NEW ZEALAND CHERRY CORP.

Proposed Private Plan Change
Shannon Farm
Cromwell

Response to Request for Further Information

CARRIAGEWAY CONSULTING

traffic engineering | transport planning

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1. Introduction

1.1. New Zealand Cherry Corp (Leyser) LP Limited proposes to lodge a private plan change to rezone an area of Rural-zoned land to facilitate the future development of up 160 rural residential properties, at a location to the west of Cromwell ("*the plan change area*" / "*the site*").

1.2. In May 2019, a Transportation Assessment was produced which set out a detailed analysis of the transportation issues associated with the proposed plan change including changes in travel patterns that are likely to arise from development of the site. The Transportation Assessment has been reviewed by Stantec, acting as engineering consultants to Central Otago District Council, who have issued a Request for Further Information.

1.3. This report responds to each of the matters raised by Stantec. For ease of reference, the query raised by Stantec is initially set out, followed by the response.

2. Roading Classification

2.1. Stantec Comment: No discussion of Ord Road which could be used by traffic, such as to access McNulty Road without right turn on to SH6

2.1.1. The location of Ord Road, Ripponvale Road (west) and other roads mentioned by Stantec, are shown below.

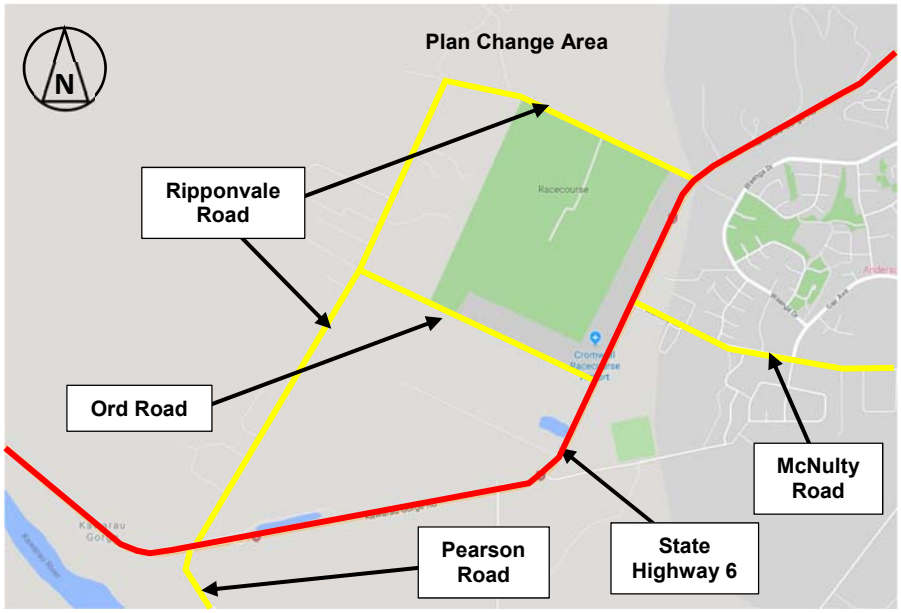


Figure 1: Plan Change Area and Environs

2.1.2. Ord Road is a Rural Local Road under the Council's road hierarchy. It has a straight alignment and a slight gradient falling from west to east. The carriageway is sealed and is 6.1m wide with a centreline but no edgeline markings. There are grassed verges and swale on each side, with these being 5m wide and 9m wide on the northern and southern sides respectively. The speed limit is 100km/h.

Photograph 1: Ord Road Looking East

2.1.3. Ord Road meets State Highway 6 at a priority (give-way) intersection, approximately 2.8km from the plan change area. No auxiliary turning lanes are provided for traffic but there are wide shoulders (that is, an NZTA Diagram E type of layout) for vehicles to pass others that are waiting or slowing to turn.

Photograph 2: State Highway 6 / Ord Road Intersection

2.1.4. Ripponvale Road (west) is a Rural Collector Road under the Council's road hierarchy. It largely has a straight alignment with a flat vertical alignment on the eastern section, and falling slightly from east to west on the western section. The carriageway is sealed and is 5.5m wide with a centreline but no edgeline markings. On the northern side of the road is a grassed verge of 6m and on the southern side there is a grassed verge of 7m width. Both verges contain a swale. The speed limit of the road is 100km/h.

Photograph 3: Ripponvale Road (west) Looking West

2.1.5. Ord Road meets Ripponvale Road at a priority ('give-way') intersection with no auxiliary lanes or widening. Sight distances for turning and approaching traffic are excellent in every direction. A driveway access is located on the northern side of the intersection.

Photograph 4: Ripponvale Road / Ord Road Intersection Looking South

2.1.6. At its very western end, Ripponvale Road narrows, crosses a culvert and meets State Highway 6 at a four-arm priority intersection (around 3.2km from the plan change area), with Pearson Road forming the fourth (southernmost) arm. The intersection is give-way controlled, with traffic on the highway retaining priority. These are auxiliary lanes for the right-turn and left-turn movement from the highway.

Photograph 5: Aerial View of the State Highway 6 / Ripponvale Road / Pearson Road Intersection

2.1.7. McNulty Road joins the highway 0.5km northeast of the State Highway 6 / Ord Road intersection and 0.8km southwest of the State Highway 6 / Ripponvale Road (east) intersection. The State Highway 6 / McNulty Road intersection has auxiliary lanes for traffic turning left and right from the highway.

