Appendix 5 – Cardno Eppell Olsen Traffic Impact Assessment

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Cardno Eppell Olsen

Shaping the Future

Southern River Precinct 3E ODP

□ra□i□ □□ □a□t Assess□ ent

Project Number: CEP02098



Prepared for Department of Housing

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1 INTRODUCTION

It should be noted that the residential unit yields proposed in the current development plans have decreased from the 420 units quoted in this report, to 337, and the resulting traffic generation volumes quoted in this report can therefore be viewed as a very conservative estimate. As analysis of the intersections included in this report have shown that all intersections are expected to operate within an acceptable level of service (C or better) with the traffic generated by the originally proposed 420 units, these intersections are expected to operate at a better or similar level of service as a consequence of the decreased unit yields.

1.1 BACKGROUND

Cardno was commissioned by Department of Housing for the provision of a Traffic Impact Assessment for a proposed residential development in Southern River, consisting of the Southern River Precinct 3E ODP. This traffic impact assessment has been completed to a standard consistent with the requirements of the City of Gosnells and the WAPC Transport Assessment Guidelines for Developments: Volume 2 – Structure Plans (2006).

The scope of this traffic impact assessment involves the following:

- Project Inspection and Site Inspection
- Data Collation and Review
- Traffic Generation and Distribution Exercise
- SIDRA Intersection Assessment (2011, 2021 and 2031 scenarios)
- Public Transport, Cycling and Pedestrian Assessment
- Reporting (this document)

1.2 STUDY AREA

The study area is bounded by Southern River Road to the north-west, Balannup Drain to the north-east, Matison Street to the south-east and Lander Street to the south-west. The study area is part of the Precinct 3E which is one of six sub-precincts of the broader Southern River Precinct 3.

The existing site consists of vacant land and is adjacent to low-density rural residential and commercial land uses. The majority of the nearby commercial uses consist of kennels and pet hotels. The Southern River Precinct 3 Structure Plan proposes residential and commercial uses for the immediate surrounding developments.

Figure 1 shows the extent of the study area.

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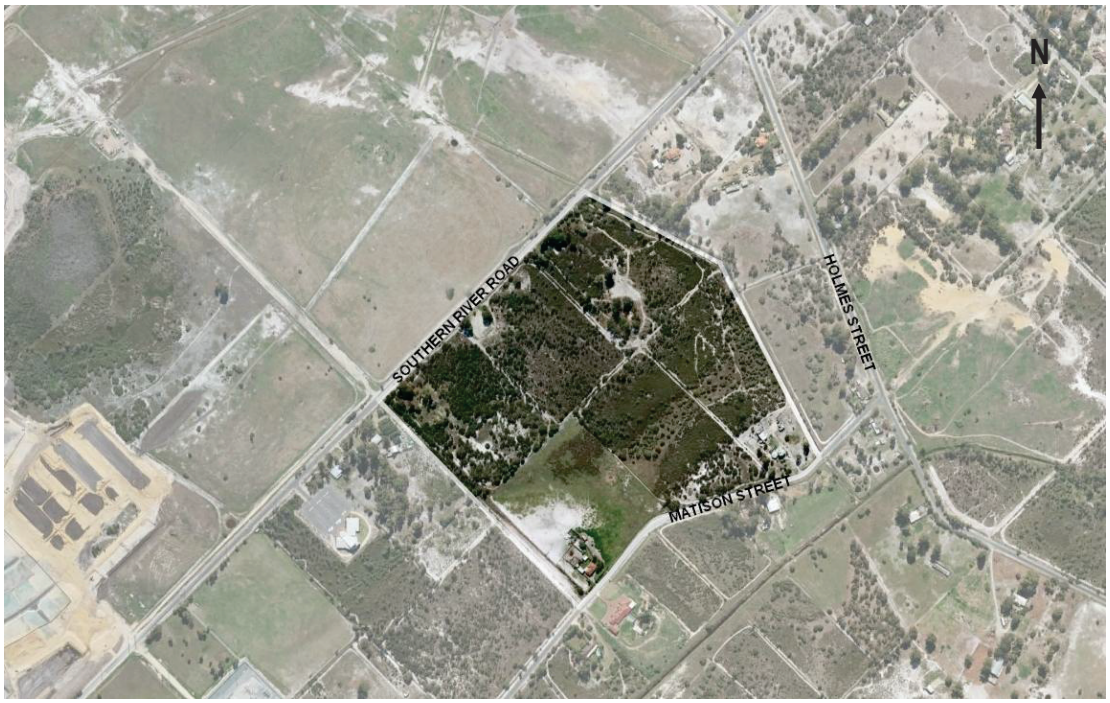
Figure 1 ***Precinct 3E ODP Area***



1.3 PROPOSED DEVELOPMENT

Southern River Precinct development is proposed to consist of a variety of land-uses including urban development, open space and conservation sites, some light industrial and mixed business/commercial centres, a primary school and a secondary school. The Precinct 3E is intended to consist of residential land uses and a substantial Public Open Space which includes the existing wetlands area. The proposed local structure plan is shown in **Appendix A**.

The proposed Precinct 3E development comprises a total of approximately 420 residential lots, including a mixture of residential R30 and R40 developments, with the remainder of the area being drainage swales, irrigated turf active space, high quality conservation value bushland and multiple use wetland open space. Three major access roads are also proposed to be developed within the study area. The proposed concept design plan is shown in **Appendix B**.

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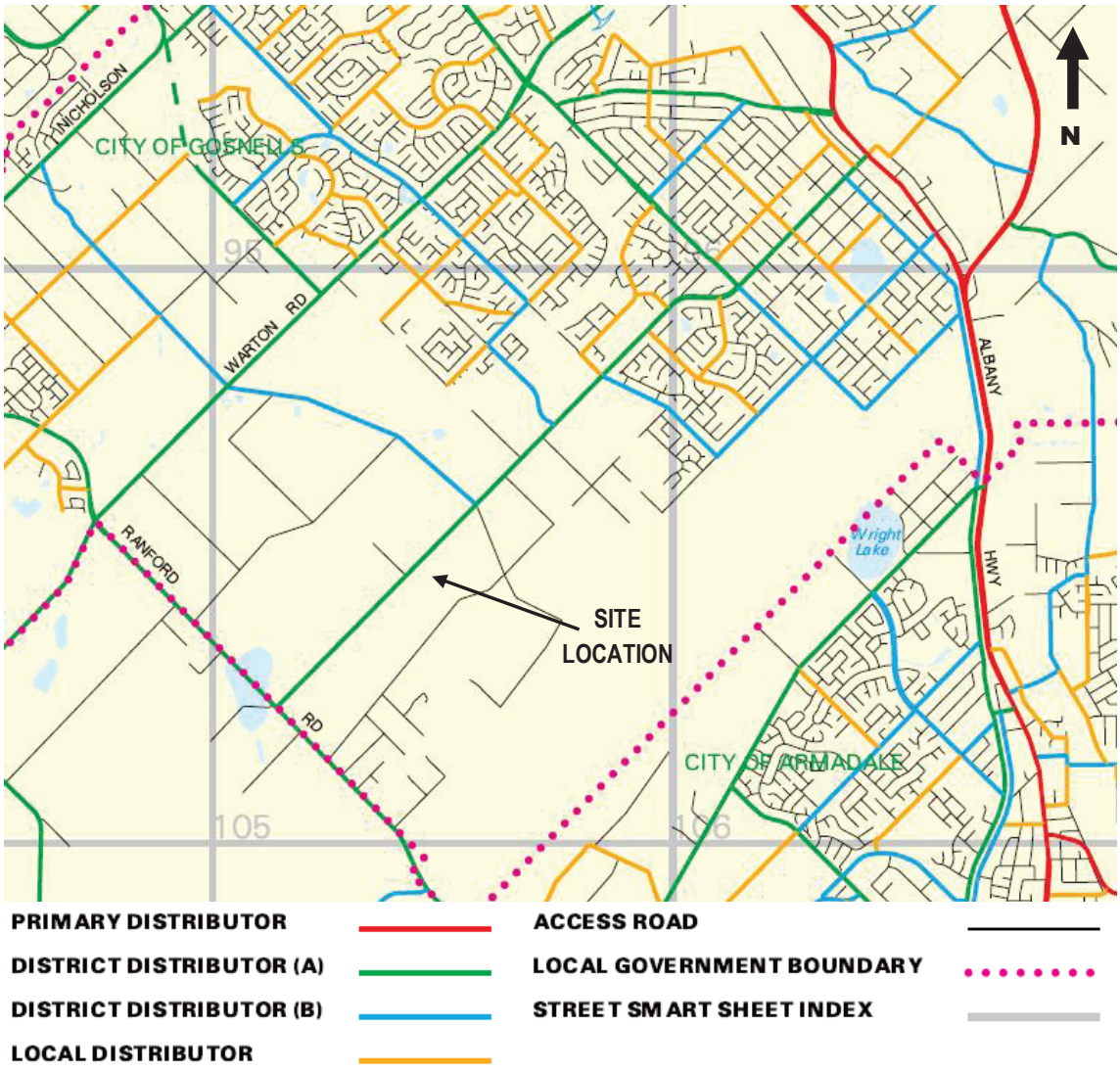
2 EXISTING SITUATION

2.1 ROAD NETWORK

Under the MRWA *Main Roads Functional Road Hierarchy (MRFH)*, Southern River Road, a two-lane undivided rural road , is classified as a Distributor A road with a posted speed of 80 km/h. Matison Street is a single carriageway rural road and classified as an Access Road with a posted speed of 60 km/h. Lander Street is currently an unpaved rural road and classified as an Access Road with a posted speed of 50 km/h.

Figure 2 shows the MRFH for the area surrounding the study area.

Figure 2 ***Main Roads Functional Road Hierarchy***



(Source: Mainroads)

These classifications are defined in the MRFH as follows:

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Primary Distributors: These provide for major regional and inter-regional traffic movement and carry large volumes of generally fast moving traffic. Some are strategic freight routes and all are National or State roads. They are managed by Main Roads.

District Distributor A: These carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.

District Distributor B: Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 kilometres apart. They are managed by Local Government.

Local Distributors: Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local government.

Access Roads: Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local government.

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2.2 PEDESTRIAN/CYCLE PATHS

There are currently no pedestrian or cycle paths within or surrounding the study area as it is in a rural location. Under the existing Perth Bicycle Network (PBN), Matison Street and Holmes Street are currently designated as 'good' road riding environments, while Southern River Road is designated as a 'medium' road riding environment.

Figure 3 ***Perth Bicycle Network Cycling Facilities***



(Source: Department of Transport)

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2.3 PUBLIC TRANSPORT

The nearest train station is the Gosnells Station (Armadale line) located approximately 4.8 kilometres away from the corner of Southern River Road/Lander Street intersection. The Murdoch Station (Mandurah line) is located approximately 13 kilometres away from the corner of Southern River Road/Lander Street intersection.

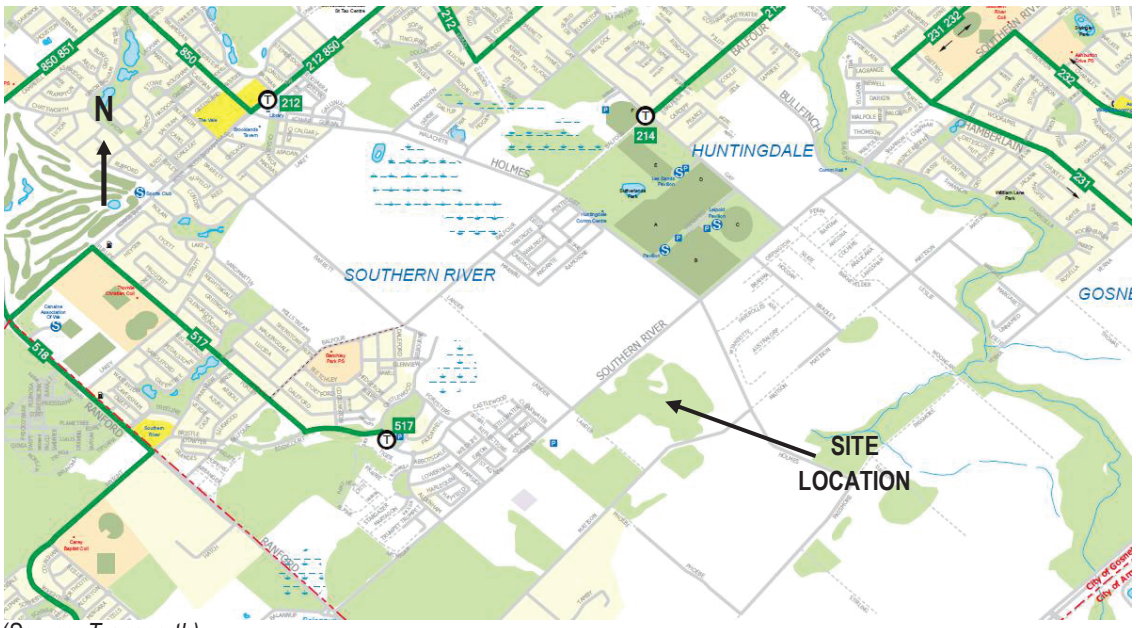
The network of bus routes serving the Southern River area is summarised in **Table 1** and illustrated in **Figure 4** below.

