Private Plan Change 80

Transportation Hearing Report

September 2022

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TRANSPORTATION SPECIALISTS

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Project: **Private Plan Change 80**
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 80 (PPC80), which has been lodged by Two Chain Road Limited.

As part of my review, I have considered the cumulative transport effects of multiple 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
- PPC80: Rolleston, rural to industrial zone (subject of this report)
- PPC81: Rolleston, 350 residential lots
- PPC82: Rolleston, 1320 residential lots.

This report focuses on my review of PPC80, however I include comments on the cumulative effect of the other PPCs to assist Council's understanding of the potential future effects on the transport network should all PPCs be approved.

While PPC73 has been declined I understand that this decision has been appealed to the Environment Court. For the purposes of my assessment of cumulative effects on the Rolleston transport network, I included traffic that could be generated by PPC73 if it becomes operative.

Key transport matters identified in my review are

- The cumulative effect of the multiple PPCs on the Rolleston transport network, and the proportional effect of PPC80
- The safety and efficiency effects of PPC80 on key intersections, and what intersection and road upgrades are required to support PPC80
- Connectivity of the Outline Development Plan within the site, and to the adjacent existing and future transport network
- Consideration of the Rolleston Structure Plan and the Canterbury Regional Policy Statement infrastructure boundary.

In terms of the immediate effects of PPC80, and the proposed ODP

- The future State Highway 1 / Dunns Crossing Road / Walkers Road roundabout (proposed as part of NZUP) will operate acceptably with traffic from PPC80, but without traffic from PPC81 and PPC82. When traffic from PPC81 and PPC82 is added, it is indicated that this intersection will perform poorly in 2033. However, in my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. Critical efficiency effects at intersections tend to be indicated in traffic models by exponential increases in queue lengths, and/or volume to capacity ratios that are approaching or exceeding 1. Neither applies in this situation. I therefore consider that the effects of PPC80 on the State Highway 1 / Dunns Crossing Road / Walkers Road intersection are within the range of what is acceptable during peak periods, should the intersection be upgraded to a dual lane roundabout. However, I consider that the existing safety issues at this intersection mean that any traffic generated by PPC80 prior to the intersection being upgraded will cause unacceptable safety effects. I therefore recommend that proposed Rule 22.9.x(a) be amended to require that no earthworks or construction activity is to be undertaken within PPC80 prior to the commencement of the upgrade of the intersection[1]. Refer to my discussion in Section 5.1
- The traffic modelling for the Two Chain Road / Walkers Road intersection indicates that this intersection will operate acceptably with PPC80 traffic once it is upgraded to a roundabout. I recommend an amendment to Rule 22.9.x(e) to clarify that either a through site link or an upgrade to this intersection is required prior to the occupation of any building. Refer to my discussion in Section 5.2
- The PPC80 ITA has identified performance issues with the Dunns Crossing Road / Newman Road intersection, with the average delay on Newman Road increasing from 54 seconds to 78 seconds. However, in my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. I therefore consider that the effects of PPC80 on the Dunns Crossing Road / Newman Road intersection are within the range of what is acceptable during peak periods. Refer to my discussion in Section 5.3
- I consider that the proposed Rules are adequate to ensure that transport effects resulting from any vehicle access onto the unformed section of legal road (Runners Road) can be managed through future resource consenting processes[2]. Should the requestor wish to stop the unformed legal road in the future, Council can assess the merits of this at the time, if an application is made. Refer to my discussion in Section 5.4
- I recommend that Council's Planner confirm the legal description for the intersection of Wards Road. In the proposed Rules it is referenced as the Jones Road / Wards Road intersection, however I consider that this should reference the Two Chain Road / Wards Road intersection. I consider that the proposed Rules are adequate to ensure that transport effects on the Two Chain Road / Wards Road intersection can be managed through future resource consenting processes. However, I recommend that proposed Rule 22.9.x include a requirement for the Two Chain Road

[1] I have been advised that the applicant intends to make amendments to the application which align with this recommendation

[2] I have been advised that the applicant intends to make amendments to the application to restrict direct vehicle access to Walkers Road, north of the Primary Road intersection. I support this amendment

rail level crossing to be upgraded prior to the occupation of any building within the Plan Change site. Refer to my discussion in Section 5.5

- I consider that the proposed Rules and the ODP adequately address the requirement for frontage upgrades to Walkers Road and Two Chain Road. Refer to my discussion in Section 5.6
- I consider that PPC80 will have good accessibility by active modes in the future. Public transport accessibility may improve in the future, however this will depend on planning and funding from the Canterbury Regional Council. Refer to my discussion in Section 5.7
- I consider that the ODP provides for an internal street network that generally integrates well with the surrounding existing and will provide for all users of the transport system. Refer to my discussion in Section 5.8
- In general, I support the transport upgrades identified in proposed Rule 22.9.x, other than as discussed in other sections of my report. I support Waka Kotahi's request (submission PC80-0007) to amend Rule 22.9.x(a) – (d). I recommend that Council's Planner consider whether, in relation to "built development", Council can efficiently and effectively monitor "building occupation" as a control for these upgrades, or whether an alternative control such as "prior to the issue of any s224 subdivision certificate" is more appropriate[3]. Refer to my discussion in Section 5.9
- PPC80 is inconsistent with the Rolleston Structure Plan and CRPS infrastructure boundary, in that it is outside the anticipated future urban area. However, in the context of the multiple Plan Changes within Rolleston to enable urban residential development, I consider that PPC80 will have some benefit to the wider transport network. PPC80 is likely to "soak up" some trips from the additional urban residential development that that would otherwise have destinations outside of Rolleston, as PPC80 will provide additional local employment and services. Refer to my discussion in Section 6.

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

- Flow has also used Paramics traffic models, provided by the requestors for PPC80, PPC81 and PPC82 requestors, to assess the potential effect of multiple PPCs within the Rolleston area. To assess the cumulative effects of all Plan Changes on the Rolleston network, we have relied on the PPC81 and PPC82 Paramics models. We have not used the PPC80 Paramics model to assess the cumulative effects of the multiple plan changes, as this model does not include land use proposed by PPC81 and PPC82, and therefore has lower overall traffic demands.

  Concurrently with the development of the PPC81 Paramics model and the PPC82 Paramics model, Waka Kotahi has developed an alternative version of the Paramics 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 Paramics models that I have relied upon for this report.

[3] I have been advised that the applicant intends to make amendments to the application which align with this recommendation

We have referred to both the PPC81 and the PPC82 Paramics models in our assessment of PPC80, and where relevant we identify which model we have relied upon. I note that the PPC81 and PPC82 Paramics models do 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 underestimated. In my view, additional effects on these roads (beyond those indicated in the PPC81 and PPC82 Paramics models) would need to be considered under the NZUP project. Refer to my discussion in Section 4

- I recommend that Council consider the proportional effect that each PPC will have on network hotspots and assumed intersection improvements contained in the Rolleston Paramics model, as identified in Table 3. Council should consider whether the proportional effects of PPC80 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 there are discrepancies between the total travel demand and traffic routing in the PPC81, PPC82 and NZUP Paramics models. Should the Paramics models be used to determine how Development Contributions are calculated, I recommend that inconsistencies between the PPC81, PPC82 and NZUP Paramics models are addressed. Refer to my discussion in Section 4.1.

CONTENTS

APPENDICES

1 INTRODUCTION

This report has been completed by Mat Collins (Associate) with assistance from Qing Li (Senior 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[4].

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

- PPC64: Rolleston, 969 residential lots. Status: approved consent to subdivide and develop the proposed land for housing under the COVID-19 Recovery (Fast-track Consenting) Referred Projects Order 2020
- PPC70: Rolleston, 800 residential lots plus commercial. Status: Awaiting response to Council's request for further information issued 24 December 2020
- PPC71: Rolleston, 660 residential lots. Status: Hearing closed as of 28 March 2022. Awaiting Commissioners recommendation
- PPC73: Rolleston, 2100 residential lots plus commercial. Status: Declined by Council, currently under appeal
- PPC75: Rolleston, 280 residential lots. Status: Approved by Council, no appeals received. Plan change to be included in Variation
- PPC76: Rolleston, 150 residential lots. Status: Approved by Council, no appeals received. Plan change to be included in Variation
- PPC78: Rolleston, 750 residential lots. Status: Approved by Council, no appeals received. Plan change to be included in Variation
- PPC81: Rolleston, 350 residential lots. Further Submission period closed Wednesday 22 June 2022. Hearing scheduled for September 2022
- PPC82: Rolleston, 1320 residential lots. Further Submission period closed Wednesday 22 June 2022. Hearing scheduled for September 2022.

While PPC73 has been declined I understand that this decision has been appealed to the Environment Court. For the purposes of my assessment of cumulative effects on the Rolleston transport network, I included traffic that could be generated by PPC73 if it becomes operative.

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. PPC66 was operative as of 11 February 2022.

[4] Note: This report has primarily been written by Mat Collins. In the instance that I am relying on my expert opinion, I use "I" and "my" throughout the report. In the instance that I am relying on the transport modelling expert opinion of Qing Li and/or Ian Clark, I use "we" and "our" throughout the report.

Two Chain Road Limited (requestor) has lodged a PPC to change the Selwyn District Plan to rezone approximately 98 hectares of Rural Inner Plains zoned land to Business 2A zone (PPC80).

This report details my review of PPC80. Where relevant I also make comments about the cumulative effects of all other 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 PPC80 and includes the following

- A summary of PPC80 focusing on transport matters
- An overview of transport projects contained within the Long Term Plan (LTP), which are relevant to PPC80
- A summary of the modelled traffic effects of all Rolleston PPCs
- A review of the material provided to support the application for PPC80
- Summary of submissions, relating to transport matters only
- My recommendations.

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

- Request for Change to the Selwyn District Plan, prepared by Novo Group Limited, dated February 2022, including appendices relevant to transport matters (as notified)
- Third party traffic model files, as discussed in Section 3
- Submissions as outlined in Section 7.

2 A SUMMARY OF PPC80

PPC80 proposes to rezone approximately 98 hectares of Rural Inner Plains zoned land to Business 2A zone, with an Outline Development Plan (ODP) proposed to guide the form and layout of future development.

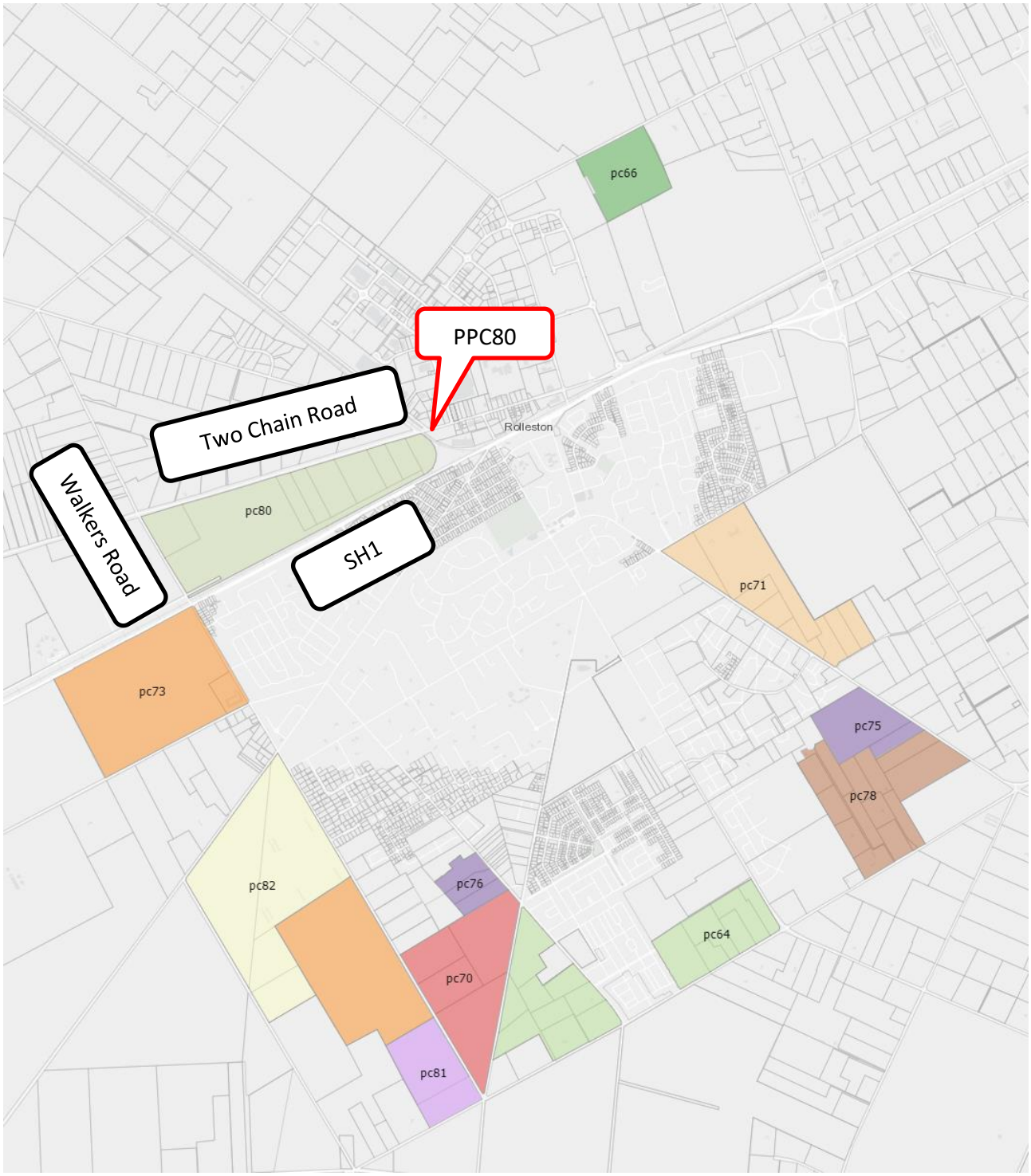
PPC80 has road frontages to Walkers Road and Two Chain Road, as shown in Figure 1 and Figure 2.

