TRANSPORT IMPACT ASSESSMENT

Project:	Proposed Outline Development Plan Southern River Sub-Precinct 3D
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1 Summary

Shawmac Pty Ltd was commissioned by Dynamic Planning to undertake an assessment of the transportation impacts associated with the revised Outline Development Plan for Southern River Sub-precinct 3D.

Since the previous revision of the Transport Impact Assessment prepared in 2012, the structure plan area has been reduced, with the remaining area to be addressed under a separate ODP.

It is concluded that the internal transport network is compliant with the WAPC Liveable Neighbourhoods guidelines and the structure plan traffic can be accommodated within the capacity of the existing and future planned road network.

The proposed street network will provide an acceptable range of choices for travel and ensure that traffic volumes on individual streets can be kept below threshold levels to ensure the amenity of the area is preserved and safe movement options exist for pedestrians, cyclists and local traffic.

2 Introduction and Background

2.1 General

Shawmac has been engaged by Dynamic Planning to undertake a Transport Impact Assessment of the revised ODP for Southern River Sub-precinct 3D. The ODP proposes development of approximately 310 residential lots (including 3 grouped housing sites).

The assessment has been prepared in accordance with the Western Australian Planning Commission's (WAPC) *Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans*. The intent of this transport assessment is to clearly demonstrate to the approving authority that the subdivision would:

- provide safe and efficient access for all modes;
- be well integrated with the surrounding land uses;
- not adversely impact on the surrounding area; and
- not adversely impact on the surrounding transport networks and the users of those networks.

2.2 Location

The site is bounded by Matison Street, Holmes Street and Passmore Street as shown on **Figure 1** and comprises Lots 8, 9 and 1792 Holmes Street and Part Lots 5 and 6 Matison Street, Southern River.

An aerial photo of the site is shown in **Figure 2**.

Figure 1: Location

Figure 2: Aerial Photo of Site

3 Structure Plan Proposal

3.1 Regional Context

The site is within Southern River Precinct 3 Local Structure Plan Area as shown in **Figure 3**.

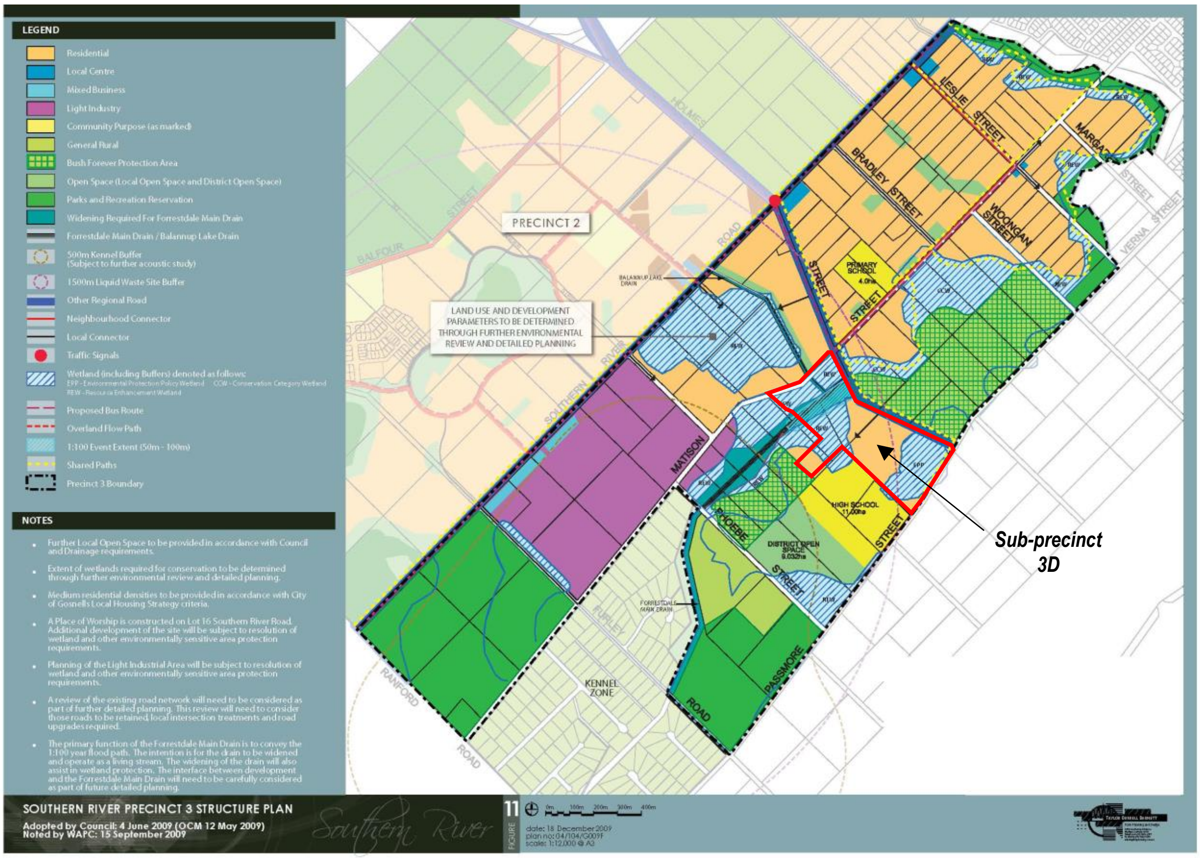

Figure 3: Southern River Precinct 3 Structure Plan

The Southern River Precinct 3 area is served by Southern River Road along its northwest boundary and Passmore Street along its southwest boundary. Holmes Street runs through the centre of the precinct and forms the boundary between the north and south cells of Precinct 3.

3.2 Proposed Outline Development Plan and Land Use

The proposed ODP is shown in **Figure 4**.

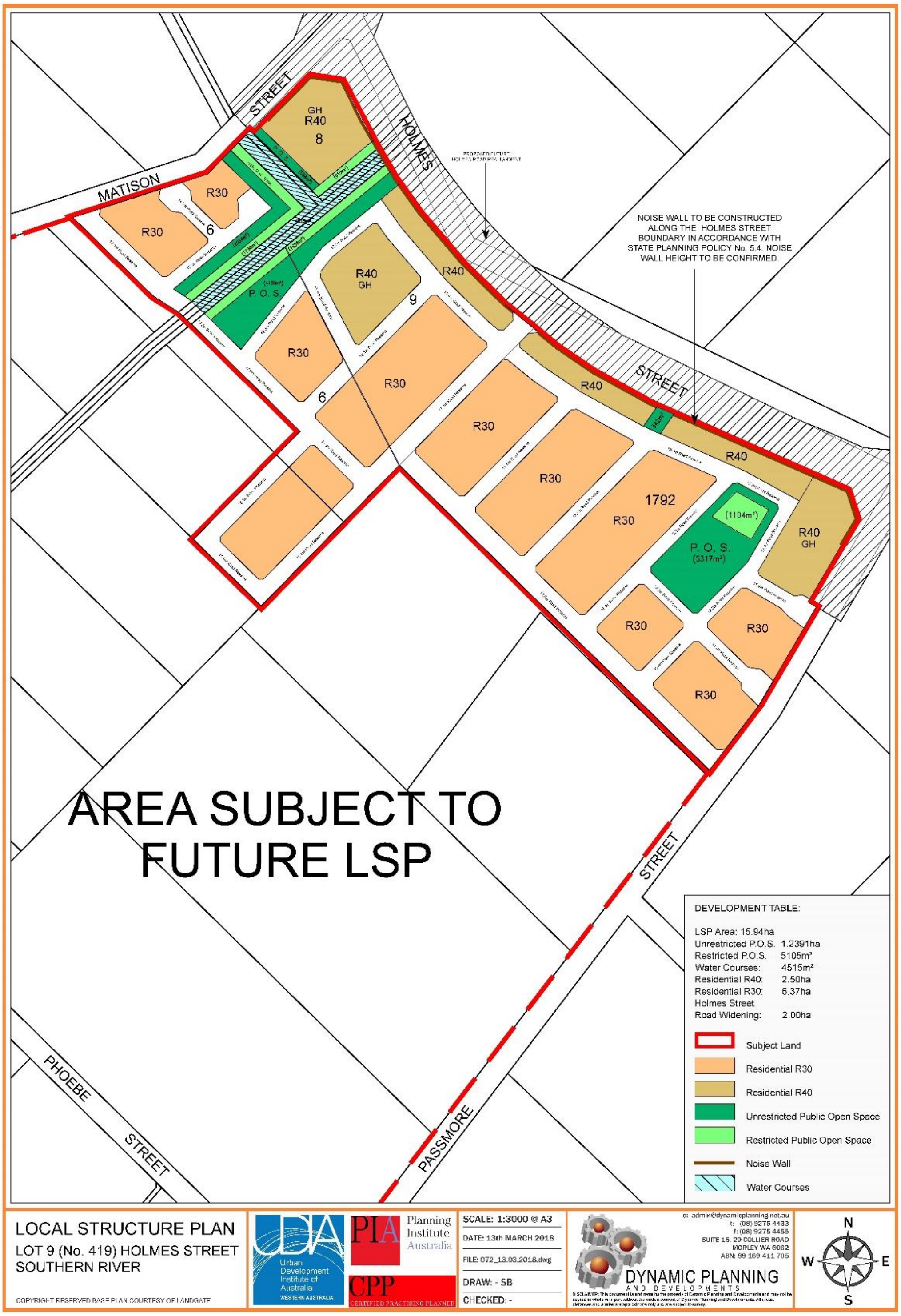

Figure 4: Proposed Southern River Precinct 3D Outline Development Plan

Proposed land use is primarily residential and public open space as summarised in **Table 1**. The dwelling yield has been estimated from a Subdivision Concept Plan. The dwelling yield for the grouped housing sites has been based on the average R40 lot size of 220sqm in accordance with the WAPC Residential Design Codes.

