Before the Selwyn District Council

under: the Resource Management Act 1991

in the matter of: Proposed Private Plan Change 69 to the Operative District Plan: Lincoln South

and: **Rolleston Industrial Developments Limited**
Applicant

Statement of Evidence of Nicholas Fuller (Transport)

Dated: 4 November 2021

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STATEMENT OF EVIDENCE OF NICHOLAS FULLER

INTRODUCTION

1 My full name is Nicholas Peter Fuller.

2 I am a Senior Transport Engineer at Novo Group Limited and have worked on resource management transport planning and engineering projects for 20 years. My experience during this time includes development planning, preparing Traffic and Transport Assessments for resource consents, preparation of Project Feasibility and Scheme Assessment Reports for Council's and the New Zealand Transport Agency.

3 My qualifications include a Bachelor of Engineering (Honours) in Civil Engineering.

4 I prepared the Integrated Transport Assessment (*ITA*) that was submitted as part of the Plan Change 69 application.

5 I am familiar with the plan change application by Rolleston Industrial Developments Limited (*the Applicant*) to rezone approximately 190 hectares of land on Springs Road, Lincoln to enable approximately 2,000 residential sites and small commercial zones.

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.

7 I have reviewed and relied on the following documents in preparing this evidence:

7.1 Traffic modelling undertaken by Abley (dated 15 February 2021) as outlined in the RFI response;

7.2 Subsequent traffic modelling undertaken by Abley (dated 03 November 2021) to assist in the preparation of evidence;

7.3 The Flow Transportation Specialists *Transport Hearing Report* dated 27 October 2021; and

7.4 Transport related submissions received on the Plan Change application.

SCOPE OF EVIDENCE

8 My evidence will deal with the following:

8.1 The traffic effects associated with the proposed Plan Change, including the traffic generation and operation of the surrounding road network;

8.2 Upgrades required to accommodate the Plan Change traffic generation and trigger points for requiring these upgrades;

8.3 The accessibility of the Plan Change site by a range of transport modes;

8.4 Site access arrangements and the design of the Moirs Lane / Ellesmere Road intersection; and

8.5 Review and response to the Section 42a report and transport related submissions.

SUMMARY OF EVIDENCE

9 I have provided additional information regarding the traffic generation associated with the Plan Change site. The ITA used a rate of 0.7 vehicle movements per unit per hour in the peaks, which is based on a range of traffic surveys of Village sites where drivers will be expected to need to travel further to reach employment. The surveyed rate has been increased to 0.7 vehicle movements per unit per hour from an initial survey result of 0.55 vehicle movements per unit per hour to provide a more robust assessment. I note that the rate of 0.9 vehicles per unit is from a single survey and therefore may not be representative of the proposed development.

10 Connectivity between the Plan Change site and adjacent subdivisions has been considered. I note that pedestrian and cycle connections are proposed that would reduce the walking and cycling distance to the existing commercial area at Vernon Drive.

11 A potential roading link is included on the Outline Development Plan (ODP), which ties into Kaitorete Drive. This will provide localised benefits in terms of traffic routing to the Vernon Drive commercial area and the Primary school at Russ Drive. This link would also provide useful pedestrian and cycle connections to the adjacent areas. However, the majority of traffic is seeking to access wider destinations (such as Christchurch) and these vehicles would best use Springs Road and Ellesmere Road rather than travelling through the local road network of the adjacent sub-divisions. The traffic

modelling has also confirmed that this link is not critical in terms of traffic operation.

12 The ODP includes several local centres, which are intended to accommodate the day-to-day shopping needs of residents. These are within walking and cycling distance of residents of the proposed Plan Change, as well as residents of the existing subdivisions.

13 The traffic modelling has been updated to account for pedestrian crossing movements at the Springs Road / Ellesmere Junction Road / Gerald Street intersection as well as with and without the altered location of the potential link to the Te Whariki subdivision. This modelling indicates that the road network can satisfactorily accommodate the predicted traffic volumes.

14 I have considered the operation of Springs Road north and south of Gerald Street. I consider that the operation of the network will be satisfactory. I also consider that the existing flush median on Springs Road provides the opportunity to install pedestrian crossing islands linking to / from the University.

15 Deferments in development timing are proposed with regards to access to Ellesmere Road. This will not permit the link to Moirs Lane to be opened until such time as Ellesmere Road has been widened (between Moirs Lane and Knight Stream Bridge) and the Ellesmere Road / Edward Street / Lincoln Tai Tapu Road has been upgraded.

16 I agree that Ellesmere Road will require upgrading between Edward Street and Moirs Lane. I disagree with Council's requirement that this be a Collector Road standard, as it will largely be a rural road. I consider seal widening to a rural road standard will be sufficient. I also consider that the cost of the upgrade should be distributed across several parties, noting that development of the Living Zone land near Edward Street would also likely be required to contribute to this upgrade.

17 Confirmation is provided that Moirs Lane has a corridor width of 20.12m and I have provided a concept arrangement of this road and the intersection with Ellesmere Road.

18 Council feedback regarding changes to the ODP transport network have largely been provided for. The exception to this is that the main access intersection is required to be traffic signals to better accommodate the traffic volumes at this location. This also has the benefit of providing safe pedestrian and cycle access across Springs Road.

TRANSPORT ASSESSMENT

Plan Change Proposal

19 As set out above, the proposed Plan Change would facilitate approximately 2,000 dwellings with three local commercial centres. The predicted traffic generation of the Plan Change site is set out in detail in my original ITA (paragraphs 45-53) and is summarised in **Table 1**.

Table 1: Plan Change Traffic Generation

Time Period	Arrivals	Departures	Total
AM Peak Hour	350	1,050	1,400
PM Peak Hour	882	518	1,400
Daily	7,000	7,000	14,000

Internal Transport Network & Connections

20 The ODP includes a Spine Road that could have been converted to a by-pass route if required. That by-pass was not proposed by the Plan Change, nor did the Plan Change rely on it. It is understood that the proposed by-pass is no longer proposed by Council so it is not discussed further in my evidence.

21 Alterations have been proposed to the ODP regarding potential roading links to adjacent subdivisions. The eastern potential link into Verdeco Park on the western side of Springs Road is retained and this would link to the adjacent land. This connection would be expected to carry low volumes as most traffic would travel to / from Springs Road via the internal ODP network.

22 The link to Liffey Springs Road (toward Ellesmere Road) is no longer proposed, acknowledging the uncertainty of establishing this connection.

23 Options for roading links to the Te Whāriki subdivision are potentially able to be created and are discussed further in the evidence of Mr Phillips. In brief, there is the potential to connect to Kaitorete Drive (between Rennie Place and Waikirikiri Avenue) and this is illustrated on the updated ODP (and indicatively in **Figure 1**). This in turn provides the ability to link toward the commercial area (adjacent to Vernon Drive and Gerald Street) as well as toward the primary school on Russ Drive. The updated traffic modelling has

confirmed that this link will benefit the traffic network, but is not essential.

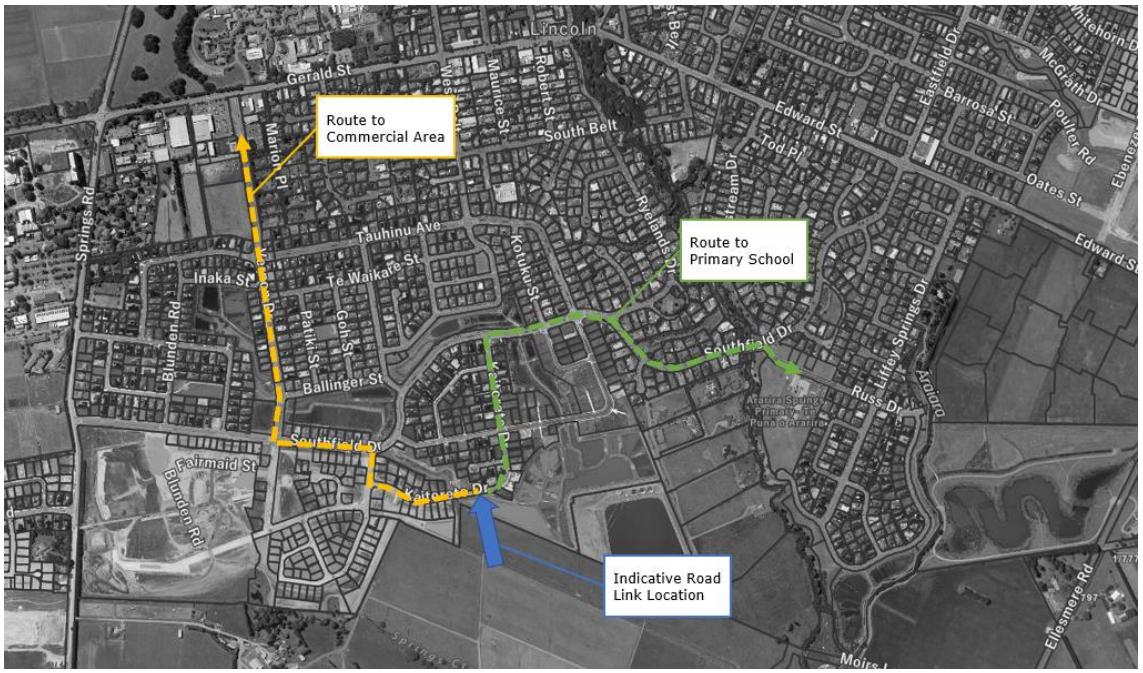


Figure 1: Potential Te Whariki Road Link

24 Walking and cycling connections are also proposed to tie in with existing green links in the Verdeco Park and Te Whāriki subdivisions as well as the Rail Trail cycling route (at Moirs Lane). The Verdeco Park link is proposed to tie-into Verdeco Boulevard towards the western end of the subdivision. The Te Whāriki links are proposed to tie in with Hollard Crescent and the existing walking and cycle network that follows the southern boundary of that subdivision. The potential Te Whāriki road link would also provide walking and cycling access into that subdivision.

25 Off-road shared paths are proposed along Springs Road and Collins Road to tie-in with the existing off-road shared path on Springs Road. The internal transport layout of the ODP includes a range of *Green Links* that would include footpaths and cycleways. The internal network would also provide footpaths and cycle facilities as required by the road hierarchy, as shown on the revised ODP in Mr Phillips' evidence that largely adopts the recommendations of Council's Transport review.

External Transport Upgrades

26 The ITA identified the following roading upgrades as being required:

26.1 **Springs Rd / Ellesmere Junction Rd / Gerald St:** The existing roundabout is proposed to be upgraded to a traffic signal controlled intersection in the Selwyn District Long-Term

Plan (LTP). This upgrade is required to accommodate the Plan Change traffic and no development would occur prior to this upgrade;

26.2 **Springs Road:** The existing road will be upgraded along the Plan Change site boundary to be consistent with the urbanised segment to the north of the Plan Change site. As identified above, this will include a continuation of the 2.5m shared path on the eastern side of the road;

26.3 **Collins Road:** The existing road will be upgraded along the Plan Change boundary to a 60km/hr Local Road standard. This will include a shared path on the northern side of the road;

26.4 **Moirs Lane:** The existing road will be upgraded to a Collector Road standard (as part of the Spine Road through the Plan Change site) and will also accommodate the off-road Rail Trail cycle route at the eastern end. Contrary to the suggestion in the section 42a report, Moirs Lane has a legal width of 20.12m (as confirmed by the survey plan included in **Attachment 1** and in the evidence of Mr McLeod). As such, there is ample space to accommodate a Collector Road plus shared path for the Rail Trail. An example layout within the 20.12m corridor is illustrated in **Attachment 2**, which uses imagery from Land Information New Zealand and also confirms a road corridor width of 20.12m; and

26.5 **Ellesmere Road:** It is proposed this road would be upgraded to provide a 7.0m carriageway plus 2.5m shoulders on both sides (1.5m minimum seal) prior to a connection to Moirs Lane being established. The costs associated with this upgrade are expected to be partly met by the developer (through development contributions, that are otherwise proportionately levied on others) as some of the works would also be required to accommodate residential development to the south of Edward Street.

27 The above locations for upgrades are illustrated in **Figure 2** (green lines and circle denotes the Plan Change required works and blue circles are LTP schemes discussed in paragraph 28).

