



Project: Private Plan Change 76: Dunweavin

Title: Transportation Hearing Report

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SUMMARY OF MY PEER REVIEW

Selwyn District Council (Council) has requested Flow Transportation Specialists (Flow) to review the transportation matters associated with Private Plan Change 76 (PPC76), which has been lodged by Dunweavin 2020 Ltd (requestor). As part of my review, I have considered the cumulative transport effects of 8 private plan changes (PPCs) within Rolleston, being

- ◆ PPC64: Rolleston, 969 residential lots
- PPC66: Rolleston, rural zone to industrial zone
- ◆ PPC70: Rolleston, 800 residential lots plus commercial
- PPC71: Rolleston, 660 residential lots
- ◆ PPC73: Rolleston, 2100 residential lots plus commercial
- PPC75: Rolleston, 280 residential lots
- PPC76: Rolleston, 150 residential lots
- PPC78: Rolleston, 750 residential lots.

This report focuses on my review of PPC76, however I include comments on the cumulative effect of the additional seven PPCs to assist Council's understanding of the potential future effects on the transport network should all PPCs be approved.

Key transport matters identified in my review are

- The cumulative effect of the 8 PPCs on the Rolleston transport network, and the proportional effect of PPC76
- The safety and efficiency effects of PPC76 on key intersections, and what intersection and road upgrades are required to support PPC76
- Connectivity of the Outline Development Plan (ODP) within the site, and to the adjacent existing and future transport network
- Consideration of the Rolleston Structure Plan.

In terms of the immediate effects of PPC76, and the proposed ODP

- The Proposed Road/East Maddisons Road intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. Refer to my discussion in Section 5.1
- ◆ The East Maddisons Road/Goulds Road tee intersection and the Shillingford Boulevard/Goulds Road roundabout are indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. Refer to my discussion in Section 5.2
- I recommend that the ODP indicates the requirement for the requestor to deliver the frontage upgrade for East Maddison Road. Detailed upgrades should be determined by the developer in collaboration with Council at subdivision stage and in accordance with Council Engineering Code of Practice requirements. Refer to my discussion in Section 6.1

- I consider that the proposed transport network shown in the ODP aligns with adjacent developments, however I recommend that the ODP should be amended to show a direct east/west primary road through the site. Refer to my discussion in Sections 6.2, 6.3, and 7
- I recommend that the ODP should provide an east/west cycle route through the site. Refer to my discussion in Section 6.3.

I recommend that Council consider the following matters regarding effects on the wider transport network

• I recommend that Council consider the proportional effect that each PPC will have on network hotspots and assumed intersection improvements contained in the 2033 Rolleston Paramics model, as identified in Table 3. Council should consider whether the proportional effects of PPC76 affect programmed funding within the Long Term Plan, whether new projects should be added to the Long Term Plan, and how Development Contributions are calculated. I note that the 2033 Rolleston Paramics model does not incorporate the change to the SH1/Rolleston Drive South intersection, proposed as part of Waka Kotahi New Zealand Transport Agency New Zealand Upgrade Programme (NZUP). Should NZUP implement these changes, it is likely that our reporting of traffic effects on Dunns Crossing Road, Brookside Road, Lowes Road (among others) are under indicated. Refer to my discussion in Section 4.

Should my recommendations be adopted I consider that the safety and efficiency effects on the localised transport network can be appropriately addressed through the future resource consent process and Council's Long Term Plan.

I consider that PPC76 will generate safety and efficiency effects on the wider transport network, however these are more appropriate to be addressed by Council due to PPC76 being just a proportion of the cumulative growth effects anticipated in Rolleston.

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1 INTRODUCTION

This report has been completed by Mat Collins (Associate) with assistance from Qing Li (Principal) and review by Ian Clark (Director). Ian, Qing and I are experts in the field of transport planning and engineering. Ian and I frequently attend Council and Environment Court mediation and hearings as transport experts for local government, road controlling authorities and private concerns.

In July 2021 Selwyn District Council (Council) requested Flow Transportation Specialists (Flow) to assist with the review of transportation matters associated with 7 Private Plan Changes (PPCs) within Rolleston

- PPC64: Rolleston, 969 residential lots
- PPC70: Rolleston, 800 residential lots plus commercial
- PPC71: Rolleston, 660 residential lots
- PPC73: Rolleston, 2100 residential lots plus commercial
- PPC75: Rolleston, 280 residential lots
- PPC76: Rolleston, 150 residential lots
- PPC78: Rolleston, 750 residential lots.

In addition, PPC66 in Rolleston (which seeks to rezone 27ha of rural land to industrial zone) has been included in our consideration of the cumulative traffic effects of the PPCs within the Rolleston area.

Dunweavin 2020 Ltd (requestor) has lodged a PPC to change to the Selwyn District Plan to rezone approximately 13 hectares of Rural Inner Plains to Living Z. This report details my review of PPC76. Where relevant I also make comments about the cumulative effects of all 8 Rolleston PPCs so that Council may understand how the future transport network may operate should all PPCs be approved.

The scope of this specialist transport report is to assist Council in determining the transport outcomes of PPC76 and includes the following

- A summary of PPC76 focusing on transport matters
- An overview of transport projects contained within the Long Term Plan (LTP), which are relevant to PPC76
- A summary of the modelled traffic effects of the 8 Rolleston PPCs
- A review of the material provided to support the application for PPC76, and discussion of the potential effects of PPC76
- Summary of submissions, relating to transport matters only
- My recommendations.

I have reviewed the following documents, as they relate to transport matters

- Application for Private Plan Change, prepared by Aston Consultants, dated May 2021, including
 - Appendix 7 Integrated Transport Assessment, prepared by Novo Group, dated March
 2021

- Response to Council information requests, prepared by Aston Consultants, dated 24 March 2021
- Third party traffic model files, as discussed in Section 4
- Submissions as outlined in Section 7.

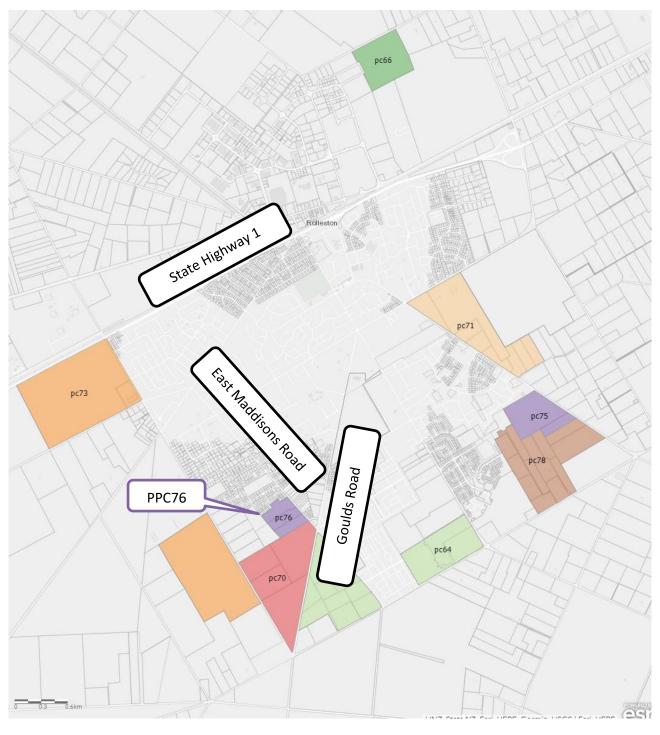
2 A SUMMARY OF PPC76

PPC76 proposes to rezone approximately 13 hectares of Rural Inner Plains to Living Z, as shown in Figure 1. An Outline Development Plan (ODP) is proposed to guide the form and layout of future development.

