Private Plan Change 71: Four Stars Development Ltd and Gould Developments Ltd

Transportation Hearing Report

December 2021

flow
TRANSPORTATION SPECIALISTS

flow
TRANSPORTATION SPECIALISTS

Project:	**Private Plan Change 71: Four Stars Development Ltd and Gould Developments Ltd**
Title:	**Transportation Hearing Report**
Document Reference:	**P:\SDCX\006 PC71 Four Stars\4.0 Reporting\R1C211210 - PPC71 Hearing report.docx**
Prepared by:	**Mat Collins/Qing Li**
Reviewed by:	**Ian Clark**

Revisions:

Date	Status	Reference	Approved by	Initials
24 November 2021	For Council comment	R1A211124	I Clark	
6 December 2021	Update with Council feedback	R1B211206	M Collins	
10 December 2021	Final	R1C211210		

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 71 (PPC71), which has been lodged by Four Stars Development Ltd and Gould Developments Ltd. As part of my review, I have considered the cumulative transport effects of seven additional 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 PPC71 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 PPC71
- The safety and efficiency effects of PPC71 on key intersections, and what intersection and road upgrades are required to support PPC71
- Connectivity of the Outline Development Plan 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 PPC71, and the proposed ODPs

- The Lincoln Rolleston Road/Broadlands Drive intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. The ITA assumes that this intersection will be formed as a roundabout. I recommend that ODP Area 4 is amended to identify the requirement for a roundabout at this intersection, and that a planning mechanism is included that requires development within ODP Area 5 to be staged to align with the implementation of the roundabout and extension of Broadlands Drive. Refer to my discussion in Section 5.1
- The Lincoln Rolleston Road/Branthwaite Drive intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. Refer to my discussion in Section 5.2

- The Levi Road/Ruby Drive intersection is indicated to operate poorly in 2033 when traffic from all 8 Rolleston Plan changes is modelled, with the extension of Ruby Drive into PPC71 being a key contributor to this. I consider that a roundabout should be formed by the applicant when PPC71 connects to the existing intersection. I recommend that the ODP be amended to identify the requirement for the applicant to form a roundabout at this intersection. Refer to my discussion in Section 5.3
- I consider that PPC71 does not adequately provide for cycling (refer to my discussion in Section 5.4). In my view, the following cycle facilities should be provided
    - A shared use path on Lincoln Rolleston Road along the site frontage, including provision of safe crossing points to the shared use path on the western side of Lincoln Rolleston Road
    - A shared use path on Levi Road along the site frontage, including provision of a safe crossing point at the Lincoln Rolleston Road/Levi Road roundabout to connect with the existing shared use path on Lowes Road
    - A north/south cycle route through ODP Area 5
- The ITA does not appear to consider the potential effects resulting from rezoning land within Area 4 from low density (1000 m^2 +) to low density. I have assessed the potential increase in yield that may result and estimate this to be approximately 4 dwellings. I consider that this omission has a negligible effect on my assessment of PPC71, or the conclusions of my report. Refer to my discussion in Section 6.5
- I recommend that amendments are made to the ODP Area 4 (refer to my discussion in Section 6.6) to
    - Identify a roundabout at the Lincoln Rolleston Road/Broadlands Road intersection on the ODP Plan and in the Movement Network narrative
    - Identify in the Movement Network narrative that Primary Roads are expected to be Collector Roads, and that other road typologies are subject to confirmation of compliance with Council's Engineering requirements
    - Clarify in the Movement Network narrative that cycling and walking will be contained within the road corridor rather than within the road carriageway
    - Identify the requirement to upgrade frontages with existing roads to urban standard
- I recommend that amendments are made to the ODP Area 5 (refer to my discussion in Section 6.7) to
    - Clarify that Broadlands Drive, including a roundabout intersection with Lincoln Rolleston Road and extension of Broadlands Drive over ODP Area 4, is to be staged with development
    - Clarify that Broadlands Drive shall be constructed in conjunction with the development of any adjoining land, and shall be based on the anticipation of full residential development for the entire ODP
    - Clarify in the Access and Transport narrative that cycling and walking will be contained within the road corridor rather than within the road carriageway

- Identify the requirement to upgrade frontages with existing roads to urban standard

- Provided the recommendations of my report are adopted, I consider that any potential traffic effects arising from the deferral of part of the ODP Area 5 (due to the area of "Deferred Low Density zoning") will be adequately mitigated. Refer to my discussion in Section 6.8.

Having reviewed submissions (refer to my discussion in Section 8.1), I recommend that the ODP Area 5 narrative include the following sentence

> *"Nobeline Drive including the intersection with Lincoln Rolleston Road is to be upgraded by the applicant, including vesting of frontage where needed, to a Local Major Road standard in accordance with the Engineering Code of Practice."*

PPC71 is inconsistent with the Rolleston Structure Plan, in that it is outside the anticipated urban area. Should PPC71 affect the quantum of residential growth within Selwyn, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment. However, assessing the effects of such development on the long term planning and funding commitments associated with bulk transport infrastructure is complex and requires assessment of multiple land use scenarios. Refer to my discussion in Section 7.

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 discussed in Section 4. Council should consider whether the proportional effects of PPC71 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. In particular, I recommend that Council consider whether

- the current Development Contributions policy is sufficient to reflect the contribution of PPC71 traffic towards the Lowes Road/Levi Drive/Masefield Drive intersection upgrade. Refer to my discussion in Section 6.1
- the Levi Road/Strauss Road intersection should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71. Refer to my discussion in Section 6.2
- the Levi Road/Weedons Road intersection should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71. Refer to my discussion in Section 6.3
- the SH1/Weedons interchange should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71. Refer to my discussion in Section 6.4.

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.

However, I note that PPC71 is inconsistent with the Rolleston Structure Plan, in that it is outside the anticipated urban area. Should PPC71 affect the quantum of residential growth within Selwyn, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment.

CONTENTS

APPENDICES

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.

Four Stars Development Ltd and Gould Developments Ltd (requestor) has lodged a PPC to change the Selwyn District Plan to rezone approximately 54 hectares of Rural Inner Plains zoned land to Living Z and make changes to the Rolleston ODP Area 4 (PPC71). This report details my review of PPC71.

The scope of this specialist transport report is to assist Council in determining the transport outcomes of PPC71 and includes the following

- A summary of PPC71 focusing on transport matters
- An overview of transport projects contained within the Long Term Plan (LTP), which are relevant to PPC71
- A summary of the modelled traffic effects indicated by Council's 2033 Rolleston Paramics model
- A review of the material provided to support the application for PPC71, and discussion of the potential effects of PPC71
- 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 June 2021, including
    - Appendix 1: Outline Development Plans
    - Appendix 12: Integrated Transport Assessment, prepared by Novo Group, November 2020
- Response to Council transport related information requests, prepared by Novo Group, dated 25 January 2021
- Third party traffic model files, as discussed in Section 4
- Submissions as outlined in Section 8.

2 A SUMMARY OF PPC71

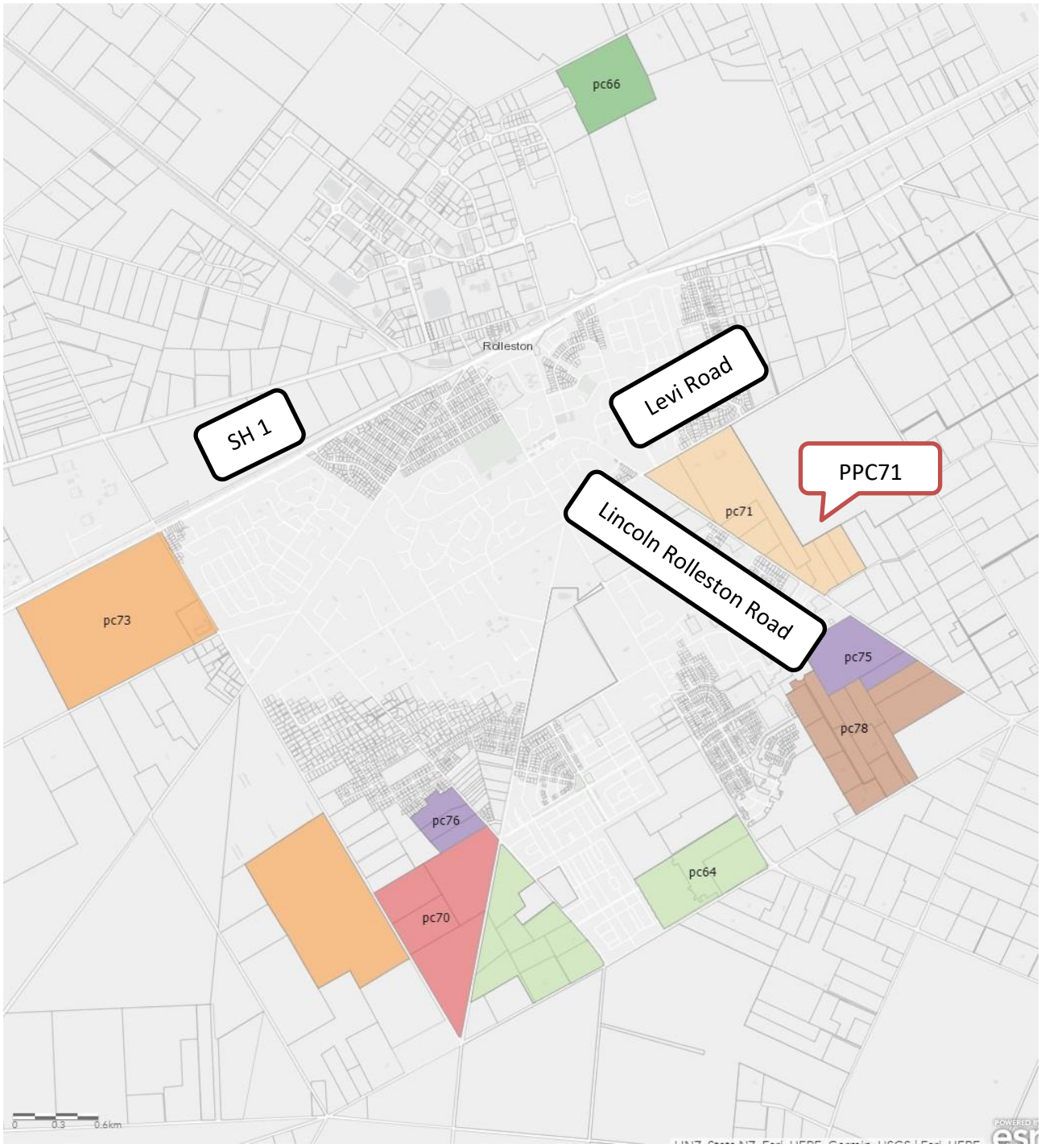
There are currently multiple private plan changes lodged within Rolleston, Lincoln and Prebbleton, with the Rolleston plan changes (current to October 2021) shown in Figure 1. PPC71 is near Rolleston Area 11, PPC75 and PPC78, and is bounded by Lincoln Rolleston Road and Levi Road. PPC71 is shown in context with Rolleston Area 11 ODP in Figure 2.