The ODP is shown in Figure 3 and is intended to provide

- An east-west Primary Road, between Walkers Road and Two Chain Road
- A north-south Primary Road, between Two Chain Road and the east-west Primary Road
- Internal walking and cycling connections
- Restrictions on individual vehicle accesses from Two Chain Road
- Walking and cycling paths along the site frontage with Walkers Road and Two Chain Road.

Both Walkers Road and Two Chain Road along the site frontage are identified as arterial roads in Operative District Plan, and as arterial roads in the Proposed District Plan.

Figure 1: Overview of PPC80 with other nearby Rolleston PPCs[5]



[5] 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: PPC80 extent

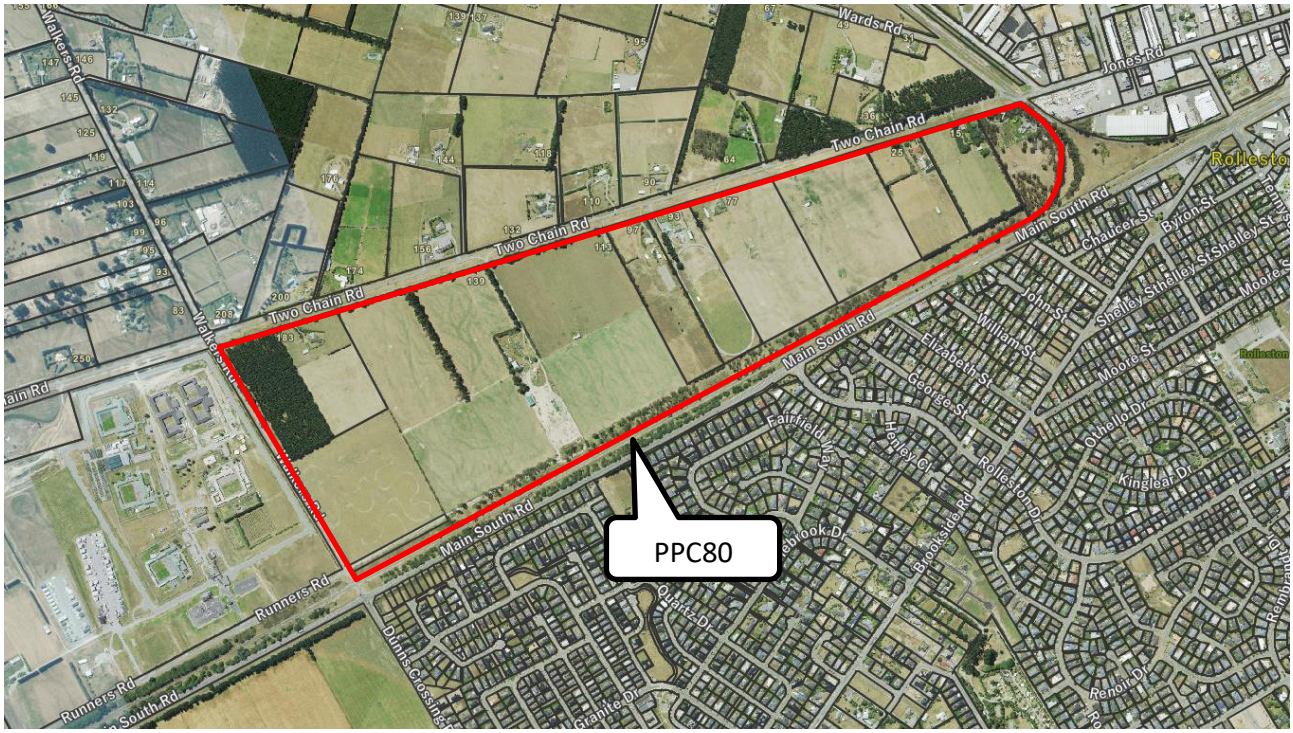
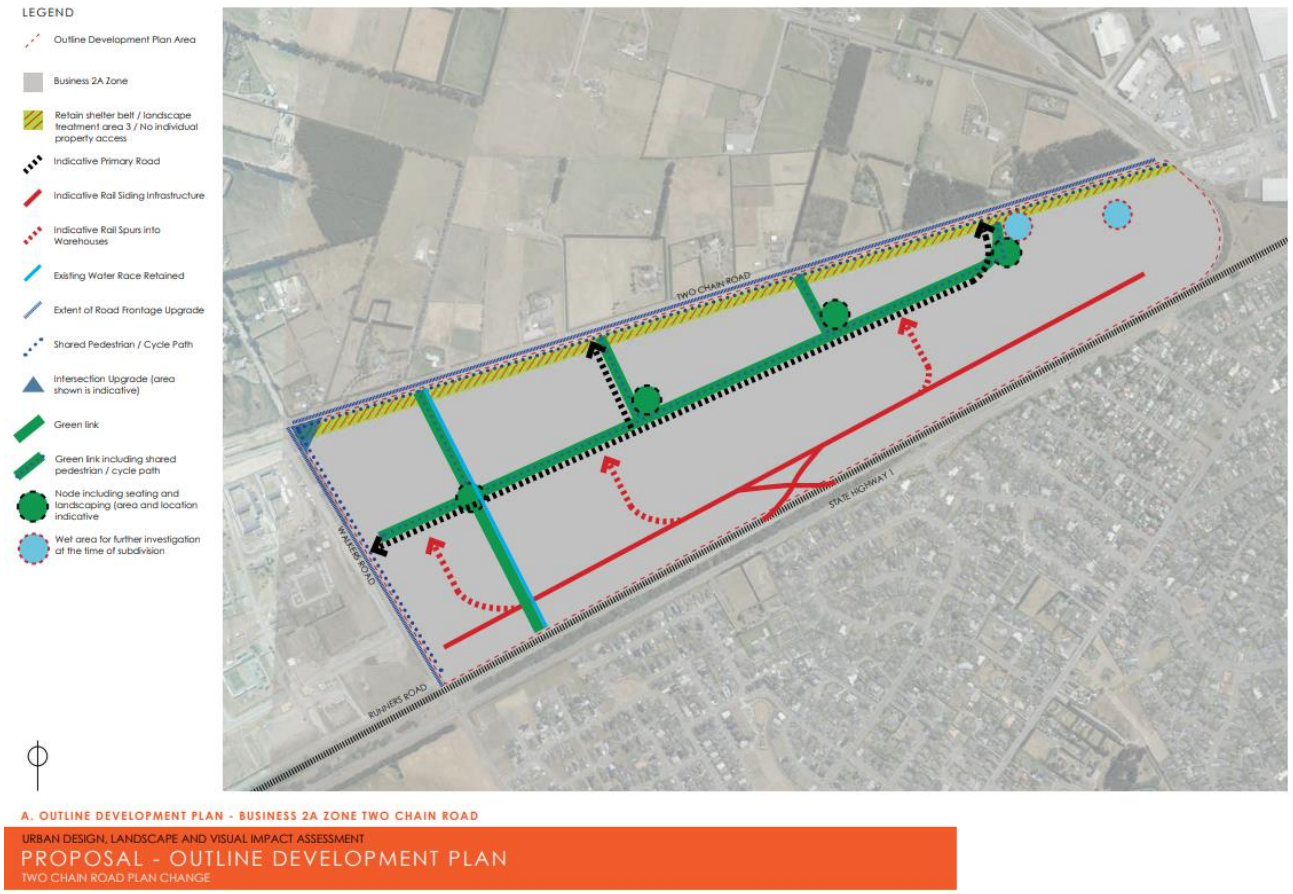


Figure 3: PPC80 ODP



3 ROLLESTON TRANSPORT PROJECTS RELEVANT TO PPC80

This section discusses various funded and planned transport projects in Rolleston that have relevance to PPC80.

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 PPC80. I have reproduced these in Table 1 below. Further discussion of how PPC80 are anticipated to affect various parts of the transport network is provided in Section 4.

Table 1: LTP transport projects relevant to PPC80

Project	Scheduled year	Description	Relevance to PPC80
Traffic Signals at Rolleston Drive/Tennyson Street	2021/22	Safety upgrade, including safer pedestrian crossing	PPC80 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	PPC80 contributes around 1% of peak hour traffic movements in 2033
Springston Rolleston Road/Selwyn Road intersection	2024/27	Safety upgrade under the National Land Transport Plan by Waka Kotahi	PPC80 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	PPC80 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	PPC80 contributes around 1% of peak hour traffic movements in 2033
Selwyn/Weedons Road Roundabout	2027/28	Safety upgrade - Rolleston southern arterial link	PPC80 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	High relevance to PPC80, this is near to PPC80 and will improve cycle accessibility to the site.
Lincoln Rolleston Road/Selwyn Road Intersection Upgrade	2028/29	Safety upgrade - Rolleston southern arterial link	PPC80 contributes less than 1% of peak hour traffic movements in 2033

Walkers Road/Two Chain Road Roundabout, widening of Two Chain Road, realignment of Jones Road/Ward Road intersection, and upgrade of rail level crossing.	2028/29	Safety upgrade - Rolleston Industrial Zone southern link	High relevance to PPC80, as these upgrades are required to support development within the site.
Goulds/East Maddisons Road Roundabout	2029/30	Connects Farrington and new subdivisions to Goulds Road	PPC80 contributes less than 1% of peak hour traffic movements in 2033
Rolleston to Burnham Cycleway	2029/30	From Elizabeth St to Aylesbury Road, which may include a cycling underpass at the SH1/Dunns Crossing Road/Walkers Road intersection	High relevance to PPC80, this is near to PPC80 and will improve cycle accessibility to the site.
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	PPC80 contributes around 2% of peak hour traffic movements in 2033
Rolleston South to Rolleston Industrial Zone Cycleway (may be partially delivered by PPC80)	2033/34		High relevance to PPC80, this is near to PPC80 and will improve cycle accessibility to the site.
West Melton to Rolleston Cycleway	2034/35		
Lowes Road/Dunns Crossing Road Roundabout	2035/36		PPC80 contributes around 2% of peak hour traffic movements in 2033
Burnham School Road Widening	2042/43		PPC80 contributes around 2% of peak hour traffic movements 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 PPC80 are discussed in Table 2.

Table 2: NZUP[6] transport projects relevant to PPC80

Project	Scheduled year	Description	Relevance to PPC80
SH1 Rolleston and Rolleston Flyover[7]	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 Jones 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 conversion of the SH1/Rolleston Drive intersection to a left in/left out. Discussion of the SH1/Dunns Crossing Road intersection is provided in Section 5.1.

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

[7] Rolleston flyover and transport improvements media release, July 2022, available online https://www.nzta.govt.nz/media-releases/feedback-sought-on-plan-changes-for-state-highway-1-through-rolleston/

4 MY REVIEW OF TRAFFIC MODELLING FOR THE ROLLESTON AREA

To understand the cumulative effects of the multiple PPCs within Rolleston, we have used 4 third party Paramics traffic models to assess the effects of PPC80 on the transport network

- 2028 model, which represents a "base case" with no private plan changes
- 2033 PPC80 model, which builds on the 2028 model by including all private plan changes up to PPC80
- 2033 PPC81 model[8], which builds on the 2028 model by including all private plan changes up to PPC81
- 2033 PPC82 model[9], which builds on the 2028 model by including all private plan changes up to PPC81.

Our rationale for using the PPC81 and PPC82 models for assessment of the cumulative effects of PPC80 is as follows

- The PPC80 Paramics model does not incorporate PPC81 and PPC82, it therefore shows that PPC80 has a higher proportion of total traffic movements at some intersections, e.g. SH1/Dunns Crossing Road/Walkers Road
- Paramics model used by the PPC81 ITA did not include urbanisation proposed by PPC82, and predicted a total peak hour demand of 32,850 light vehicles and 1,500 heavy vehicles within the modelled area during the AM peak
- The Paramics model used by the PPC82 ITA includes urbanisation proposed by PPC81, and predicted a total peak hour demand of 32,150 light vehicles and 920 heavy vehicles during the AM peak within the same modelled area
- It is not clear to me why the PPC82 Paramics model anticipates a lower total travel demand compared with the PPC81 Paramics model, when it (the PPC82 model) includes a greater quantum of new development
- I have not used the PPC80 Paramics model to assess the cumulative effects of the multiple plan changes, as this model does not include PPC81 and PPC82. However, I have referred the PPC80 Paramics model in my discussion of the PPC80 ITA in Section 5.