The ODP is shown in Figure 2 and is intended to provide

- approximately 156 dwellings
- direct north-south primary road connection, between Lennon Drive (consented) and PPC70 (lodged)
- east-west indirect road connection from East Maddisons Road
- pedestrian and cycle links within and through the ODP area to connect to adjoining urban areas.

Figure 1: Overview of PPC76 and other nearby Rolleston PPCs1



¹ Adapted from Council's "Current plan change requests" website, available at https://www.selwyn.govt.nz/property-And-building/planning/strategies-and-plans/selwyn-district-plan/plan-changes

Figure 2: Proposed ODP, with transport connections to adjoining development



3 ROLLESTON TRANSPORT PROJECTS RELEVANT TO PPC76

This section discusses various funded and planned transport projects in Rolleston that have relevance to PPC76.

3.1 Transport projects in the Long Term Plan

Council has provided a list of transport projects within the LTP that I consider to be relevant to PPC76. I have reproduced these in Table 1 below. Further discussion of how PPC76 is anticipated to affect various parts of the transport network is provided in Section 4.

Table 1: LTP transport projects relevant to PPC76

Project	Scheduled year	Description	Relevance to PPC76
Traffic Signals at Rolleston Drive/Tennyson Street	2021/22	Safety upgrade, including safer pedestrian crossing	PPC76 contributes less than 1% of peak hour traffic movements in 2033
Foster Park - Park N Ride	2023/24	improved parking to access express bus services	Supports improved Public Transport access between Rolleston and Christchurch
Brookside Road/Rolleston Drive Roundabout	2024/25	Safety upgrade	PPC76 contributes less than 1% of peak hour traffic movements in 2033
Springston Rolleston Road/Selwyn Road intersection	2024/27	Safety upgrade under NLTP (Waka Kotahi)	PPC76 contributes less than 1% of peak hour traffic movements in 2033
Lowes Road/Levi Drive/Masefield Drive Intersection Upgrade	2025/26	Safety upgrade - link to Southern Motorway Interchange	PPC76 contributes less than 1% of peak hour traffic movements in 2033
Tennyson/Moore Street Roundabout	2026/27	Safety upgrade as part of Moore Street extension	PPC76 contributes less than 1% of peak hour traffic movements in 2033
Selwyn/Weedons Road Roundabout	2027/28	Safety upgrade - Rolleston southern arterial link	PPC76 contributes less than 1% of peak hour traffic movements in 2033
Jones Road Cycleway	2027/28	Between Jones Road and Weedons Road - links to Rolleston to Templeton Cycleway	Some relevance to PPC76, however this is located more than 5km from PPC76.
Lincoln Rolleston Road/Selwyn Road Intersection Upgrade	2028/29	Safety upgrade - Rolleston southern arterial link	PPC76 contributes less than 1% of peak hour traffic movements in 2033

Walkers Road/Two Chain Road Roundabout	2028/29	Safety upgrade - Rolleston Industrial Zone southern link	PPC76 contributes less than 1% of peak hour traffic movements in 2033		
Goulds/East Maddisons Road Roundabout	2029/30	Connects Farrington and new subdivisions to Goulds Road	PPC76 contributes around 1% of peak hour traffic movements in 2033		
Rolleston to Burnham Cycleway	2029/30	From Elizabeth St to Aylesbury Road along the northside of SH1 and along Runners Road	Some relevance to PPC76. Project is approximately 3km from the site, this will increase cycle accessibility		
Rolleston 'Park N Ride'	2030/31	new facilities for parking to access to express bus services	Supports improved Public Transport access between Rolleston and Christchurch		
Burnham School Road/Dunns Crossing Road Traffic Signals	2032/33		Some relevance to PPC76. Project is approximately 3km from the site, this will increase cycle accessibility		
Rolleston South to Rolleston Industrial Zone Cycleway	2033/34		Some relevance to PPC76. Project is approximately		
West Melton to Rolleston Cycleway	2034/35		5km from the site, this will increase cycle accessibility		
Lowes Road/Dunns Crossing Road Roundabout	2035/36	Project funded beyond the 2021-31 LTP	PPC76 contributes less than 1% of peak hour traffic movements in 2033		
Burnham School Road Widening	2042/43		Some relevance, PPC76 contributes around 1% of peak hour traffic movements at the Burnham School Road/Dunns Crossing Road intersection in 2033.		

3.2 Transport projects in the New Zealand Upgrade Programme

The New Zealand Upgrade Programme (NZUP) projects in Canterbury are intended to manage growth effects by providing residents with safer and better travel choices, as well as improving freight links to support economic growth and the opening of the Christchurch Southern Motorway through to Rolleston. The NZ Upgrade Programme includes \$300 million for six projects to support growth in the south-west sector of Christchurch and neighbouring Selwyn District. Projects relevant to PPC76 are discussed in Table 2.

Table 2: NZUP² transport projects relevant to PPC76

Project	Scheduled year	Description	Relevance to PPC76
SH1 Rolleston and Rolleston Flyover ³	2024/2026	\$125 million has been provided to create safer and better access from the residential area across State Highway 1 (SH1) and the Main South Line (railway) to the industrial zone. A new two-lane overbridge will be built to connect the two areas and provide improved walking and cycling facilities. It will cross SH1 from Rolleston Drive to Hoskyns Road. Four intersections along SH1 between Burnham and Rolleston will also be upgraded, with a range of safety improvements to reduce deaths and serious injuries and better manage the forecast future growth in traffic volumes along this section of the highway	Includes upgrade of SH1/Dunns Crossing Road, and potential changes to SH1/Rolleston Drive. The 2033 Rolleston Paramics model assumes that the NZUP projects in Rolleston have been implemented, however it does not include the potential conversion of the SH1/Rolleston Drive intersection to a left in/left out. While there are identified safety issues with the existing intersection, traffic modelling indicates that PPC76 will only generate 25 peak hour movements through the intersection by 2033.

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² NZUP Canterbury Package, available online https://www.nzta.govt.nz/planning-and-investment/nz-upgrade/canterbury-package/

³ Rolleston flyover and transport improvements feedback form, July 2021, available online https://www.nzta.govt.nz/assets/projects/sh1-rolleston/SH1-Rolleston-flyover-and-transport-improvements-brochure.pdf

4 MY REVIEW OF TRAFFIC MODELLING FOR THE ROLLESTON AREA

Flow has also used the following existing transport models to assess the potential effect of the 8 PPCs within the Rolleston area (as shown in Figure 1)

- ◆ 2028 Rolleston Paramics model, produced by Abley (which excludes the 8 PPCs)
- 2033 Rolleston Paramics model, produced by Abley, as summarised in the Abley memo "Rolleston Plan Change Modelling" to Council, dated 5 May 2021 (which includes the 8 PPCs).

Flow interrogated the models to understand the potential traffic effects of PPC76 both in isolation and as a cumulative effect in conjunction with the other 7 PPCs. Further detail on the methodology is provided in Appendix B, and our findings are summarised below.

I note that concurrently with the development of the Rolleston Plan Change Modelling, Waka Kotahi has developed an alternative version of the Rolleston Model to investigate how the SH1 NZUP project might affect the transport network. I understand that this model includes the conversion of the SH1/Rolleston Drive South intersection into a left in/left out intersection.