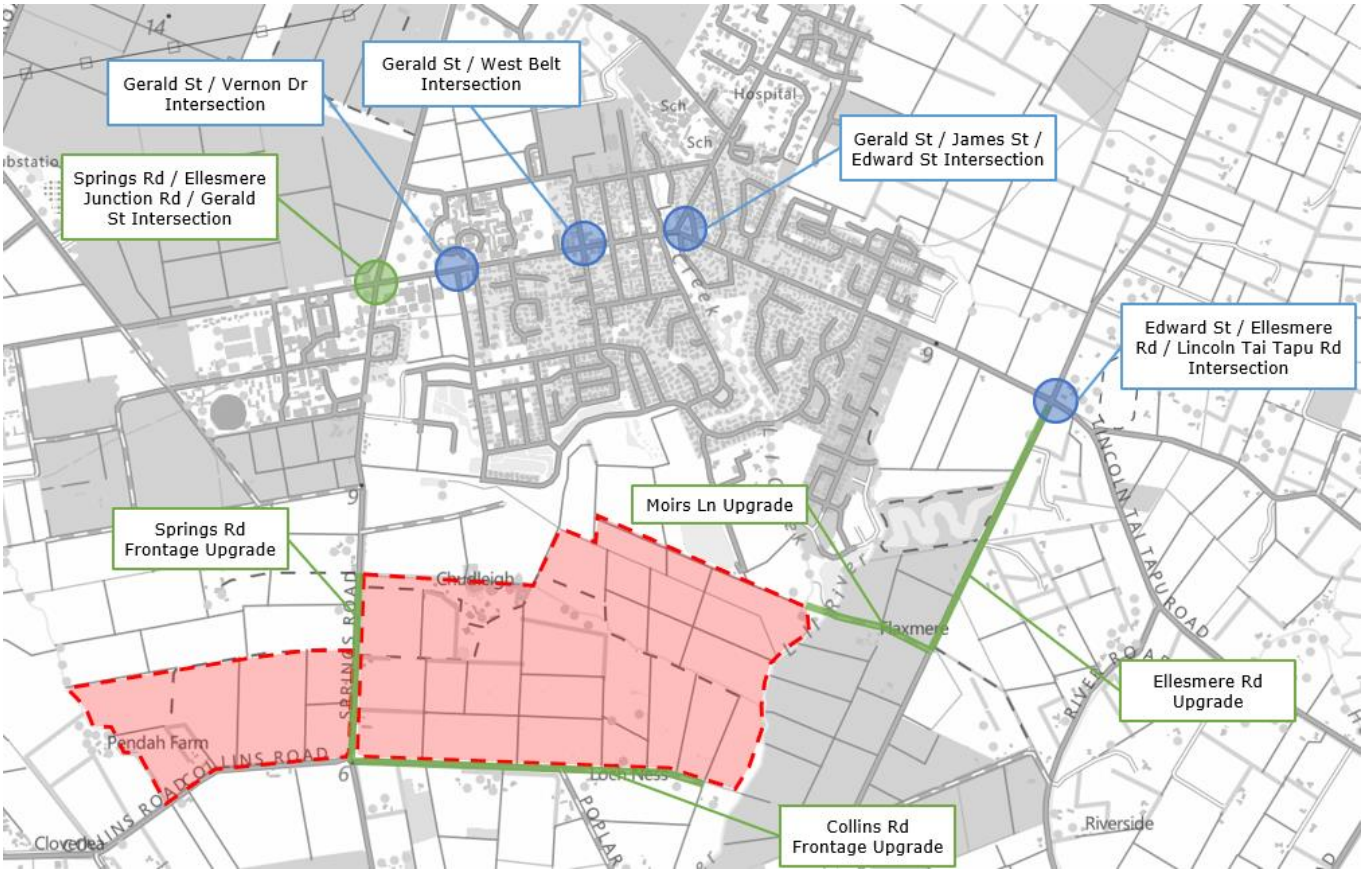


Figure 2: Location of Off-Site Transport Improvements

28 In addition to the above, the following road upgrades are understood to be planned within Lincoln by the Council (see also **Figure 2**).

28.1 **Edward Street / Ellesmere Road / Lincoln Tai Tapu Road:** This intersection is currently a cross-road and is proposed to be upgraded to a roundabout in the LTP in 2024 / 2025. There are benefits from this upgrade to the operation of the road network as the Plan Change and development contributions are assumed to bring the timing of this upgrade forward to coincide with development of the Plan Change site;

28.2 **Gerald Street / Vernon Drive:** It is understood that traffic signals are proposed at this 'T' intersection in the LTP (prior to 2028);

28.3 **Gerald Street / West Belt:** It is understood that traffic signals are proposed at this cross-road intersection in the LTP (prior to 2028); and

28.4 **Gerald Street / James Street / Edward Street**: It is understood that traffic signals are proposed at this 'T' intersection in the LTP (prior to 2028).

Transport Effects

29 Although initial traffic assessment work was presented in the ITA, this has been superseded by the modelling provided with the RFI response. That modelling uses the Selwyn District Council traffic model of Lincoln, which includes the road improvements identified above. The traffic model represents the year 2031 and includes development of all current ODP areas in Lincoln.

30 Further refinements have been made to the traffic model to account for altered roading links to adjacent subdivisions and account for some of the comments received in the Section 42A report. Updates to the traffic modelling are discussed in Mr Smith's evidence and a copy of the revised results are included in **Attachment 3** of my evidence.

31 Three versions of the model have been reported on, as follows:

31.1 **Base Model:** The 2031 model received from Council without any alterations;

31.2 **With Development & No Te Whariki Link:** The 2031 model plus the proposed Plan Change (although without the proposed by-pass). This does not include a roading link to the Te Whāriki subdivision; and

31.3 **With Development & Te Whariki Link:** The 2031 model plus the proposed Plan Change (although without the proposed by-pass). This includes a roading link to the Te Whāriki subdivision at Kaitorete Drive (between Rennie Place and Waikirikiri Avenue).

32 This modelling indicates that the road network is predicted to operate satisfactorily with the Plan Change traffic in place, both with and without the Te Whāriki link.

Intersection Performance

33 The intersection performance of the revised traffic modelling (included in **Attachment 3**) is summarised as follows:

33.1 The operation of the key intersections indicates they are all predicted to operate satisfactorily with the inclusion of the Plan Change traffic and no intersection is predicted to operate worse than Level of Service E[1] overall, with the majority of intersections operating no worse than Level of Service D; and

33.2 The operation of individual turning movements at intersections was also set out in the **Attachment 3**, which identified that no movement is predicted to operate worse

[1] On a scale where 'A' is excellent operation, 'E is at capacity and 'F is over-capacity.

than Level of Service E, although some right turning movements associated with the University accesses are predicted to operate at Level of Service F.

34 The intersection that is predicted to operate at Level of Service E is the Springs Road / Verdeco Park priority. However, the intersection reporting is based on the worst operation of any turning movement and I consider Level of Service E to be acceptable for a turning movement at peak times.

35 I note that the Springs Road / Gerald Street / Ellesmere Junction Road intersection is predicted to operate at Level of Service D at peak times. I consider this to be acceptable operation for peak times.

36 I understand that the queuing associated with the right turn into the University in the AM peak is contained within the flush median and this does not affect through traffic. The right turn out of the University is low volume (only three vehicles). Whilst having these movements at Level of Service F is not ideal, it is not predicted to lead to adverse effects.

37 Overall, it is considered that the road network can satisfactorily accommodate the traffic predicted from the proposed Plan Change on the basis of the 2031 road network.

Additional Traffic on Links

38 In addition to the intersection operation reported on in the RFI response, the following increases in link volumes are apparent.

Table 2: Increases in Link Volumes

Link	Peak	Base	With Development	
		Model	Model	Change
Ellesmere Junction Rd	AM	935	1,130	+195
	PM	816	922	+106
Springs Rd (north of Gerald St)	AM	608	1,050	+442
	PM	512	617	+105
James St	AM	768	822	+54
	PM	820	833	+13
Ellesmere Rd (South of Edward St)	AM	213	431	+218
	PM	160	450	+290

39 The above indicates that the majority of increases in traffic on the surrounding network are relatively modest. That said, the increase in traffic on Springs Road (north of Gerald Street) in the AM peak is predicted to be between 442 vehicles per hour.

40 The majority of the increase on Springs Road during the AM peak hour is traffic heading north. This represents approximately 421 vehicles per hour of the 442 vehicles per hour increase in the 'With Development' scenario.

41 The Selwyn LTP includes a series of improvements in the Prebbleton area. These are indicatively illustrated in **Figure 3** and are understood to be provided to encourage traffic to travel around (not through) Prebbleton. The orange lines in **Figure 3** represent the encouraged route of traffic around Prebbleton. I note that the Shands Road / Blakes Road and Springs Road / Marshs Road intersections are under construction. The majority of the other improvements are programmed for 2018 to 2028[2]. These upgrade works provide alternate routes to avoid Prebbleton and would spread the Springs Road traffic generated by the Plan Change site.

[2] The exception to this is the Springs Road / Trents Road Roundabout and Prebbleton Springs Road town centre traffic calming, which are both post 2028.

These works will likely be completed well before PC69 is fully developed.

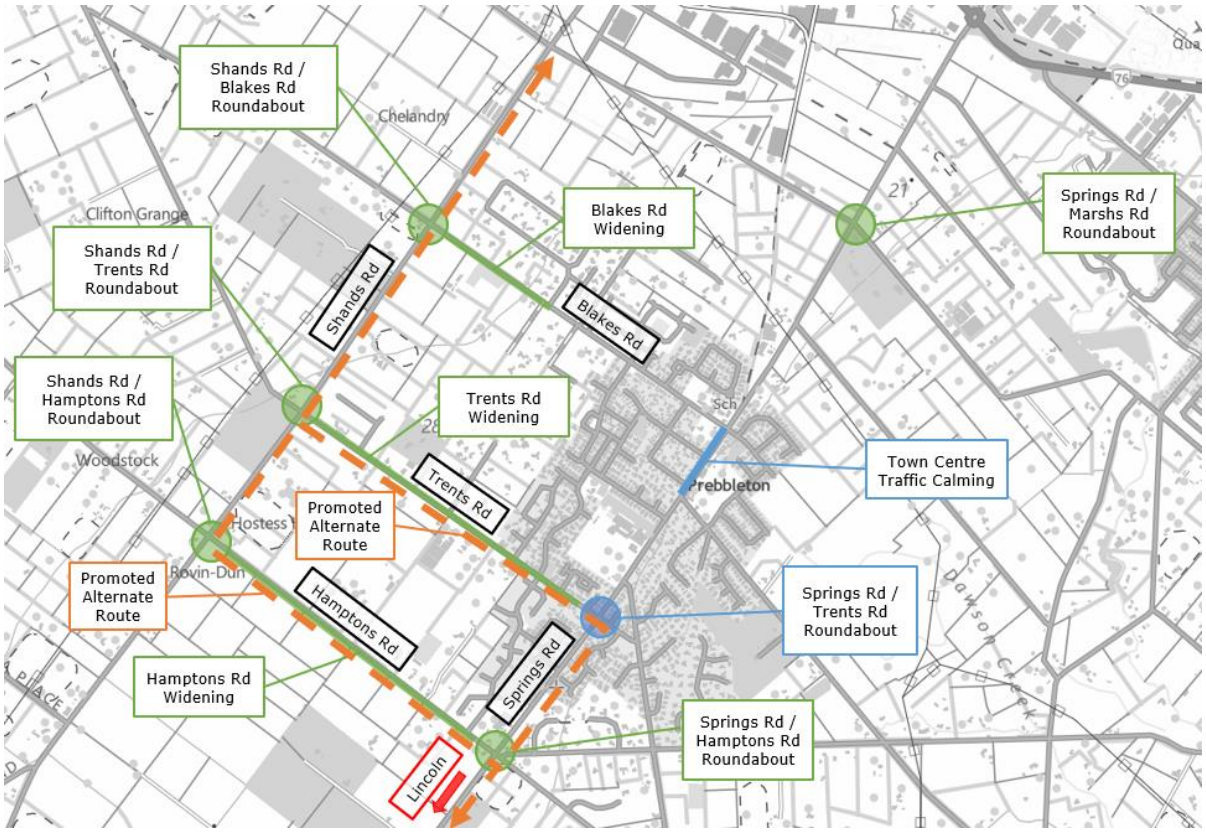


Figure 3: Prebbleton Upgrade Works

42 Overall, it is considered that the traffic effects of the proposed Plan Change on the network will be acceptable.

Walking & Cycling

43 The ODP provides a range of walking and cycling routes within the Plan Change site. These link into the existing / planned off-site walking and cycling infrastructure as far as is practicable. This means that the commercial centre on Vernon Drive is within approximately 1.2km of the Plan Change site boundary, which is a cycle ride of approximately three and a half minutes. As such, the existing commercial centre is within a comfortable ten-minute cycle of the far boundaries of the Plan Change site.

Figure 4: Walking & Cycling Linkage

44 The Plan Change will also provide a continuation of the off-street shared path on Springs Road. This can also be used to link to Southfield Drive to access the commercial area.

45 There is also the ability for residents within the Plan Change area to utilise the Rail Trail connection between Moirs Lane and Jimmy Adams Terrace to access the Primary School on Russ Drive. Furthermore, there is potential for the site to include a school should the Ministry of Education choose to do so.

46 The ODP also includes Local Centres, which is intended to accommodate the day-to-day shopping needs of the new residents. This provides these retail facilities within walking distance of not only the residents of the Plan Change area, but also the adjacent Verdeco Park and Te Whāriki subdivisions. The local nature of these commercial developments is not anticipated to attract traffic from the wider area.

47 Road connections are limited due to the existing development to the north and the associated land constraints. This means car trips to the township (and wider area) will primarily use Springs Road and Ellesmere Road to access those locations. The Plan Change has sought to incorporate vehicle connections although these cannot be guaranteed. Whilst this limits the connectivity by car, it also reduces the potential for traffic to route along residential streets. Again, the intention of the Local Centres within the site is to reduce the need of residents to regularly travel to the existing commercial areas and thereby reduce the traffic movements between these areas. Overall, whilst the limited vehicle connectivity is not ideal, it is not considered to be a significant concern.

48 In summary, it is considered that the site has sufficient connectivity for alternate transport modes. Although it is not well connected for cars, the provision of local centres has sought to remove the need for these trips to occur on a regular basis.