Table 1 ***Local Bus Routes***

Route No.	Service Type	Destinations	Nearest Bus Stop
231	Full Time, Monday to Sunday including Public Holidays	Gosnells Train Station – King St/Eudoria St–Chamberlain St/ Southern River Rd – Harry St/Corfield St – Gosnells Train Station (Aniti-Clockwise Circular Route)	2.6 km
232	Full Time, Monday to Sunday including Public Holidays	Gosnells Train Station – Harry St/Corfield St – Southern River Rd/Chamberlain St – King St/Eudoria St – Gosnells Train Station (Clockwise Circular Route)	2.5 km
517	Full Time, Monday to Sunday including Public Holidays	Murdoch Station – Livingston Shopping Centre – Castlewood Parkway/Edencourt Drive (Southern River)	1.5 km
518	Full Time, Monday to Saturday only	Murdoch Station – Livingston Shopping Centre – Wright Road/Lauraine Drive – Wright Road/Bordeaux Parade (Plara Waters)	3.3 km

**Nearest bus stop is measured by the distance away from the corner of Southern River Road/Lander Street intersection.*

Figure 4 ***Bus Route Network***



(Source: Transperth)

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2.3.1 Service frequency

Table 2 provides a summary of the weekday service frequency for the various bus routes serving the Southern River area.

Table 2 ***Weekday Service Frequency***

Route No.	First Service (Departs)	Service Frequency (buses per hour)				Last Service (Departs)
		AM Peak	Daytime	PM Peak	Evening	
231	6:58am	2	2	2 - 4	1	9:29pm
232	5:52am	3 - 4	2	3 - 4	1	9:58pm
517 to Southern River	7:05am	1 - 2	1 - 3	3	1 - 2	10:04pm
517 from Southern River	6:08am	3 - 4	1 - 2	1	1	9:33pm
518 to Piara Waters	6:45am	1 - 2	1	3 - 4	1	9:33pm
518 from Piara Waters	5:10am	3 – 4	1 - 2	1 – 2	1	8:01pm

The Southern River DSP suggests that there are no current plans to significantly improve bus services in the area.

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3 SITE DESIGN AND ACCESS

3.1 BASIS OF ASSESSMENT

The Precinct 3E ODP is part of the Southern River Precinct 3 South sub-area. Prior to this assessment, no traffic analysis has been conducted within Precinct 3 South. A traffic assessment for Precinct 3A (Precinct 3 North) was undertaken to support the ODP submission.

To complete the Precinct 3E traffic assessment, information was compiled from existing data and the Precinct 3A Transport Assessment. Additional data was generated from first-principles for the Precinct 3 South area, including Precinct 3E.

Information regarding developments outside of Southern River Precinct 3 were not made available and are not included in this analysis.

3.2 STUDY AREA ACCESS POINTS

It is proposed that the study area will have four (4) access points as follows:

- North-western Access – A priority "T" intersection with Southern River Road;
- North-eastern Access - A roundabout connection across the Ballinup Drain into Precinct 3A towards Holmes Street; and
- South-eastern Access – Two priority "T" intersections with Matison Street.

The configuration of the proposed access points is considered to be adequate.

3.3 ROAD HIERARCHY

The roads within the proposed development are unlikely to experience a high volume of traffic due to the relatively small residential catchment. Therefore, the majority of streets within the study area have been classified as Access Roads. These road reserves will generally comply with Liveable Neighbourhood Guidelines.

The proposed road hierarchy for the study area is provided in **Appendix B**.

3.4 PEDESTRIAN AND CYCLING PROVISION

Roads designated Access Road B and Access Road C are proposed to include pedestrian facilities, with a single higher-order shared pedestrian/cycling path linking the wetland POS with Southern River Road, as shown in **Appendix B**.

3.5 LOCAL AREA TRAFFIC MANAGEMENT (LATM)

A detailed review of the proposed road layout within the study area has been undertaken, with a series of recommendations relating to future traffic control and LATM to safely control traffic and minimise speeds throughout the study area.

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A combination of LATM measures are proposed, including:

- Threshold Treatments; and
- Raised Pavements.

The proposed LATM plan for the study area is provided in **Appendix C**.

3.6 EXTERNAL ROAD NETWORK

Traffic volumes associated with Precinct 3E are not anticipated to significantly impact the boundary road network and as such, no modifications are proposed to Southern River Road or Matison Street, outside of the requirements of the broader Precinct 3 Structure Plan.

The current Southern River Developer Contributions Scheme (DCP) provides for significant improvements to the function and operation of Holmes Street. These improvements include road widening and signalisation of the intersections of Holmes Street with Southern River Road and Holmes Street.

Based on the analysis included in this report, which includes the traffic impact for all of Precinct 3 against the existing background traffic, these upgrades are not considered necessary in the near term. The strategic network improvements proposed for the 2021 and 2031 scenarios, including the Holmes Street realignment (to connect Garden Street / Nicholson Road to Tonkin Highway) are likely to require mitigation measures required, including signalisation. However, the need for any modifications would result from changes to the strategic road network and are not triggered or required by development of Precinct 3.

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4 BACKGROUND TRAFFIC VOLUMES

The following sections outline the methodology adopted for development of the background traffic volumes on the surrounding road network.

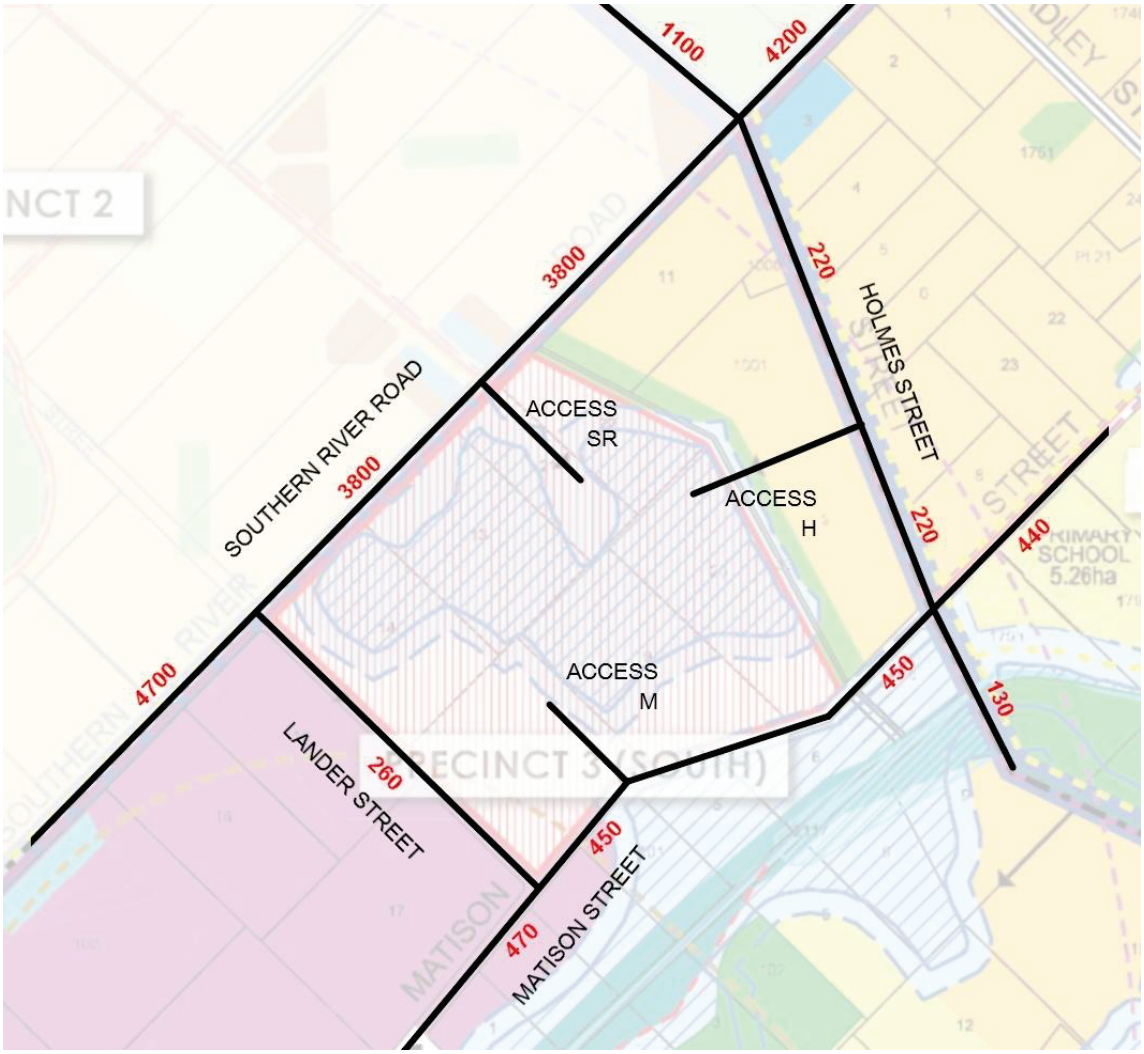
4.1 EXISTING TRAFFIC VOLUMES

A desktop traffic model was created for the existing scenario, based on count data provided by Main Roads WA, City of Gosnells and on-site observations. The daily two-way link counts from this circulation model are shown in **Figure 5.**

Traffic was additionally modelled the following two (2) peak hours:

- AM Peak (8am – 9am)
- PM Peak (5pm – 6pm)

Figure 5 ***Existing Daily Link Volumes***



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4.2 DEVELOPMENT TRAFFIC GENERATION

Development traffic generation rates and in/out distribution percentages have been sourced from the *Trip Generation Manual: 7th Edition* produced by the Institute of Transportation Engineers (ITE), and Guide to Traffic Generating Developments Version 2.2 produced by the Roads and Traffic Authority (RTA). The daily, AM peak hour and PM peak hour generation rates adopted for the assessment, including in/out splits, are summarised below in **Table 3**.

Table 3 ***Trip Generation Rates and In/Out Splits***

Development	Estimated Number	Period	Total Generated Trips (Two Way)	Precinct 3E Component	3E Directional Split	
					In	Out
Precinct 3E Origins						
Residential	420 dwellings	AM Peak	357	357	145	212
		PM Peak	357	357	190	85
		Daily	3,780	3,780	1586	1586
Precinct 3 Destinations						
Primary School	400 students	AM Peak	400	100	54	45
		PM Peak	300	75	34	41
		Daily	700	175	88	88
Secondary School	750 students	AM Peak	500	50	28	23
		PM Peak	375	38	17	21
		Daily	1,000	100	50	50
Local Shops	1,400 sq.m	AM Peak	88	11	7	4
		PM Peak	175	22	11	11
		Daily	1,694	212	106	106
Industrial	1600 employees	AM Peak	243	12	10	2
		PM Peak	243	12	2	10
		Daily	2,430	122	61	61

The distribution of these trips to the external road network has been estimated based on external traffic modelling undertaken by Main Roads WA and local directional analysis based on peak flow patterns along the existing primary road network, data supplied by Main Roads WA.

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Development traffic volumes have been calculated for both the Precinct 3E ODP area and for the entirety of Precinct 3. **Figure 6** shows the daily two-way traffic volumes generated from Precinct 3E only, while **Figure 7** shows the generation from all of Precinct 3.

