

Before the Selwyn District Council

under: the Resource Management Act 1991

in the matter of: Proposed Private Plan Changes 81 and 82 to the
Operative District Plan: Dunns Crossing Road, Rolleston

and: **Rolleston Industrial Developments Limited** and
Brookside Road Residential Limited
Applicant

Statement of Evidence of Chris Blackmore (Traffic modelling)

Dated: 26 August 2022

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STATEMENT OF EVIDENCE OF CHRIS BLACKMORE

INTRODUCTION

- 1 My full name is Christopher John Blackmore.
- 2 I hold a Bachelor of Science and a Bachelor of Commerce (with Honours) in Operations Research from the University of Canterbury. I am a Young Professional Member of the Chartered Institute of Logistics and Transport, an affiliate member of Engineering New Zealand, and a member of the NZ Modelling User Group sub-group of ENZ.
- 3 I hold the position of Senior Transportation Planner at Abley. I have been in this position since 2020 and have been at Abley for five years. My experience during this time includes undertaking transportation modelling and analysis within a wide range of development and transportation planning projects, for both public and private sector clients.
- 4 I have undertaken modelling of the future transport environment using the Rolleston Paramics microsimulation model. The model was updated in 2019 for Council by myself and the Abley team and has subsequently been used to support transportation planning across the township.
- 5 I am familiar with:
 - (a) The plan change application by Rolleston Industrial Developments Limited to rezone approximately 28 hectares of rural land in Rolleston to Living MD (*PC81*); and
 - (b) The plan change application by Brookside Road Residential Limited to rezone approximately 110 hectares of rural land in Rolleston to Living MD and Business 1 (*PC82*),

together the *Proposed Plan Changes*, and Rolleston Industrial Developments Limited and Brookside Road Residential Limited together the *Applicants*.

CODE OF CONDUCT

- 6 Although this is not an Environment Court hearing, I note that in preparing my evidence I have reviewed the Code of Conduct for Expert Witnesses contained in Part 7 of the Environment Court Practice Note 2014. I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where relying on the opinion or evidence of other witnesses. I have not omitted to consider material

facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 7 My evidence will deal with the following:
 - (c) Response to matters raised in Mr Collins' Transport Hearing Report; and
 - (d) Sensitivity testing of proposed State Highway 1 intersection forms as requested by Mr Fuller.

MATTERS RAISED IN TRANSPORT HEARING REPORT

- 8 My evidence responds to Mr Collins' review of the modelling presented in his Transport Hearing Report, namely the cumulative transport effects of the multiple private plan changes within Rolleston, and on this basis I have updated the modelling accordingly for Mr Fuller's consideration. This update addresses the difference in activity between the modelling undertaken as part of the individual PC81 and PC82 transport assessments. I have also updated the intersection configurations to align with the configuration referenced by Mr Collins¹.
- 9 The total development I have included is distributed as notated in Mr Fuller's evidence², covering the following plan changes:
 - 9.1 PPC64: Rolleston, 969 residential lots;
 - 9.2 PPC66: Rolleston, rural zone to industrial zone;
 - 9.3 PPC70: Rolleston, 800 residential lots plus commercial;
 - 9.4 PPC71: Rolleston, 660 residential lots;
 - 9.5 PPC73: Rolleston, 2100 residential lots plus commercial;
 - 9.6 PPC75: Rolleston, 280 residential lots;
 - 9.7 PPC76: Rolleston, 150 residential lots;
 - 9.8 PPC78: Rolleston, 750 residential lots;
 - 9.9 PPC80: Rolleston, rural to industrial zone;