We have therefore referred to both the PPC81 and the PPC82 Paramics models in our assessment of the proportional contribution of PPC80 to wider network effects, and where relevant we identify which model we have relied upon in the following subsections.

Flow interrogated the models to understand the potential traffic effects of PPC80, in isolation and as a cumulative effect in conjunction with the other Rolleston PPCs. Further detail on the methodology is provided in Appendix B, and our findings are summarised below.

[8] Provided to Flow as part of PPC81 Clause 23 responses, from Nick Fuller via email on Monday, 20 December 2021 10:51 AM, subject: Plan Change 81: Traffic Model Files
[9] Provided to Council as part of PPC82 Clause 23 responses, from Fiona Aston via email on Wednesday, 19 January 2022 5:08 PM, subject: FW: PC82 - RFI Transport Response

Concurrently with the development of the PPC81 Paramics model and the PPC82 Paramics model, Waka Kotahi has developed an alternative version of the Paramics 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 Paramics models that I have relied upon for this report, and it is likely to have a consequential effect on the traffic movements on Dunns Crossing Road, Brookside Road, and Lowes Road, among others.

Outcome: Flow has also used Paramics traffic models, provided by the requestors for PPC80, PPC81 and PPC82 requestors, to assess the potential effect of multiple PPCs within the Rolleston area. To assess the cumulative effects of all Plan Changes on the Rolleston network, we have relied on the PPC81 and PPC82 Paramics models. We have not used the PPC80 Paramics model to assess the cumulative effects of the multiple plan changes, as this model does not include land use proposed by PPC81 and PPC82.

Concurrently with the development of the PPC81 Paramics model and the PPC82 Paramics model, Waka Kotahi has developed an alternative version of the Paramics 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 Paramics models that I have relied upon for this report.

We have referred to both the PPC81 and the PPC82 Paramics models in our assessment of PPC80, and where relevant we identify which model we have relied upon. I note that the PPC81 and PPC82 Paramics models do 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 underestimated. In my view, additional effects on these roads (beyond those indicated in the PPC81 and PPC82 Paramics models) would need to be considered under the NZUP project.

4.1 PPC80 proportion of the cumulative network effects of all Rolleston PPCs

We have relied on the PPC81 Paramics model to identify intersections will be operating near to or over capacity by 2033 if all PPCs in Rolleston proceed. We have chosen to use the PPC81 Paramics model as this has a higher total traffic demand than the PPC80 Paramics model and PPC82 Paramics model. The PPC81 Paramics model indicates that the following intersections will be operating near to or over capacity by 2033 if all PPCs in Rolleston proceed

- SH1/Weedons Interchange South roundabout
- Dunns Crossing Road/Newman Road
- 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
- SH1/Tennyson Street

- East Maddisons Road/Brookside Road/Burnham School Road
- Broadlands Drive/Learners Drive
- Springston Rolleston Road/Dynes Road
- Jones Road/(Hoskyns) Retail connector
- Jones Road/Weedons Road roundabout.

To determine the extent to which PPC80 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 PPC81 and PPC82 Paramics models (for example signalisation or conversion to a roundabout). We have used traffic flows from the PPC82 Paramics model to determine the extent to which PPC80 is contributing to the capacity effects, as the PPC81 Paramics model does not include traffic from PPC82.

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

- SH1/Dunns Crossing Road/Walkers Road roundabout is indicated to be performing poorly. PPC80 has a minor contribution to congestion effects in 2033 (around 3.5% of total traffic movements). Refer to my discussion in Section 5.1
- Dunns Crossing Road/Newman Road priority intersection is indicated to be performing poorly. PPC80 has a minor contribution to congestion effects in 2033 (almost 3% of total traffic movements). Refer to my discussion in Section 5.2
- The Jones Road/Retail Connector Road (Freight Drive) is indicated to be performing poorly. PPC80 has a minor contribution to congestion effects in 2033 (almost 3% of total traffic movements).

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

- PPC80 has a less than minor effect on these intersections.

Information on the proportional effect of each PPC may assist Council in its consideration of how the Rolleston 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 PPC81 and PPC82 Paramics model).

As discussed in Section 4, I note that there are discrepancies between the total travel demand and traffic routing in the PPC81, PPC82 and NZUP Paramics models. Should the Paramics models be used to determine how Development Contributions are calculated, I recommend that inconsistencies between the PPC81, PPC82 and NZUP Paramics models are addressed.

Outcome: I recommend that Council consider the proportional effect that each PPC will have on network hotspots and assumed intersection improvements contained in the Rolleston Paramics model, as identified in Table 3. Council should consider whether the proportional effects of PPC80 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 there are discrepancies between the total travel demand and traffic routing in the PPC81, PPC82 and NZUP Paramics models. Should the Paramics models be used to determine how Development Contributions are calculated, I recommend that inconsistencies between the PPC81, PPC82 and NZUP Paramics models are addressed.

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[10] (red for LOS F)	2033[11] performance with plan changes (red for LOS F)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined) [12]										
					PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78	PPC80	PPC81	PPC82
					%	%	%	%	%	%	%	%	%	%	%
Intersections with congestion/high delays in the 2033 Rolleston Paramics model															
SH1/Dunns Crossing Road/Walkers Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS F on Dunns Crossing and SH1 west in AM	9.3%	0.8%	0.0%	1.0%	0.5%	0.2%	0.2%	0.5%	3.6%	0.4%	2.1%
Dunns Crossing Road/Newman Road	Priority	Priority in both years	LOS A in both AM and PM	LOS F on Newman Rd in AM	24.9%	1.9%	0.0%	2.5%	0.2%	0.1%	0.4%	0.5%	2.8%	1.2%	6.2%
Jones Road/Weedons Road	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS F on all approaches except Weedons Road South in PM	2.1%	0.9%	0.6%	0.9%	0.7%	0.3%	0.2%	0.8%	2.3%	0.3%	1.0%
Levi Road/Ruby Drive	Priority	Priority in both years	LOS B and C in AM and PM respectively	LOS F in both AM and PM	2.0%	1.9%	0.0%	3.0%	5.5%	0.7%	0.6%	0.8%	0.1%	0.6%	0.8%
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	1.4%	1.6%	0.0%	2.5%	4.0%	0.6%	0.5%	0.6%	0.0%	0.5%	0.5%
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	1.3%	2.1%	0.0%	2.3%	3.6%	0.7%	0.5%	1.5%	0.0%	0.5%	0.3%
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	12.7%	1.8%	0.0%	3.2%	2.6%	0.6%	0.4%	1.4%	0.4%	0.5%	5.7%
Selwyn Road/Lincoln Rolleston Road	Priority	Priority/ Roundabout	LOS F on Lincoln Rolleston Rd north in PM	LOS B in both AM and PM	4.2%	5.2%	0.0%	2.1%	1.5%	1.5%	0.3%	5.1%	0.0%	0.1%	0.3%
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 South, AM and PM	1.4%	1.9%	0.2%	2.0%	3.2%	0.6%	0.4%	1.4%	0.4%	0.4%	0.3%
SH1/Tennyson Street	Priority	Left in and left out	LOS D on SH1 East in PM	LOS F on SH1 East in PM	2.4%	0.4%	0.0%	0.6%	0.5%	0.2%	0.2%	0.5%	1.3%	0.0%	0.0%
Springston Rolleston Road/Broadlands	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS E on Springston Rolleston Road South and Broadlands Drive West in AM, and Broadlands Drive East in PM	3.6%	4.1%	0.1%	4.3%	2.1%	0.2%	0.6%	1.1%	0.7%	1.0%	0.4%

[10] Performance based on 2028 Paramics model
[11] Performance based on PPC81 Paramics model

[12] 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[10] (red for LOS F)	2033[11] performance with plan changes (red for LOS F)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined) [12]										
					PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78	PPC80	PPC81	PPC82
					%	%	%	%	%	%	%	%	%	%	%
East Maddisons Road/Brookside Road/Burnham School Road	Priority	Priority in both years	LOS A in both AM and PM	LOS F on East Maddison Road in AM, and LOS F on Brookside Road East in PM	10.5%	1.8%	0.0%	3.1%	0.6%	0.3%	1.2%	0.8%	0.4%	1.3%	0.0%
Broadlands Drive/Learners Drive	No intersection	Priority in both years	LOS B in both AM and PM	LOS F on Learners Drive in AM	5.3%	4.4%	0.0%	7.1%	2.3%	0.3%	1.1%	0.6%	0.2%	1.5%	0.0%
Springston Rolleston Road/Dynes Road	Priority	Priority in both years	LOS C on Lanner Drive in both AM and PM	LOS F on Dynes Road in AM	1.4%	6.3%	0.0%	1.5%	2.1%	0.1%	0.3%	0.8%	0.4%	0.4%	0.0%
Jones Road/(Hoskyns) Retail connector	No intersection	Roundabout in both years	LOS A in both AM and PM	LOS F on the retail connector and Jones Road East in PM	1.6%	1.8%	0.0%	1.2%	1.3%	0.5%	0.2%	1.2%	3.1%	0.3%	0.0%
Jones Road/Iport Drive	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS E on Iport Drive in PM	1.1%	0.9%	0.0%	0.7%	0.7%	0.2%	0.1%	0.5%	2.5%	0.2%	0.0%
Other intersections 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 in both AM and PM	35.0%	3.8%	0.0%	4.4%	1.0%	0.4%	0.7%	1.3%	2.2%	0.5%	3.1%
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 D in AM and C in PM	29.4%	4.0%	0.0%	6.0%	0.4%	0.2%	0.4%	0.8%	1.8%	3.3%	10.0%
Dunns Crossing Road/East West Primary	Priority	Priority/Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	29.9%	5.4%	0.0%	8.5%	1.2%	0.8%	0.4%	1.7%	1.0%	4.0%	6.7%
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	11.9%	3.4%	0.0%	5.3%	0.7%	0.5%	0.2%	3.1%	0.0%	4.2%	8.2%
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	28.5%	5.7%	0.0%	7.8%	0.1%	0.3%	0.0%	1.2%	1.4%	3.5%	4.4%
Goulds Road /East Maddisons Road	Priority	Priority/Roundabout	LOS A and B in AM and PM respectively	LOS A in both AM and PM	9.6%	7.1%	0.0%	12.9%	2.5%	1.2%	1.3%	2.2%	0.5%	2.8%	2.6%
Lowes Road/Dunns Crossing Road	Priority	Priority/Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	31.1%	3.0%	0.0%	4.3%	1.1%	0.3%	0.5%	0.9%	1.8%	2.0%	17.3%
Lowes Road/East Maddisons Road	Priority	Priority/Roundabout	LOS B and D in AM and PM respectively	LOS B in both AM and PM	15.9%	2.1%	0.0%	2.1%	2.1%	0.6%	1.1%	1.5%	0.9%	0.4%	8.0%
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	3.5%	1.4%	0.1%	2.1%	4.9%	1.6%	0.4%	3.6%	0.7%	0.5%	1.1%

Intersection	Existing Layout	Intersection form assumed in models (2028/2033)	2028 performance without PPCs[10] (red for LOS F)	2033[11] performance with plan changes (red for LOS F)	**Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined)[12]**										
					PPC73	**PPC64**	**PPC66**	**PPC70**	**PPC71**	**PPC75**	**PPC76**	**PPC78**	**PPC80**	**PPC81**	**PPC82**
					%	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Lowes Road/Tennyson Street	Signals	Signals in both years	LOS B and C in AM and PM respectively	LOS C in both AM and PM	4.5%	3.2%	0.1%	3.3%	1.3%	0.3%	0.5%	0.9%	0.7%	0.8%	1.7%
Rolleston Drive/Brookside Road	Priority	Roundabout in both years	LOS A and C in AM and PM respectively	LOS E and D in AM and PM respectively	7.6%	0.5%	0.1%	1.3%	0.9%	0.3%	0.5%	0.7%	1.1%	0.6%	4.8%
Rolleston Road/Tennyson Street	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS C and D in AM and PM respectively	3.3%	2.8%	0.1%	2.7%	1.3%	0.3%	0.4%	1.0%	0.9%	0.6%	1.3%
Selwyn Road /Weedons Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	4.1%	4.8%	0.0%	1.9%	1.4%	1.4%	0.3%	4.6%	0.0%	0.7%	1.6%
Springston Rolleston Road/Selwyn Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS B in both AM and PM	5.7%	9.5%	0.0%	3.2%	0.9%	0.6%	0.4%	3.4%	0.0%	1.6%	3.3%
Tennyson Street/Moore Street	Priority	Roundabout in both years	Not provided	LOS B in both AM and PM	2.2%	1.6%	0.0%	0.9%	0.7%	0.2%	0.1%	0.9%	0.9%	0.2%	0.9%
Walkers Road/Two Chain Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	3.8%	0.9%	0.2%	0.9%	0.7%	0.3%	0.2%	0.7%	1.8%	0.4%	1.4%