Table 1: Proposed Land Use and Yields

Land Use	Area (ha)	Number of Dwellings
Residential (R30)	6.45	198
Residential (R40)	2.50	112
Public Open Space / Drainage	1.75	-

4 Existing Situation

4.1 Land Use

Under the City of Gosnells *Town Planning Scheme No. 6* (TPS6), the majority of the site is zoned *Residential*.

The majority of the site is undeveloped. There are two existing rural properties on Lot 8 Holmes Street and Lot 6 Matison Street. Both properties comprise a dwelling and several outbuildings.

The adjacent land is also largely undeveloped with only a few rural properties along Matison Street. In the broader area, typical suburban development is underway towards the north and west within Southern River Precinct 2 and Sub-precinct 3A.

4.2 Road Network

According to Main Roads WA *Road Information Mapping System,* the existing Matison Street, Holmes Street and Passmore Street are all currently classified as Access Roads. Southern River Road is currently classified as a District Distributor A Road. The existing hierarchy of the road network surrounding the site is shown in **Figure 5**.

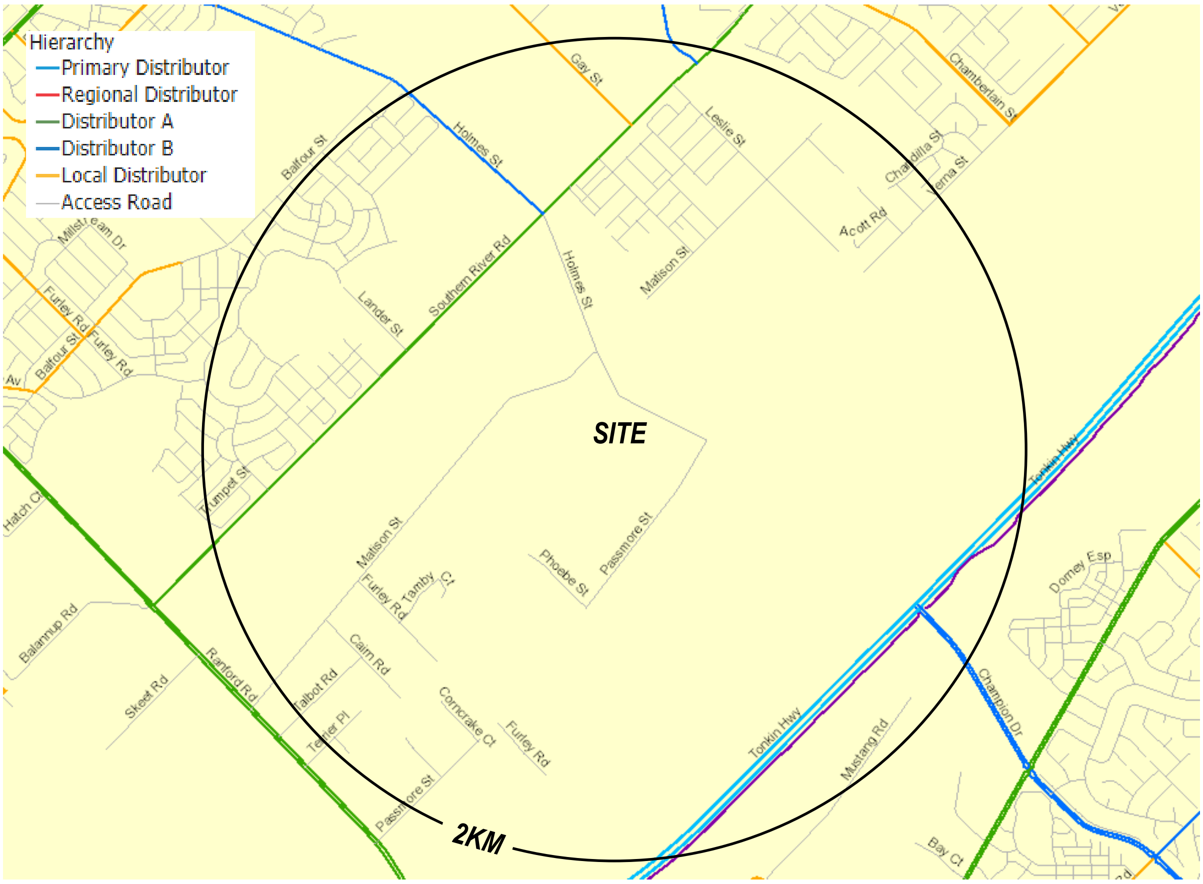

Figure 5: Existing Road Hierarchy

The current configuration of the boundary roads is summarised in **Table 2**. Photo examples of the existing road are shown in **Figure 6** to **Figure 8**.

Table 2: Existing Road Network Summary

Road	Configuration	Paths	Speed Limit	Intersection Details
Southern River Road – south of Holmes	Kerbed 4-lane dual carriageway with on-road cycle lanes	None	80 km/h	4 way roundabout at Holmes Street
Southern River Road – north of Holmes	Kerbed 2-lane dual carriageway	Shared path on south side	60 km/h	4 way roundabout at Holmes Street
Matison Street	Unkerbed single carriageway 6.0m carriageway	None	60 km/h	Channelised 3 way intersection at Holmes Street
Holmes Street	Unkerbed single carriageway 4.8 – 6.0m carriageway	None	80 km/h	Channelised 3 way intersection at Matison Street 90 degree bend at Passmore Street
Passmore Street	Unkerbed single carriageway 4.8m carriageway	None	50 km/h	90 degree bend at Holmes Street

None of the boundary roads allow RAV vehicles.

Figure 6: Matison Street Near Holmes Street

Figure 7: Holmes Street

Figure 8: Passmore Street

4.3 Metropolitan Region Scheme

Holmes Street is identified as an 'Other Regional Road' under the Metropolitan Region Scheme (MRS) as shown in **Figure 9**. Holmes Street is shown to eventually extend further south-east to Tonkin Highway at the current intersection with Champion Drive. Sections of Matison Street and Passmore Street on either side of Holmes Street have also been reserved under the scheme to allow for the future upgrades to the existing intersections.

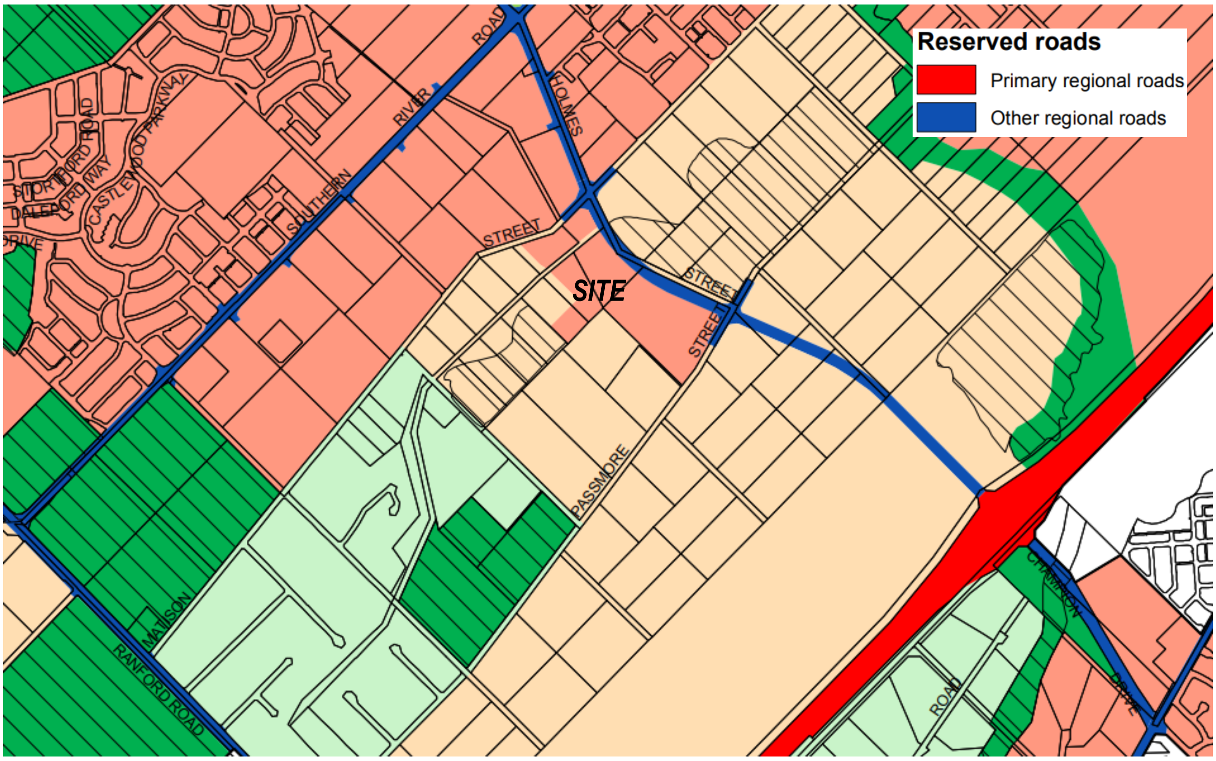

Figure 9: Holmes Street Other Regional Road (Metropolitan Region Scheme)

4.4 Pedestrian / Cyclist Network

There is no existing pedestrian or cyclist infrastructure within the site or in the surrounding area.