Photograph 6: State Highway 6 / McNulty Road Intersection

2.2. Stantec Comment: No description of the road hierarchy on the eastern side of SH6 for connection into Cromwell

2.2.1. In our view there are only two routes into Cromwell that provide a convenient and practical route, and which does not introduce excessive additional distance.

2.2.2. Towards the south, McNulty Road is an Urban Arterial Road providing a route towards the southern parts of Cromwell. This has a largely flat and straight alignment, and a speed limit of 70km/h over the first 500m from State Highway 6, reducing to 50km/h to the east of this. The carriageway is 6.5m wide, although close to the highway it is wider in order to accommodate a newly-constructed intersection with Old Saleyard Road.

Photograph 7: McNulty Road, Looking East

2.2.3. Some 2km north of McNulty Road, State Highway 8B joins State Highway 6 from the east. This is a short section of highway which has an east-west alignment and forms the connection

between State Highways 6 and 8. The State Highway 6 / State Highway 8B is constructed as a high-capacity priority intersection with two approach lanes on State Highway 8B, and a long left-turn lane and raised deflection island for vehicles travelling from north to east. There is also an auxiliary lane for vehicles turning right from south to east.

3. Current Roading Network

3.1. Stantec Comment: No mention of the bend in eastern section of Ripponvale Road, which is referenced later in the report in terms of sightlines

3.1.1. We confirm that there are two existing curves on Ripponvale Road (east). One of these is located approximately 80m to the east of the proposed site access location, where the alignment of the road turns through 13 degrees with a curve radius in the order of 250m. The curve does not have any additional signage and does not restrict vehicle speeds.

Photograph 8: Shallow Curve in Ripponvale Road (East) Looking West

3.1.2. Another curve is located around 300m to the west of the site access. In this location, Ripponvale Road turns through 80 degrees. There is no advisory speed limit but the curve radius is in the order of 25m indicating an operating speed of around 35km/h.

Photograph 9: Sharper Curve in Ripponvale Road (East) Looking West

3.2. Stantec Comment: Insufficient discussion about landuse and access along the southern section of Ripponvale Road

3.2.1. A description of the land use along the western section of Ripponvale Road is set out in the application. However to assist Stantec however, we confirm that the whole of Ripponvale Road is fronted by rural activities, including paddocks, orchards and rural residential properties. The accesses on the road are driveways to residential properties and gates which gain access to rural land.

3.3. Stantec Comment: No discussion of the SH6 / Ripponvale Road / Pearson Road intersection

3.3.1. This intersection is discussed previously in this report.

3.4. Stantec Comment: No discussion of Ord Road, which could be a route used at peak times particularly to and from McNulty Road to avoid right turns onto SH6

3.4.1. Ord Road is discussed previously in this report. We comment further on the use of Ord Road when discussing trip distribution but we do not consider that it will be used by traffic associated with the plan change area. The route is not particularly convenient and due to the low delays for right-turning traffic we do not consider that there is any reason why drivers will seek to avoid the right-turn movement.

4. Non-Car Infrastructure

4.1. Stantec Comment: There is a statement that cycling and pedestrian activity can be carried out safely, but no supporting information

4.1.1. Surveys reported in the Transportation Assessment showed peak hour volumes of 25 to 28 vehicles (two-way). Although there are no formal counts of walking and cycling in the area, we expect that volumes will be low due to the distances involved and because Ripponvale Road is not a designated route for these road users.

4.1.2. Given the very low traffic volumes, we consider that the possibly of one road user encountering another is low. Moreover, the wide verge on either side of the carriageway means that road users are not required to share the same roadspace.

4.1.3. There is no record of adverse road safety issues arising from any conflict between these road users.

4.1.4. The Council's Engineering Standards do not indicate that footpaths or provision for cyclists is required on rural roads.

5. Future Changes

5.1. Stantec Comment: The report advises there are no known projects. It is not clear what sources of information they have considered in making this statement

5.1.1. Stantec requests that reference is made to the NZTA project list and District Council transport programmes. Having done this, we have not identified any confirmed and funded projects which will materially affect conditions in the vicinity of the plan change area.

5.2. Stantec Comment: There is no information provided on planned growth in Cromwell, including the existing zoning patterns and other zoning currently being sought by Plan Changes (e.g. PC13)

5.2.1. To our knowledge, plan changes and other proposals which have not been approved/consented do not form part of the receiving environment and have therefore not been considered within the Transportation Assessment.

5.2.2. From a transportation perspective, the development of Cromwell (and surrounding area) will simply result in traffic growth as other matters which may be relevant to the application fall into different technical areas. Consequently we consider that, providing that traffic growth is allowed for, any effects of growth in Cromwell will be accounted for in the analysis. In that regard, the Transportation Assessment factors the prevailing traffic flows on the highway by ten years of growth at 7.2% per annum (that is, the traffic flows increase by 72%). We consider that this is sufficiently robust to take into account the receiving environment.

5.2.3. In passing, through Plan Change 13 it was identified as being unlikely that this level of growth could be maintained and for the purposes of the assessment of that plan change, growth at 4.6% per annum (being the rate observed over the past ten years) was an appropriate approach. We have not used this rate in this analysis but have highlighted it to identify that the extent of traffic growth allowed for within the currently-proposed plan change is considerably greater than is likely to arise.

5.3. Stantec Comment: There is no reference to the Cromwell Masterplan

5.3.1. The Cromwell Masterplan was released several weeks after the report was produced, which is why it was not referenced. The plan change area lies outside the area of focus of the masterplan although is within the study area.