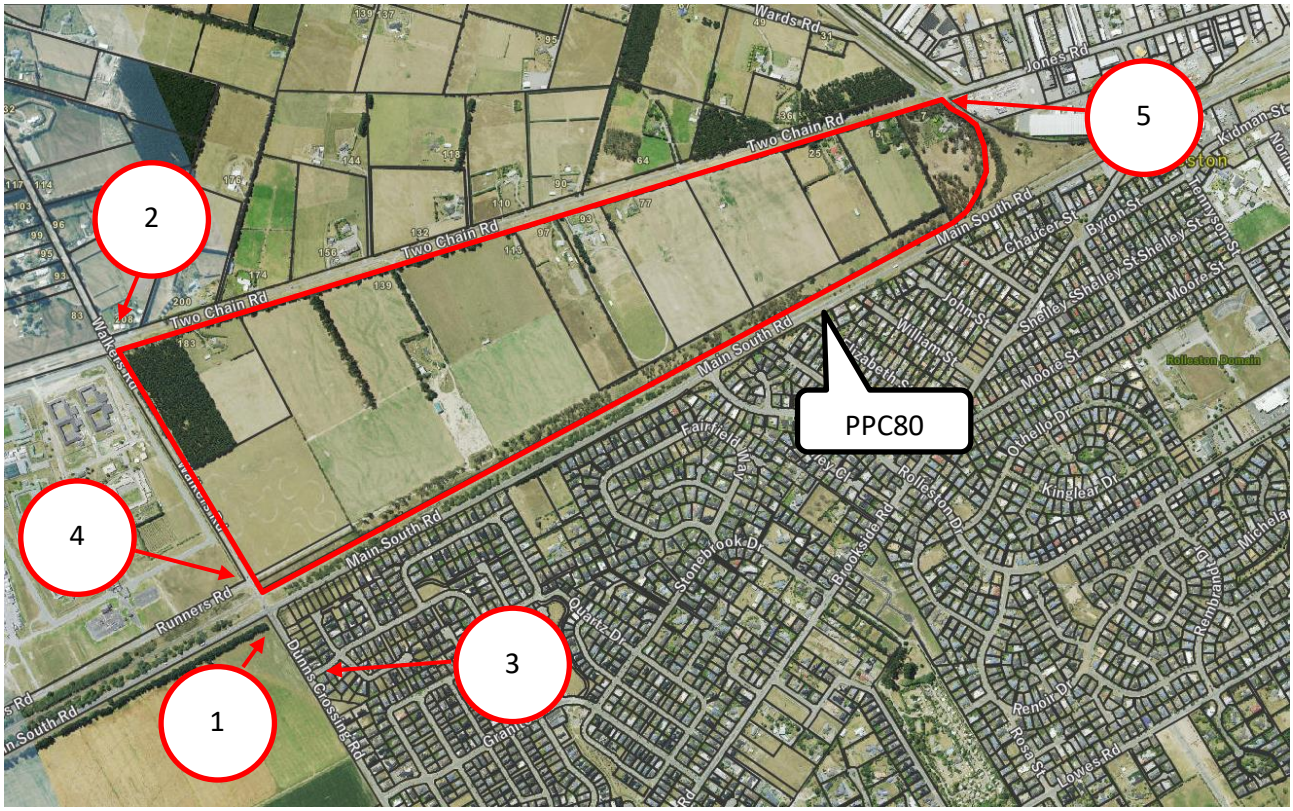
5 MY REVIEW OF THE NOTIFIED ITA AND CLAUSE 23 MATERIAL

The PPC80 Integrated Transport Assessment (ITA), prepared by Novo Group provides traffic modelling assessments of several intersections of interest (shown in Figure 4). I comment on these intersections, and other matters relevant to transport, in the following subsections

1. State Highway 1 / Dunns Crossing Road / Walkers Road intersection
2. Two Chain Road / Walkers Road intersection
3. Dunns Crossing Road / Newman Road intersection
4. Walkers Road / Runners Road intersection
5. Two Chain Road / Wards Road intersection and level rail crossing
6. Frontage upgrades
7. Transport accessibility
8. Internal street network
9. Recommended mitigations and staging.

Although PPC80 was lodged prior to PPC81 and PPC82, the PPC80 hearing is scheduled for after PPC81 and PPC82. I have therefore included discussion of the potential traffic effects of PPC81 and PPC82 in some of the following subsections, however I confirm that I have considered PPC80 on its own merits and in isolation from PPC81 and PPC82.

Figure 4: Intersections discussed in the following subsections of this report



5.1 State Highway 1 / Dunns Crossing Road / Walkers Road intersection

The intersection of State Highway 1 / Dunns Crossing Road / Walkers Road is located at the south western corner of the site and is currently a stop-controlled priority crossroads with priority given to State Highway 1. Waka Kotahi has identified it as a high risk intersection, and is currently investigating intersection improvements, which may include converting the intersection to a roundabout (refer to Waka Kotahi's submission on PPC80 for further detail). Construction of the roundabout has funding and is expected to be initiated in 2024 and completed by 2026.

Our review of the PPC82 Paramics model indicates that PPC80 contributes around half a percent of peak hour traffic movements at this intersection by 2033.

I have summarised the Paramics model results for this intersection

- The ITA has not assessed the performance of the existing intersection, as the author assumes that the intersection will be upgraded to a roundabout prior to any development occurring within PPC80
- The PPC80, Paramics model indicates that this intersection will operate acceptably in 2033 with traffic from PPC80
- However, the PPC81 and PPC82 Paramics models indicated that the intersection will operate at a poor level of performance at Level of Service F (LOS F) in the AM peak

Indicative queue lengths from the PPC81 and PPC82 Paramics models, during the 2033 AM peak, are shown in Figure 5 and Figure 6 respectively[13]. In my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. In my view the indicated delays on the western arm (according to the PPC81 Paramics model) and the southern arm (according to the PPC82 Paramics model), while classified as LOS F, do not indicate a critical failure at the intersection.

Critical efficiency effects at intersections tend to be indicated in traffic models by exponential increases in queue lengths, and/or volume to capacity ratios that are approaching or exceeding 1. Neither applies in this situation.

Further, a roundabout intersection at SH1/Dunns Crossing Road (compared with a cross road intersection), allows for safer interaction between movements and therefore has less risk that driver delays will result in negative safety effects.

I note that the s32 assessment assumes that the intersection will be upgraded prior to any development being occupied within the site. However, in my view the identified safety issues at this intersection are of sufficient concern that any earthworks or construction activity generated by the sites, prior to the upgrade of the intersection, could have potentially significant effects. Once construction works on the intersection are underway, I consider that the safety effects of any earthworks or construction activity generated by the sites will be adequately managed, as speeds on SH1 will be reduced during the construction of the intersection. However, I understand that Council has some concern about the potential traffic effects should the NZUP and PPC80 construction works occur simultaneously, causing compounding disruption to traffic. In my experience this is a matter that is better dealt with at a consenting level rather than a Plan Change level.

I therefore recommend that no earthworks or construction activity is permitted within the sites prior to the commencement of construction of the SH1/Dunns Crossing Road intersection upgrade.

[13] Note that these model outputs include traffic from PPC73, which is currently under appeal to the Environment Court.

Figure 5: PPC81 Paramics Model, indicative queuing in 2033 AM peak

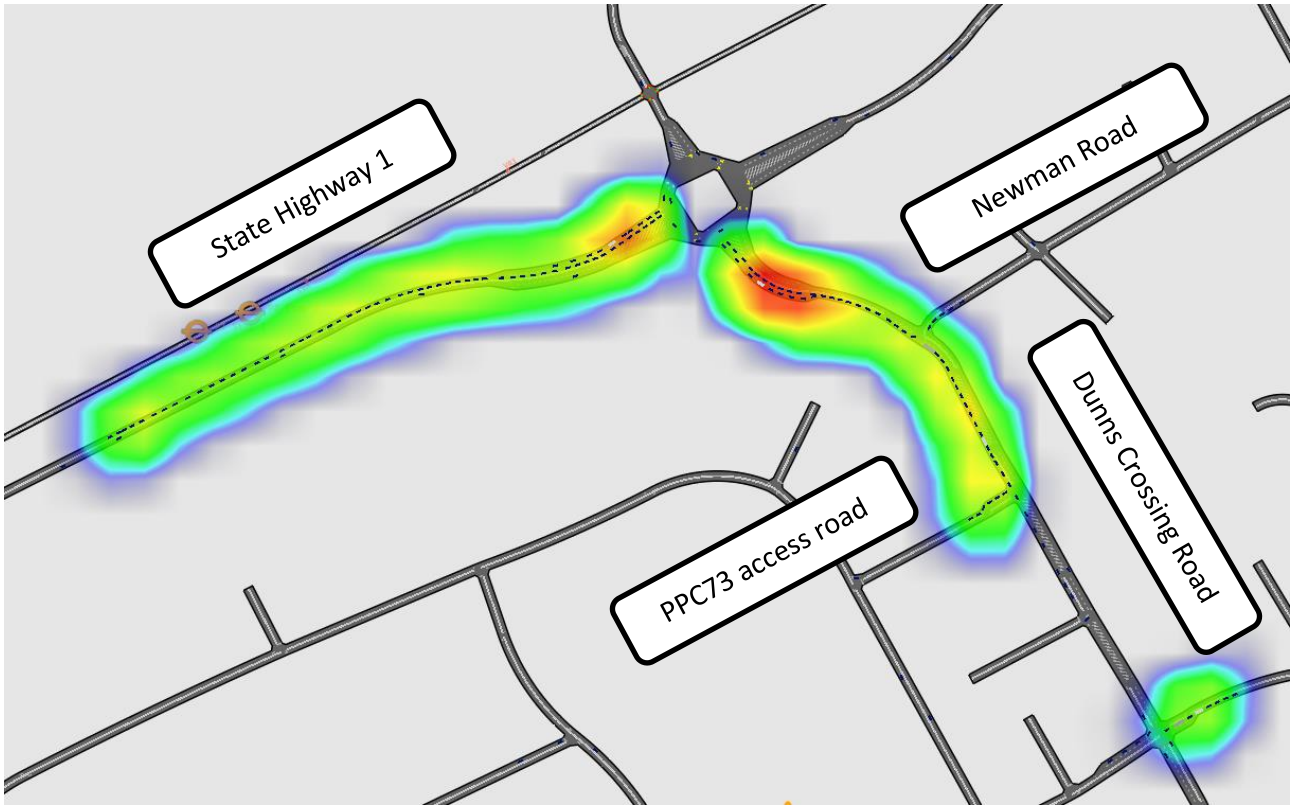
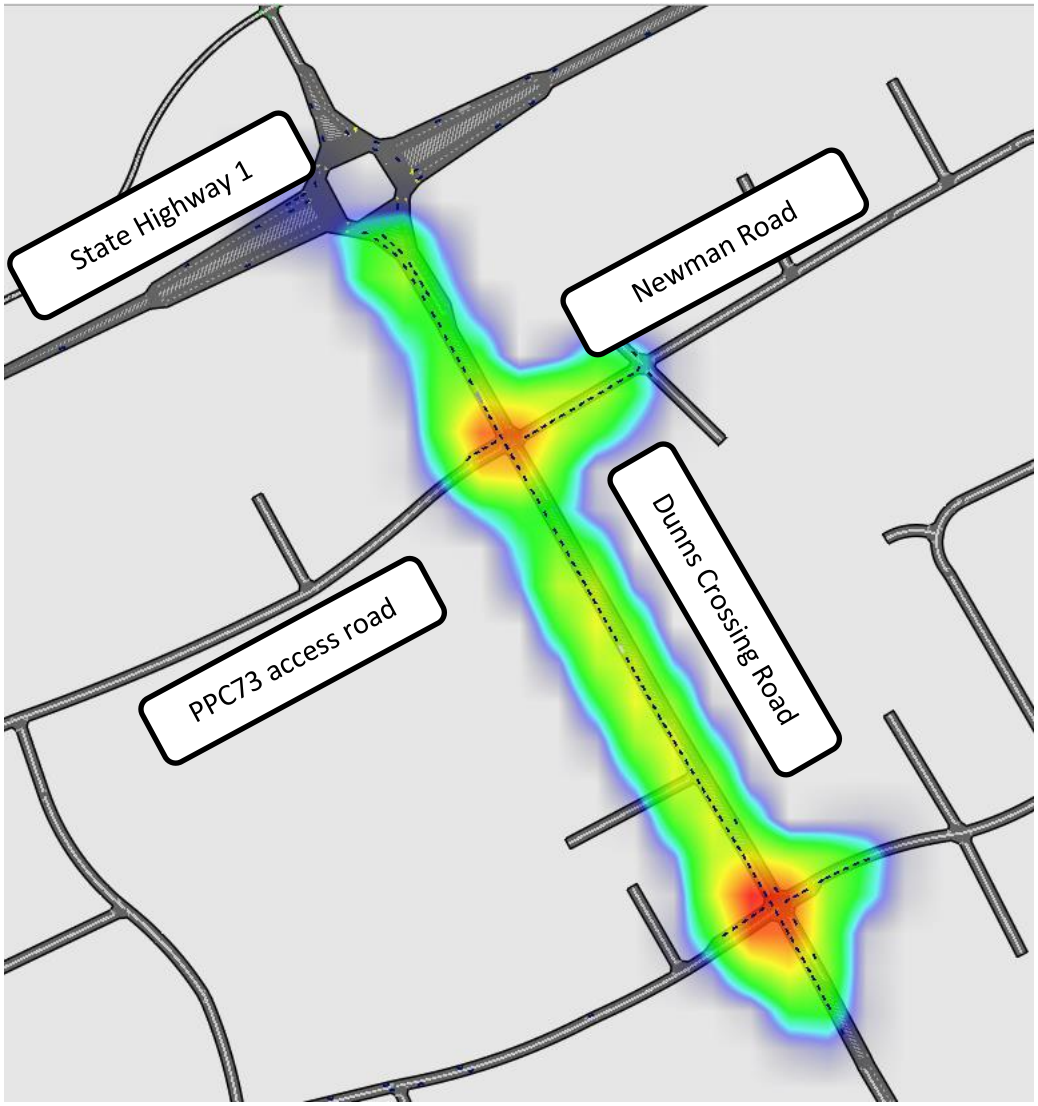


Figure 6: PPC82 Paramics Model, indicative queuing in 2033 AM peak



Outcome: The future State Highway 1 / Dunns Crossing Road / Walkers Road roundabout (proposed as part of NZUP) will operate acceptably with traffic from PPC80, but without traffic from PPC81 and PPC82. When traffic from PPC81 and PPC82 is added, it is indicated that this intersection will perform poorly in 2033. However, in my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. Critical efficiency effects at intersections tend to be indicated in traffic models by exponential increases in queue lengths, and/or volume to capacity ratios that are approaching or exceeding 1. Neither applies in this situation. I therefore consider that the effects of PPC80 on the State Highway 1 / Dunns Crossing Road / Walkers Road intersection are within the range of what is acceptable during peak periods, should the intersection be upgraded to a dual lane roundabout. However, I consider that the existing safety issues at this intersection mean that any traffic generated by PPC80 prior to the intersection being upgraded will cause unacceptable safety effects. I therefore recommend that proposed Rule 22.9.x(a) be amended to require that no earthworks or construction activity is to be undertaken within PPC80 prior to the commencement of the upgrade of the intersection.