PPC71 proposes to rezone approximately 54 hectares of Rural Inner Plains zoned land to Living Z zone and Living Z deferred. Changes are also proposed to the operative Rolleston ODP Area 4. Two Outline Development Plans (ODPs), Rolleston Area 4 and Rolleston Area 5, are proposed to guide the form and layout of future development.

The ODPs are shown in and Figure 3 and Figure 4, and provide

- Approximately 660 residential lots, additional to those enabled by Rolleston Area 4
- Two primary east-west roads
- Multiple secondary roads
- Indicative pedestrian/cycle links
- Future transport links
- Several new intersections on Lincoln Rolleston Road
- One new intersection on Levi Road.

Figure 1: Overview of PPC71 and other nearby Rolleston PPCs[1]



[1] Adapted from Council's "Current plan change requests" website, based on current plan changes in October 2021, available at https://www.selwyn.govt.nz/property-And-building/planning/strategies-and-plans/selwyn-district-plan/plan-changes

Figure 2: PPC71 Outline Development Plans in context with the surrounding transport network

Figure 3: Rolleston ODP Area 4 (proposed)

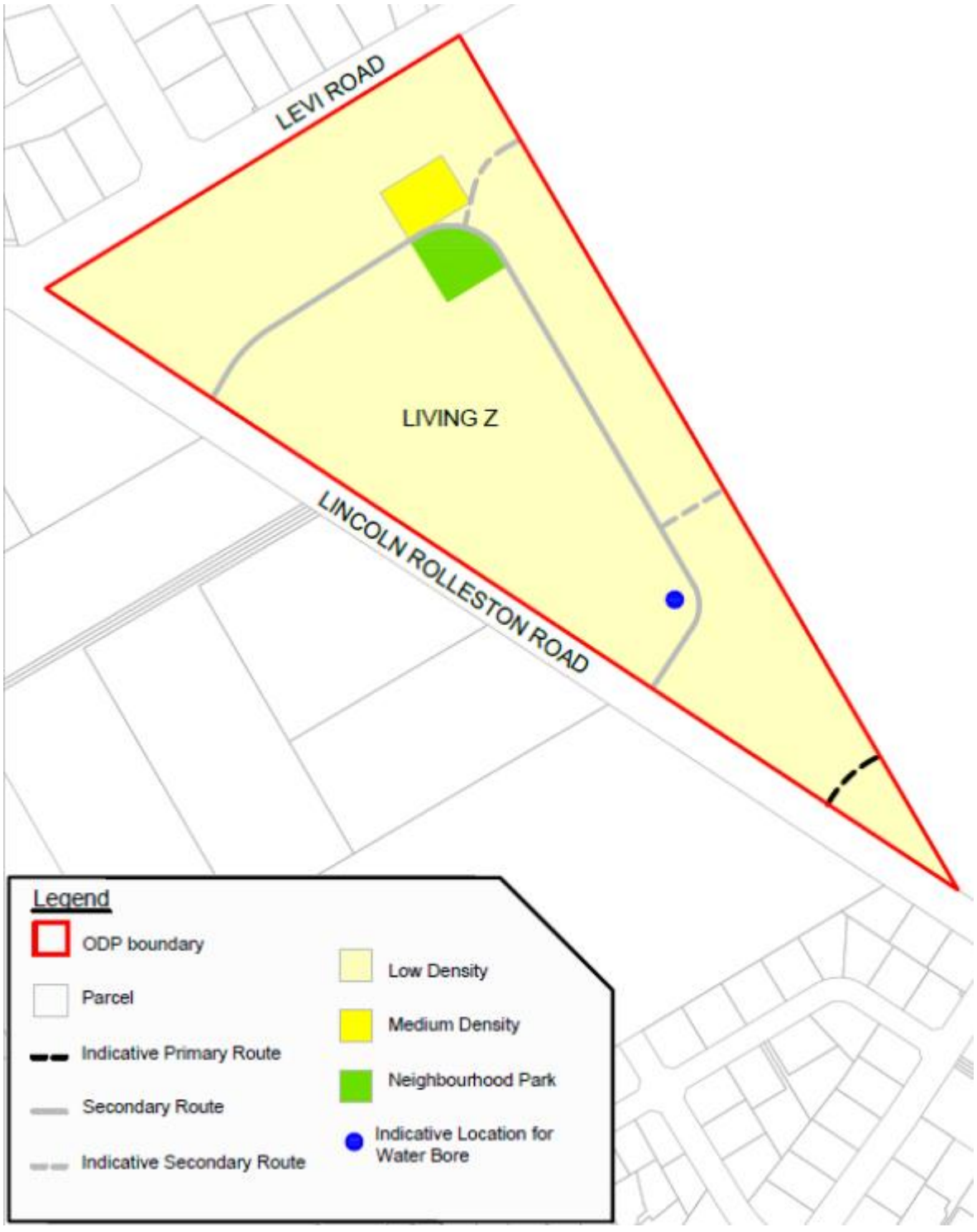
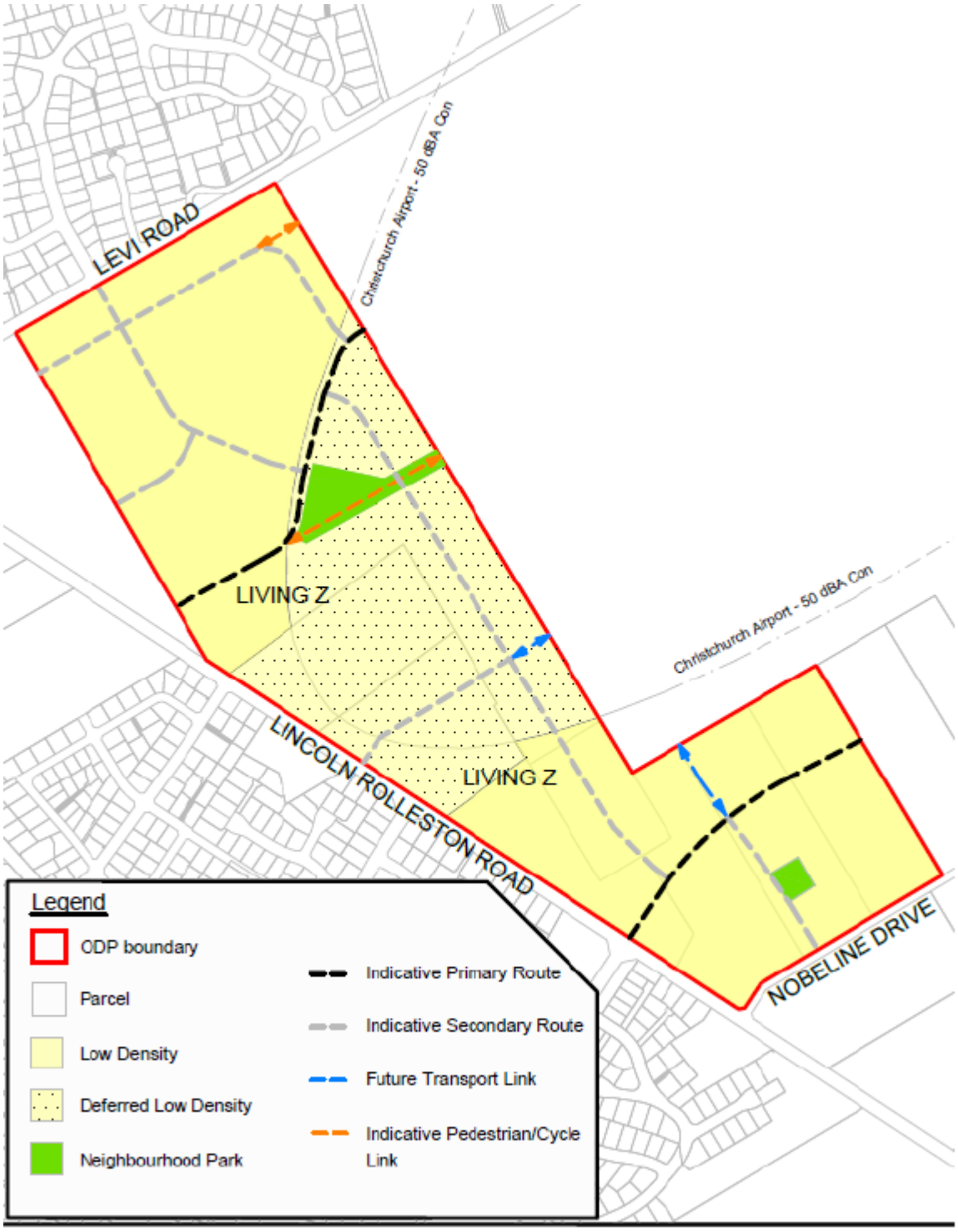


Figure 4: Rolleston ODP Area 5 (proposed)



3 ROLLESTON TRANSPORT PROJECTS RELEVANT TO PPC71

This section discusses various funded and planned transport projects in Rolleston that have relevance to PPC71.

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 PPC71. I have reproduced these in Table 1 below. Further discussion of how PPC71 is anticipated to affect various parts of the transport network is provided in Section 4.