4.5 Public Transport Services

There are currently no public transport services within reasonable walking distance of the site. The closest service is Transperth Bus Route 517 which travels between Murdoch and Thornlie Station along Southern River Road. The nearest stops are located on Gay Street to the north of the site and Clearwater Drive to the west of the site.

4.6 Traffic Counts

There is limited traffic count data for the roads surrounding the site. The following average weekday traffic (AWT) count data for Southern River Road from May 2016 was obtained from Main Roads WA Reporting Centre:

- Daily Traffic — 7,252 vehicles per day (3,735 EB, 3,517 WB)
- AM Peak Hour (8-9am) — 582 vehicles per hour (304 EB, 278 WB)
- PM Peak Hour (5-6am) — 648 vehicles per hour (365 EB, 283 WB)

The current traffic volume along Matison Street south of Holmes Road are estimated to be less than 1000 vpd. The current traffic volumes along Holmes Street and Passmore Street are estimated to be less than 50 vpd.

5 Proposed Internal Transport Networks

The internal road network consists of a network of Access Roads. All internal intersections are proposed as priority controlled intersections (stop or give way). **Figure 10** indicates the proposed internal road network and hierarchy that has been developed from predicted traffic flows. The recommended road cross sections and pedestrian / cyclist networks within the site are discussed later in the assessment. The proposed access point onto Holmes Street will be a left-in/left-out only intersection. If development within the site precedes the proposed upgrades to Holmes Street (refer Section 6), then this intersection could allow full movements until the upgrades are completed.

The known access points into the neighbouring sub-precincts are indicated by the grey arrows.

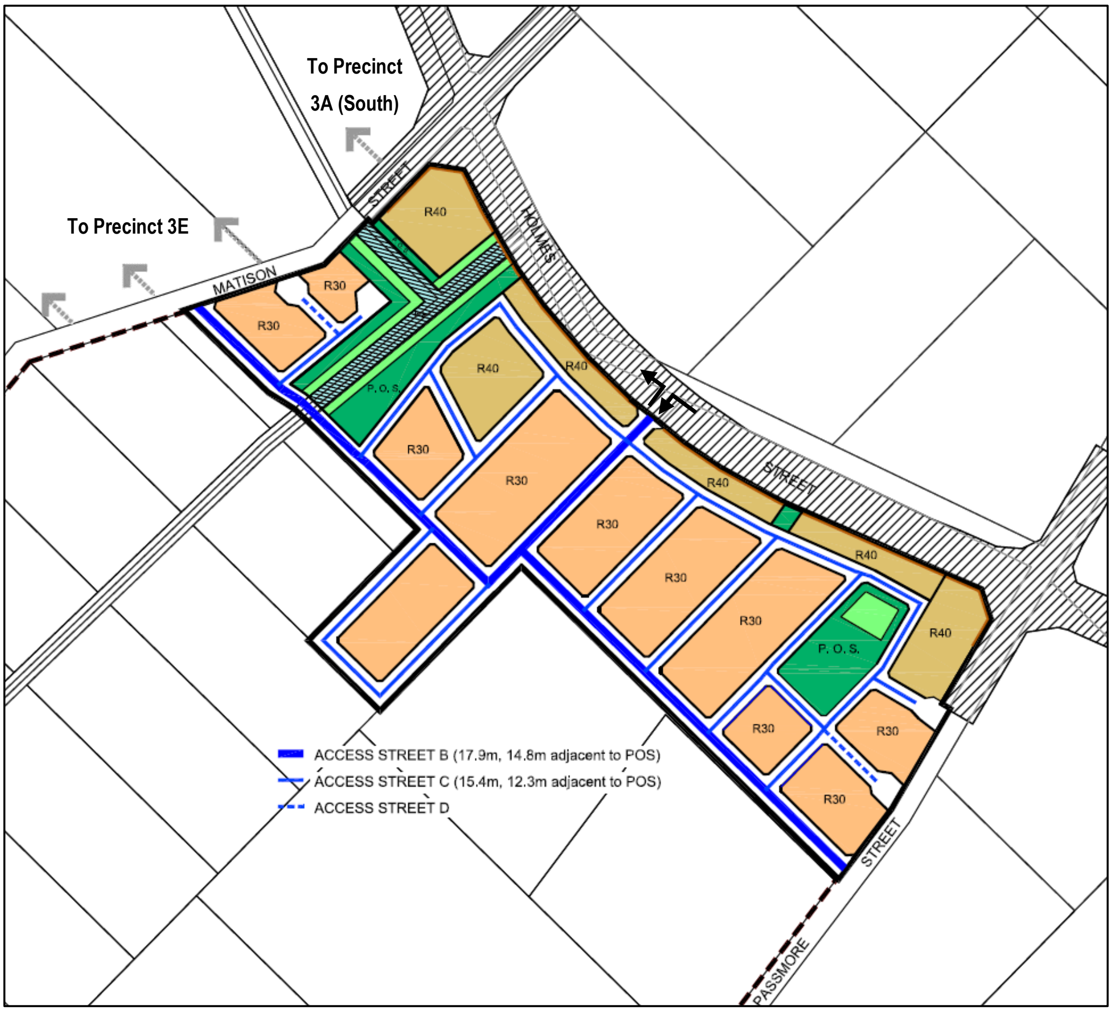

Figure 10: Proposed Internal Road Network

6 Changes to External Transport Networks

6.1 Road Network

The duplication of Southern River Road between Ranford Road and Holmes Street and the upgrade of the intersection Southern River Road with Holmes Street is being constructed and should be completed shortly.

Ongoing development within the Huntingdale and Southern River areas has necessitated the creation of a 4-lane sub-arterial road connection between Roe Highway and Tonkin Highway. The City of Gosnells has advised that the extension of Garden Street south of Harpenden Street to the intersection of Holmes Street and Balfour Street is planned to be commenced in late 2018.

Subsequently, as part of the development of this sub-arterial road, Garden Street will be extended further south of Balfour Street to the intersection of Tonkin Highway and Champion Drive as a replacement of Holmes Street. The timing for delivery of these works are not currently known as this is dependent on the development staging in the area and funding. Previous advice is that the section from Southern River Road to Tonkin Highway is tentatively scheduled for completion around 2025 to 2027.

The future Garden Street / Matison Street intersection is currently being planned as a roundabout.

A draft Developer Contributions Plan has been created for development in Southern River Precinct 3 to facilitate the required upgrades to the various common infrastructure works in the area which includes the proposed construction of the Garden Street extension and associated intersections.

6.2 Pedestrian / Cyclist Network

The external pedestrian and cyclist network will be developed as the surrounding development and road network is progressed.

6.3 Public Transport

The Public Transport Authority have advised that there are preliminary long term plans to introduce the following new bus services within the Southern River Precinct 3 area:

- Route 233 between Gosnells and Murdoch Station along Southern River Road;
- Route 234 between Gosnells Station and Southern River along Matison Street; and
- Route 235 between Armadale and Gosnells Station along Passmore Street / Verna Street.

The routes and timing of implementation will ultimately depend on funding, resource availability, the staging of development throughout Southern River and the areas of demand. The public transport planning and accessibility to the development should be reassessed at the subdivision stage of development.

7 Integration with Surrounding Area

7.1 Major Attractors and Generators

The key external attractors of traffic from the site include the Perth CBD, Armadale, Gosnells and the Kwinana Industrial Area as shown in **Figure 11**. The key generators are the existing and proposed residential dwellings within the site and in the surrounding areas.