This is not reflected in the 2028 or 2033 Rolleston Paramics model and is likely to have a consequential effect on the traffic movements on Dunns Crossing Road, Brookside Road, and Lowes Road, among others.

4.1 PPC76 proportion of the cumulative network effects of all PPCs

The 2033 Rolleston Paramics model identifies that the following intersections will be operating near to or over capacity by 2033 if all 8 PPCs in Rolleston proceed

- SH1/Weedons Interchange South roundabout
- Lowes Road/Broadlands Drive priority intersection
- Levi Road/Ruby Drive priority intersection
- Levi Road/Strauss Drive priority intersection
- Levi Road/Weedons Road priority intersection
- Dunns Crossing Road/Newman Road priority intersection
- Selwyn Road/Lincoln Rolleston Road priority intersection with seagull treatments
- Jones Road/Weedons Road roundabout.

To determine the extent to which PPC76 is contributing to the capacity effects at these intersections, Flow interrogated the traffic flows generated by each PPC as a proportion of the modelled vehicle flow through each intersection (presented as the combination of both the 1 hour AM and PM peak hour flows, which are generally between 7am-8am and 5pm-6pm). Further, we have included intersections where improvements have been assumed in the 2033 Rolleston Paramics (for example signalisation or conversion to a roundabout).

These results are presented in Table 3, which I have colour coded to assist interpretation

- no shading: the PPC contributes less than 2.5% of total traffic movements at this intersection, which I consider to be less than minor
- orange shading: the PPC contributes between 2.5% and 5% of total traffic movements at this intersection, which I consider to be minor
- red shading: the PPC contributes more than 5% of total traffic movements at this intersection, which I consider to be more than minor.

In relation to intersections with indicated congestion/high delays in 2033, PPC76 has less than minor contribution to congestion effects, with less than 1% of traffic movements being attributable to PPC76.

In relation to intersections that are not indicated to have congestion/high delays in 2033, but are assumed to have improvements, PPC76 has less than minor contribution to congestion effects, with less than 2% of traffic movements being attributable to PPC76.

A Select Link Analysis output from the 2033 Rolleston Paramics model is provided in Appendix C, demonstrating traffic flows from PPC76.

Information on the proportional effect of each PPC may assist Council in its consideration of how the eight PPCs may affect funding within the Long Term Plan (LTP), either by bringing forward the timing of planned infrastructure upgrades, or by introducing new projects that are needed within the LTP (for example, those assumed in the 2033 Rolleston Paramics model).

Outcome: I recommend that Council consider the proportional effect that each PPC will have on network hotspots and assumed intersection improvements contained in the 2033 Rolleston Paramics model, as identified in Table 3. Council should consider whether the proportional effects of PPC76 affect programmed funding within the Long Term Plan, whether new projects should be added to the Long Term Plan, and how Development Contributions are calculated.

I note that the 2033 Rolleston Paramics model does not incorporate the change to the SH1/Rolleston Drive South intersection, proposed as part of NZUP. Should NZUP implement these changes, it is likely that our reporting of traffic effects on Dunns Crossing Road, Brookside Road, Lowes Road (among others) is under indicated.

Table 3: future network hotspots, planned Council projects, and proportional PPC effects

Intersection	Existing Layout	Intersection form assumed in models (2028/2033)	2028 performance without PPCs	2033 performance with all 8 PPCs	2033 traffic movements With all PPCs		_				a proporti		
			(red for LOS F)	(red for LOS F)	(AM and PM combined)	PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78
						%	%	%	%	%	%	%	%
Intersections with congestion	n/high delays in the	2033 Rolleston Paramics mode	el										
Dunns Crossing Road/Granite Road	Priority	Priority/Signals	LOS A in both AM and PM	LOS E on Granite Rd east in AM	2,450 veh	30.0%	2.2%	0.0%	3.3%	0.3%	0.1%	0.5%	0.7%
Dunns Crossing Road/Newman Road	Priority	Priority in both years	LOS A in both AM and PM	LOS F on Newman Rd and PC73 access in AM	2,590 veh	25.1%	1.8%	0.0%	2.8%	0.2%	0.1%	0.4%	0.5%
Jones Road/Weedons Road	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS F on Weedons Ross Rd north and Jones Rd east in PM	3,620 veh	2.1%	1.0%	0.7%	0.9%	0.8%	0.3%	0.2%	0.9%
Levi Road/Ruby Drive	Priority	Priority in both years	LOS B and C in AM and PM respectively	LOS F on PC71 Access in AM, Ruby Dr and Lowes Rd in PM	2,890 veh	1.7%	2.1%	0.0%	3.0%	5.4%	0.8%	0.5%	0.9%
Levi Road/Strauss Drive	Priority	Priority in both years	LOS D and C in AM and PM respectively	LOS F on Strauss Dr and Levi Rd east in AM	3,210 veh	1.2%	1.7%	0.0%	2.5%	4.0%	0.7%	0.5%	0.7%
Levi Road/Weedons Road	Priority	Priority in both years	LOS F on Weedons Rd South and Levis Rd west in PM	LOS F on Weedons Rd South in both AM and PM, and on Levis Rd west in PM	3,480 veh	1.2%	2.3%	0.0%	2.2%	3.7%	0.8%	0.4%	1.8%
Lowes Road/Broadlands Drive	Priority	Priority in both years	LOS B and C in AM and PM respectively	LOS F on Broadlands Dr in AM, Lowes Rd west in PM	1,910 veh	10.6%	1.9%	0.0%	2.9%	2.1%	0.8%	0.5%	1.2%
Selwyn Road/Lincoln Rolleston Road	Priority	Priority/ Priority with Seagull Treatment	LOS F on Lincoln Rolleston Rd north in PM	LOS F on Lincoln Rolleston Rd north in PM	3,990 veh	4.1%	5.3%	0.0%	1.8%	1.4%	1.5%	0.3%	5.3%
SH1/Weedons Interchange South	Roundabout	Roundabout in both years	LOS F on SH1 West, AM and PM	LOS F on SH1 West and Weedons Rd, AM and PM	3,870 veh	1.3%	2.1%	0.2%	2.0%	3.3%	0.7%	0.4%	1.6%
Other intersection with upgr	ades assumed in the	2033 Rolleston Paramics mod	lel			•							
Burnham School Road/Dunns Crossing Road	Priority cross road	Signals	LOS A in both AM and PM	LOS B and A in AM and PM respectively	2,150	33.2%	3.7%	0.0%	4.8%	0.9%	0.5%	0.7%	1.5%
Dunns Crossing Road/Brenley Drive/Skellerup Primary Access	No intersection	Priority T/Priority Cross Road with Right Turn bays	LOS A in both AM and PM	LOS C in both AM and PM	2,280 veh	33.2%	3.6%	0.0%	5.9%	0.4%	0.2%	0.7%	0.9%
Dunns Crossing Road/East West Primary	Priority	Priority/Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	1,670 veh	32.6%	5.5%	0.0%	8.7%	1.0%	0.5%	0.2%	1.6%

⁴ Orange shading: the PPC contributes between 2.5% and 5% of total traffic movements at this intersection. Red shading: the PPC contributes more than 5% of total traffic movements at this intersection.