Passenger Transport

49 There are three bus routes that currently travel through Lincoln. These are illustrated in **Figure 5**. These services are:

49.1 Route 80: Parklands to Lincoln (via central Christchurch), with one bus every 30 minutes during weekdays;

49.2 Route 87: Southbridge to Lincoln, with one bus from Southbridge to Lincoln in the AM peak and two buses from Lincoln to Southbridge in the PM peak; and

49.3 Route 820: Burnham to Lincoln (via Rolleston), with one bus every hour during weekdays.

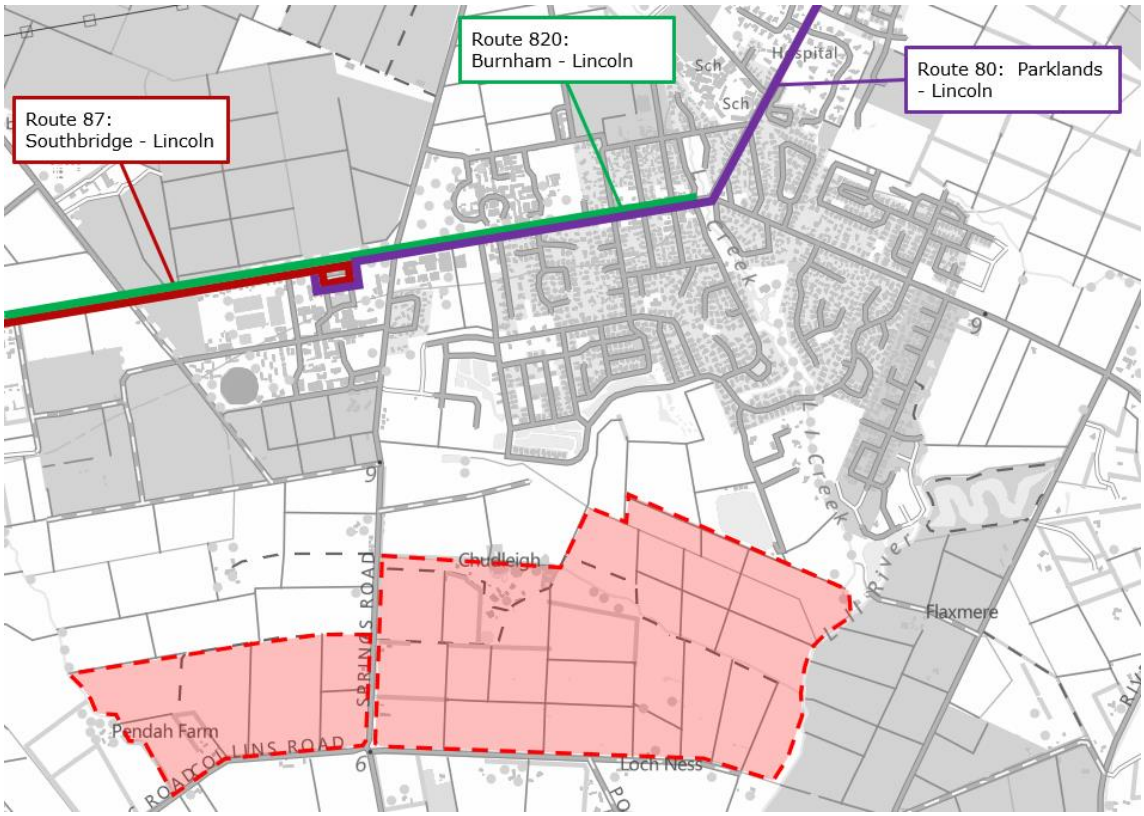


Figure 5: Existing Bus Services

50 It is expected that the expansion of Lincoln would lead to changes in the passenger transport network in this area. This could be via re-routing existing services or through the provision of additional services. The identification of Lincoln as a Key Activity Centre in the

CRPS and District Plan suggests that growth and the consequential improvement of passenger transport could be expected.

51 **Figure 6** illustrates a notional alteration to Routes 80 and 820 that could not only serve this Plan Change site, but also serve the emerging residential development to the east of Lincoln. However, the routes and frequency of passenger transport is the remit of Environment Canterbury who will ultimately be responsible for the services provided.

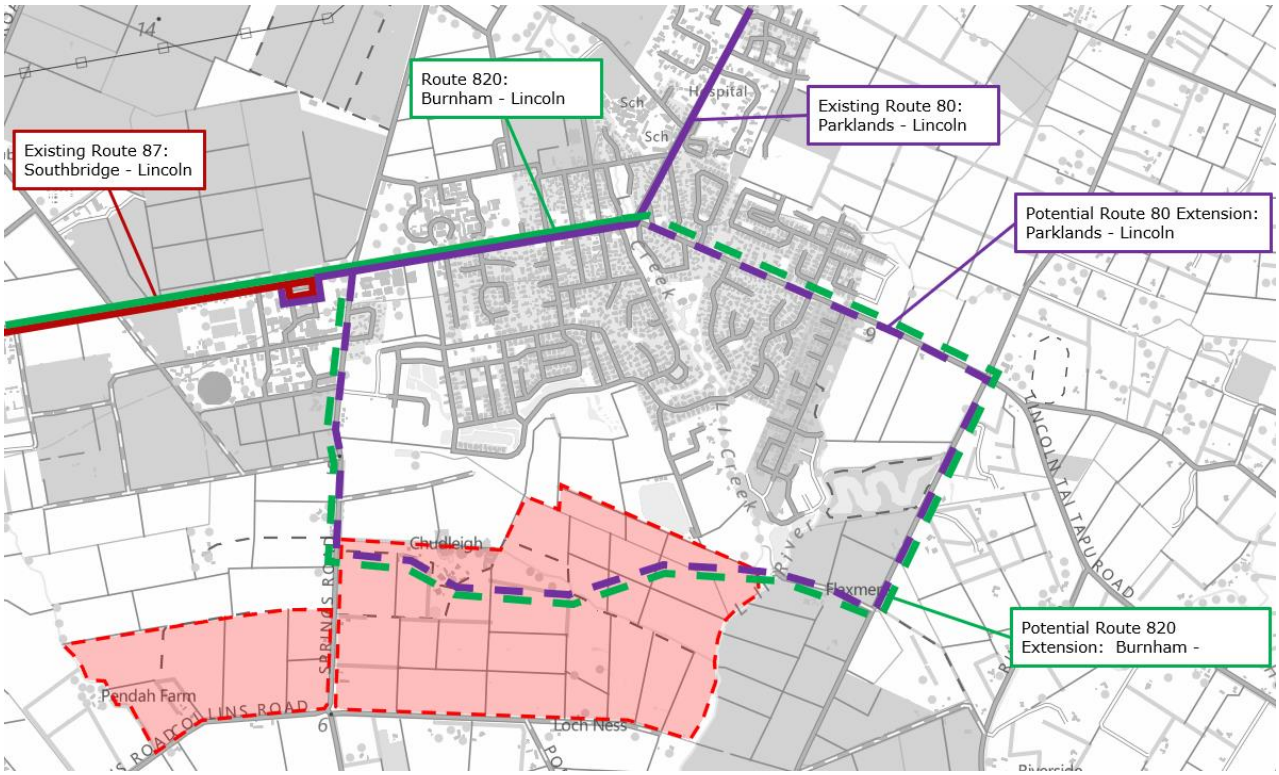


Figure 6: Potential Bus Service Extensions

RESPONSE TO SECTION 42A REPORT

52 I have reviewed the Transportation Hearing Report prepared by Flow and I address the matters as they were raised in the following sections.

Modelled Traffic Volumes

53 The initial concern raised regarding this matter is that the traffic generation rate adopted in the assessment of traffic effects is lower than that used elsewhere (specifically in Rolleston) and that this may lead to an underestimation of traffic effects associated with the Plan Change. The ITA sets out the rationale of the traffic generation rate adopted, comparing this to the typical peak hour traffic generation rate adopted for other work in Selwyn (0.9 vehicles per

dwelling per hour in the peaks) and that of a range of village locations from the United Kingdom, as extracted from the TRICS database which is a commonly used source of information for New Zealand developments.

54 I note that the traffic generation rate of 0.9 vehicles per hour is from the NZTA Research Report 453 *Trips and Parking Related to Land Use*. That rate is from **one** site only according to the summary table that report[3] and accordingly I consider it preferable to utilise the larger data set of the TRICS database.

55 NZTA Research Report 453 also notes the following can have an effect with regards to residential traffic generation:

55.1 proximity to employment centres (satellite commuter towns close to major metropolitan areas typically have lower average residential trip generation rates than suburbs of a metropolitan area); and

55.2 increased opportunity to work from home (advances of internet and other telecommunications technology).

56 The above are indicative of the Plan Change location currently, the anticipated role of Lincoln as a Key Activity Centre as described in Policy 6.2.5 of the CRPS, and the increase in working from home (as discussed in the evidence of **Mr Farrelly**).

57 The traffic generation rate adopted was selected because it represents 'village' locations where it is expected that residents will spread their departures based upon the trip purpose (i.e. local trips to education but employment further afield). Whilst I accept this is UK based data, it has been selected to relate to the characteristics of the proposed development and I consider it to be applicable. This was based on data from nine sites with twelve weekdays of data. The traffic generation rate obtained from the UK data was increased from an initial survey rate of 0.53 and 0.55 to 0.7 vehicles per dwelling to strike a balance between the two sources of data and provide a more robust assessment than simply adopting the UK data.

58 Overall, I consider that the traffic generation rate adopted is sufficiently robust for the assessment of traffic effects associated with the Plan Change.

[3] Refer to Appendix C of NZTA RR453.

59 I note concerns were raised regarding the traffic volumes input into the traffic model and these are addressed in the evidence of Mr Smith.

Traffic Distribution

60 The distribution of traffic associated with the Plan Change site is discussed in the evidence of Mr Smith.

Operation of the Springs Road / Ellesmere Junction Road / Gerald Street Intersection

61 Concerns were raised regarding the operation of the above intersection given the above comments, as well as the reporting of the intersection operation. These are addressed in the evidence of Mr Smith. In brief, the updated modelling indicates that this intersection can satisfactorily accommodate the predicted traffic volumes.

Springs Road North of Gerald Street

62 Queries have been raised regarding the operation of specific intersections on Springs Road north of Gerald Street. The Springs Road intersections with Boundary Road and Tancreds Road are included within the Lincoln traffic model. The modelling included in **Attachment 3** indicates that these intersections are predicted to operate satisfactorily with the Plan Change traffic included on the road network.

63 The Springs Road intersection with Robinsons Road is beyond the extent of the traffic model, so an isolated intersection model has been created that uses the through volumes on Springs Road predicted by the Lincoln traffic model and the turning volumes from counts undertaken on 02 November 2021. The results of this model are included in **Attachment 4** and these also indicate that this intersection is predicted to operate satisfactorily.

Springs Road South of Gerald Street

64 The traffic modelling indicates that traffic volumes on Springs Road south of Gerald Street of approximately 1,509 vehicles per hour predicted and a PM peak hour volume of 1,264 vehicles per hour (immediately south of Gerald Street). The concern is that vehicles may struggle to turn into and out of intersections and restrict the ability for pedestrians and cyclists to cross the road.

65 The traffic modelling undertaken included the intersections of Springs Road with Anaru Road, Southfield Drive and Verdeco Boulevard. These intersections all operated satisfactorily in the

peak hours, so the traffic effects regarding these intersections is considered acceptable.

66 I note that Springs Road from Farm Road north includes a flush median. There is the ability to install pedestrian crossing islands on this road if required through utilising the flush median at a later stage when specific desire lines have been identified.

Edward Street / Ellesmere Road / Lincoln Tai Tapu Road Intersection

67 An intersection upgrade is planned at this location in 2024 / 2025 by Council that will replace the existing cross-roads with a roundabout. Council has recommended that no development occur until this upgrade has been completed.

68 It is proposed to amend the ODP to include a rule that permits a maximum of 1,586 dwellings at the Plan Change site east of Springs Road and no access to Ellesmere Road (via Moirs Lane or otherwise) ahead of the construction of the roundabout. This limit of development is consistent with the traffic volumes that are predicted to use the Springs Road access[4]. No deferment is required of development west of Springs Road, as this traffic would most likely use Springs Road to head north from Lincoln.

69 The proposed limit precludes the use of Ellesmere Road ahead of the roundabout construction and therefore avoids adverse effects.

Ellesmere Road Widening – South of Edward Street

70 The Council report recommends that the Plan Change site be required to upgrade Ellesmere Road (from Moirs Lane to Edward Street). I consider that it is appropriate for Ellesmere Road to be upgraded, but not to a Collector Road standard. The upgrade I have suggested is consistent with a rural road carrying the traffic volumes predicted to be on this section of Ellesmere Road and comprises a 7.0m carriageway plus 2.5m shoulder on both sides (1.5m minimum seal). The upgrade to a Collector Road standard would require an 11m carriageway, on-street car parking and footpaths / cycle facilities on both sides of the road. I consider there is no need for the parking, cycle facilities or footpaths given this will essentially be a rural road. Nonetheless, the road reserve is still of a sufficient width to add further urban/collector infrastructure such as parking, cycle lanes, bus-stops etc. if it is ever required.

[4] The modelling indicates that a peak of 290 additional vehicles would use Ellesmere Road south of Edward Street as a result of the Plan Change. Adopting the trip rate of 0.7 vehicles per dwelling per hour, this equates to 414 dwellings. Subtracting this from the total of 2,000 dwellings in the Plan Change leads to a threshold of 1,586 dwellings.

71 I consider that pedestrians and cyclists would use the links proposed to the immediate north of the Plan Change site (or the Rail Trail link to Jimmy Adams Terrace) rather than use Ellesmere Road. That said, it is reiterated that Ellesmere Road has a corridor width of 20m and is able to be further upgraded should urbanisation occur at a later date.

72 I also consider that the costs of upgrading this road should be distributed across several parties. I note that approximately 335m of Ellesmere Road (on the approach to Edward Street) is currently zoned as Living Z, so there is a reasonable expectation that this segment would be upgraded as a result of the development of that land. Given this, I consider that the requirement for development contributions toward the upgrade for a commensurate share of the costs would be appropriate.

Ellesmere Road Widening – North of Edward Street

73 The Council's report recommends that no development occurs at this Plan Change site until Council widening of Ellesmere Road north of Edward Street to Knights Bridge is completed. Council currently plans to undertake this widening in 2024 / 2025.

74 As with the upgrade to the Edward Street / Ellesmere Road / Lincoln Tai Tapu Road Intersection, I consider that some development could occur within the Plan Change area prior to a link to Ellesmere Road being constructed, which would mitigate the need to undertake the seal widening. This would be included in the same addition to the ODP text outlined in paragraph 68.

Moirs Lane

75 The Council report queries the ability to provide a Collector Road and accommodate an off-road path for the rail trail in the Moirs Lane corridor. I have provided a concept arrangement for this in **Attachment 2**, which is based on the 20.12m corridor width that is legally available. On this basis, I am satisfied that there is sufficient space available to provide a satisfactory arrangement.

76 Note that the concept design provided in **Attachment 2** is on the basis of a Collector Road standard on Ellesmere Road. Whilst I consider this is an overdesign of Ellesmere Road based on its rural nature, it confirms that this section of Ellesmere Road could be upgraded in the future if required and the intersection would still be accommodated.

77 Furthermore, the ability to provide the above link means that the potential option to use Collins Road (as outlined in the Council report) is not required in my opinion.

Site Access Intersections

78 The Council recommendation is that the site accesses to Springs Road be constructed as roundabouts. The traffic modelling undertaken in the RFI response (and updated as per Mr Smith's evidence) includes a roundabout at the southern intersection and traffic signals at the northern intersection. Traffic signals are the preferred intersection form because of potential delays to the southern Springs Road approach with high volumes of traffic turning right out of the Plan Change site in the AM peak.

79 The provision of traffic signals also includes the ability to provide safe pedestrian and cycle crossing facilities, which is particularly beneficial given the proximity to the commercial centre.