5.3.2. The masterplan is necessarily at a very high level and as a result, the transportation aspects as fairly generalised (such as the aim to improve access to public transport “in the long term”). As such, we interpret the masterplan cautiously as it may change between now and when formally adopted, since any initiatives require costing and community consultation is required. However, we do not consider that the proposed plan change precludes the ability to give effect to the overarching objectives of the masterplan.

6. Traffic Flows

6.1. Stantec Comment: The description of the NZTA counts site location is incorrect. Based on the coordinates in the NZTA count summaries the site is west of Pearson Road

6.1.1. Having visited the site, and searched for the counter, we agree that it lies to the west of Pearson Road. However it remains the closest counter to Cromwell. We further note that the NZTA counters to the immediate south and north show volumes that are within 3.5% of the volume recorded in this location, meaning that the volumes reported remain typical of those using State Highway 6 past the site.

6.1.2. The data from the counter was included to provide an overall view of the traffic patterns on the highway and all analysis was carried out using a specific survey of the State Highway 6 / Ripponvale Road (east) intersection. As such, the location of the counter is not a material matter – the key issues of clear peak hours in the weekday, tidal flow towards Queenstown in the morning, and relatively high weekend flows remain valid.

6.2. Stantec Comment: The traffic count profile is shown as an average of 12 months. That is an unusual presentation method

6.2.1. We disagree that it is unusual method of presentation, for example, all NZTA data is presented as the Annual Average Daily Traffic meaning that it is the average flow not a peak flow. However as requested we have shown below a busy week.

6.2.2. It should be noted that this particular counter records continuously and thus there were 52 weeks of data recorded in 2018. The 90th percentile weekly traffic was some 43,576 vehicles and this corresponds to the week of Monday 12 February to Sunday 18 February (when there were 43,653 vehicles recorded).

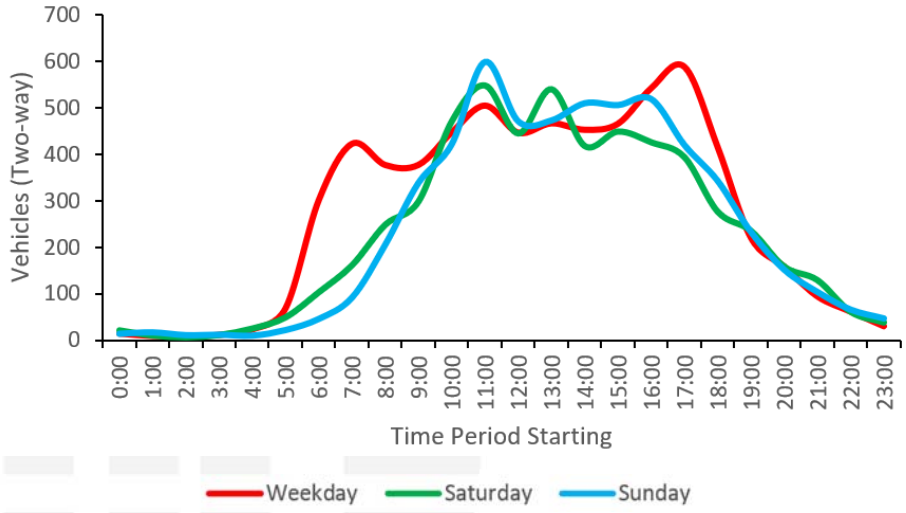


Figure 2: Traffic Flows on State Highway 6, Busy Week

6.2.3. As remains the case, the weekday traffic flows display a morning and evening peak hour. The average recorded traffic flows were:

- Morning peak hour, 7am to 8am: 335 vehicles southbound, 87 vehicles northbound; and
- Evening peak hour, 5pm to 6pm: 214 vehicles southbound, 373 vehicles northbound

6.2.4. 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.

6.2.5. 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.

6.2.6. We also note that Stantec requests data for a typical week. We clarify that the information in the Transportation Assessment was an average of the data collected over the course of a year and therefore is representative of a typical week.

6.3. Stantec Comment: Low level of information about traffic volumes on the surrounding road network

6.3.1. The MobileRoad website notes the following traffic flows:

- Ripponvale Road (east): 250 vehicles per day;
- Ripponvale Road (west): 250 vehicles per day; and
- Ord Road: 370 vehicles per day.

6.3.2. Since the peak hour volume on a road is typically expected to be around 10% to 15% of the daily flow, these volumes indicate the following peak hour flows:

- Ripponvale Road (east): 25 to 37 vehicles (two-way);
- Ripponvale Road (west): 25 to 37 vehicles (two-way); and
- Ord Road: 37 to 56 vehicles (two-way).

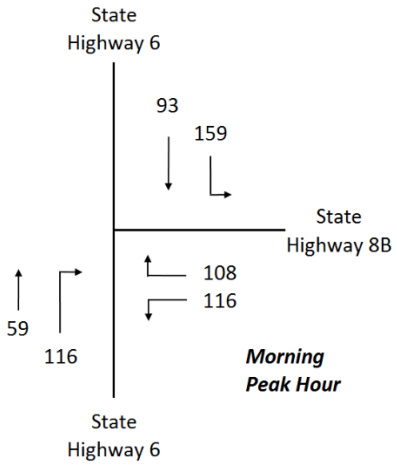
6.3.3. By way of comparison, our own survey of Ripponvale Road (east) showed a peak hour volume of 25 to 28 vehicles (two-way) which lies within the expected range.