¹ Mr Collins, Transport Hearing Report Section 5.2

² Mr Fuller, Evidence Figure 1

9.10 PPC81: Rolleston, 350 residential lots; and

9.11 PPC82: Rolleston, 1320 residential lots.

- 10 Vehicle trip generation for the private plan changes has been modelled at a rate of 0.9 trips in peak hour per dwelling. This is as instructed by Mr Fuller for Plan Changes 73, 81 and 82 but is also the default rate adopted for all the residential Plan Changes included in the model.
- 11 As noted by Mr Fuller, the amount of activity in the model is in excess of the Waka Kotahi Rolleston NZUP 2038 project model. The plan change model represents a full development scenario and includes all currently zoned residential, commercial, and industrial land, as well as development of the private plan changes listed above.
- 12 As a full development model, the cumulative plan change model does not represent a fixed future year and is intended as a planning tool to provide a robust assessment of the long-term performance of the network. Significantly, the 2033 modelled year is a nominal year at which all of the current residential zoned land and the Plan Changes are fully developed. As such, the 2033 transportation model includes 17,513 households compared to 6,745 households in 2018, a 160% increase. The total growth is then 10,768 households over 15 years, as well as extensive commercial and industrial development over this period. This equates to 11% growth per annum. As noted in section 2.2.1 of the AEE report, population growth in the past 10 years in the Selwyn District has been very high at 5.4% per annum but this is well below the modelled growth included in my modelling assessment.
- 13 I have accessed the Selwyn District Population Projections from the Statistics New Zealand website 'NZ-Stat' service and identified that across the Statistical Areas in Rolleston the medium and high population growth forecasts anticipate 58% and 76% growth (respectively) between 2018-2033 which equates to 3.9% and 5.1% growth per annum over this period (refer Table One below). The modelled scenario with 11% growth per annum is clearly well in excess of even the highest population projection. I have further identified that the quantum of development in the 2033 model aligns with five additional years of growth above the Statistics New Zealand 2048 high growth forecast, so by proxy represents a 35 year high-growth forecast.
- 14 As such the 2033 future year is a nominal year which corresponds to the full development of all of the Plan Changes that have been lodged and assessed, and is realistically a high growth 35 year forecast model. It is important to bear this in mind when considering my modelling assessment.

Table One Statistics New Zealand Rolleston Population Projections

| Medium forecasts by year for: | 2018 | 2033 | 2048 |
|--------------------------------------|---------------|---------------|---------------|
| Rolleston Izone | 40 | 40 | 50 |
| Rolleston North West | 3,980 | 4,490 | 4,560 |
| Rolleston Central | 3,410 | 3,890 | 4,350 |
| Rolleston North East | 4,780 | 5,910 | 6,710 |
| Rolleston South West | 2,970 | 4,510 | 5,540 |
| Rolleston South East | 3,220 | 10,250 | 15,100 |
| Total Rolleston Medium | 18,400 | 29,090 | 36,310 |
| Growth from 2018 | | 58% | 97% |
| Growth pa | | 3.9% | 3.2% |
| High forecasts by year for: | 2018 | 2033 | 2048 |
| Rolleston Izone | 40 | 60 | 80 |
| Rolleston North West | 3,980 | 5,050 | 5,800 |
| Rolleston Central | 3,410 | 4,270 | 5,200 |
| Rolleston North East | 4,780 | 6,630 | 8,340 |
| Rolleston South West | 2,970 | 4,920 | 6,430 |
| Rolleston South East | 3,220 | 11,500 | 17,450 |
| Total Rolleston High | 18,400 | 32,430 | 43,300 |
| Growth from 2018 | | 76% | 135% |
| Growth pa | | 5.1% | 4.5% |

- 15 Updated modelling results demonstrate that in the morning peak hour the State Highway 1/ Dunns Crossing Road/ Walkers Road roundabout operates acceptably at LOS D for the intersection overall. The southern Dunns Crossing approach operates at LOS F, indicating that approach is near to, or in excess of, capacity. The 94 seconds of

total delay on the Dunns Crossing approach accounts for all delay on the approach experienced by average vehicle including stop-line delay, any delay experienced traversing the roundabout, and reduction in free-flow speed travelling north from Burnham School Road.

- 16 Whilst I have left the interpretation of the modelling to Mr Fuller, I consider that this updated modelling addresses the concern regarding capturing the cumulative effects of development raised by Mr Collins. I am of the view that the modelling has been undertaken in line with best practice and appropriately demonstrates the cumulative effects of the multiple private plan changes on the Rolleston transport network.

