

Before an Independent Commissioner
Appointed by the Selwyn District Council

Under The Resource Management Act 1991

In the matter of Private Plan Change 62 to the Selwyn District Plan

Evidence of Andrew David Carr

31 August 2020

Applicant's solicitors:

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Introduction

- 1 My full name is Andrew (“Andy”) David Carr.
- 2 I am a Chartered Professional Engineer and an International Professional Engineer (New Zealand section of the register). I am also a Chartered Member of Engineering New Zealand (formerly the Institution of Professional Engineers New Zealand), and an Associate Member of the New Zealand Planning Institute.
- 3 I hold a Masters degree in Transport Engineering and Operations and also a Masters degree in Business Administration.
- 4 I served on the national committee of the Resource Management Law Association between 2013-14 and 2015-17, and I am a past Chair of the Canterbury branch of the organisation.
- 5 I have more than 30 years' experience in traffic engineering, over which time I have been responsible for investigating and evaluating the traffic and transportation impacts of a wide range of land use developments, both in New Zealand and the United Kingdom.
- 6 I am presently a director of Carriageway Consulting Ltd, a specialist traffic engineering and transport planning consultancy which I founded five years ago. My role primarily involves undertaking and reviewing traffic analyses for both resource consent applications and proposed plan changes for a variety of different development types, for both local authorities and private organisations. I am also a Hearings Commissioner and have acted in that role for Greater Wellington Regional Council, Ashburton District Council, Waimakariri District Council and Christchurch City Council.
- 7 Prior to forming Carriageway Consulting Ltd I was employed by traffic engineering consultancies where I had senior roles in developing the business, undertaking technical work and supervising project teams primarily within the South Island.
- 8 I have been involved in a number of proposals which have involved assessing the traffic generation and effects of residential developments and plan changes that facilitate residential development. Within this district, examples include Faringdon (over 1,000 lots to the south of Rolleston), Stonebrook (460 lots to the west of Rolleston), Te Whariki (400 lots in Lincoln) and Levi Park (170 lots to the east of Rolleston). I provided transportation advice to the Council for plan changes 28 (Denwood Trustees), 36 (Conifer Grove) and 41 (Shands and Trents Road). I also provided transportation advice to the requestors of Plan Changes 24 (Silverstream, Darfield) and 34 (Southbridge).

- 9 In Christchurch, my experience includes Plan Changes 30 (Prestons) and the Awatea development for Fletcher Living, and further afield I have provided advice for large residential developments in Waiamakariri, Central Otago, Queenstown Lakes, Mackenzie and Hamilton City districts.
- 10 I have also provided advice for numerous other residential plan changes and resource consents within the South Island.
- 11 As a result of my experience, I consider that I am fully familiar with traffic-related issues associated with residential plan changes.

Code of Conduct for Expert Witnesses

- 12 While this is not a hearing before the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2014 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Scope of Evidence

- 13 In this matter, I have been asked by the plan change requestor¹ to consider the submissions made on its plan change request to rezone land on the western side of Leeston township from Living 1 (deferred), Living 2 (deferred) and Outer Plains, to Living 1 (42ha) and Living 2 (19ha). I have also been asked to comment on and respond to the Council Officers' reports.
- 14 The area subject to the plan change request is bounded by High Street to the south, Harmans Road to the west, Leeston Dunsandel Road to the north and residential activity to the east. Within my evidence I refer to this as '**the site**'.
- 15 I have been involved with this project since October 2017, when I provided an initial high-level overview of the key transportation matters relating to the site. I subsequently produced a Transportation Assessment for the site, which accompanied the plan change request. Subsequently, I responded to a Request for Further Information from the Council, part of which included a more detailed assessment of the High Street / Market Street intersection, including peak hour traffic surveys to determine current traffic flows.
- 16 I adopt my Transportation Assessment and Response to the Request for Further Information reports as the primary part of my evidence, and accordingly, have not replicated much of the detail within this evidence, other by way of an overview and

¹ D Marshall, L Martin & A Formosa, M & T Saunders, B Hammett and J & S Howson

matters relevant to submissions and the Officer Reports. I have however provided a brief summary of the key findings, including updating information as relevant.