Intersection	Existing Layout	Intersection form assumed in models (2028/2033)	2028 performance without PPCs	2033 performance with all 8 PPCs	2033 traffic movements With all PPCs		_	offic associates through					
			(red for LOS F)	(red for LOS F)	(AM and PM combined)	PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78
						%	%	%	%	%	%	%	%
Dunns Crossing Road/Goulds Road/Selwyn Road	Priority	Priority/Roundabout with Priority control at Goulds /Dunns Crossing Intersection	LOS C in both AM and PM	LOS A in both AM and PM, at both intersections	1,640 veh	14.2%	3.0%	0.0%	5.8%	0.8%	0.4%	0.2%	2.2%
Dunns Crossing Road/ODP12 Access/ Skellerup Secondary Access	No intersection	Priority T/Priority Cross Road with Right Turn bays	LOS A in both AM and PM	LOS A in both AM and PM	1,450 veh	30.8%	5.3%	0.0%	8.5%	0.1%	0.2%	0.0%	1.2%
Goulds Road /East Maddisons Road	Priority	Priority/Roundabout	LOS A and B in AM and PM respectively	LOS A in both AM and PM	2,480 veh	9.5%	8.6%	0.0%	13.6%	2.2%	1.0%	1.2%	2.1%
Lowes Road/Dunns Crossing Road	Priority	Priority/Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	2,690 veh	30.9%	3.1%	0.0%	4.9%	0.9%	0.4%	0.6%	1.2%
Lowes Road/East Maddisons Road	Priority	Priority/Roundabout	LOS B and D in AM and PM respectively	LOS B and A in AM and PM respectively	2,320 veh	13.1%	2.0%	0.1%	2.1%	1.5%	0.7%	1.3%	1.6%
Lowes Road/Levi Drive/Masefield Drive	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS C in both AM and PM	4,300 veh	3.4%	1.6%	0.1%	2.1%	4.6%	1.7%	0.4%	3.4%
Lowes Road/Tennyson Street	Signals	Signals in both years	LOS B and C in AM and PM respectively	LOS B and C in AM and PM respectively	4,540 veh	4.1%	3.6%	0.1%	3.1%	1.0%	0.4%	0.6%	0.8%
Rolleston Drive/Brookside Road	Priority	Roundabout in both years	LOS A and C in AM and PM respectively	LOS D and C in AM and PM respectively	3,390 veh	7.1%	0.5%	0.2%	1.4%	0.8%	0.3%	0.6%	0.7%
Rolleston Road/Tennyson Street	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS B and C in AM and PM respectively	4,320 veh	2.8%	3.1%	0.2%	2.5%	1.1%	0.4%	0.5%	1.0%
Selwyn Road /Weedons Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	4,270 veh	4.1%	4.9%	0.0%	1.7%	1.3%	1.4%	0.3%	4.8%
Springston Rolleston Road/Selwyn Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	3,080 veh	5.9%	10.1%	0.0%	3.1%	1.1%	0.6%	0.4%	3.1%
Tennyson Street/Moore Street	Priority	Roundabout in both years	Not provided	Not provided	1,660veh	2.0%	1.4%	0.2%	0.9%	0.6%	0.3%	0.2%	0.7%
Walkers Road/Two Chain Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	970 veh	6.9%	1.3%	0.2%	1.6%	0.6%	0.2%	0.3%	0.7%

5 MY REVIEW OF THE ITA

The ITA provides an assessment of the following intersections (shown in Figure 3)

- 1. Proposed Road/East Maddisons intersection
- 2. East Maddisons Road/Goulds Road intersection.

The ITA used traffic flows for existing roads based on outputs from the 2028 Rolleston Paramics model to inform SIDRA intersection models, however the 2033 Rolleston Paramics model has since been developed, as discussed in Section 4. I note that the 2028 Rolleston Model only assumes 25% of the future urban area within Rolleston has been developed, whereas the 2033 Rolleston Model assumes full development including the 8 PPCs. Therefore, there are some differences in the performance of several intersections between the two models, with the 2033 Rolleston Model indicating more congestion due to a higher level of development.

I discuss my review of these intersections in the following subsections and note any differences between the ITA SIDRA model results and the 2033 Rolleston Paramics model results where relevant.

North-eastern arm of East Maddisons Road/Goulds Road recently realigned

Figure 3: Intersections assessed in the ITA

5.1 Proposed Road/East Maddisons Road intersection

The intersection is a new intersection created by the east/west road within PPC76, and its connection to East Maddisons Road. The ITA assumes that this intersection will be a priority tee-intersection with priority given to East Maddisons Road.

We have summarised the modelling results for this intersection

- The ITA indicates that this intersection will operate acceptably in 2028, with traffic from PPC76
- The 2033 Rolleston Paramics Model indicates that this intersection will operate acceptably in 2033, with traffic from all 8 Rolleston Plan changes.

Outcome: The Proposed Road/East Maddisons Road intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled.

5.2 East Maddisons Road/Goulds Road intersection

The north eastern arm of the East Maddisons Road/Goulds Road intersection has recently been realigned to form a priority tee intersection approximately 120m north of the old East Maddisons Road/Goulds Road crossroads intersection. The ITA has assessed the performance of the realigned priority tee intersection for the 2028 year.

In 2029/2030 Shillingford Boulevard is anticipated to be connected to Goulds Road in a roundabout, and extended to the west, as the CRETS Collector Road (refer to Section 7 for further discussion). Both the 2028 and 2033 Rolleston Paramics models assume that this roundabout is in place.

We have summarised the modelling results for this intersection

- The ITA indicates that the East Maddisons Road/Goulds Road tee intersection will operate acceptably in 2028, with traffic from PPC76
- The 2033 Rolleston Paramics Model indicates that the East Maddisons Road/Goulds Road tee intersection and the Shillingford Boulevard/Goulds Road roundabout will operate acceptably in 2033, with traffic from all 8 Rolleston Plan changes

Outcome: The East Maddisons Road/Goulds Road tee intersection and the Shillingford Boulevard/Goulds Road roundabout are indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled.

6 MY CONSIDERATION OF MATTERS NOT INCLUDED IN THE ITA

6.1 Frontage upgrades

The AEE and ITA do not discuss frontage upgrades to East Maddison Road. I consider that PPC76 should provide frontage upgrades, as is the common practice where greenfield sites front existing rural roads, and that this should be identified on the ODP. I have suggested amendments to the OPD in Figure 5.

Outcome: I recommend that the ODP indicates the requirement for the requestor to deliver the frontage upgrade for East Maddison Road. Detailed upgrades should be determined by the developer in collaboration with Council at subdivision stage and in accordance with Council Engineering Code of Practice requirements

6.2 Integration with surrounding developments

PPC76 is to the north of PPC70. I understand that three subdivision consents, RC185014 (approved), RC205574 (approved) and RC215553 (lodged), are to the north and west of PPC76. I have indicatively shown the adjacent developments in Figure 4. I consider that the ODP for PPC76 aligns with the adjoining PPC70, however changes to PPC70 will be required to connect to the east-west road provided in PPC76.