5.2 Two Chain Road / Walkers Road intersection

The intersection of Two Chain Road and Walkers Road is located on the north western corner of the site and is currently a stop-controlled priority crossroads with priority given to Two Chain Road.

Our review of the 2033 Rolleston Model indicates that PPC80 contributes around 2% of peak hour traffic movements at this intersection by 2033. As identified in Table 1, Council has programmed the upgrade of this intersection for 2028/2029.

I have summarised the modelling results for this intersection

- The ITAs assessed the performance of the future intersection as a roundabout using the PPC80 Paramics model, which indicates that this intersection will operate acceptably in 2033 with full buildout traffic from PPC80

The ITA has not assessed the performance of the existing intersection, as the author recommends that either

- The intersection be upgraded to a roundabout prior to any development within PPC80; or
- Development within PPC80 can progress prior to the upgrade of the intersection, if the roading connection through PPC80 (from Walkers Road to Two Chain Road) is constructed prior to occupation of any development.

I support these recommendations and support proposed Rule 22.9.x(e), which directs this outcome. However, for the requestor's benefit, I suggest that Rule 22.9.x(e) could be amended as follows (my edits are in red)

> *22.9.x Within the Appendix E43B Rolleston Business 2A Zone Two Chain Road ODP area, no building shall be occupied until such time as:*
>
> *e. a primary road link is operational within the E43B ODP area, linking Two Chain Road and Walkers Road, or the intersection of Two Chain Road and Runners Road has been upgraded to a roundabout.*

Outcome: The traffic modelling for the Two Chain Road / Walkers Road intersection indicates that this intersection will operate acceptably with PPC80 traffic once it is upgraded to a roundabout. I recommend an amendment to Rule 22.9.x(e) to clarify that either a through site link or an upgrade to this intersection is required prior to the occupation of any building.

5.3 Dunns Crossing Road / Newman Road intersection

The intersection of Dunns Crossing Road / Newman Road is located to the south of the site and is currently a give way-controlled T-intersection with priority given to Dunns Crossing Road.

Waka Kotahi has identified the nearby State Highway 1 / Dunns Crossing Road / Walkers Road intersection as a high risk intersection, and is currently investigating intersection improvements, which

may include the realignment of Dunns Crossing Road and relocation of the existing Dunns Crossing Road / Newman Road intersection.

Our review of the Paramics models indicates that PPC80 contributes around 3% of peak hour traffic movements at this intersection by 2033.

While PPC73 is subject to an appeal at the Environment Court, I note that PPC73 proposed to include Rule 12.1.3.50(a) into the District Plan, to require the upgrade of the Dunns Crossing Road/Newman Road intersection to include a separate left turn lane[14].

I have summarised the modelling results for this intersection

- The PPC80 ITA assessed the intersection using the PPC80 Paramics model, which indicated that this intersection will operate acceptably in 2033 without any traffic from PPC80
- The PPC80 ITA indicated that the eastern approach to the intersection (Newman Road) will operate at a poor level of performance at Level of Service F (LOS F) in the AM peak in 2033 with full buildout traffic from PPC80, without the separate left turn lane on Newman Road. The average delay is estimated to increase from 54 seconds to 78 seconds
- The PPC81 ITA indicated that the eastern approach to the intersection (Newman Road) will operate at a poor level of performance at Level of Service F (LOS F) in the AM peak in 2033 with full buildout traffic from PPC81, without the separate left turn lane on Newman Road. The average delay is estimated to increase from 43 seconds to 52 seconds
- The PPC82 ITA indicated that the eastern approach to the intersection (Newman Road) will operate acceptably (LOS C) in the AM peak in 2033 with full buildout traffic from PPC82, without the separate left turn lane on Newman Road.

The PPC80 ITA concluded that the delay for Newman Road is a result of queuing from the nearby State Highway 1 / Dunns Crossing Road / Walkers Road, anticipated by the Paramics model, and it notes that the SIDRA model for the State Highway 1 / Dunns Crossing Road / Walkers Road intersection indicates reduced queues which may improve performance at the Dunns Crossing Road / Newman Road intersection.

In my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. In my view the additional average delay on Newman Road (increasing from 54 seconds to 78 seconds), while classified as LOS F, does not indicate a critical failure at the intersection. In my view, development within PPC80 can proceed prior to the upgrade of the Dunns Crossing Road/Newman Road intersection to include a separate left turn lane.

Outcome: The PPC80 ITA has identified performance issues with the Dunns Crossing Road / Newman Road intersection, with the average delay on Newman Road increasing from 54 seconds to 78 seconds. However, in my opinion a degree of congestion is to be expected within urban areas during peak

[14] Refer to PPC73 Closing Legal Submission Appendix 1 proposed rules, available online at https://www.selwyn.govt.nz/__data/assets/pdf_file/0006/562866/Appendix-1-Proposed-Rules-Package-and-ODPS.pdf

commuter periods. I therefore consider that the effects of PPC80 on the Dunns Crossing Road / Newman Road intersection are within the range of what is acceptable during peak periods.

5.4 Walkers Road / Runners Road intersection

The intersection of Walkers Road / Runners Road is located on the southwestern boundary of the site and is currently a giveway-controlled priority T-intersection with priority given to Walkers Road. An unformed legal road connects on the northern side of the intersection.

I understand that this intersection may be realigned to the southwest, as part of the SH1 / Dunns Crossing Road / Walkers Road intersection upgrade being progressed by Waka Kotahi, as discussed in Section 3.2.

The ITA did not assess the performance of this intersection, or the unformed legal road. However, the matter of the unformed legal road is discussed in the requestor's responses to Clause 23 information requests, and in the s32 report.

In summary

- The unformed legal road is included within the plan change area
- Proposed rules 17.2.3.5, 17.3.1.7, and 17.3.9.5 mean a resource consent is required for any activity that proposes vehicle access onto the unformed legal road, including consideration of effects on the Walkers Road / Runners Road intersection
- Proposed Rule 22.9.x(c) requires the intersection of Walkers Road intersection with Runners Road and rail crossing to be upgraded prior to the occupation of any building within the Plan Change site
- The requestor may apply to Council to stop the unformed legal road in the future.

I understand that the future Rolleston to Burnham Cycleway may use the currently unformed section of Runners Road. I consider that the proposed rules are adequate to ensure that transport effects resulting from any vehicle access onto the unformed section of legal road (Runners Road) can be managed through future resource consenting processes. Should the requestor wish to stop the unformed legal road in the future, Council can assess the merits of this at the time, if an application is made.

Outcome: I consider that the proposed Rules are adequate to ensure that transport effects resulting from any vehicle access onto the unformed section of legal road (Runners Road) can be managed through future resource consenting processes. Should the requestor wish to stop the unformed legal road in the future, Council can assess the merits of this at the time, if an application is made.

5.5 Two Chain Road / Wards Road intersection and rail level crossing

The intersection of Two Chain Road / Wards Road is located on the north-eastern boundary of the site and is currently a giveway-controlled priority T-intersection with priority given to Two Chain Road (east) and Wards Road. The intersection is offset approximately 45m from a rail level crossing.

The ITA did not assess the performance of this intersection, or the potential safety effects on the rail level crossing. However, the matter is discussed in the requestor's responses to Clause 23 information requests, and in the s32 report.

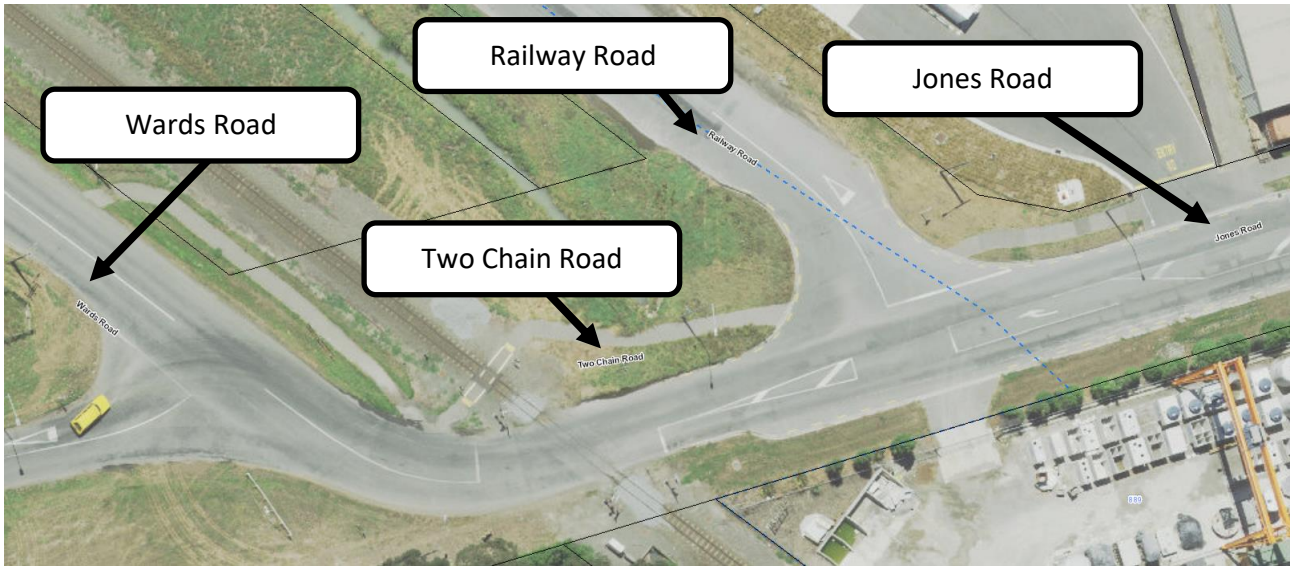
In summary

- Proposed Rule 22.9.x(d) requires the intersection of Jones Road and Wards Road to be realigned prior to the occupation of any building within the Plan Change site
- This intersection upgrade is currently programmed in Council's Long Term Plan for 2028/2029 as part of a programme of works to improve freight access to the area, and it includes an upgrade to the rail level crossing within barrier arms.

I consider that the proposed rules should also include a requirement for the Two Chain Road rail level crossing to be upgraded prior to the occupation of any building within the Plan Change site, due to potential safety effects that may otherwise result. As discussed above, this upgrade is included within the same programme of works plan by Council for 2028/29.

Finally, I recommend that Council's Planner confirm the legal description of the intersection, as I consider that Jones Road terminates at Railway Road as shown below Figure 7. Further, Appendix 2 of the Proposed District Plan[15] identifies that Wards Road intersects with Two Chain Road, not Jones Road. Should my assumption be correct, I recommend that the proposed Rules are amended to reference the Two Chain Road / Wards Road intersection and the Two Chain Road rail level crossing, rather than the Jones Road / Wards Road intersection.

Figure 7: Two Chain Road / Wards Road intersection and rail level crossing[16]



Outcome: I recommend that Council's Planner confirm the legal description for the intersection of Wards Road. In the proposed Rules it is referenced as the Jones Road / Wards Road intersection, however I consider that this should reference the Two Chain Road / Wards Road intersection. I

[15] Selwyn Proposed District Plan, Appendix 2 – Roading Hierarchy, available online at https://eplan.selwyn.govt.nz/review/default.html#Rules/0/492/1/0/0
[16] Selwyn Proposed District Plan map, available online at https://eplan.selwyn.govt.nz/review/default.html#/Property/0

consider that the proposed Rules are adequate to ensure that transport effects on the Two Chain Road / Wards Road intersection can be managed through future resource consenting processes. However, I recommend that proposed Rule 22.9.x include a requirement for the Two Chain Road rail level crossing to be upgraded prior to the occupation of any building within the Plan Change site.