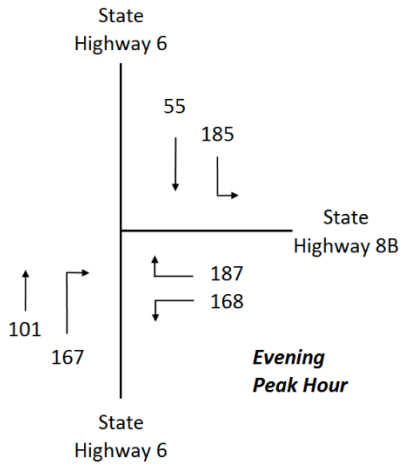
6.3.4. These volumes equate to less than one vehicle movement every minute showing that they are very lightly trafficked. We also note that Ord Road serves the racecourse and the aerodrome, and traffic volumes are therefore higher than might be expected if the road simply served the rural residential development in the immediate area.

6.3.5. Stantec requests volumes on Pearson Road, McNulty Road and State Highway 8B also.

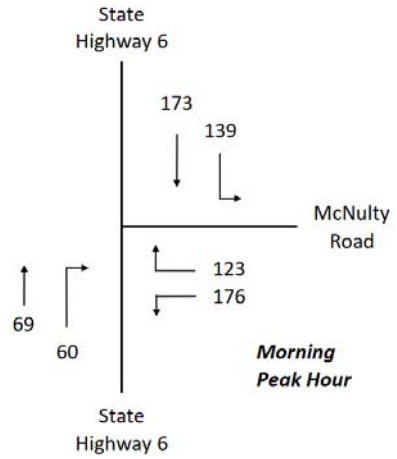
- Pearson Road (from MobileRoad): 450 vehicles per day, estimated 45-68 vehicles in the peak hour;
- McNulty Road (from evidence to Plan Change 13): 5,107 vehicles per weekday, 520 vehicles in the morning peak hour, 430 vehicles in the evening peak hour; and
- State Highway 8B (from NZTA): Annual Average Daily Traffic of 7,779 vehicles (two-way).

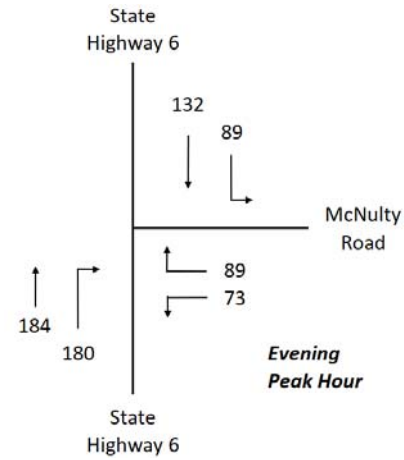
6.3.6. Data presented to Plan Change 13 also showed turning volumes at the State Highway 6 / 8B and State Highway 6 / McNulty Road intersection.





Figures 3 and 4: Peak Hour Traffic Flows at the State Highway 6 / State Highway 8B Intersection



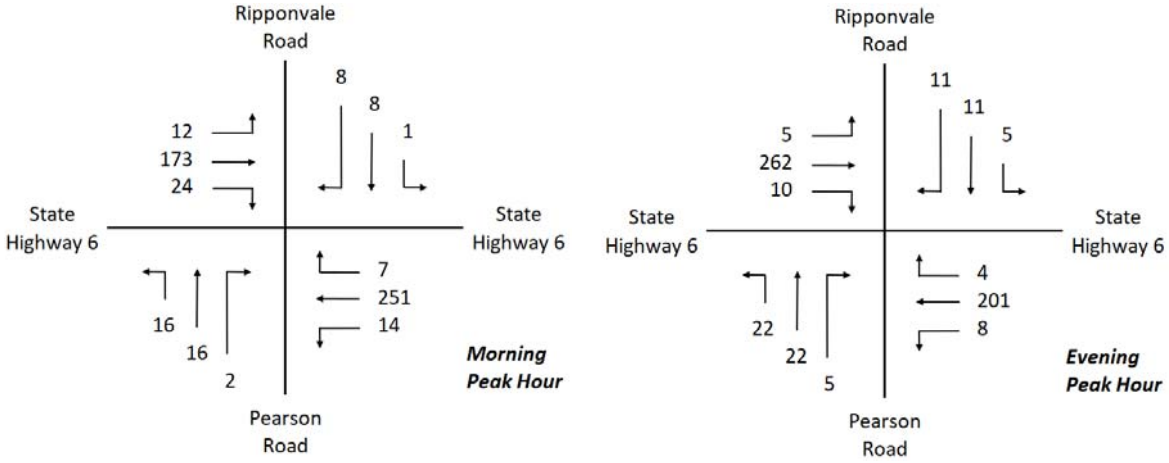


Figures 5 and 6: Peak Hour Traffic Flows at the State Highway 6 / McNulty Road Intersection

6.3.7. There are no turning volumes available at the State Highway 6 / Ripponvale Road (west) intersection. However the daily traffic volumes on Ripponvale Road (west) are the same as on Ripponvale Road (east) and on Pearson Road they are twice as great. It is therefore reasonable to expect that peak hour flows on Ripponvale Road (west) will be the same as Ripponvale Road (east) but with a bias towards Queenstown rather than Cromwell. We anticipate a similar scenario for Pearson Road, but with flows that are twice as high.

6.3.8. In our view it is unlikely that there will be a significant amount of north-south traffic but we have allowed for this also.