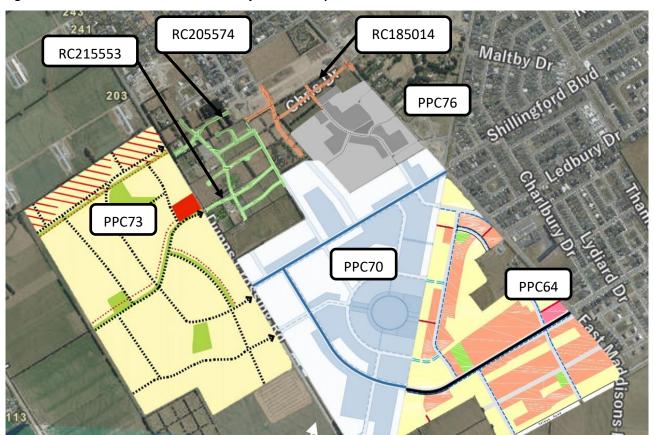


Figure 4: PPC76 with road networks from adjacent developments

Outcome: I consider that the proposed transport network shown in the ODP aligns with adjacent developments.

6.3 The internal transport network

East/west primary road

The ODP includes two east/west linkages, offset along the north/south linkage. As discussed in Section 7, the Rolleston Structure Plan identifies that the east/west linkage through the site may be used as a local public transport route. While the Regional Public Transport Plan⁵ (RPTP) does not detail the routing of future local bus services in Rolleston, Figure 8.6 of the RPTP does identify an intent to improve accessibility within Rolleston and to the higher frequency services running between Rolleston and Christchurch.

In my view, the offset of the east/west linkages will result in inefficiencies for road users, particularly if the route is used for public transport services. I consider that the ODP should be amended, to provide a direct and legible east/west road through the site. I have suggested amendments to the OPD in Figure 5, which I have coordinated with other Council experts.

Outcome: I recommend that the ODP should be amended to show a direct east/west primary road through the site.

Provision for cycling

I have considered whether north/south and east/west cycle routes should be included in the ODP. In my view the opportunity for a north/south cycle route has been somewhat precluded by consented development to the north (for example Lennon Drive), as these roads have been constructed without cycle facilities. However, I consider that an east/west cycle route should be provided, connecting into PPC70, as shown in Figure 5.

Outcome: I recommend that the ODP should provide an east/west cycle route through the site.

⁻

Figure 5: Recommended amendments to the ODP (including amendments recommended by other Council experts)



7 THE ROLLESTON STRUCTURE PLAN

As part of my review, I have considered the Rolleston Structure Plan (Structure Plan)⁶.

The Structure Plan was prepared in 2009 and provides a high-level plan that shows the arrangement of land-use types, and identifies public infrastructure, such as streets, schools, rail, reservoirs and natural features. The Structure Plan's purpose is to consider how existing and future development in Rolleston should be integrated in order to ensure that sustainable development occurs and makes best use of natural resources.

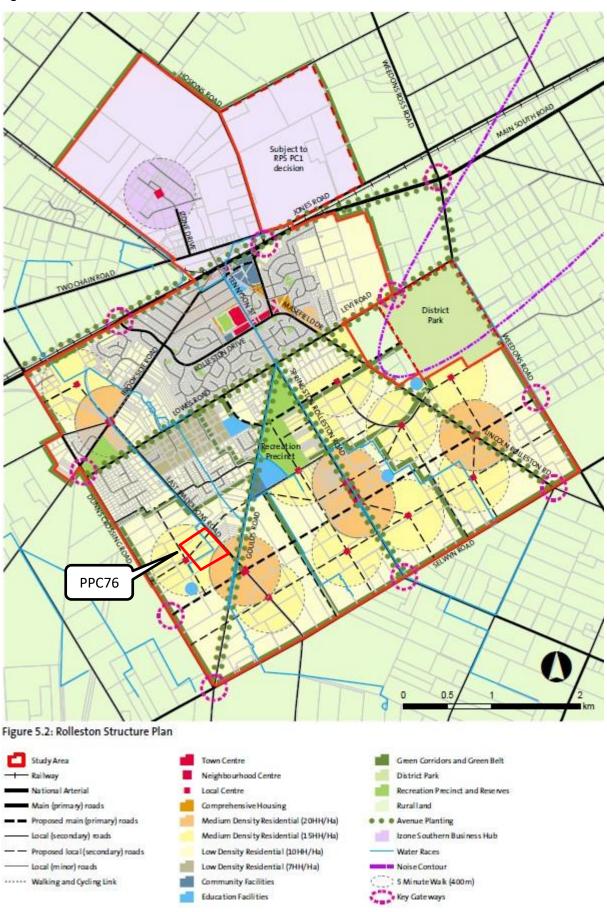
PPC76 sits within the anticipated urban area, as shown in Figure 6 and Figure 7. Key aspects of the Structure Plan relevant to PPC76 include

- A proposed local (secondary) road running east/west through the site
- A potential public transport route, utilising the east/west local road.

Outcome: PPC76 is generally consistent with the Rolleston Structure Plan. However, it does not efficiently provide for the proposed local (secondary) road, which I address in other recommendations in my report.

⁶ Rolleston Structure Plan, available online https://www.selwyn.govt.nz/ data/assets/pdf file/0015/14361/Final-Rolleston-Structure-Plan-230909.pdf

Figure 6: Rolleston Structure Plan with location of PPC76





0.5

Figure 7: Rolleston Structure Plan public transport routes with location of PPC76

Figure 8.5: Public Transport Route Patterns



8 MY REVIEW OF SUBMISSIONS

8.1 Submissions

Four submissions related to transport matters were received. Transport matters contained in submissions can be grouped into the following broad topics

- Future road networks outside of the plan change area
- Potential traffic effects
- Provision of public transport services, and the viability of public transport services.

Details of the submissions, and my comments, are provided in Table 4 in Appendix A. In summary, I recommend that

- Council's Planner consider whether the proposed zoning unnecessarily restricts the potential residential density of the site
- Council's Transport team continue to advocate for the provision of improved public transport services in Rolleston.

9 SUMMARY AND CONCLUSION

I have reviewed the PPC76 application documents, responses to Council information requests, and submissions.

In terms of the immediate effects of PPC76, and the proposed ODP

- The Proposed Road/East Maddisons Road intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. Refer to my discussion in Section 5.1
- The East Maddisons Road/Goulds Road tee intersection and the Shillingford Boulevard/Goulds Road roundabout are indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. Refer to my discussion in Section 5.2
- I recommend that the ODP indicates the requirement for the requestor to deliver the frontage upgrade for East Maddison Road. Detailed upgrades should be determined by the developer in collaboration with Council at subdivision stage and in accordance with Council Engineering Code of Practice requirements. Refer to my discussion in Section 6.1
- I consider that the proposed transport network shown in the ODP aligns with adjacent developments, however I recommend that the ODP should be amended to show a direct east/west primary road through the site. Refer to my discussion in Sections 6.2, 6.3, and 7
- I recommend that the ODP should provide an east/west cycle route through the site. Refer to my discussion in Section 6.3.

I recommend that Council consider the following matters regarding effects on the wider transport network

• I recommend that Council consider the proportional effect that each PPC will have on network hotspots and assumed intersection improvements contained in the 2033 Rolleston Paramics model, as identified in Table 3. Council should consider whether the proportional effects of PPC76 affect programmed funding within the Long Term Plan, whether new projects should be added to the Long Term Plan, and how Development Contributions are calculated. I note that the 2033 Rolleston Paramics model does not incorporate the change to the SH1/Rolleston Drive South intersection, proposed as part of NZUP. Should NZUP implement these changes, it is likely that our reporting of traffic effects on Dunns Crossing Road, Brookside Road, Lowes Road (among others) is under indicated. Refer to my discussion in Section 4.

Should my recommendations be adopted I consider that the safety and efficiency effects on the localised transport network can be appropriately addressed through the future resource consent process and Council's Long Term Plan.