Table 1: LTP transport projects relevant to PPC71

Project	Scheduled year	Description	Relevance to PPC71
Traffic Signals at Rolleston Drive/Tennyson Street	2021/22	Safety upgrade, including safer pedestrian crossing	PPC71 contributes 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	PPC71 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)	PPC71 contributes around 1% of peak hour traffic movements in 2033
Lowes Road/Levi Drive/Masefield Drive Intersection Upgrade	2025/26	Upgrade to traffic signals	PPC71 contributes over 4.5% of peak hour traffic movements in 2033
Tennyson/Moore Street Roundabout	2026/27	Safety upgrade as part of Moore Street extension	PPC71 contributes under 1% of peak hour traffic movements in 2033
Selwyn/Weedons Road Roundabout	2027/28	Safety upgrade - Rolleston southern arterial link	PPC71 contributes over 3% of peak hour traffic movements in 2033
Jones Road Cycleway	2027/28	Between Jones Road and Weedons Road - links to Rolleston to Templeton Cycleway	Relevant to PPC71, Weedons interchange is approximately 2.5km from the site, this will increase cycle accessibility
Lincoln Rolleston Road/Selwyn Road Intersection Upgrade	2028/29	Safety upgrade - Rolleston southern arterial link	PPC71 contributes over 1% of peak hour traffic movements in 2033

Walkers Road/Two Chain Road Roundabout	2028/29	Safety upgrade - Rolleston Industrial Zone southern link	PPC78 contributes under 1% of peak hour traffic movements in 2033
Goulds/East Maddisons Road Roundabout	2029/30	Connects Farrington and new subdivisions to Goulds Road	PPC78 contributes over 2% 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 PPC71, this is within 5km, which is cyclable distance
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	Project funded beyond the 2021-31 LTP	PPC71 contributes under 1% of peak hour traffic movements in 2033
Rolleston South to Rolleston Industrial Zone Cycleway	2033/34		Some relevance to PPC71, this is within 5km, which is cyclable distance
West Melton to Rolleston Cycleway	2034/35		
Lowes Road/Dunns Crossing Road Roundabout	2035/36		PPC71 contributes under 1% of peak hour traffic movements in 2033
Burnham School Road Widening	2042/43		Some relevance, however PPC71 generates under 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 PPC71 are discussed in Table 2.

Table 2: NZUP[2] transport projects relevant to PPC71

Project	Scheduled year	Description	Relevance to PPC71
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 the version of the model used for this report does not include the potential conversion of the SH1/Rolleston Drive intersection to a left in/left out.

[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 discussed in Section 1)

- 2028 Rolleston Paramics model, produced by Abley (which excludes the 8 PPCs)
- 2033 Rolleston Paramics model, produced by Abley, (which includes the 8 PPCs).

Flow interrogated the models to understand the potential traffic effects of PPC71 both in isolation and as a cumulative effect in conjunction with the other 7 PPCs. Further detail on the methodology is provided in Appendix A, 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 used for this report 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 PPC71 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 PPC71 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, PPC71 contributes a more than minor effect on congestion at the following intersections

- Levi Road/Ruby Road. This intersection is expected to operate poorly on Ruby Drive extension (south) in the morning peak, and poorly on Ruby Drive (north) and Levi Road (west) in the afternoon peak. PPC71 contributes around over 5% of total vehicle movements through the intersection
- Levi Road/Strauss Drive. This intersection is expected to operate poorly on Strauss Drive and Levi Road (east) during the morning peak. PPC71 contributes around 4% of total vehicle movements through the intersection
- Levi Road/Weedons Road. This intersection is expected to operate poorly on Weedons Road (south) in both the morning and evening peak, and Levi Road is expected to perform poorly in the evening peak. PPC71 contributes over 3.5% of total vehicle movements through the intersection
- SH1/Weedons Interchange South. This intersection is expected to operate poorly on SH1 (west) and Weedons Road in both the morning and evening peak. PPC71 contributes over 3% of total vehicle movements through the intersection.

In relation to intersections that are not indicated to have congestion/high delays in 2033, but are assumed to have improvements

- Lowes Road/Levi Drive/Masefield Drive is assumed to be upgraded from a roundabout to a signalised intersection. PPC71 generates around 4.5% of total peak hour movements through this intersection. Refer to my discussion in Section 6.1

A Select Link Analysis output from the 2033 Rolleston Paramics model is provided in Appendix B, demonstrating traffic flows from PPC71.

In summary, I consider that PPC71 has a

- more than minor effect on congestion at the Levi Road/Rudy Road intersection
- minor effect on congestion at the Levi Road/Strauss Road intersection
- minor effect on congestion at the Levi Road/Weedons Road intersection
- minor effect on congestion at the SH1/Weedons Road interchange
- minor effect on the need for an upgrade of the Lowes Road/Levi Drive/Masefield Drive intersection.

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 PPC71 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.

In particular, I consider that PPC71 has a

- ***more than minor effect on congestion at the Levi Road/Rudy Road intersection***
- ***minor effect on congestion at the Levi Road/Strauss Road intersection***
- ***minor effect on congestion at the Levi Road/Weedons Road intersection***
- ***minor effect on congestion at the SH1/Weedons Road interchange***
- ***minor effect on the need for an upgrade of the Lowes Road/Levi Drive/Masefield Drive intersection.***

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 (red for LOS F)	2033 performance with all 8 PPCs (red for LOS F)	**2033 traffic movements With all PPCs (AM and PM combined)**	**Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined)** [4]							
						PPC73	**PPC64**	**PPC66**	**PPC70**	**PPC71**	**PPC75**	**PPC76**	**PPC78**
						%	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Intersections with congestion/high delays in the 2033 Rolleston Paramics model													
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 Levi 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 Levi Rd west in PM	LOS F on Weedons Rd South in both AM and PM, and on Levi 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 upgrades assumed in the 2033 Rolleston Paramics model													
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 (red for LOS F)	2033 performance with all 8 PPCs (red for LOS F)	**2033 traffic movements With all PPCs (AM and PM combined)**	**Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined)** [4]							
						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

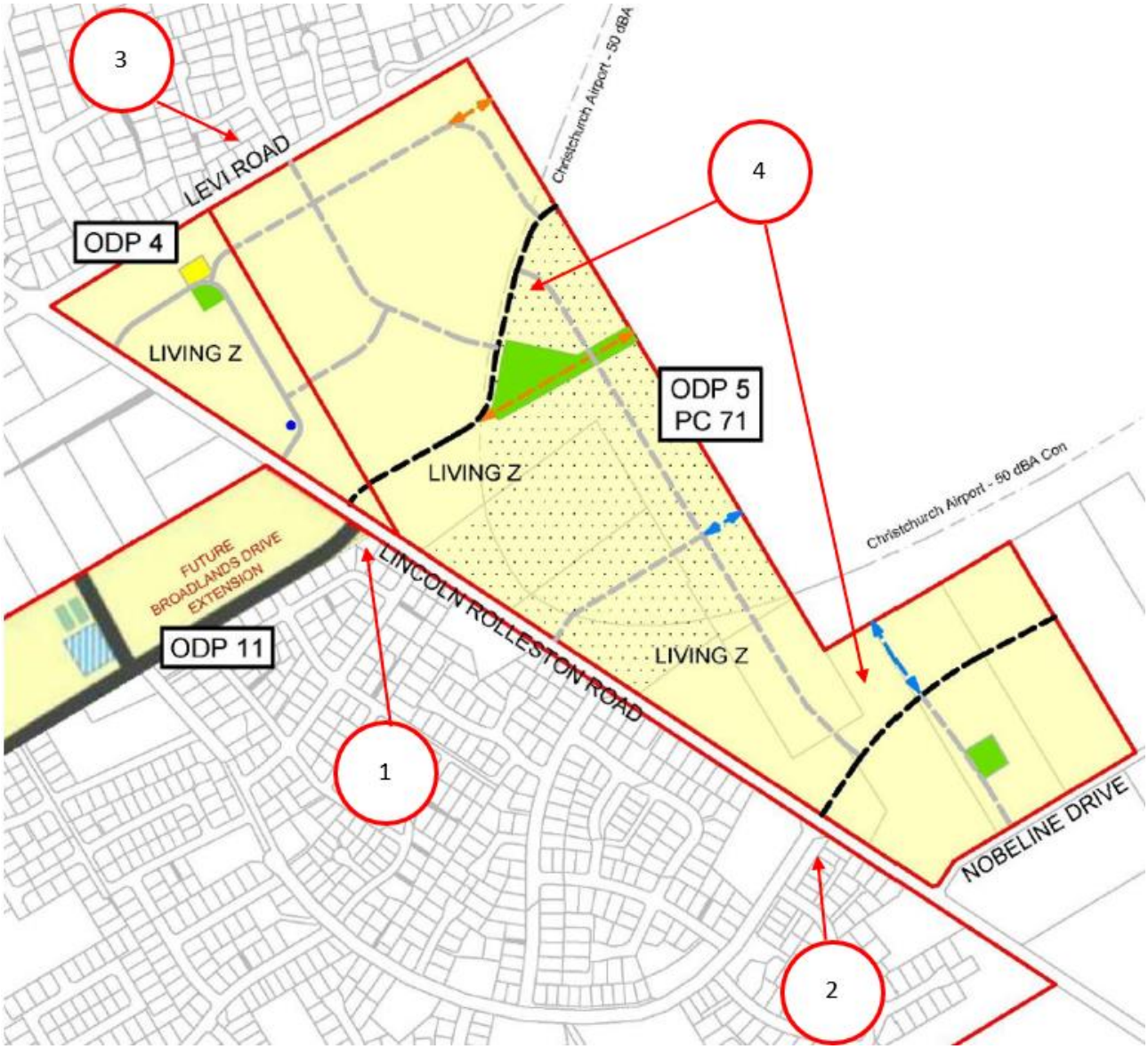
The ITA discusses the following aspects of the existing and future transport environment (shown in Figure 5)

1. Broadlands Drive extension from ODP 11, forming a roundabout with Lincoln Rolleston Road
2. Branthwaite Drive extension, forming a giveway controlled intersection with Lincoln Rolleston Road, with right turn bays
3. Ruby Drive extension, forming a giveway controlled intersection
4. Cycle facilities, including those on Primary Roads.

I discuss these aspects in the following subsections, and I note any differences between the ITA SIDRA model results and the 2033 Rolleston Paramics model results where relevant.

I note that during my review I have considered the total traffic that would be generated by PPC68, including the Living Z deferred zone, which I refer to in this report as “full build out traffic”. My commentary on the Living Z deferred zone is provided in Section 6.8.

Figure 5: aspects discussed in the ITA



5.1 Lincoln Rolleston Road/Broadlands Drive intersection

The ODP proposes to extend Broadlands Drive (provided for in ODP Area 11), by forming a new roundabout on Lincoln Rolleston Road. I support the ITA's recommendation for a roundabout, as this intersection form allows for safer turning movements at the primary access point to PPC71.