Gateway Feature

80 The Council reporting recommends a gateway feature be proposed in the vicinity of the Springs Road / Collins Road intersection to indicate that drivers are entering an urban environment. I agree with this and a requirement to provide this has been included on the amended ODP.

Connections to Verdeco Park, Te Whāriki & Liffey Springs Drive

81 The Council report identifies that the proposed links to Verdeco Park, Te Whāriki and Liffey Springs Drive are not possible. The ODP has been amended to remove the link to Liffey Springs Drive.

82 Other roading connections to Verdeco Park and Te Whāriki have been explored, as set out in the evidence of Mr Phillips. These roading links are desirable, although not crucial in terms of traffic operation, as set out in the revised traffic modelling. As discussed at paragraph 23, the benefit of this link is that it reduces the car journey distances to the existing commercial centre on Vernon Drive and the primary school on Russ Drive. This effectively provides local connectivity, with traffic travelling to / from wider destinations (such as Christchurch) generally preferring Springs Road and Ellesmere Road as these are faster and more direct connections.

83 The walking and cycling links are still proposed to the adjacent subdivisions. These provide links to the green networks in those subdivisions and the links will provide useful connections to reduce the walking and cycling distances to other areas as set out at paragraph 43.

Road Frontage Upgrades Plus Walking & Cycling Links

84 Council's report recommends identifying the road frontage upgrades to Springs Road and Collins Road on the ODP. I agree with this approach.

85 Council's report also recommends inclusion of additional walking and cycling routes within the Plan Change, and I also agree with this.

86 These recommendations have been included on the ODP.

RESPONSE TO SUBMITTERS

87 The submissions received on the Plan Change application have been split into the following broad themes. These are discussed in turn.

The Existing Road Network is Already Busy & Unsafe

88 Concerns have been raised regarding the capacity of the road network in general and the ability to safely accommodate the predicted traffic volumes. The traffic modelling undertaken and presented in the RFI response confirms that the surrounding transport network can satisfactorily accommodate the predicted volumes.

89 Furthermore, a range of road upgrading projects are proposed (refer to **Figure 2**). These works are intended to improve the safety of the surrounding road network such that the safety and efficiency of the surrounding road network are considered acceptable.

Lack of Passenger Transport Services & Alternate Transport Modes

90 I have outlined the availability of passenger transport services in Lincoln and the potential to re-route these services in paragraphs 49 to 51. In brief, I consider there is potential to provide passenger transport services within the Plan Change site, although this is ultimately a matter for Environment Canterbury.

91 Links for walking and cycling are also proposed within the Plan Change site, along Springs Road and Collins Road that link to existing facilities. Links are also proposed to the greenlink network of the adjacent subdivisions.

92 I consider this addresses these concerns.

Link to Liffey Springs Rd

93 The link to Liffey Springs Drive is no longer proposed, which addresses the concerns regarding the potential increases on this road.

Wider Network Effects

94 The traffic effects beyond the Lincoln Township have been considered with specific regard to the largest increases, which are predicted to occur toward Prebbleton. Paragraphs 39 to 41 outline the proposed works around the Prebbleton area that effectively form a by-pass and assist with accommodating this traffic.

95 I consider that this is sufficient to confirm the wider traffic effects of the proposed Plan Change are acceptable.

Opposition to Bypass

96 Several submissions raised concerns regarding the proposed by-pass of Lincoln. I note that the by-pass is not proposed by this Plan Change nor does this Plan Change rely on this by-pass. I consider this matter to have been resolved given Council have indicated they do not intend to pursue this by-pass.

Lack of Land For Upgrades

97 The traffic modelling provided as part of the RFI response has indicated that there is sufficient capacity in the Council's proposed upgrade of the Springs Road / Ellesmere Junction Road / Gerald Street intersection to accommodate the proposed development. This upgrade would be required prior to development occurring at the Plan Change site and development contributions are anticipated to go towards this and the other upgrades already planned in the Lincoln Township.

CONCLUSIONS

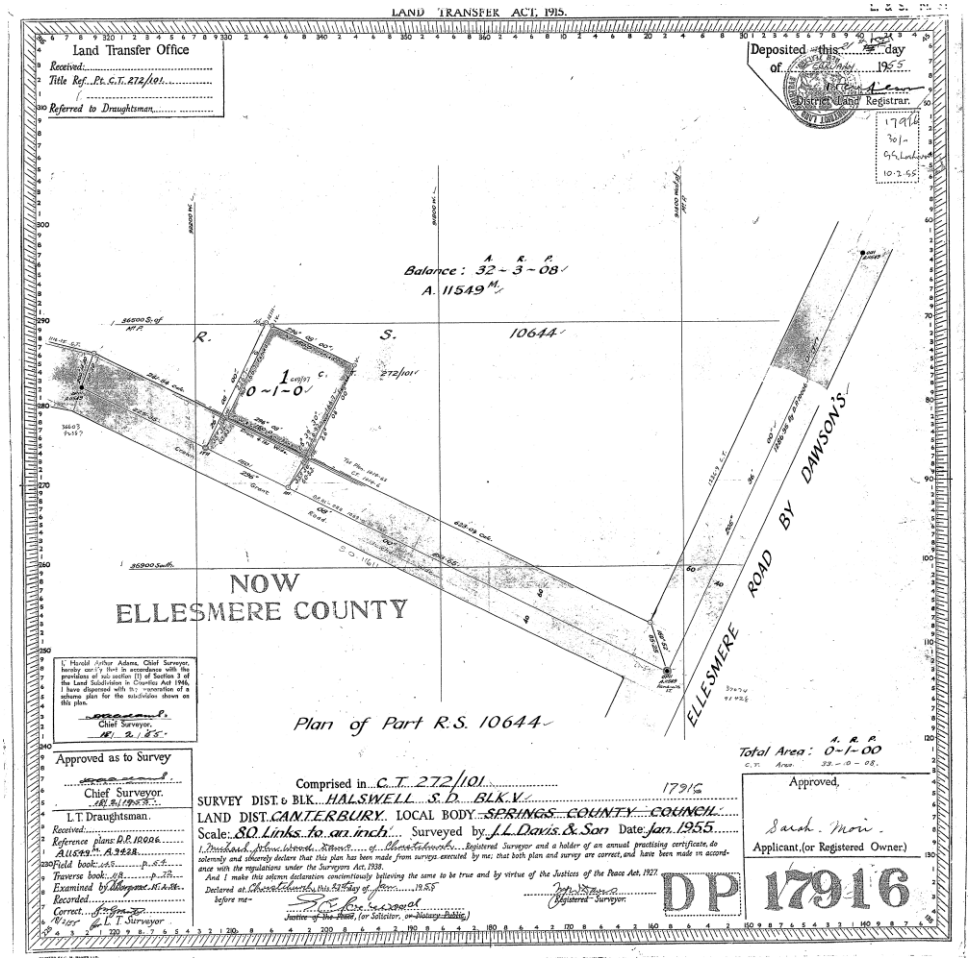
98 Based on the above, I consider that the Plan Change will have acceptable effects on the transport network.

Dated: 4 November 2021

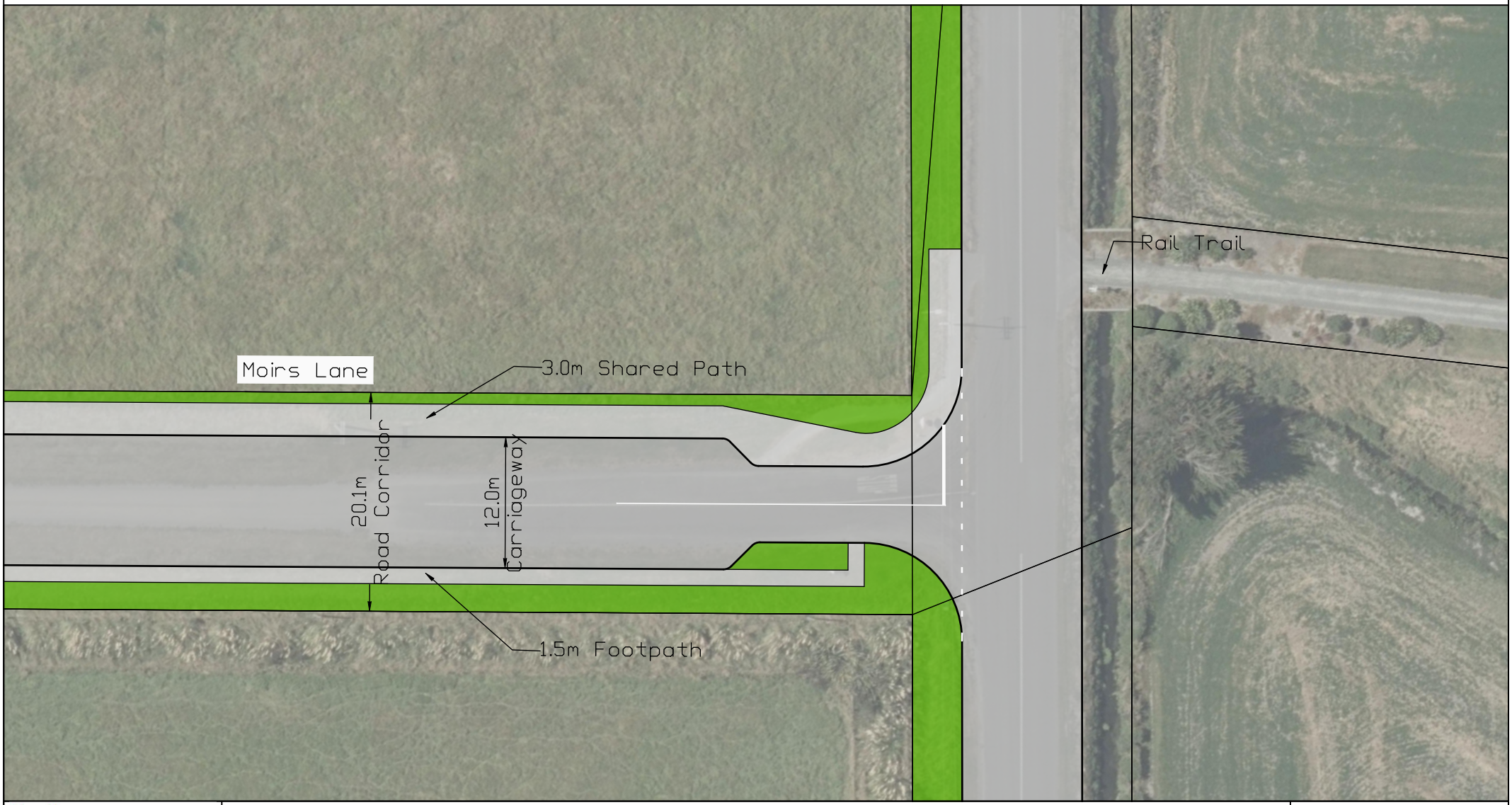
_____

Nicholas Fuller

ATTACHMENT 1: MOIRS LANE SURVEY PLAN



ATTACHMENT 2: MOIRS LANE CONCEPT ARRANGEMENT



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Plan Change 69 - Lincoln South
Rolelston Industrial Developments Ltd

Moirs Lane / Ellesmere Road Concept Arrangement

For Information

Drawing: 021-028 - TR001A

Sheet
TR001A

Scale @A4 1:500
Date 03 Nov 2021
By N Fuller
Project #021-028

ATTACHMENT 3: UPDATED TRAFFIC MODELLING NOTE

Transport + Location Intelligence

ATTACHMENT ONE – Technical Note

South Lincoln Private Plan Change Modelling

Prepared for:	Rolleston Industrial Developments Ltd
Job Number:	RIDL-J001
Revision:	Revised draft
Issue Date:	3 November 2021
Prepared by:	Chris Blackmore, Senior Transportation Planner
Reviewed by:	Dave Smith, Technical Director

1. Development Overview

Abley were commissioned by Rolleston Industrial Developments Ltd (RIDL) to model a residential development, totalling around 2,000 households, in South Lincoln. Modelling was carried out within the Lincoln s-Paramics microsimulation model. This model has been developed by Abley for Selwyn District Council (SDC), and permission has been granted by SDC to use the model for this work.

Diagrams of the proposed development area were provided by RIDL for inclusion in the Lincoln model, shown in **Figure 1.1**. This network has been updated as advised by RIDL, and in response to comments from the Section 42a report, as described in Section 2.2.

Trip generation from the residential development was provided by RIDL for use in the modelling, morning and evening peak generation for inbound and outbound trips is shown in **Table 1.1**. Other trip generation and distribution, including expanding the peak hour generation to a two-hour level and then distributing the generated volumes onto the network have been informed by similar residential developments within the existing Lincoln model. Trip generation and distribution for the small 450sqm GFA commercial / retail development has been based on the existing commercial and retail activity within the model. No additional pass-by reductions have been made at this time.

The model runs a two-hour morning period from 07:00 to 09:00 and a two-hour evening period from 16:00 to 18:00. From these results are reported for a peak hour in the morning from 08:00 to 09:00 and in the evening from 17:00 to 18:00.

Paramics microsimulation is a stochastic modelling package, which means there is some inherent variability between modelling runs. To account for this the results presented are the averages of five model runs. Generally, outlier results are excluded from the analysis however this has not been required for any of the results reported here.