Summary and Update of Previous Transportation Assessment

- 17 The Transportation Assessment was produced in August 2019 and so I have taken the opportunity to review the prevailing traffic volumes and road safety records since that time.
- 18 The prevailing traffic volumes are shown in paragraph 4.1.1 of the Transportation Assessment. I have replicated these below, together with the most recent volumes recorded in the MobileRoad website.
- Harmans Road: 250 vehicles per day (no change);
 - Feredays Road (east of Harmans Road): 3,700 vehicles per day (increase from 3,100 vehicles per day);
 - High Street (east of Spring Place): 3,600 vehicles per day (decrease from 4,060 vehicles per day);
 - Spring Place: 150 vehicles per day (decrease from 220 vehicles per day);
 - Leeston Dunsandel Road: 500 vehicles per day (decrease from 600 vehicles per day); and
 - Market Street: 1,000 vehicles per day (no change).
- 19 In three locations, the recorded traffic flows are shown to have decreased from the volumes previously recorded and used within the Transportation Assessment. While there are various reasons why traffic volumes might decrease on a road, in order to ensure a robust assessment, I have not corrected for this (downward) change.
- 20 On Feredays Road, the traffic volumes are shown as increasing by 600 vehicles per day. Applying the factors set out in paragraph 4.1.2 of the Transportation Assessment this would suggest that the peak hour flows have increased from 470 vehicles per hour to 555 vehicles per hour. I have therefore re-evaluated the figures within Table 4 for Feredays Road, as shown below.

Scenario	Current Traffic Volumes		Traffic Volumes Generated by PC62		Total Traffic Volumes	
	Per Day	Peak Hour	Per Day	Peak Hour	Per Day	Peak Hour
Previous	3,100	470	352	44	3,452	514
Updated	3,700	555	352	44	4,052	599

Table 1: Revised Traffic Volumes on Feredays Road

- 21 In paragraph 7.1.2 of the Transportation Assessment, I identified that the previous traffic flows resulted in Feredays Road changing from Level of Service B to Level

of Service C in the peak hours. This remains the case under the increased traffic flows shown above.

- 22 In paragraph 7.2.1 of the Transportation Assessment, I noted that the traffic flows were so low that there was no requirement for a detailed intersection assessment. The increase in background traffic however means that the volumes exceed the threshold at which an assessment is required, and I have therefore carried out an assessment of a notional Feredays Road / Site Access intersection. For this, I have assumed that the intersection is priority controlled, with a right-turn auxiliary lane for the east-to-north movement (that is, from the existing township, turning right into the site). This layout can be easily accommodated within the existing legal road width. The results of the modelling of the intersection 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
Feredays Rd	R	5.4	0	A	5.7	0	A
Site Access	L	5.5	1	A	5.6	0	A
	R	8.1	0	A	10.1	0	B
Feredays Rd	L	7.8	0	A	7.8	0	A

Table 2: Assessment of Notional Feredays Road / Site Access Intersection with Full Development of Site

- 23 The modelling shows that the intersection can easily accommodate the expected traffic flows with low queues and delays.
- 24 Consequently, the increased traffic flows do not change the conclusions in respect of the ability of the surrounding road network to accommodate the traffic generated at full development of the site.
- 25 With regard to road safety, I have reviewed the additional crashes reported on the same sections of road as within the Transportation Assessment, from July 2019 to the current time. This showed that there had been no additional crashes recorded, and therefore the conclusions within my earlier Transportation Assessment remain valid.

Response to Submissions

- 26 I have reviewed the submissions received on the plan change request and identified those that raise traffic and transportation matters. I address these below. For clarity, the matters are not listed in any particular order, and where the same issue has been raised by several submitters, I have only responded once to avoid unnecessary repetition.