Figure 6 ***Precinct 3E Daily Link Volumes***

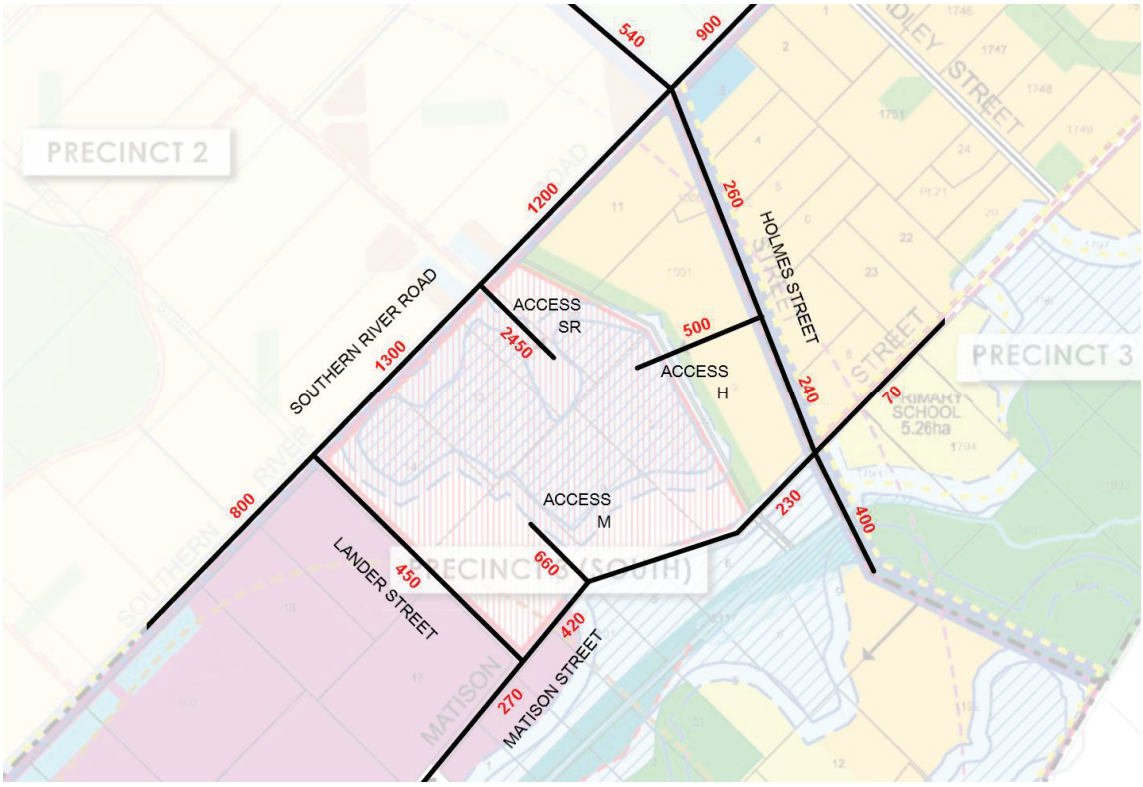

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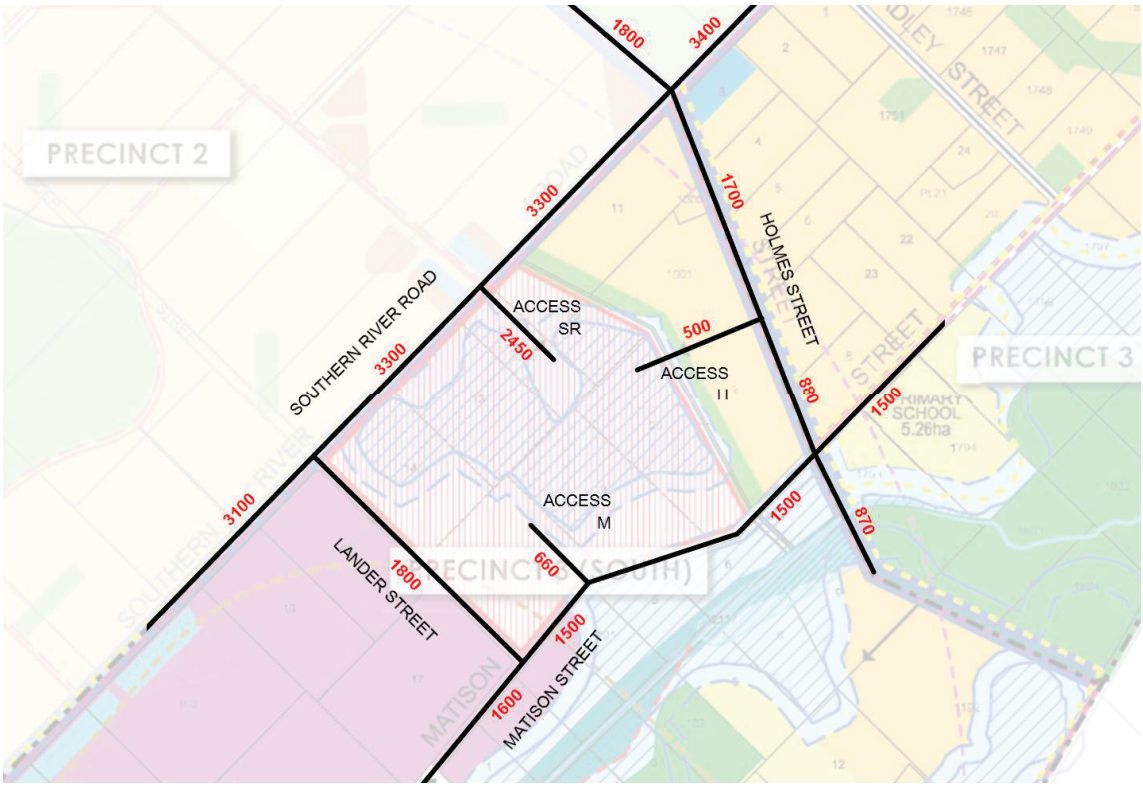
Figure 7 ***Precinct 3 Daily Link Volumes***



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5 DEVELOPMENT IMPACT ASSESSMENT

SIDRA analysis of the network has been undertaken for the boundary road network under the Ultimate (existing plus full development of Precinct 3) Scenario, at the following intersections, for AM and PM peak hours, using 2011 background traffic flows.

- Southern River Road / Ranford Road
- Southern River Road / Holmes Street
- Matison Street / Ranford Road
- Matison Street / Holmes Street
- Holmes Street / Access Road

SIDRA outputs for each approach are presented in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics are defined as follows:

- **Degree of Saturation (DOS)**: is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The Degree of Saturation ranges from close to zero for varied traffic flow up to one for saturated flow or capacity. The theoretical intersection capacity is exceeded for an un-signalised intersection where DOS > 0.80;
- **Average Delay**: is the average of all travel time delays for vehicles through the intersection. An un-signalised intersection can be considered to be operated at capacity where the average delay exceeds 40 seconds for any movement;
- **Level of Service (LOS)**: is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as follows:

LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	5-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

- **95% Queue**: is the statistical estimate of the queue length below which 95% of all observed queues would be expected**.**

Figure 8 shows the daily background (existing) plus development traffic volumes utilised in the assessment, which includes the estimated volumes from all of Precinct 3.

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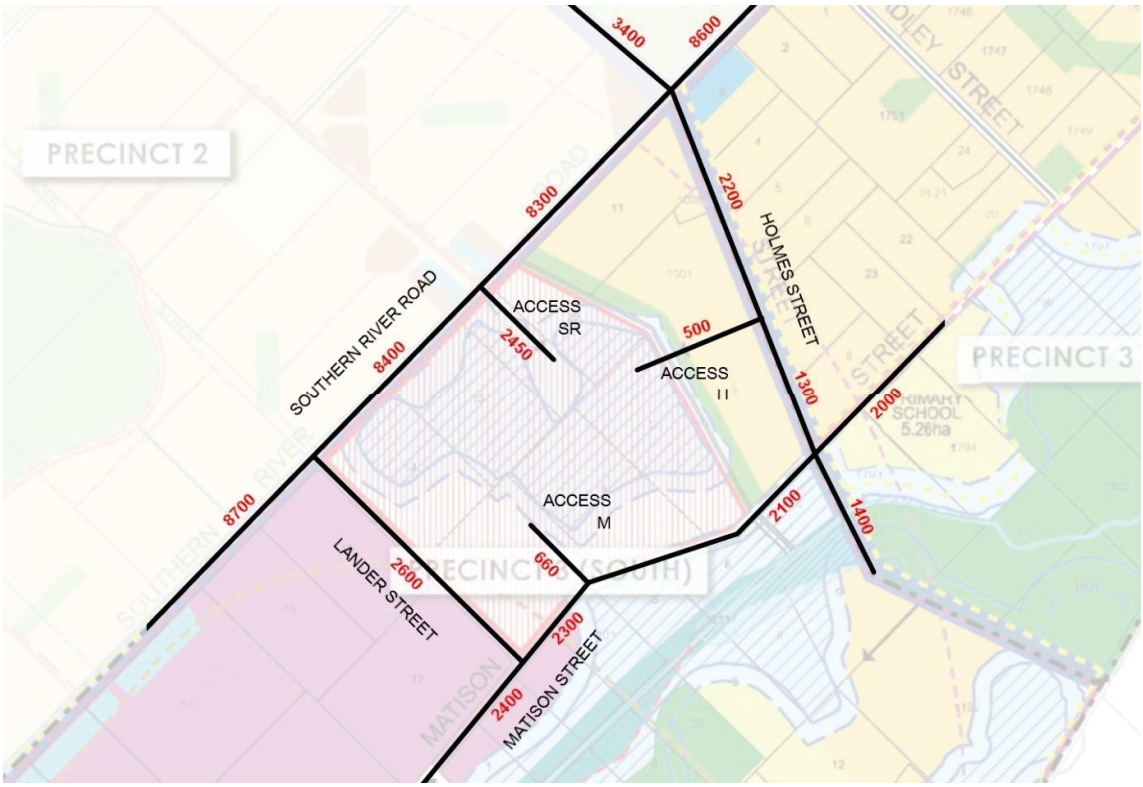
Figure 8 ***Background + Development Daily Link Volumes***



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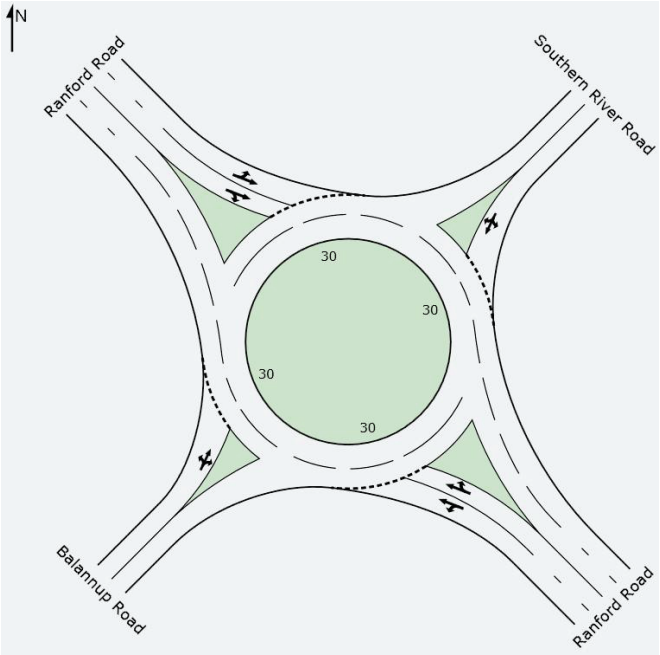
5.1 SOUTHERN RIVER ROAD/RANFORD ROAD

The Southern River Road/Ranford Road intersection is a roundabout intersection as shown in **Figure 9**.

Figure 9 ***Southern River Road/Ranford Road Intersection Layout***



The results of the operational analysis are summarised in **Table 4**.

Table 4 ***SIDRA Results for Southern River Road/Ranford Road Intersection***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	L	0.370	6.4	A	14.5	0.316	6.7	A	12.0
	T	0.370	5.2	A	14.5	0.316	5.5	A	12.0
	R	0.370	12.1	B	14.2	0.316	12.5	B	11.6
North East: Southern River Road	L	0.320	7.9	A	9.5	0.538	9.5	A	21.1
	T	0.320	6.9	A	9.5	0.538	8.5	A	21.1
	R	0.320	13.7	B	9.5	0.538	15.4	B	21.1
North West: Ranford Road	L	0.338	6.7	A	12.1	0.339	6.4	A	12.3
	T	0.338	5.6	A	12.1	0.339	5.2	A	12.3
	R	0.338	12.5	B	11.8	0.339	12.1	B	12.0
South West: Balannup Road	L	0.053	8.7	A	1.4	0.041	8.4	A	1.1
	T	0.053	7.7	A	1.4	0.041	7.4	A	1.1
	R	0.053	14.6	B	1.4	0.041	14.3	B	1.1
All Vehicles		0.370	7.1	A	14.5	0.538	7.5	A	21.1

The results above show that the operational performance of all approaches is generally acceptable.

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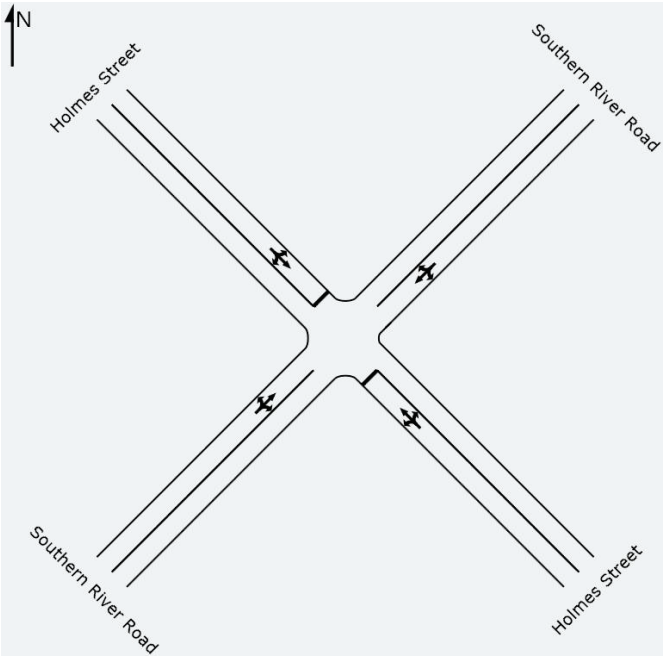
5.2 SOUTHERN RIVER ROAD /HOLMES STREET

The Southern River Road/Holmes Street intersection is a priority controlled 4-way intersection as shown in **Figure 10.**

Figure 10 ***Southern River Road/Holmes Street Intersection Layout***



The results of the operational analysis are summarised in **Table 5**.