I have summarised the modelling results for this intersection

- The ITA indicates that this intersection will operate acceptably in 2028 with full buildout traffic from PPC71
- The 2033 Rolleston Paramics Model assumes that this intersection will be a roundabout, and it indicates that this intersection will operate acceptably in 2033, with traffic from all 8 Rolleston Plan changes.

As discussed in the ITA, Broadlands Drive is expected to be extended from ODP Area 11 through the PPC71. ODP Area 11 shows Broadlands Drive running parallel to the boundary of existing properties on

Lucca Cres (as shown in Figure 2). However, I understand that Council anticipates that this will be set approximately 30m to the north of these properties, as indicated in Figure 6. It appears that ODP Area 4 allows for this alignment, therefore I consider that the slight offset of Broadlands Drive between ODP Area 11 and ODP Area 4 reflects Council's thinking. I understand that Council anticipates forming the western section of Broadlands Drive, through ODP Area 11, in 2033/34.

I consider that development within the ODP Area 5 should be staged, such that development is capped until the Lincoln Rolleston Road/Broadlands Drive intersection is constructed as a roundabout and Broadlands Drive is extended into Area 5, as this link is a primary access point to ODP Area 5 (via ODP Area 4). The staging threshold should be set based on the maximum number of vehicle movements that ODP Area 5 is able to generate through the Levi Drive/Ruby Road intersection without adversely affecting intersection performance. Table 3 of the ITA assumes that ODP Area 5 will generate 227 veh/hr through the Levi Road/Ruby Drive intersection, however the staging threshold should be cognisant of my recommendations in Section 5.3 of this report.

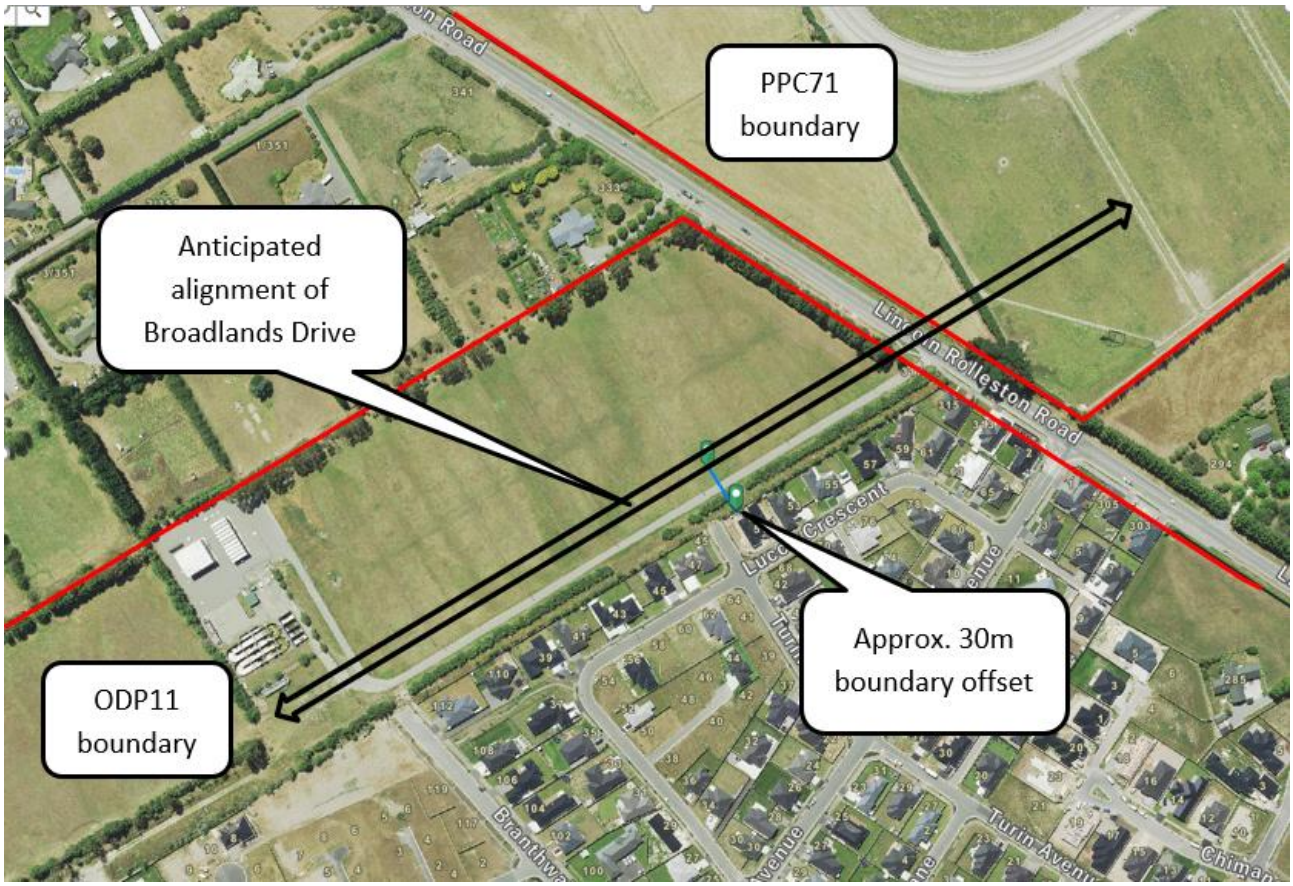
I recommend that a planning mechanism is included, which identifies the need to provide the Lincoln Rolleston Road/Broadlands Drive roundabout and Broadlands Drive extension to align with development within ODP Area 5. Pending confirmation from the applicant regarding my recommendations for the Levi Road/Ruby Drive intersection (discussed in Section 5.3), I have left a placeholder "**xxx**" for staging in my recommended wording as follows

> *A roundabout at the intersection of Lincoln Rolleston Road and Broadlands Drive, and the extension of Broadlands Drive over ODP Area 4 to ODP Area 5, shall be formed prior to the occupation of more than **xxx** dwellings within ODP Area 5.*

While the need for the roundabout is being driven by ODP Area 5 (as an unanticipated extension of the urban area and as a means to relieve pressure on the Levi Road/Ruby Drive intersection), I consider it necessary to identify this requirement in ODP Area 4 to ensure the footprint required for the roundabout is protected and ensure that the traffic effects arising from the additional development are appropriately mitigated.

Outcome: The Lincoln Rolleston Road/Broadlands Drive intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. The ITA assumes that this intersection will be formed as a roundabout. I recommend that ODP Area 4 is amended to identify the requirement for a roundabout at this intersection, and that a planning mechanism is included that requires development within ODP Area 5 to be staged to align with the implementation of the roundabout and extension of Broadlands Drive.

Figure 6: Indicative alignment of Broadlands Drive through ODP11



5.2 Lincoln Rolleston Road/Branthwaite Drive intersection

The ODP proposes to extend Branthwaite Drive by forming a cross road intersection with right turn bays on Lincoln Rolleston Road. I have summarised the modelling results for this intersection

- The ITA indicates that this intersection will operate acceptably in 2028 with full buildout traffic from PPC71, although delays on the existing arm of Branthwaite Drive (west) are apparent during the AM and PM peaks
- The 2033 Rolleston Paramics Model assumes that this intersection will be a priority intersection, and it indicates that this intersection will operate acceptably in 2033, with traffic from all 8 Rolleston Plan changes.

Outcome: The Lincoln Rolleston Road/Branthwaite Drive intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled.

5.3 Levi Road/ Ruby Drive intersection

The ODP proposes to extend Ruby Drive, by forming a cross road intersection on Levi Road. I have summarised the modelling results for this intersection

- The ITA indicates that this intersection will operate acceptably in 2028 with full buildout traffic from PPC71, although delays on the new arm of Ruby Drive (south) are apparent during the AM and PM peaks and on Ruby Drive (north) during the PM peak

- The 2033 Rolleston Paramics Model assumes that this intersection will be a priority intersection, and it indicates that this intersection will operate poorly in 2033, with traffic from all 8 Rolleston Plan changes. During the AM peak, LOS F is predicted on Ruby Drive (south) in the AM peak, and LOS F for Ruby Drive (north) and Levi Road (west) in the PM peak.

PPC71 contributes over 5% of total vehicle movements through the intersection, and Council does not currently have a programmed improvement identified for the intersection. In my view a key factor in the poor performance of this intersection is a result of the proposed extension of Rudy Drive into PPC71. Therefore, to mitigate the effects of PPC71, I consider that a roundabout intersection should be formed and that these works be undertaken by the applicant when Ruby Drive is extended.

Outcome: The Levi Road/Ruby Drive intersection is indicated to operate poorly in 2033 when traffic from all 8 Rolleston Plan changes is modelled, with the extension of Ruby Drive into PPC71 being a key contributor to this. I consider that a roundabout should be formed by the applicant when PPC71 connects to the existing intersection. I recommend that the ODP be amended to identify the requirement for the applicant to form a roundabout at this intersection

5.4 Cycling facilities

The ITA states that a shared use path will be provided on Broadlands Drive extension and Branthwaite Drive extension, consistent with the constructed sections of these roads to the west of PPC71. I agree with this approach and recommend that it be identified in ODP Area 4 and Area 5.

ODP Area 5 also proposes a cycle connection through to the reserve on the eastern side of the site, however no further cycle facilities are proposed.

In my view, PPC71 lacks sufficient cycling facilities. In addition to the facilities identified in the ITA, I consider that the following are required to align with likely desire lines

- A shared use path on Lincoln Rolleston Road along the site frontage, including provision of safe crossing points to the shared use path on the western side of Lincoln Rolleston Road
- A shared use path on Levi Road along the site frontage, including provision of a safe crossing point at the Lincoln Rolleston Road/Levi Road roundabout to connect with the existing shared use path on Lowes Road
- A north/south cycle route through ODP Area 5.

I note that ODP Area 4 would be expected to deliver frontage upgrades to Lincoln Rolleston Road and Levi Road, regardless of PPC71. This is consistent with other developments that front these key arterial roads. My recommended amendments to ODP Area 4 are intended to remove any ambiguity and to ensure consistency with other recent plan changes, rather than to place a new obligation on ODP Area 4.