Submitter concern: The roads in Leeston will not be able to accommodate the increased traffic flows

- 27 I have evaluated the effects of the expected increase in traffic, and my analysis shows that the roads and intersections in Leeston will continue to provide a good level of service.

Submitter concern: The increased traffic flows will lead to a reduction in road safety

- 28 I have reviewed the crash records on the roads and intersections that are closest to the site, and on this basis, I do not consider that the traffic generated by the plan change request will result in adverse road safety effects arising.

Submitter concern: Spring Place should not be used as a way of vehicles gaining access to the site

- 29 At the outset, I note that this area is in the same title as the main site, and it is not (as mentioned by some submitters) an undeveloped residential lot.

- 30 Within my Transportation Assessment, I identified that a roading link onto Spring Place would be likely to result in an increase of 70 vehicle movements in the peak hours on Spring Place. This equates to an average of one additional vehicle movement every 51 seconds. In order to accommodate this while ensuring that Spring Place meets the Council's roading standards, the southernmost section of the road will need to be improved to the same standard as presently in place for the northern section. This can be accomplished within the existing legal road reserve.

- 31 Given that the road would meet the Council's standards, I do not consider that the slight increase in traffic flows would give rise to adverse efficiency effects.

- 32 The requestor's planning consultant previously advised me that this roading link was sought by Council. From a transportation perspective, if the link was to be removed then the volume that it carries could easily be accommodated using other roads within the site. However even if it was to be removed as a trafficable road, I consider that a link onto Spring Place should be retained for walking and cycling purposes.

- 33 That said, I note Mr Mazey's comment that it should be downgraded to a secondary link. I discuss this further later in my evidence.

Submitter concern: The traffic increase on Spring Place will make it harder to turn out onto High Street

- 34 The hour when the greatest number of vehicles will exit Spring Place onto High Street will be the morning peak hour, and at this time my analysis shows that 103

vehicles will emerge from Spring Place at full development of the site. Taking this into account, and allowing for only one vehicle to emerge from Spring Place at a time (that is, without having two vehicles queue side-by-side), I modelled the performance of the intersection using the computer software package Sidra Intersection. The results are summarised below.

Road and Movement		Morning Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
High Street	R	7.3	0	A
Spring Place	L	10.5	1	B
	R	11.9	1	B
High Street	L	5.6	0	A

Table 3: Assessment of High Street / Spring Place Intersection with Full Development of Site

35 It can be seen that queues and delays remain low.

Submitter concern: The traffic increase on Spring Place will make it harder to reverse from driveways

36 My assessment of an increase of 70 vehicle movements in the peak hours on Spring Place is unlikely to present significant issues for reversing movements from driveways because it remains unlikely that a reversing vehicle will encounter another vehicle. Further, any drivers using Spring Place to access the site will be aware that it serves residences, and will therefore be anticipating that they may be delayed from time to time by a vehicle reversing from a driveway.

Submitter concern: The traffic increase on Spring Place will create adverse road safety effects for pedestrians

37 There is a 1.8m wide footpath on the eastern side of Spring Place which means that pedestrians are physically separated from the adjacent traffic streams.

38 On High Street there is only a footpath along the southern side meaning that any pedestrians need to cross the road. The flat and straight alignment of High Street means that pedestrians can easily see approaching vehicles, and the speed limit of 50km/h also supports a safer environment for pedestrians.

39 An assessment shows that the road at present provided Level of Service B ('very good') for pedestrians that are crossing, and this would change to Level of Service D ('some concern') with the site fully developed. However straightforward measures such as a refuge could easily be installed within the legal road which would result in the level of service being improved. I would expect that such measures would be put in place as part of the Council's ongoing improvements of

the roading network, but if necessary, they could specifically be considered when consents are sought for subdivision of the site.

