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Integrated Transport Assessment

Prepared for

HUGHES DEVELOPMENTS LIMITED

Faringdon Oval
Rolleston

January 2022

Integrated Transport Assessment
Prepared for

Hughes Developments Limited

Faringdon Oval
Rolleston

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Document Date:	**31/01/2022**
Document Version/Status:	Revision 5 | FINAL
Project Reference:	033021
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Introduction

1. Hughes Developments Limited commissioned Novo Group to prepare an Integrated Transport Assessment (ITA) of a site in Rolleston referred to as the 'Faringdon Oval'. This will form part of the Fast-Track application for the site. The site comprises several lots – 597 East Maddisons Road, Goulds Road, 92 Dunns Crossing Road, 108 Dunns Crossing Road, 144 Dunns Crossing Road and 130 Dunns Crossing Road.

2. This report provides an assessment of the transport aspects of the proposed development. It describes the transport environment in the vicinity of the site, the transport related components of the proposal and identifies any transportation issues associated with the proposed development. This includes any likely changes in travel patterns. The assessment also examines any potential adverse effects and whether these can be mitigated. The report has been prepared broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research report 422, November 2010.

3. The site location is illustrated in **Figure 1**. The proposed Concept Plan for the site is contained in **Appendix 1**.

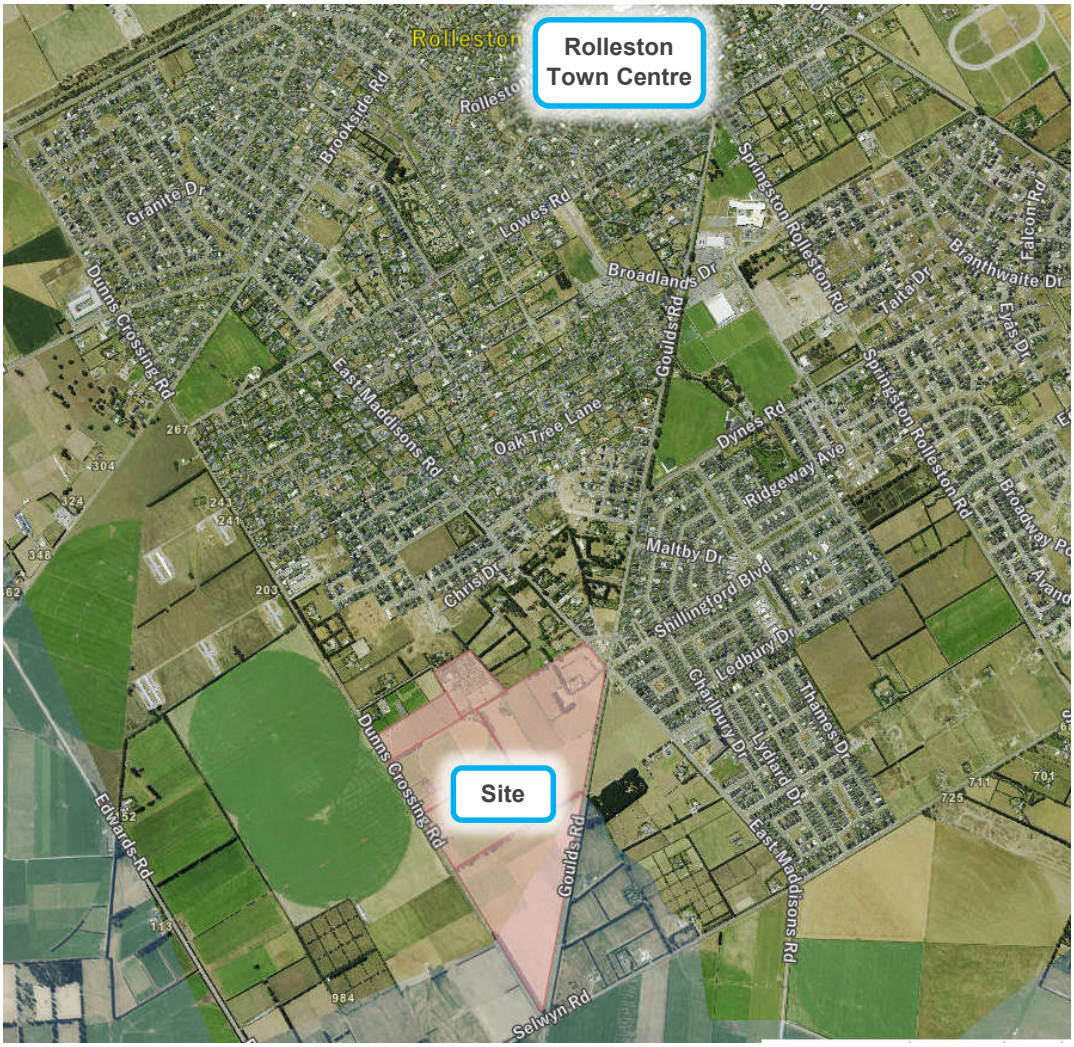


Figure 1: Site location (source: Canterbury maps)

Transport Environment

Road Network

4. The site is located approximately 3.0 km south of Rolleston's town centre. Dunns Crossing Road runs along the western side of the site with Goulds Road to the east. North of the site there are some large rural properties as well as a suburban subdivision. To the east, there is some frontage with East Maddisons Road. Selwyn Road is the main arterial road to the south of the site. These roads are shown below in **Figure 2**.

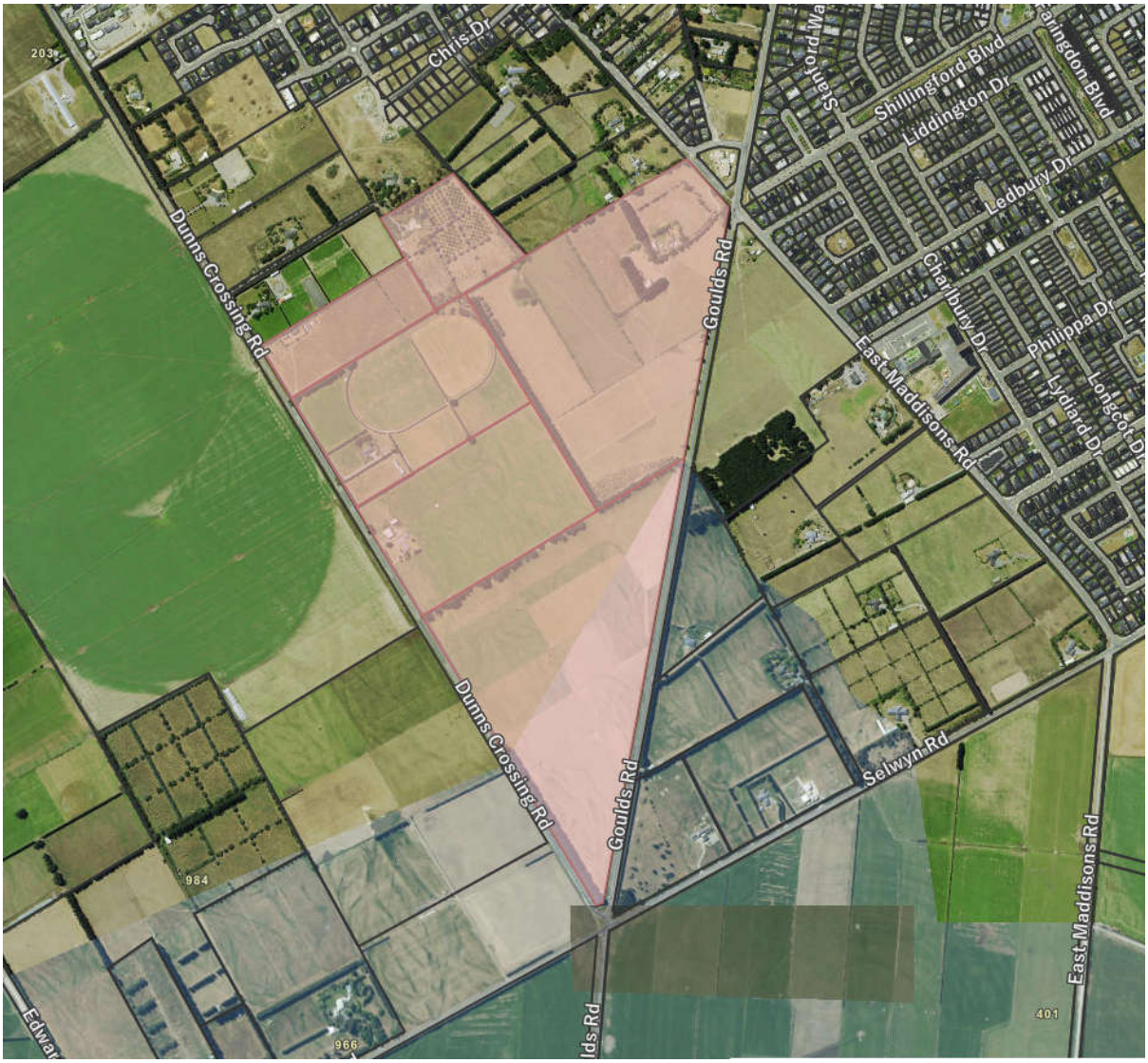


Figure 2: Roads Adjacent to the Site (source: Canterbury maps)

5. The key characteristics of adjacent roads are summarised below in **Table 1**.

Dunns Crossing Road and Selwyn Road

Table 1: Road characteristics – Dunns Crossing Road and Selwyn Road

Key Feature or Characteristic	Dunns Crossing Road	Selwyn Road
Road Classification	Operative District Plan: Local Road (south of Lowes Road). Proposed District Plan: Local Road (south of Lowes Road) on the Planning Map; however, it is classified as an Arterial Road in Road Hierarchy Table APP2.	Arterial
Cross section Description	20 m road reserve. Grass verge. 7.0m (approx.) sealed carriageway, 3.5m lane in each direction separated by a painted centreline. 1.0m approximately either side unsealed shoulder. No edge line markings.	20 m road reserve. Grass verge. 6.5 m (approx.) sealed carriageway, 3.25 m lane in each direction separated by a painted centreline. No edge line markings.
Road features	Straight alignment with grass verges/scrub either side (range from 1-3 m) with power poles on the west side.	Straight alignment with grass verges either side (range from 6-8 m) with power poles on the north side.
Traffic Volumes	1,602 vehicles per day (vpd) (Sept 2019).	638 vpd (2019).
Posted Speed Limit	The speed limit is 80 km/h north from Selwyn Road but then reduces to 60km/h from 130 Dunns Crossing Road.	80 km/h between Dunns Crossing Road and East Maddisons Road but then reduces to 60 km/h.
Cycling Infrastructure	None	None
Pedestrian Infrastructure	None	None
Public Transport	There are currently no public transport routes passing the site.	There are currently no public transport routes passing the site.
Other Notes	At the southern end, Dunns Crossing Road joins as a T-intersection to Goulds Road.	Selwyn Road has priority over East Maddisons Road and Goulds Road.

Notes:
All traffic volumes are from RAMM and provided by SDC (Selwyn District Council).
In the Proposed District Plan, Dunns Crossing Road is classed as a local road on the digital map, however it is tabled as an arterial road within Part 4 - APP2.[1]

[1] https://eplan.selwyn.govt.nz/review/#Rules/0/492/1/0/0

Goulds Road and East Maddisons Road

Table 2: Road characteristics – Goulds Road and East Maddisons Road (north and south of Goulds Road)

	Goulds Road	East Maddisons Road (north)	East Maddisons Road (south)
Road Classification	Collector	Collector	Collector
Cross section Description	20 m road reserve Grass verge 7 m (approx.) sealed carriageway, 3.5 m lane in each direction separated by a painted centreline.	20 m road reserve. 10 m (approx.) carriageway (kerb to kerb), 5.0 m lane in each direction separated by a painted centreline. Unrestricted (unmarked) kerbside parking on both sides, north of 600 East Maddisons Road. The road width reduces to 9 m on the approach to Goulds Road after Rangatira Street. Footpaths on both sides of East Maddisons Road up to 600 East Maddisons Road. Footpaths range in width from 1.5 m – 2.5 m. The footpath then extends further on the east side up to 610 East Maddisons Road. Verge between the footpath and the kerb.	20 m road reserve. 11 m (approx.) carriageway (kerb to kerb), 5.5m lane in each direction separated by a painted centreline. Unrestricted (unmarked) kerbside parking on both sides. 1.5 m footpath along the east side of the road with a verge between the footpath and the kerb. Verge approximately 4 m in width on the west side of the road.
Traffic Volumes	984 vpd (July 2020)	2,026 vpd (July 2020)	2,026 vpd (July 2020)
Posted Speed Limit	80 km/h north from Selwyn Road but then changes to 60 km/h just south of the intersection with East Maddisons Road.	60 km/h north of Goulds Road but then changes to 50km/h just north of Fairbairn Road.	60 km/h between Selwyn Road and Goulds Road.
Cycling Infrastructure	None	None	None
Pedestrian Infrastructure	None	Sealed footpaths provided on both sides of the road. Several uncontrolled pedestrian crossing points along and across East Maddisons Road that includes at the intersection with Goulds Road. These all have tactile paving.	Sealed footpath provided on east side of road. Several uncontrolled crossings along the east side of Maddisons Road. No tactile paving. No uncontrolled crossings over East Maddisons Road.
Public Transport	There are currently no public transport routes passing the site.	There are currently no public transport routes passing the site.	There are currently no public transport routes passing the site.
Other Notes	Goulds Road has priority over East Maddisons Road and Dunns Crossing Road.	Give-way controlled priority intersection with Goulds Road. Goulds Road has priority.	Stop controlled priority intersection with East Maddisons Road. Goulds Road has priority.

	No stopping lines on both sides of the road south from 600 East Maddisons Road. There is a short access road on the bend (Rangatira Street) to some on street parking bays. This section was formerly East Maddisons Road before the realignment.	The east side of the road is characterised by multiple driveways, but the western side is undeveloped. However, there is a private plan change in progress for this undeveloped site to convert to Living Z zone.

Note: All traffic volumes are from RAMM and provided by SDC.

6. The southern end of Dunns Crossing Road joins Goulds Road approximately 15m north of Selwyn Road. This is controlled by a give-way control with priority afforded to traffic on Goulds Road as shown in **Figure 3**. To the west of this intersection the speed limit increases to 100 km/h along Selwyn Road.

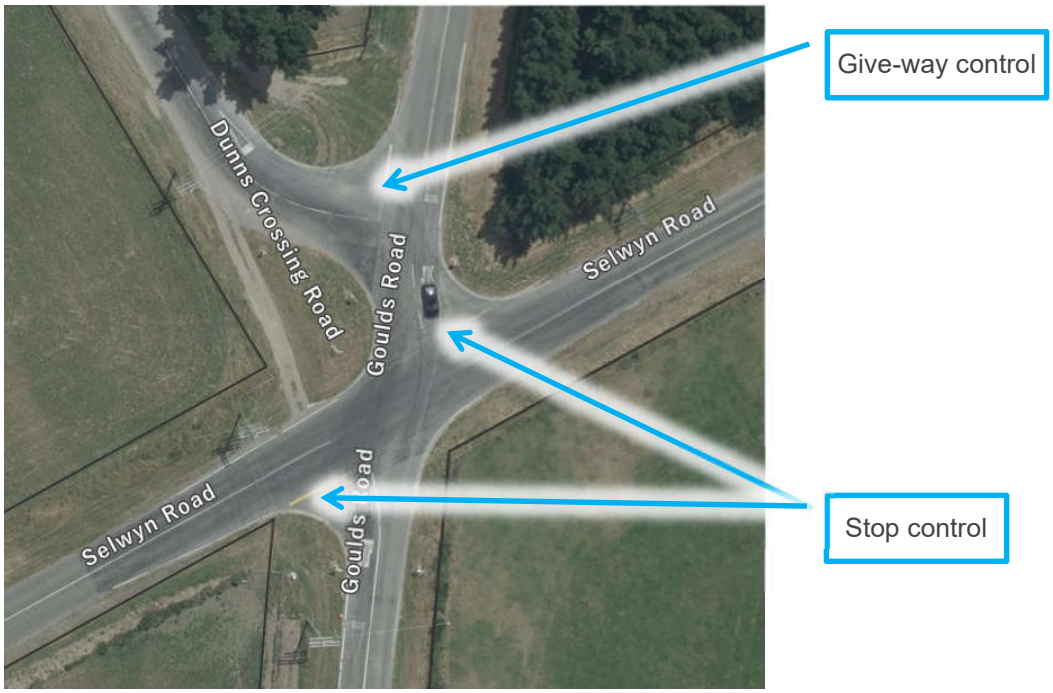


Figure 3: Dunns Crossing Road/Goulds Road and Selwyn Road intersection (source: Canterbury Maps)

7. The Goulds Road (north and south) approaches connect with Selwyn Road on an approximate 60-degree angle.

8. To the east of the proposed site, East Maddisons Road has been re-orientated to provide a set of two staggered-T-intersections as shown in **Figure 4**. Note that Rangatira Street has been created in place of the previous East Maddisons Road, however, this does not connect with Goulds Road.