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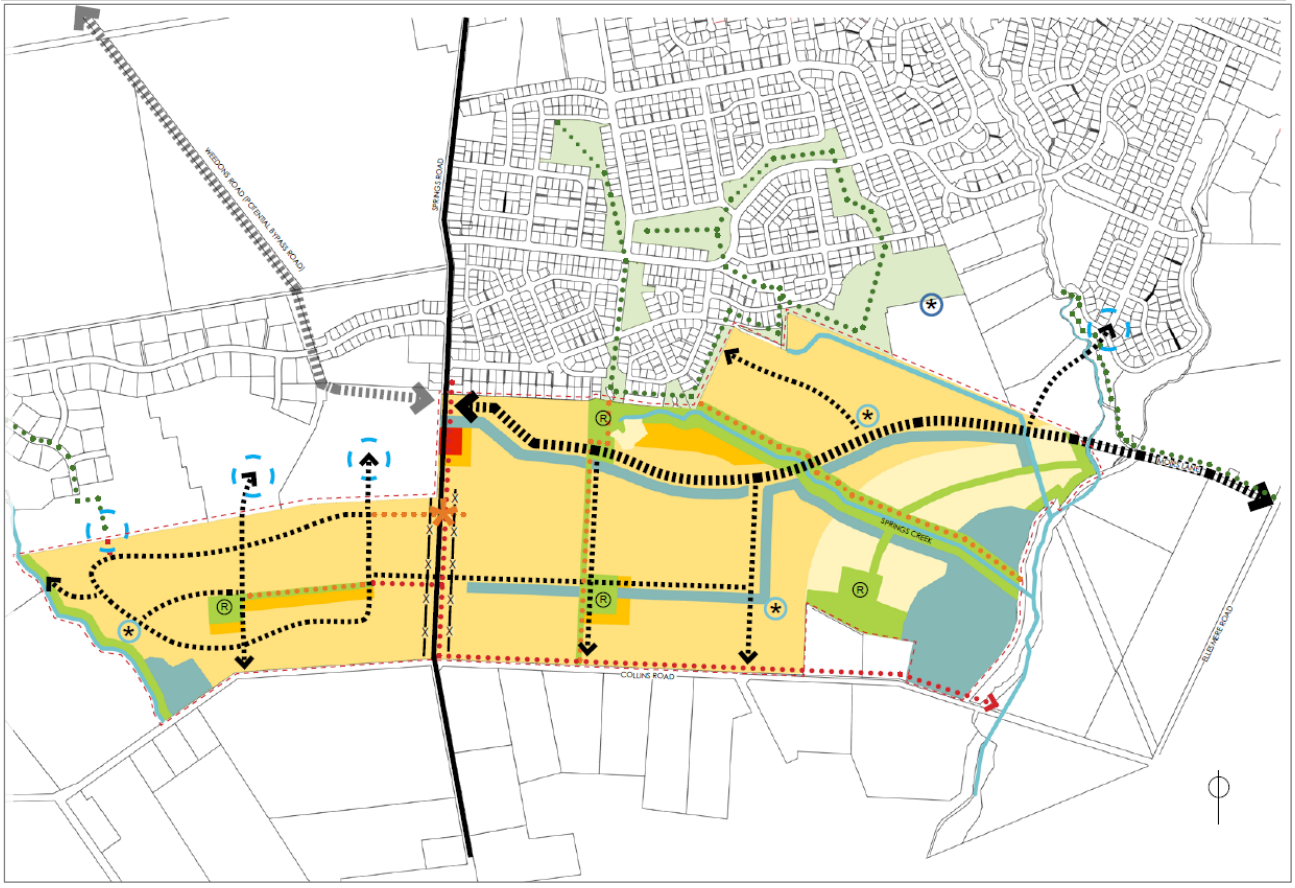

Figure 1.1 Overview of South Lincoln Development, supplied by RIDL

Table 1.1 Trip Generation per Developed Household, supplied by RIDL

Period	Arrivals	Departures	Total
Morning Peak Hour	0.175	0.525	0.7
Evening Peak Hour	0.441	0.259	0.7
Daily	3.5	3.5	7.0

2. Modelled Network

2.1 Base Network

The base network utilised for this analysis corresponds to the 2031 future model developed for SDC. This includes development of all current ODP areas, including Verdeco Park and residential development south of Southfield Dr, which are both currently under construction. This model also includes infrastructure included by SDC as part of the draft 2021-2024 Long Term Plan in line with other modelling conducted for SDC in Lincoln.

Small changes to corridor operation have been included to ensure vehicle behaviour along key links, especially Springs Rd, is realistic and responses to vehicle congestion are appropriate. These changes have been maintained across all model networks to maintain a fair comparison.

A significant improvement to routing choice has been made in the northern exits to and from Christchurch. Vehicles travelling along the Springs Rd and Shands Rd corridors are now able to react to delay on each corridor and can make a choice between the two routes. This is improved from previous modelling where the corridor choice was deterministic and fixed. As with the minor changes, this has been kept consistent across the model networks.

The base network used is shown in **Figure 2.1**.

Figure 2.1 Base Model Network

2.2 Inclusion of South Lincoln Development

Road connections were included in line with the plans shown in **Figure 1.1**. Infrastructure included at intersections was agreed with RIDL and represents intersection forms which would typically be associated with Connector class roads. The changes to the network are shown in **Figure 2.2**.

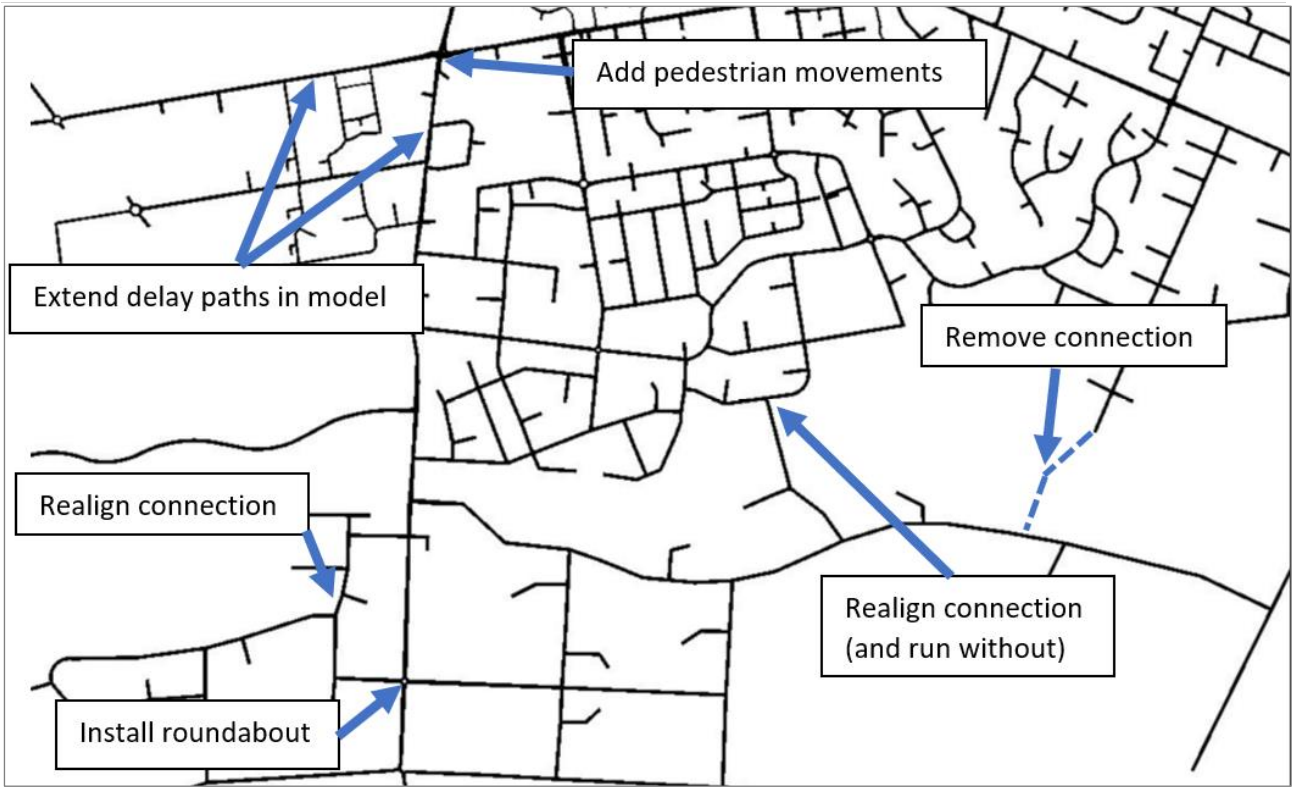

Figure 2.2 Network changes resulting from structure plan updates

2.3 Inclusion of Central Link Connection

The alignment used for the potential Central Link connection is as per the supplied plans from RIDL. It connects to the southern side of Kaitorete Dr and forms a connection with the unnamed Development Connector road.

The network including the potential Central Link connection is shown in **Figure 2.3**.

The model was run firstly excluding the potential Central Link, then including the potential Central Link. Results for each scenario are presented in Section 4.

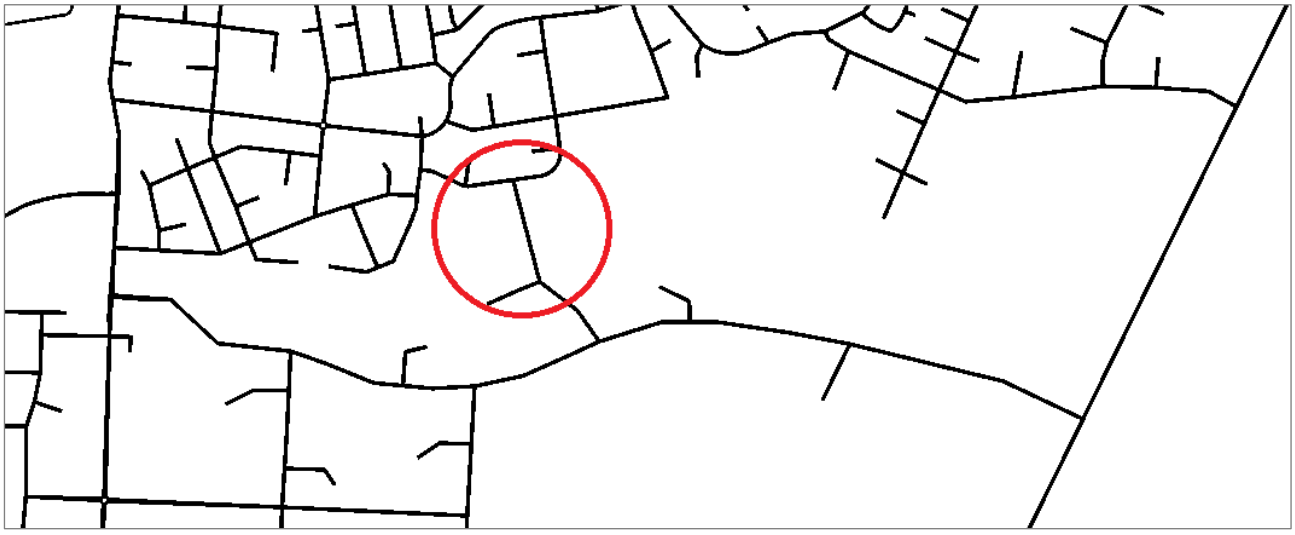

Figure 2.3 Network including main ODP Road and potential Central Link

3. Included Modelling Assumptions

The main assumptions relied on in this modelling are listed below. While these would have an impact on results if not included, they are in line with previous modelling undertaken for SDC and provide a consistent basis with which to analyse the impact of the South Lincoln Development.

- Lincoln University activity, especially the main car park, remains located in the south-eastern corner of the University land. While there has been discussion of the formation of a large carpark on the north-western corner of the Springs Rd / Ellesmere Jct intersection there is no publicly available information at this time.
- The University access at Springs Rd / Farm Rd is currently unformed. This is assumed to become a formed access in the future network to allow a second access to the University off Springs Rd. There is no formal announcement from the University to undertake this development, however this assumption is in line with other modelling conducted for SDC.
- The trip distribution for the residential and commercial development is assumed to follow the same patterns as other residential greenfield development vehicle trips, i.e. the residents of the new development access the town centre, supermarket and other destinations at the same rate as residents in similar greenfields developments around Lincoln. This also means that residents of the new development travel to and from Christchurch and Rolleston at the same rate as other residents in similar greenfields developments.

4. Outputs Provided

4.1 Volumes

The 'With Development' model shows that increases in traffic volumes in both peaks are primarily along Springs Rd and Ellesmere Jct / Gerald St, with other collectors also seeing some increase. When the Central Link connection is included around 200 vehicles divert from Springs Rd and Ellesmere Rd to the Central Link, while around 100 vehicles previously using Southfield Dr and Vernon Dr to access the town centre divert to the Central Link. Refer to **Table 4.1**, **Figure 4.1** and **Figure 4.2** for the morning peak results and **Table 4.2**, **Figure 4.3** and **Figure 4.4** for evening peak results.