Table 5 ***SIDRA Results for Southern River Road/Holmes Street Intersection***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Holmes Street	L	0.259	17.1	C	6.7	0.220	17.3	C	5.3
	T	0.259	16.7	C	6.7	0.220	16.9	C	5.3
	R	0.259	16.9	C	6.7	0.220	17.1	C	5.3
North East: Southern River Road	L	0.123	14.2	B	8.0	0.180	13.9	B	12.4
	T	0.123	5.8	A	8.0	0.180	5.6	A	12.4
	R	0.123	14.4	B	8.0	0.180	14.2	B	12.4
North West: Holmes Street	L	0.159	16.9	C	3.7	0.264	18.2	C	6.9
	T	0.159	16.5	C	3.7	0.264	17.8	C	6.9
	R	0.159	16.7	C	3.7	0.264	18.0	C	6.9
South West: Southern River Road	L	0.277	10.2	B	19.2	0.257	11.2	B	18.6
	T	0.277	1.9	A	19.2	0.257	2.8	A	18.6
	R	0.277	10.5	B	19.2	0.257	11.5	B	18.6
All Vehicles		0.277	8.2	NA	19.2	0.264	9.2	NA	18.6

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The results above show that the operational performance of all approaches is generally acceptable. This assessment contradicts the findings of the Precinct 3 North Traffic Impact Assessment which suggested modification of this intersection to a signalised form, based on two-way traffic volumes. This assessment was based on the future two-way traffic volumes at this intersection which exceed the warrants given in Austroads guidelines. However, the intersection is of a very simple design and there is a high capacity for non-signalisation modifications to mitigate future traffic impacts. Therefore, it is not considered necessary to undertake signalisation works as a result of the Precinct 3 works.

5.3 MATISON STREET/RANFORD ROAD

The existing Matison Street/Ranford Road intersection is a priority controlled T- intersection as shown in **Figure 11.** The wide central median allows for staged crossing for right-turning egress from Matison Street, with sufficient storage for a single vehicle. The results of the operational analysis are summarised in **Table 6**.

Figure 11 ***Matison Street/Ranford Road Intersection Layout***

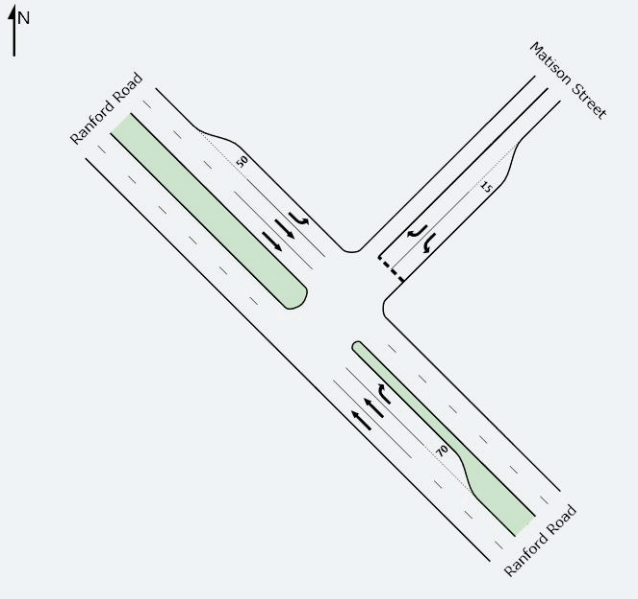

Table 6 ***SIDRA Results for Matison Street/Ranford Road Intersection***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	T	0.201	0.0	A	0.0	0.162	0.0	A	0.0
	R	0.247	43.7	C	6.0	0.226	38.5	C	3.3
North East: Matison Street	L	0.066	12.8	B	1.4	0.111	13.6	B	2.4
	R	0.206	21.5	C	4.7	0.279	24.0	C	6.9
North West: Ranford Road	L	0.041	8.4	A	0.0	0.029	8.4	A	0.0
	T	0.170	0.0	A	0.0	0.190	0.0	A	0.0
All Vehicles		0.247	2.9	NA	6.5	0.279	3.0	NA	6.9

The results above show that the operational performance of all approaches is generally acceptable.

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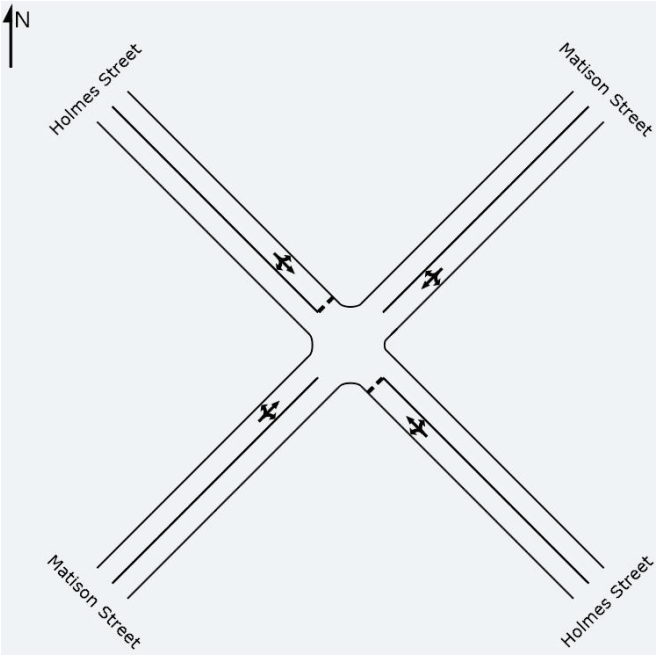
5.4 MATISON STREET/HOLMES STREET

The Matison Street/Holmes Street intersection is a priority controlled 4-way intersection as shown in **Figure 12.**

Figure 12 ***Matison Street/Holmes Street Intersection Layout***



The results of the operational analysis are summarised in **Table 7**.

Table 7 ***SIDRA Results for Matison Street/Holmes Street Intersection***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Holmes Street	L	0.098	10.0	A	2.4	0.088	9.9	A	2.2
	T	0.098	8.7	A	2.4	0.088	8.6	A	2.2
	R	0.098	10.2	B	2.4	0.088	10.1	B	2.2
North East: Matison Street	L	0.091	9.6	A	3.7	0.086	9.5	A	3.7
	T	0.091	1.2	A	3.7	0.086	1.1	A	3.7
	R	0.091	9.9	A	3.7	0.086	9.8	A	3.7
North West: Holmes Street	L	0.088	9.9	A	2.2	0.096	9.8	A	2.4
	T	0.088	8.6	A	2.2	0.096	8.6	A	2.4
	R	0.088	10.1	B	2.2	0.096	10.1	B	2.4
South West: Matison Street	L	0.104	9.2	A	4.7	0.094	9.3	A	4.2
	T	0.104	0.9	A	4.7	0.094	0.9	A	4.2
	R	0.104	9.5	A	4.7	0.094	9.5	A	4.2
All Vehicles		0.104	6.7	NA	4.7	0.096	6.7	NA	4.2

The results above show that the operational performance of all approaches is generally acceptable.

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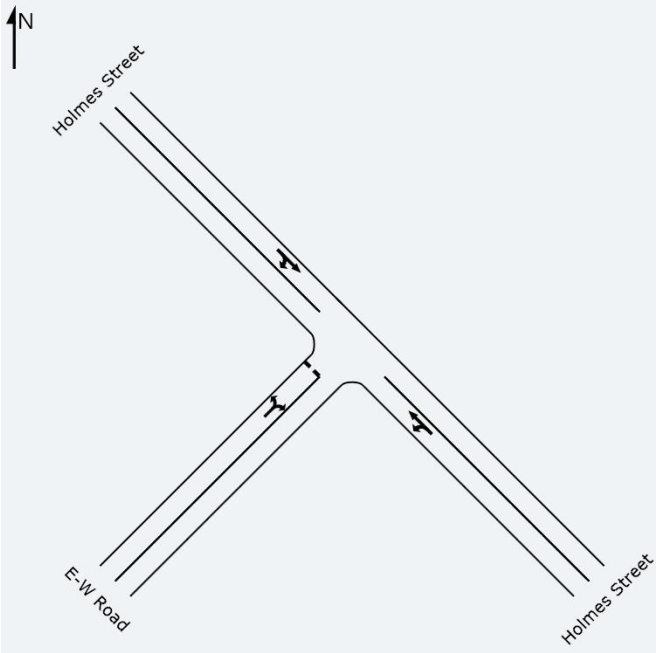
5.5 HOLMES STREET/E-W ACCESS STREET

The Holmes Street/E-W Access Street intersection is proposed as a priority controlled T- intersection as shown in **Figure 13.**

Figure 13 ***Holmes Street/E-W Access Street Intersection Layout***



The results of the operational analysis are summarised in **Table 8.**

Table 8 ***SIDRA Results for Holmes Street/E-W Access Street Intersection***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Holmes Street	L	0.045	8.2	A	0.0	0.040	8.2	A	0.0
	T	0.045	0.0	A	0.0	0.040	0.0	A	0.0
North West: Holmes Street	T	0.090	1.3	A	2.6	0.108	1.1	A	3.3
	R	0.090	9.8	A	2.6	0.108	9.6	A	3.3
South West: E-W Access Street	L	0.152	8.9	A	3.7	0.130	9.0	A	3.1
	R	0.152	9.1	A	3.7	0.130	9.3	A	3.1
All Vehicles		0.152	7.6	NA	3.7	0.130	7.3	NA	3.3

The results above show that the operational performance of all approaches is generally acceptable.

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5.6 BALANNUP DRAIN CROSSING

A crossing of the Balannup Drain is proposed between the Precinct 3E ODP area and the adjacent Precinct 3A lands to the east. The chosen crossing was previously supported by a roundabout internal to Precinct 3E which was proposed to control speed and improve priority. The roundabout also creates an effective and attractive entry statement to the area. The location of this roundabout also eliminates any long sections of straight road which might otherwise require calming.

The internal road configuration splits traffic between two approach roads, minimising the impact of traffic on the Balannup Drain reserve or the proposed wetlands POS. While its location is not directly opposite the Holmes Street connection, this option does create a simple connection through to the internal 'spine' road of the proposed Precinct 3A plan, as shown in **Figure 14**. Analysis of traffic volumes suggests that the volumes of traffic associated with this movement will not significantly impact the operation of the Precinct 3A internal road network.

Figure 14 ***Proposed Drain Crossing and Potential Connection to Precinct 3A***



Three options were investigated to determine if an alternative design yielded better results.

Alternative A relocates the drain crossing further to the east, creating a straight connection to Holmes Street, as shown in **Figure 15.** This reduces the viability of a roundabout form and suggests a staggered-tee arrangement across the Drain. Traffic demand analysis showed a much higher split of traffic along the Balannup Drain reserve, potentially impacting on the amenity of this system. The proposed staggered-T arrangement is considered inferior to the proposed roundabout which suggests that Alternative A is not a better option for development.

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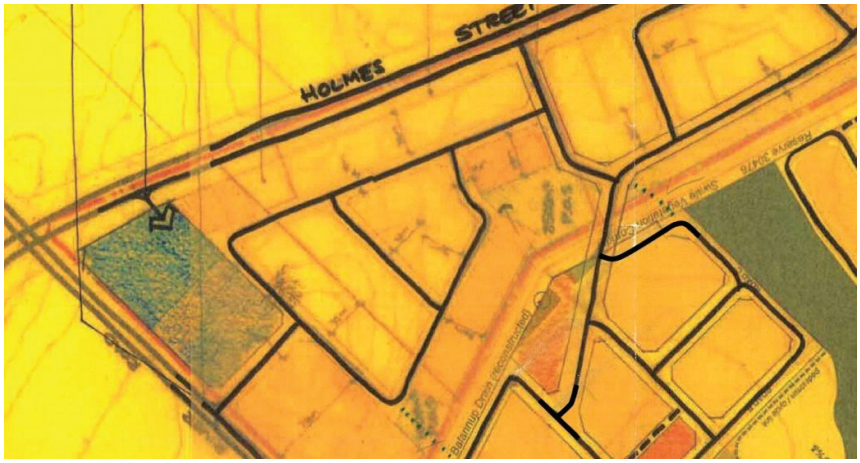
Figure 15 *Alternative A Balannup Drain Crossing and Associated Connection to Precinct 3A*



Alternative B realigns the crossing to create an angled bridge over the drain, as shown in **Figure 16**. This arrangement retains the detrimental features of Alternative A including a staggered-tee intersection form across the Drain, and also creates streamlined connection through Precinct 3A to Matison Street (a non-preferred distributor road) which would require additional traffic calming measures. The cost of this angled crossing is also likely to be significantly higher than the perpendicular bridge as a result of the additional engineering requirements, longer crossing length and non-symmetrical loading.

Figure 16 *Alternative B Balannup Drain Crossing and Associated Connection to Precinct 3A*



Alternative C retains the original crossing location, but removes the roundabout as shown in **Figure 17**. This alignment is preferred to the alternatives as it reduces the priority of the connection to Matison Street. The intersection configuration within Precinct 3E supports distributed traffic throughout this north-eastern cell, retaining amenity for active modes (walking, cycling etc.), particularly along the Drain frontage. The proposed staggered-T arrangement is considered a viable alternative to the proposed roundabout due to the short lengths associated with the major roadway, combined with the lack of expected cross traffic across the stagger. Alternative C is therefore supported as an option for development.