Submitter concern: The traffic increase on Leeston Dunsandel Road will adversely affect the school drop-off and pick-up

- 40 Residential development typically does not generate large traffic flows at the time of school pick-up, but rather, any effects arise in the morning as the 'school run' coincides with trips to work. In the morning peak hour my assessment showed that an additional 82 vehicles could pass Ellesmere College, which equates to one additional vehicle movement every 44 seconds, on average. I do not anticipate that this will give rise to any adverse effects on drop-off activities.

Submitter concern: The traffic increase on Leeston Dunsandel Road will adversely affect the ability of children to walk to school

- 41 The increase in traffic flow on Leeston Dunsandel Road is small, even in the peak hours, and I therefore do not consider that the ability of children to walk to school will be adversely affected. It would be straightforward however for a footpath or shared footpath/cyclepath to be constructed alongside the road if desired. This is a matter that can be addressed when subdivision consents are sought since the legal width of the road is sufficient to accommodate such a connection.

Submitter Concern: Construction traffic should not use Spring Place

- 42 For major works within the site, a Traffic Management Plan would need to be produced as a matter of course before any work commenced, with this plan having to be approved by the Council. I would expect that as a matter of good practice, heavy vehicles would be retained on roads higher in the hierarchy (such as High Street and Feredays Road) rather than roads that are lower in the hierarchy (such as Spring Place). However this matter cannot be addressed through a plan change request.

Submitter Concern: Adverse efficiency effects will arise on the wider roading network

- 43 It is invariably the case that the traffic effects of any development are the most pronounced on the roading network in the immediate vicinity of that site. This is because as distance from any site increases, traffic effects become more dispersed due to drivers having a greater number of routing choices that decrease the volume of extra traffic on any roading link. As such, any traffic-related effects of the plan change request will be most pronounced in Leeston, rather than in (say) Rolleston which is 19km away, or Christchurch which is some 32km away.

- 44 The roading network around Leeston presently has ample capacity for the traffic flows carried, and this remains the case with full development of the site. The peak hour traffic flow anticipated to be generated is in the order of 370 vehicle movements, and when this is spread over several different roads, I do not consider that the increase on roads further from Leeston will be significant.

Response to Council Officers

- 45 I have read the report of Ms Jocelyn Lewes, Strategy and Policy Planner at Selwyn District Council, who relies on a traffic engineering report produced by Mr Andrew Mazey, Council's Asset Manager Transportation.
- 46 Mr Mazey generally supports the roading and transport layout shown on the ODP, and has no concerns in respect of the capacity of any intersections affected by the traffic generated through development of the plan change area. However he has recommended that a number of issues are re-examined when subdivision consents are lodged, such as checking the Southbridge-Leeston Road / Feredays Road / Harmans Road intersection to ensure that it will operate safely, the provision of improved delineation around the High Street / Spring Place intersection, and the re-formation of various roads with a more 'urban' design including footpaths. Since subdivision cannot be carried out as of right, I agree with Mr Mazey that these are matters that can be addressed at the time of subdivision.
- 47 In respect of Spring Place, Mr Mazey is supportive of the proposed roading connection to provide co-joined development and local transport connectivity and access resilience, and describes that the land was retained for the purposes of forming a road in future. Given the concerns of the submitters though, he has recommended that it should be downgraded and form a secondary road as well as recommending that some form of threshold treatment is implemented to limit the attractiveness of the route.
- 48 As I set out above, this approach would not present any difficulties with regard to the capacity of any other intersections in the immediate area and I can therefore support the proposal. I understand that the requestor has proposed an amendment to the Outline Development Plan accordingly.
- 49 I note that Mr Mazey sets out that a roundabout should be installed at the proposed High Street / Clausen Avenue / Site Access intersection to cater for the traffic generated by the increase in traffic. He considers that this would be safer than a crossroads intersection, establish this location as the main point of access into the plan change area, provide a threshold for the township, and better manage vehicle speeds along High Street.
- 50 I do not agree that a roundabout is required at this intersection. In the Transportation Assessment, I identified that a priority intersection would have

ample capacity to serve the plan change area (Transportation Assessment section 7.4). Given that this will not operate as a crossroads per se (because there will be very little north-south traffic) I do not consider that adverse road safety issues would arise from the provision of a priority-type arrangement. Provision of a threshold for Leeston and speed management on High Street appear to be issues unrelated to the plan change itself but related to matters of general roading management.