Table 4.1 Two-Way Volumes on Key Corridors in the Morning Peak (08:00-09:00)

Measurement point	No Development	With Development	With Development and Central Link
Springs N of Verdeco	412	1355	1229
Springs S of Ellesmere Jct / Gerald	814	1509	1454
Springs N of Ellesmere Jct / Gerald	608	1050	1048
Ellesmere Jct W of Uni	935	1130	1144
Weedons N of Ellesmere Jct	573	753	766
Gerald W of Springs	1022	1155	1165
Central Link N of ODP Road	0	0	268
Days N of Collins	0	34	33
Ellesmere S of Edward	213	431	358

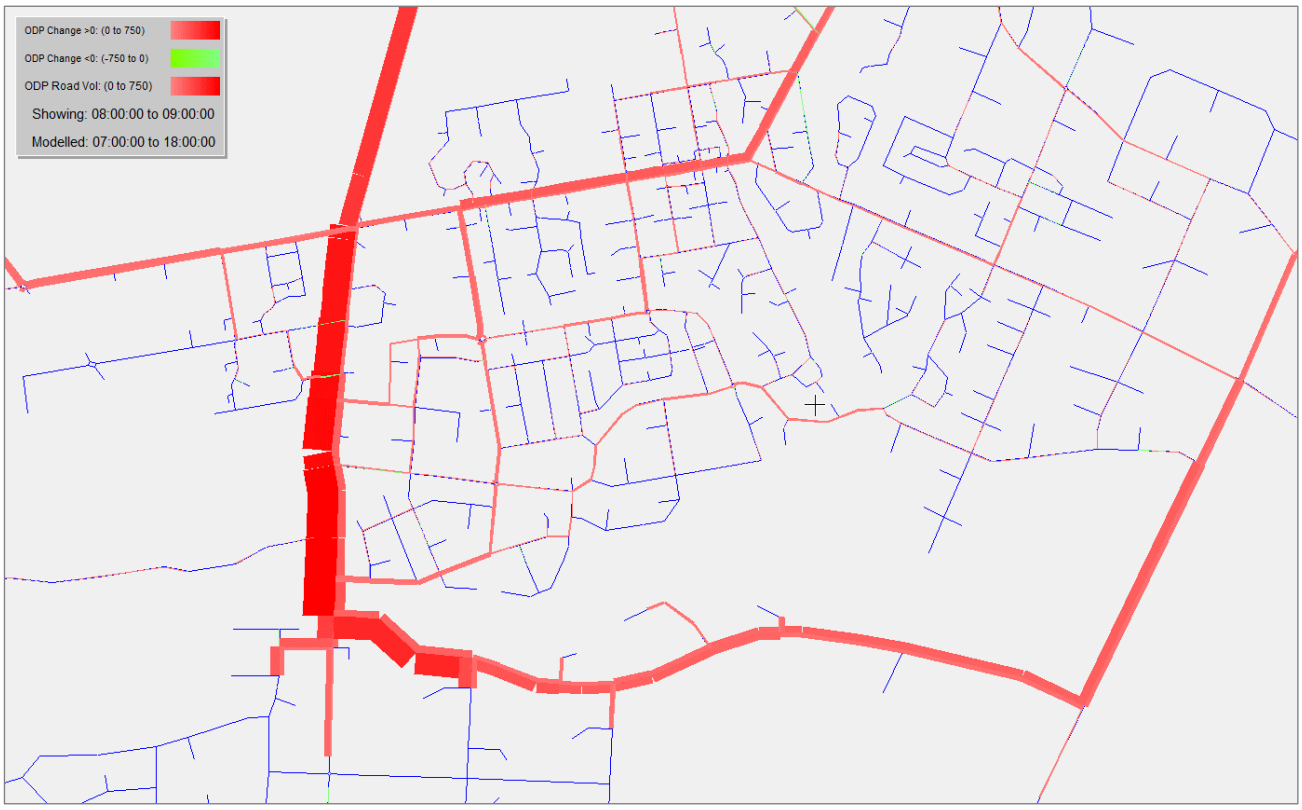

Figure 4.1 Change in Volume between No Development and Development in the Morning Peak (08:00-09:00)

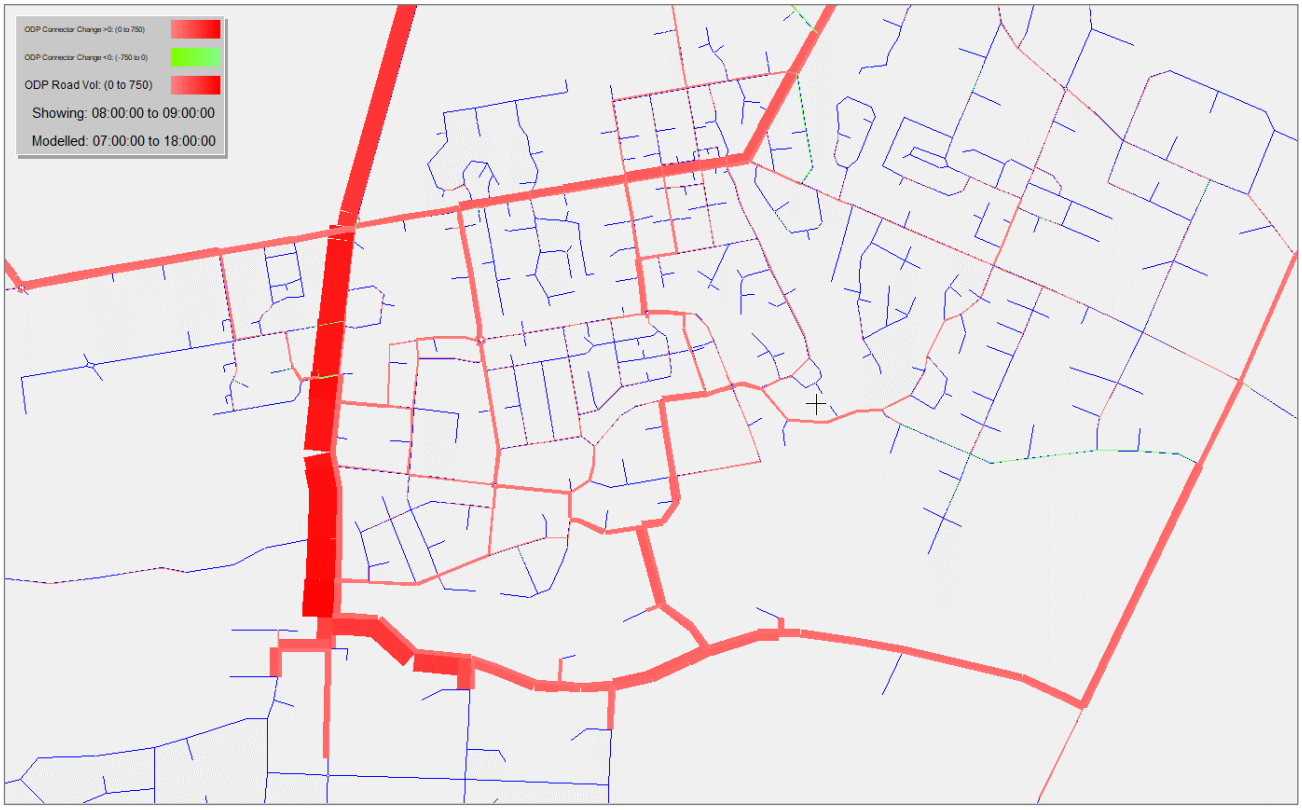

Figure 4.2 Change in Volume between No Development and Development with Central Link in the Morning Peak (08:00-09:00)

Table 4.2 Two-Way Volumes on Key Corridors in the Evening Peak (17:00-18:00)

Measurement point	No Development	With Development	With Development and Central Link
Springs N of Verdeco	538	1048	965
Springs S of Ellesmere Jct / Gerald	914	1264	1209
Springs N of Ellesmere Jct / Gerald	512	617	605
Ellesmere Jct W of Uni	816	922	915
Weedons N of Ellesmere Jct	447	525	526
Gerald W of Springs	1126	1241	1227
Central Link N of ODP Road	0	0	299
Days N of Collins	0	31	28
Ellesmere S of Edward	160	450	378

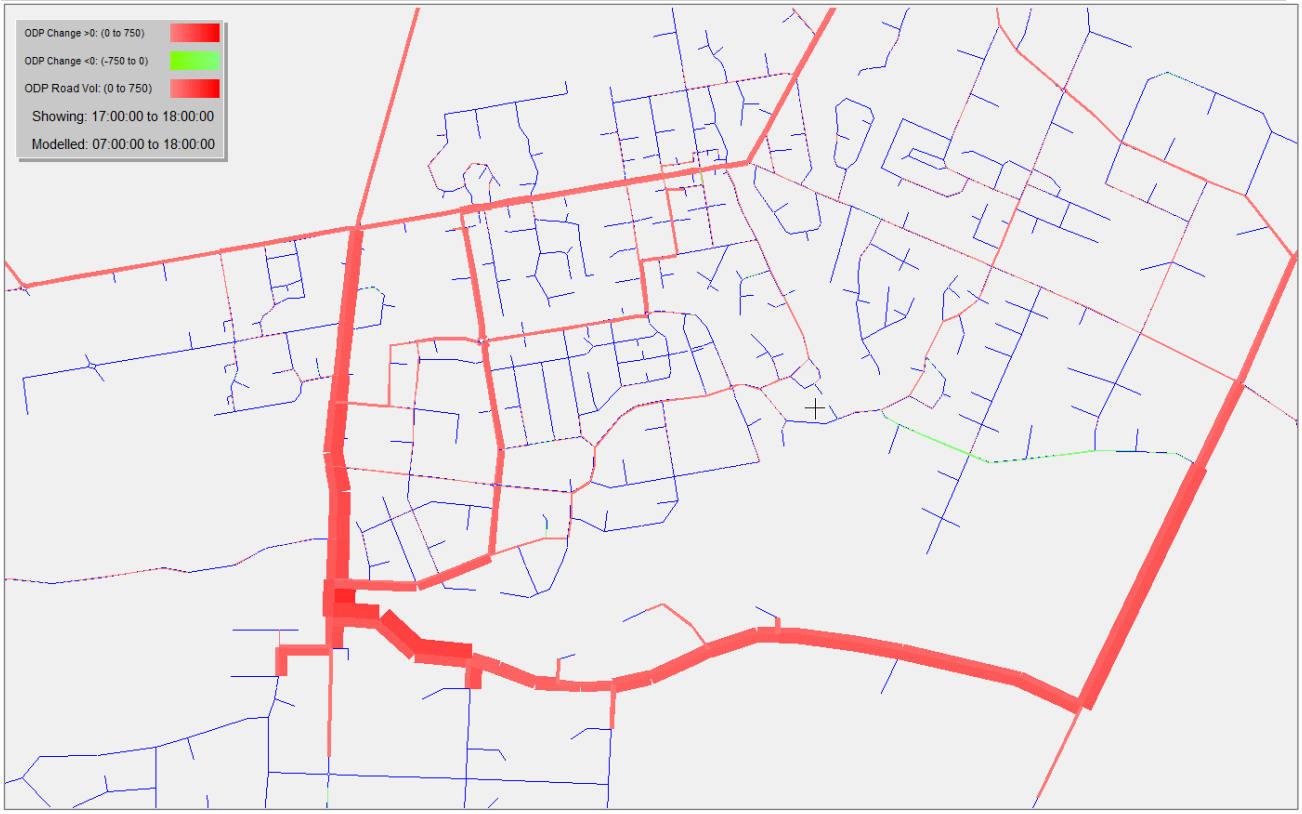

Figure 4.3 Change in Volume between No Development and Development in the Evening Peak (17:00-18:00)

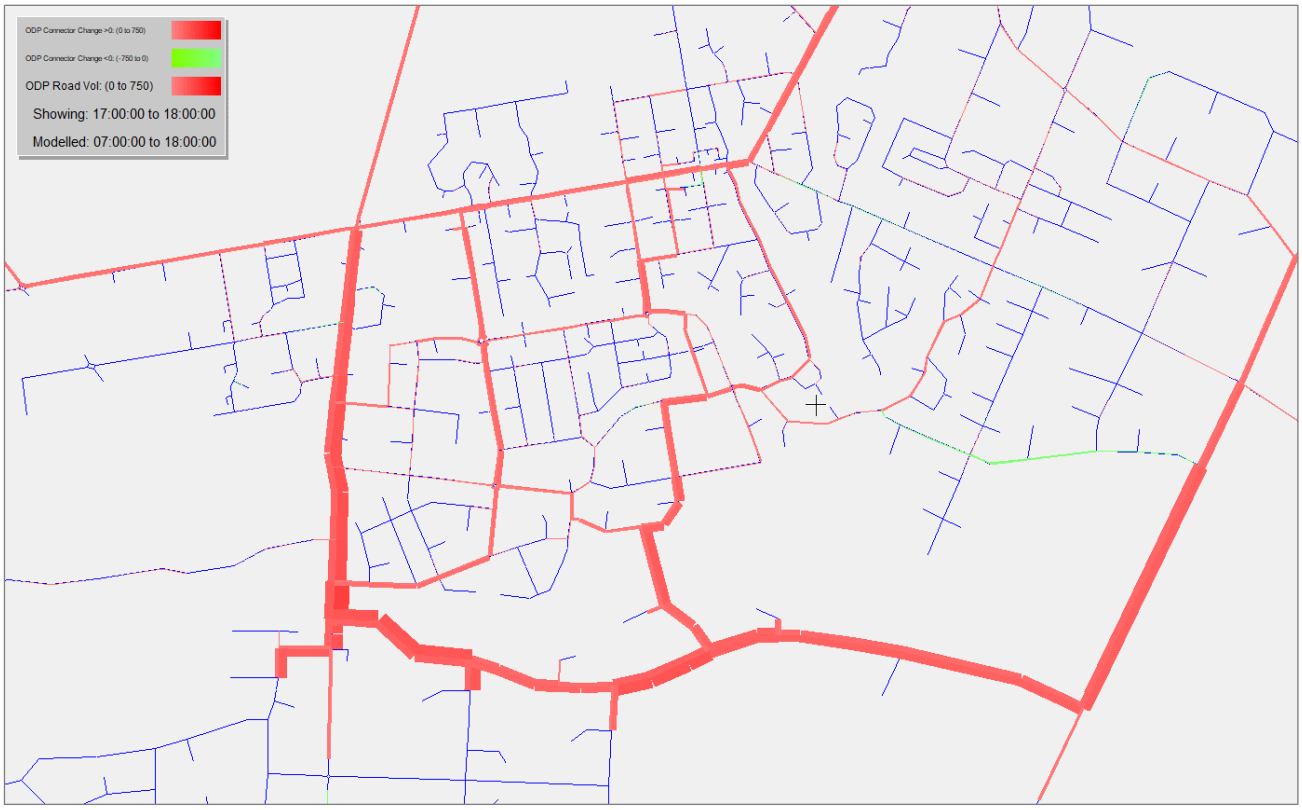

Figure 4.4 Change in Volume between No Development and Development with Central Link in the Evening Peak (17:00-18:00)

4.2 Intersection Performance

The delay and Level of Service (LOS) of key intersections have been evaluated and compared between the 'without development', 'with development', and 'with Central Link' models. LOS is calculated for roundabouts and signalised intersections on the basis of average weighted approach while for priority control intersections it is calculated as the worst approach averaged across movements. The performance of key intersections in the morning peak hour is demonstrated in **Table 4.3** and the evening peak hour in **Table 4.4**. Further breakdowns of the individual movements are attached as Appendix A.