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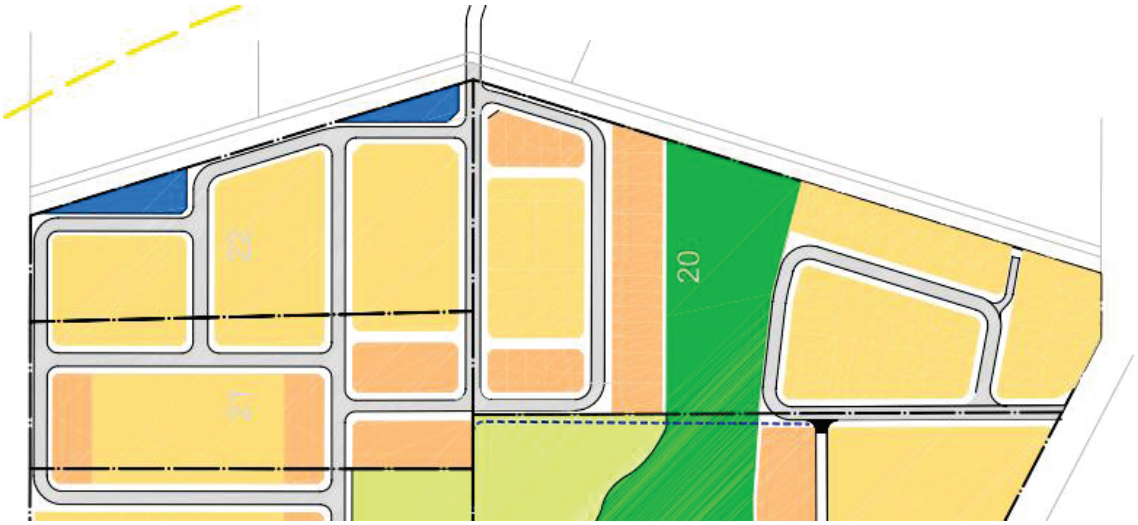
Figure 17 ***Alternative C Balannup Drain Crossing and Associated Connection to Precinct 3A***



Following the above analysis, the proposed crossing location has been shown to be the preferred option, with either a roundabout or through-connection considered appropriate. The proposed staggered-tee intersection within Precinct 3E is not expected to result in appreciable volumes of crossing traffic and is considered to be a viable alternative for a roundabout intersection at this point.

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6 FUTURE (2021) TRAFFIC OPERATIONS SCENARIO

The 2021 scenario, as modelled by the Main Roads WA Regional Operations Model (ROM), includes the impact of development throughout the local and regional areas. The only local road network modification that is modelled for this scenario is the 4-laning of Garden Street north of Balfour Street.

The lack of additional connections from the Southern River precinct suggests that within the study area, traffic growth will be restricted to internal development only, with regional traffic affecting operation only along the Southern River Road and Ranford Road boundaries. In particular, Holmes Street is not projected to connect through to Tonkin Highway in the 2021 ROM.

SIDRA analysis of the network has been undertaken for the boundary road network under the Ultimate (existing plus full development of Precinct 3) Scenario, at the following intersections, for AM and PM peak hours, using 2021 ROM outputs to determine background traffic flows.

- Southern River Road / Ranford Road
- Southern River Road / Holmes Street
- Matison Street / Ranford Road

For the purpose of this assessment, traffic volumes along Holmes Street are not projected to substantially increase, as no additional regional connection is proposed prior to the 2021 horizon. For this reason, a reassessment of the Holmes Street / Access Road intersection has been conducted only for the 2031 scenario.

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6.1 SOUTHERN RIVER ROAD/RANFORD ROAD

The Southern River Road/Ranford Road intersection has been analysed in its current roundabout form as shown in **Figure 9**.

The results of the operational analysis are summarised in **Table 9**.

Table 9 ***SIDRA Results for Southern River Road/Ranford Road Intersection (2021 Scenario)***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	L	0.829	12.9	B	84.5	0.742	10.1	B	58.0
	T	0.829	11.9	B	84.5	0.742	9.0	A	58.0
	R	0.829	19.7	B	81.5	0.742	16.5	B	56.5
North East: Southern River Road	L	1.003	73.5	E	221.9	1.923	1676.6	F	3693.7
	T	1.003	72.5	E	221.9	1.923	1675.6	F	3693.7
	R	1.003	79.4	E	221.9	1.923	1682.4	F	3693.7
North West: Ranford Road	L	0.930	29.1	C	156.6	0.922	24.1	C	148.6
	T	0.930	30.0	C	156.6	0.922	24.5	C	148.6
	R	0.930	37.4	D	143.9	0.922	32.1	C	139.0
South West: Balannup Road	L	0.648	25.0	C	28.2	0.505	16.5	B	19.5
	T	0.648	24.0	C	28.2	0.505	15.5	B	19.5
	R	0.648	30.9	C	28.2	0.505	22.4	C	19.5
All Vehicles		1.003	30.1	C	221.9	1.923	370.6	F	3693.7

The results above show that the roundabout is insufficient to accommodate the regional traffic growth along these two major regional connections and an alternative arrangement will be required by 2021.

A potential signalised intersection arrangement is shown in **Figure 18**.

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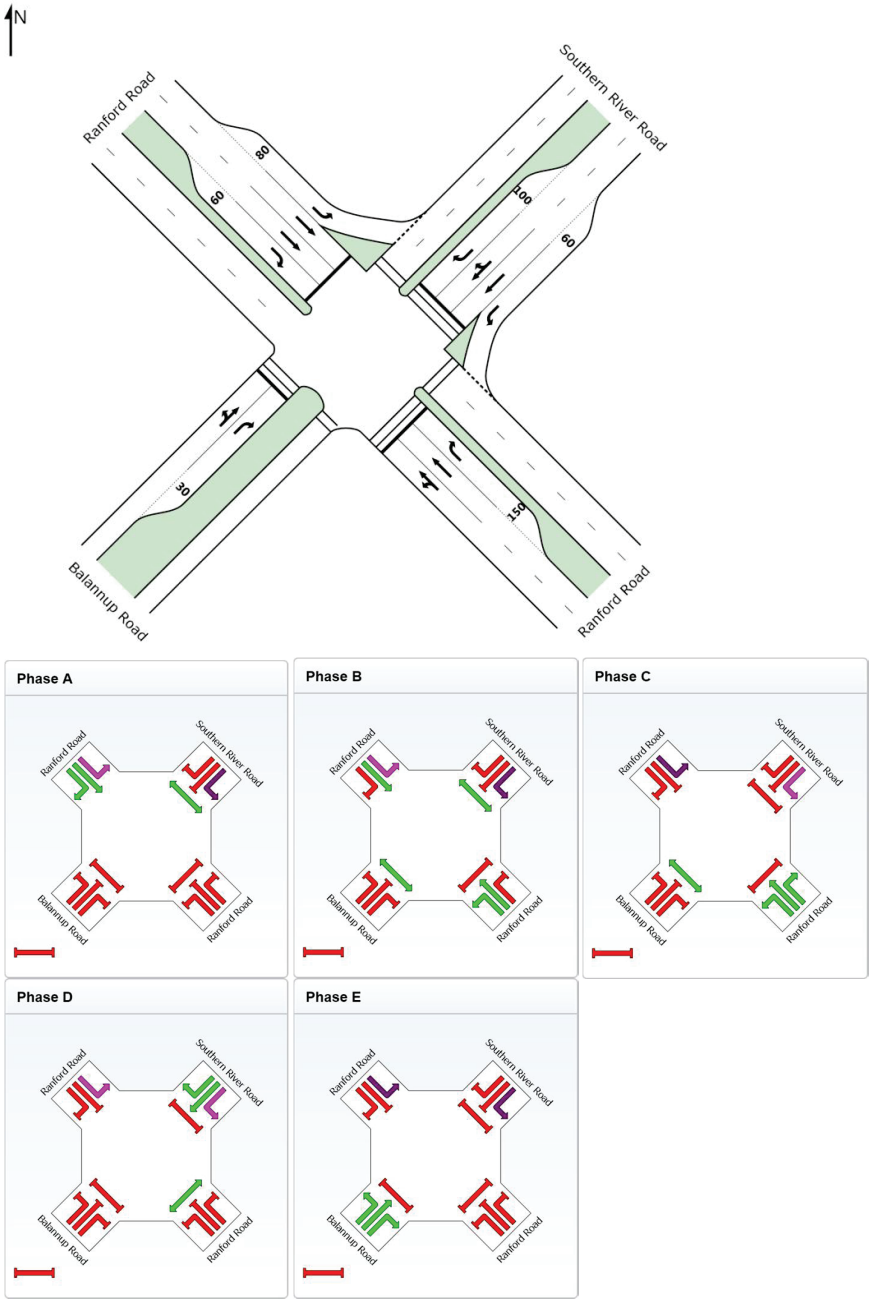
Figure 18 Potential Ranford Road / Southern River Road Signalised Intersection Layout and Phasing Diagram



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The above intersection geometry has been modelled in SIDRA and designed to provide an acceptable level of service for the 2021 PM peak. The results of operational analysis for this potential arrangement are shown in **Table 10**.

Table 10SIDRA Results for Potential Ranford Road/Southern River Road Signalised Intersection (2021 Scenario)

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	L	0.871	70.0	E	167.9	0.627	35.3	D	179.7
	T	0.871	43.7	D	320.0	0.627	26.9	C	180.7
	R	0.935	76.9	E	244.8	0.874	68.8	E	193.6
North East: Southern River Road	L	0.430	13.4	B	32.1	0.803	25.1	C	88.8
	T	0.461	47.6	D	57.1	0.778	52.4	D	103.4
	R	0.461	59.3	E	57.1	0.778	69.4	E	103.4
North West: Ranford Road	L	0.956	25.0	C	163.2	0.770	17.4	B	107.2
	T	0.846	56.8	E	169.1	0.886	58.9	E	236.2
	R	0.851	84.6	F	32.7	0.627	76.0	E	40.1
South West: Balannup Road	L	0.870	81.6	F	68.1	0.876	85.7	F	63.2
	T	0.870	73.2	E	68.1	0.876	77.3	E	63.2
	R	0.352	68.9	E	16.5	0.474	73.7	E	22.4
All □e□i□les		**0.956**	**49.2**	**D**	**320.0**	**0.886**	**45.3**	**D**	**236.2**

The minimal traffic along Balannup Road results in relatively long delays for both access and egress movements. This is considered acceptable, given necessity to retain priority for Southern River Road and Ranford Road traffic.

Signal phasing has been chosen to minimise traffic delays while still providing protected pedestrian crossing for Southern River Road and Ranford Road. Given the lack of trip attractors adjacent to this intersection, it is likely that pedestrian phasing would operate on an actuated basis. This suggests that the design and operation of the potential signalised intersection is conservative in this analysis.

A pedestrian filter has been modelled for the Balannup Road crossing. This is supported by the low volumes of traffic turning into Balannup Road, even during peak operation.

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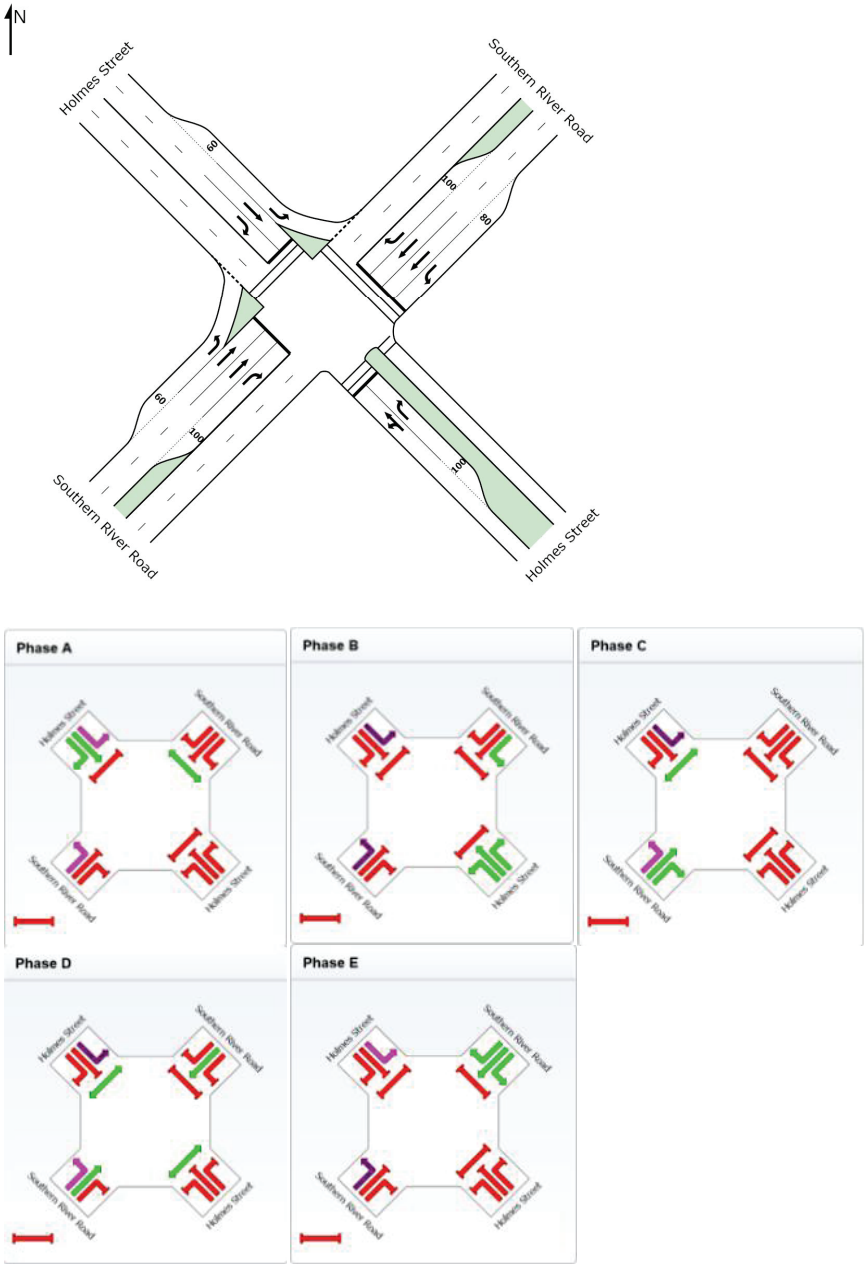
6.2 SOUTHERN RIVER ROAD /HOLMES STREET

The significant increase in traffic volumes resulting from the Garden Street extension to Southern River Road suggest that the existing intersection geometry will be unable to accommodate the Southern River Road/Holmes Street intersection is a priority controlled 4-way intersection. An alternative signalised intersection form has been modelled for the 2021 scenario, as shown in **Figure 19.**

Figure 19 Potential Southern River Road/Holmes Street Intersection Layout and Phasing Diagrams



The above intersection geometry has been modelled in SIDRA and designed to provide an acceptable level of service for the 2021 PM peak. The results of operational analysis for this potential arrangement are shown in **Table 11**.