- 51 More importantly, I anticipate that any roundabout would need to be designed to meet current standards. If the current western approach to the potential roundabout was to be maintained at a 100km/h speed limit (as at present), or even reduced to 80km/h, then this means the **minimum** diameter of the roundabout central island would be 20m, and to allow for the movement of heavy vehicles (stock trucks and the like), the circulating carriageway would need to be 8m (Austroads Guide to Road Design Part 8: Roundabouts, Tables 4.1 and 4.3). The roundabout therefore would be around 36m wide (a 20m inner island with an 8m circulating carriageway around it). I have superimposed these key parameters over the location of the intersection, without requiring third party land (and reducing the existing 5m separation between the edge of the carriageway and private land to just 3m, accommodate a footpath and verge).

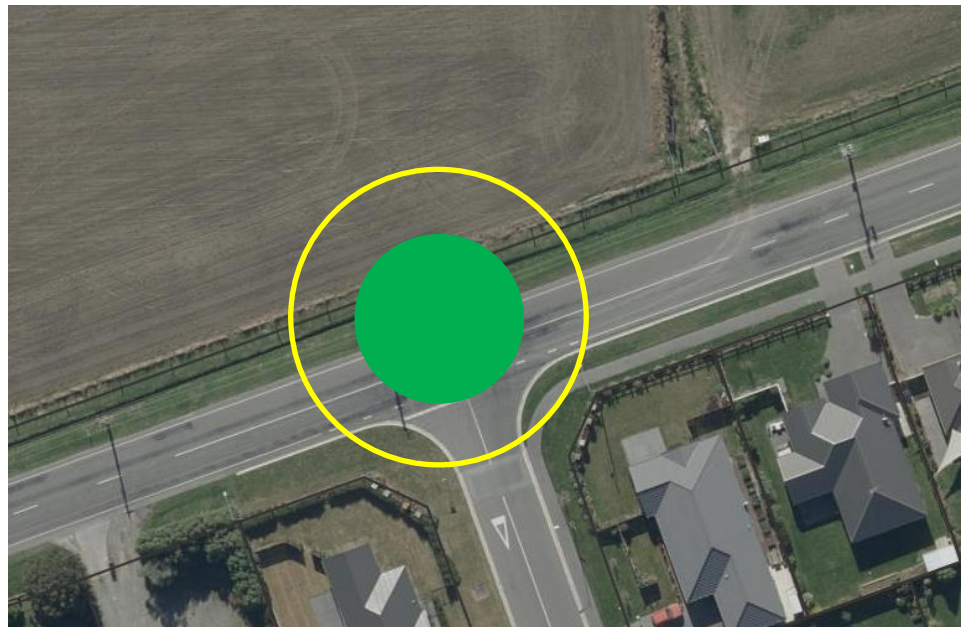


Figure 1: Key Geometry of Potential Roundabout at High Street / Clausen Avenue / Site Access Intersection

- 52 It can be seen that the roundabout is located to the north of the centreline of High Street. In turn, this means that the eastern and western approach roads need to be realigned slightly to accommodate the offset.