Outcome: I consider that PPC71 does not adequately provide for cycling. In my view, the following cycle facilities should be provided

- ***A shared use path on Lincoln Rolleston Road along the site frontage, including provision of safe crossing points to the shared use path on the western side of Lincoln Rolleston Road***

- ***A shared use path on Levi Road along the site frontage, including provision of a safe crossing point at the Lincoln Rolleston Road/Levi Road roundabout to connect with the existing shared use path on Lowes Road***
- ***A north/south cycle route through ODP Area 5***.

6 MY CONSIDERATION OF OTHER TRANSPORT MATTERS NOT DISCUSSED IN THE ITA

6.1 Lowes Road/Levi Drive/Masefield Drive

The 2033 Rolleston Paramics model assumes that the roundabout at this intersection is upgraded to traffic signals. The LTP has programmed funding for the upgrade to this intersection in 2025/26 (refer to Table 1).

As identified in Table 3, PPC71 is expected to generate over 4.5% of traffic movements through this intersection in 2033. I consider that PPC71 is unlikely to result in a need to bring construction of the traffic signals forward, as I expect that PPC71 will be generating only a minor number of vehicle movements prior to 2025.

However, I recommend that Council consider whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71.

Outcome: I recommend that Council consider whether the current Development Contributions policy is sufficient to reflect the contribution of PPC71 traffic towards the Lowes Road/Levi Drive/Masefield Drive intersection upgrade.

6.2 Levi Road/Strauss Drive intersection

The 2033 Rolleston Paramics model assumes that this intersection will be a priority controlled intersection, per the existing form. As discussed in Section 4, the 2033 Rolleston Paramics model predicts that this intersection will perform with LOS F on Strauss Drive and Levi Road (east) during the morning peak.

PPC71 contributes around 4% of total vehicle movements through the intersection, and Council does not currently have a programmed improvement identified for the intersection. A roundabout intersection may address the future poor performance, however this may not fit within Council's prioritisation for transport funding.

While I consider that PPC71 has a proportional contribution to make to any upgrade of this intersection, in my view a mechanism in the District Plan to restrict development is not appropriate given that the cause of the congestion, and the benefits of any upgrade, go beyond PPC71.

Outcome: I recommend that Council consider whether the Levi Road/Strauss Road intersection should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71.

6.3 Levi Road/Weedons Road intersection

The 2033 Rolleston Paramics model assumes that this intersection will be a priority controlled intersection, per the existing form. As discussed in Section 4, the 2033 Rolleston Paramics model

predicts that this intersection will perform with LOS F on Weedons Road (south) in both the morning and evening peak, and Levi Road (west) is expected to perform poorly in the evening peak.

PPC71 contributes around 3.5% of total vehicle movements through the intersection, and Council does not currently have a programmed improvement identified for the intersection. A roundabout intersection may address the future poor performance, however this may not fit within Council's prioritisation for transport funding.

While I consider that PPC71 has a proportional contribution to make to any upgrade of this intersection, in my view a mechanism in the District Plan to restrict development is not appropriate given the cause of congestion, and benefits of any upgrade, go beyond PPC71.

Outcome: I recommend that Council consider whether the Levi Road/Weedons Road intersection should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71.

6.4 SH1/Weedons Interchange

The 2033 Rolleston Paramics model assumes that this intersection will be a roundabout, per the existing form. As discussed in Section 4, the 2033 Rolleston Paramics model predicts that this intersection will perform with LOS F on SH1 (west) and Weedons Road in both the morning and evening peak.

PPC71 contributes over 3% of total vehicle movements through the intersection, and Council or Waka Kotahi do not currently have a programmed improvement identified for the interchange.

While I consider that PPC71 has a proportional contribution to make to any future upgrade of this intersection that may occur, in my view a mechanism in the District Plan to restrict development is not appropriate given the cause of congestion, and benefits of any upgrade, go beyond PPC71.

Outcome: I recommend that Council consider whether the SH1/Weedons interchange should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71.

6.5 Rezoning within Area 4

Included in PPC71 are proposed amendments to the operative ODP Area 4. Changes are shown in Figure 7 and include

- Two "indicative secondary routes" to connection to ODP Area 5
- One "indicative primary route" to form the extension of Broadlands Drive between Lincoln Rolleston Road and ODP Area 5
- Change from low density (1000 m^2 +) to low density.

The ITA discusses the additional roads, however it does not assess the potential effects of rezoning the eastern portion of the site (rather it only considers the number of dwellings enabled by Area 5).

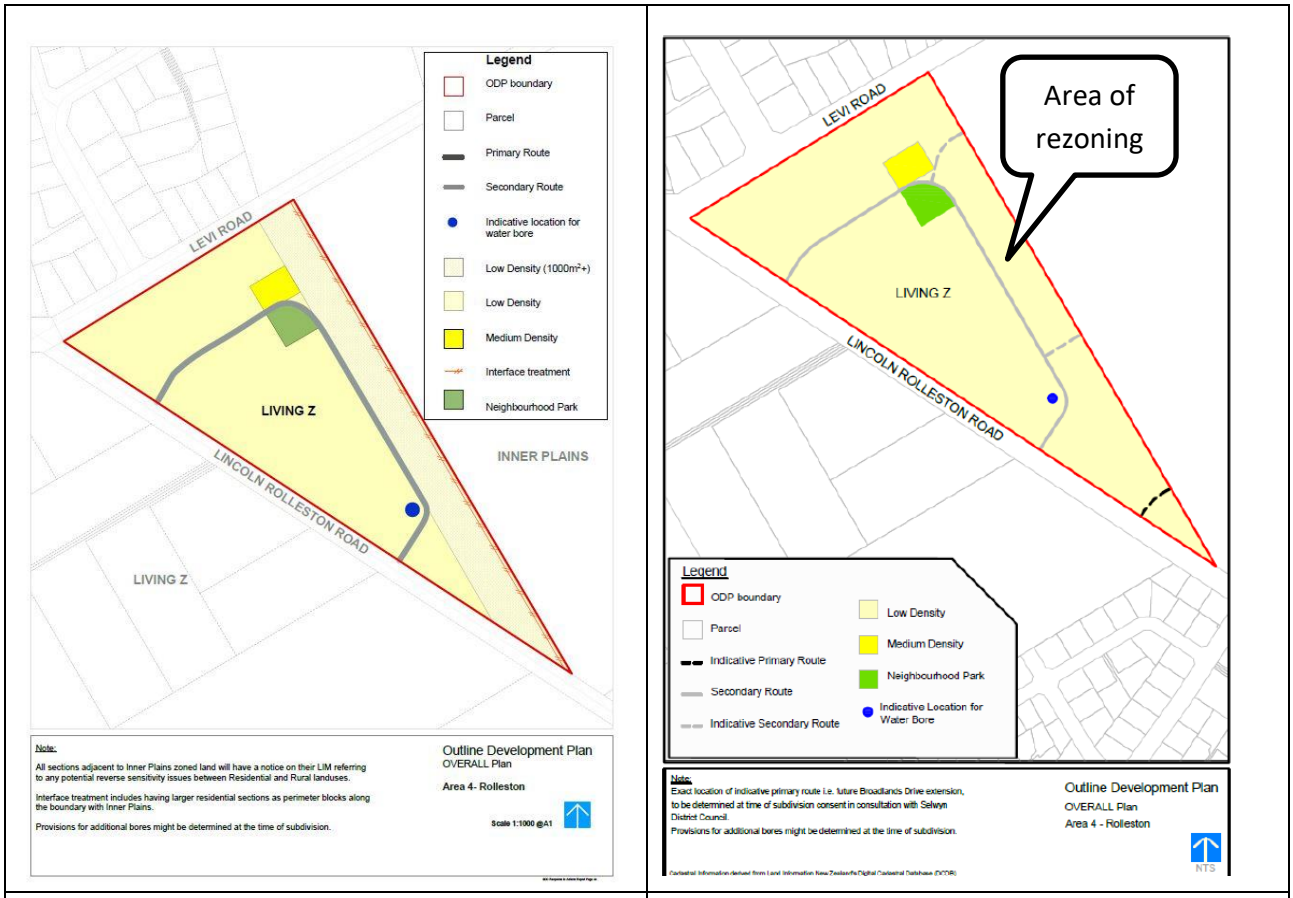
Based on my desktop assessment, the area of rezoning is approximately 20,000 m^2. Allowing for 10% of this area to be used for public use (e.g. roading, stormwater management etc)

- the anticipated yield based on operative zoning is around 18 dwellings
- using a dwelling yield of 12 dwellings per hectare, the anticipated yield based on the proposed zoning is around 22 dwellings.

I consider that omission of this area from the ITA assessment has a negligible effect on my assessment of PPC71, or the conclusions of my report.

Outcome: The ITA does not appear to consider the potential effects resulting from rezoning land within Area 4 from low density (1000 m² +) to low density. I have assessed the potential increase in yield that may result and estimate this to be approximately 4 dwellings. I consider that this omission has a negligible effect on my assessment of PPC71, or the conclusions of my report.

Figure 7: Comparison of operative and proposed ODP Area 4



Operative ODP Area 4	Proposed ODP Area 4

6.6 Amendments to ODP Area 4 (proposed)

I support the changes that the applicant has proposed to ODP Area 4, however I recommend that several additional amendments are made.