TESTING OF STATE HIGHWAY 1 INTERSECTION FORMS

- 17 Mr Fuller has also asked me to undertake a modelling sensitivity test to explore the impact of altering the infrastructure constructed at the State Highway 1/ Rolleston Drive South intersection as part of the Waka Kotahi State Highway 1 Rolleston Transport Improvements programme, from the proposed left-in left-out configuration to an appropriately sized roundabout.
- 18 I have modelled the State Highway 1/ Rolleston Drive South intersection as a dual circulating lane roundabout with dual-lane approaches on all sides. Infrastructure changes have been limited to the State Highway 1/ Rolleston Drive South intersection only, and wider network changes to support the operation of the intersection have not been considered at this time. For this reason, it is my belief that the improvements in network operation enabled by the additional connectivity and capacity are conservative.
- 19 It is my view that overall, the operation of the State Highway 1 connections to Rolleston operate much more efficiently with the inclusion of the State Highway 1/ Rolleston Drive South roundabout.
- 20 The additional connectivity leads to reductions in circulating volumes at the State Highway 1/ Dunns Crossing Road/ Walkers Road roundabout of between 15% and 20% in the morning peak hour. Delays are also significantly improved, with a reduction of 36 seconds of delay on the Dunns Crossing Road southern approach and a 12 second reduction in delay on the intersection overall. This is indicated in the results contained in Appendix 1 (refer to 'With Rolleston Dr South' columns).
- 21 A second test was also requested by Mr Fuller comprising of converting the State Highway 1/ Dunns Crossing Road/ Walkers Road roundabout to an appropriately sized traffic-signal controlled crossroads, while maintaining the State Highway 1/ Rolleston Drive

South intersection as a left-in left-out only, priority controlled intersection.

- 22 My modelling of this intersection configuration demonstrates a significant increase in capacity at the State Highway 1/ Dunns Crossing Road/ Walkers Road intersection, compared to the currently proposed roundabout configuration. Vehicle delay on the Dunns Crossing Road southern approach reduces in peak hour from 97s to 48s, while intersection delay remains similar overall (refer to 'With Signalised Crossroads' column in Appendix 1).
- 23 In my opinion the intersection layout demonstrates sufficient reserve capacity to be operated in a way which maintains low delays along the State Highway while providing a higher level of flexibility than a roundabout configuration.

CONCLUSION

- 24 I have undertaken modelling of cumulative transport effects of private plan change traffic using the Rolleston Paramics microsimulation model. Following Mr Collins' review of the modelling presented in his Transport Hearing Report, I have revisited several assumptions and updated the modelling accordingly for Mr Fuller's consideration. This is appended to this report as Appendix 1.
- 25 I consider that the modelling has been undertaken in line with best practice and appropriately demonstrates the cumulative effects of the Plan Changes on the Rolleston transport network.

Dated: 26 August 2022

Christopher Blackmore

APPENDIX ONE – STATE HIGHWAY 1/ DUNNS CROSSING ROAD/ WALKERS ROAD INTERSECTION PERFORMANCE

SH1 / Dunns Crossing Road / Walkers Road roundabout

| Approach | Movement | Updated Baseline 07:00 to 08:00 | | | | | | With Rolleston Dr S Rbt 07:00 to 08:00 | | | | | | With Signalised Crossroads 07:00 to 08:00 | | | | | |
|---------------------------|----------|---------------------------------|-----------|-----------|-----|----------------|--------------|--|-----------|-----------|-----|----------------|--------------|---|-----------|-----------|-----|----------------|--------------|
| | | Flow | Max Delay | Avg Delay | LOS | Approach delay | Approach LOS | Flow | Max Delay | Avg Delay | LOS | Approach delay | Approach LOS | Flow | Max Delay | Avg Delay | LOS | Approach delay | Approach LOS |
| Walkers Road North | Left | 26 | 96 | 19 | B | 38 | D | 37 | 156 | 31 | C | 54 | D | 27 | 95 | 44 | D | 48 | D |
| Walkers Road North | Through | 88 | 136 | 43 | D | | | 83 | 291 | 65 | E | | | 89 | 128 | 50 | D | | |
| Walkers Road North | Right | 23 | 115 | 43 | D | | | 24 | 211 | 51 | D | | | 24 | 100 | 46 | D | | |
| SH1 East | Left | 91 | 13 | 5 | A | 8 | A | 83 | 11 | 5 | A | 7 | A | 70 | 73 | 21 | C | 46 | D |
| SH1 East | Through | 731 | 37 | 8 | A | | | 708 | 26 | 7 | A | | | 711 | 173 | 49 | D | | |
| SH1 East | Right | 157 | 35 | 11 | B | | | 128 | 31 | 9 | A | | | 140 | 105 | 42 | D | | |
| Dunns Crossing Road South | Left | 113 | 306 | 75 | F | 97 | F | 136 | 159 | 42 | D | 61 | E | 137 | 128 | 40 | D | 48 | D |
| Dunns Crossing Road South | Through | 194 | 402 | 128 | F | | | 240 | 234 | 82 | F | | | 244 | 130 | 42 | D | | |
| Dunns Crossing Road South | Right | 559 | 362 | 91 | F | | | 540 | 211 | 57 | E | | | 727 | 150 | 52 | D | | |
| SH1 West | Left | 139 | 74 | 21 | C | 37 | D | 92 | 82 | 22 | C | 32 | C | 129 | 82 | 31 | C | 35 | C |
| SH1 West | Through | 416 | 179 | 30 | C | | | 575 | 152 | 30 | C | | | 418 | 95 | 34 | C | | |
| SH1 West | Right | 214 | 219 | 60 | E | | | 96 | 164 | 50 | D | | | 223 | 86 | 38 | D | | |
| Intersection Total | | 2752 | | 46 | D | 46 | D | 2739 | | 34 | C | 34 | C | 2938 | | 44 | D | 44 | D |