6.3.9. On this basis, we have therefore synthesized a turning volume for this intersection.



Figures 7 and 8: Synthesised Peak Hour Traffic Flows at the State Highway 6 / Ripponvale Road (West) Intersection

6.3.10. The State Highway 6 / 8B and State Highway 6 / Ripponvale Road (west) intersections has been modelled using the traffic flows shown in Figures 3 and 4 above, and with all movements factored up by 72% to allow for ten years of ambient traffic growth:

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 (south)	R	8.3	1	A	7.3	1	A
State Highway 8B	L	7.8	1	A	6.9	1	A
	R	16.5	2	C	27.7	8	D
State Highway 6 (north)	L	8.3	1	A	8.9	1	A

Table 1: Performance of State Highway 6 / State Highway 8B Intersection (No 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	11.3	0	B	10.4	0	B
	T	20.5	0	C	22.4	1	C
	R	21.6	0	C	24.1	1	C
State Highway 6 (east)	L	8.8	0	A	8.7	0	A
	R	8.9	0	A	9.8	0	A
Ripponvale Road	L	9.8	0	A	11.4	0	B
	T	20.4	0	C	21.9	1	C
	R	23.0	0	C	25.4	1	D
State Highway 6 (west)	L	8.7	0	A	8.7	0	A
	R	9.8	0	A	9.2	0	A

Table 2: Performance of State Highway 6 / Ripponvale Road (West) Intersection (No Plan Change)

6.3.11. Each intersection provides a good level of service even allowing for this level of traffic growth.

6.3.12. The State Highway 6 / McNulty Road intersection has not been modelled since any traffic volumes arising from development of the plan change area will be very low compared to the prevailing volumes, as discussed below.

6.4. Stantec Comment: Ripponvale Road includes activities that may be subject to seasonal peaking due to the activities on it, and this is not discussed

6.4.1. Seasonality on the highway was specifically identified, discussed and allowed for in the analysis. Seasonality on Ripponvale Road was not discussed since there is little information available in that regard. We concur however that some seasonality is likely in view of the surrounding rural area, such as at harvest. Equally though, there will be periods where there is little traffic flow.

6.4.2. Taking peak seasonality into account within analyses is typically not a recognised traffic engineering approach – it would be akin to assessing a supermarket at Christmas-time rather than at other, more typical, times of the year. However the plan change is for residential development and it is therefore reasonable to expect that residents will be familiar with the seasonal patterns of the surrounding land and with the potential for encountering higher traffic volumes at certain times of the year. The low prevailing traffic flows means that it is extremely unlikely that any capacity issues will arise.

7. Road Safety

7.1. Stantec Comment: The road safety record references partial data for 2018, but does not state what period the partial data covers

7.1.1. We have taken the opportunity to completely update the road safety assessment, allowing for the past ten years of data on Ripponvale Road (July 2009 to July 2019) and on the state highway over the past five years (July 2014 to July 2019). For ease of reference we have split the assessment into different sections, and when reporting crashes at intersections we have identified those within 100m of the intersection centre.

Ripponvale Road (east), Ripponvale Road (west), Ord Road

7.1.2. Over the past ten years (June 2009 to June 2019) there has been only one crash recorded on these roads, This occurred at Ripponvale Road (east) around 1km west of the highway, when an eastbound driver stopped suddenly in the carriageway for no apparent reason, and was struck by a following eastbound vehicle

Intersections of State Highway 6 with Ripponvale Road (east), Ripponvale Road (west), Ord Road

7.1.3. Over the past five years (June 2014 to June 2019) there have been no crashes recorded at the State Highway 6 / Ord Road intersection.

7.1.4. There has been only one crash recorded at the State Highway 6 / Ripponvale Road (west) intersection. This occurred when a driver travelling from Pearson Road into Ripponvale Road was struck by a car travelling eastbound (towards Cromwell) on the highway. The crash did not result in any injuries, and a contributing factor was the driver on Pearson Road pulling out in front of the vehicle on the highway.

7.1.5. There has been one crash recorded at the State Highway 6 / Ripponvale Road (east) intersection. This occurred when a driver travelling from Ripponvale Road turning towards the north was struck by a truck travelling northbound (towards Cromwell) on the highway. The crash did not result in any injuries, and a contributing factor was the driver on Ripponvale Road pulling out in front of the vehicle on the highway.

State Highway 6 (Ripponvale Road (east) to Ripponvale Road (west))

7.1.6. Over the past five years (June 2014 to June 2019) there have been 8 crashes recorded on this 4km section of State Highway 6:

- One crash occurred at the State Highway 6 / McNulty Road intersection when a truck driver turning right from the highway onto McNulty Road struck a car waiting at the give-way line. It did not result in any injuries;
- One crash occurred around 200m south of Ord Road, when a northbound driver lost control and left the road. It did not result in any injuries;
- One crash occurred around 700m south of Ord Road, when a southbound driver lost control due to ice on the highway and left the road. It did not result in any injuries;
- One crash occurred around 800m south of Ord Road, when a northbound driver carrying out ‘donuts’ on the highway lost control and left the road. It did not result in any injuries;
- One crash occurred around 350m east of Ripponvale Road (west) when a southbound driver crossed the centreline and struck a northbound vehicle. The crash resulted in serious injuries;

- Two crashes have occurred at the entrance to an orchard around 250m east of Ripponvale Road (west). In both cases, a driver turned right off the highway and struck a westbound vehicle on the highway. One crash resulted in minor injuries and the other resulted in no injuries;
- One crash occurred around 200m east of Ripponvale Road (west) when a driver attempted a u-turn and was struck by a following truck. It did not result in any injuries.

7.1.7. We remain of the view that the historic pattern of crashes does not indicate any particular safety-related deficiencies on this section of highway or any of the district roads.