5.6 Frontage upgrades

Frontage upgrades are discussed in the requestor's responses to Clause 23 information requests, and in the s32 report.

In summary

- Proposed Rule 22.9.x(b) requires frontage upgrades for Walkers Road and Two Chain Road, including a flush median on Walkers Road
- A flush median is not proposed on Two Chain Road, as no direct property access is proposed. However, should consent be sought for direct property access to Two Chain Road, Council has scope to require a flush median at that point
- Frontage upgrades, including shared pedestrian / cycle paths, are identified on the ODP.

I understand that Council staff anticipate that this will include lighting, kerbing, active modes facilities, etc. In my view the detailed design of the frontage upgrade can be addressed through future consenting and engineering plan approval processes.

Outcome: I consider that the proposed Rules and the ODP adequately address the requirement for frontage upgrades to Walkers Road and Two Chain Road.

5.7 Transport accessibility

The current and future transport accessibility of PPC80 and be summarised as

- The accessibility by active modes (walking and cycling) is poor. This is to be expected given its current rural location
- The existing accessibility of PPC80 by public transport is low. The existing Route 820 bus service travels on Two Chain Road, between Burnham and Lincoln via Rolleston. This service runs approximately hourly, between 7am and 9pm on weekdays, between 7am and 6pm on Saturdays, and between 10am and 5pm on Sundays
- The future accessibility by active modes is likely to be good, with several cycleway projects planned by Council (as discussed in Table 1), as well as cycle facilities proposed by PPC80. Council is currently working with Waka Kotahi to ensure that the SH1/Dunns Crossing Road intersection upgrade includes appropriate facilities for pedestrians and cyclists to safely and conveniently travel through the intersection. I understand that this includes a preference by Council that Waka Kotahi provide grade separated facilities to link to Walkers Road
- The future accessibility of PPC80 by public transport may be improved however, the expansion of the public transport network is subject to planning and funding from the Canterbury Regional Council

- The future accessibility of PPC80 to the freight rail network is likely to be excellent. This will be subject to planning and approvals processes from KiwiRail
- The interfacing between the extension of the rail network with and road and active modes users will need to be managed to ensure safe outcomes (e.g. with grade separation or warning signals and barriers). In my view the detailed design of the frontage upgrade can be addressed through future consenting and engineering plan approval processes

Outcome: I consider that PPC80 will have good accessibility by active modes in the future. Public transport accessibility may improve in the future, however this will depend on planning and funding from the Canterbury Regional Council.

5.8 Internal street network

I consider that the ODP provides for an internal street network that generally integrates well with the surrounding existing, and will provide for all users of the transport system.

I understand that Council staff anticipate that internal roads will be generally consistent with those that have been constructed as part of the nearby IZone development. In my view the detailed design of the internal roads can be addressed through future consenting and engineering plan approval processes.

Outcome: I consider that the ODP provides for an internal street network that generally integrates well with the existing and future transport network, and will provide for all users of the transport system.

5.9 Recommended mitigations and staging

Development within PPC80 is proposed to be staged to align with transport infrastructure delivery, via proposed Rule 22.9.x. In general, I support the proposed Rule other than as discussed in other sections of my report.

In my opinion these intersection upgrades do not need to be underway or complete in order to support traffic generated by earthworks/construction activity within PPC80, other than for SH1/Dunns Crossing Road as discussed in Section 5.1.

However, I understand that Council may not be able to monitor and enforce planning mechanisms related to "building occupation" effectively and efficiently. I recommend that Council's Planner consider whether Council can efficiently and effectively monitor dwelling occupation as a control for these upgrades, or whether an alternative control such as "prior to the issue of any s224 subdivision certificate" is more appropriate.

I note that Waka Kotahi (submission PC80-0007) has requested amendments to Rule 22.9.x. I support the amendments to Rule 22.9.x(a) – (d) in terms of clarifying what constitutes an "upgrade". In terms of the timing of these upgrades, I have discussed my view above.

Outcome: In general, I support the transport upgrades identified in proposed Rule 22.9.x, other than as discussed in other sections of my report. I support Waka Kotahi's request (submission PC80-0007) to amend Rule 22.9.x(a) – (d). I recommend that Council's Planner consider whether Council can

efficiently and effectively monitor "building occupation" as a control for these upgrades, or whether an alternative control such as "prior to the issue of any s224 subdivision certificate" is more appropriate.

6 THE ROLLESTON STRUCTURE PLAN AND THE RPS

PPC80 sits outside the anticipated urban area of the Rolleston Structure Plan (shown in Figure 8)[17], as well as the proposed infrastructure boundary specified in the Canterbury Regional Policy Statement (CRPS) Map A[18].

In regard to the potential transport effects of PPC80 on the wider transport network

- The transport effects of PPC80 on the wider transport network, beyond Rolleston, have not been assessed in the ITA
- If PPC80 does not affect the quantum of residential growth within Selwyn District over the life of the District Plan (i.e. growth in land use activity within Selwyn District is a "zero sum game", with PPC80 drawing growth demand away from other parts of Selwyn), PPC80 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 PPC80 (as a Plan Change outside the anticipated urban area) leads to greater land use activity in Selwyn beyond what has been anticipated in strategic growth plans and policies, without a corresponding increase in residential development, additional impact on the Greater Christchurch transport network can be expected as customers, employees etc travel to from outside of Rolleston to access services and employment within PPC80
- There are multiple Plan Changes within Rolleston, which seek to enable urban residential zoning (discussed in Section 1), some of which are outside of the anticipated urban area. In the context of these Plan Changes, I consider that PPC80 will have some benefit to the wider transport network, as it is likely to "soak up" some trips that that would otherwise have destinations outside of Rolleston, as PPC80 will provide additional local employment and services
- One of the stated outcomes for the NZUP project, and in particular the SH1/Dunns Crossing Road/Walkers Road roundabout, is to create a southern main/freight access to The Rolleston Industrial Zone to/from SH1. In my view PPC80 supports this outcome.

Outcome: PPC80 is inconsistent with the Rolleston Structure Plan and CRPS infrastructure boundary, in that it is outside the anticipated future urban area. However, in the context of the multiple Plan Changes within Rolleston to enable urban residential development, I consider that PPC80 will have some benefit to the wider transport network. PPC80 is likely to "soak up" some trips from the additional urban residential development that would otherwise have destinations outside of Rolleston, as PPC80 will provide additional local employment and services.

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

[18] Canterbury Regional Policy Statement Map A, available online https://www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-regional-policy-statement/

Figure 8: Rolleston Structure Plan with PPC80 location

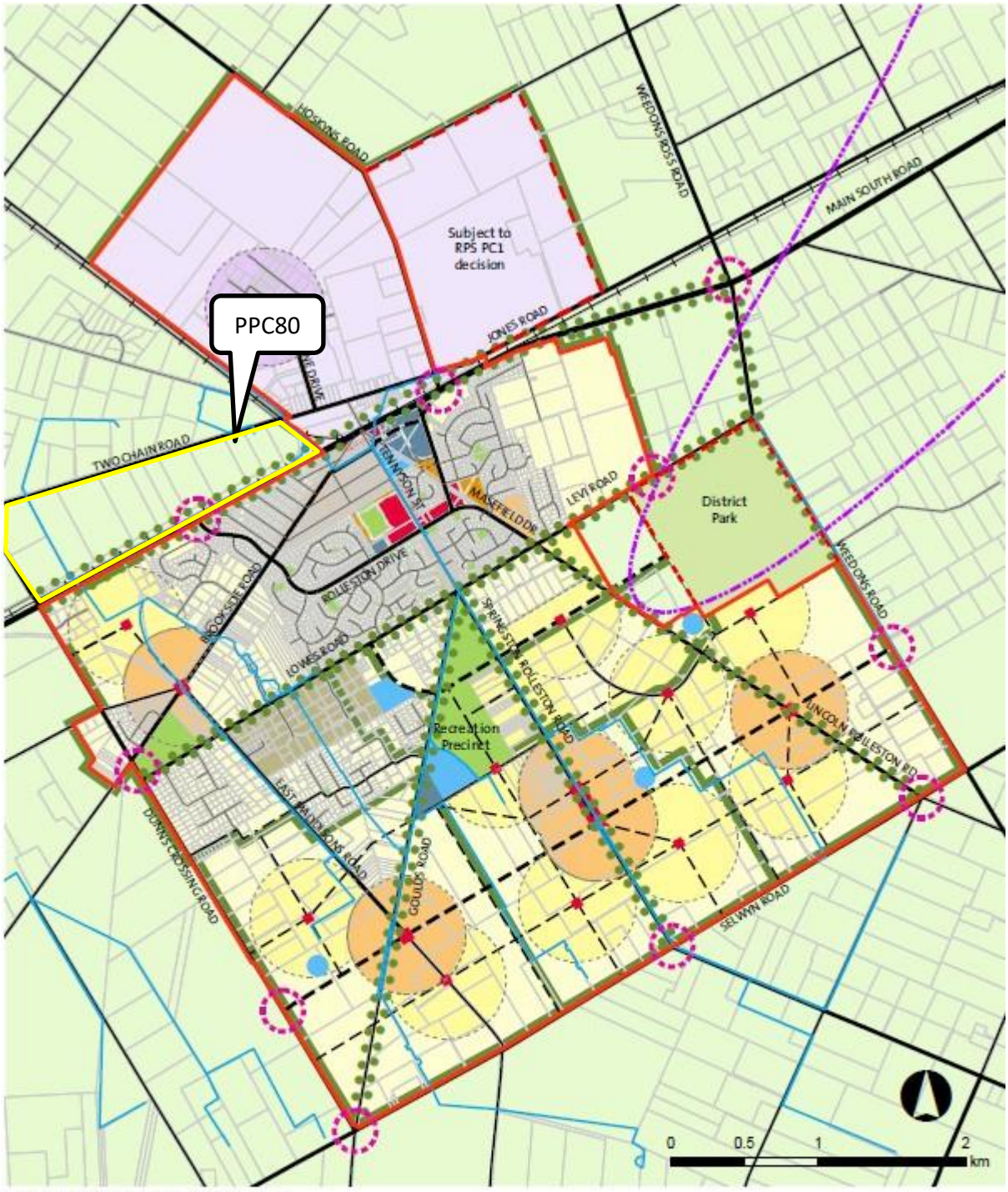
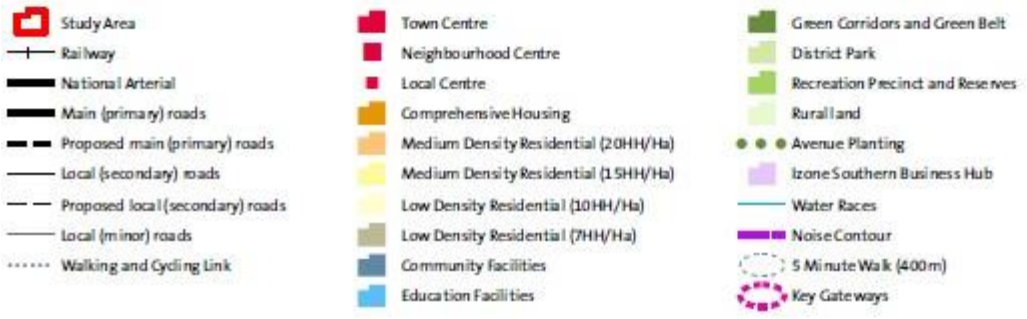


Figure 5.2: Rolleston Structure Plan



7 MY REVIEW OF SUBMISSIONS

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

- Provision of transport infrastructure
- Walking and cycling
- Public transport
- Wider effects on the transport network, and the effect of unanticipated urban expansion.

Details of the submissions, and my comments, are provided in Table 4 in Appendix A.

Other matters related to traffic were identified in submissions, however I have not commented on these as I am not a subject matter expert for

- Traffic noise and pollution
- Amenity
- Greenhouse gas emissions from traffic.

8 SUMMARY AND CONCLUSION

I have reviewed the PPC80 application documents, responses to Council information requests, and submissions.