SH1 / Dunns Crossing Road / Walkers Road roundabout

| Approach | Movement | Updated Baseline 17:00 to 18:00 | | | | | | With Rolleston Dr S Rbt 17:00 to 18:00 | | | | | | With Signalised Crossroads 17:00 to 18:00 | | | | | |
|---------------------------|----------|---------------------------------|-----------|-----------|-----|----------------|--------------|--|-----------|-----------|-----|----------------|--------------|---|-----------|-----------|-----|----------------|--------------|
| | | Flow | Max Delay | Avg Delay | LOS | Approach delay | Approach LOS | Flow | Max Delay | Avg Delay | LOS | Approach delay | Approach LOS | Flow | Max Delay | Avg Delay | LOS | Approach delay | Approach LOS |
| Walkers Road North | Left | 51 | 167 | 27 | C | 68 | E | 67 | 100 | 23 | C | 33 | C | 58 | 114 | 45 | D | 47 | D |
| Walkers Road North | Through | 246 | 247 | 76 | F | | | 264 | 136 | 35 | D | | | 264 | 126 | 48 | D | | |
| Walkers Road North | Right | 57 | 226 | 72 | F | | | 69 | 123 | 36 | D | | | 69 | 122 | 48 | D | | |
| SH1 East | Left | 649 | 54 | 12 | B | 16 | B | 604 | 21 | 7 | A | 10 | B | 607 | 68 | 24 | C | 32 | C |
| SH1 East | Through | 773 | 90 | 19 | B | | | 750 | 61 | 12 | B | | | 758 | 95 | 37 | D | | |
| SH1 East | Right | 100 | 82 | 22 | C | | | 81 | 47 | 14 | B | | | 100 | 90 | 39 | D | | |
| Dunns Crossing Road South | Left | 89 | 24 | 6 | A | 12 | B | 103 | 22 | 6 | A | 11 | B | 88 | 90 | 36 | D | 43 | D |
| Dunns Crossing Road South | Through | 149 | 51 | 14 | B | | | 144 | 56 | 14 | B | | | 148 | 162 | 48 | D | | |
| Dunns Crossing Road South | Right | 254 | 77 | 13 | B | | | 146 | 55 | 12 | B | | | 255 | 125 | 42 | D | | |
| SH1 West | Left | 78 | 21 | 6 | A | 9 | A | 50 | 15 | 5 | A | 6 | A | 71 | 68 | 28 | C | 34 | C |
| SH1 West | Through | 499 | 47 | 8 | A | | | 606 | 29 | 6 | A | | | 497 | 92 | 34 | C | | |
| SH1 West | Right | 220 | 47 | 13 | B | | | 134 | 29 | 9 | A | | | 224 | 93 | 37 | D | | |
| Intersection Total | | 3165 | | 19 | B | 19 | B | 3017 | | 12 | B | 12 | B | 3139 | | 36 | D | 36 | D |