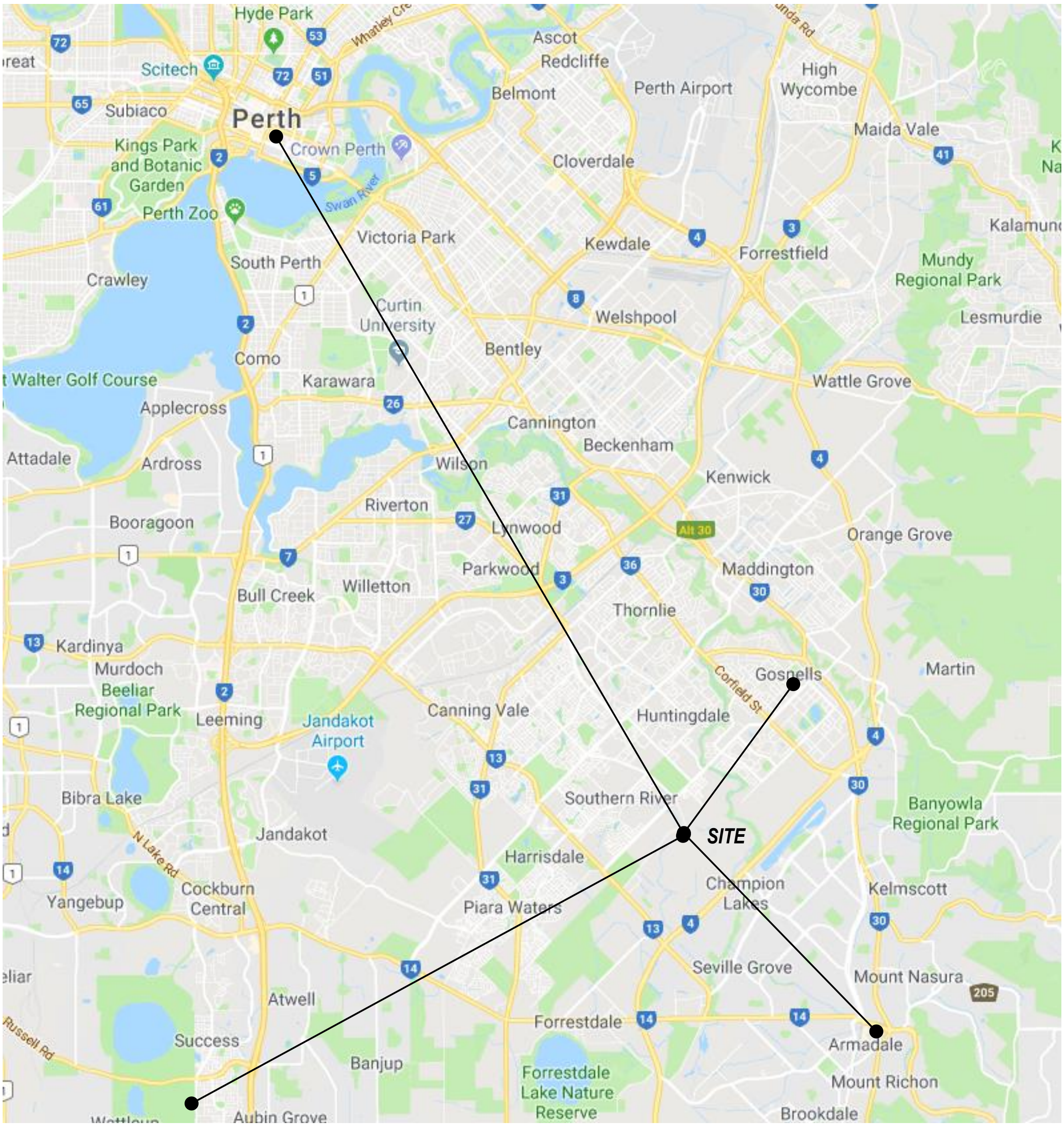

Figure 11: Major External Traffic Attractors

7.2 Major Changes to Land Uses

The surrounding area is subject to ongoing urban development as guided by the current Southern River Precinct 3 Local Structure Plan. A variety of land uses are planned including residential dwellings, industrial development, schools and local centres.

7.3 Main Desire Lines

The main desire lines between the structure plan uses and the external attractors and generators are along Holmes Street, Southern River Road, Matison Street and Ranford Road.

7.4 Gap Analysis

A brief qualitative assessment on whether or not the existing transport network, plus any proposed changes, would adequately match predicted desire lines has been undertaken, particularly for pedestrians, cyclists and public transport. Whilst the proposed transport network is considered to adequate for passenger vehicles, there is a lack of provision for other road users. Recommendations for pedestrian/cyclist infrastructure and public transport accessibility are provided in the detailed assessment in the following sections.

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8 Analysis of Internal Transport Networks

8.1 Assessment Years

The assessment has been based on full development of Precinct 3D on the existing road network. At this stage, development within Precincts 3A, 3E and 3F are likely to be complete (or at least underway) and Matison Street north-east of Holmes Street would be completed through to Precinct 3B. It has been assumed as a worst case scenario that the Garden Street extension south of Balfour Street would not have been completed and Passmore Street would not be completed beyond its current extent nor connected to Ranford Road or Verna Street. The access points to the site would all operate as full movement intersections. The assessment scenario is detailed in **Figure 12**.

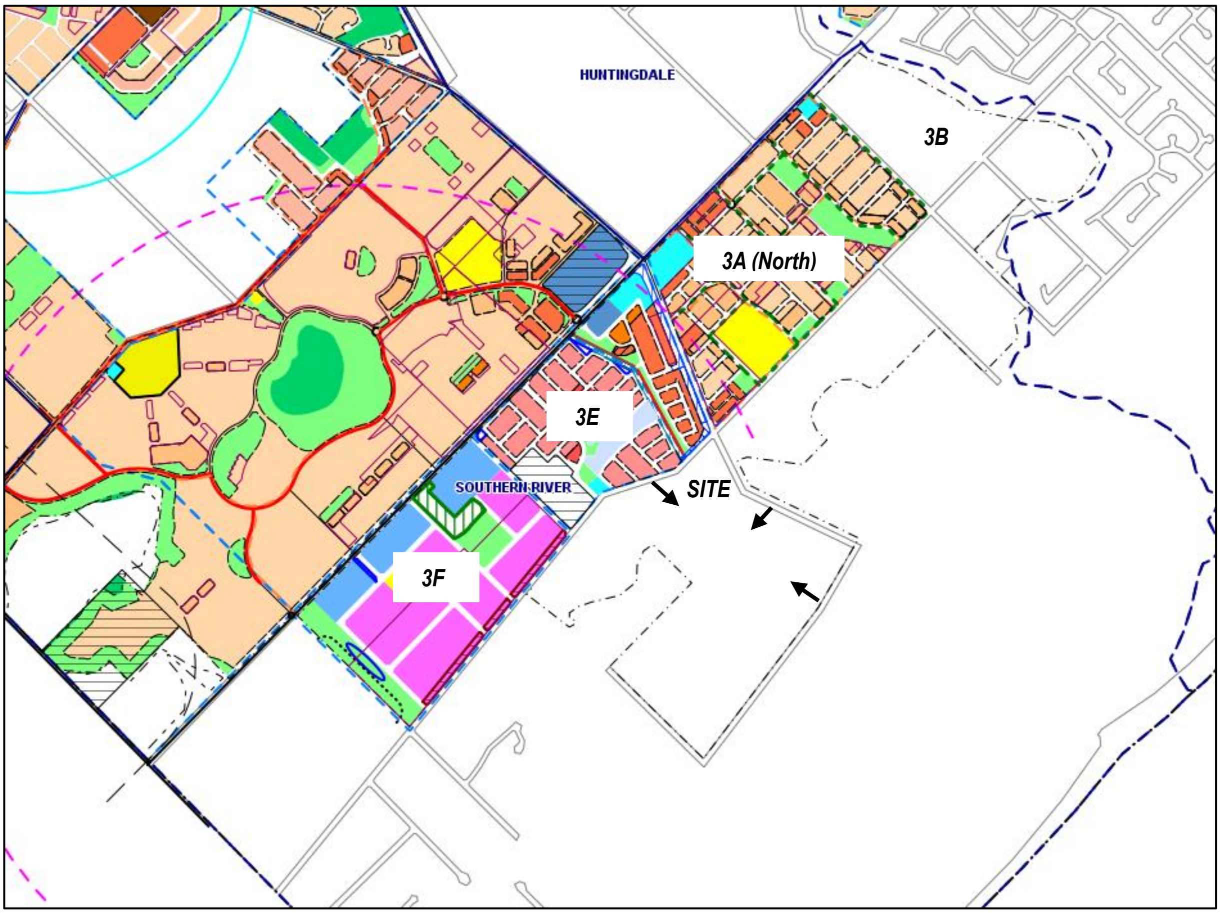

Figure 12: Assessment Scenario

8.2 Time Periods for Assessment

As the structure plan proposes only residential uses, a single design peak hour has been used for assessment.

8.3 Structure Plan Generated Traffic

The typical vehicle trip generation rates outlined in Table 1 of the WAPC TIA Guidelines were used to estimate the traffic generation potential of the proposed residential development within the site. The same trip generation rate has been used for both single dwellings and grouped dwellings to be conservative. The traffic generation is summarised in **Table 3** and **Table 4**. Both the AM and PM peak hour generation has been shown for comparison.

Table 3: Structure Plan Vehicle Trip Generation - AM Peak Hour

Land Use	Units	Quantity	Trip Rate		Number of Trips		
			AM Peak In	AM Peak Out	AM Peak In	AM Peak Out	AM Peak Total
Residential	Dwellings	310	0.2	0.6	62	186	248

Table 4: Structure Plan Vehicle Trip Generation - PM Peak Hour

Land Use	Units	Quantity	Trip Rate		Number of Trips		
			PM Peak In	PM Peak Out	PM Peak In	PM Peak Out	PM Peak Total
Residential	Dwellings	310	0.5	0.3	155	93	248

As per **Table 4**, the proposed land uses within the site are predicted to generate a total of 248 vehicle trips during the PM peak hour (155 inbound and 93 outbound). As the proposed land use is primarily residential it has been assumed that all vehicle trips are external to the structure plan area.

8.4 Non-Structure Plan Traffic

From a review of the overall Precinct 3 LSP, the most significant external generator of traffic through the structure plan site would be the proposed high school adjacent to the site. It has been assumed that by completion of development within Precinct 3D, the adjacent school would have been completed to Stage 1 to accommodate 700 students. A peak hour trip generation rate of 1.3 trips per student has been assumed based on the typical advice from the Department of Finance – Building Management and Works (For new schools, a daily trip rate of 2.6 trips per student is considered appropriate) Although the afternoon peak hour does not typically coincide with the road network peak, the school trip generation has been included during both peak hours to be conservative. The future school is therefore estimated to generate 910 vehicle trips during each peak hour. It was also assumed that the school would have one access on the internal road network and another access directly onto Passmore Street.