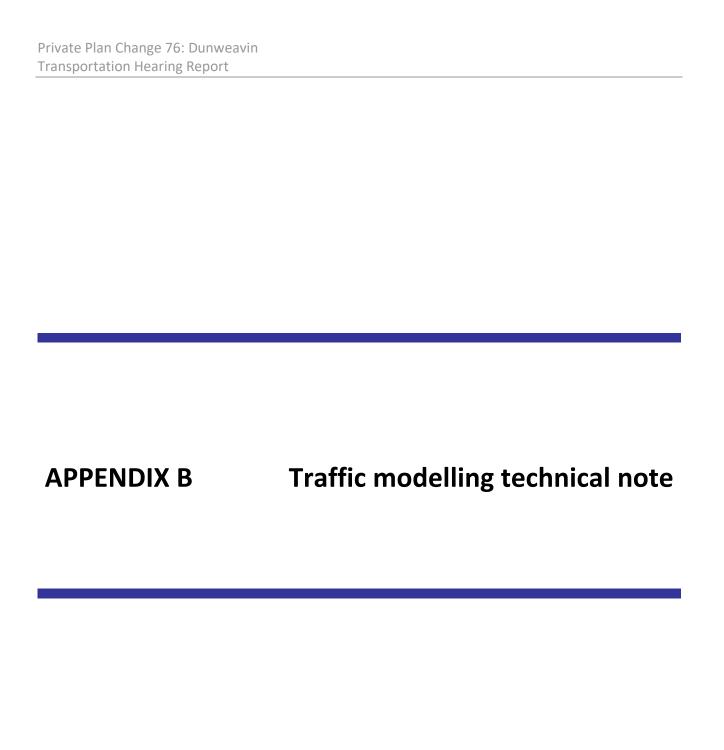




Submission summary

Table 4: Submission summary and commentary

Submitter	Summary of submission	Flow comment	Status
Danielle and Daniel Corry: PC76-0002/001	Supports the plan change in principle but has concerns that the detail of the roading layout that may be included in the Outline Development Plan (ODP) may impact the amenity of the submitter's property. Requests that the plan change is approved but no additional roading connections are provided to East Maddisons Road beyond those indicated on the ODP as notified.	The submitters property is outside of the plan change area, therefore no roading networks are shown on the submitter's property. However, the Rolleston Structure Plan anticipates a local (secondary) road continuing in an east/west direction through the plan change site and continuing east of East Maddisons Road. Refer to my discussion in Sections 6.3 and 7.	Neither support nor oppose. Refer to my discussion of the east/west local road in Sections 6.3 and 7.
Ministry of Education: PC76-0004/002	Considers that the plan change may give rise to congestion and safety effects that may adversely impact of the operation of Waitaha and Lemonwood Schools. Requests that the traffic effects are assessed and mitigated before the plan change is approved.	Refer to my discussion of wider traffic effects in Section 4. Provided that development in PPC76 is integrated with wider network improvements, I consider that the potential traffic effects from PPC76 will be adequately managed.	Support in part. Refer to my discussion in Section 4.
Christchurch City Council: PC76-0005/001	Considers that wider transport effects on Christchurch City must be addressed. Requests the plan change is amended to promote an urban form and include development controls that ensure a funded and implemented public transport system to service the site, including connections to Christchurch City, prior to any residential development.	I consider that changes to the transport network within PPC76 are required to ensure that it does not preclude the efficient provision of public transport services. Refer to my discussion in Section 6.3. In my view, the funding and implementation of a public transport system is a matter for Rolleston as a whole, rather than a site specific matter relating to this plan change. I consider it would be difficult to require the developer of these sites to fund and implement a public transport system to service the site, nor is it likely that such services would be provided by a third party prior to any development occurring. I understand the Selwyn District Council has been lobbying the submitter to provide bus services into new subdivisions within Rolleston as early as possible, subject to funding availability.	Support in part, oppose in part. I recommend that Council's Transport team continue to advocate for the provision of improved public transport services in Rolleston. Refer to my discussion of the east/west local road in Sections 6.3 and 7.
Christchurch City Council: PC76-0005/002 Canterbury Regional Council –	Considers that a higher minimum net density of 15 households per hectare consistent with the Greater Christchurch Partnership density report would better achieve efficiencies in coordinating land use and infrastructure, enabling mixed land use, supporting multi-modal transport systems and protecting productive land. Requests the plan change to be amended to apply a minimum net density of 15 households per hectare to the development. Considers that the plan change should give greater attention to identified housing needs, including by	I agree with the submitter that higher residential densities can support greater mode share for public transport. However, residential densities should be determined after considering a number of factors, not just public transport catchments. I am not opposed to higher densities, however I consider that this should be addressed via the land-use zoning applied to the site, rather than through specific mechanisms applied to PPC76. I note that even if	Support in part, however the transport effects of the requested relief would require assessment.
Environment Canterbury: PC76-0006/001	increasing the minimum net density to 15 households per hectare and including mechanisms for enabling social and affordable housing. Requests that Council consider increasing the minimum net density to 15 households per hectare and including mechanisms for enabling social and affordable housing to meet identified housing needs.	higher density is permitted by the land use zoning that is applied, higher densities may not be realised unless there is a subsequent market demand for higher density in this location. Finally, the 2033 Rolleston Paramics model has assessed the stated yields of the 8 Rolleston Plan Changes. Should yields be increased, Council would need to rerun the model to determine what effect a higher yield for PPC76 would have on the transport network.	
Canterbury Regional Council – Environment Canterbury: PC76-0006/002	Considers that development of the site ahead of enhanced public transport services in this location is likely to create a dependency on private motor vehicle use. Requests Council to consider how timely and effective public transport provision to and through the site can be achieved and any integrated transport options that would encourage uptake of existing services.	Refer to my response to Christchurch City Council: PC76-0005/001.	



technical note



PROJECT SELWYN DISTRICT PLAN CHANGE 73

SUBJECT TRAFFIC MODELLING REVIEW

TO SELWYN DISTRICT COUNCIL

FROM QING LI (FLOW)

REVIEWED BY MAT COLLINS (FLOW)

DATE 13 AUGUST 2021

1 INTRODUCTION

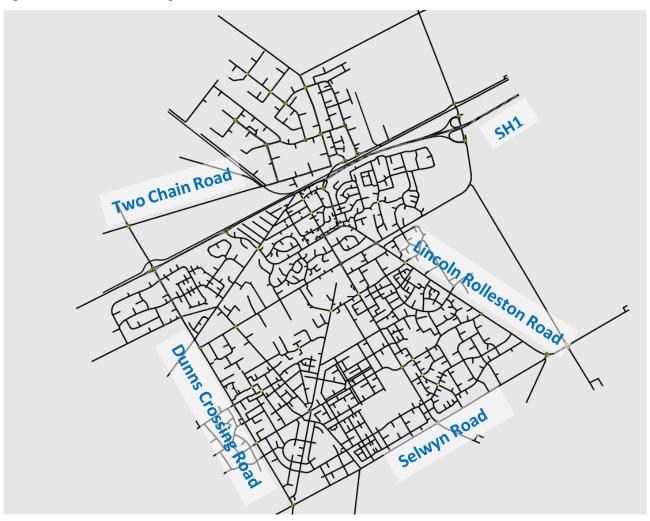
This technical note provides a summary of the traffic modelling assessment completed for Private Plan Change 73 (PPC73) in Rolleston, Selwyn District. The assessment has been based on the Paramics model developed by Abley Limited (Abley). This model was developed in May 2021 and it assumes a 2033 background traffic/network scenario and the full development of the Outline Development Plans (ODPs).