The Movement Network section of the proposed ODP Area 4 narrative identifies the expected typology for Primary and Secondary Roads. However, I consider that the application material has not provided sufficient evidence to determine typology at a Plan Change level. Further, Broadlands Drive will fulfil a

role as a major east/west link through Rolleston, consistent with the existing and planned sections west of Lincoln Rolleston Road. I therefore recommend that typology be confirmed during future subdivision, and that the narrative be amended as follows

> *"MOVEMENT NETWORK*
>
> *…it is anticipated that the built standard for a —Primary Road will be the equivalent to the District Plan standards for a Collector Road ~~or Local-Major Road~~ standard~~s~~, and a —Secondary Road will be the equivalent to the District Plan standards for a Local-Major or Local-Intermediate Road, subject to confirmation of compliance to Council's Engineering requirements"*

As discussed in Section 5.1, the ITA assumes that the Lincoln Rolleston Road/Broadlands Drive intersection will be a roundabout. I consider that the ODP narrative should specify that a roundabout be formed when this connection is made. I recommend that this is shown on the ODP plan and that the narrative be amended as follows

> *"MOVEMENT NETWORK*
>
> *…A new primary road link in the form of an extension of Broadlands Drive will cross the southern part of the ODP Area to connect up with the Plan Change 71 site providing direct east-west access to the proposed District Park. The intersection of Broadlands Drive with Lincoln Rolleston Road shall be formed as a roundabout."*

Footpaths should be provided within the berm, and cycling facilities should be provided either separated from the carriageway or within the carriageway (with traffic calming) depending on Council's Engineering requirements. I therefore recommend that the narrative be amended as follows

> *"MOVEMENT NETWORK*
>
> *…Cycling and walking will be contained within the road ~~carriageway~~ corridor and incorporated in the roading design of the secondary and (future) tertiary roads."*

The ITA identifies that the frontages of Lincoln Rolleston Road and Levi Road will be upgraded to urban standard, however this is not reflected in the ODP. I recommend that ODP narrative include the following sentence

> *"Lincoln-Rolleston Road and Levi Road frontages are to be upgraded to an urban standard in accordance with the Engineering Code of Practice."*

Outcome: I recommend that amendments are made to the ODP Area 4 to

- ***Identify a roundabout at the Lincoln Rolleston Road/Broadlands Road intersection on the ODP Plan and in the Movement Network narrative***
- ***Identify in the Movement Network narrative that Primary Roads are expected to be Collector Roads, and that other road typologies are subject to confirmation of compliance with Council's Engineering requirements***
- ***Clarify in the Movement Network narrative that cycling and walking will be contained within the road corridor rather than within the road carriageway***

- ***Identify the requirement to upgrade frontages with existing roads to urban standard.***

6.7 Amendments to ODP Area 5

The Access and Transport section of the ODP Area 5 narrative identifies the intended function of Broadlands Drive as a key access road, and that it has been positioned along the CIAL Noise Contour to maximise yield.

The narrative suggests that the internal road network should respond to progressive development. In my view a degree of flexibility is warranted, to allow subdivision to adapt to staging, refinement of scheme plans, etc. However, I consider that the ODP narrative should clearly state that Broadlands should be formed based on the ultimate buildout of the ODP area, rather than providing an "interim" solution in response to Living Z deferred zone. Further, development should be staged with the delivery of a roundabout at Lincoln Rolleston Road/Broadlands Drive (as discussed in Section 5.1).

> *"Access and Transport*
>
> *… In anticipation of full residential development for the entire ODP area the extension of Broadlands Drive is to be located within the contour to maximise lot yield, and ~~to provide a more rational design for that longer term proposition~~ shall be constructed in conjunction with development of any adjoining land and shall be based on anticipation of full residential development for the entire ODP.*
>
> *Development will be staged to align with the formation of a roundabout at the intersection of Lincoln Rolleston Road and Broadlands Drive, and the extension of Broadlands Drive over ODP Area 4 to ODP Area 5.*

Footpaths should be provided within the berm, and cycling facilities should be provided either separated from the carriageway or within the carriageway (with traffic calming) depending on Council's Engineering requirements. I therefore recommend that the narrative be amended as follows

> *"Access and Transport*
>
> *…Cycling and walking will be contained within the road ~~carriageway~~ corridor and incorporated in the design of any roads.*
>
> *A connection is proposed between the shared path on Lincoln Rolleston Road and the future reserve and cycling and walking will otherwise be contained within the road ~~carriageway~~ corridor and incorporated in the design of any roads."*

The ITA identifies that the frontages of Lincoln Rolleston Road and Levi Road will be upgraded to urban standard, however this is not reflected in the ODP. I recommend that ODP narrative include the following sentence

> *"Lincoln-Rolleston Road and Levi Road frontages are to be upgraded to an urban standard in accordance with the Engineering Code of Practice."*

Outcome: I recommend that amendments are made to the ODP Area 5 to

- ***Clarify that Broadlands Drive, including a roundabout intersection with Lincoln Rolleston Road and extension of Broadlands Drive over ODP Area 4, is to be staged with development***
- ***Clarify that Broadlands Drive shall be constructed in conjunction with the development of any adjoining land, and shall be based on the anticipation of full residential development for the entire ODP***
- ***Clarify in the Access and Transport narrative that cycling and walking will be contained within the road corridor rather than within the road carriageway***
- ***Identify the requirement to upgrade frontages with existing roads to urban standard.***

6.8 Staged development within ODP Area 5

The ODP includes an area of deferred low density development, which generally sits within the Christchurch Airport noise contour, as shown in Figure 4. In my view

- Delaying development is unlikely to affect peak hour traffic distribution, as development within the southern portion of the site will tend to favour Branthwaite Drive extension over Ruby Drive extension or Broadlands Drive extension, regardless of whether internal roads provide connections within ODP Area 5
- Delaying development will have some effect on connectivity within ODP Area 5, particularly for active modes. However, I consider that my recommendation for the frontage upgrade to Lincoln Rolleston Road (discussed in Section 5.4), as well as the existing shared use path along the western side of Lincoln Rolleston Road, are adequate mitigation as it provides an alternative connection between the northern and southern development areas within ODP Area 5
- I recommend that the ODP narrative should state that Broadlands Drive should be constructed based on the anticipated full buildout of ODP Area 5, regardless of deferment of adjoining land. Refer to my recommendations in Section 6.7.

Outcome: Provided the recommendations of my report are adopted, I consider that any potential traffic effects arising from the deferral of part of the ODP Area 5 (due to the area of "Deferred Low Density zoning") will be adequately mitigated.

7 THE ROLLESTON STRUCTURE PLAN

As part of my review, I have considered the Rolleston Structure Plan (Structure Plan)[5].

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.

PPC71 sits outside of the anticipated urban area, as shown in Figure 8, as well as the proposed infrastructure boundary specified in the Canterbury Regional Policy Statement (CRPS) Map A. The transport effects of PPC71, and other PPCs within Rolleston, have been assessed for the local transport network (as discussed in Section 4).

I regard to the potential effects of PPC71 on the wider transport network

- The transport effects of PPC71 on the wider transport network, beyond Rolleston, have not been assessed in the ITA or Council's Rolleston Paramics traffic model
- If PPC71 does not affect the quantum of residential growth within Selwyn District over the life of the District Plan (i.e. residential growth in Selwyn District is a "zero sum game", with PPC71 drawing growth demand away from other parts of Selwyn), PPC71 is unlikely to result in significant wider transport network effects beyond what are already anticipated by strategic growth plans and policies (such as Our Space and the CRPS)
- If PPC71 (as a Plan Change outside the anticipated urban area) leads to greater residential growth in Selwyn beyond what has been anticipated strategic growth plans and policies, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment
- The wider area effects of PPC71 may not be overly apparent in a macro scale regional traffic model. Assessing the effects of PPC71, as a development outside of the identified infrastructure boundary, on the long term planning and funding commitments associated with bulk transport infrastructure is complex and requires assessment of multiple land use scenarios (e.g. expansion vs intensification scenarios.

Outcome: PPC71 is inconsistent with the Rolleston Structure Plan, in that it is outside the anticipated urban area. Should PPC71 affect the quantum of residential growth within Selwyn, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment. However, assessing the effects of such development on the long term planning and funding commitments associated with bulk transport infrastructure is complex and requires assessment of multiple land use scenarios.

[5] Rolleston Structure Plan, available online https://www.selwyn.govt.nz/__data/assets/pdf_file/0015/14361/Final-Rolleston-Structure-Plan-230909.pdf

Figure 8: Rolleston Structure Plan with PPC71 location

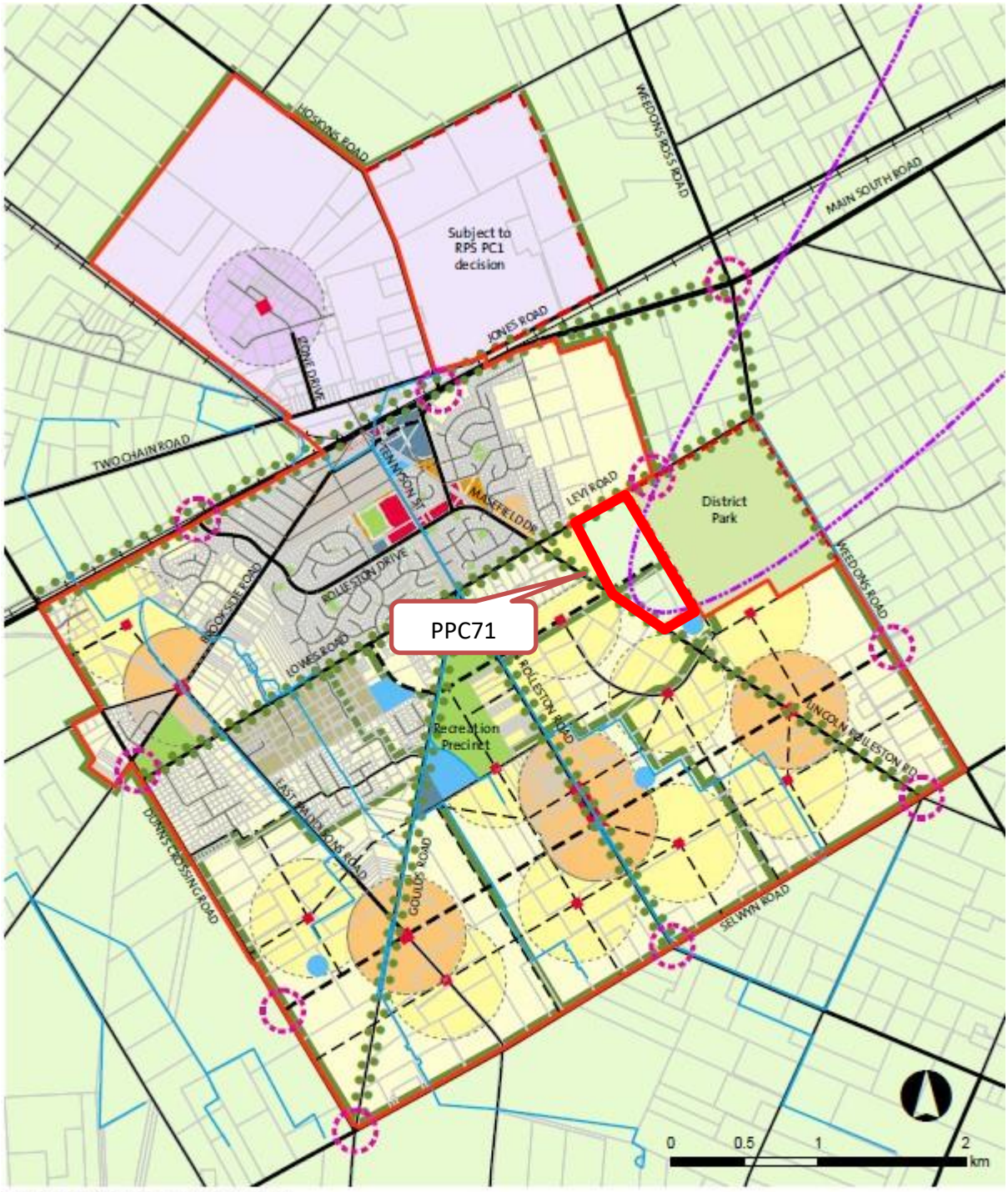
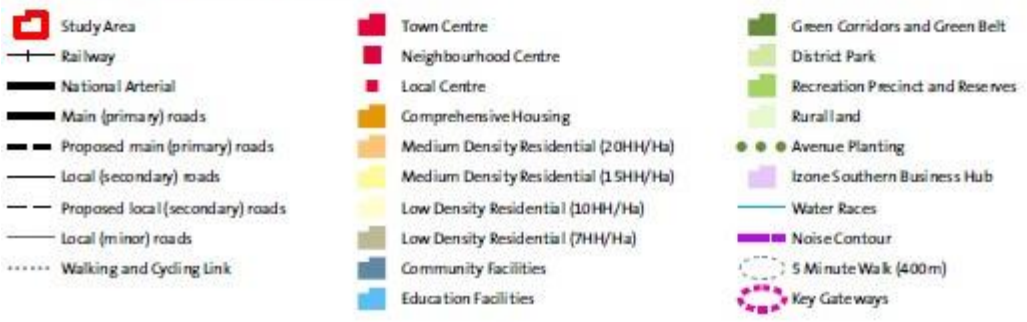