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Table 11 *SIDRA Results for Southern River Road/Holmes Street Intersection (2021 Scenario)*

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Holmes Street	L	0.534	61.5	E	19.0	0.598	73.5	E	21.5
	T	0.534	53.1	D	19.0	0.598	65.2	E	21.5
	R	0.260	59.9	E	8.8	0.290	71.4	E	9.9
North East: Southern River Road	L	0.044	24.7	C	2.4	0.059	26.4	C	4.2
	T	0.165	20.6	C	24.5	0.228	24.6	C	41.7
	R	0.793	55.5	E	82.4	0.890	70.3	E	151.5
North West: Holmes Street	L	0.386	10.4	B	22.7	0.556	10.6	B	38.4
	T	0.055	31.4	C	5.9	0.064	32.6	C	9.2
	R	0.765	49.4	D	100.4	0.883	63.9	E	190.1
South West: Southern River Road	L	0.676	11.2	B	51.1	0.785	16.8	B	77.7
	T	0.494	32.7	C	67.6	0.549	43.9	D	79.1
	R	0.390	60.7	E	13.4	0.435	72.3	E	15.0
All □e□i□les		**0.793**	**29.5**	**C**	**100.4**	**0.890**	**38.7**	**D**	**190.1**

Signal phasing has been chosen to minimise traffic delays while still providing protected pedestrian crossing for Southern River Road and Holmes Street. Given the lack of trip attractors adjacent to this intersection, it is likely that pedestrian phasing would operate on an actuated basis. This suggests that the design and operation of the potential signalised intersection is conservative in this analysis.

At this location, pedestrian facilities have been shown across three (3) approaches, with all crossings fully protected.

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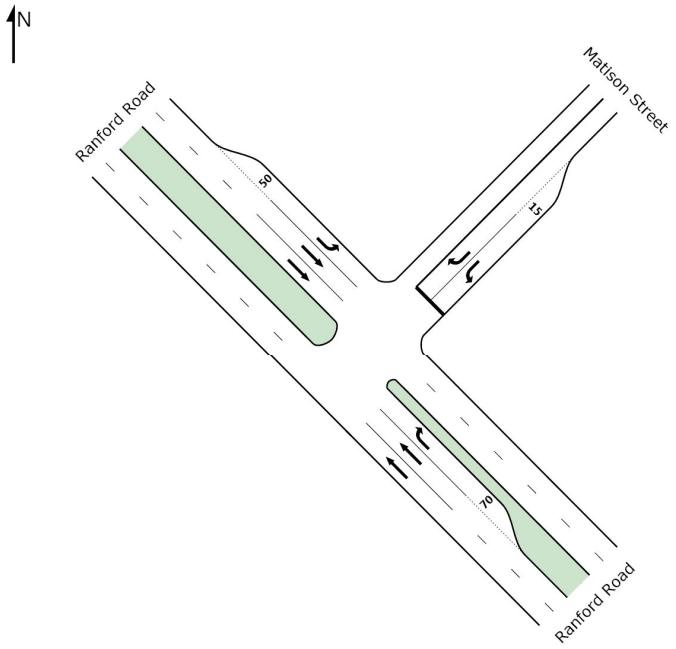
6.3 MATISON STREET/RANFORD ROAD

The existing Matison Street/Ranford Road intersection is a priority controlled T- intersection as shown in **Figure 11.** A revised intersection form has been modelled for the 2021 scenario, including a wide central median allows for staged crossing for right-turning egress from Matison Street and sufficient storage for a single vehicle. This potential layout is shown in **Figure 20**.

Figure 20 ***Potential Matison Street/Ranford Road Intersection Layout***



The results of the operational analysis are summarised in **Table 12**.

Table 12 ***SIDRA Results for Matison Street/Ranford Road Intersection (2021 Scenario)***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	T	0.451	0.0	A	0.0	0.418	0.0	A	0.0
	R	0.098	14.1	B	2.4	0.077	18.7	C	1.7
North East: Matison Street	L	0.045	13.8	B	1.1	0.118	18.9	C	2.7
	R	0.473	91.9	F	1.4	0.518	75.8	F	3.4
North West: Ranford Road	L	0.032	8.4	A	0.0	0.015	8.4	A	0.0
	T	0.282	0.0	A	0.0	0.395	0.0	A	0.0
All □e□i□les		**0.473**	**1.6**	**N/A**	**10.5**	**0.518**	**1.7**	**N/A**	**12.5**

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The results above show that the operational performance of all approaches is generally acceptable, though the right turning egress into Ranford Road from the central median is constrained by the volume of traffic. It should be noted that this analysis does not include the impact of upstream signals likely to be required at Ranford Road / Southern River Road, which would improve the intersection operation.

6.4 SUMMARY OF THE 2021 SCENARIO

Modifications to the strategic road network will be required as a result of regional traffic growth. Intersection analysis has been undertaken for the future 2021 scenario which indicates that:

- The form of Southern River Road / Ranford Road and Southern River Road / Holmes Street intersections will be insufficient to accommodate the traffic;
- Southern River Road / Ranford Road and Southern River Road / Holmes Street intersections will require signalisation by 2021; and
- The intersection of Ranford Road / Matison Street will continue to operate acceptably under the existing priority control arrangement, provided a central median sufficient to allow staged crossing is constructed.

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7 FUTURE (2031) TRAFFIC OPERATIONS SCENARIO

SIDRA analysis of the network has been undertaken for the boundary road network under the Ultimate (existing plus full development of Precinct 3) Scenario, at the following intersections, for AM and PM peak hours, using 2031 ROM outputs to determine background traffic flows.

- Southern River Road/Ranford Road
- Southern River Road/Holmes Street
- Holmes Street/E-W Access Street
- Ranford Road/Matison Street

For the purpose of this assessment, the future road network has been taken from the Main Roads WA 2031 ROM output. This assumes that Matison Road does not connect with the Holmes Street extension to Tonkin Highway. However, it is understood that an MRS amendment is currently underway that would realign Garden Street and include a connection to Matison Street. The impact of this connection on traffic volumes is not fully understood and has been omitted from this analysis. Further investigation may be required following the MRS amendment process, once alignment and connection options are finalised.

While access from Matison Street to the realigned Garden Street has not been modelled for this analysis, a connection between the E-W Access Street is considered to be the worst-case for operation and has been included for completeness.

7.1 SOUTHERN RIVER ROAD/RANFORD ROAD

The Southern River Road/Ranford Road intersection has been assessed in its potential 2021 form, and then modified to accommodate the additional traffic anticipated for 2031.

Changes to this intersection are restricted to minor increases in turning pocket length to ensure sufficient queuing space. No significant modifications are expected to be required between 2021 and 2031.

The modified potential intersection layout and phasing diagrams are shown in **Figure 21**.

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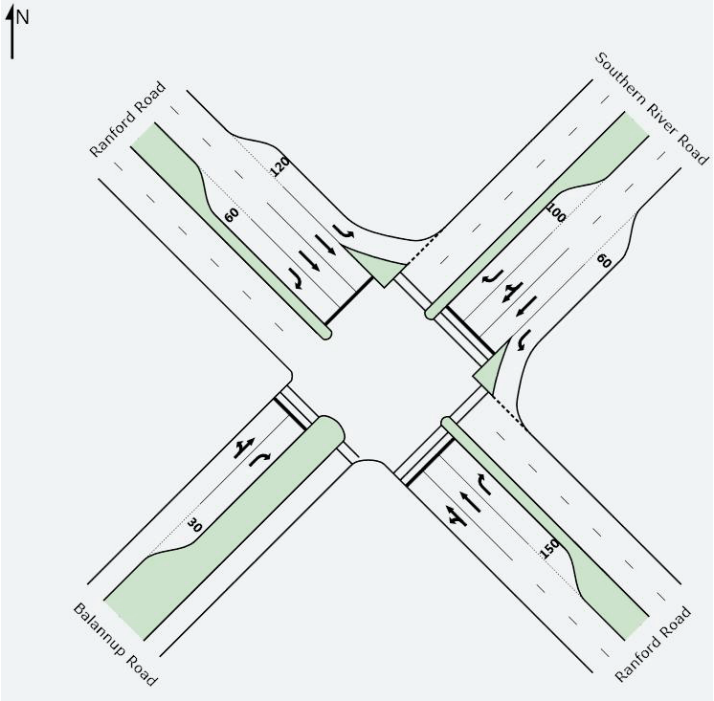
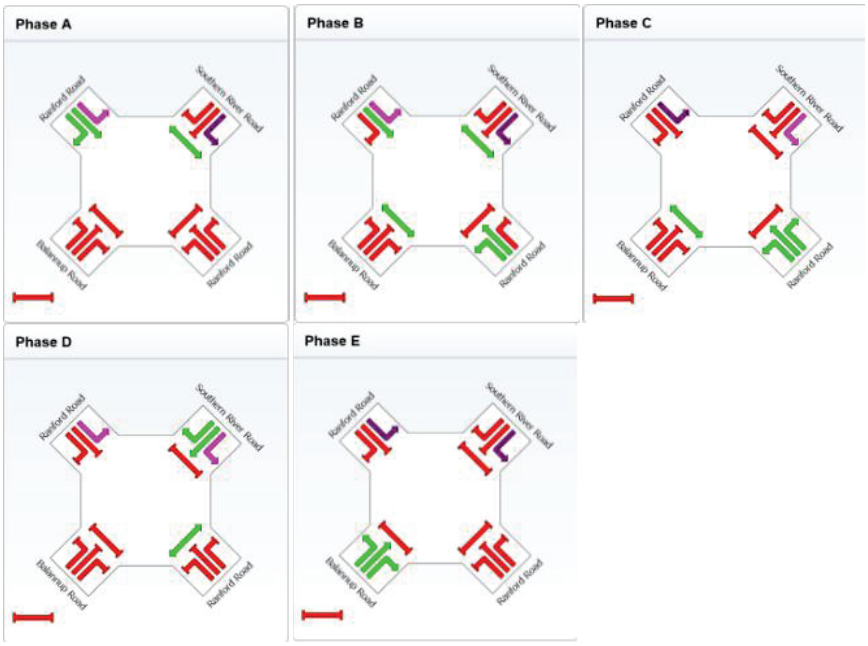
Figure 21 ***Potential Southern River Road/Ranford Road Intersection Layout and Phasing Diagrams***





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The results of this assessment are shown in **Table 13.**

Table 13 ***SIDRA Results for Southern River Road/Ranford Road Intersection (2031 Scenario)***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	L	0.802	41.3	D	182.7	0.627	35.3	D	179.7
	T	0.802	32.9	C	183.6	0.627	26.9	C	180.7
	R	0.819	54.9	D	117.3	0.874	68.8	E	193.6
North East: Southern River Road	L	0.344	10.6	B	21.0	0.803	25.1	C	88.8
	T	0.128	35.6	D	14.3	0.778	52.4	D	103.4
	R	0.719	50.6	D	91.0	0.778	69.3	E	103.4
North West: Ranford Road	L	0.816	17.3	B	138.8	0.697	17.4	B	107.2
	T	0.648	40.0	D	86.0	0.886	58.9	E	236.2
	R	0.848	69.2	E	38.2	0.627	76.0	E	40.1
South West: Balannup Road	L	0.798	64.5	E	50.5	0.876	85.7	F	63.2
	T	0.798	56.1	E	50.5	0.876	77.3	E	63.2
	R	0.209	56.8	E	9.6	0.474	73.6	E	22.4
All □e□i□les		**0.848**	**35.9**	**D**	**183.6**	**0.886**	**45.3**	**D**	**236.2**

The Southern River Road / Ranford Road intersection is shown to operate effectively through to the 2031 horizon with only minor changes from the 2021 intersection form.