7.2. Stantec Comment: The road safety search does not include other important road links such as Ripponvale Road (west) and key intersections accessing Cromwell

7.2.1. These are discussed above.

8. Proposal

8.1. Stantec Comment: The description does not provide information on the scale of individual lots, density of access, type of internal road formation anticipated, gradient of proposed roads, connectivity to adjacent land parcels

8.1.1. These matters are described within the application itself.

8.1.2. The Council's existing roading standards have been relied upon as being appropriate to guide future development and cater for internal traffic demands. Any changes to this will be assessed at the time of subdivision.

9. Site Layout

9.1. Stantec Comment: The assessment does not describe the rationale for the proposed internal layout from a transport perspective

9.1.1. The proposal is for a plan change rather than a subdivision and thus there is only a structure plan available. The proposal for having a loop road was to avoid creating cul-de-sacs.

9.1.2. The pattern of subdivision will be discussed and assessed (and can be assessed by the Council) when an application is made.

10. Traffic Generation

10.1. Stantec Comment: There is no reference to traffic generation databases or surveys of comparable sites in the area to suggest 6vpd/hh is appropriate at this location

10.1.1. As set out in the Transportation Assessment, there is ample capacity in this part of the roading network. Consequently we propose to adopt a higher rate of 8 vehicle movements per day, as set out in the Council's Engineering Standards (paragraph 3.3.2.1).

10.2. Stantec Comment: The report adopts 90% exiting traffic in the morning peak hour, but does not provide supporting information

10.2.1. We adopted 90% because it results in the greatest volume of traffic exiting Ripponvale Road in the morning peak hour and onto the highway. As such, it ensures a robust assessment of the intersection(s) through which the traffic was expected to pass.

10.2.2. In view of the comment made, we propose to adopt an 80% / 20% directional split as suggested by Stantec as discussed subsequently. This results in the following traffic generation in the morning peak hour – 128 vehicles exiting and 32 vehicles entering. The evening peak hour remains as previous calculated, with 56 vehicles exiting and 104 vehicles entering.

11. Trip Distribution

11.1. Stantec Comment: The route choice for trip distribution appears to be flawed. The assumption is made that all traffic will travel to SH6 via the northern Ripponvale Road / SH6 intersection. The shortest distance to SH6 south for travel to Queenstown is via Ripponvale Road west (3.2km) v the longer route analysed which is 4.8km

11.1.1. Drivers choose their routes on the basis of travel time rather than travel distance. Taking into account that travel speeds on the highway will be faster than on Ripponvale Road due to the superior alignment and greater width, the lack of accesses on the highway, and that it is a roadway onto which drivers will ultimately turn anyway, we consider that the bulk of drivers will use Ripponvale Road (east) to reach State Highway 6. Our analysis shows that when considered as part of the journey to Queenstown/Frankton (at least 40 minutes), the difference in travel time is a matter of a few seconds and is insignificant.

11.1.2. Nevertheless, as requested, the routing via Ripponvale Road (west) has been considered subsequently.

11.2. Stantec Comment: The report does not explain why 80% of peak traffic is expected to be to and from Queenstown for this development. This is a significant assumption that does not align with census data

11.2.1. Stantec has mis-read the trip distribution since 60% of the generated traffic was expected to travel to/from Queenstown rather than 80%.

11.2.2. The greatest delays at any priority intersection occur for the right-turn movement from the minor approach because drivers have to wait for a gap in both traffic streams on the main road. In this case, this scenario arises with the highest volume of traffic turning in the direction of Queenstown.

11.2.3. The matter of the trip distribution was an issue which arose during consideration of proposed Plan Change 13 also. As part of this, it was agreed that:

- In cases such as this, trip distribution cannot be forecast with certainty;
- It is appropriate to undertake sensitivity testing;
- A bias of vehicle movements towards Queenstown is an appropriate distribution as being one end of the range; and
- A bias of vehicle movements towards Cromwell is an appropriate distribution as being the other end of the range.

11.2.4. Based on the trip distribution discussed through Plan Change 13, we consider that the distribution in the Transportation Assessment represents one potential outcome. For a second distribution we have allowed for:

- 75% to/from Cromwell;
- 10% to/from Queenstown;
- 5% to/from Wanaka; and
- 10% to/from Alexandra/Omarama direction.

11.3. Stantec Comment: The assumption also appears to be that all traffic to and from Cromwell will be via the SH8B route. There is no assessment of why this route is assumed for access to Cromwell

11.3.1. This route was selected because it is by far the shortest route by distance to the town centre and is slightly shorter by distance to Cromwell College. It is also a route that uses roads with faster speeds, meaning that the travel time will be much shorter in both cases.

11.3.2. The route via McNulty Road and Gair Avenue is very slightly shorter by distance to the primary school, but when travel speeds are taken into account the SH8B route is faster.

11.3.3. On this basis, we do not expect that McNulty Road will be well-used as a route by traffic associated with the plan change. If it was to be used, then traffic flows will be very low and highly unlikely to materially affect the operation of the intersection

11.3.4. Ord Road has been noted by Stantec as providing a route for drivers that do not wish to turn right onto the highway. However this route is not particularly convenient and we are unclear why a driver would seek to avoid a right-turn movement since the delays for the movement are not excessive. While there might be some minor use of the route, we do not consider that there are any reasons which justify inclusion of this route within the assessment.