Table 4.3 Intersection Performance at Key Intersections in the Morning Peak (08:00-09:00)

Intersection	No Development			With Development			With Development and Central Link		
	Vol	Delay	LOS	Vol	Delay	LOS	Vol	Delay	LOS
Springs / Gerald / Ellesmere Jct Signals	1617	19	B	2320	40	D	2301	39	D
Gerald / James / Edward Signals	1275	12	B	1538	13	B	1575	1413	B
Weedons / Ellesmere Jct RAB	957	5	A	1125	6	A	1313	8	A
Springs / Anaru Priority	474	2	A	1293	3	A	1027	2	A
Springs / Southfield Priority	496	5	A	1315	31	D	1042	16	C
Springs / Verdeco Priority	421	4	A		36	E	1257	24	C
Springs / West Arterial Signals	255	1	A	1400	20	C	1217	19	B
Springs / ODP Access RAB	140	2	A	345	3	A	316	2	A
Springs / Collins Priority	140	3	A	133	3	A	142	3	A

Table 4.4 Intersection Performance at Key Intersections in the Evening Peak (17:00-18:00)

Intersection	No Development			With Development			With Development and Central Link		
	Vol	Delay	LOS	Vol	Delay	LOS	Vol	Delay	LOS
Springs / Gerald / Ellesmere Jct Signals	1616	18	B	1970	36	D	1924	36	D
Gerald / James / Edward Signals	1376	11	B	1512	12	B	1546	12	B
Weedons / Ellesmere Jct RAB	816	4	A	920	4	A	916	4	A
Springs / Anaru Priority	488	2	A	982	2	A	917	2	A
Springs / Southfield Priority	570	5	A	1081	7	A	1006	8	A
Springs / Verdeco Priority	552	5	A	1082	10	B	998	8	A
Springs / West Arterial Signals	572	2	A	1480	17	B	1285	16	B
Springs / ODP Access RAB	194	2	A	342	3	A	328	3	A
Springs / Collins Priority	194	2	A	195	3	A	194	3	A

4.3 Accessway Performance

Accessway performance for the Lincoln University accesses onto Springs Rd have been collected for the northern (this is essentially the car park access to the south of Farm Road) and southern (Engineering Drive) intersections. The LOS for priority control intersections it is calculated as the worst approach averaged across movements. The performance of the accesses in the morning peak hour is demonstrated in **Table 4.5** and the evening peak hour in **Table 4.6**. Further breakdowns of the individual movements are included within Appendix A.

Table 4.5 Access Performance in the Morning Peak (08:00-09:00)

Intersection	No Development			With Development			With Development and Central Link		
	Vol	Delay	LOS	Vol	Delay	LOS	Vol	Delay	LOS
Springs Rd Uni Entrance North Priority	808	6	A	1515	24	C	1455	33	D
Springs Rd Uni Entrance South Priority	680	6	A	1419	29	D	1341	48	E

Table 4.6 Access Performance in the Evening Peak (17:00-18:00)

Intersection	No Development			With Development			With Development and Central Link		
	Vol	Delay	LOS	Vol	Delay	LOS	Vol	Delay	LOS
Springs Rd Uni Entrance North Priority	902	10	B	1268	18	C	1224	21	C
Springs Rd Uni Entrance South Priority	735	5	A	1145	10	A	1100	9	A

Springs / Gerald / Ellesmere Jct Signals

Intersection Movement value is weighted delay for signals and roundabouts and worst movement for priority intersections

Approach values are only calculated for priority intersections

No ODP

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	62	9	A				45	9	A			
Springs Rd North	Thru	215	19	B				53	17	B			
Springs Rd North	Right	15	20	C				10	25	C			
Gerald St East	Left	114	16	B				186	18	B			
Gerald St East	Thru	255	19	B				328	20	C			
Gerald St East	Right	84	35	D				47	26	C			
Springs Rd South	Left	25	12	B				84	16	B			
Springs Rd South	Thru	223	16	B				321	18	B			
Springs Rd South	Right	113	19	B				209	18	B			
Ellesmere Jct Rd West	Left	4	21	C				0	0	A			
Ellesmere Jct Rd West	Thru	388	19	B				290	17	B			
Ellesmere Jct Rd West	Right	118	23	C				44	23	C			
Intersection		1617	19	B				1616	18	B			

ODP, no Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	69	14	B				48	10	A			
Springs Rd North	Thru	223	41	D				126	43	D			
Springs Rd North	Right	15	64	E				9	38	D			
Gerald St East	Left	120	48	D				236	52	D			
Gerald St East	Thru	257	47	D				311	51	D			
Gerald St East	Right	80	54	D				45	38	D			
Springs Rd South	Left	112	42	D				113	26	C			
Springs Rd South	Thru	647	42	D				342	29	C			
Springs Rd South	Right	228	47	D				300	31	C			
Ellesmere Jct Rd West	Left	5	25	C				21	31	C			
Ellesmere Jct Rd West	Thru	392	25	C				287	31	C			
Ellesmere Jct Rd West	Right	171	35	D				132	29	C			
Intersection		2320	40	D				1970	36	D			

ODP and Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	81	11	B				57	8	A			
Springs Rd North	Thru	194	38	D				115	39	D			
Springs Rd North	Right	19	61	E				5	48	D			
Gerald St East	Left	109	47	D				232	51	D			
Gerald St East	Thru	264	48	D				305	48	D			
Gerald St East	Right	88	69	E				47	35	D			
Springs Rd South	Left	102	36	D				118	27	C			
Springs Rd South	Thru	651	40	D				337	32	C			
Springs Rd South	Right	220	44	D				280	33	C			
Ellesmere Jct Rd West	Left	5	23	C				16	25	C			
Ellesmere Jct Rd West	Thru	397	25	C				290	32	C			
Ellesmere Jct Rd West	Right	172	33	C				121	28	C			
Intersection		2301	39	D				1924	36	D			

Gerald / James / Edward Signals

No ODP

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
James St North	Left	357	11	B				316	10	B			
James St North	Right	85	18	B				18	16	B			
Edward St East	Thru	251	10	A				298	8	A			
Edward St East	Right	288	6	A				464	8	A			
Gerald St West	Left	38	16	B				22	14	B			
Gerald St West	Thru	255	20	C				258	20	C			
Intersection		1275	12	B				1376	11	B			

ODP, no Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
James St North	Left	383	11	B				322	11	B			
James St North	Right	98	21	C				19	22	C			
Edward St East	Thru	422	9	A				350	8	A			
Edward St East	Right	301	7	A				470	8	A			
Gerald St West	Left	40	19	B				22	17	B			
Gerald St West	Thru	295	22	C				330	21	C			
Intersection		1538	13	B				1512	12	B			

ODP and Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
James St North	Left	375	12	B				324	10	A			
James St North	Right	103	28	C				15	23	C			
Edward St East	Thru	440	10	A				359	9	A			
Edward St East	Right	300	7	A				474	8	A			
Gerald St West	Left	38	18	B				22	18	B			
Gerald St West	Thru	319	22	C				352	21	C			
Intersection		1575	14	B				1546	12	B			

Weedons / Ellesmere Jct RAB

No ODP

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Weedons Rd North	Left	413	5	A				206	2	A			
Weedons Rd North	Thru	0	0	A				0	0	A			
Weedons Rd North	Right												
Ellesmere Jct Rd East	Left	0	0	A				0	0	A			
Ellesmere Jct Rd East	Thru	127	3	A				233	4	A			
Ellesmere Jct Rd East	Right	161	4	A				241	4	A			
West Arterial South	Left	0	0	A				0	0	A			
West Arterial South	Thru	0	0	A				0	0	A			
West Arterial South	Right	0	0	A				0	0	A			
Ellesmere Jct Rd West	Left												
Ellesmere Jct Rd West	Thru	234	6	A				136	5	A			
Ellesmere Jct Rd West	Right	0	0	A				0	0	A			
Intersection		934	5	A				816	4	A			

ODP, no Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Weedons Rd North	Left	503	7	A				263	3	A			
Weedons Rd North	Thru	0	0	A				0	0	A			
Weedons Rd North	Right												
Ellesmere Jct Rd East	Left	0	0	A				0	0	A			
Ellesmere Jct Rd East	Thru	127	4	A				234	4	A			
Ellesmere Jct Rd East	Right	250	4	A				262	5	A			
West Arterial South	Left	0	0	A				0	0	A			
West Arterial South	Thru	0	0	A				0	0	A			
West Arterial South	Right	0	0	A				0	0	A			
Ellesmere Jct Rd West	Left												
Ellesmere Jct Rd West	Thru	249	8	A				160	6	A			
Ellesmere Jct Rd West	Right	0	0	A				0	0	A			
Intersection		1129	6	A				920	4	A			

ODP and Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Weedons Rd North	Left	516	8	A				263	3	A			
Weedons Rd North	Thru	0	0	A				0	0	A			
Weedons Rd North	Right												
Ellesmere Jct Rd East	Left	0	0	A				0	0	A			
Ellesmere Jct Rd East	Thru	128	4	A				233	4	A			
Ellesmere Jct Rd East	Right	249	4	A				264	5	A			
West Arterial South	Left	0	0	A				0	0	A			
West Arterial South	Thru	0	0	A				0	0	A			
West Arterial South	Right	0	0	A				0	0	A			
Ellesmere Jct Rd West	Left												
Ellesmere Jct Rd West	Thru	251	8	A				157	6	A			
Ellesmere Jct Rd West	Right	0	0	A				0	0	A			
Intersection		1145	7	A				916	4	A			

Springs Rd Uni Entrance North Priority

No ODP

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	345	2	A	435	3	A	272	2	A	283	2	A
Springs Rd North	Right	89	6	A				11	10	A			
Springs Rd South	Left	5	2	A	347	1	A	2	3	A	488	2	A
Springs Rd South	Thru	342	1	A				486	2	A			
Uni Access West	Left	24	5	A	25	6	A	127	10	B	131	10	B
Uni Access West	Right	2	23	C				4	18	C			
Intersection		808	23	C	808	6	A	902	18	C	902	10	B

ODP, no Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	431	4	A	506	7	A	490	2	A	499	2	A
Springs Rd North	Right	75	24	C				8	12	B			
Springs Rd South	Left	14	5	A	991	5	A	6	3	A	641	2	A
Springs Rd South	Thru	977	5	A				635	2	A			
Uni Access West	Left	15	19	C	18	24	C	118	17	C	128	18	C
Uni Access West	Right	3	54	F				10	25	D			
Intersection		1515	54	F	1515	24	C	1268	25	D	1268	18	C

ODP and Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	391	15	B	463	17	C	464	2	A	473	2	A
Springs Rd North	Right	72	30	D				9	11	B			
Springs Rd South	Left	12	5	A	976	6	A	6	3	A	626	2	A
Springs Rd South	Thru	964	6	A				620	2	A			
Uni Access West	Left	14	24	C	16	33	D	111	20	C	125	21	C
Uni Access West	Right	2	93	F				13	32	D			
Intersection		1455	93	F	1455	33	D	1224	32	D	1224	21	C

Springs Rd Uni Entrance South Priority

No ODP

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	127	1	A	348	6	A	251	1	A	277	2	A
Springs Rd North	Right	221	9	A				26	5	A			
Springs Rd South	Left	16	2	A	293	2	A	3	2	A	185	2	A
Springs Rd South	Thru	277	2	A				182	2	A			
Uni Access West	Left	35	4	A	39	5	A	249	4	A	274	5	A
Uni Access West	Right	4	11	B				25	7	A			
Intersection		680	11	B	680	6	A	737	7	A	737	5	A

ODP, no Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	281	3	A	436	29	D	474	2	A	504	2	A
Springs Rd North	Right	154	76	F				30	7	A			
Springs Rd South	Left	25	4	A	944	3	A	5	3	A	351	2	A
Springs Rd South	Thru	919	3	A				346	2	A			
Uni Access West	Left	32	12	B	39	14	B	235	9	A	290	10	A
Uni Access West	Right	7	22	C				55	14	B			
Intersection		1419	76	F	1419	29	D	1145	14	B	1145	10	A

ODP and Central Link

		AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	247	8	A	397	48	E	452	2	A	479	2	A
Springs Rd North	Right	150	114	F				27	5	A			
Springs Rd South	Left	25	4	A	897	4	A	5	3	A	325	2	A
Springs Rd South	Thru	872	4	A				320	2	A			
Uni Access West	Left	35	21	C	47	24	C	244	9	A	297	9	A
Uni Access West	Right	12	33	D				53	13	B			
Intersection		1341	114	F	1341	48	E	1100	13	B	1100	9	A

Springs / Anaru Priority

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	7	2	A	132	2	A	9	2	A	281	2	A	7	2	A	291	2	A	16	2	A	538	2	A	7	2	A	261	2	A	15	3	A	512	2	A
Springs Rd North	Thru	125	2	A				272	2	A				284	2	A				522	2	A				254	2	A				497	2	A			
Anaru Rd East	Left	3	2	A	43	2	A	7	2	A	11	2	A	13	2	A	83	3	A	50	2	A	60	2	A	11	2	A	111	2	A	40	2	A	54	2	A
Anaru Rd East	Right	40	2	A				4	1	A				69	3	A				10	2	A				100	2	A				14	2	A			
Springs Rd South	Thru	293	2	A	299	2	A	185	1	A	196	1	A	944	3	A	996	3	A	350	2	A	385	2	A	899	3	A	933	3	A	324	2	A	352	2	A
Springs Rd South	Right	6	2	A				11	2	A				52	2	A				34	2	A				34	2	A				28	2	A			
Intersection		473	2	A	473	2	A	488	2	A	488	2	A	1370	3	A	1370	3	A	982	2	A	982	2	A	1305	3	A	1305	3	A	917	3	A	917	2	A

Springs / Southfield Priority

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	18	2	A	127	1	A	25	1	A	279	1	A	13	2	A	296	1	A	23	2	A	571	1	A	17	3	A	265	1	A	27	3	A	538	1	A
Springs Rd North	Thru	109	1	A				255	1	A				283	1	A				548	1	A				248	1	A				511	1	A			
Southfield Dr East	Left	23	2	A	86	6	A	41	4	A	49	5	A	34	14	B	75	27	D	55	6	A	63	7	A	29	17	C	88	26	D	51	7	A	63	8	A
Southfield Dr East	Right	63	7	A				9	7	A				40	37	E				8	12	B				59	30	D				11	11	B			
Springs Rd South	Thru	236	1	A	279	1	A	188	1	A	242	1	A	958	2	A	1037	2	A	377	2	A	447	3	A	875	2	A	949	2	A	341	2	A	406	3	A
Springs Rd South	Right	43	2	A				53	3	A				79	5	A				70	7	A				74	5	A				65	7	A			
Intersection		492	7	A	492	6	A	570	7	A	570	5	A	1408	37	E	1408	27	D	1081	12	B	1081	7	A	1303	30	D	1303	26	D	1006	11	B	1006	8	A