Figure 4: Goulds Road/ East Maddisons Road T-intersections (source: Canterbury Maps)

Crash History

9. The NZ Transport Agency Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported within proximity of the site's road frontages for the five-year period ending 9 December 2021. In total, 12 crashes were identified, as shown in **Figure 5**.

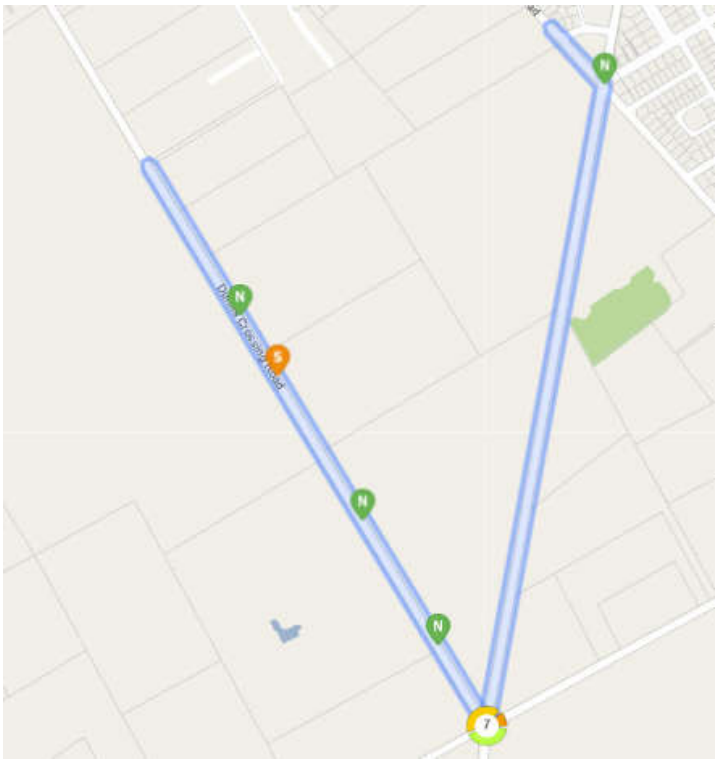


Figure 5: CAS database study area and results

10. **Figure 6** illustrates the collision diagram for the study area.

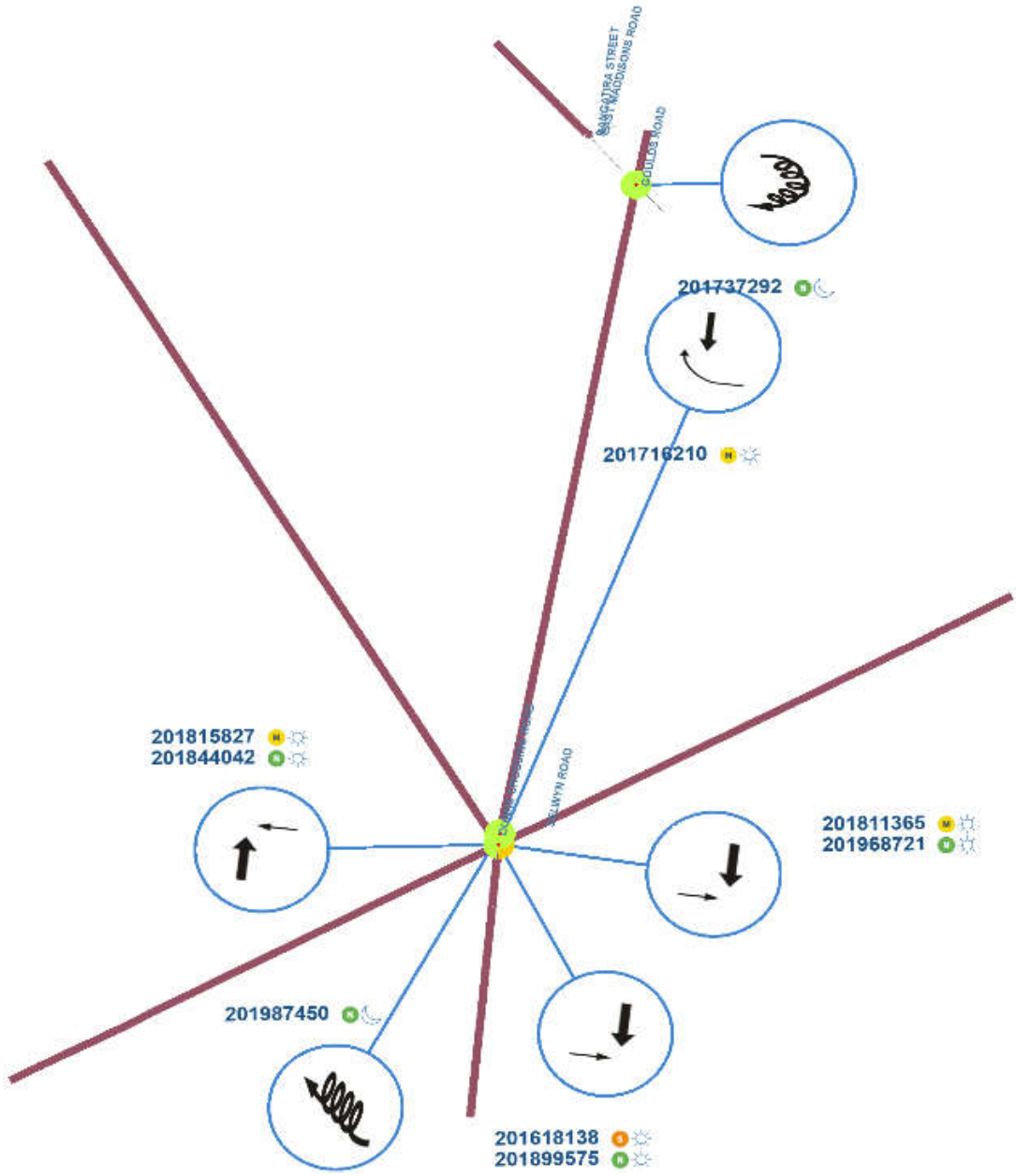


Figure 6: Collision diagram of crashes at Selwyn Road/Goulds Road and along Dunns Crossing Road.

11. The different road frontages have been assessed individually for any trends in the types of crashes:

Dunns Crossing Road

12. Three crashes reported with only one resulting in an injury, which was serious. However, this is suspected of being alcohol related. Among the other two crashes, one was related to speeding and inexperience and the other involved someone learning to drive who panicked. All three were related to losing control.

13. <u>Key trend(s) observed:</u> Losing control was a key factor in all the crashes, which may be related to speed.

East Maddisons Road/Goulds Road

14. Only one crash reported, which was non-injury. This involved losing control on a bend as driving too fast when turning right from Goulds Road into East Maddisons Road (North), however, the East Maddisons Road intersection has since changed to a new realignment.

15. Key trend(s) observed: None.

Dunns Crossing Road/Goulds Road

16. Only one crash reported, which was non-injury. This was done on purpose.

Key trend(s) observed: None.

Selwyn Road

17. Seven crashes were reported at the intersection of Selwyn Road and Goulds Road. The general details of the crashes are listed below in **Table 3**.

Table 3: Crashes at the intersection of Selwyn Road and Goulds Road in the last 5 years

Direction travelling	Factor	Type of Injury
Vehicle from Goulds Road North	Failure to see vehicle from Selwyn Road East	Minor
Vehicle from Goulds Road North	Failure to see vehicle from Selwyn Road East due to sunstrike	Non-injury
Vehicle from Goulds Road North	Failure to see vehicle from Selwyn Road East	Non-injury
Vehicle from Goulds Road North	Failure to stop at intersection. Tourist not familiar with conditions	Serious
Vehicle from Goulds Road North	Failure to see vehicle from Selwyn Road East	Minor
Vehicle from Goulds Road South	Failure to give-way to vehicle from Selwyn Road West	Non-injury
Vehicle from Goulds Road South	Failure to see vehicle from Selwyn Road East due to sunstrike	Minor

Key trend(s) observed:

(1) Failure to see vehicles driving westbound along Selwyn Road (North).

(2) Failure to see vehicles driving westbound along Selwyn Road due to sunstrike.

(3) Failure to stop at the stop-controlled intersection from Goulds Road (North and South).

Note that all crashes only resulted in minor injuries with the one serious injury related to a tourist failing to stop, likely due to being unfamiliar with the conditions.

Non-Car Modes of Transport

18. The site is located on the edge of the current urban development of Rolleston, on a greenfield site. Footpaths are typically aligned with the extent of development. Accordingly, there is limited infrastructure in the area for non-car modes. There is a small section of footpath (approximately 130m in length) adjacent to the site along East Maddisons Road and Rangatira Street, north of Goulds Road. This was presumably built following the realignment of East Maddisons Road on the north side of Goulds Road.

19. The nearest subdivision is Faringdon (located on the eastern side of Goulds Road and East Maddisons Road), which has a footpath along the eastern side of East Maddisons Road.

20. We are aware of two consented subdivisions to the east of the site on the south-eastern side of Goulds Road and to the south-west of East Maddisons Road as shown in **Figure 7**. The housing is proposed on two blocks of land referred to as Faringdon South East and Faringdon South West. These have been processed as fast track projects.

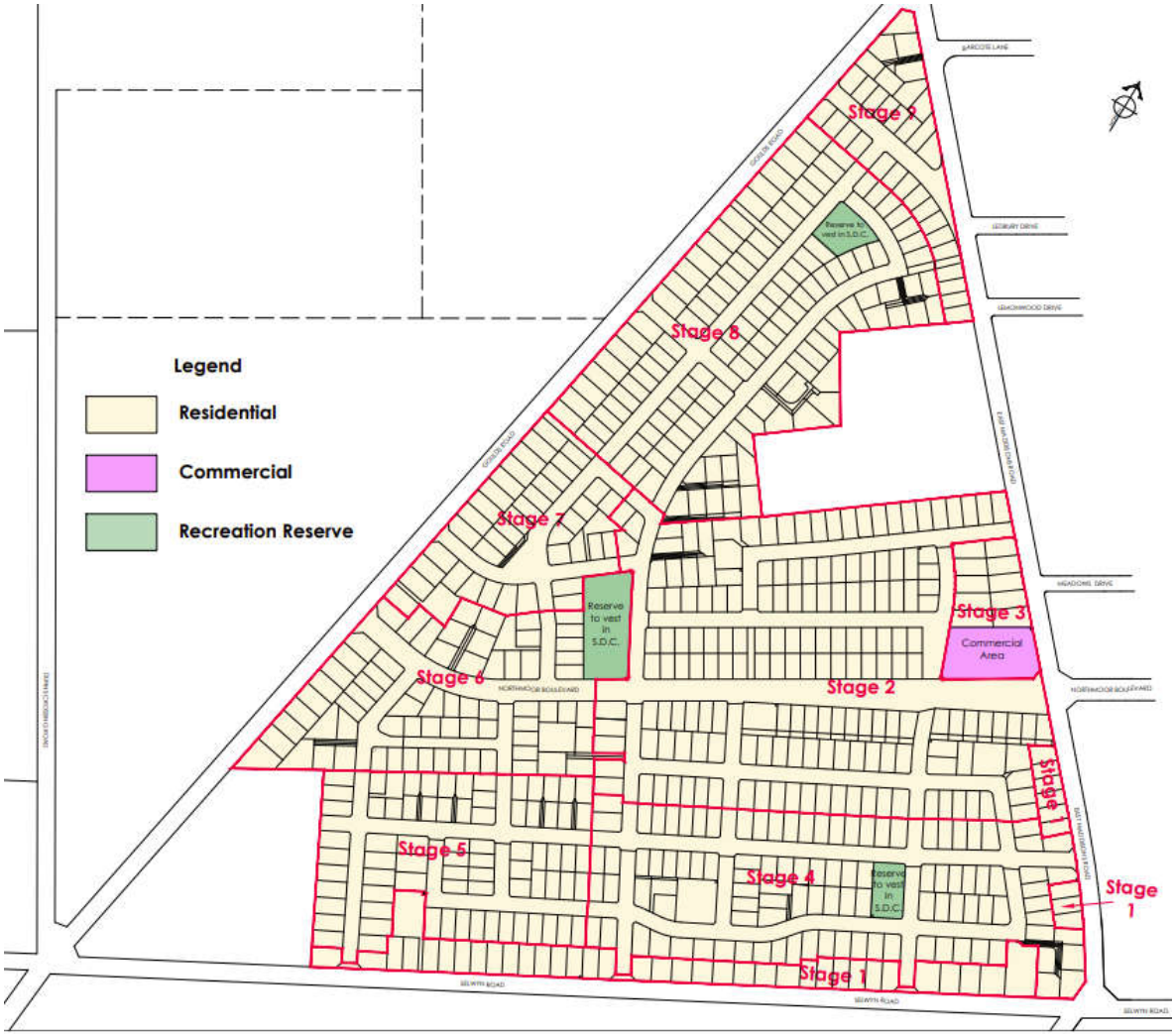


Figure 7: Faringdon South East and Faringdon South West Fast Track Projects (East of the Proposed Site).

Future Changes to Land Use Infrastructure

Rolleston Structure Plan

21. A Structure Plan for Rolleston was set out in 2009 that demonstrated how existing and future development could be integrated to maximise sustainable development outcomes. The Structure Plan was intended to provide some high-level principles to guide growth.

22. **Figure 8** illustrates the future road network outlined in the Structure Plan, in relation to the site. It clearly indicates a primary east-west route through the site that links Dunns Crossing Road with Goulds Road and East Maddisons Road. The middle/eastern portion of this road has already been constructed within the adjoining Faringdon subdivision and is known as Shillingford Boulevard. It is understood that a roundabout is ultimately proposed at the intersection of this road and Goulds Road.

Figure 8: Rolleston Structure Plan – Main Roads – Primary Network (source: Rolleston Structure Plan 2009[2])

23. The Structure Plan also proposes 'local secondary roads' across the site that extend between Dunns Crossing Road and Goulds Road.

24. The nearest cycle routes proposed are along Dunns Crossing Road (north to south) and Selwyn Road (east to west) as indicated in **Figure 9**. There is another east to west link proposed further north of the site that connects Dunns Crossing Road and Goulds Road.