Figure 5.2: Rolleston Structure Plan



8 MY REVIEW OF SUBMISSIONS

Multiple submissions were received relating to transport effects, including

- The width of Nobeline Drive
- Car parking
- Development outside of the projected infrastructure boundary and not within a future development area
- Provision for walking and cycling
- Housing density
- Public transport
- Internal transport network for ODP Area 4 and connections to ODP Area 5.

I comment on these matters further in the following subsections.

8.1 Nobeline Drive

One submitter raised concerns with the existing width of Nobeline Drive and queried whether this was sufficient to include a footpath. Further, the submitter raised concerns with increased congestion at the Lincoln Rolleston Road/Nobeline Drive intersection.

The existing corridor is approximately 12m wide, with a 4.2m carriageway and no footpaths. The ITA discusses the potential upgrade of Nobeline Drive in paragraph 61 and concludes that this can be assessed during future subdivision. However, I consider that the developer should upgrade this road to urban standard, including vesting frontage as needed, as its current design is not consistent with the planned urban land use. I recommend that the ODP Area 5 narrative include the following sentence

> *"Nobeline Drive including the intersection with Lincoln Rolleston Road is to be upgraded by the applicant, including vesting of frontage where needed, to a Local Major Road standard in accordance with the Engineering Code of Practice."*

Regarding the submitters concern about congestion at the Lincoln Rolleston Road/Nobeline Drive intersection, the 2033 Rolleston Paramics model does not include Nobeline Drive in the layout. However, I note that the nearby intersection of Lincoln Rolleston Road / Branthwaite Road intersection is expected to perform acceptably as a priority controlled cross road. This intersection is likely to have a greater number of traffic movements than the Lincoln Rolleston Road/Nobeline Drive intersection, therefore I consider that Lincoln Rolleston Road/Nobeline Drive intersection will perform adequately as an urbanised priority intersection.

8.2 Car parking

One submitter raised concerns with the provision of car parking at supermarkets and other retail activities in Rolleston. I consider that parking at sites external to PPC71 can be managed by land owners and existing Council processes.

8.3 Effects on the surrounding transport network

Several submitters identified concerns with potential safety and efficiency effects on the surrounding transport network. Refer to Section 4, 5 and 6 for my discussion of these matters.

One submitter raised concerns with the width of Levi Road, particularly when cars are parked on street. Levi Road has an approximate carriageway width of 8m, which is likely to be extended to around 9 – 11m (subject to Engineering design at subdivision stage). Should parking controls be required, such as no stopping at all times markings, this can be addressed at subdivision stage.

8.4 Development outside of the identified growth boundary

Several submitters identified concerns with potential effects on the wider transport network as a result of growth outside of the identified infrastructure boundary/future development areas. Refer to Section 7 for my discussion of this matter.

8.5 Provision for walking and cycling

Several submitters discussed the need to provide for walking and cycling. Refer to Sections 5.4, 6.6, and 6.7 for my discussion of this matter.

8.6 Public transport

Submission points on this topic relate to the lack of existing public transport services, request to require provision of public transport services as part of the plan change, and a minimum density of 15 households/hectare to support public transport provisions.

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 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.

Finally, the 2033 Rolleston Paramics model has assessed the stated yields of PPC71. Should yields be increased, Council would need to rerun the model to determine what effect a higher yield for PPC71 would have on the transport network

8.7 Internal transport network for ODP Area 4 and connections to ODP Area 5

Foodstuffs (South Island) Properties Limited's submission identified the following

- The submitter has an unconditional agreement to purchase 157 Levi Road, which is the only land parcel within Area 4
- The submitter intends to develop the site as a supermarket

- The proposed amendments to the transport network for the ODP Area 4 are not feasible based on the development plan for the supermarket
- Concerns with there only being a single road access from ODP Area 5 to Levi Road.

I understand that, based on the Living Zone Rules of operative District Plan, a supermarket in this location would be at least a Discretionary Activity (for example Rule C10.8). The submission therefore revolves around a development plan (which, I understand, resource consent has not been sought or granted) for activity that is not consistent with the operative zoning and may not be consistent with the proposed transport network for the operative ODP Area 4.

To quantify the potential traffic effects of a supermarket / retail development within ODP Area 4 I have estimated the potential number of peak hour vehicle movements into/out of ODP Area 4

- A residential yield of 12 households per hectare within ODP Area 4 is likely to generate less than 100 veh/hr
- I have assumed that a supermarket/retail development for the site would yield around 30% GFA (with the remaining area being roading, carparking, circulation, loading, landscaping etc), resulting in around 25,000 m^2 GFA for a supermarket and other retail
- Published vehicle trip rates for supermarket and retail activity range from 5 veh/hr/100 m^2 GFA to 25+ veh/hr/100 m^2 GFA. Using 15 veh/hr/100 m^2 GFA results in around 3,700 veh/hr.

Clearly, a supermarket and retail development will generate significantly more traffic movements than what is anticipated by the operative residential zoning. At this stage the effect of this type of development on the transport network is not understood.

In my view, the proposed amendments to the transport aspects of the ODP Area 4 (subject to my recommendations in this report) are entirely consistent with what would be expected for an extension of the urban area. I.e. that the continuity/connectivity of the transport network is provided between adjacent development areas. I consider that this connectivity, particularly for Broadlands Drive as a key east-west corridor, is required regardless of the land use activity that occurs within the ODP Area 4.

Therefore, I do not support the submitters concerns and consider that the appropriateness of the submitters proposed development needs to be tested and assessed through a separate plan change or land use consenting process.

9 SUMMARY AND CONCLUSION

I have reviewed the PPC71 application documents, responses to Council information requests, and submissions.

In terms of the immediate effects of PPC71, and the proposed ODPs

- The Lincoln Rolleston Road/Broadlands Drive intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. The ITA assumes that this intersection will be formed as a roundabout. I recommend that ODP Area 4 is amended to identify the requirement for a roundabout at this intersection, and that a planning mechanism is included that requires development within ODP Area 5 to be staged to align with the implementation of the roundabout and extension of Broadlands Drive. Refer to my discussion in Section 5.1
- The Lincoln Rolleston Road/Branthwaite Drive intersection is indicated to operate acceptably in 2033 when traffic from all 8 Rolleston Plan changes is modelled. Refer to my discussion in Section 5.2
- The Levi Road/Ruby Drive intersection is indicated to operate poorly in 2033 when traffic from all 8 Rolleston Plan changes is modelled, with the extension of Ruby Drive into PPC71 being a key contributor to this. I consider that a roundabout should be formed by the applicant when PPC71 connects to the existing intersection. I recommend that the ODP be amended to identify the requirement for the applicant to form a roundabout at this intersection. Refer to my discussion in Section 5.3
- I consider that PPC71 does not adequately provide for cycling (refer to my discussion in Section 5.4). In my view, the following cycle facilities should be provided
    - A shared use path on Lincoln Rolleston Road along the site frontage, including provision of safe crossing points to the shared use path on the western side of Lincoln Rolleston Road
    - A shared use path on Levi Road along the site frontage, including provision of a safe crossing point at the Lincoln Rolleston Road/Levi Road roundabout to connect with the existing shared use path on Lowes Road
    - A north/south cycle route through ODP Area 5
- The ITA does not appear to consider the potential effects resulting from rezoning land within Area 4 from low density (1000 m^2 +) to low density. I have assessed the potential increase in yield that may result and estimate this to be approximately 4 dwellings. I consider that this omission has a negligible effect on my assessment of PPC71, or the conclusions of my report. Refer to my discussion in Section 6.5
- I recommend that amendments are made to the ODP Area 4 (refer to my discussion in Section 6.6) to
    - Identify a roundabout at the Lincoln Rolleston Road/Broadlands Road intersection on the ODP Plan and in the Movement Network narrative

- Identify in the Movement Network narrative that Primary Roads are expected to be Collector Roads, and that other road typologies are subject to confirmation of compliance with Council's Engineering requirements
- Clarify in the Movement Network narrative that cycling and walking will be contained within the road corridor rather than within the road carriageway
- Identify the requirement to upgrade frontages with existing roads to urban standard

- I recommend that amendments are made to the ODP Area 5 (refer to my discussion in Section 6.7) to
  - Clarify that Broadlands Drive, including a roundabout intersection with Lincoln Rolleston Road and extension of Broadlands Drive over ODP Area 4, is to be staged with development
  - Clarify that Broadlands Drive shall be constructed in conjunction with the development of any adjoining land, and shall be based on the anticipation of full residential development for the entire ODP
  - Clarify in the Access and Transport narrative that cycling and walking will be contained within the road corridor rather than within the road carriageway
  - Identify the requirement to upgrade frontages with existing roads to urban standard
- Provided the recommendations of my report are adopted, I consider that any potential traffic effects arising from the deferral of part of the ODP Area 5 (due to the area of "Deferred Low Density zoning") will be adequately mitigated. Refer to my discussion in Section 6.8.

