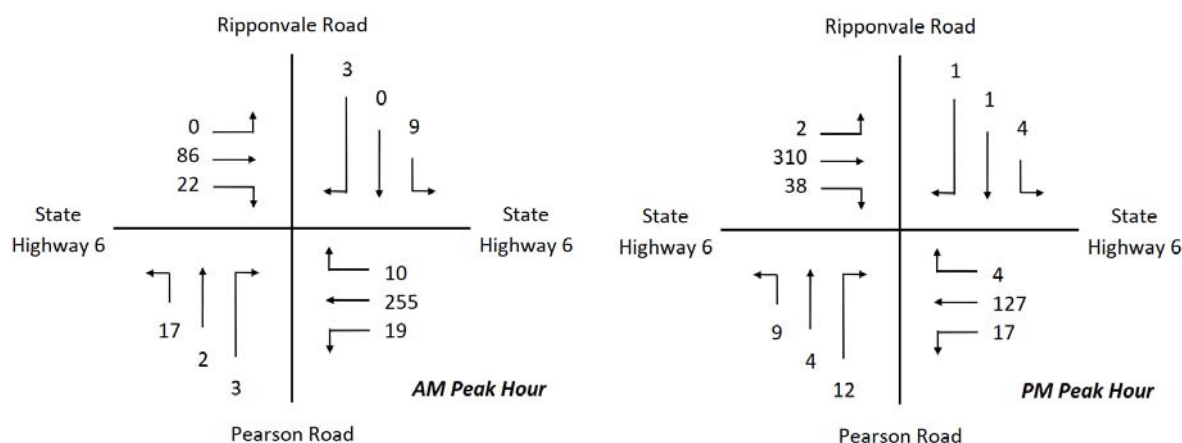


Figure 2: Observed Traffic Flows on State Highway 6 / Ripponvale Road Intersection

The surveys support the NZTA data with a predominant southbound flow on the highway in the morning (towards Queenstown), and the direction of flows being reversed in the evening.

As an initial check, it can be seen that morning peak hour flow on the highway was 383 vehicles compared to the 331 vehicles observed by the traffic counter. In the evening peak hour, 487 vehicles were observed compared to 561 vehicles at the counter. We therefore consider that the observed flows are robust.

It can be seen that Ripponvale Road and Pearson Road are lightly trafficked with average peak hour volumes of 20 and 72 vehicles respectively.

In the Transportation Assessment supporting the plan change, we applied traffic growth of 7.2% per annum to the volumes on the highway, as a robust way of taking into account growth (and noting that the traffic engineering considering Plan Change 13 noted that 4.6% per annum would

¹ We highlight that in the RFI response, traffic volumes at this intersection were synthesised based on other observations. As such, the analysis in this letter differs from that in the RFI response. We consider that since this letter is based on observed volumes, it is the more accurate.



be more likely). In order to demonstrate the extent of available capacity at this intersection, we have applied the higher rate of growth over a period of 10 years, meaning that the observed traffic flows have been increased by 72%.

We have modelled these volumes using the Sidra Intersection computer program and the results are summarised below.

| Road and Movement | | Morning Peak Hour | | | Evening Peak Hour | | |
|------------------------|---|-------------------|---------------------|------------------|-------------------|---------------------|------------------|
| | | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service |
| Pearson Road | L | 11.4 | 0 | B | 9.3 | 0 | A |
| | T | 16.3 | 0 | C | 22.4 | 0 | C |
| | R | 17.3 | 0 | C | 23.3 | 0 | C |
| State Highway 6 (east) | L | 8.7 | 0 | A | 8.8 | 0 | A |
| | R | 8.3 | 0 | A | 10.3 | 0 | B |
| Ripponvale Road | L | 8.8 | 0 | A | 12.4 | 0 | B |
| | T | 15.9 | 0 | C | 21.2 | 0 | C |
| | R | 17.2 | 0 | C | 22.5 | 0 | C |
| State Highway 6 (west) | L | 8.6 | 0 | A | 8.6 | 0 | A |
| | R | 9.8 | 0 | A | 8.7 | 0 | A |

Table 1: Performance of State Highway 6 / Ripponvale Road Intersection, No Plan Change

We consider that in ten years' time under these conditions for traffic growth, the intersection will continue to provide a very good level of service.

Road Safety

We have also assessed the crash record of the intersection using the NZTA Crash Analysis System. In view of the low traffic flows on the minor approaches, we have adopted a period of ten years for this (notwithstanding that for the highway, a five-year period would be more appropriate). All reported crashes within 100m of the intersection were identified. This showed that three crashes had been recorded:

- One crash occurred 50m south of the intersection on Pearson Road, when a motorcyclist lost control turning right. No further details are available of this crash, other than it involved only a single vehicle (the motorcycle) and resulted in serious injuries;
- One crash occurred at the intersection when a vehicle on the highway struck two pedestrians that were crossing the highway. The crash resulted in serious injuries; and
- One crash occurred at the intersection itself when an eastbound vehicle on the highway was struck by a northbound vehicle on Pearson Road, that had failed to give-way at the intersection. The crash did not result in any injuries.

The first two of these crashes appear to be unrelated to the intersection geometry, but the latter type of crash can be influenced by a lack of sight distance. However the proposed plan change will not increase this turning movement.

Notwithstanding this, we have reviewed the sightlines available at the intersection.

The sightlines towards the east is very good, and is virtually unlimited.