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

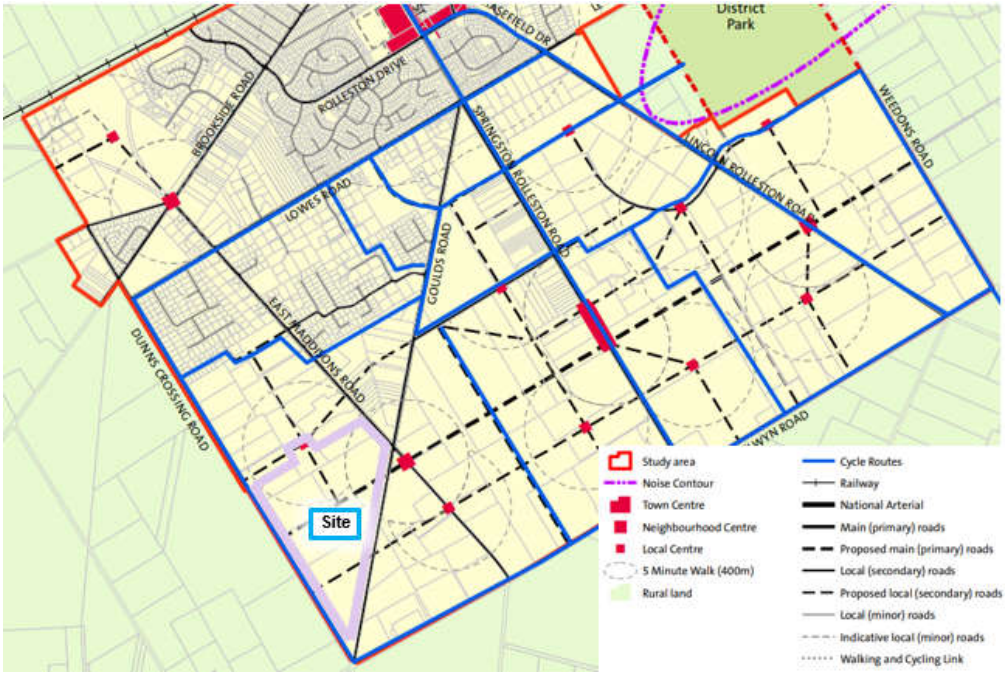


Figure 9: Rolleston Structure Plan – Cycleway Routes (source: Rolleston Structure Plan 2009)

25. For public transport provision, the expected development of bus service routes is indicated in **Figure** 10. This is only indicative and dependent on development; however, it suggests that the primary east to west link could have a 'potential service' with it operating through the site. In addition, an 'orbital service' may operate adjacent to the site. Accordingly, the site is likely to be well served by public transport.

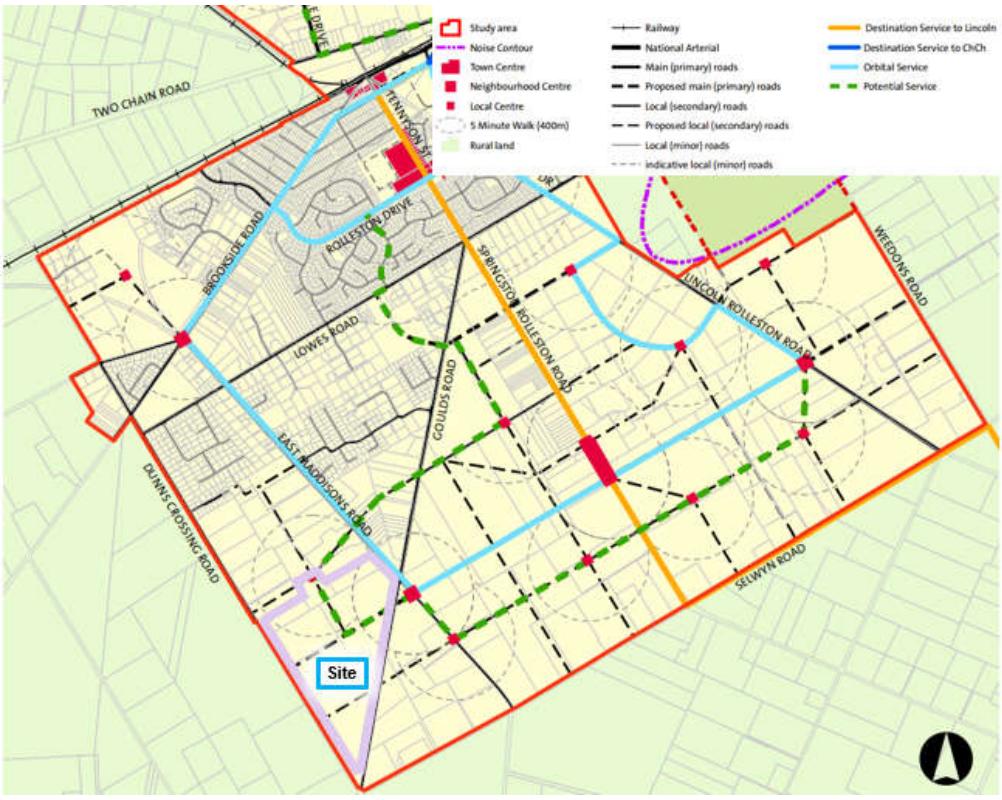


Figure 10: Rolleston Structure Plan – Public Transport Route Patterns (source: Rolleston Structure Plan 2009)

Land Use Changes

26. We are also aware that various Plan Changes are being lodged in the vicinity of this site that will lead to additional traffic on the surrounding road network. That said, the status of those Plan Changes is not certain (i.e. they have not been approved) and the adoption of the 2028 Paramics model forecasts is considered to be a reasonable basis for the future environment until such time as the status of other Plan Changes applications has been determined.

Current and Future Transportation Patterns

27. There is significant ongoing development in Rolleston and in the vicinity of the proposed Subdivision Plan for the site. Conducting traffic counts along the relevant roads will not accurately assess the appropriate impact. SDC therefore appointed a consultant to manage and maintain a Paramics model for Rolleston. The full Paramics model network is shown below in **Figure 11** from which volumes were extracted from. AM and PM peak traffic volumes were provided for the future forecast year of 2028.

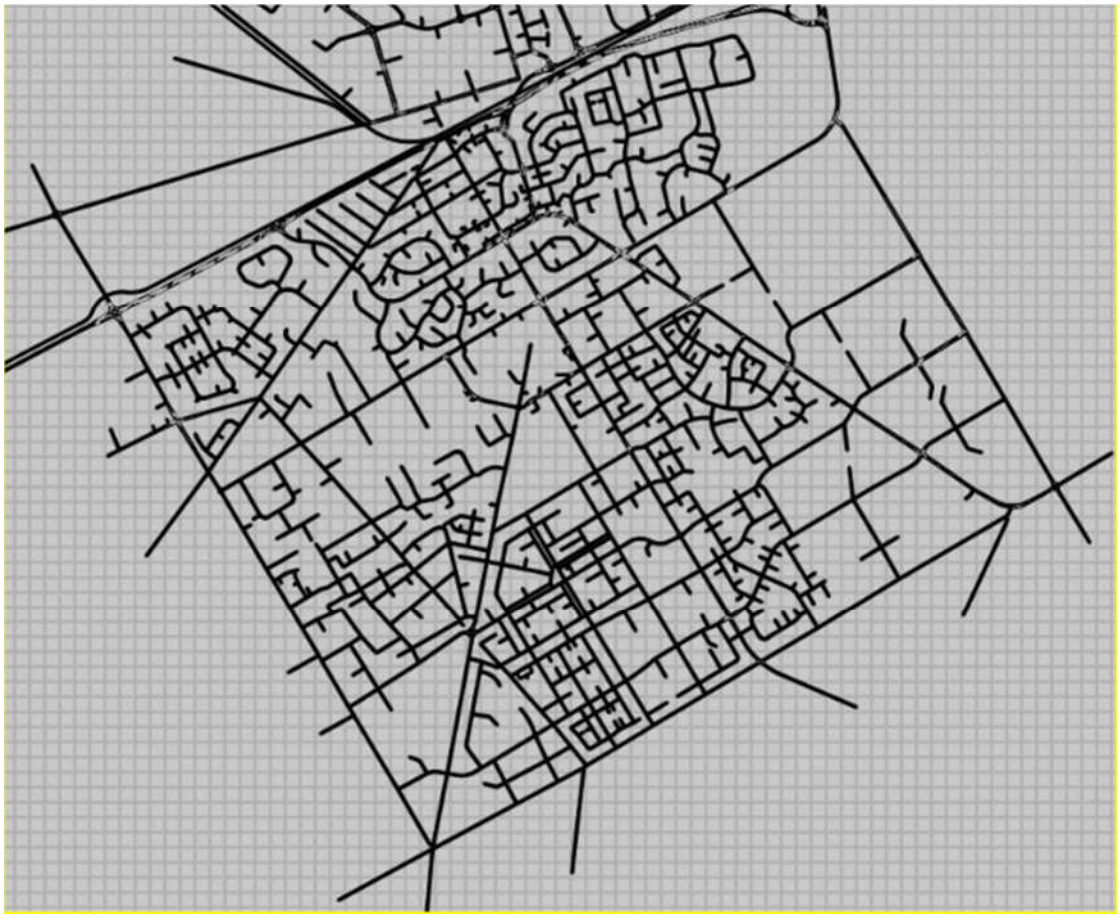


Figure 11: 2028 Paramics Network Model for Rolleston

28. The latest version of the Paramics model used was released in the week commencing 2/11/2020.

Model Volumes and Assumptions

29. The turning volumes from the Paramics model are included within **Appendix 2**. The model includes the following assumptions:

- A proposed roundabout at Goulds Road and East Maddisons Road has been added into the 2028 model.

- The modelling assumes all primary and secondary connectors illustrated in the Faringdon Far West plan provided are complete by 2028.

- The 2028 model assumes that 25% of development in the Future Urban Development Areas (which includes Faringdon Oval) will be complete. This development is assumed to be evenly spread across each Future Urban Development Area.

- Household trip rates are not specifically calibrated in the model – instead they are passed down from matrices from the CAST model.

Proposal

30. The proposal is for a residential zone providing 1,050 lots, based on 15 households per hectare across the 70-hectare block. The proposed Concept Plan is illustrated in **Appendix 1**.

31. Unless otherwise stated, it is proposed to adopt the transport provisions of the Operative District Plan.

32. The area will have several linkages to adjoining sites and that are in line with the Structure Plan for Rolleston. These include:

    - A primary east-west link through the site. This broadly aligns with that identified in the Structure Plan and will tie in with a proposed roundabout at the intersection of Shillingford Boulevard and Goulds Road.

    - A further primary north-south road (slightly curving) through the site linking with the other primary road (to the north) and ultimately Northmoor Boulevard (within the Faringdon South East and Faringdon South West Fast Track Projects area to the east).

    - Three local secondary roads connecting with Dunns Crossing Road.

    - Four local secondary roads connecting with Goulds Road.

    - Four local secondary roads connecting with land further to the north.

33. The road cross-sections are proposed to comply with the requirements of the District Plan. It is proposed that the roads identified on the Concept Plan would be constructed as either Local Major or Local Intermediate roads.

34. The Operative District Plan (ODP) requires intersections to have a minimum spacing of 75m for posted speed limits of 50km/h or less on local roads. Goulds Road and Dunns Crossing Road are classed as local roads by the ODP. Furthermore, as this is an emerging subdivision, coupled with urbanisation of the site and surrounding area (with development planned on both sides of Goulds Road and Dunns Crossing Road, the latter by way of Plan Changes), it is not unreasonable to assume that the posted speed limits along Goulds Road and Dunns Crossing Road will reduce to at least 50km/h when the area develops. In this respect, the 75m separation distance specified in the ODP is considered to be the most appropriate spacing in which to consider potential effects.

35. The smallest intersection distance along Goulds Road is 73m and along Dunns Crossing Road it is 140m. This minimum separation distance along Goulds Road and Dunns Crossing Road can be considered a safe and acceptable design.

36. Within the proposed subdivision, there are several intersections with separation distances less than 75m. In our opinion, the 75m separation distance is considered to be onerous – noting that for several existing intersections in the surrounding area (e.g. along Lemonwood Drive) the separation is less than 50m and along Maltby Drive it is less than 70m.

37. Along the two primary linkages through the site (i.e. Shillingford Boulevard and the north-south road that links up to Northmoor Boulevard), the minimum recommended separation distance is 70m. Drawing on guidance from Austroads[3], "*Desirably intersections should be separated by at least five seconds of travel time at the design speed to provide time for drivers to process information relating to traffic, the road layout and traffic signs".* Applying a (future) design speed of 50km/h, suggests that a minimum separation of at least 70m is recommended between successive intersections. This is achieved along both the primary roads within the subdivision apart from one location, which is planned to be rectified at the subdivision stage.

38. For the local secondary roads, the minimum recommended separation distance proposed is 56m. It is not unreasonable to assume that these narrower, urban roads will have reduced speeds more akin to 40km/h. Based on this design speed, a minimum separation distance of at least 56m is recommended to achieve five seconds of travel time. This is achieved across all the local secondary roads shown apart from two intersections, which will similarly be rectified at the subdivision stage.

39. Accordingly, with the rectification of three intersections on the Concept Plan at subdivision stage, all roads are considered as being able to accommodate an acceptable separation distance.

40. A series of shared paths (off road and on road) will be proposed through the site for pedestrians and cyclists.

Alignment with Adjacent Plan Changes and Fast Track Projects

41. We have examined the possible alignment of road connections between Faringdon Oval and the adjacent plan changes and Fast-Track projects as shown in **Figure 12**. PC73 and PC81 seek residential development along the western side of Dunns Crossing Road. Faringdon South East and Faringdon South West Fast-track projects have already been approved on the southeast side of Goulds Road. PC76 is located to the north and adjacent to the site.

[3] See Guide to Road Design Part 4: Intersections and Crossings (B.2.2 Proximity to Intersections)

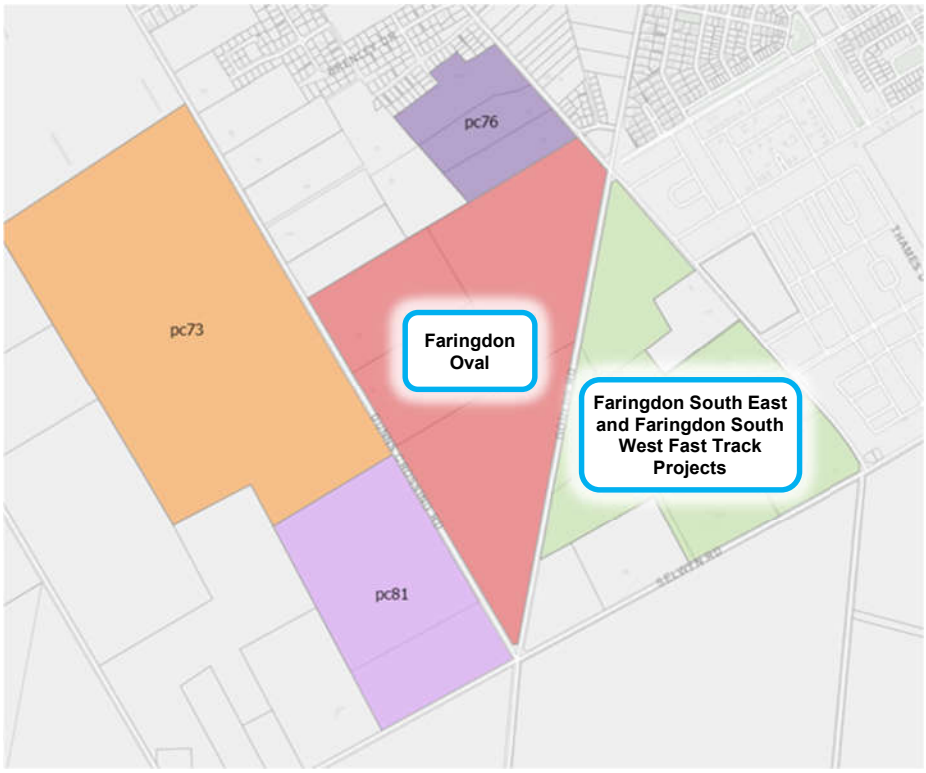


Figure 12: Adjacent Plan Changes and Fast-Track Projects in Relation to Faringdon Oval

42. In general, the main road connections between Faringdon Oval and adjacent plan changes/Fast-track projects align, as shown in **Appendix 1**. These are discussed below in turn. The intention is for roads to align between the adjacent sites and Faringdon Oval.