Having reviewed submissions (refer to my discussion in Section 8.1), I recommend that the ODP Area 5 narrative include the following sentence

> *"Nobeline Drive including the intersection with Lincoln Rolleston Road is to be upgraded by the applicant, including vesting of frontage where needed, to a Local Major Road standard in accordance with the Engineering Code of Practice."*

PPC71 is inconsistent with the Rolleston Structure Plan, in that it is outside the anticipated urban area. Should PPC71 affect the quantum of residential growth within Selwyn, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment. However, assessing the effects of such development on the long term planning and funding commitments associated with bulk transport infrastructure is complex and requires assessment of multiple land use scenarios. Refer to my discussion in Section 7.

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 discussed in Section 4. Council should consider whether the proportional effects of PPC71 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. In particular, I recommend that Council consider whether

- the current Development Contributions policy is sufficient to reflect the contribution of PPC71 traffic towards the Lowes Road/Levi Drive/Masefield Drive intersection upgrade. Refer to my discussion in Section 6.1
- the Levi Road/Strauss Road intersection should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71. Refer to my discussion in Section 6.2
- the Levi Road/Weedons Road intersection should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71. Refer to my discussion in Section 6.3
- the SH1/Weedons interchange should be upgraded in the future and, if so, whether the current Development Contributions policy is sufficient to reflect traffic demand through this intersection generated by PPC71. Refer to my discussion in Section 6.4

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.

However, I note that PPC71 is inconsistent with the Rolleston Structure Plan, in that it is outside the anticipated urban area. Should PPC71 affect the quantum of residential growth within Selwyn, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment.

APPENDIX A Traffic modelling technical note

flow
TRANSPORTATION SPECIALISTS

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

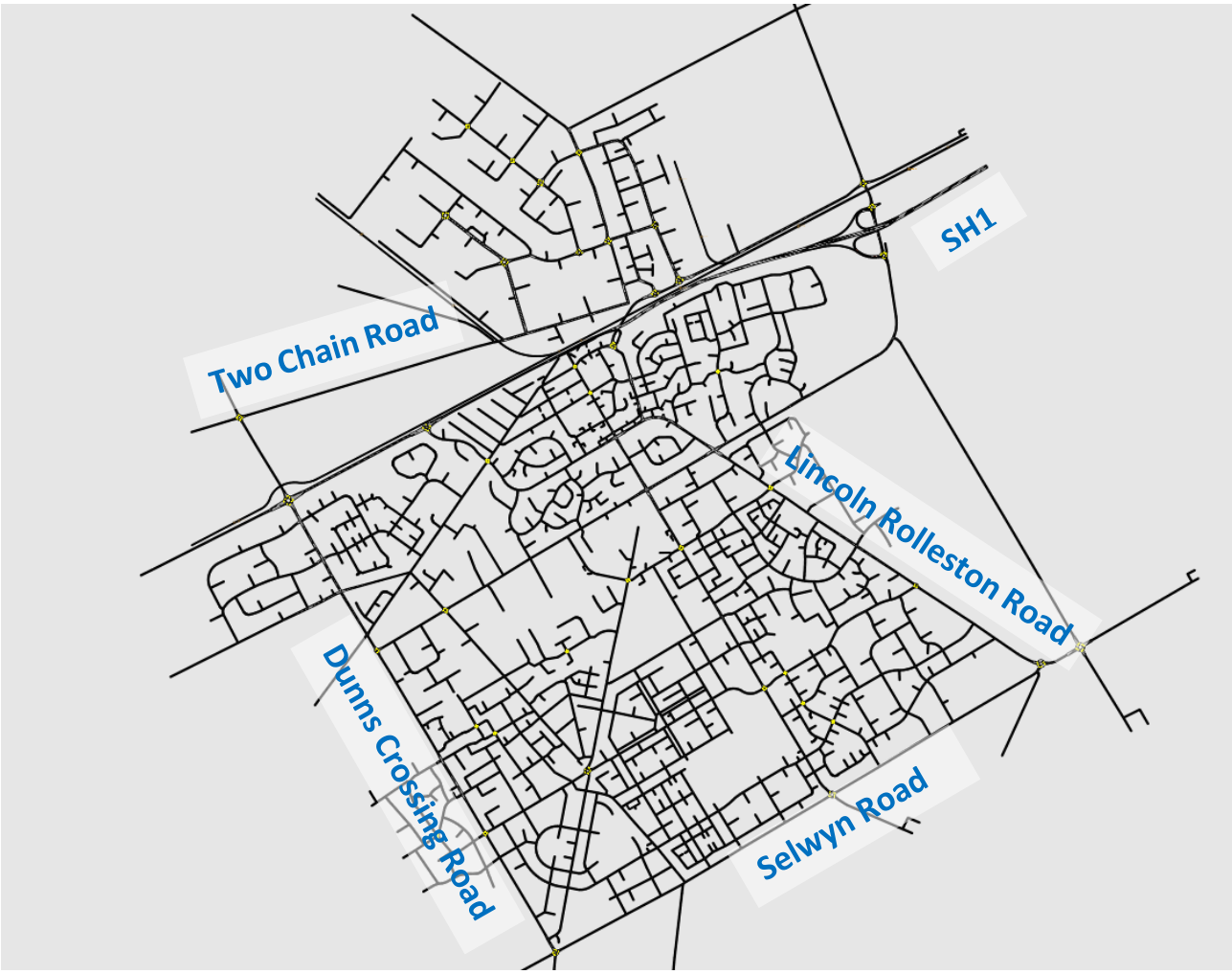
This technical note provides a summary of the traffic modelling assessment completed for Private Plan Change 73 (PPC73) in Rolleston, Selwyn District. The assessment has been based on the Paramics model developed by Abley Limited (Abley). This model was developed in May 2021 and it assumes a 2033 background 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 area[1]

[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 2024[2]
- 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

[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	Morning 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'

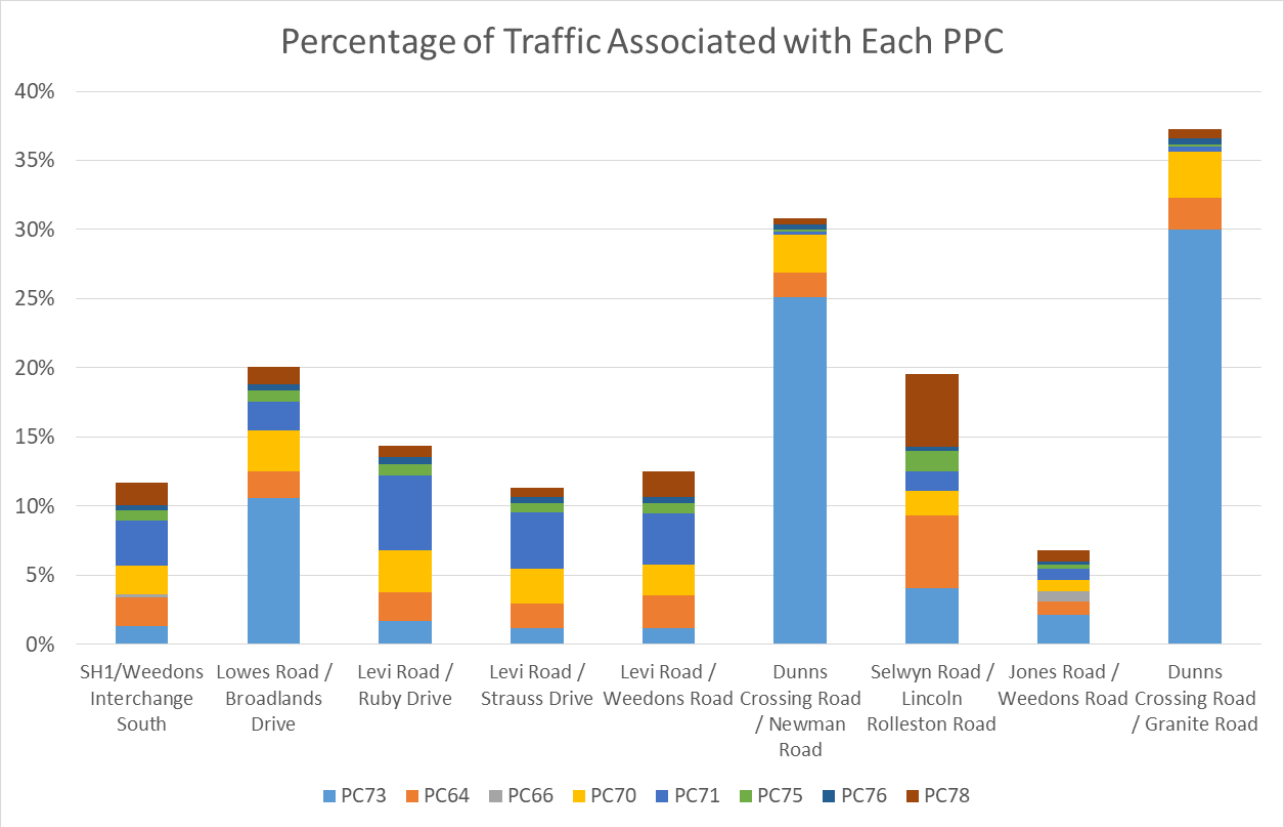


Table 2: 2033 network performance and individual PPC effects

Intersection	Existing Layout	Intersection form assumed in models (2028/2033)	2028 performance without PPCs	2033 performance with all 8 PPCs	2033 traffic movements With all PPCs (AM and PM combined)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined)							
						PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78
						%	%	%	%	%	%	%	%
Intersection with Congestion/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 Changes													
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 (2028/2033)	2028 performance without PPCs	2033 performance with all 8 PPCs	2033 traffic movements With all PPCs (AM and PM combined)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (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

	SH1 East	SH1 West	South	Selwyn Rd East	North	within 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 B Traffic modelling Select Link Analysis


250
300
120
35
35
25
130
65
90
50
10
AM_PC71 OD Routes (all)
07:00 to 08:00
1.0 to 250.0


245
430
125
25
35
15
155
115
60
40
10
PM_PC71 OD Routes (all)
17:00 to 18:00
1.0 to 404.0