Springs / Verdeco Priority

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Thru	79	3	A	133	3	A	245	3	A	295	3	A	267	3	A	317	6	A	554	6	A	604	6	A	231	2	A	277	5	A	512	3	A	563	3	A
Springs Rd North	Right	54	3	A				51	4	A				50	20	C				51	6	A				47	17	C				51	5	A			
Springs Rd South	Left	4	0	A	145	2	A	6	1	A	207	2	A	17	2	A	921	2	A	15	1	A	421	2	A	16	2	A	832	2	A	15	2	A	378	2	A
Springs Rd South	Thru	141	2	A				201	2	A				904	2	A				406	2	A				816	2	A				363	2	A			
Verdeco Dr West	Left	138	4	A	144	4	A	41	5	A	50	5	A	134	37	E	149	36	E	39	6	A	57	10	B	134	24	C	148	24	C	42	6	A	57	8	A
Verdeco Dr West	Right	6	7	A				9	8	A				16	34	D				18	19	C				14	25	C				16	12	B			
Intersection		422	7	A	422	4	A	552	8	A	552	5	A	1387	37	E	1387	36	E	1082	19	C	1082	10	B	1257	25	C	1257	24	C	998	12	B	998	8	A

Springs / West Arterial Signals

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	0	0	A				0	0	A				147	12	B				305	16	B				98	11	B				182	13	B			
Springs Rd North	Thru	104	2	A				315	2	A				202	15	B				523	19	B				195	16	B				510	18	B			
Springs Rd North	Right	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
ODP Road East	Left	0	0	A				0	0	A				27	15	B				66	16	B				26	17	B				63	17	B			
ODP Road East	Thru	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
ODP Road East	Right	0	0	A				0	0	A				497	25	C				158	18	B				390	21	C				104	17	B			
Springs Rd South	Left	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Springs Rd South	Thru	151	1	A				257	2	A				501	20	C				370	12	B				482	19	B				366	12	B			
Springs Rd South	Right	0	0	A				0	0	A				26	23	C				58	41	D				26	22	C				61	28	C			
West Arterial West	Left	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
West Arterial West	Thru	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
West Arterial West	Right	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Intersection		255	1	A				572	2	A				1400	20	C				1480	17	B				1217	19	B				1285	16	B			

Springs / ODP Access South RAB

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	0	0	A				0	0	A				13	3	A				28	3	A				5	2	A				15	3	A			
Springs Rd North	Thru	32	3	A				138	3	A				26	2	A				117	3	A				25	2	A				117	3	A			
Springs Rd North	Right	0	0	A				0	0	A				17	2	A				35	3	A				17	3	A				34	3	A			
ODP Road East	Left	0	0	A				0	0	A				2	3	A				9	3	A				5	3	A				8	4	A			
ODP Road East	Thru	0	0	A				0	0	A				11	3	A				25	3	A				10	4	A				25	4	A			
ODP Road East	Right	0	0	A				0	0	A				66	5	A				20	6	A				51	3	A				14	4	A			
Springs Rd South	Left	0	0	A				0	0	A				1	0	A				1	1	A				0	0	A				0	0	A			
Springs Rd South	Thru	108	1	A				56	1	A				88	3	A				43	3	A				91	2	A				44	2	A			
Springs Rd South	Right	0	0	A				0	0	A				3	1	A				3	2	A				4	2	A				5	2	A			
ODP Road West	Left	0	0	A				0	0	A				110	2	A				39	1	A				98	2	A				45	1	A			
ODP Road West	Thru	0	0	A				0	0	A				8	2	A				22	1	A				9	2	A				21	1	A			
ODP Road West	Right	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Intersection		140	2	A				194	2	A				345	3	A				342	3	A				316	2	A				328	3	A			

Springs / Collins Priority

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	0	0	A	32	2	A	0	0	A	138	2	A	0	0	A	29	2	A	1	0	A	127	2	A	0	0	A	30	2	A	0	0	A	125	2	A
Springs Rd North	Thru	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Springs Rd North	Right	32	2	A				138	2	A				29	2	A				126	2	A				30	2	A				125	2	A			
Collins Rd East	Left	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	9	3	A	0	0	A	15	3	A	0	0	A	8	3	A	0	0	A	14	3	A
Collins Rd East	Thru	0	0	A				0	0	A				4	1	A				13	4	A				5	3	A				12	4	A			
Collins Rd East	Right	0	0	A				0	0	A				5	4	A				2	2	A				4	3	A				2	3	A			
Springs Rd South	Left	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A
Springs Rd South	Thru	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Springs Rd South	Right	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Collins Rd West	Left	108	3	A	108	3	A	55	2	A	55	2	A	87	3	A	96	3	A	44	3	A	52	3	A	92	3	A	104	3	A	48	3	A	56	3	A
Collins Rd West	Thru	0	0	A				0	0	A				9	1	A				8	3	A				12	3	A				8	4	A			
Collins Rd West	Right	0	0	A				0	0	A				0	0	A				0	0	A				0	0	A				0	0	A			
Intersection		140	3	A	140	3	A	194	2	A	194	2	A	133	3	A	133	3	A	195	2	A	195	3	A	142	3	A	142	3	A	194	2	A	194	3	A

Springs / Boundary Priority

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	39	6	A	436	3	A	38	6	A	165	4	A	45	2	A	263	1	A	40	3	A	155	2	A	42	3	A	248	2	A	33	4	A	146	2	A
Springs Rd North	Thru	198	3	A				63	3	A				214	1	A				106	1	A				201	1	A				105	1	A			
Springs Rd North	Right	198	3	A				63	3	A				4	7	A				10	3	A				5	10	A				9	4	A			
Boundary Rd East	Left	18	4	A	176	6	A	4	3	A	100	5	A	27	8	A	197	10	B	12	3	A	119	5	A	27	7	A	193	11	B	10	3	A	114	5	A
Boundary Rd East	Thru	86	6	A				52	5	A				85	12	B				62	6	A				84	12	B				61	6	A			
Boundary Rd East	Right	72	6	A				44	4	A				85	9	A				44	4	A				82	11	B				44	5	A			
Springs Rd South	Left	32	2	A	314	1	A	37	2	A	408	1	A	90	2	A	740	2	A	41	2	A	436	1	A	96	3	A	753	2	A	38	2	A	432	1	A
Springs Rd South	Thru	274	1	A				369	1	A				637	2	A				392	1	A				642	2	A				390	1	A			
Springs Rd South	Right	8	4	A				2	4	A				13	3	A				4	4	A				16	3	A				3	4	A			
Boundary Rd West	Left	2	3	A	164	5	A	3	3	A	126	6	A	4	6	A	141	9	A	2	2	A	152	6	A	4	5	A	138	8	A	2	2	A	149	5	A
Boundary Rd West	Thru	84	7	A				84	7	A				70	11	B				88	8	A				68	10	B				87	7	A			
Boundary Rd West	Right	79	4	A				39	3	A				66	7	A				62	3	A				66	6	A				60	3	A			
Intersection		1091	3	A	1091	6	A	799	3	A	799	6	A	1341	4	A	1341	10	B	863	3	A	863	6	A	1333	4	A	1333	11	B	841	3	A	841	5	A

Springs / Tancreds Priority

		No ODP												ODP, no Central Link												ODP and Central Link											
		AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)						AM Peak (0800-0900)						PM Peak (1700-1800)					
		Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach			Movement			Approach		
Approach	Movement	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS	Flow	Average Delay	LOS
Springs Rd North	Left	24	3	A	193	1	A	18	3	A	84	2	A	23	4	A	214	1	A	17	4	A	98	2	A	24	4	A	210	1	A	15	4	A	93	2	A
Springs Rd North	Thru	165	1	A				57	1	A				187	1	A				72	1	A				181	1	A				68	1	A			
Springs Rd North	Right	4	5	A				9	5	A				4	8	A				10	6	A				5	7	A				9	5	A			
Tancreds Rd East	Left	7	6	A	91	8	A	10	6	A	89	6	A	14	9	A	102	13	B	24	5	A	92	8	A	11	7	A	97	11	B	22	5	A	89	7	A
Tancreds Rd East	Thru	73	8	A				41	7	A				75	15	C				43	11	B				76	13	B				45	9	A			
Tancreds Rd East	Right	10	5	A				38	6	A				14	9	A				24	5	A				11	7	A				22	5	A			
Springs Rd South	Left	37	3	A	347	1	A	26	3	A	418	1	A	74	4	A	726	1	A	28	4	A	443	1	A	72	3	A	724	1	A	26	3	A	442	1	A
Springs Rd South	Thru	304	1	A				386	1	A				638	1	A				407	1	A				639	1	A				408	1	A			
Springs Rd South	Right	5	5	A				6	5	A				13	4	A				9	4	A				13	5	A				8	4	A			
Tancreds Rd West	Left				128	8	A				116	8	A				120	12	B				133	9	A				120	11	B				131	8	A
Tancreds Rd West	Thru	61	9	A				73	9	A				55	13	B				74	10	B				62	12	B				75	9	A			
Tancreds Rd West	Right	68	6	A				42	6	A				65	10	B				59	7	A				58	10	B				56	7	A			
Intersection		758	3	A	758	8	A	706	3	A	706	8	A	1162	4	A	1162	13	B	766	3	A	766	9	A	1151	3	A	1151	11	B	754	3	A	754	8	A

ATTACHMENT 4: SPRINGS ROAD / ROBINSONS ROAD TRAFFIC MODELLING RESULTS

MOVEMENT SUMMARY

Site: 101 [Springs Robinsons PM Plus Plan Change (Site Folder: General)]

Plus Plan Change Model
Site Category: Existing Design
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Springs Rd														
1	L2	9	1	9	11.1	0.236	8.4	LOS A	0.2	1.7	0.04	0.06	0.04	81.5
2	T1	384	11	404	2.9	0.236	0.0	LOS A	0.2	1.7	0.04	0.06	0.04	97.8
3	R2	26	0	27	0.0	0.236	7.7	LOS A	0.2	1.7	0.04	0.06	0.04	86.4
Approach		419	12	441	2.9	0.236	0.7	NA	0.2	1.7	0.04	0.06	0.04	96.6
East: Robinsons Rd														
4	L2	9	1	9	11.1	0.064	10.5	LOS B	0.2	1.6	0.34	0.98	0.34	66.0
5	T1	32	1	34	3.1	0.064	12.9	LOS B	0.2	1.6	0.34	0.98	0.34	68.2
6	R2	1	0	1	0.0	0.064	13.4	LOS B	0.2	1.6	0.34	0.98	0.34	69.2
Approach		42	2	44	4.8	0.064	12.4	LOS B	0.2	1.6	0.34	0.98	0.34	67.7
North: Springs Rd														
7	L2	4	0	4	0.0	0.051	8.8	LOS A	0.0	0.3	0.07	0.06	0.07	86.4
8	T1	80	3	84	3.8	0.051	0.1	LOS A	0.0	0.3	0.07	0.06	0.07	97.2
9	R2	4	0	4	0.0	0.051	9.0	LOS A	0.0	0.3	0.07	0.06	0.07	85.9
Approach		88	3	93	3.4	0.051	0.9	NA	0.0	0.3	0.07	0.06	0.07	96.1
West: Robinsons Rd														
10	L2	11	1	12	9.1	0.065	12.2	LOS B	0.2	1.7	0.51	0.97	0.51	66.2
11	T1	22	3	23	13.6	0.065	14.0	LOS B	0.2	1.7	0.51	0.97	0.51	64.7
12	R2	5	0	5	0.0	0.065	13.5	LOS B	0.2	1.7	0.51	0.97	0.51	68.8
Approach		38	4	40	10.5	0.065	13.4	LOS B	0.2	1.7	0.51	0.97	0.51	65.6
All Vehicles		587	21	618	3.6	0.236	2.4	NA	0.2	1.7	0.09	0.18	0.09	91.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Springs Robinsons AM Plus Plan Change (Site Folder: General)]

With Plan Change Model
Site Category: Existing Design
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Springs Rd														
1	L2	12	0	13	0.0	0.341	8.4	LOS A	0.2	1.1	0.02	0.03	0.02	87.7
2	T1	590	11	621	1.9	0.341	0.0	LOS A	0.2	1.1	0.02	0.03	0.02	98.9
3	R2	11	1	12	9.1	0.341	8.8	LOS A	0.2	1.1	0.02	0.03	0.02	82.4
Approach		613	12	645	2.0	0.341	0.4	NA	0.2	1.1	0.02	0.03	0.02	98.3
East: Robinsons Rd														
4	L2	22	0	23	0.0	0.136	10.4	LOS B	0.5	3.4	0.51	0.95	0.51	65.6
5	T1	33	3	35	9.1	0.136	19.0	LOS C	0.5	3.4	0.51	0.95	0.51	62.8
6	R2	4	0	4	0.0	0.136	19.6	LOS C	0.5	3.4	0.51	0.95	0.51	65.4
Approach		59	3	62	5.1	0.136	15.8	LOS C	0.5	3.4	0.51	0.95	0.51	64.0
North: Springs Rd														
7	L2	5	0	5	0.0	0.125	10.6	LOS B	0.2	1.3	0.10	0.06	0.10	86.0
8	T1	185	24	195	13.0	0.125	0.3	LOS A	0.2	1.3	0.10	0.06	0.10	96.7
9	R2	11	0	12	0.0	0.125	10.6	LOS B	0.2	1.3	0.10	0.06	0.10	85.6
Approach		201	24	212	11.9	0.125	1.1	NA	0.2	1.3	0.10	0.06	0.10	95.7
West: Robinsons Rd														
10	L2	12	0	13	0.0	0.123	13.3	LOS B	0.4	3.0	0.70	1.01	0.70	64.3
11	T1	26	2	27	7.7	0.123	18.5	LOS C	0.4	3.0	0.70	1.01	0.70	62.0
12	R2	7	0	7	0.0	0.123	19.9	LOS C	0.4	3.0	0.70	1.01	0.70	64.1
Approach		45	2	47	4.4	0.123	17.3	LOS C	0.4	3.0	0.70	1.01	0.70	62.9
All Vehicles		918	41	966	4.5	0.341	2.4	NA	0.5	3.4	0.10	0.14	0.10	92.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.