PC73

43. The Skellerup block adjacent to Faringdon Oval is located approximately 700m north of Selwyn Road and forms part of the PC73 area. There are two connections proposed from PC73 adjacent to Faringdon Oval. The northern link comprises a primary road and is generally aligned with the primary road from Faringdon Oval. The southern link (not shown on the plan) involves a minor road. The preference is for the southern link from PC73 to be aligned with the minor link from Faringdon Oval, and has therefore been modelled as a Stop-controlled cross junction for the purpose of this report.

44. As the main east-west connector road through Faringdon Oval is fixed (it ties in with the extension of Shillingford Boulevard and the proposed new roundabout at the intersection of Goulds Road and Shillingford Boulevard), it is recommended that the main access road, from the Skellerup block, is aligned with the main east-west connector road.

45. The following forms of intersection are proposed for the two links:

    i. Northern link – four arm roundabout (single circulating lane)

    ii. Southern link – priority cross-roads.

PC81

46. The Skellerup South block forms part of PC81 and proposes two intersections onto Dunns Crossing Road comprising a primary and a secondary road link. The primary link is expected to align with the new alignment proposed for Goulds Road, while the minor link is proposed to align with a local secondary road from Faringdon Oval.

47. Both intersections are expected to take the form of priority cross-roads.

PC76

48. The proposed ODP includes secondary road connectors on each main block face, thus two road connections are proposed with Faringdon Oval. One of these will link through to a secondary road that then joins the primary east-west link (Shillingford Boulevard).

Faringdon South East and Faringdon South West Fast Track Projects

49. Located to the southeast of the site, the consented development links to Goulds Road via three local secondary roads and one primary road link. Faringdon Oval aligns with the primary link and two of the three local secondary road links. In particular, the primary north-south road through the site aligns with Northmoor Boulevard to the east.

Traffic Generation and Distribution

50. Based on the NZ Transport Agency Research Report 453 (Trips and Parking Related to Land Use), and using the 85th percentile traffic generation rate, the traffic generation of the proposed activity (residential) is 0.9 vehicle movements per unit per peak hour and 8.2 vehicle movements per unit per day for outer suburban residential dwellings.

51. Applying those rates to the proposed 1,050 lots planned on the Concept Plan will lead to a traffic generation of 945 vehicle movements per hour at peak times and 8,610 vehicle movements per day.

52. In the morning peak, 80% of trips will be departing the development, with 65% arriving in the evening peak hour. These are typical splits for residential housing in the peak hours. The anticipated traffic generation is shown in **Table 4**.

Table 4: Traffic Generation (1,050 Lots)

Scenario	In	Out	Total
Morning Peak Hour	189	756	945
Evening Peak Hour	614	331	945
Daily	4,305	4,305	8,610

53. When the Total “Ins” and Total “Outs” from the model are compared to the projected development traffic for the site based on trip generation rates from the NZ Transport Agency Research Report 453, the volumes used in the modelling are 10% lower in the AM peak but 15% higher in the PM peak. This indicates that we have modelled a fair case. The comparison is shown in **Table 5**. Note that the Total Ins and Outs did not include traffic associated with the Goulds Road access so the development trips modelled in SIDRA are higher than anticipated.

Table 5: Comparison of Model vs NZTA 453 Trip Generation Rates

	Source	Total Ins	Total Outs	Total
Development trips based on NZ Transport Agency Research Report 453	AM Peak	189	756	945
	PM Peak	614	331	945
Development trips modelled	AM Peak	344*	508*	854*
	PM Peak	556*	528*	1,084*

Note: * The Total Ins and Outs did not include traffic using the Goulds Road access.

54. As the 2028 model assumes that development is only 25% complete for Future Urban Development Areas, the turning volumes related to site traffic have been multiplied by a factor of 4 for use in the SIDRA modelling. This ensures that full development traffic for the site has been included. The forecasted total traffic volumes at the three intersections to the Concept Plan are illustrated in **Figure 13**.

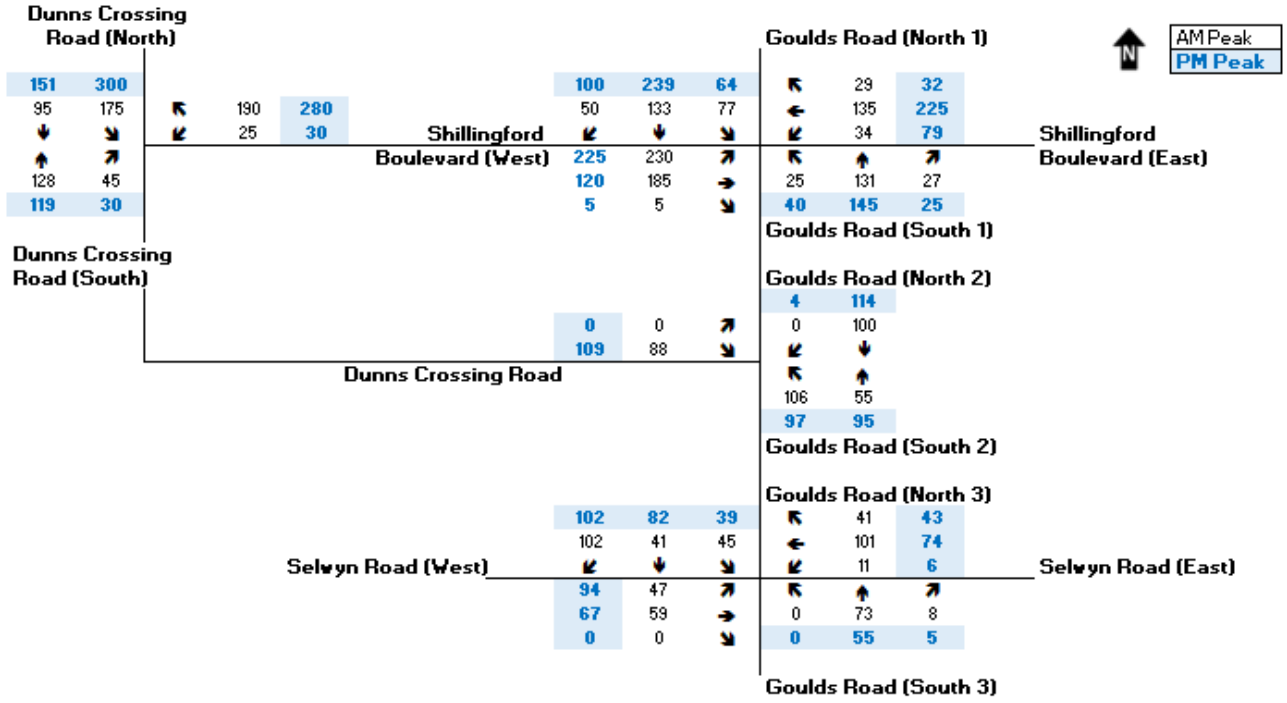


Figure 13: Projected Turning Volumes for 2028

55. Trip distribution for the site is based on that shown in the Paramics model. Without turning volumes for the Goulds Road access, only an indicative assumption can be drawn that the new roundabout at the intersection of Goulds Road and Shillingford Boulevard will accommodate a significant proportion of traffic related to the site with a high proportion expected to use Goulds Road North and Shillingford Boulevard East.

Effects on the Transportation Networks

Roading Network Capacity

56. The traffic effects of the proposed Concept Plan have been modelled using SIDRA 9.0 – an industry standard computer-based analysis tool for assessing the performance characteristics of an intersection.

57. The results presented in this report include the Level of Service ('LOS') provided by the intersection. LOS is a generalised function of delay where LOS A and B are very good and indicative of free-flow conditions; C is good; D is acceptable; and E and F are typically indicative of congestion and unstable conditions, although the former is sometimes accepted in the peak hour.

58. As there were no volumes provided for the baseline, we have only been able to model the future year 2028 scenario with 100% development traffic for the site.

59. Due to the proximity of Dunns Crossing Road/Goulds Road intersection with Goulds Road/Selwyn Road intersection, these were modelled as being linked as shown in **Figure 14**. Given the likely re-classification of Dunns Crossing Road as an arterial route, logic suggests that intersection rationalisation and improvements would have some merit in this location.

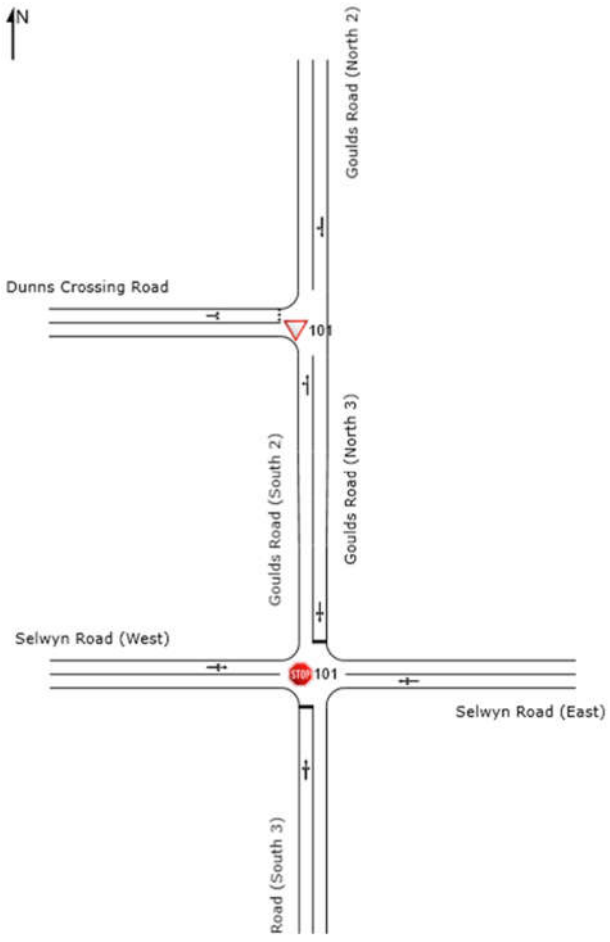


Figure 14: Layout Modelled for the Dunns Crossing Road/Goulds Road/Selwyn Road T-intersections

60. The SIDRA results are summarised below.

Table 6: SIDRA Results at the Dunns Crossing Road/Shillingford Boulevard T-intersection

Road and Movement	Turn	AM			PM		
		Avg Delay (s)	95 %tile Queue (veh)	Level of Service	Avg Delay (s)	95 %tile Queue (veh)	Level of Service
Dunns Crossing Rd South	R	5.6	1	A	6.6	1	A
Shillingford Blvd	L	4.9	1	A	5.7	2	A
	R	6.4	1	A	7.8	2	A
Dunns Crossing Rd North	L	4.6	0	A	4.6	0	A

Table 7: SIDRA Results at the Shillingford Boulevard/Goulds Road Roundabout

Road and Movement	AM			PM		
	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service
Goulds Road (South 1)	4.5	1	A	5.2	1	A
Shillingford Boulevard (East)	4.3	1	A	5.3	2	A
Goulds Road (North 1)	4.8	1	A	4.7	2	A
Shillingford Boulevard (West)	3.9	2	A	4.0	2	A

Table 8: SIDRA results at the Dunns Crossing Road/Goulds Road/Selwyn Road T-intersections

Road and Movement	AM			PM		
	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service
Goulds Road (South 2)	1.4	0	A	1.1	0	A
Goulds Road (North 2)	0.1	0	A	0.2	0	A

Dunns Crossing Road	5.4	1	A	5.7	1	A
Goulds Road (South 3)	10.0	1	A	10.1	1	B
Selwyn Road (East)	2.5	1	A	3.1	1	A
Goulds Road (North 3)	5.8	1	A	5.8	1	A
Selwyn Road (West)	3.1	0	A	4.1	0	A

61. The results indicate that the existing intersections at Goulds Road/Selwyn Road and Dunns Crossing Road/Goulds Road can support the level of development traffic proposed. LOS A are shown for the AM and PM peak periods.

62. All SIDRA modelling for the existing intersections is included in **Appendix 3**.

Access Arrangements and Roading Network

63. The engineering details of the proposed access arrangements are yet to be determined, although it is considered there will be sufficient space to accommodate satisfactory intersections. The intersections will be designed to comply with relevant design standards, including sight line requirements. These will also be subject to road safety audit requirements to confirm they are anticipated to operate safely.

64. Access to individual properties is also proposed to comply with the District Plan requirements. Any non-compliances will either be addressed at subdivision stage or addressed on an individual basis and the effects of this on safety and efficiency considered at that stage.

65. It is understood that the existing roading environment will be revised as a result of the development of the Subdivision Plan. The area will change from being rural to urban, so carriageways are expected to be widened alongside the implementation of kerbs and footpaths along all site frontages.

66. As the area urbanises, speed limits are envisioned to reduce along Goulds Road, East Maddisons Road and Dunns Crossing Road. It would be appropriate for the 80km/h speed limit to be lowered to at least 60km/h, to be consistent with East Maddisons Road and Dunns Crossing Road at the northern end.

67. Accordingly, the internal transport network is considered to be safe and efficient.

68. The District Plan rules regarding parking and loading will be adopted during development of the Subdivision Plan. This is sufficient to confirm that parking and loading will be satisfactorily provided for in a functional and practical manner.

Non-Car Modes of Transport

69. The proposed site will include a number of pedestrian and cycle links at the Subdivision Plan stage. These are proposed to connect with adjacent ODPs and Fast-Track Projects and, through detailed design. will be tailored to the satisfaction of Council at subdivision stage. At this stage, they are envisaged to be provided along the primary roads i.e. Shillingford Boulevard and Northmoor Boulevard (extended from the site to the east).

70. At subdivision stage, the plan will ensue that there are sufficient pedestrian and cycle links for access to the neighbourhood centre proposed to the east as well as linkages for those attending the new school along East Maddisons Road, south of Goulds Road. It is anticipated that many children will choose to walk to this school from the subdivision.

71. Any cycle routes across the site are expected to tie in with the cycle route proposed along Dunns Crossing Road.

72. The above is considered to be sufficient to confirm that the site has sufficient accessibility to a range of everyday facilities without the need to drive.

73. It is anticipated that the roads/footpaths/cycle infrastructure proposed within the subdivision stage will meet the Council's standards in terms of geometric design and cross section detail.

74. As the site is located on a 'possible bus service' route, the primary roads across the site (i.e. east west link – Shillingford Boulevard, and the north south link - extension of Northmoor Boulevard) will be designed to cater for any bus services through the site in the future. This includes the consideration of bus stops through the site. Goulds Road will also be upgraded to accommodate bus manoeuvring to and from proposed road connections.

Off-Site Improvements

75. Abley provided traffic turning volumes for the intersections proposed between Faringdon Oval and PC73 (Skellerup Block). The 2028 Paramics model was updated to include traffic generated by PC73 adjacent (see **Appendix 4**). The 2028 base model was used with the following infrastructure improvements:

- Lincoln Rolleston Road / Selwyn Road 'seagull'-type priority intersection (2028/29)
- Dunns Crossing Road / Burnham School Road signals (2029/30)
- Dunns Crossing Road / Lowes Road roundabout (2029/30).