In terms of the immediate effects of PPC80, and the proposed ODP

- The future State Highway 1 / Dunns Crossing Road / Walkers Road roundabout (proposed as part of NZUP) will operate acceptably with traffic from PPC80, but without traffic from PPC81 and PPC82. When traffic from PPC81 and PPC82 is added, it is indicated that this intersection will perform poorly in 2033. However, in my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. Critical efficiency effects at intersections tend to be indicated in traffic models by exponential increases in queue lengths, and/or volume to capacity ratios that are approaching or exceeding 1. Neither applies in this situation. I therefore consider that the effects of PPC80 on the State Highway 1 / Dunns Crossing Road / Walkers Road intersection are within the range of what is acceptable during peak periods, should the intersection be upgraded to a dual lane roundabout. However, I consider that the existing safety issues at this intersection mean that any traffic generated by PPC80 prior to the intersection being upgraded will cause unacceptable safety effects. I therefore recommend that proposed Rule 22.9.x(a) be amended to require that no earthworks or construction activity is to be undertaken within PPC80 prior to the commencement of the upgrade of the intersection. Refer to my discussion in Section 5.1
- The traffic modelling for the Two Chain Road / Walkers Road intersection indicates that this intersection will operate acceptably with PPC80 traffic once it is upgraded to a roundabout. I recommend an amendment to Rule 22.9.x(e) to clarify that either a through site link or an upgrade to this intersection is required prior to the occupation of any building. Refer to my discussion in Section 5.2
- The PPC80 ITA has identified performance issues with the Dunns Crossing Road / Newman Road intersection, with the average delay on Newman Road increasing from 54 seconds to 78 seconds. However, in my opinion a degree of congestion is to be expected within urban areas during peak commuter periods. I therefore consider that the effects of PPC80 on the Dunns Crossing Road / Newman Road intersection are within the range of what is acceptable during peak periods. Refer to my discussion in Section 5.3
- I consider that the proposed Rules are adequate to ensure that transport effects resulting from any vehicle access onto the unformed section of legal road (Runners Road) can be managed through future resource consenting processes. Should the requestor wish to stop the unformed legal road in the future, Council can assess the merits of this at the time, if an application is made. Refer to my discussion in Section 5.4
- I recommend that Council's Planner confirm the legal description for the intersection of Wards Road. In the proposed Rules it is referenced as the Jones Road / Wards Road intersection, however I consider that this should reference the Two Chain Road / Wards Road intersection. I consider that the proposed Rules are adequate to ensure that transport effects on the Two Chain Road / Wards Road intersection can be managed through future resource consenting processes. However, I recommend that proposed Rule 22.9.x include a requirement for the Two Chain Road

rail level crossing to be upgraded prior to the occupation of any building within the Plan Change site. Refer to my discussion in Section 5.5

- I consider that the proposed Rules and the ODP adequately address the requirement for frontage upgrades to Walkers Road and Two Chain Road. Refer to my discussion in Section 5.6
- I consider that PPC80 will have good accessibility by active modes in the future. Public transport accessibility may improve in the future, however this will depend on planning and funding from the Canterbury Regional Council. Refer to my discussion in Section 5.7
- I consider that the ODP provides for an internal street network that generally integrates well with the surrounding existing and will provide for all users of the transport system. Refer to my discussion in Section 5.8
- In general, I support the transport upgrades identified in proposed Rule 22.9.x, other than as discussed in other sections of my report. I support Waka Kotahi's request (submission PC80-0007) to Rule 22.9.x(a) – (d). I recommend that Council's Planner consider whether Council can efficiently and effectively monitor "building occupation" as a control for these upgrades, or whether an alternative control such as "prior to the issue of any s224 subdivision certificate" is more appropriate. Refer to my discussion in Section 5.9
- PPC80 is inconsistent with the Rolleston Structure Plan and CRPS infrastructure boundary, in that it is outside the anticipated future urban area. However, in the context of the multiple Plan Changes within Rolleston to enable urban residential development, I consider that PPC80 will have some benefit to the wider transport network. PPC80 is likely to "soak up" some trips from the additional urban residential development that that would otherwise have destinations outside of Rolleston, as PPC80 will provide additional local employment and services. Refer to my discussion in Section 6.

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

- Flow has also used Paramics traffic models, provided by the requestors for PPC80, PPC81 and PPC82 requestors, to assess the potential effect of multiple PPCs within the Rolleston area. To assess the cumulative effects of all Plan Changes on the Rolleston network, we have relied on the PPC81 and PPC82 Paramics models. We have not used the PPC80 Paramics model to assess the cumulative effects of the multiple plan changes, as this model does not include land use proposed by PPC81 and PPC82.

  Concurrently with the development of the PPC81 Paramics model and the PPC82 Paramics model, Waka Kotahi has developed an alternative version of the Paramics 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 Paramics models that I have relied upon for this report.

  We have referred to both the PPC81 and the PPC82 Paramics models in our assessment of PPC80, and where relevant we identify which model we have relied upon. I note that the PPC81 and PPC82 Paramics models do 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 underestimated. In my view, additional effects on these roads (beyond those indicated in the PPC81 and PPC82 Paramics models) would need to be considered under the NZUP project. Refer to my discussion in Section 4

- I recommend that Council consider the proportional effect that each PPC will have on network hotspots and assumed intersection improvements contained in the Rolleston Paramics model, as identified in Table 3. Council should consider whether the proportional effects of PPC80 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 there are discrepancies between the total travel demand and traffic routing in the PPC81, PPC82 and NZUP Paramics models. Should the Paramics models be used to determine how Development Contributions are calculated, I recommend that inconsistencies between the PPC81, PPC82 and NZUP Paramics models are addressed. Refer to my discussion in Section 4.1.

APPENDIX A Submission summary

Table 4: Submission summary and commentary

Summary of submission	Flow comment
Whether the applicant's 2033 modelling includes all Plan Changes that affect the Dunns Crossing and Two Chain/ Walkers Intersection, and inconsistencies between traffic models (Waka Kotahi (PC80-0007))	Refer to my discussion of the effects on the Dunns Crossing Road/Walkers Road/ State Highway 1 intersection in Sections 4 and 5.1. The applicant's modelling included all Rolleston Plan Changes identified in Section 1 of my report, other than PPC81 and PPC82. I discuss the cumulative effects of all Rolleston Plan Changes in Section 4, including PPC81 and PPC82. I comment on inconsistencies between the PPC81, PPC82 and NZUP Paramics models in Section 4.
Appropriateness of restricting building occupation prior to upgrades occurring, not building work itself (Waka Kotahi (PC80-0007))	Refer to my discussion of the timing of the SH1/Dunns Crossing Road in Section 5.1. Refer to my discussion of the timing of upgrades in Section 5.9. I consider that the construction works for the SH1/Dunns Crossing Road intersection upgrade should be commenced prior to any earthworks or construction activity commencing within PPC80. I consider that all other transport upgrades should be complete prior to the occupation of any building within PPC80.
Reliance on unplanned/unfunded/unconfirmed upgrades and related land acquisition occurring (Ara Poutama (PC80-0002); NZDF (PC80-0005)), including lack of specificity about the nature of these upgrades or what constitutes an "upgrade" (Waka Kotahi (PC80-0007))	Refer to my discussion of the status of planning and funding for various transport projects in Section 3, and Section 5.9 for my discussion of the proposed Rules to stage development within PPC80 with required upgrades. I support the amendments sought by Waka Kotahi to Rule 22.9.x(a) – (d) in terms of clarifying what constitutes an "upgrade". In terms of the timing of these upgrades, refer to my discussion in Section 5.9
Generation of significant additional heavy freight traffic movements along Walkers Road and impacts on the amenity of the prison site (Ara Poutama (PC80-0002))	Refer to my discussion of transport safety and efficiency effects on Walkers Road in Section 5. I have not considered amenity effects resulting from the increase in heavy vehicle movements as a result of PPC80, as this is outside the extent of my expert opinion. However, I note that Walkers Road is classified as an arterial road and therefore anticipated to carry significant volumes of traffic.
Increased traffic, including heavy vehicle movements, on Two Chain Road, and impacts on amenity levels due to noise and general disruption (D & H Fraser (PC80-0008))	I consider that the frontage upgrade identified in the ODP and proposed Rules will ensure Two Chain Road is upgraded to an appropriate standard (likely to be either a rural arterial or urban arterial standard) through the future consenting process. Direct vehicle access to Two Chain Road can be addressed through the future consenting processes, using rules proposed as part of PPC80.
Increase of traffic in and around West Rolleston School and surrounding areas and on the roading system (J. Horne (PC80-0011))	Refer to my discussion of effects in Section 5. Refer to my discussion of the proportional contribution to traffic in Section 4. Subject to the recommendations of my report being adopted, I consider that the effects of PPC80 will be adequately addressed. Dunns Crossing Road will experience an increase in traffic. I have considered the effects of the multiple Plan Changes within Rolleston, and consider them to be within the range of what is to be expected within a typical urban area. However, I have not assessed how the proposed left in / left out intersection at SH1/Rolleston Drive, proposed by Waka Kotahi, might affect Dunns Crossing Road. I note that Council recently provided a submission to Waka Kotahi outlining concerns about potential effects on Dunns Crossing Road[19].
Potential effects on safe and efficient access to Burnham Military Camp (NZDF (PC80-0005))	The traffic modelling discussed in Section 4 indicates that the majority of traffic from PPC80 is expected to route directly to and from SH1 via Walkers Road and Jones Road. Very little traffic is anticipated to route via Two Chain Road, west of Walkers Road. This indicates that immediate effects on the Burnham Military Camp are likely to be limited to the SH1/Aylesbury Road intersection. I have not assessed the effects on this intersection, as it sits outside of the traffic models discussed in Section 4, and I consider it to be sufficiently remote from PPC80 to not warrant further consideration by the requestor.
Restricting to only one road crossing/intersection from the PC80 site (located at the eastern end closest to Izone/railway line) onto Two Chain Road; with a maximum of two other breaks in the existing shelter/proposed Landscape Treatment Area 3 to provide for additional pedestrian/cycle linkages only (D & H Fraser (PC80-0008))	I consider that restricting access to a single intersection is not warranted based on transport safety and efficiency matters. Providing several access points on Two Chain Road will help distribute traffic across the site more evenly, and result in these site access points operating more efficiently.

[19] Selwyn District Council Submission on Rolleston NZUP Project, prepared by the Office of the Mayor, dated 4 August 2022

Consideration of multi-modal transport and lack of connections to wider area, leading to likely dependence on private vehicles (Waka Kotahi (PC80-0007))	Refer to my discussion of transport options in Section 5.7. I consider that the existing area has low access to transport options. I consider that PPC80 will have good accessibility by active modes in the future. Public transport accessibility may improve in the future, however will depend on planning and funding from the Canterbury Regional Council. Council is currently working with Waka Kotahi to ensure that the SH1/Dunns Crossing Road intersection upgrade includes appropriate facilities for pedestrians and cyclists to safely and conveniently travel through the intersection. I understand that this includes a preference by Council that Waka Kotahi provide grade separated facilities to link to Walkers Road.
Approve PPC80 as notified, as it provides a significant and rare opportunity for new rail sidings to be established in a way that improves the efficiency of freight movements (KiwiRail Holdings Ltd (PC80-0012))	Refer to my discussion of transport options in Section 5.7. I support the submitters position in terms of freight efficency. I note that the extension of the rail network into PPC80 can introduce conflicts with other transport users, for example where roads or footpaths/cycleways cross rail lines, however I consider that this can be managed through future consenting and engineering plan approval processes.

APPENDIX B Traffic modelling technical note

flow
TRANSPORTATION SPECIALISTS

technical note

PROJECT	**SELWYN DISTRICT PLAN CHANGE**
SUBJECT	**TRAFFIC MODELLING REVIEW**
TO	**SELWYN DISTRICT COUNCIL**
FROM	QING LI (FLOW)
REVIEWED BY	MAT COLLINS (FLOW)
DATE	16 AUGUST 2022

1 INTRODUCTION

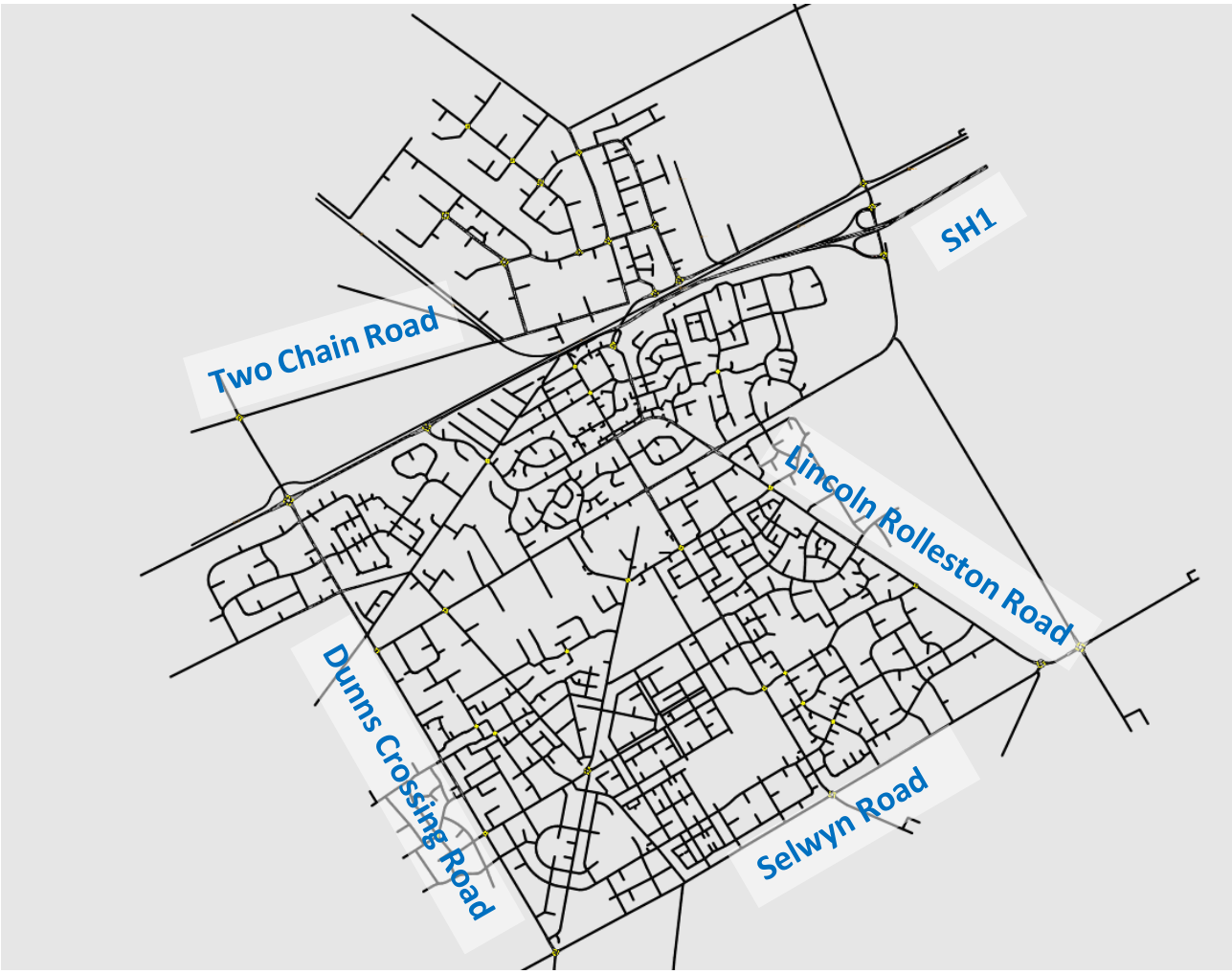
This technical note provides a summary of the model investigation completed for the proposed Private Plan Changes (PPCs) in Rolleston, Selwyn District. The assessment has been based on the Paramics model developed by Abley Limited (Abley). This model was originally developed in May 2021 and it assumes a 2033 background traffic/network scenario and the full development of the Outline Development Plans (ODPs). Since then, Stantec has used the model to assist the transport assessment of the proposed PPC82.