12. Intersection Capacity

12.1. Stantec Comment: The analysis only applies growth based on existing through traffic growth patterns. There may be other growth in Cromwell that leads to a step change in traffic growth that should be considered

12.1.1. Traffic growth on the highway was discussed as part of proposed Plan Change 13, where it was determined by Stantec that an increase in through-traffic of 4.6% per annum was appropriate. We consider that the application of a rate of 7.2% is therefore robust and will take into account any additional growth. We stress than to our knowledge, unapproved plan changes and resource consents do not form part of the receiving environment.

12.2. Stantec Comment: The traffic distribution and route choice may be flawed as noted above. This could impact the intersection performance

12.2.1. We have addressed each of these below.

Original Trip Distribution (Bias Towards Queenstown)

12.2.2. 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).

12.2.3. The trip generation is:

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

12.2.4. 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

12.2.5. 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).

12.2.6. The State Highway 6 / 8B and State Highway 6 / Ripponvale Road (west) intersections have been remodelled using the traffic flows shown in Figures 3, 4, 7 and 8 above, and with all movements factored up by 72% to allow for ten years of ambient traffic growth, plus the traffic associated with the 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
State Highway 6 (south)	R	8.3	1	A	7.4	1	A
State Highway 8B	L	7.8	1	A	6.9	1	A
	R	18.3	2	C	32.5	9	D
State Highway 6 (north)	L	8.5	1	A	9.0	1	A

Table 3: Performance of State Highway 6 / State Highway 8B 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	11.4	0	B	10.4	0	B
	T	21.1	0	C	22.4	1	C
	R	22.3	0	C	24.1	1	C
State Highway 6 (east)	L	8.8	0	A	8.7	0	A
	R	9.0	0	A	9.8	0	A
Ripponvale Road	L	9.8	0	A	11.4	0	B
	T	28.5	2	D	27.2	2	D
	R	31.5	2	D	31.2	2	D
State Highway 6 (west)	L	8.7	0	A	8.7	0	A
	R	9.8	0	A	9.2	0	A

Table 4: Performance of State Highway 6 / Ripponvale Road (West) Intersection (With Plan Change)

12.2.7. It can be seen that the intersections continue to perform well and that the difference in queues and delays due to the plan change related traffic is very small.

Additional Trip Distribution (Bias Towards Cromwell)

12.2.8. As before, the trip generation is:

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

12.2.9. The trip distribution is:

- 75% to/from Cromwell:
  - Morning peak hour: 96 vehicles out, 24 vehicles in; and;
  - Evening peak hour: 42 vehicles out, 78 vehicles in
- 10% to/from Queenstown:
  - Morning peak hour: 13 vehicles out, 3 vehicles in; and;
  - Evening peak hour: 6 vehicles out, 10 vehicles in
- 5% to/from Wanaka:
  - Morning peak hour: 6 vehicles out, 1 vehicle in; and;
  - Evening peak hour: 3 vehicles out, 5 vehicles in

- 10% to/from Alexandra/Omarama:
  - Morning peak hour: 13 vehicles out, 3 vehicles in; and;
  - Evening peak hour: 6 vehicles out, 10 vehicles in

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

- 75% to/from Cromwell: all via SH8B;
- 10% to/from Queenstown: all via Ripponvale Road (west); and
- 15% to/from Wanaka and Alexandra: via Ripponvale Road (east).

12.2.11. There is no requirement to model the State Highway 6 / Ripponvale Road (west) intersection with this traffic flow since it has already been modelled with a much higher traffic flow and found to perform adequately. Consequently only the State Highway 6 / 8B intersection has been modelled with the factored traffic flows to allow for ten years of ambient traffic growth at 7.2%, plus the traffic associated with the 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
State Highway 6 (south)	R	8.4	1	A	7.4	1	A
State Highway 8B	L	7.8	1	A	6.9	1	A
	R	21.0	3	C	39.5	10	E
State Highway 6 (north)	L	8.9	1	A	9.2	1	A

Table 5: Performance of State Highway 6 / State Highway 8B Intersection (With Plan Change)

12.2.12. It can be seen that the difference in queues and delays due to the plan change related traffic is very small. Level of Service E arises for the right-turn movement out of State Highway 8B in the evening peak hour, but this is largely because *without* the plan change, the assumed extent of traffic growth means that a very high Level of Service D is expected. That is, the movement is almost at Level of Service E without any plan change traffic present.

12.2.13. As noted above, the extent of background traffic growth allowed for is very high and unlikely to occur in practice. Even in that case, the plan change traffic increases the delay for the movement by just 7 seconds.

12.2.14. Overall then, we remain of the view that the traffic generated by full development of the plan change site can be accommodated on the road network.

13. Non-Car Modes of Travel

13.1. Stantec Comment: We consider that the site could be considered within a viable cycling distance of Cromwell. The site is less than 3km from the town centre, employment areas, and schools

13.1.1. When allowing for a bias in travel towards Cromwell, development of the plan change area will result in peak hour traffic flows of 115 vehicles (two-way) on Ripponvale Road (east) and total peak hour flows on the road of around 150 vehicles (two-way) equivalent to an average of one vehicle movement every 24 seconds. This represents a very low level of traffic.

13.1.2. Further, if more people were to cycle, then it can be expected that car-borne travel would reduce, meaning that these peak hour volumes would reduce even further.

13.1.3. We do not consider that additional infrastructure is needed on Ripponvale Road for cyclists. None is signalled within the Council's Code of Practice for rural areas, and in practice we consider that the extent of cycling will be very limited due to the relatively small scale of development.

13.1.4. Nevertheless, this is a matter that can be considered further at the time when a subdivision consent is sought. As discussed previously, there are no impediments to the provision of additional infrastructure if necessary due to the wide road reserve and flat/straight nature of the roading network.