76. With Faringdon Oval and PC73 added, the Paramics model was further updated to include the following changes:

- Updated lane designations on the SH1 / Dunns Crossing Road / Walkers Road and SH1 / Rolleston Drive Roundabouts.
- Rural roundabout at the intersection of Selwyn Road and Dunns Crossing Road, with Goulds Road realigned to meet Dunns Crossing Road at a priority intersection. This is per the RFI issued by SDC on Plan Change 70 to their District Plan. The roundabout is assumed to be single-lane with an inscribed circle diameter (ICD) of 30 metres.
- Rural roundabout at the intersection of Selwyn Road and Springston Rolleston Road, assumed to be single-lane with an ICD of 30 metres. This roundabout has been previously identified as a necessary temporary measure to enable development in southwest Rolleston until the CRETS collector road is complete.
- Urban roundabout at the intersection of Lowes Road and East Maddisons Road, assumed to be single-lane with an ICD of 20 metres.
- Traffic signals at the intersection of Dunns Crossing Road and Granite Drive.

- Internal road network for Faringdon Oval and PC73.
- Rural roundabout at the intersection of Faringdon Oval Main Site Access / Dunns Crossing Road / PC73 Main Site Access as per **Paragraph 45**.
- Priority cross-roads at the intersection of Faringdon Oval Minor Site Access / Dunns Crossing Road / PC73 Minor Site Access as per **Paragraph 45**.

77. As Faringdon Oval is part of Area 1 and PC64 (Faringdon) has been approved (forms part of Area 1), the Paramics 2028 model was updated to reflect the Urban Development Area 1 being 100% developed, while Areas 2 and 3 remain as 25% developed (as indicated in **Figure 15**).

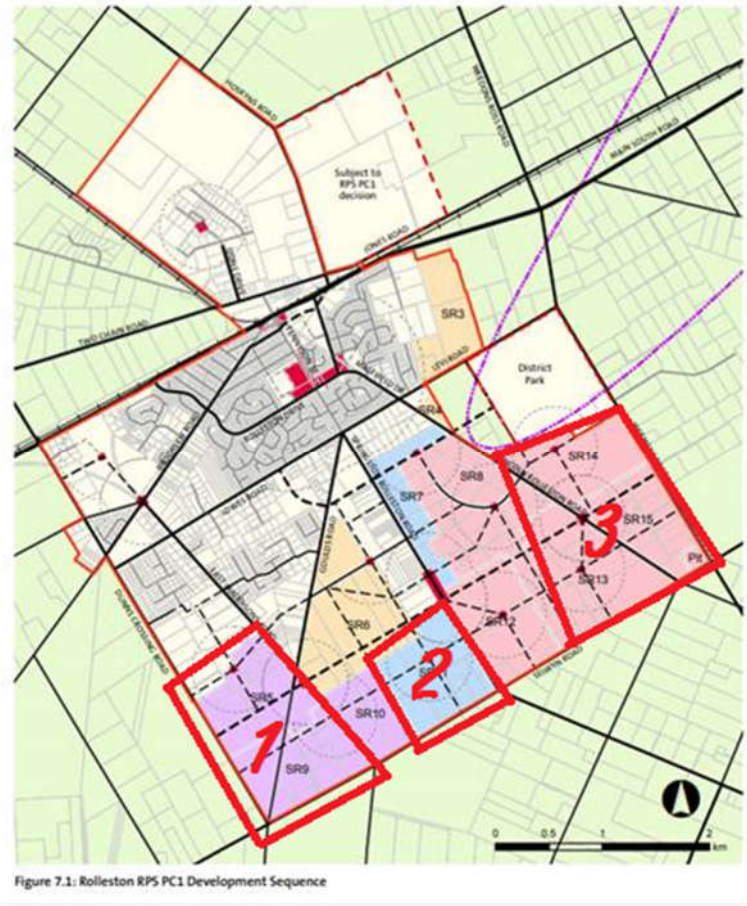


Figure 15: Future Urban Development Areas in the 2028 Paramics Model

78. Using the traffic volumes from the Paramics model, the two road connections between Faringdon Oval and PC73 were modelled using SIDRA 9.0. The layouts modelled are shown below in **Figure 16** and **Figure 17.**

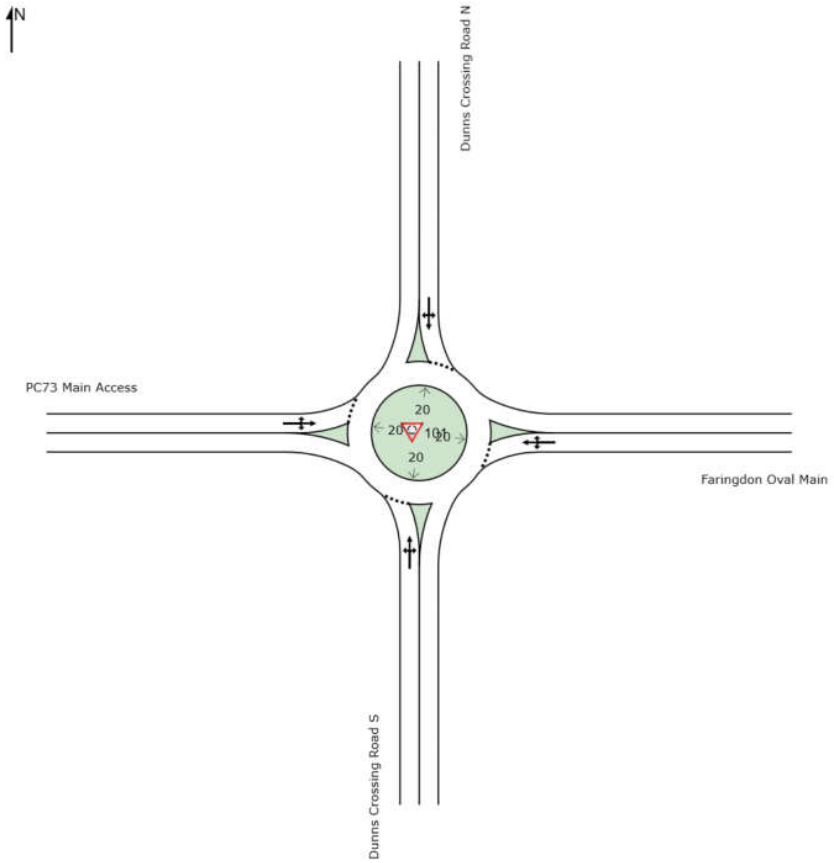


Figure 16: Layout Modelled for Faringdon Oval Main Site Access / Dunns Crossing Road / PC73 Main Site Access

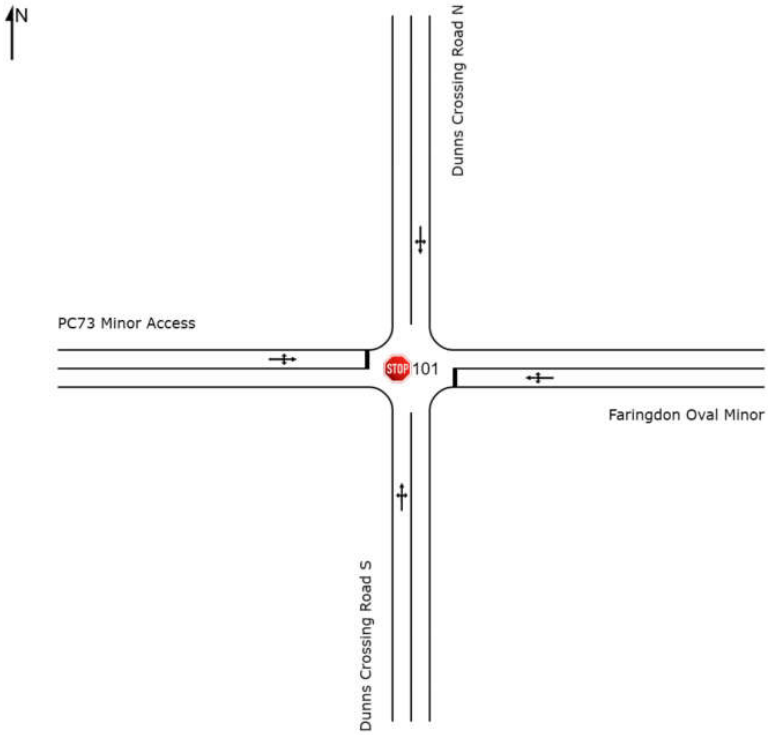


Figure 17: Layout Modelled for Faringdon Oval Minor Site Access / Dunns Crossing Road / PC73 Minor Site Access

79. The SIDRA results are summarised below in **Table 9** and **Table 10**. Note that volumes to and from the site have been increased by a factor of 1.25 to reflect that a housing density of 15 per hectare is proposed, whereas originally the density was 12 residential units per hectare.

Table 9: SIDRA Results (Year – 2028) at the Faringdon Oval Main Site Access/ Dunns Crossing Road / PC73 Main Site Access Roundabout

Road and Movement	AM			PM		
	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service
Dunns Crossing Rd South	5.4	2	A	5.2	2	A
Faringdon Oval Main Access	6.9	1	A	6.0	2	A
Dunns Crossing Rd North	5.2	2	A	4.7	2	A
PC73 Main Access	5.7	2	A	5.3	1	A

80. The results indicate that the proposed new roundabout (with a single circulating lane) on Dunns Crossing Road, linking Faringdon Oval and PC73 and where the main east-west link meets, can support traffic volumes at the intersection. The LOS is A across both the AM and PM peak periods.

Table 10: SIDRA Results (Year - 2028) at the Faringdon Oval Minor Site Access/ Dunns Crossing Road / PC73 Minor Site Access Cross-Roads Intersection

Road and Movement	AM			PM		
	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service
Dunns Crossing Rd South	0.8	0	A	1.0	1	A
Faringdon Oval Minor Access	10.9	1	B	11.3	1	B
Dunns Crossing Rd North	1.1	1	A	2.7	1	A
PC73 Minor Access	10.5	1	B	10.7	1	B

81. The results indicate that the proposed cross-roads intersection, where the minor approaches from each PC meet, can support the level of development traffic proposed in 2028, in the AM and PM peak. The highest LOS recorded being a B.

82. SDC has considered that the intersection of Selwyn Road / Dunns Crossing Road / Goulds Road intersection is upgraded to a roundabout. The layout modelled is shown below in **Figure 18**. The SIDRA results are summarised in **Table 11**.

Table 11: SIDRA Results (Year – 2028) at the Selwyn Road / Dunns Crossing Road / Goulds Road Roundabout

Road and Movement	AM			PM		
	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service
Goulds Road	6.5	1	A	6.8	1	A
Selwyn Road East	6.1	1	A	6.9	2	A
Dunns Crossing Road	5.8	3	A	6.0	2	A
Selwyn Road West	3.9	1	A	4.5	2	A

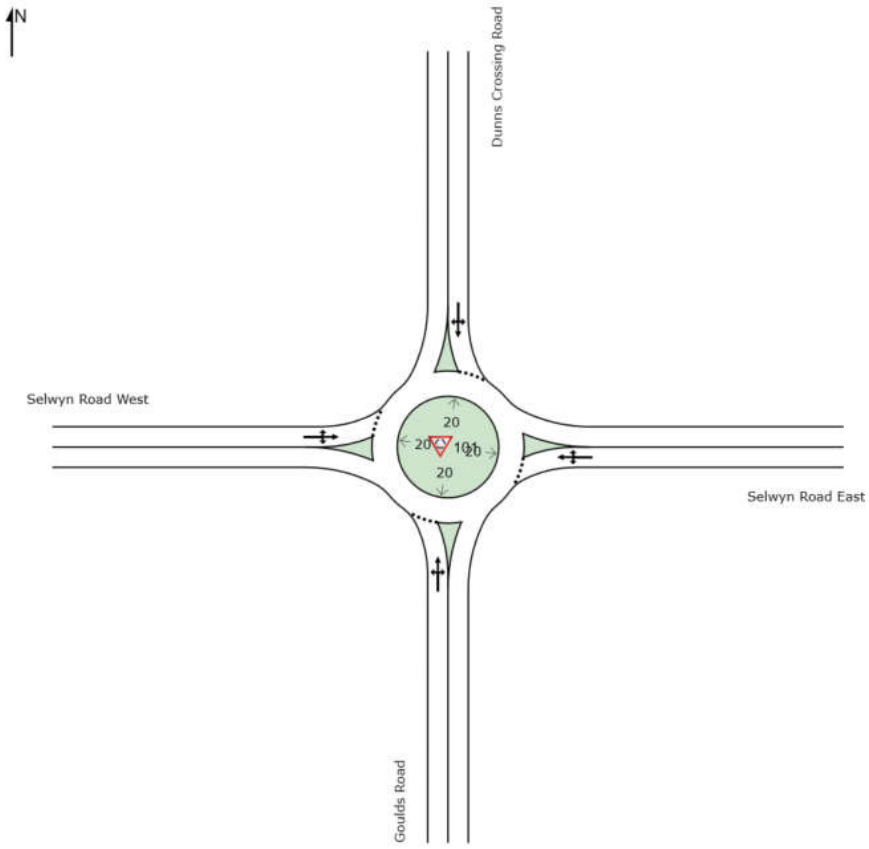


Figure 18: Layout Modelled for Selwyn Road / Goulds Road / Dunns Crossing Road Roundabout

83. The results indicate that the proposed new roundabout (with a single circulating lane) at the intersection of Dunns Crossing Road and Selwyn Road can support traffic volumes in 2028 with the LOS being A in both the AM and PM peak periods.

84. SIDRA modelling for the new and upgraded intersection is included in **Appendix 5.**

Summary and Conclusions

Summary

85. This Concept Plan would enable the development of up to 1,050 residential lots within the area.

86. The Concept Plan provides multiple access points from surrounding roads and connections with adjoining land. A primary road east-west is provided through the site which will ultimately connect with Shillingford Boulevard in the adjoining Faringdon subdivision. A further primary road will provide alternative access to a further east-west road link (Northmoor Boulevard) located to the south. A series of other local roads will provide connections for all modes such that a high level of accessibility is provided.

87. The traffic capacity of intersections proposed as offsite improvements were assessed to be acceptable for the development including traffic from PC73 proposed to the west and the Fast-track projects to the east (Faringdon South East and Faringdon South West). This includes the intersections of:

- Faringdon Oval Main Access and PC73 Main Access (roundabout) on Dunns Crossing Road
- Faringdon Oval Minor Access and PC73 Minor Access (crossroads) on Dunns Crossing Road
- Selwyn Road / Dunns Crossing Road / Goulds Road Roundabout

88. There will also be sufficient sight distance for these intersections to operate safely as they are all on straight sections of road.

89. The crash history at the intersection of Goulds Road/Selwyn Road will improve with the intersection upgrade at Selwyn Road / Dunns Crossing Road / Goulds Road.