Towards the west, the highway curves and descends. However, having visited the site, we note the initial obstruction to the sight distance appears to be the overgrown verge where there are tall species which are located within the sightline. In respect of the underlying landform, there is an earth bank but the toe of this is located at least 4.5m from edge of the nearest traffic lane (and the sightline passes over the top of this). Based on site visits and aerial photographs we consider that the sightline in this direction is in the order of 251m. Under the Austroads Guide to Road Design Part 4A ('Unsignalised and Signalised Intersections') this is appropriate for an operating speed on the highway of 101km/h.

Traffic Volumes Associated with the Proposed Plan Change

These are discussed in detail within the Transportation Assessment and RFI response documents but we have repeated the text from the latter document below:

The traffic generation of the original scenario considered in the Transportation Assessment requires updating to reflect the use of an 80% / 20% directional split in the morning peak hour, and the use of Ripponvale Road (west).

The trip generation is:

- *Morning peak hour: 128 vehicles out, 32 vehicles in; and*
- *Evening peak hour: 56 vehicles out, 104 vehicles in.*

The initial trip distribution was:

- *25% to/from Cromwell:*
 - *Morning peak hour: 32 vehicles out, 8 vehicles in; and;*
 - *Evening peak hour: 14 vehicles out, 26 vehicles in*
- *60% to/from Queenstown:*
 - *Morning peak hour: 77 vehicles out, 19 vehicles in; and;*
 - *Evening peak hour: 34 vehicles out, 62 vehicles in*
- *15% to/from Wanaka and Alexandra:*
 - *Morning peak hour: 19 vehicles out, 5 vehicles in; and;*
 - *Evening peak hour: 8 vehicles out, 16 vehicles in*

For this analysis we have adopted the following traffic assignments as a 'worst case' scenario:

- *25% to/from Cromwell: all via SH8B;*
- *60% to/from Queenstown: all via Ripponvale Road (west); and*
- *15% to/from Wanaka and Alexandra: via Ripponvale Road (east).*

Effects of Traffic Generated by Plan Change

Using the same assumptions noted above, plus ambient traffic growth at 72%, we have re-modelled the State Highway 6 / Ripponvale Road intersection and the results are summarised below.



| Road and Movement | | Morning Peak Hour | | | Evening Peak Hour | | |
|------------------------|---|-------------------|---------------------|------------------|-------------------|---------------------|------------------|
| | | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service |
| Pearson Road | L | 11.4 | 0 | B | 9.3 | 0 | A |
| | T | 16.3 | 0 | C | 22.4 | 0 | C |
| | R | 17.3 | 0 | C | 23.3 | 0 | C |
| State Highway 6 (east) | L | 8.7 | 0 | A | 8.8 | 0 | A |
| | R | 8.3 | 0 | A | 10.3 | 0 | B |
| Ripponvale Road | L | 8.8 | 0 | A | 12.4 | 0 | B |
| | T | 18.1 | 1 | C | 23.7 | 1 | C |
| | R | 19.6 | 1 | C | 25.2 | 1 | D |
| State Highway 6 (west) | L | 8.6 | 0 | A | 8.6 | 0 | A |
| | R | 9.8 | 0 | A | 8.7 | 0 | A |

Table 2: Performance of State Highway 6 / Ripponvale Road Intersection, With Plan Change

| Road and Movement | | Morning Peak Hour | | | Evening Peak Hour | | |
|------------------------|---|-------------------|---------------------|------------------|-------------------|---------------------|------------------|
| | | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service | Avg Delay (secs) | 95 %ile Queue (veh) | Level of Service |
| Pearson Road | L | - | - | - | - | - | - |
| | T | - | - | - | - | - | - |
| | R | - | - | - | - | - | - |
| State Highway 6 (east) | L | - | - | - | - | - | - |
| | R | - | - | - | - | - | - |
| Ripponvale Road | L | - | - | - | - | - | - |
| | T | +2.1 | +1 | - | +2.5 | +1 | - |
| | R | +2.4 | +1 | - | +2.7 | +1 | C to D |
| State Highway 6 (west) | L | - | - | - | - | - | - |
| | R | - | - | - | - | - | - |

Table 3: Difference in Performance of State Highway 6 / Ripponvale Road Intersection, With and Without Plan Change

It can be seen that the changes in intersection performance are very small.

As set out in other documents, we consider that this is very much a ‘worst case’ set of assumptions for the trip distribution, because the values used lie at one end of the range of the possible range, plus we consider that in practice more use will be made of the eastern end of Ripponvale Road. Nevertheless, even under this scenario, the changes at the intersection are minimal.

With regard to road safety, the sightline towards the west does not appear to have given rise to any adverse effects in the past. Having reviewed the Crash Analysis System, there has never been a recorded crash involving vehicles turning right (or going straight ahead) from Ripponvale Road, and even though turning volumes are low, we would expect that over the past 40 years it would be likely that at least once crash would be recorded if sightlines were deficient for the prevailing vehicle speeds.



Nevertheless, since there will potentially be an increase in these turning movements we consider that safety would be enhanced through removing the vegetation within the sightline, and potentially undertaking minor earthworks to reduce the height of various parts of the earth bank.

Summary

Based on our view, we remain of the view that the proposed plan change will not result in adverse road safety or efficiency effects arising at the western State Highway 6 / Ripponvale Road intersection.

We would be pleased to discuss any aspects of this letter with you at your convenience. We understand that the plan change is to be publicly notified this week, but if there are any matters arising, we would be keen to discuss them with you (and work to resolve them where possible) prior to the closing date for submissions.

Kind regards

Carriageway Consulting Limited

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