It includes the following Private Plan Changes (PPCs) in Rolleston

- ◆ PPC64: Rolleston, 969 residential lots
- PPC66: Rolleston, rural zone to industrial zone
- PPC70: Rolleston, 800 residential lots plus commercial
- PPC71: Rolleston, 660 residential lots
- PPC73: Rolleston, 2100 residential lots plus commercial
- PPC75: Rolleston, 280 residential lots
- ◆ PPC76: Rolleston, 150 residential lots
- PPC78: Rolleston, 750 residential lots.

The development of the model and the associated transport network assessment is summarised in the Abley technical note "Rolleston Plan Change Modelling (May 2021)". An overview of the Paramics model is provided in Figure 1 overleaf.

Figure 1: Rolleston Plan Change Paramics Model



In August 2021, Flow Transportation Specialists (Flow) was commissioned by Selwyn District Council to review the traffic effects associated with PPC73. We have therefore obtained the 2033 Plan Change model to understand the cumulative effects of the various plan changes. The results are discussed and summarised in this technical note.

2 HIGH LEVEL REVIEW OF THE PARAMICS MODEL

As part of our review of the Paramics mode we noted the following

- The model assumes 2033 background traffic informed by the 2028 and 2038 Christchurch Assignment and Simulation Transportation (CAST) model. In our view this is appropriate
- ◆ Traffic generation of each PPCs in the Rolleston area has been based on the land use/trip rates information provided in the Integrated Transport Assessments (ITAs) prepared for each PPC (if available). A common vehicle trip rate of 0.9 trips per hour per household has been applied to all PPCs in both the morning and evening peaks. We consider that this trip rate is reasonable, given the existing low public transport (PT) and active mode shares in the area¹

¹ 2018 Census Main Means of Travel to Work data (retrieved from https://commuter.waka.app/) suggested a mode share of 3%, 7% and 3% for PT, walking and cycling respectively for the Rolleston Central, North East, North West, South West and South East areas.

- In addition, we also note that the model has assumed a PT modal shift of some 6% to 8% between Rolleston and Christchurch (SH1 East) and 2.5% for trips to/from Lincoln (including walking and cycling). A 5% mode shift to walking and cycling within Rolleston has also been assumed. These adjustments have resulted in reductions of some 5% to 10% to the raw traffic generation for each PPC area, we consider that this is reasonable, however it is likely that improvements to PT and active modes access will be required within Rolleston to achieve this mode share
- The traffic distribution of each PPC in the 2033 model has been based on the origins and destinations of existing residential trips. We have looked at the predicted trip distribution for the PPC73 area, and note the following
 - A high percentage of PPC73 demands are assumed to travel to/from zones within Rolleston (40% and 55% in AM and PM respectively). These figures are similar to the existing 40% distribution reported in the 2018 Means of Travel to Work data (AM peak only)
 - Traffic to /from SH1 East (to Christchurch) is predicted to be some 15% to 20% of the total traffic generated by PPC73, making it the second highest trip origin/destination of the PPC73 demands. (A detailed trip distribution summary for PPC73 is included as an Appendix to this technical note)
- The network assumptions included in the 2033 Plan Change model were based on Counil's Long Term Plan (up to 2032-33). The model also assumes the SH1 changes proposed west of the SH1/Weedons Road interchange as part of the Government's NZUP programme. This is reasonable as the 2021 update from Waka Kotahi states that construction is due to start in 2024²
- We note the following from these assumptions
 - As discussed in Section 3 of the Abley technical note, the Business Case for the Rolleston component of the NZUP programme is on-going and its outcome may change the access/route choice options between the Rolleston area and SH1
 - We note that a more recent model has been developed which includes a roundabout layout at the Lincoln Rolleston Road/Selwyn Road intersection. We however note that this is unlikely to significantly change the vehicle routing in the model
 - The model predicts that the SH1/Weedons Road interchange will operate with high delays with the existing layout, and roundabout metering signals have been assumed in the model at the Weedons Road southern roundabout to reduce delays. We note that these appeared to be a temporary solution and congestion is still predicted in the 2033 model with the PPCs

In summary, we consider that the 2033 Rolleston Paramics Plan Change model is is fit for purpose for our high level assessment of the potential effects of the eight PPCs in the Rolleston area.

In addition, the Abley technical note also included the results of a 2028 model which assumed no PPC developments in Rolleston. To investigate the background traffic growth predicted between the 2028

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² https://www.nzta.govt.nz/planning-and-investment/nz-upgrade/canterbury-package/

and 2033 models, we have compared the total traffic demands in the non-PPC zones between the two models.

Table 1: Background Traffic Demand Comparison

Peak	Mornir	ng Peak	Evening Peak				
Years	2028	2033	2028 2033				
Total Traffic Demands	21,300	21,400	24,410	24,530			

The above table indicates that background traffic demands are not predicted to change significantly between 2028 and 2033. We however note that some of the growth between 2028 and 2033 may have been reduced by the PT/active mode shift assumptions in the 2033 models. The assumed pass-by trips for the PPCs may also have reduced background traffic in the 2033 models.

3 PREDICTED HOT SPOTS WITHIN ROLLESTON

Based on the model results provided in the Abley technical note, the following intersections are predicted to operate at Level of Service (LOS) F, for one or more movements during the morning and/or evening peak periods with the proposed PPC developments. We have undertaken Select Link Analysis to determine the traffic flows through each of these intersections, which provides understanding of the proportion of traffic flows associated with each PPC. This analysis has also been done for the intersections with layout improvements assumed in the 2033 Plan Change models.

The proportions are displayed in Figure 1 below and the detailed percentages for each PPC are provided in Table 1 overleaf. We have used the following colour code to assist interpretation:

- no shading: the PPC is predicted to contribute less than 2.5% towards the traffic volumes at this intersection
- orange shading: the PPC contributes between 2.5% and 5% towards the traffic volumes at this intersection
- red shading: the PPC contributes more than 5% towards the traffic volumes at this intersection.

The predicted intersection performance in 2028, without the proposed PPCs in the Rolleston area, has also been obtained from the Abley technical note and provided in the table for comparison. In this assessment, we have focused on the peak hours, being 7 am - 8 am in the morning and 5 pm - 6 pm in the evening.