90. The development of this land aligns well with the Rolleston Structure Plan.

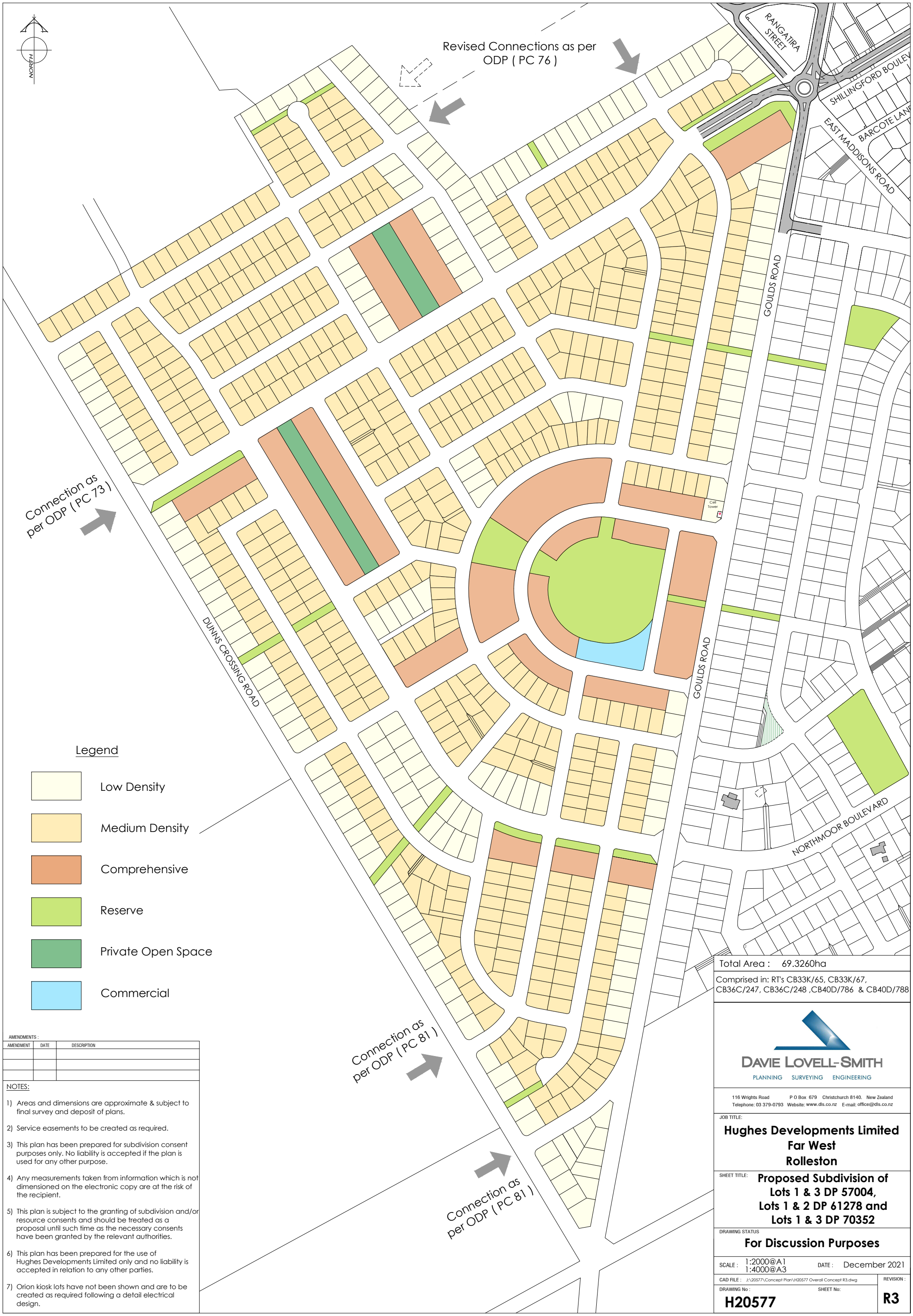
91. The transport provisions of the Operative District Plan (or Proposed District Plan) can be adopted at the subdivision and/or resource consent stages. No specific rules are required for any other transport purpose.

Conclusion

92. For the reasons discussed above, the proposed development of this site for residential purposes can be supported from a transport perspective.

Appendix 1

Concept Plan



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES:

1) Areas and dimensions are approximate & subject to final survey and deposit of plans.
2) Service easements to be created as required.
3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purpose.
4) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
5) This plan is subject to the granting of subdivision and/or resource consents and should be treated as a proposal until such time as the necessary consents have been granted by the relevant authorities.
6) This plan has been prepared for the use of Hughes Developments Limited only and no liability is accepted in relation to any other parties.
7) Orion kiosk lots have not been shown and are to be created as required following a detail electrical design.

Total Area : 69.3260ha

Comprised in: RT's CB33K/65, CB33K/67, CB36C/247, CB36C/248 ,CB40D/786 & CB40D/788

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JOB TITLE:

Hughes Developments Limited
Far West
Rolleston

SHEET TITLE: **Proposed Subdivision of Lots 1 & 3 DP 57004, Lots 1 & 2 DP 61278 and Lots 1 & 3 DP 70352**

DRAWING STATUS

For Discussion Purposes

SCALE : 1:2000@A1 1:4000@A3

DATE : December 2021

CAD FILE : J:\20577\Concept Plan\H20577 Overall Concept R3.dwg

REVISION : **R3**

DRAWING No : **H20577**

SHEET No:

Appendix 2

2028 Paramics Model Data – Initial Model with No Plan Changes and Limited Development

Dunns Crossing Rd / Faringdon East-West Link:

From	To	2028 AM		2028 PM	
		07:00 to 08:00	08:00 to 09:00	16:00 to 17:00	17:00 to 18:00
Dunns Crossing Rd N	Faringdon East-West Link	24	35	38	60
Dunns Crossing Rd N	Dunns Crossing Rd S	89	95	130	151
Faringdon East-West Link	Dunns Crossing Rd S	6	5	8	6
Faringdon East-West Link	Dunns Crossing Rd N	40	38	46	56
Dunns Crossing Rd S	Dunns Crossing Rd N	118	128	105	119
Dunns Crossing Rd S	Faringdon East-West Link	6	9	5	6

Goulds Rd roundabout:

From	To	2028 AM		2028 PM	
		07:00 to 08:00	08:00 to 09:00	16:00 to 17:00	17:00 to 18:00
Goulds Rd N	Faringdon East-West Link E	56	77	62	64
Goulds Rd N	Goulds Rd S	102	133	198	239
Goulds Rd N	Faringdon East-West Link W	10	10	19	20
Goulds Rd N	Goulds Rd N	0	0	1	1
Faringdon East-West Link E	Goulds Rd S	27	34	62	79
Faringdon East-West Link E	Faringdon East-West Link W	20	27	37	45
Faringdon East-West Link E	Goulds Rd N	20	29	32	32
Faringdon East-West Link E	Faringdon East-West Link E	0	1	0	1
Goulds Rd S	Faringdon East-West Link W	3	5	7	8
Goulds Rd S	Goulds Rd N	99	131	135	145
Goulds Rd S	Faringdon East-West Link E	19	27	21	25
Goulds Rd S	Goulds Rd S	0	0	0	0
Faringdon East-West Link W	Goulds Rd N	43	46	40	45
Faringdon East-West Link W	Faringdon East-West Link E	16	37	18	24
Faringdon East-West Link W	Goulds Rd S	1	1	1	1
Faringdon East-West Link W	Faringdon East-West Link W	0	0	1	1

Goulds Rd / Selwyn Rd / Dunns Crossing Rd intersections:

From	To	2028 AM		2028 PM	
		07:00 to 08:00	08:00 to 09:00	16:00 to 17:00	17:00 to 18:00
Goulds Rd N	Selwyn Rd E	24	24	18	20
Goulds Rd N	Goulds Rd S	18	22	35	42
Goulds Rd N	Selwyn Rd W	46	54	40	52
Goulds Rd N	Dunns Crossing Rd	1	0	2	4
Selwyn Rd E	Goulds Rd S	10	11	6	6
Selwyn Rd E	Selwyn Rd W	90	101	69	74
Selwyn Rd E	Dunns Crossing Rd	22	27	19	22
Selwyn Rd E	Goulds Rd N	10	14	20	21
Goulds Rd S	Selwyn Rd W	0	0	0	0
Goulds Rd S	Dunns Crossing Rd	48	48	23	28
Goulds Rd S	Goulds Rd N	23	25	23	27
Goulds Rd S	Selwyn Rd E	8	8	7	5
Selwyn Rd W	Dunns Crossing Rd	25	31	42	47
Selwyn Rd W	Goulds Rd N	12	16	43	47
Selwyn Rd W	Selwyn Rd E	60	59	73	67
Selwyn Rd W	Goulds Rd S	0	0	0	0
Dunns Crossing Rd	Goulds Rd N	0	0	0	0
Dunns Crossing Rd	Selwyn Rd E	23	21	20	19
Dunns Crossing Rd	Goulds Rd S	17	19	39	40
Dunns Crossing Rd	Selwyn Rd W	44	48	44	50

Appendix 3

SIDRA Reports – Existing Intersections

MOVEMENT SUMMARY

Site: 101 [DC Rd & S Blvd - 2028 - AM - FT (Site Folder: General)]

New Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Dunns Crossing Road South														
2	T1	128	1.0	135	1.0	0.104	0.4	LOS A	0.3	2.5	0.22	0.15	0.22	48.6
3	R2	45	1.0	47	1.0	0.104	5.6	LOS A	0.3	2.5	0.22	0.15	0.22	47.7
Approach		173	1.0	182	1.0	0.104	1.8	NA	0.3	2.5	0.22	0.15	0.22	48.4
East: Shillingford Blvd														
4	L2	25	1.0	26	1.0	0.237	4.9	LOS A	0.9	6.3	0.36	0.64	0.36	45.6
6	R2	190	1.0	200	1.0	0.237	6.4	LOS A	0.9	6.3	0.36	0.64	0.36	45.3
Approach		215	1.0	226	1.0	0.237	6.2	LOS A	0.9	6.3	0.36	0.64	0.36	45.3
North: Dunns Crossing Road North														
7	L2	175	1.0	184	1.0	0.150	4.6	LOS A	0.0	0.0	0.00	0.35	0.00	47.5
8	T1	95	1.0	100	1.0	0.150	0.0	LOS A	0.0	0.0	0.00	0.35	0.00	48.0
Approach		270	1.0	284	1.0	0.150	3.0	NA	0.0	0.0	0.00	0.35	0.00	47.7
All Vehicles		658	1.0	693	1.0	0.237	3.7	NA	0.9	6.3	0.18	0.39	0.18	47.1

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 [DC Rd & S Blvd - 2028 - PM - FT (Site Folder: General)]

New Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Dunns Crossing Road South														
2	T1	119	1.0	125	1.0	0.093	0.7	LOS A	0.3	2.1	0.25	0.13	0.25	48.7
3	R2	30	1.0	32	1.0	0.093	6.6	LOS A	0.3	2.1	0.25	0.13	0.25	47.8
Approach		149	1.0	157	1.0	0.093	1.9	NA	0.3	2.1	0.25	0.13	0.25	48.5
East: Shillingford Blvd														
4	L2	30	1.0	32	1.0	0.383	5.7	LOS A	1.9	13.2	0.48	0.79	0.59	44.9
6	R2	280	1.0	295	1.0	0.383	7.8	LOS A	1.9	13.2	0.48	0.79	0.59	44.5
Approach		310	1.0	326	1.0	0.383	7.6	LOS A	1.9	13.2	0.48	0.79	0.59	44.5
North: Dunns Crossing Road North														
7	L2	300	1.0	316	1.0	0.251	4.6	LOS A	0.0	0.0	0.00	0.36	0.00	47.4
8	T1	151	1.0	159	1.0	0.251	0.1	LOS A	0.0	0.0	0.00	0.36	0.00	47.9
Approach		451	1.0	475	1.0	0.251	3.1	NA	0.0	0.0	0.00	0.36	0.00	47.6
All Vehicles		910	1.0	958	1.0	0.383	4.4	NA	1.9	13.2	0.21	0.47	0.24	46.6

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 [S Blvd & G Rd - 2028 - AM - FT (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Goulds Road (South 1)														
1	L2	25	1.0	26	1.0	0.167	3.9	LOS A	0.9	6.5	0.42	0.48	0.42	46.6
2	T1	131	1.0	138	1.0	0.167	3.7	LOS A	0.9	6.5	0.42	0.48	0.42	47.7
3	R2	27	1.0	28	1.0	0.167	8.5	LOS A	0.9	6.5	0.42	0.48	0.42	48.0
Approach		183	1.0	193	1.0	0.167	4.5	LOS A	0.9	6.5	0.42	0.48	0.42	47.6
East: Shillingford Boulevard (East)														
4	L2	34	1.0	36	1.0	0.177	3.7	LOS A	1.0	7.2	0.41	0.47	0.41	46.7
5	T1	135	1.0	142	1.0	0.177	3.6	LOS A	1.0	7.2	0.41	0.47	0.41	47.8
6	R2	29	1.0	31	1.0	0.177	8.3	LOS A	1.0	7.2	0.41	0.47	0.41	48.0
Approach		198	1.0	208	1.0	0.177	4.3	LOS A	1.0	7.2	0.41	0.47	0.41	47.6
North: Goulds Road (North 1)														
7	L2	77	1.0	81	1.0	0.238	4.0	LOS A	1.4	10.1	0.45	0.51	0.45	46.5
8	T1	133	1.0	140	1.0	0.238	3.8	LOS A	1.4	10.1	0.45	0.51	0.45	47.6
9	R2	50	1.0	53	1.0	0.238	8.6	LOS A	1.4	10.1	0.45	0.51	0.45	47.8
Approach		260	1.0	274	1.0	0.238	4.8	LOS A	1.4	10.1	0.45	0.51	0.45	47.3
West: Shillingford Boulevard (West)														
10	L2	230	1.0	242	1.0	0.362	3.9	LOS A	2.4	17.2	0.46	0.48	0.46	46.9
11	T1	185	1.0	195	1.0	0.362	3.8	LOS A	2.4	17.2	0.46	0.48	0.46	48.0
12	R2	5	1.0	5	1.0	0.362	8.5	LOS A	2.4	17.2	0.46	0.48	0.46	48.3
Approach		420	1.0	442	1.0	0.362	3.9	LOS A	2.4	17.2	0.46	0.48	0.46	47.4
All Vehicles		1061	1.0	1117	1.0	0.362	4.3	LOS A	2.4	17.2	0.44	0.48	0.44	47.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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 [S Blvd & G Rd - 2028 - PM - FT (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Goulds Road (South 1)														
1	L2	40	1.0	42	1.0	0.217	4.8	LOS A	1.3	9.2	0.56	0.57	0.56	46.2
2	T1	145	1.0	153	1.0	0.217	4.6	LOS A	1.3	9.2	0.56	0.57	0.56	47.3
3	R2	25	1.0	26	1.0	0.217	9.4	LOS A	1.3	9.2	0.56	0.57	0.56	47.5
Approach		210	1.0	221	1.0	0.217	5.2	LOS A	1.3	9.2	0.56	0.57	0.56	47.1
East: Shillingford Boulevard (East)														
4	L2	79	1.0	83	1.0	0.343	4.9	LOS A	2.2	15.8	0.60	0.59	0.60	46.1
5	T1	225	1.0	237	1.0	0.343	4.8	LOS A	2.2	15.8	0.60	0.59	0.60	47.2
6	R2	32	1.0	34	1.0	0.343	9.6	LOS A	2.2	15.8	0.60	0.59	0.60	47.5
Approach		336	1.0	354	1.0	0.343	5.3	LOS A	2.2	15.8	0.60	0.59	0.60	47.0
North: Goulds Road (North 1)														
7	L2	64	1.0	67	1.0	0.334	3.6	LOS A	2.2	15.7	0.41	0.48	0.41	46.4
8	T1	239	1.0	252	1.0	0.334	3.5	LOS A	2.2	15.7	0.41	0.48	0.41	47.5
9	R2	100	1.0	105	1.0	0.334	8.2	LOS A	2.2	15.7	0.41	0.48	0.41	47.8
Approach		403	1.0	424	1.0	0.334	4.7	LOS A	2.2	15.7	0.41	0.48	0.41	47.4
West: Shillingford Boulevard (West)														
10	L2	225	1.0	237	1.0	0.312	3.9	LOS A	2.0	14.4	0.47	0.49	0.47	46.9
11	T1	120	1.0	126	1.0	0.312	3.8	LOS A	2.0	14.4	0.47	0.49	0.47	48.0
12	R2	5	1.0	5	1.0	0.312	8.6	LOS A	2.0	14.4	0.47	0.49	0.47	48.3
Approach		350	1.0	368	1.0	0.312	4.0	LOS A	2.0	14.4	0.47	0.49	0.47	47.3
All Vehicles		1299	1.0	1367	1.0	0.343	4.7	LOS A	2.2	15.8	0.50	0.53	0.50	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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 [DC Rd & G Rd - 2028 - PM (Site Folder: General)]

Network: N101 [Network1 (Network Folder: General)]

New Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road (South 2)														
1	L2	102	1.0	102	1.0	0.106	2.1	LOS A	0.0	0.0	0.00	0.25	0.00	47.7
2	T1	100	1.0	100	1.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	48.6
Approach		202	1.0	202	1.0	0.106	1.1	NA	0.0	0.0	0.00	0.25	0.00	48.1
North: Goulds Road (North 2)														
8	T1	120	1.0	120	1.0	0.064	0.0	LOS A	0.0	0.1	0.03	0.02	0.03	49.6
9	R2	4	1.0	4	1.0	0.064	5.2	LOS A	0.0	0.1	0.03	0.02	0.03	48.9
Approach		124	1.0	124	1.0	0.064	0.2	NA	0.0	0.1	0.03	0.02	0.03	49.6
West: Dunns Crossing Road														
10	L2	1	1.0	1	1.0	0.115	4.9	LOS A	0.2	1.1	0.33	0.60	0.33	45.9
12	R2	115	1.0	115	1.0	0.115	5.7	LOS A	0.2	1.1	0.33	0.60	0.33	43.2
Approach		116	1.0	116	1.0	0.115	5.7	LOS A	0.2	1.1	0.33	0.60	0.33	43.3
All Vehicles		442	1.0	442	1.0	0.115	2.0	NA	0.2	1.1	0.09	0.28	0.09	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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).
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 [S Rd & G Rd - 2028 - PM (short) (Site Folder: General)]

Network: N101 [Network1 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road (South 3)														
1	L2	1	1.0	1	1.0	0.075	9.2	LOS A	0.1	0.8	0.37	0.94	0.37	62.5
2	T1	58	1.0	58	1.0	0.075	10.1	LOS B	0.1	0.8	0.37	0.94	0.37	57.2
3	R2	5	1.0	5	1.0	0.075	10.4	LOS B	0.1	0.8	0.37	0.94	0.37	62.1
Approach		64	1.0	64	1.0	0.075	10.1	LOS B	0.1	0.8	0.37	0.94	0.37	58.0
East: Selwyn Road (East)														
4	L2	6	1.0	6	1.0	0.074	7.5	LOS A	0.1	0.8	0.21	0.24	0.21	69.2
5	T1	78	1.0	78	1.0	0.074	0.3	LOS A	0.1	0.8	0.21	0.24	0.21	74.2
6	R2	45	1.0	45	1.0	0.074	7.2	LOS A	0.1	0.8	0.21	0.24	0.21	69.3
Approach		129	1.0	129	1.0	0.074	3.1	NA	0.1	0.8	0.21	0.24	0.21	72.8
North: Goulds Road (North 3)														
7	L2	41	1.0	41	1.0	0.273	4.8	LOS A	0.5	3.2	0.33	0.97	0.33	58.4
8	T1	86	1.0	86	1.0	0.273	5.7	LOS A	0.5	3.2	0.33	0.97	0.33	57.9
9	R2	107	1.0	107	1.0	0.273	6.3	LOS A	0.5	3.2	0.33	0.97	0.33	57.6
Approach		235	1.0	235	1.0	0.273	5.8	LOS A	0.5	3.2	0.33	0.97	0.33	57.9
West: Selwyn Road (West)														
10	L2	99	1.0	99	1.0	0.091	7.0	LOS A	0.0	0.0	0.00	0.38	0.00	68.0
11	T1	71	1.0	71	1.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.38	0.00	73.4
12	R2	1	1.0	1	1.0	0.091	6.9	LOS A	0.0	0.0	0.00	0.38	0.00	68.0
Approach		171	1.0	171	1.0	0.091	4.1	NA	0.0	0.0	0.00	0.38	0.00	71.0
All Vehicles		599	1.0	599	1.0	0.273	5.2	NA	0.5	3.2	0.21	0.64	0.21	65.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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).
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 [DC Rd & G Rd - 2028 - AM (short) (Site Folder: General)]

Network: N102 [Network2 (Network Folder: General)]

New Access
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road (South 2)														
1	L2	112	1.0	112	1.0	0.089	2.1	LOS A	0.0	0.0	0.00	0.32	0.00	47.3
2	T1	58	1.0	58	1.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.32	0.00	48.2
Approach		169	1.0	169	1.0	0.089	1.4	NA	0.0	0.0	0.00	0.32	0.00	47.6
North: Goulds Road (North 2)														
8	T1	105	1.0	105	1.0	0.054	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	49.9
9	R2	1	1.0	1	1.0	0.054	5.1	LOS A	0.0	0.0	0.01	0.01	0.01	49.0
Approach		106	1.0	106	1.0	0.054	0.1	NA	0.0	0.0	0.01	0.01	0.01	49.9
West: Dunns Crossing Road														
10	L2	1	1.0	1	1.0	0.088	4.7	LOS A	0.1	0.8	0.28	0.58	0.28	46.0
12	R2	93	1.0	93	1.0	0.088	5.4	LOS A	0.1	0.8	0.28	0.58	0.28	43.4
Approach		94	1.0	94	1.0	0.088	5.4	LOS A	0.1	0.8	0.28	0.58	0.28	43.5
All Vehicles		369	1.0	369	1.0	0.089	2.0	NA	0.1	0.8	0.07	0.29	0.07	47.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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).
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 [S Rd & G Rd - 2028 - AM (short) (Site Folder: General)]

Network: N102 [Network2 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road (South 3)														
1	L2	1	1.0	1	1.0	0.098	9.3	LOS A	0.1	1.0	0.37	0.94	0.37	62.6
2	T1	77	1.0	77	1.0	0.098	9.9	LOS A	0.1	1.0	0.37	0.94	0.37	57.4
3	R2	8	1.0	8	1.0	0.098	10.3	LOS B	0.1	1.0	0.37	0.94	0.37	62.2
Approach		86	1.0	86	1.0	0.098	10.0	LOS A	0.1	1.0	0.37	0.94	0.37	58.3
East: Selwyn Road (East)														
4	L2	12	1.0	12	1.0	0.088	7.3	LOS A	0.1	0.8	0.14	0.21	0.14	70.1
5	T1	106	1.0	106	1.0	0.088	0.1	LOS A	0.1	0.8	0.14	0.21	0.14	75.2
6	R2	43	1.0	43	1.0	0.088	7.0	LOS A	0.1	0.8	0.14	0.21	0.14	71.1
Approach		161	1.0	161	1.0	0.088	2.5	NA	0.1	0.8	0.14	0.21	0.14	74.1
North: Goulds Road (North 3)														
7	L2	47	1.0	47	1.0	0.232	4.8	LOS A	0.4	2.6	0.28	0.96	0.28	58.2
8	T1	43	1.0	43	1.0	0.232	5.6	LOS A	0.4	2.6	0.28	0.96	0.28	57.8
9	R2	107	1.0	107	1.0	0.232	6.3	LOS A	0.4	2.6	0.28	0.96	0.28	57.5
Approach		198	1.0	198	1.0	0.232	5.8	LOS A	0.4	2.6	0.28	0.96	0.28	57.7
West: Selwyn Road (West)														
10	L2	49	1.0	49	1.0	0.060	7.0	LOS A	0.0	0.0	0.01	0.29	0.01	70.4
11	T1	62	1.0	62	1.0	0.060	0.0	LOS A	0.0	0.0	0.01	0.29	0.01	74.8
12	R2	1	1.0	1	1.0	0.060	7.0	LOS A	0.0	0.0	0.01	0.29	0.01	69.2
Approach		113	1.0	113	1.0	0.060	3.1	NA	0.0	0.0	0.01	0.29	0.01	73.5
All Vehicles		558	1.0	558	1.0	0.232	4.9	NA	0.4	2.6	0.20	0.60	0.20	66.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix 4

2028 Paramics Model Data and PC73 Development Traffic

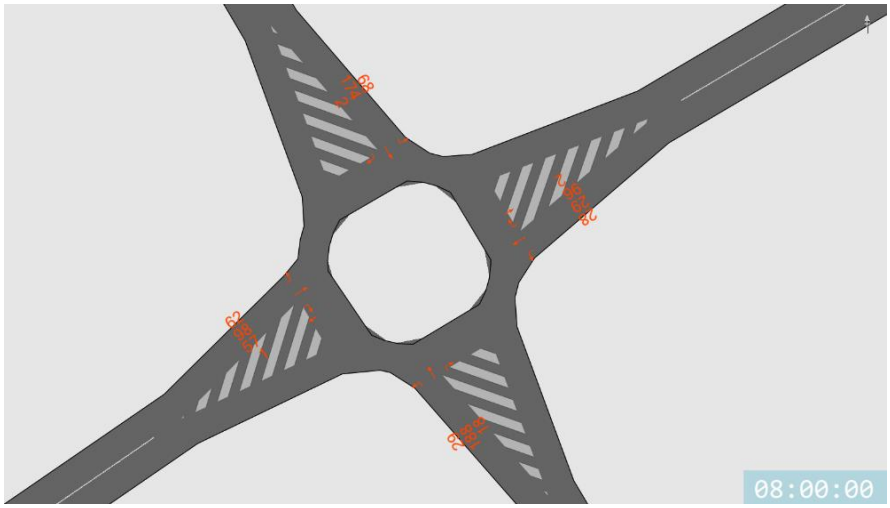
Thanks for approaching us regarding modelling for PC70. We have updated the land use and network connectivity as instructed. In this modelling we have included:

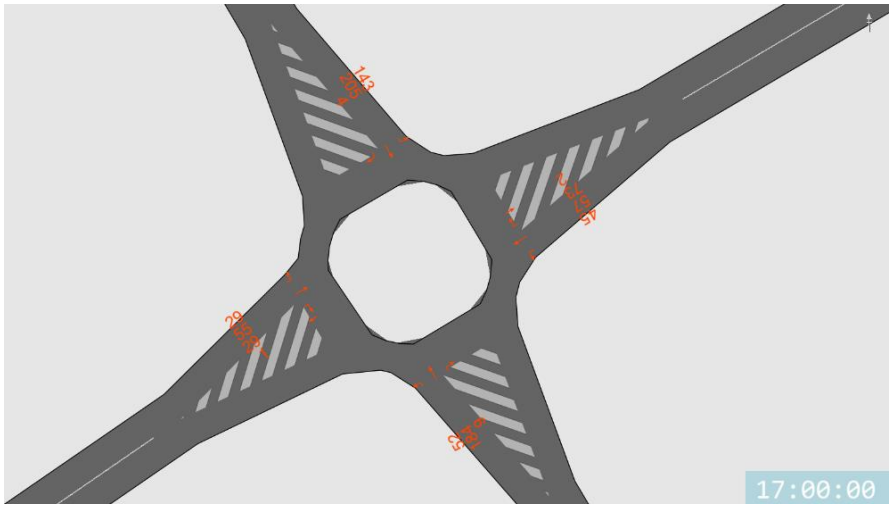
- Roundabouts at Dunns Crossing Rd / Selwyn Rd and Dunns Crossing Rd / CRETS collector as requested
- SDC LTP infrastructure up to 2028/29
- Roundabout at Selwyn Road / Springston Rolleston Road which does not form part of the LTP but has been identified as being a necessary measure to enable development in South Rolleston until the CRETS collector road is complete.
- Infrastructure upgrades included in the PC73 ITA
- PC70 at 100% developed with trip generation per the PC70 ITA (0.9 trips per household)
- PC73 at 100% development
- Adjacent FUDA 1 area at 100% development
- FUDA 2 and 3 at 25% development

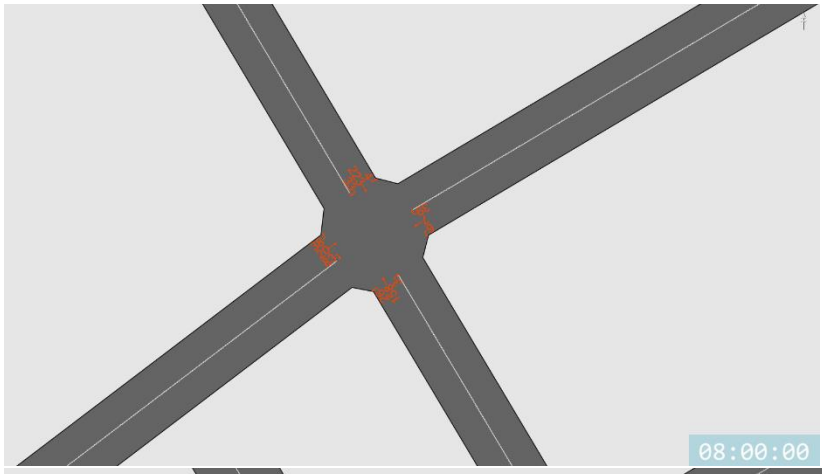
We have also calibrated the trip generation for PC70 so that it is in line with the ITA (0.9 per household, 80% departing in AM and 65% arriving in PM) with total vehicle generation as follows:

2-hour AM: 1123.28 outbound and 280.8 inbound = 2601.29 = 1404.08 = 702 per hour

2-hour PM: 491.45 outbound and 913.1 inbound = 1404.55 = 702 per hour



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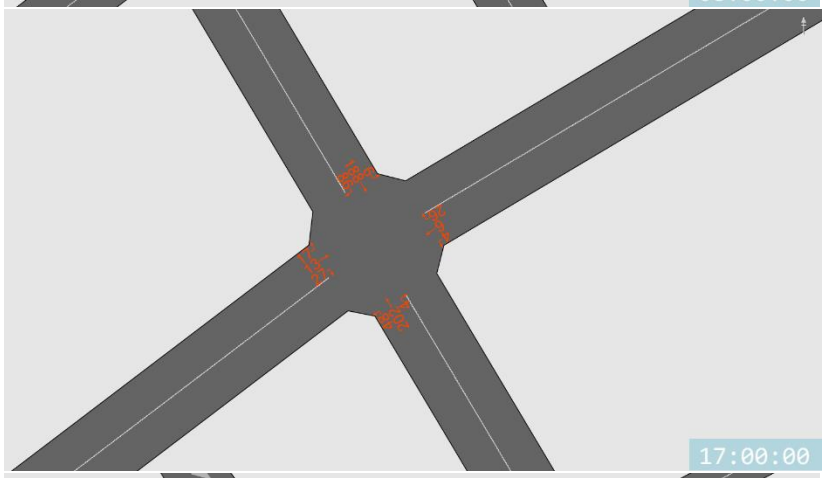
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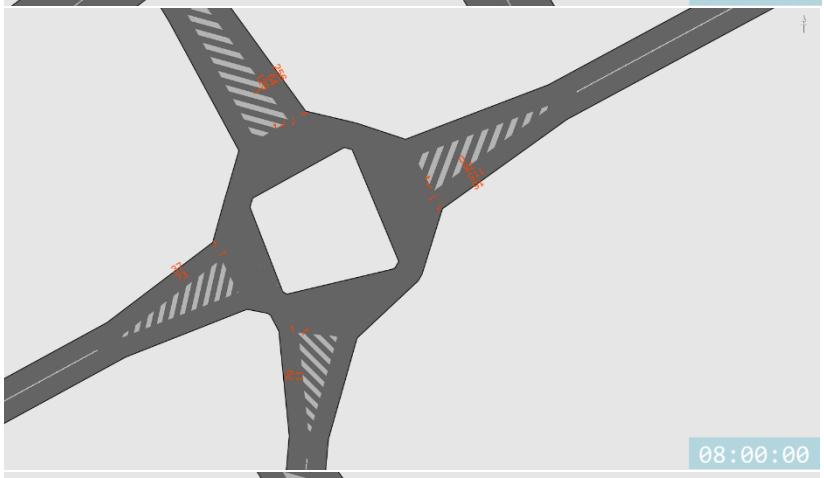
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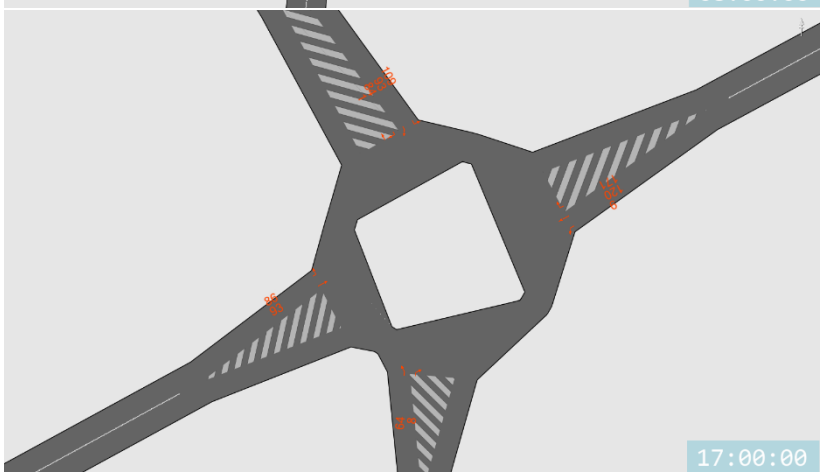
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Appendix 5