8.5 Design Traffic Flows

The structure plan road network has been modelled using Quick Response System II (QRS II) software which is a strategic travel demand forecasting program. The road network is entered graphically into the General Network Editor (GNE) program and the traffic generation for each land use and the assumed distribution of traffic is input into the road network. QRS II is then used to assign the traffic onto the modelled road network.

Based on the layout of the existing road network, the surrounding development and the likely external destinations, the distribution of structure plan and non-structure plan (high school) generated traffic has been assumed as shown in **Figure 13**.

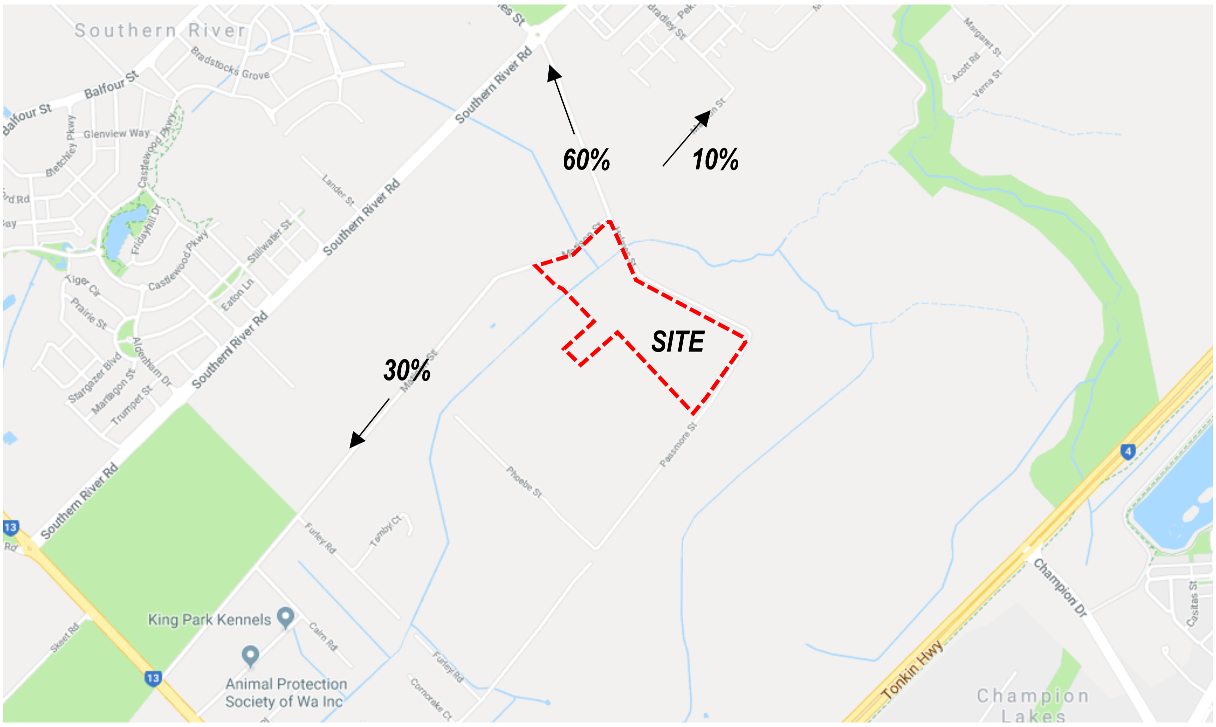

Figure 13: Assumed Distribution of Structure Plan and Adjacent High School Traffic

The peak hour design traffic flows generated by Sub-precinct 3D and the adjacent school are as shown in **Figure 14**.

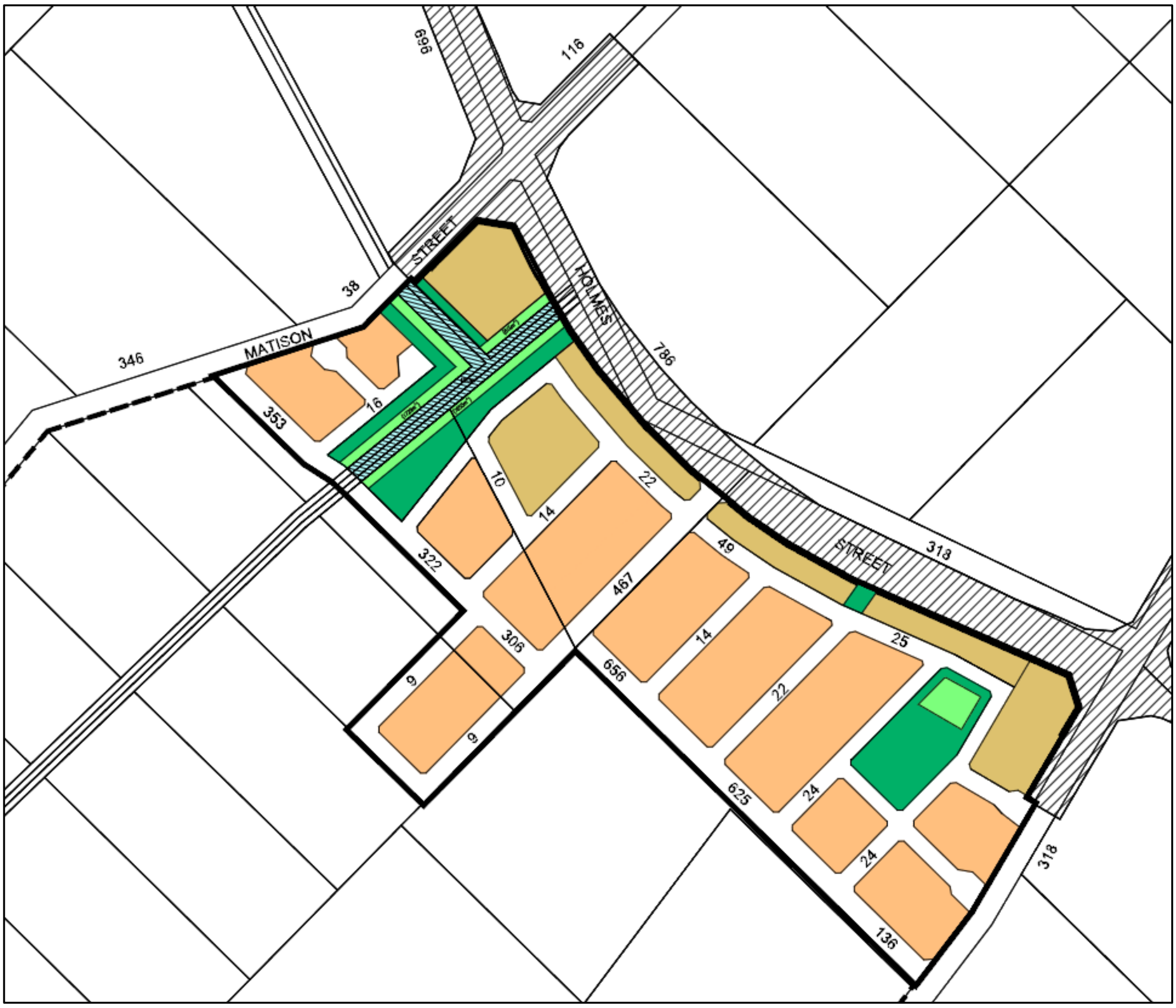

Figure 14: Peak Hour Design Traffic Flows

8.6 Roads and Intersections

8.6.1 Road Cross Sections and Hierarchy

The WAPC TIA Guidelines refers to Austroads Guide to Traffic Management (GTM) for assessment of the impact of changes in traffic flows on the surrounding road network. Austroads GTM Part 3: Traffic Studies and Analysis notes that the typical midblock capacity of a single traffic lane on an urban road is somewhere between 1,500 and 2,400 passenger cars per hour (pc/h). Based on the predicted peak hour traffic flows, a two lane cross section would be sufficient for all internal roads and the recommended classification for all internal roads will be Access Streets. The proposed internal road network hierarchy and road reservation widths are shown in **Figure 15**.