The latest model 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
- PPC80: Rolleston, industrial zone
- PPC81: Rolleston, 350 residential lots
- PPC82: Rolleston, 1,320 residential lots

The development of the original model and the associated transport network assessment is summarised in the Abley technical note "Rolleston Plan Change Modelling (May 2021)". An overview of the original 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, and subsequently PPC80, 81 and 82 in late 2021/early 2022. We have therefore obtained the 2033 Plan Change model to understand the cumulative effects of the various plan changes. A high level review of the model has been completed and discussed in an earlier version of this technical note (also provided in Section 2 below).

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]

- 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
- The network assumptions included in the 2033 Plan Change model were based on Council'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
    - 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 fit for purpose for our high level assessment of the potential effects of the eleven 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 and 2033 models, we have compared the total traffic demands in the non-PPC zones between the two models.

[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.

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

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

To identify the intersections that may operate under pressure in future, we have relied on the model results provided in the Abley technical note for PPC 73. We note that a few more PPCs have been proposed in the area since the PPC 73 traffic assessment and these may have increased the anticipated traffic volumes in Rolleston area. We also note that additional intersection/road improvements may have been discussed in each individual PPC traffic assessments but they may not capture the cumulative effects of the other PPCs. As such, the intersections looked at in our assessment should be viewed as indicative and an updated network wide intersection assessment will be required to identify all the network 'hot spots' related to the proposed PPCs.

Table 2 overleaf provides the intersections which are predicted to operate at Level of Service (LOS) F, for one or more approaches during the morning and/or evening peak periods. 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.

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, except for the Broadlands Drive/Learners Drive intersection which we have extracted from the 2028 model. 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.

Table 2: 2033 network performance and individual PPC effects

Intersection	Existing Layout	Intersection form assumed in models (2028/2033)	2028 performance without PPCs[3] (red for LOS F)	2033[4] performance with plan changes (red for LOS F)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined) [5]										
					PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78	PPC80	PPC81	PPC82
					%	%	%	%	%	%	%	%	%	%	%
Intersections with congestion/high delays in the 2033 Rolleston Paramics model															
SH1/Dunns Crossing Road/Walkers Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS F on Dunns Crossing and SH1 west in AM	9.3%	0.8%	0.0%	1.0%	0.5%	0.2%	0.2%	0.5%	3.6%	0.4%	2.1%
Dunns Crossing Road/Granite Road	Priority	Priority (T intersection)/Signals (cross intersection)	LOS A in both AM and PM	LOS E on Granite Rd east in AM	30.2%	2.3%	0.0%	3.1%	0.4%	0.2%	0.5%	0.6%	2.8%	1.2%	6.2%
Dunns Crossing Road/Newman Road	Priority	Priority in both years	LOS A in both AM and PM	LOS F on Newman Rd in AM	24.9%	1.9%	0.0%	2.5%	0.2%	0.1%	0.4%	0.5%	2.8%	1.2%	6.2%
Jones Road/Weedons Road	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS F on all approaches except Weedons Road South in PM	2.1%	0.9%	0.6%	0.9%	0.7%	0.3%	0.2%	0.8%	2.3%	0.3%	1.0%
Levi Road/Ruby Drive	Priority	Priority in both years	LOS B and C in AM and PM respectively	LOS F in both AM and PM	2.0%	1.9%	0.0%	3.0%	5.5%	0.7%	0.6%	0.8%	0.1%	0.6%	0.8%
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	1.4%	1.6%	0.0%	2.5%	4.0%	0.6%	0.5%	0.6%	0.0%	0.5%	0.5%
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	1.3%	2.1%	0.0%	2.3%	3.6%	0.7%	0.5%	1.5%	0.0%	0.5%	0.3%
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	12.7%	1.8%	0.0%	3.2%	2.6%	0.6%	0.4%	1.4%	0.4%	0.5%	5.7%
Selwyn Road/Lincoln Rolleston Road	Priority	Priority/ Roundabout	LOS F on Lincoln Rolleston Rd north in PM	LOS B in both AM and PM	4.2%	5.2%	0.0%	2.1%	1.5%	1.5%	0.3%	5.1%	0.0%	0.1%	0.3%
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 South, AM and PM	1.4%	1.9%	0.2%	2.0%	3.2%	0.6%	0.4%	1.4%	0.4%	0.4%	0.3%
SH1/Tennyson Street	Priority	Left in and left out	LOS D on SH1 East in PM	LOS F on SH1 East in PM	2.4%	0.4%	0.0%	0.6%	0.5%	0.2%	0.2%	0.5%	1.3%	0.0%	0.0%
Springston Rollestion Road/Broadlands	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS E on Springston Rolleston Road South and Broadlands Drive West in AM, and Broadlands Drive East in PM	3.6%	4.1%	0.1%	4.3%	2.1%	0.2%	0.6%	1.1%	0.7%	1.0%	0.4%

[3] Performance based on 2028 Paramics model
[4] Performance based on PPC81 Paramics model

[5] 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[3] (red for LOS F)	2033[4] performance with plan changes (red for LOS F)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined) [5]										
					PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78	PPC80	PPC81	PPC82
					%	%	%	%	%	%	%	%	%	%	%
East Maddisons Road/Brookside Road/Burnham School Road	Priority	Priority in both years	LOS A in both AM and PM	LOS F on East Maddison Road in AM, and LOS F on Brookside Road East in PM	10.5%	1.8%	0.0%	3.1%	0.6%	0.3%	1.2%	0.8%	0.4%	1.3%	0.0%
Broadlands Drive/Learners Drive	No intersection	Priority in both years	LOS B in both AM and PM	LOS F on Learners Drive in AM	5.3%	4.4%	0.0%	7.1%	2.3%	0.3%	1.1%	0.6%	0.2%	1.5%	0.0%
Springston Rolleston Road/Dynes Road	Priority	Priority in both years	LOS C on Lanner Drive in both AM and PM	LOS F on Dynes Road in AM	1.4%	6.3%	0.0%	1.5%	2.1%	0.1%	0.3%	0.8%	0.4%	0.4%	0.0%
Jones Road/(Hoskyns) Retail connector	No intersection	Roundabout in both years	LOS A in both AM and PM	LOS F on the retail connector and Jones Road East in PM	1.6%	1.8%	0.0%	1.2%	1.3%	0.5%	0.2%	1.2%	3.1%	0.3%	0.0%
Jones Road/Iport Drive	Roundabout	Roundabout in both years	LOS A in both AM and PM	LOS E on Iport Drive in PM	1.1%	0.9%	0.0%	0.7%	0.7%	0.2%	0.1%	0.5%	2.5%	0.2%	0.0%
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 in both AM and PM	35.0%	3.8%	0.0%	4.4%	1.0%	0.4%	0.7%	1.3%	2.2%	0.5%	3.1%
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 D in AM and C in PM	29.4%	4.0%	0.0%	6.0%	0.4%	0.2%	0.4%	0.8%	1.8%	3.3%	10.0%
Dunns Crossing Road/CRETS collector	Priority	Priority/Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	29.9%	5.4%	0.0%	8.5%	1.2%	0.8%	0.4%	1.7%	1.0%	4.0%	6.7%
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	11.9%	3.4%	0.0%	5.3%	0.7%	0.5%	0.2%	3.1%	0.0%	4.2%	8.2%
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	28.5%	5.7%	0.0%	7.8%	0.1%	0.3%	0.0%	1.2%	1.4%	3.5%	4.4%
Goulds Road /East Maddisons Road	Priority	Priority/Roundabout	LOS A and B in AM and PM respectively	LOS A in both AM and PM	9.6%	7.1%	0.0%	12.9%	2.5%	1.2%	1.3%	2.2%	0.5%	2.8%	2.6%
Lowes Road/Dunns Crossing Road	Priority	Priority/Roundabout	LOS A in both AM and PM	LOS A in both AM and PM	31.1%	3.0%	0.0%	4.3%	1.1%	0.3%	0.5%	0.9%	1.8%	2.0%	17.3%
Lowes Road/East Maddisons Road	Priority	Priority/Roundabout	LOS B and D in AM and PM respectively	LOS B in both AM and PM	15.9%	2.1%	0.0%	2.1%	2.1%	0.6%	1.1%	1.5%	0.9%	0.4%	8.0%
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	3.5%	1.4%	0.1%	2.1%	4.9%	1.6%	0.4%	3.6%	0.7%	0.5%	1.1%
Lowes Road/Tennyson Street	Signals	Signals in both years	LOS B and C in AM and PM respectively	LOS C in both AM and PM	4.5%	3.2%	0.1%	3.3%	1.3%	0.3%	0.5%	0.9%	0.7%	0.8%	1.7%

Intersection	Existing Layout	Intersection form assumed in models (2028/2033)	2028 performance without PPCs[3] (red for LOS F)	2033[4] performance with plan changes (red for LOS F)	Percentage of traffic associated with each PPC as a proportion of total traffic movements through each intersection (AM and PM combined) [5]										
					PPC73	PPC64	PPC66	PPC70	PPC71	PPC75	PPC76	PPC78	PPC80	PPC81	PPC82
					%	%	%	%	%	%	%	%	%	%	%
Rolleston Drive/Brookside Road	Priority	Roundabout in both years	LOS A and C in AM and PM respectively	LOS E and D in AM and PM respectively	7.6%	0.5%	0.1%	1.3%	0.9%	0.3%	0.5%	0.7%	1.1%	0.6%	4.8%
Rolleston Road/Tennyson Street	Roundabout	Signals in both years	LOS B and C in AM and PM respectively	LOS C and D in AM and PM respectively	3.3%	2.8%	0.1%	2.7%	1.3%	0.3%	0.4%	1.0%	0.9%	0.6%	1.3%
Selwyn Road /Weedons Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	4.1%	4.8%	0.0%	1.9%	1.4%	1.4%	0.3%	4.6%	0.0%	0.7%	1.6%
Springston Rolleston Road/Selwyn Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS B in both AM and PM	5.7%	9.5%	0.0%	3.2%	0.9%	0.6%	0.4%	3.4%	0.0%	1.6%	3.3%
Tennyson Street/Moore Street	Priority	Roundabout in both years	Not provided	LOS B in both AM and PM	2.2%	1.6%	0.0%	0.9%	0.7%	0.2%	0.1%	0.9%	0.9%	0.2%	0.9%
Walkers Road/Two Chain Road	Priority	Roundabout in both years	LOS A in both AM and PM	LOS A in both AM and PM	3.8%	0.9%	0.2%	0.9%	0.7%	0.3%	0.2%	0.7%	1.8%	0.4%	1.4%

APPENDIX C Traffic modelling Select Link Analysis


70
SH1 East
70
280
Two Chain Road
160
260
70
40
SH1 West
5
100
5
40
30
Levi Road
Lincoln Rolleston Road
5
50
Dunns Crossing Road
10
10
Selwyn Road
Selwyn Road
Zone 143_AM OD Routes
07:00 to 08:00
1.0 to 226.3


Two Chain Road
SH1 West
SH1 East
Levi Road
Lincoln Rolleston Road
Dunns Crossing Road
Selwyn Road
Selwyn Road
60
190
90
100
200
30
20
5
10
20
70
5
5
30
5
5
Zone 143_PM OD Routes
17:00 to 18:00
1.0 to 150.5