Figure 2: Predicted Percentage of Traffic from PPCs at Each 'Hot Spot'

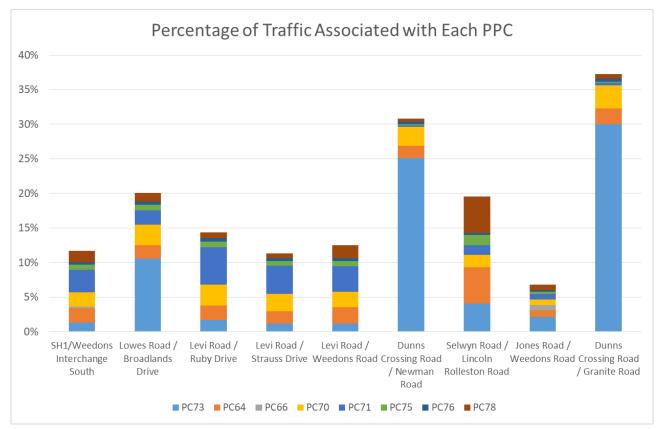


Table 2: 2033 network performance and individual PPC effects

Intersection	Existing Layout	Intersection form assumed in models	2028 performance without PPCs	2033 performance with all 8 PPCs	2033 traffic movements With all PPCs		_	ffic associa					
		(2028/2033)			(AM and PM combined)	PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78
						%	%	%	%	%	%	%	%
Intersection with Congestio	n/High Delays												
SH1/Weedons Interchange South	Roundabout	Roundabout in both years	LOS F on SH1 West, AM and PM	LOS F on SH1 West and Weedons Rd, AM and PM	3,870 veh	1.3%	2.1%	0.2%	2.0%	3.3%	0.7%	0.4%	1.6%
Lowes Road / Broadlands Drive	Priority	Priority in both years	LOS B and C in AM and PM respectively	LOS F on Broadlands Dr in AM, Lowes Rd west in PM	1,910 veh	10.6%	1.9%	0.0%	2.9%	2.1%	0.8%	0.5%	1.2%
Levi Road / Ruby Drive	Priority	Priority in both years	LOS B and C in AM and PM respectively	LOS F on PC71 Access in AM, Ruby Dr and Lowes Rd in PM	2,890 veh	1.7%	2.1%	0.0%	3.0%	5.4%	0.8%	0.5%	0.9%
Levi Road / Strauss Drive	Priority	Priority in both years	LOS D and C in AM and PM respectively	LOS F on Strauss Dr and Levi Rd east in AM	3,210 veh	1.2%	1.7%	0.0%	2.5%	4.0%	0.7%	0.5%	0.7%
Levi Road / Weedons Road	Priority	Priority in both years	LOS F on Weedons Rd South and Levis Rd west in PM	LOS F on Weedons Rd South in both AM and PM, and on Levis Rd west in PM	3,480 veh	1.2%	2.3%	0.0%	2.2%	3.7%	0.8%	0.4%	1.8%
Dunns Crossing Road / Newman Road	Priority	Priority in both years	LOS A in both AM and PM	LOS F on Newman Rd and PC73 access in AM	2,590 veh	25.1%	1.8%	0.0%	2.8%	0.2%	0.1%	0.4%	0.5%
Selwyn Road / Lincoln Rolleston Road	Priority	Priority/ Priority with Seagull Treatment ³	LOS F on Lincoln Rolleston Rd north in PM	LOS F on Lincoln Rolleston Rd north in PM	3,990 veh	4.1%	5.3%	0.0%	1.8%	1.4%	1.5%	0.3%	5.3%
Jones Road / Weedons Road	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS F on Weedons Ross Rd north and Jones Rd east in PM	3,620 veh	2.1%	1.0%	0.7%	0.9%	0.8%	0.3%	0.2%	0.9%
Dunns Crossing Road / Granite Road	Priority	Priority / Signals	LOS A in both AM and PM	LOS E on Granite Rd east in AM	2,450 veh	30.0%	2.2%	0.0%	3.3%	0.3%	0.1%	0.5%	0.7%
Intersection with Layout Ch	anges												
Tennyson Street / Moore Street	Priority	Roundabout in both years	Not provided	Not provided	1,660veh	2.0%	1.4%	0.2%	0.9%	0.6%	0.3%	0.2%	0.7%
Rolleston Road / Tennyson Street	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS B and C in AM and PM respectively	4,320 veh	2.8%	3.1%	0.2%	2.5%	1.1%	0.4%	0.5%	1.0%
Rolleston Drive / Brookside Road	Priority	Roundabout in both years	LOS A and C in AM and PM respectively	LOS D and C in AM and PM respectively	3,390 veh	7.1%	0.5%	0.2%	1.4%	0.8%	0.3%	0.6%	0.7%
Dunns Crossing Road / Goulds Road / Selwyn Road	Priority	Priority / Roundabout with Priority control at Goulds /Dunns Crossing Intersection	LOS C in both AM and PM	LOS A in both AM and PM, at both intersections	1,640 veh	14.2%	3.0%	0.0%	5.8%	0.8%	0.4%	0.2%	2.2%
Dunns Crossing Road / East West Primary	Priority	Priority / Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	1,670 veh	32.6%	5.5%	0.0%	8.7%	1.0%	0.5%	0.2%	1.6%

³ As discussed in Section 2, we understand that Abley has recently completed another version of the 2033 Plan Change model to include a roundabout layout at this intersection, we note that this change is unlikely to change the traffic routing in the area significantly.

Intersection	Existing Layout	Intersection form assumed in models	2028 performance without PPCs	2033 performance with all 8 PPCs	2033 traffic movements With all PPCs		_	fic associa s through					
		(2028/2033)			(AM and PM combined)	PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78
						%	%	%	%	%	%	%	%
Dunns Crossing Road / Brenley Drive / Skellerup Primary Access	No intersection	Priority T / Priority Cross Road with Right Turn bays	LOS A in both AM and PM	LOS C in both AM and PM	2,280 veh	33.2%	3.6%	0.0%	5.9%	0.4%	0.2%	0.7%	0.9%
Dunns Crossing Road / ODP12 Access/ Skellerup Secondary Access	No intersection	Priority T / Priority Cross Road with Right Turn bays	LOS A in both AM and PM	LOS A in both AM and PM	1,450 veh	30.8%	5.3%	0.0%	8.5%	0.1%	0.2%	0.0%	1.2%
Lowes Road / Tennyson Street	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS B and C in AM and PM respectively	4,540 veh	4.1%	3.6%	0.1%	3.1%	1.0%	0.4%	0.6%	0.8%
Lowes Road / East Maddisons Road	Priority	Priority / Roundabout	LOS B and D in AM and PM respectively	LOS B and A in AM and PM respectively	2,320 veh	13.1%	2.0%	0.1%	2.1%	1.5%	0.7%	1.3%	1.6%
Lowes Road / Dunns Crossing Road	Priority	Priority / Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	2,690 veh	30.9%	3.1%	0.0%	4.9%	0.9%	0.4%	0.6%	1.2%
Lowes Road / Levi Drive / Masefield Drive	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS C in both AM and PM	4,300 veh	3.4%	1.6%	0.1%	2.1%	4.6%	1.7%	0.4%	3.4%
Springston Rolleston Road / Selwyn Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	3,080 veh	5.9%	10.1%	0.0%	3.1%	1.1%	0.6%	0.4%	3.1%
Selwyn Road /Weedons Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	4,270 veh	4.1%	4.9%	0.0%	1.7%	1.3%	1.4%	0.3%	4.8%
Walkers Road / Two Chain Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	970 veh	6.9%	1.3%	0.2%	1.6%	0.6%	0.2%	0.3%	0.7%
Goulds Road /East Maddisons Road	Priority	Priority / Roundabout	LOS A and B in AM and PM respectively	LOS A in both AM and PM	2,480 veh	9.5%	8.6%	0.0%	13.6%	2.2%	1.0%	1.2%	2.1%

APPENDIX A - Predicted PPC73 Trip Distribution



				Selwyn Rd		within
	SH1 East	SH1 West	South	East	North	Rolleston
Total AM	24%	4%	11%	9%	13%	40%
Total PM	17%	3%	9%	6%	10%	55%

 $Reference: P: \SDCX \001\ PC73\ Dunns\ Crossing \Reporting \TN1A210809. docx - Qing\ Li$

APPENDIX C

Traffic modelling Select Link
Analysis