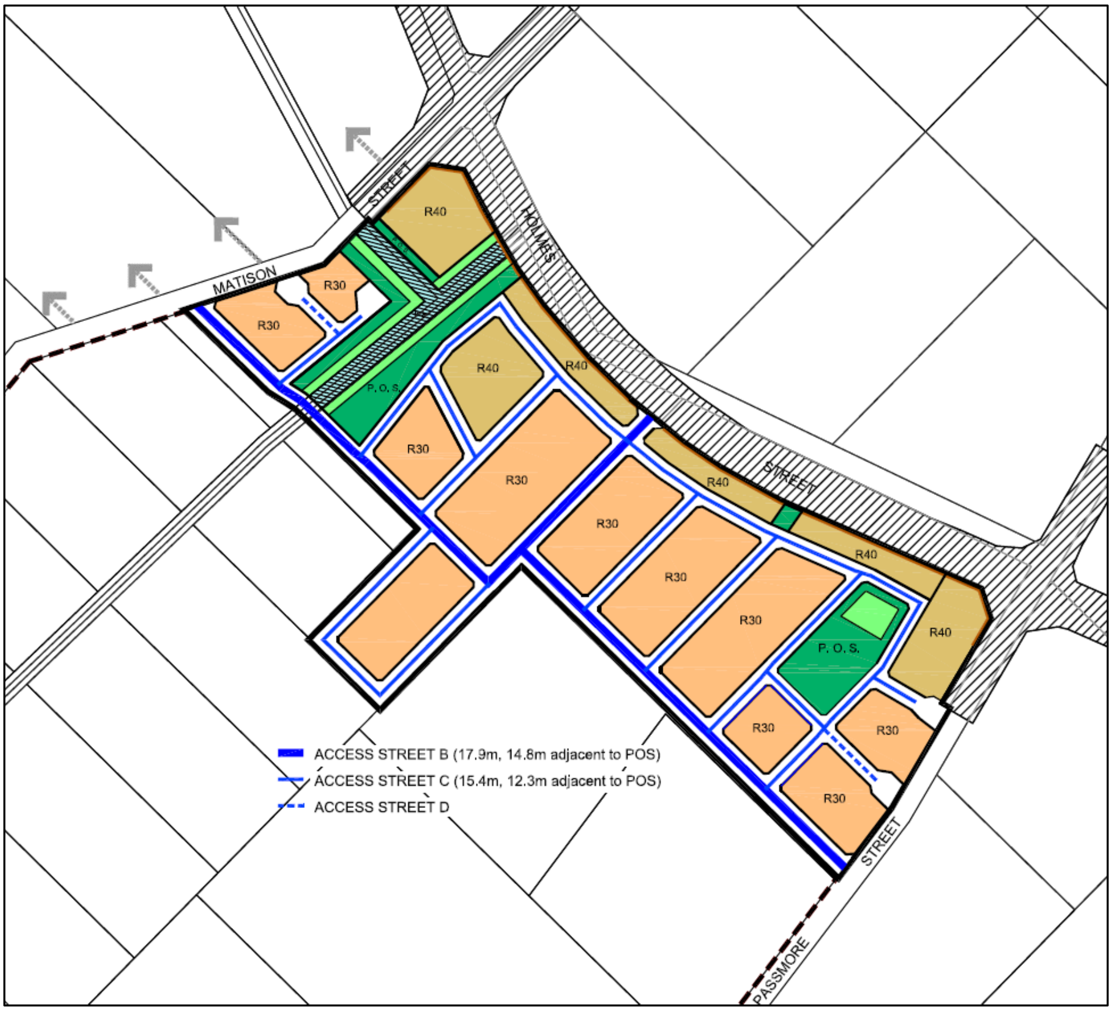

Figure 15: Proposed Road Hierarchy and Reservation Widths

The proposed road reserve widths were assessed as being consistent with the criteria outlined in Liveable Neighbourhoods as shown in **Table 5**.

Table 5: Liveable Neighbourhoods Road Criteria

Road classification	Indicative reserve width	Indicative road cross section
Access Street B (Wider street)	16.5 - 18 metres	9.7 metre lane
Access Street C (Yield or give way street)	15.4 - 16 metres	7.2 (7.8 –7.5) metre lane
Access Street D (Narrow yield or give way street)	14.2 metres	5.5 –6.0 metre lane

Indicative road cross sections for Access Streets as recommended by Liveable Neighbourhoods are shown in **Figure 16** to **Figure 18**. It is noted that verge widths on access streets abutting parks may usually be reduced from 4.1m to 1m on the park side.

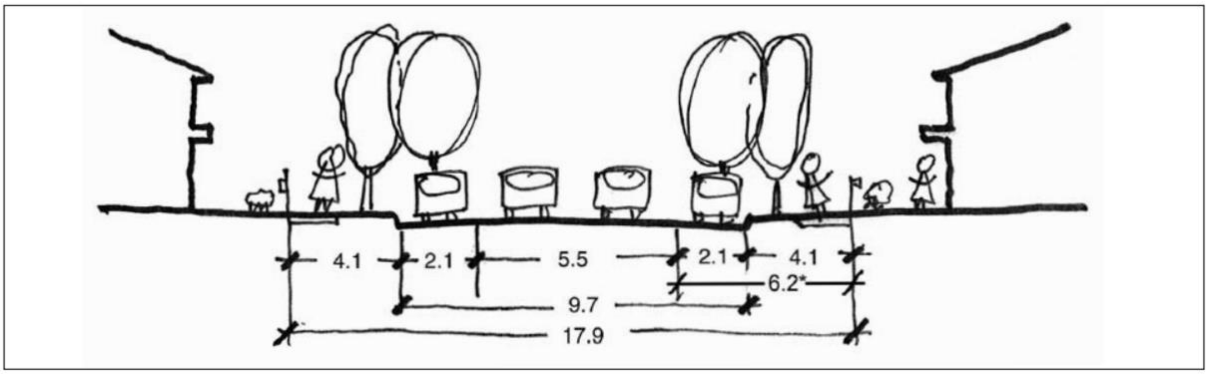

Figure 16: Typical Road Cross Section – Access Street B (Liveable Neighbourhoods 2009)

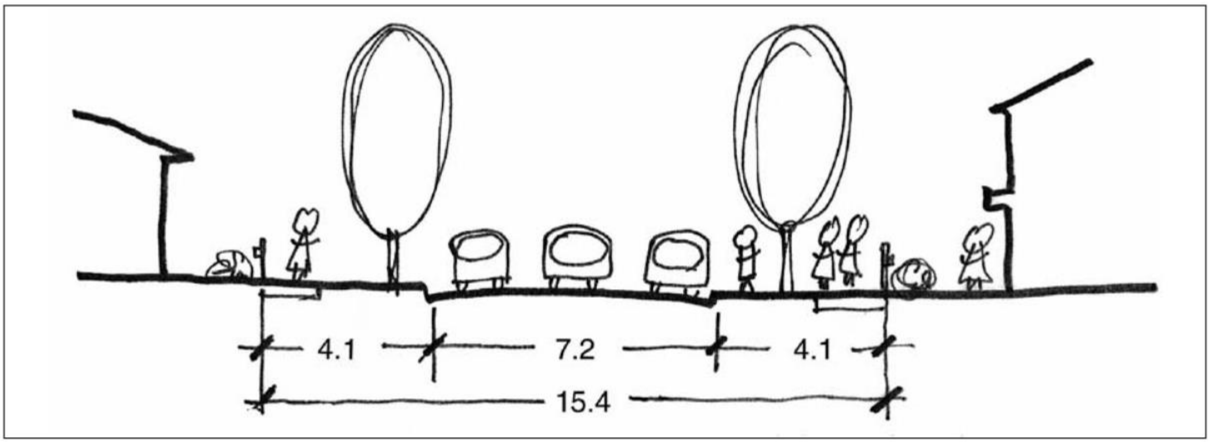

Figure 17: Typical Road Cross Section – Access Street C (Liveable Neighbourhoods 2009)

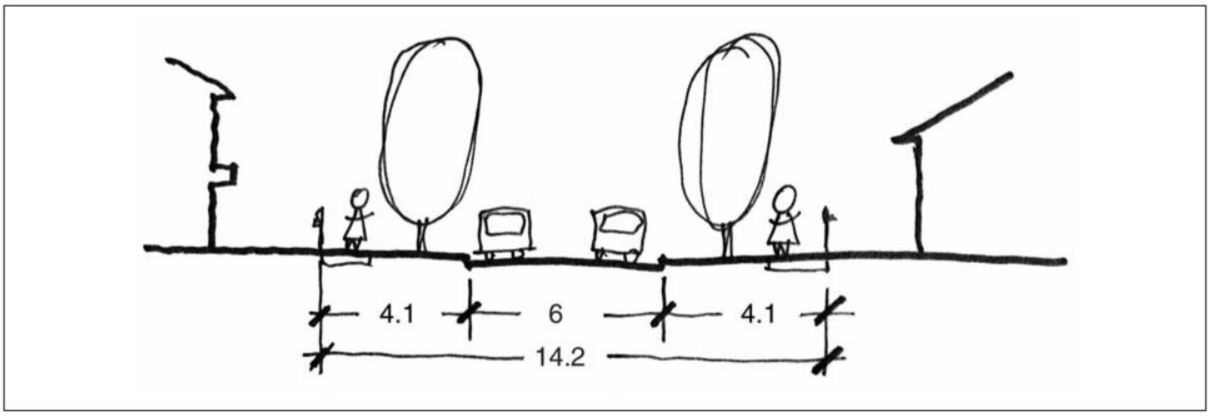

Figure 18: Typical Road Cross Section – Access Street D (Liveable Neighbourhoods 2009)

8.6.2 Intersections

Table 2.3 of Austroads *GTM Part 6 - Intersections, Interchanges and Crossings* (shown as **Table 6**) describes the likely suitability of various intersection control devices at intersections of various road classes within urban networks.

Table 6: Recommended Intersection Controls (Austroads, 2015)

Road type	Primary arterial	Secondary arterial	Collector and local crossing road	Local street
Traffic signals				
Primary arterial	A	A	O	X
Secondary arterial	A	A	O	X
Collector & local crossing road	O	O	X	X
Local street	X	X	X	X
Roundabouts				
Primary arterial	O	O	X	X
Secondary arterial	O	O	O	X
Collector & local crossing road	X	O	A	O
Local street	X	X	O	A
Stop signs or *give way* signs				
Primary arterial urban/(rural)	X/(O)	X/(O)	A	A
Secondary arterial urban/(rural)	X/(O)	X/(O)	A	A
Collector & local crossing road	A	A	A	A
Local street	A	A	A	A

A = Most likely to be an appropriate treatment
O = May be an appropriate treatment
X = Usually an inappropriate treatment

As all internal roads are local streets, the most appropriate intersection treatments are priority control or roundabout control. Austroads recommends that it is normal to initially provide the lowest level of traffic management and to increase the level of control from signed priority control to a roundabout or signal control as traffic safety or traffic congestion problems begin to arise.