SIDRA Reports – New & Upgraded Intersections

MOVEMENT SUMMARY

Site: 101 [2028 Dunns Crossing Rd - Major Link - AM Peak - FT (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Dunns Crossing Road S														
1	L2	29	0.0	31	0.0	0.207	4.7	LOS A	1.2	8.6	0.38	0.50	0.38	53.6
2	T1	188	0.0	198	0.0	0.207	5.0	LOS A	1.2	8.6	0.38	0.50	0.38	54.9
3	R2	23	0.0	24	0.0	0.207	9.6	LOS A	1.2	8.6	0.38	0.50	0.38	52.4
Approach		240	0.0	253	0.0	0.207	5.4	LOS A	1.2	8.6	0.38	0.50	0.38	54.5
East: Faringdon Oval Main														
4	L2	35	0.0	37	0.0	0.177	4.1	LOS A	1.0	7.0	0.44	0.59	0.44	47.7
5	T1	36	0.0	38	0.0	0.177	4.0	LOS A	1.0	7.0	0.44	0.59	0.44	49.3
6	R2	120	0.0	126	0.0	0.177	8.5	LOS A	1.0	7.0	0.44	0.59	0.44	49.3
Approach		191	0.0	201	0.0	0.177	6.9	LOS A	1.0	7.0	0.44	0.59	0.44	49.0
North: Dunns Crossing Road N														
7	L2	85	0.0	89	0.0	0.236	5.0	LOS A	1.4	10.1	0.44	0.53	0.44	50.7
8	T1	174	0.0	183	0.0	0.236	5.3	LOS A	1.4	10.1	0.44	0.53	0.44	54.9
9	R2	2	0.0	2	0.0	0.236	9.9	LOS A	1.4	10.1	0.44	0.53	0.44	54.9
Approach		261	0.0	275	0.0	0.236	5.2	LOS A	1.4	10.1	0.44	0.53	0.44	53.9
West: PC73 Main Access														
10	L2	62	0.0	65	0.0	0.241	4.8	LOS A	1.4	9.9	0.53	0.59	0.53	49.1
11	T1	123	0.0	129	0.0	0.241	4.7	LOS A	1.4	9.9	0.53	0.59	0.53	46.2
12	R2	57	0.0	60	0.0	0.241	9.2	LOS A	1.4	9.9	0.53	0.59	0.53	50.2
Approach		242	0.0	255	0.0	0.241	5.8	LOS A	1.4	9.9	0.53	0.59	0.53	48.2
All Vehicles		934	0.0	983	0.0	0.241	5.7	LOS A	1.4	10.1	0.45	0.55	0.45	51.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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 [2028 Dunns Crossing Rd - Major Link - PM Peak - FT (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Dunns Crossing Road S														
1	L2	52	0.0	55	0.0	0.213	4.8	LOS A	1.3	8.9	0.39	0.50	0.39	53.7
2	T1	184	0.0	194	0.0	0.213	5.0	LOS A	1.3	8.9	0.39	0.50	0.39	55.0
3	R2	11	0.0	12	0.0	0.213	9.6	LOS A	1.3	8.9	0.39	0.50	0.39	52.6
Approach		247	0.0	260	0.0	0.213	5.2	LOS A	1.3	8.9	0.39	0.50	0.39	54.7
East: Faringdon Oval Main														
4	L2	56	0.0	59	0.0	0.201	4.1	LOS A	1.1	8.0	0.45	0.57	0.45	48.5
5	T1	71	0.0	75	0.0	0.201	4.1	LOS A	1.1	8.0	0.45	0.57	0.45	50.1
6	R2	91	0.0	96	0.0	0.201	8.6	LOS A	1.1	8.0	0.45	0.57	0.45	50.1
Approach		218	0.0	229	0.0	0.201	6.0	LOS A	1.1	8.0	0.45	0.57	0.45	49.7
North: Dunns Crossing Road N														
7	L2	179	0.0	188	0.0	0.304	4.5	LOS A	2.0	14.0	0.34	0.47	0.34	51.4
8	T1	205	0.0	216	0.0	0.304	4.7	LOS A	2.0	14.0	0.34	0.47	0.34	55.5
9	R2	4	0.0	4	0.0	0.304	9.3	LOS A	2.0	14.0	0.34	0.47	0.34	55.5
Approach		388	0.0	408	0.0	0.304	4.7	LOS A	2.0	14.0	0.34	0.47	0.34	54.0
West: PC73 Minor Access														
10	L2	29	0.0	31	0.0	0.122	4.3	LOS A	0.7	4.6	0.46	0.54	0.46	49.4
11	T1	69	0.0	73	0.0	0.122	4.2	LOS A	0.7	4.6	0.46	0.54	0.46	46.5
12	R2	29	0.0	31	0.0	0.122	8.7	LOS A	0.7	4.6	0.46	0.54	0.46	50.4
Approach		127	0.0	134	0.0	0.122	5.3	LOS A	0.7	4.6	0.46	0.54	0.46	48.4
All Vehicles		980	0.0	1032	0.0	0.304	5.2	LOS A	2.0	14.0	0.39	0.51	0.39	52.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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 [2028 Dunns Crossing Rd - Minor Link - AM Peak - FT (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Dunns Crossing Road S														
1	L2	26	0.0	27	0.0	0.125	5.7	LOS A	0.0	0.3	0.02	0.08	0.02	57.6
2	T1	198	0.0	208	0.0	0.125	0.0	LOS A	0.0	0.3	0.02	0.08	0.02	59.2
3	R2	4	0.0	4	0.0	0.125	6.3	LOS A	0.0	0.3	0.02	0.08	0.02	55.5
Approach		228	0.0	240	0.0	0.125	0.8	NA	0.0	0.3	0.02	0.08	0.02	59.0
East: Faringdon Oval Minor														
4	L2	8	0.0	8	0.0	0.119	8.4	LOS A	0.4	2.9	0.50	0.97	0.50	44.7
5	T1	9	0.0	9	0.0	0.119	10.4	LOS B	0.4	2.9	0.50	0.97	0.50	44.4
6	R2	49	0.0	52	0.0	0.119	11.3	LOS B	0.4	2.9	0.50	0.97	0.50	44.1
Approach		66	0.0	69	0.0	0.119	10.9	LOS B	0.4	2.9	0.50	0.97	0.50	44.2
North: Dunns Crossing Road N														
7	L2	5	0.0	5	0.0	0.148	6.3	LOS A	0.3	2.0	0.11	0.09	0.11	55.7
8	T1	223	0.0	235	0.0	0.148	0.2	LOS A	0.3	2.0	0.11	0.09	0.11	58.8
9	R2	33	0.0	35	0.0	0.148	6.3	LOS A	0.3	2.0	0.11	0.09	0.11	56.6
Approach		261	0.0	275	0.0	0.148	1.1	NA	0.3	2.0	0.11	0.09	0.11	58.4
West: PC73 Minor Access														
10	L2	38	0.0	40	0.0	0.230	8.4	LOS A	0.9	6.1	0.47	0.96	0.47	46.7
11	T1	25	0.0	26	0.0	0.230	10.7	LOS B	0.9	6.1	0.47	0.96	0.47	41.3
12	R2	83	0.0	87	0.0	0.230	11.4	LOS B	0.9	6.1	0.47	0.96	0.47	46.2
Approach		146	0.0	154	0.0	0.230	10.5	LOS B	0.9	6.1	0.47	0.96	0.47	45.7
All Vehicles		701	0.0	738	0.0	0.230	3.9	NA	0.9	6.1	0.19	0.35	0.19	54.4

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 [2028 Dunns Crossing Rd - Minor Link - PM Peak - FT (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Dunns Crossing Road S														
1	L2	48	0.0	51	0.0	0.167	5.6	LOS A	0.1	0.4	0.02	0.10	0.02	57.4
2	T1	253	0.0	266	0.0	0.167	0.0	LOS A	0.1	0.4	0.02	0.10	0.02	59.0
3	R2	5	0.0	5	0.0	0.167	6.2	LOS A	0.1	0.4	0.02	0.10	0.02	55.2
Approach		306	0.0	322	0.0	0.167	1.0	NA	0.1	0.4	0.02	0.10	0.02	58.7
East: Faringdon Oval Minor														
4	L2	5	0.0	5	0.0	0.089	8.2	LOS A	0.3	2.1	0.50	0.97	0.50	44.3
5	T1	8	0.0	8	0.0	0.089	11.3	LOS B	0.3	2.1	0.50	0.97	0.50	44.0
6	R2	33	0.0	35	0.0	0.089	11.8	LOS B	0.3	2.1	0.50	0.97	0.50	43.7
Approach		46	0.0	48	0.0	0.089	11.3	LOS B	0.3	2.1	0.50	0.97	0.50	43.8
North: Dunns Crossing Road N														
7	L2	8	0.0	8	0.0	0.175	6.8	LOS A	0.7	5.0	0.29	0.21	0.29	53.5
8	T1	188	0.0	198	0.0	0.175	0.6	LOS A	0.7	5.0	0.29	0.21	0.29	57.1
9	R2	86	0.0	91	0.0	0.175	6.7	LOS A	0.7	5.0	0.29	0.21	0.29	55.1
Approach		282	0.0	297	0.0	0.175	2.7	NA	0.7	5.0	0.29	0.21	0.29	56.4
West: PC73 Minor Access														
10	L2	17	0.0	18	0.0	0.101	8.6	LOS A	0.4	2.5	0.48	0.96	0.48	46.5
11	T1	16	0.0	17	0.0	0.101	11.1	LOS B	0.4	2.5	0.48	0.96	0.48	41.1
12	R2	27	0.0	28	0.0	0.101	11.9	LOS B	0.4	2.5	0.48	0.96	0.48	46.1
Approach		60	0.0	63	0.0	0.101	10.7	LOS B	0.4	2.5	0.48	0.96	0.48	45.2
All Vehicles		694	0.0	731	0.0	0.175	3.2	NA	0.7	5.0	0.20	0.28	0.20	55.6

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 [2028 Selwyn Road / Dunns Crossing Rd /Goulds Road - AM Peak - FT (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Goulds Road														
1	L2	1	0.0	1	0.0	0.114	5.8	LOS A	0.6	4.3	0.52	0.58	0.52	52.9
2	T1	99	0.0	104	0.0	0.114	6.0	LOS A	0.6	4.3	0.52	0.58	0.52	54.1
3	R2	11	0.0	12	0.0	0.114	10.7	LOS B	0.6	4.3	0.52	0.58	0.52	54.1
Approach		111	0.0	117	0.0	0.114	6.5	LOS A	0.6	4.3	0.52	0.58	0.52	54.1
East: Selwyn Road East														
4	L2	16	0.0	17	0.0	0.214	4.2	LOS A	1.2	8.7	0.46	0.57	0.46	48.9
5	T1	115	0.0	121	0.0	0.214	4.1	LOS A	1.2	8.7	0.46	0.57	0.46	50.0
6	R2	98	0.0	103	0.0	0.214	8.6	LOS A	1.2	8.7	0.46	0.57	0.46	49.9
Approach		229	0.0	241	0.0	0.214	6.1	LOS A	1.2	8.7	0.46	0.57	0.46	49.9
North: Dunns Crossing Road														
7	L2	320	0.0	337	0.0	0.418	4.4	LOS A	3.1	21.9	0.33	0.52	0.33	53.5
8	T1	80	0.0	84	0.0	0.418	4.6	LOS A	3.1	21.9	0.33	0.52	0.33	54.8
9	R2	161	0.0	169	0.0	0.418	9.3	LOS A	3.1	21.9	0.33	0.52	0.33	54.7
Approach		561	0.0	591	0.0	0.418	5.8	LOS A	3.1	21.9	0.33	0.52	0.33	54.0
West: Selwyn Road West														
10	L2	46	0.0	48	0.0	0.109	3.9	LOS A	0.6	4.0	0.39	0.45	0.39	50.2
11	T1	73	0.0	77	0.0	0.109	3.8	LOS A	0.6	4.0	0.39	0.45	0.39	51.3
12	R2	1	0.0	1	0.0	0.109	8.3	LOS A	0.6	4.0	0.39	0.45	0.39	51.3
Approach		120	0.0	126	0.0	0.109	3.9	LOS A	0.6	4.0	0.39	0.45	0.39	50.9
All Vehicles		1021	0.0	1075	0.0	0.418	5.7	LOS A	3.1	21.9	0.39	0.53	0.39	52.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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 [2028 Selwyn Road / Dunns Crossing Rd /Goulds Road - PM Peak - FT (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	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: Goulds Road														
1	L2	1	0.0	1	0.0	0.098	6.2	LOS A	0.5	3.8	0.57	0.61	0.57	52.7
2	T1	80	0.0	84	0.0	0.098	6.4	LOS A	0.5	3.8	0.57	0.61	0.57	53.9
3	R2	8	0.0	8	0.0	0.098	11.0	LOS B	0.5	3.8	0.57	0.61	0.57	53.9
Approach		89	0.0	94	0.0	0.098	6.8	LOS A	0.5	3.8	0.57	0.61	0.57	53.9
East: Selwyn Road East														
4	L2	9	0.0	9	0.0	0.311	4.2	LOS A	2.0	13.7	0.48	0.60	0.48	48.4
5	T1	120	0.0	126	0.0	0.311	4.1	LOS A	2.0	13.7	0.48	0.60	0.48	49.4
6	R2	214	0.0	225	0.0	0.311	8.6	LOS A	2.0	13.7	0.48	0.60	0.48	49.4
Approach		343	0.0	361	0.0	0.311	6.9	LOS A	2.0	13.7	0.48	0.60	0.48	49.4
North: Dunns Crossing Road														
7	L2	125	0.0	132	0.0	0.272	4.4	LOS A	1.8	12.3	0.32	0.52	0.32	53.3
8	T1	116	0.0	122	0.0	0.272	4.7	LOS A	1.8	12.3	0.32	0.52	0.32	54.6
9	R2	105	0.0	111	0.0	0.272	9.3	LOS A	1.8	12.3	0.32	0.52	0.32	54.6
Approach		346	0.0	364	0.0	0.272	6.0	LOS A	1.8	12.3	0.32	0.52	0.32	54.1
West: Selwyn Road West														
10	L2	108	0.0	114	0.0	0.199	4.5	LOS A	1.1	8.0	0.50	0.54	0.50	49.9
11	T1	93	0.0	98	0.0	0.199	4.5	LOS A	1.1	8.0	0.50	0.54	0.50	51.0
12	R2	1	0.0	1	0.0	0.199	9.0	LOS A	1.1	8.0	0.50	0.54	0.50	51.0
Approach		202	0.0	213	0.0	0.199	4.5	LOS A	1.1	8.0	0.50	0.54	0.50	50.4
All Vehicles		980	0.0	1032	0.0	0.311	6.1	LOS A	2.0	13.7	0.44	0.56	0.44	51.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.