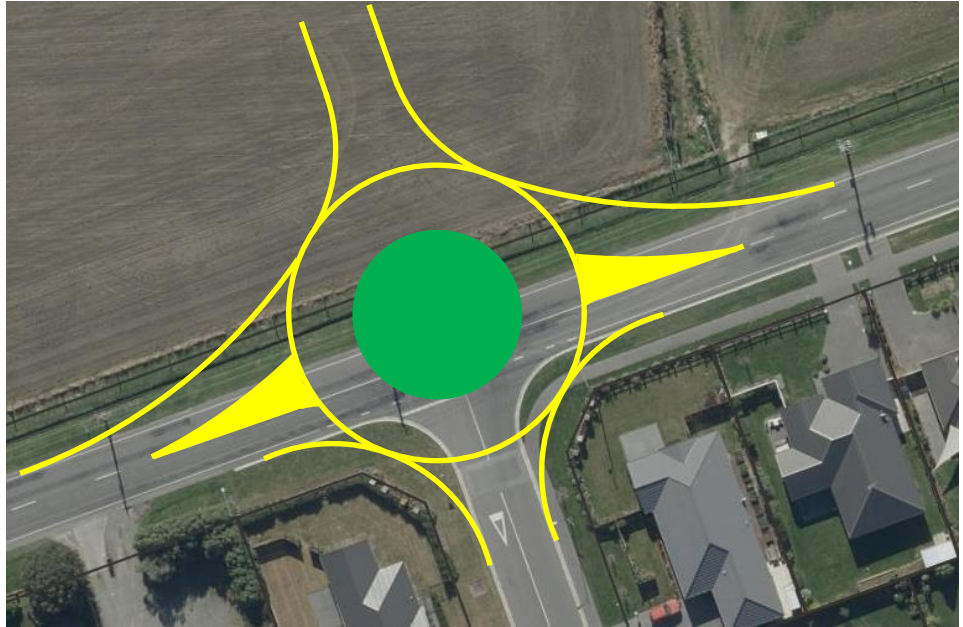


Figure 2: (Highly) Indicative Roundabout at High Street / Clausen Avenue / Site Access Intersection

- 53 In my view, this is an unnecessary design solution for what is in essence a lightly-trafficked environment (even with the plan change area fully developed). Even the conservative layout shown above is required to utilise land that is within the plan change area, and would also make access difficult for any lots close to the roundabout and those living on the southeastern and southwestern quadrants. It would also sterilise land within the plan change area that could otherwise be used for housing.
- 54 I note that Mr Mazey sets out that the splays on Clausen Avenue facilitate a roundabout (his paragraph 29). While I agree that they partially assist, the splays are not sufficiently large to eliminate the offset of the roundabout from High Street. Rather, to eliminate the offset would require a smaller roundabout, but in turn, this results in a layout that would not comply with the overarching design guide.
- 55 I understand that Mr Mazey has subsequently discussed the potential for a reduction in the speed limit in this location with the requestor's planning consultants (Baseline Planning Group), and has also indicated that a smaller roundabout design may be considered by the Council.. While I acknowledge that the Council could, at its discretion, agree to a non-complying roundabout layout, it would be problematic in my view to have a plan change provision that relied on such a design being accepted. This is because if the Council did not accept the non-complying roundabout layout, it would frustrate the ability to give effect to the plan change.
- 56 In conclusion, I agree that appropriate roading upgrades can be determined at subdivision stage, but do not agree that a roundabout should be required in this location. I therefore support the approach of the Council Planner in not making any specific reference to this within the plan change provisions.

Conclusion

- 57 Based on my review of the development facilitated by the plan change request, I consider that the traffic generated can be accommodated without significant efficiency or safety issues arising.
- 58 There is a high degree of agreement between myself and the Council Officers, with Mr Mazey also concluding that the roading efficiency or road safety effects of approving the plan change request will be no more than minor (and Ms Lewes accepting Mr Mazey's advice). I agree that the Spring Place road link should be downgraded and the Outline Development Plan updated accordingly.
- 59 In large part I concur with the Council Officers that the detailed design solutions can be evaluated at the time that subdivision consents are sought. However Mr Mazey has made reference to a roundabout being required at the High Street / Clausen Avenue / Site Access intersection, which I do not support.
- 60 I have reviewed the submissions made on the plan change request. However I do not consider that the plan change provisions need to be modified from a transportation perspective, other than in respect of the Spring Place linkage being downgraded to a secondary link.
- 61 I therefore remain of the view that there are no transportation reasons why the plan change request could not be recommended for approval.

Dated this 31 August 2020

Andy Carr