13.2. Stantec Comment: The report discusses the absence of public transport but does not assess the impact on suitability of the site for development

13.2.1. In our experience, rural residential development is not served by public transport as demand is low and therefore services are not cost-effective due to the long routes involved and low numbers of passengers. Taking this into account, and that there is no public transport in Cromwell at all, any other site brought forwards would also not be served by public transport unless it is proposed to be large and at higher densities than permitted in this instance.

14. Road Safety

14.1. Stantec Comment: There is no discussion about the use of Ripponvale Road (west) for access to SH6 towards Queenstown, and the safety of that route

14.1.1. As noted above, there have been no reported crashes on this part of the roading network, and the only crash reported at the intersection with the highway relates to a movement from south to north, which is a movement that is very unlikely to increase as a result of the proposed plan change. We therefore do not consider that there is any reason to expect that road safety issues will arise on Ripponvale Road (west).

14.2. Stantec Comment: There is no discussion of whether the change in traffic volumes at the SH6 intersections can be safely accommodated, noting the volume changes are quite substantial

14.2.1. As set out above, the intersections will continue to operate well with the plan change traffic in place, even when a considerable extent of ambient traffic growth is allowed for. The crash records of the intersections does not indicate any deficiencies in the intersection geometries and from our site visits, we confirm that sight distances are excellent. We therefore do not expect that any adverse road safety effects will arise.

14.3. Stantec Comment: As other growth is generally desired east of SH6, the site adds additional turning movements at other intersections in Cromwell that other growth patterns would not generate

14.3.1. While this is technically correct, the converse is that the plan change will also mean that traffic movements which might otherwise have occurred at intersections will *not* arise. In other words, although Stantec has suggested that there will be a negative effect at some intersections, we highlight that there will also be positive effects. Overall though, the extent of changes in traffic flow will diminish as distance from the site increases such that further from the site, we do not expect that the changes in traffic flows further from the site will be noticeable to road users or result in adverse road safety issues.

15. Ripponvale Road Upgrading

15.1. Stantec Comment: The assessment suggests road widening is achievable, but does not state whether it should be provided as part of development of the site. In addition, the scope of assessment should address the western section of Ripponvale Road

15.1.1. In the context of a plan change, we consider that the first relevant consideration is whether it is *possible* to undertake any improvements which may be required. The alignment and legal width of Ripponvale Road mean that there are no impediments to improvement measures.

15.1.2. A second general consideration is whether the scale of an anticipated adverse effect arising from development is sufficiently great that provision for mitigation needs to be put in place. If so, then in our experience, this is accomplished by having a specific rule in the plan change provision that requires the mitigation measure(s). However we are not aware of any cases where this approach has been used for minor roading improvements, but rather, only for large infrastructure or for significant adverse effects.

15.1.3. In this case, the traffic-carrying capacity of Ripponvale Road will not change if it was to be widened (or put another way, the existing formation is able to accommodate the expected traffic flows). As such, we do not consider that a significant adverse effect would arise if it was to remain at its current width even with the plan change area fully developed. Consequently we do not consider that the widening needs to be specified as a rule in the plan change provisions

15.1.4. In addition, the matter of widening Ripponvale Road can be addressed at the time of subdivision.

15.1.5. In respect of the western section of Ripponvale Road, as noted above the carriageway is presently 5.5m wide, and we confirm that the legal width is 20m. Given the extent of traffic flows presently using the road (250 vehicle movements per day, as noted above), the Council's Engineering Code of Practice requires a 6.0m width with 0.25m metalled shoulders. The existing road is therefore of a lesser standard than required under the Code of Practice.

15.1.6. The proposal will result in traffic flows increasing by around 770 vehicles per day assuming a bias of travel towards Queenstown. Under the Code of Practice this requires a 7.0m wide carriageway with 0.25m metalled shoulders.

15.1.7. In view of the 20m road reserve width and the favourable topography, we consider that this widening can easily be accomplished.

16. Otago Regional Land Transport Plan 2015-2021

16.1. Stantec Comment: It is not clear if the report references the 2018 update to the Plan, which includes refinements to goals and policies

16.1.1. We confirm that the review was carried out using the updated version of the Plan.

16.2. Stantec Comment: The report discusses a bus stop at State Highway 6 / Ripponvale Road would provide accessibility to the site. This is over 1km from the site access, and further again from most of the Plan Change area. This would be well beyond the maximum of 400m distance between a bus stop and house usually considered accessible

16.2.1. The comment in respect of the potential for a public transport stop to provide accessibility to the plan change area was made in the context of *if* a route was to be provided in future and *if* that route used the highway then there would be the ability for a stop in the vicinity of the State Highway 6 / Ripponvale Road intersection which would assist in enhancing the accessibility of the site (especially if combined with a cycle trip).

16.2.2. In our view the issue is somewhat moot since as set out above, there is no public transport within Cromwell and rural residential areas are usually not served by public transport even where there is a network in place as routes are not economic.

17. Central Otago District Plan

17.1. Stantec Comment: The report comments on how the subdivision stage may be implemented. For a Plan Change it would be typical to consider consistency of transport matters with Objectives and Policies in the District Plan

17.1.1. The assessment of the objectives and policies of the District Plan are set out within the application.

18. Regional Policy Statement

18.1. Stantec Comment: The report does not assess the Objectives and Policies related to transport and urban growth in the RPS. This is considered important from the context of how well the site can integrate with the wider transport network

18.1.1. The assessment of the objectives and policies of the Regional Policy Statement are set out within the application documentation.

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