Based on the predicted traffic flows, it is recommended that all internal intersections are proposed as signed priority control intersections. It is noted that the appropriate intersection control should also be reviewed and confirmed at the subdivision and individual development stage.

8.6.3 Intersection Spacing

As there are several proposed intersections to neighbouring precincts on the north side of Matison Street, the spacing between the proposed Precinct 3D roads and other intersections has been checked for reviewed. Matison Street is likely to be classified as a Neighbourhood Connector once the area is developed. Liveable Neighbourhoods recommends a minimum junction spacing of 40 metres for intersections along Neighbourhood Connector Road. The proposed layout achieves only a 20 metre spacing as shown in **Figure 19**.

In this instance, the below-standard spacing is not likely to be an issue for the following reasons:

- The volume of traffic expected through the Precinct 3E intersection is likely to be very low.
- There would be little or no demand for traffic to cross between the two precincts in this location.
- The SIDRA assessment of the Matison Street / Precinct 3D road indicated that there would be negligible queueing at this intersection under both the interim and full development scenario.

As such the restriction of any turning movements at this location is not warranted.

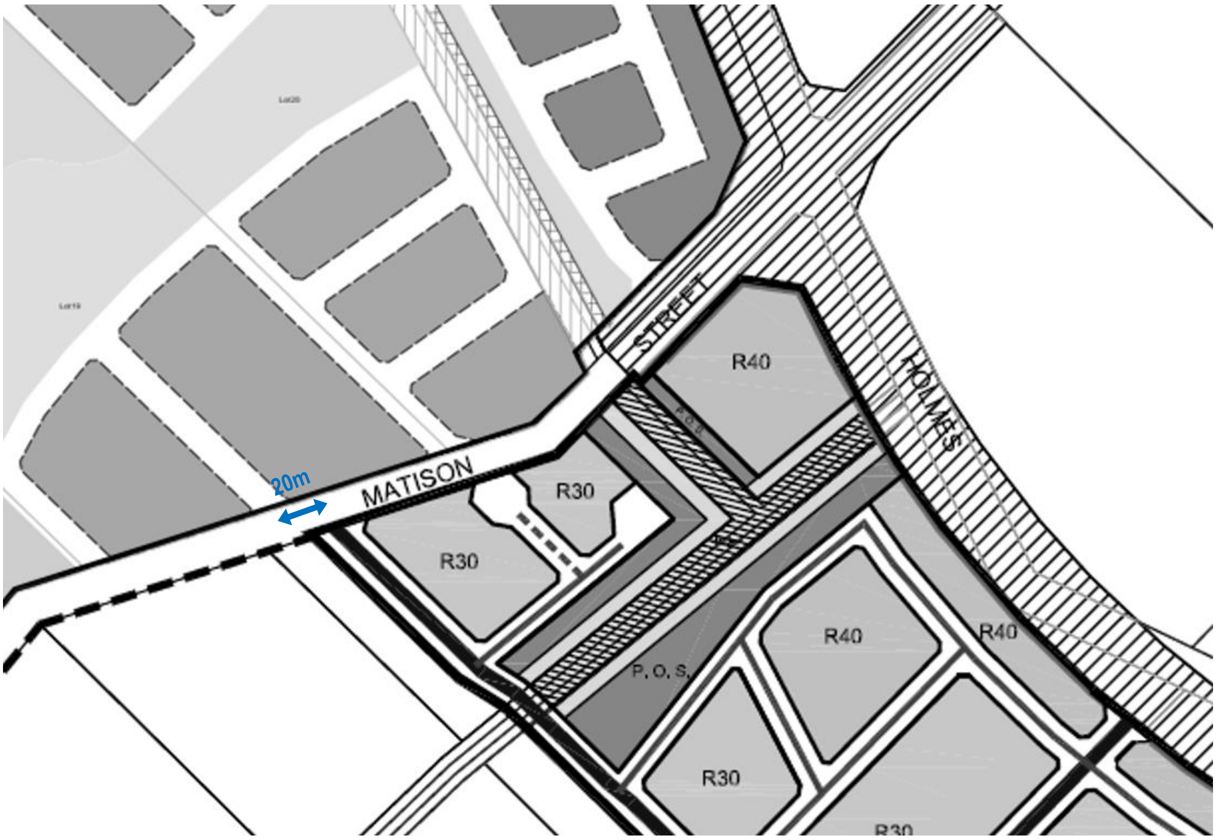

Figure 19: Intersection Spacing Along Matison Road

8.6.4 Local Area Traffic Management

Table 6 of Liveable Neighbourhoods recommends a target operating speed of 40 km/h on Access Roads B and C and a maximum desirable leg length between slow points between 130m and 200m. It is noted that the proposed layout creates some leg lengths longer than the desirable maximum and therefore it is recommended to incorporate slow points in order to achieve the desirable leg lengths. This could be achieved through traffic calming devices, priority control (changing priority at intersections) and roundabouts.

It is also recommended to incorporate threshold treatments (coloured or bricked paving) at key intersections within the structure plan area to establish priority between roads.

The details of local area traffic management will be addressed at the subdivision stage of development.

8.7 Access to Frontage Properties

All roads within the site are predicted to carry less than 500 vehicles per hour with the exception of the internal access road fronting the future high school which is predicted to carry a maximum of 658 vehicles per hour. It is considered reasonable to still allow individual direct access to these properties as these volumes within the site are likely to reduce as the external road network is developed. No individual direct access is proposed to Holmes Street, Passmore Street or Matison Street. The exception is the proposed grouped housing lot on the corner of Matison Street and Holmes Street which is restricted from internal access by the Forrestdale Main Drain. It is proposed to provide access to this lot to Matison Street at the south-western corner of the site. Holmes Street as possible as shown in **Figure 20**. Under the ultimate road network scenario, access to this lot may be restricted to left-in/left-out only due to proximity to the future Garden Street / Matison Street roundabout.

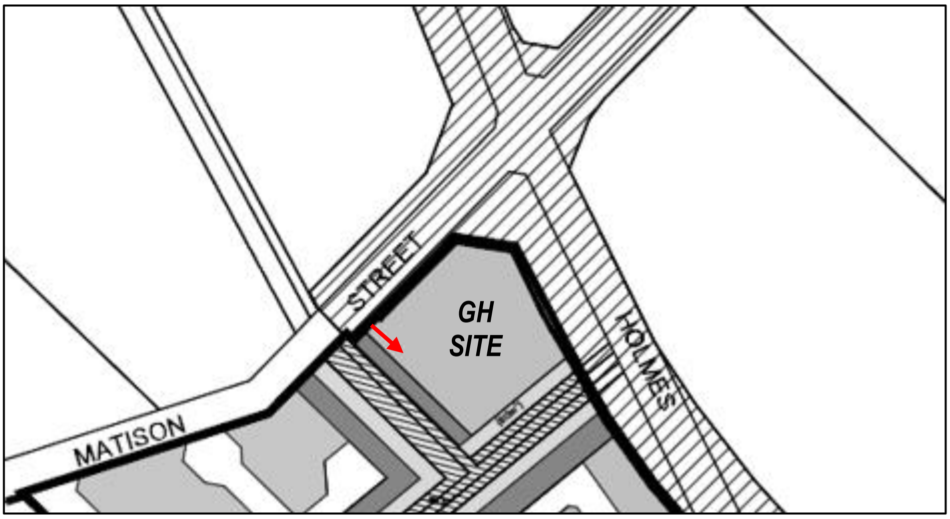

Figure 20: Proposed Access Location to Grouped Housing Site from Matison Street

8.8 Pedestrian / Cycle Networks

The current LSP does not show the proposed path network for the site. It is recommended that a footpath path is provided along at least one side of all access roads and a shared path is provided adjacent to the higher order Access Roads (Access Road B). It is also intended that shared paths will be provided along wetland boundaries to provide ease of access to these high amenity areas to pedestrians and cyclists. An indicative path network is shown in **Figure 21**.