7.2 SOUTHERN RIVER ROAD/HOLMES STREET

The Southern River Road/Holmes Street (Garden Street) intersection has been assessed in a modified form, consistent with the additional demand east of Southern River Road resulting from connection through to Tonkin Highway. The intersection has been designed to provide an acceptable level of service at the 2031 horizon. The potential 2031 signalised intersection layout and signal phasing diagrams are shown in **Figure 22**, and then modified to accommodate the additional traffic anticipated for 2031.

Changes to this intersection are restricted to minor increases in turning pocket length to ensure sufficient queuing space. No significant modifications are expected to be required between 2021 and 2031.

The modified potential intersection layout and phasing diagrams are shown in **Figure 21**.

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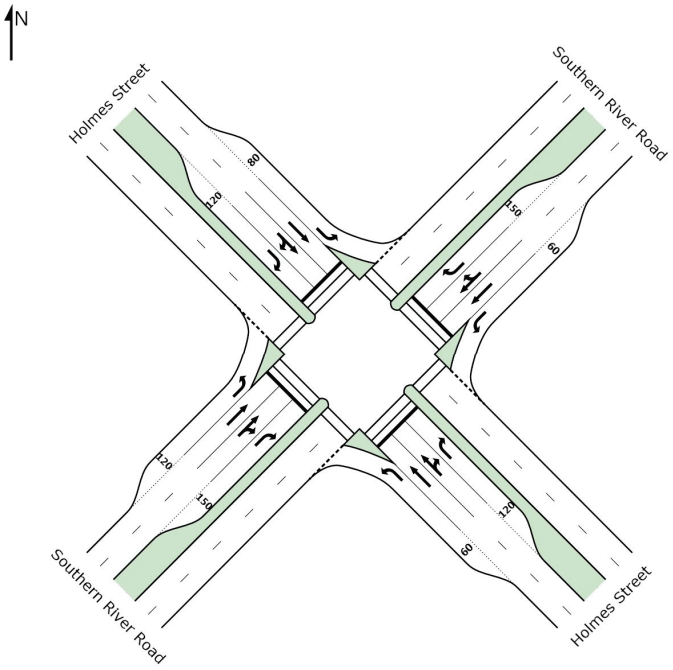
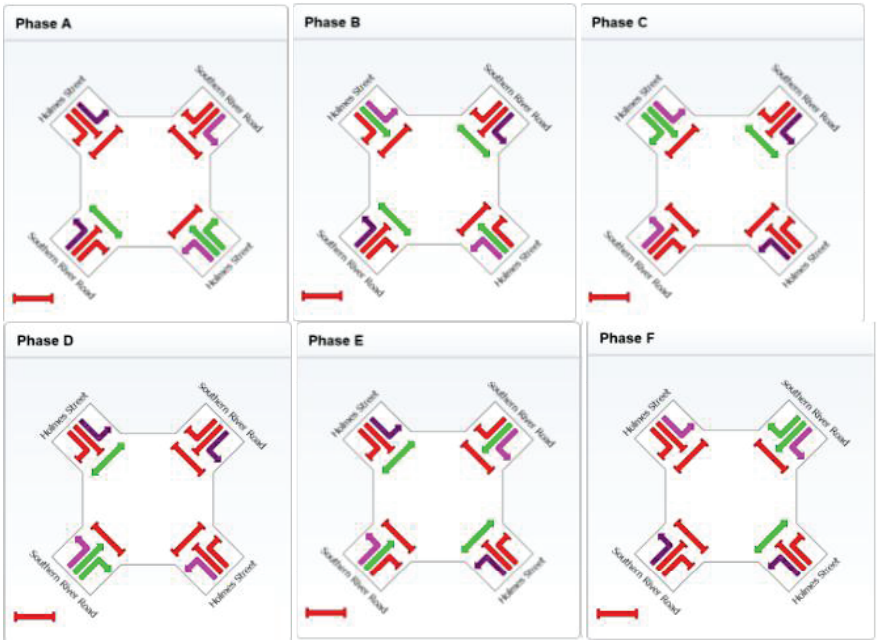
Figure 22Potential Southern River Road/Holmes Street (Garden Street) Intersection Layout and Phasing Diagrams





As a result of the increased demand, protected pedestrian phasing is proposed at all approaches and additional left-turning slip lanes included to improve operation. The results of the 2031 operation assessment are shown in **Table 14**.

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Table 14 *SIDRA Results for Southern River Road/Holmes Street*

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Holmes Street	L	0.512	12.9	B	36.5	0.640	18.8	B	53.6
	T	0.753	41.4	D	91.3	0.810	52.4	D	102.9
	R	0.753	53.9	D	68.4	0.810	64.7	E	76.3
North East: Southern Rive Road	L	0.229	15.0	B	18.6	0.420	19.1	B	36.7
	T	0.484	35.4	D	52.4	0.785	49.8	D	97.7
	R	0.754	58.2	E	40.1	0.787	63.5	E	64.2
North West: Holmes Streeet	L	0.532	15.6	B	51.1	0.731	15.3	B	79.7
	T	0.795	39.3	D	116.7	0.800	39.2	D	164.6
	R	0.795	53.2	D	79.0	0.800	52.7	D	130.4
South West: Southern Rive Road	L	0.540	14.6	B	78.9	0.598	15.3	B	79.8
	T	0.769	38.5	D	106.1	0.780	49.4	D	101.0
	R	0.826	58.7	E	60.1	0.780	62.2	E	70.9
All □e□i□les		**0.826**	**36.0**	**D**	**116.7**	**0.810**	**40.6**	**D**	**164.6**

The results show that under the potential arrangement modelled in this analysis, the intersection will continue to operate in an effective manner through to the 2031 horizon.

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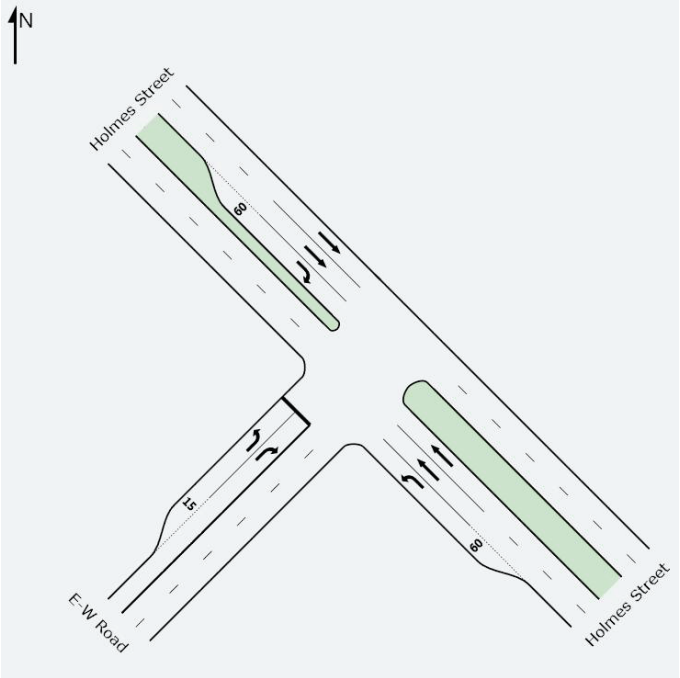
7.3 HOLMES STREET/E-W ACCESS STREET

A potential priority-controlled layout has been modelled for the E-W Access Street under t he 2031 scenario. The changes to geometry reflect the higher volumes along Holmes Street (Garden Street), necessitating construction of a wide central median sufficient to allow staged right-turning egress from the development towards Tonkin Highway.

The potential intersection layout is shown in **Figure 23**.

Figure 23 ***Potential Holmes Street/E-W Access Street Intersection layout***



The above intersection has been modelled for the 2031 scenario by including the benefits of staged crossing for right-turning egress. The impact of the upstream signals at Southern River Road / Holmes Street have not been included in this analysis, suggesting that the results shown in **Table 15** are likely to be conservative.

Table 15 ***SIDRA Results for Holmes Street/E-W Access Street***

Road		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Holmes Street	L	0.015	8.2	A	0.00	0.015	8.2	A	0.0
	T	0.227	0.0	A	0.00	0.227	0.0	A	0.0
North West: Holmes Street	T	0.272	0.0	A	0.00	0.272	0.0	A	0.0
	R	0.077	13.5	B	0.64	0.077	13.5	B	1.7
South West: E-W Access Street	L	0.164	17.7	C	0.68	0.164	17.7	C	3.4
	R	0.261	35.2	E	0.92	0.261	35.2	E	5.4
All □e□i□les		**0.665**	**3.9**	**NA**	**0.08**	**0.665**	**3.9**	**NA**	**15.7**

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7.4 RANFORD ROAD/MATISON STREET

While Matison Street has not been modelled with a connection to Garden Street under the 2031 scenario, changes to regional traffic flows as a result of the Holmes Street (Garden Street) connection to Tonkin Highway significantly impact volumes along Ranford Road. Therefore, a separate analysis of the Ranford Road / Matison Street intersection has been undertaken for the 2031 scenario. The layout of this intersection remains unchanged from the potential arrangement shown in **Figure 20**.

The results below (**Table 16**) show the operational performance of the intersection under the ultimate 2031 scenario. These results indicate that the intersection will continue to operate in an acceptable manner through to 2031.

Table 16 ***SIDRA Results for Ranford Road/Matison St***

ROAD NAME**Road**		AM Peak				PM Peak			
		DOS (%)	Delay (s)	LOS	Queue (m)	DOS (%)	Delay (s)	LOS	Queue (m)
South East: Ranford Road	T	0.396	0.0	A	0.0	0.367	0.0	A	0.0
	R	0.089	13.4	B	2.1	0.053	16.8	C	1.1
North East: Matison Street	L	0.113	15.0	B	2.4	0.229	21.4	C	5.0
	R	0.103	12.2	B	2.6	0.182	14.9	B	4.5
North West: Ranford road	L	0.028	8.4	A	0.0	0.011	8.4	A	0.0
	T	0.221	0.0	A	0.0	0.310	0.0	A	0.0
All □e□i□les		**0.655**	**2.8**	**NA**	**18.1**	**0.650**	**2.8**	**NA**	**19.2**

7.5 SUMMARY OF THE 2031 SCENARIO

Additional modifications to the strategic road network will be required as a result of changes to regional traffic flows resulting from the proposed Holmes Street (Garden Street) extension to Tonkin Highway and further regional growth. Intersection analysis has been undertaken for the future 2031 scenario which indicates that:

- The form of the Southern River Road / Holmes Street intersection will need to be modified to aupport additional traffic travelling to and from Tonkin Highway;
- The Southern River Road / Ranford Road intersection will continue to operate effectively in its 2021 form with only minor changes to turning pocket length;
- Upgrade of Holmes Street (Garden Street) will impact the Holmes Street / E-W Access Street intersection, requiring provision of a central median to facilitate staged crossing; and
- The intersection of Ranford Road / Matison Street will continue to operate acceptably under the existing priority control arrangement, provided a central median sufficient to allow staged crossing is constructed.

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8 CONCLUSIONS

This Traffic Impact Assessment report has been prepared by Cardno Eppell Olsen (Cardno) and considers the impact of the proposed residential development in Southern River. This report has been completed to a standard consistent with the requirements of the City of Gosnells and the WAPC Transport Assessment Guidelines for Developments: Volume 2 – Structure Plans (2006).

The configuration of the access points for the study area including priority T-intersection and roundabout are considered to be adequate. A combination of LATM measures are proposed including threshold treatments and raised pavements.

The form and location of the Balannup Drain crossing have been investigated to determine a 'best' option with respect to traffic distribution, cost and other impacts. The results of this analysis suggest that the proposed crossing location and alignment represent the preferred option.

In particular, the assessment considers the operational impact on the following intersections in regards to the proposed residential development:

- Southern River Road / Ranford Road
- Southern River Road / Holmes Street
- Matison Street / Ranford Road
- Matison Street / Holmes Street
- Holmes Street / E-W Access Street

The results of the SIDRA analysis show that the operational performances of all approaches for each of the above intersection are generally acceptable, and that signalisation of intersections along Holmes Street is not required as a result of the Precinct 3 development in the short term.

Further operational analysis based on 2021 and 2031 ROM data supports the findings of previous studies which suggest a requirement for signalisation at Southern River Road / Ranford Road and Southern River Road / Holmes Street. Modifications to the priority intersections at Matison Street / Ranford Road and Holmes Street / E-W Access Street are considered to be feasible for the geometries shown in this report.

It should be noted that the residential unit yields proposed in the current development plans have decreased from the 420 units quoted in this report, to 337, and the resulting traffic generation volumes quoted in this report can therefore be viewed as a very conservative estimate. As analysis of the intersections included in this report have shown that all intersections are expected to operate within an acceptable level of service (C or better) with the traffic generated by the originally proposed 420 units, these intersections are expected to operate at a better or similar level of service as a consequence of the decreased unit yields.

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Proposed Local Structure Plan

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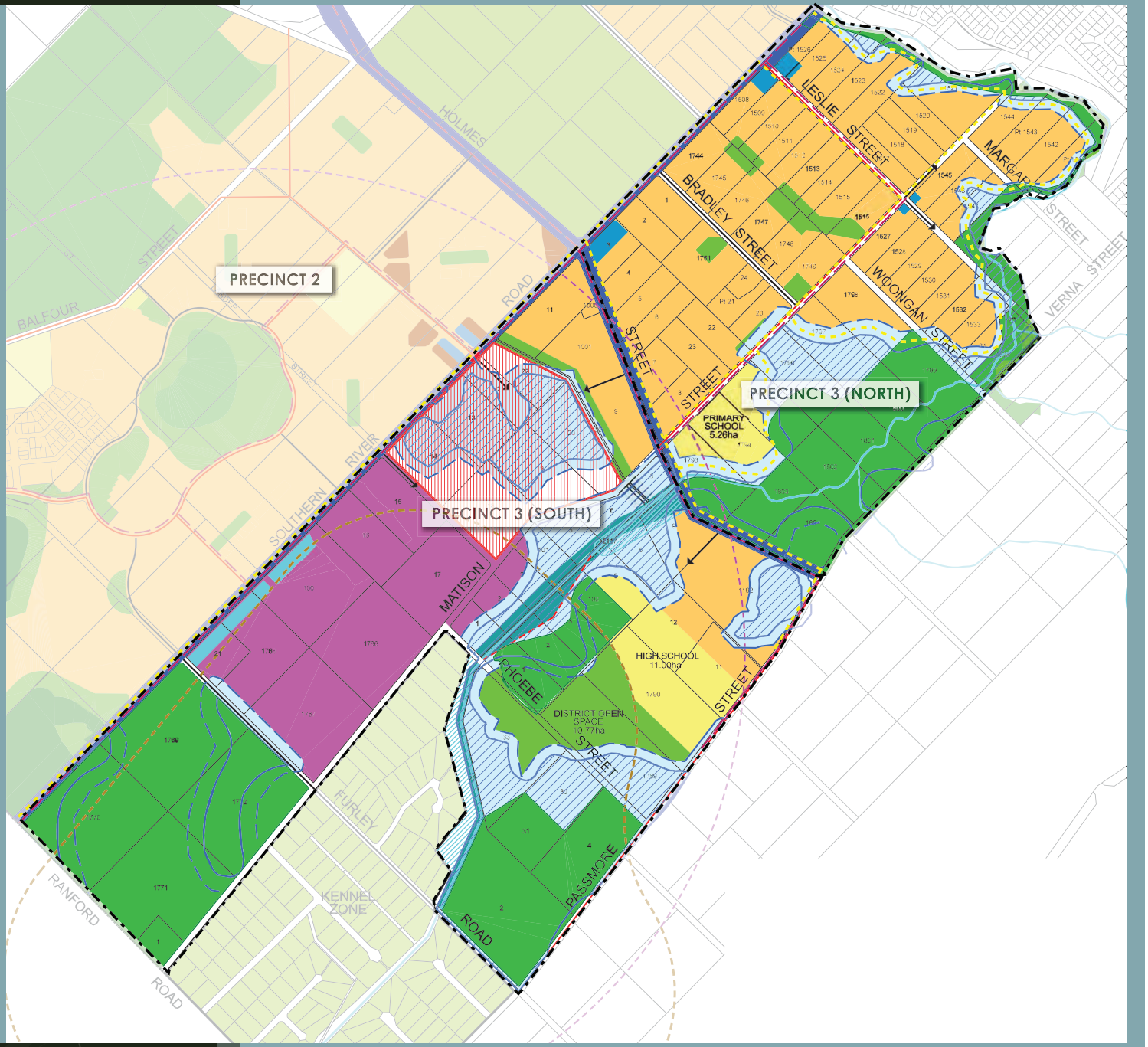
LEGEND

- Residential
- Local Centre
- Mixed Business
- Light Industrial
- Community Purpose
- Eco-Living Zone
- Open Space
- Parks and Recreation Reservation
- Widening Required For Forrestdale Main Drain
- Kennel Zone
- 500m Kennel Buffer Area (Subject to further acoustic study)
- 1500m Liquid Waste Site Buffer
- Other Regional Road
- Neighbourhood Connector
- Local Connector
- Traffic Signals
- Core Conservation (including Buffers)
- Forrestdale Main Drain
- Proposed Bus Route
- Overland Flow Path
- 1:100 Event Extent (50m - 100m)
- Precinct 3 Boundary
- Dual Use Paths

NOTES

- Further Local Open Space to be provided in accordance with Council and Drainage requirements.
- Medium residential densities to be provided in accordance with City of Gosnells Local Housing Strategy criteria.
- A Place of Worship is constructed on Lot 16 Southern River Road. Additional development of the site will be subject to resolution of wetland and other enviromentally sensitive area protection requirements.
- Planning of the Light Industrial Area will be subject to resolution of wetland and other environmentally sensitive area protection requirements.



PRECINCT 3 STRUCTURE PLAN
SOUTHERN RIVER STRUCTURE PLAN - PRECINCT 3

Southern River

FIGURE 11

0m 100m 200m 300m 400m

date: sept 2008
plan no: 04/104/G009
scale: 1:12 000

TAYLOR BURRELL BARNETT
Town Planning and Design

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Proposed Concept Design Plan

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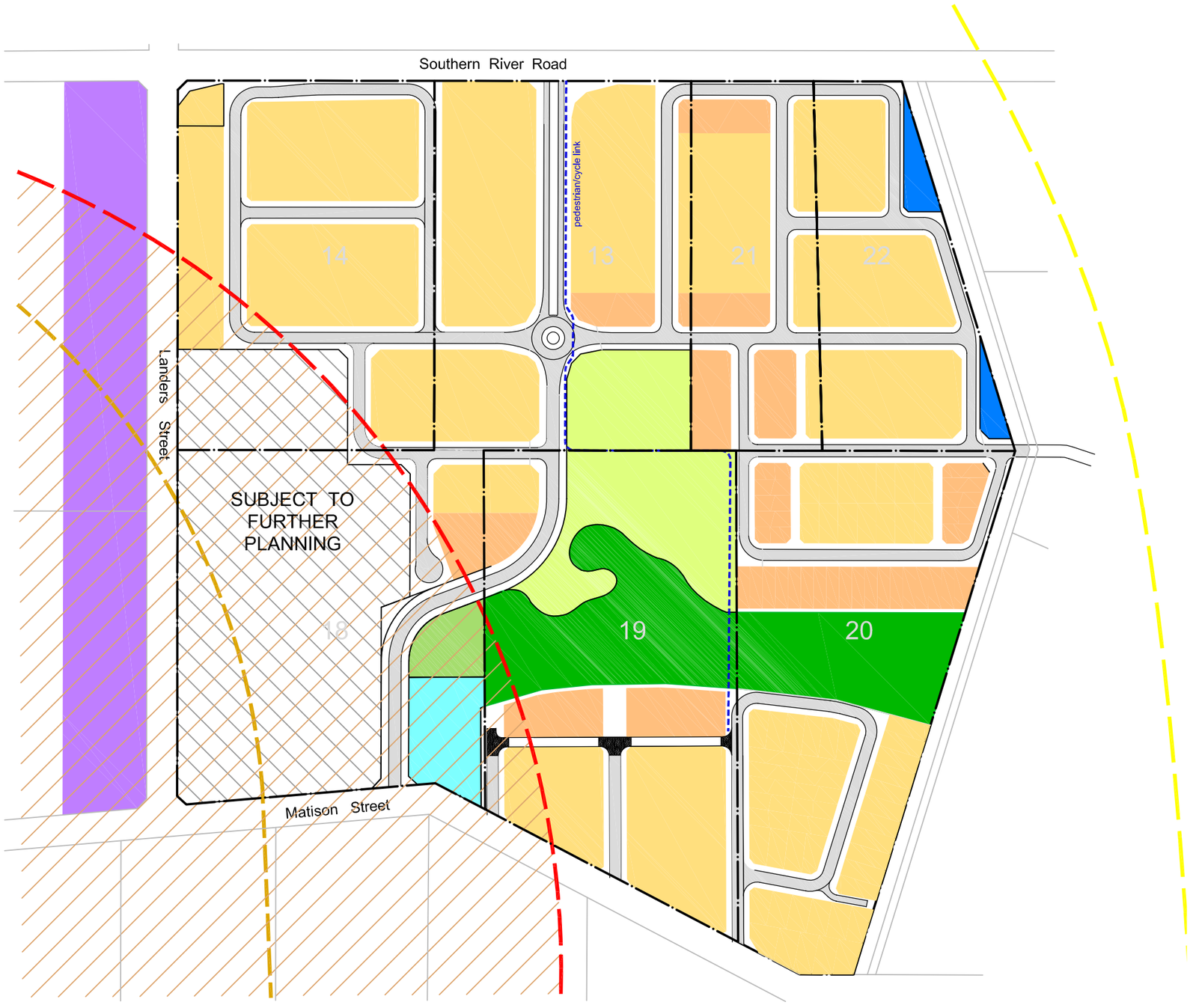
KEY

- Residential R30
- Medium Density R40
- Conservation POS
- Traditional POS
- Urban Water Management POS Swale Drainage
- Swale Drainage
- Subject to Further Planning
- Village hub. Maximum PLUC5 shop / retail floor space1200m² NLA
- Road Reserve
- Access Place with Street Parking
- 500m Kennel Buffer Area as mapped on adopted District and Local Structure Plans
- 500m Buffer to the outer boundary of all kennels zone properties
- 1000m Kennel Buffer Special Control Area



Notes:
If Laneways developed, DAP's are required.

Applications for subdivision and development of land in the hachured area will not be supported unless an appropriately conducted acoustic study can demonstrate an acceptable noise impact is achievable.

The maximum area of PLUC5 shop/retail floorspace in the Village Hub shall be 1200m² NLA.

A Wetland and Conservation Area Management Plan (or similar) is to be prepared prior to the submission of any application for subdivision or development of land that may impact on the environmental values or drainage functionality of the proposed Public Open Space area. The plan is to be prepared in accordance with relevant City, Department of Water and Department of Environment and Conservation guidelines.

A suitable uniform screen wall or fencing will need to be constructed and landscaping installed where lots are proposed to back onto Lander Street.

The alignment and width of road reserves may need to be adjusted at the subdivision design stage, in consideration access, servicing and parking requirements.

Satisfactory arrangements will need to be made to upgrade existing roads and road reserves that abut the ODP area to an urban standard, including drainage, pathways, lighting and intersection treatments.

Satisfactory arrangements will need to be made for the suitable and timely construction of the crossing over Balannup Lake branch drain.

Adjust the configuration of roads adjacent to Balannup Lake branch drain to provide a road to be constructed across the drain that can connect with the future intersection to be constructed on Holmes Street, as illustrated in the plan contained in Appendix 13.5.6H

Subject to Further Planning -
Use class permissibility as per TPS.

Cinema / Theatre	- A	Civic Use	- D	Club Premises	- A
Community Purpose	- D	Educational Establishment	- A	Hospital	- A
Market	- A	Medical Centre	- D	Office	- D
Place of Worship	- A	Reception Centre	- A	Recreation Private	- D
Retail Nursery	- D	Service Station	- A	Showroom	- D
Tavern	- A	Veterinary Centre	- A		

A detailed area plan shall be prepared for approval by the City of Gosnells, defining the distribution of land use, road hierarchy and built form guidelines, where deemed necessary by the City.

Figure 4

OUTLINE DEVELOPMENT PLAN *(indicative plan subject to change and detailed design)*

Lots 12, 14, 18, 19, 20, 21 and 22 Southern River and Matison Street
(in collaboration wirh owners of lot 18 and 20)

M G A
Town Planners
Scale 1:3000 at A3

February 2013

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Proposed LATM Treatment Plan

Document Set ID: 9303594
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KEY

- Residential R30
- Medium Density R40
- Conservation POS
- Traditional POS
- Urban Water Management POS Swale Drainage
- Swale Drainage
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- Village hub, Maximum PLUC5 shop / retail floor space1200m² NLA
- Road Reserve
- Access Place with Street Parking
- 500m Kennel Buffer Area as mapped on adopted District and Local Structure Plans
- 500m Buffer to the outer boundary of all kennels zone properties
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Community Purpose	- D	Educational Establishment	- A	Hospital	- A
Market	- A	Medical Centre	- D	Office	- D
Place of Worship	- A	Reception Centre	- A	Recreation Private	- D
Retail Nursery	- D	Service Station	- A	Showroom	- D
Tavern	- A	Veterinary Centre	- A		

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ROM Outputs

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2006 Base Network (for Calibration)



Extract from Main Roads WA ROM (Version 2011)

Document Set ID: 9303594
Version: 1, Version Date: 24/07/2026

2011 Base Network



Extract from Main Roads WA ROM (Version 2011)

Document Set ID: 9303594
Version: 1, Version Date: 24/07/2026

2021 Base Network



Extract from Main Roads WA ROM (Version 2011)

Document Set ID: 9303594
Version: 1, Version Date: 24/07/2026

2031 Base Network



Extract from Main Roads WA ROM (Version 2011)

Document Set ID: 9303594
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