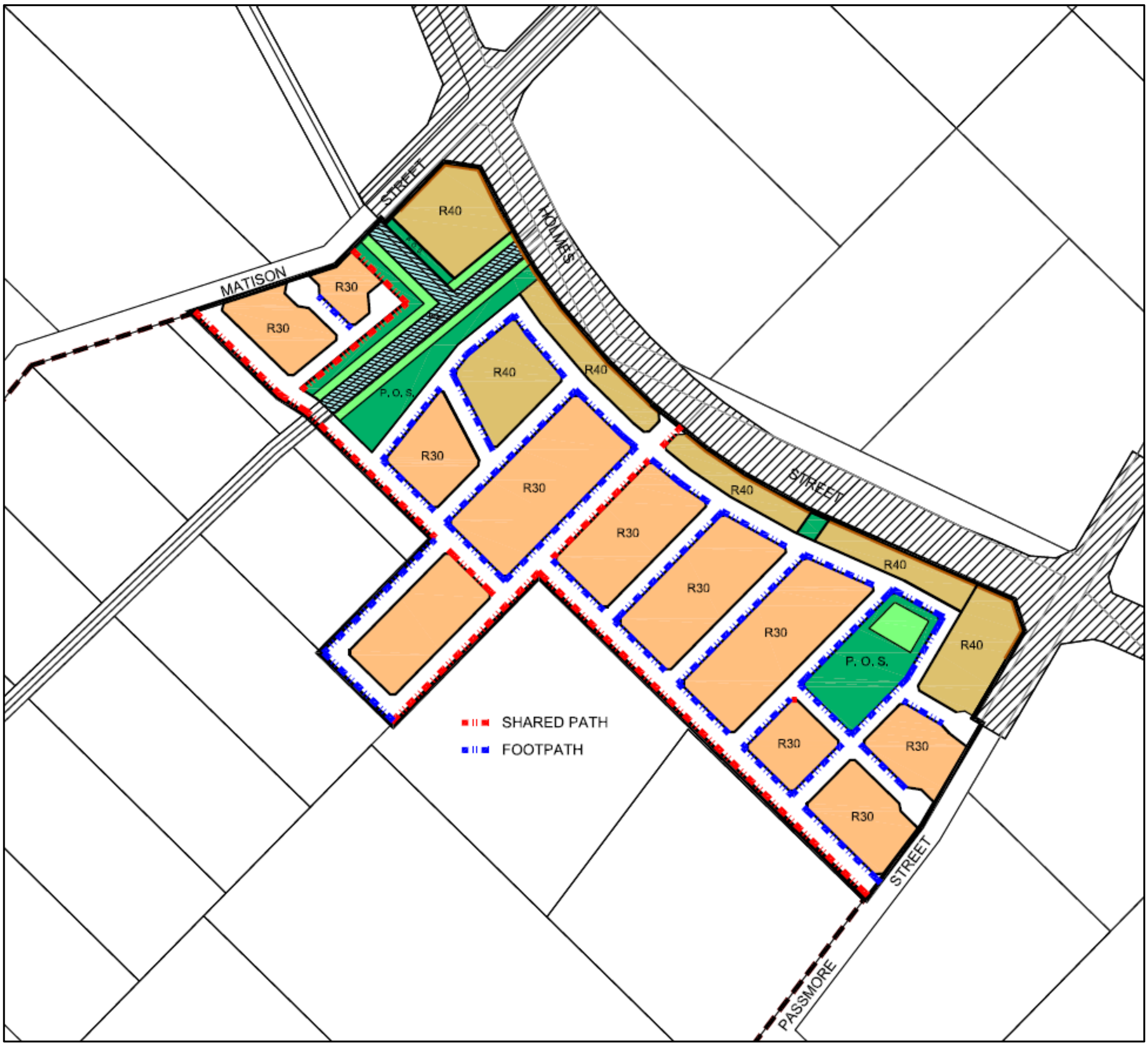

Figure 21: Recommended Path Network

Table 2 of the WAPC TIA Guidelines outlines the traffic volume thresholds of different road cross sections which affect the ability of pedestrians to cross the road. For two-lane undivided roads, the threshold is 1,100 vehicles per hour (two-way traffic). For two-lane divided roads, the threshold is 2,800 vph. All roads within the subject area are predicted to carry well below the threshold volumes and should allow for safe crossing of pedestrians without the need for safe crossing facilities. Notwithstanding this, pedestrian ramps should be provided at all proposed crossings.

8.9 Access to Public Transport

At this stage, no new public transport services are planned within the structure plan area.

9 Analysis of External Transport Networks – Interim

9.1 Assessment Years

This assessment of the external transport network has been based on the full development of Precinct 3, including Sub-precinct 3D on the interim road network prior to the future extension of Garden Street.

Under this scenario, it is assumed that Matison Street north of Holmes Street will be completed north-west through to Precinct 3B and the Matison Street / Holmes Street intersection would be constructed as a four-way priority (stop sign) controlled intersection. It is also assumed that Passmore Street would not have been extended beyond its existing extent nor connected to Ranford Road or Verna Street.

This assessment considers the 'worst-case scenario' as it is likely that the planned extension of Garden Street and ultimate roundabout intersection at Garden Street / Matison Street would be underway or completed prior to the full development within Southern River Precinct 3.

9.2 Total Flows on the External Road Network

At this stage, the traffic flows along Holmes Street and Passmore Street would be limited to the traffic generated by Sub-precinct 3D and the adjacent high school as generated in the QRS II model and as shown in **Figure 22**.

The traffic flows along Matison Street and Holmes Street north of Matison Street were derived from the Traffic Impact Assessment for Southern River Precinct 3E ODP prepared by Cardno Eppell Olsen in 2013. The modelled traffic volumes included the full development of Southern River Precinct 3. The peak hour traffic flows were assumed to be equivalent to 10% of the daily traffic. It is noted that these flows appear to be quite low compared to the Sub-precinct 3D traffic and therefore they have been added to 3D flows.

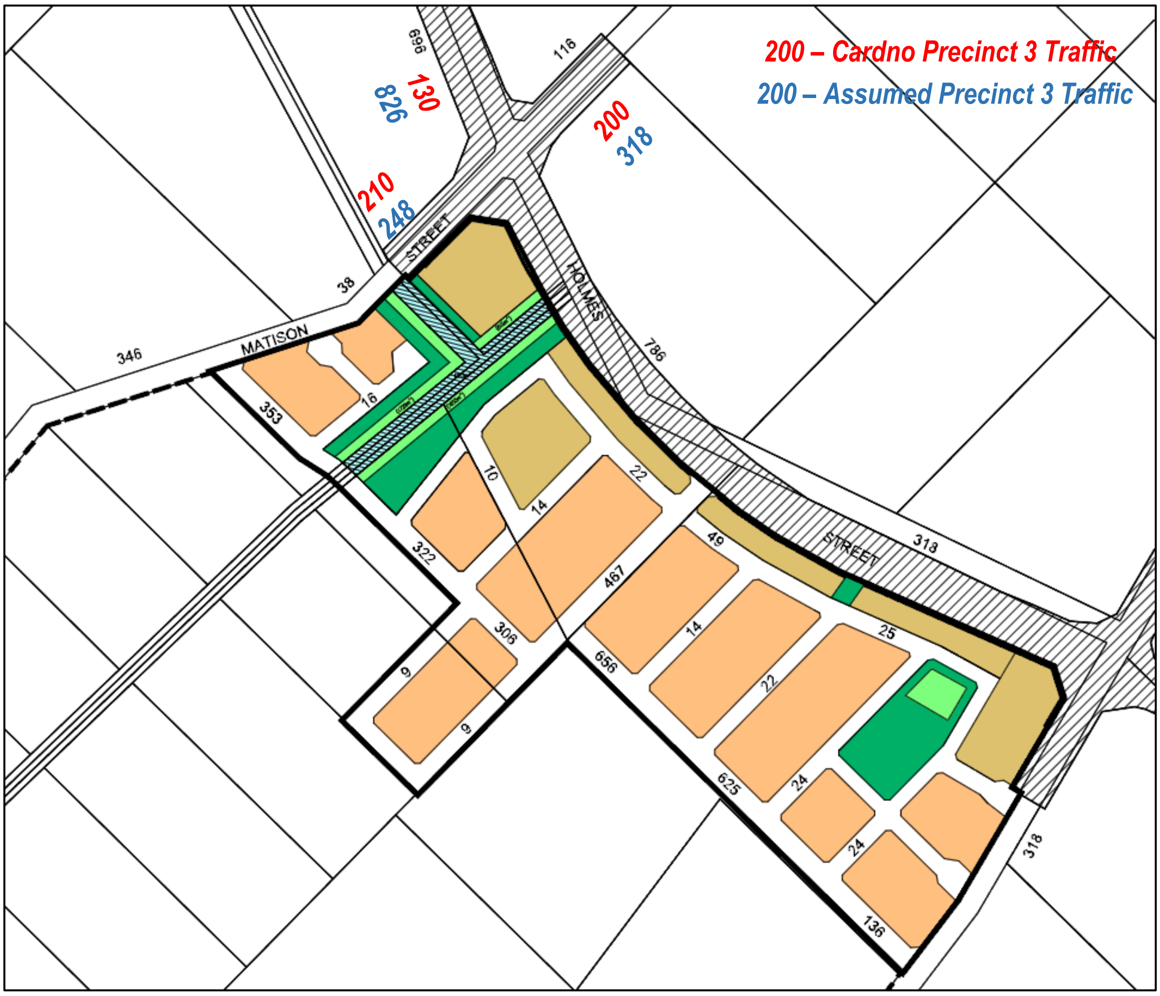

Figure 22: Design Traffic Flows – Interim Scenario

9.3 Roads

Based on the typical midblock lane capacity between 1,500 and 2,400 pc/h on an urban road, the required road cross sections for the external road network are as below.

- Holmes Street – two lanes;
- Matison Street – two lanes; and
- Passmore Street – two lanes.

The sections of Matison Road and Passmore Street adjacent to the site will need to be upgraded to a suitable urban Neighbourhood Connector standard during the subdivision stage. If the development precedes the planned Garden Street extension, then the section of Holmes Street south of the proposed site access which has an approximately 4.8m wide pavement, may need to be widened to accommodate the structure plan traffic.

9.4 Intersections

SIDRA Intersection 7.0 was used to assess the peak hour capacity of the following intersections:

- Holmes Street / Matison Street intersection;
- The intersections between the internal access roads with Matison Street, Holmes Street and Passmore Street.

The peak hour traffic flows have been derived using the following assumptions:

- Peak hour volumes are approximately 10% of the daily traffic volumes;
- 50/50 directional split of traffic ; and
- 5% heavy vehicle percentage for all movements.

9.4.1 Holmes Street / Matison Street Intersection

The modelled layout is shown in **Figure 23** and results of the assessment are shown in **Table 7**.

The results of the assessment indicate that the modelled intersection would perform at a satisfactory level as a four-way priority controlled intersection.

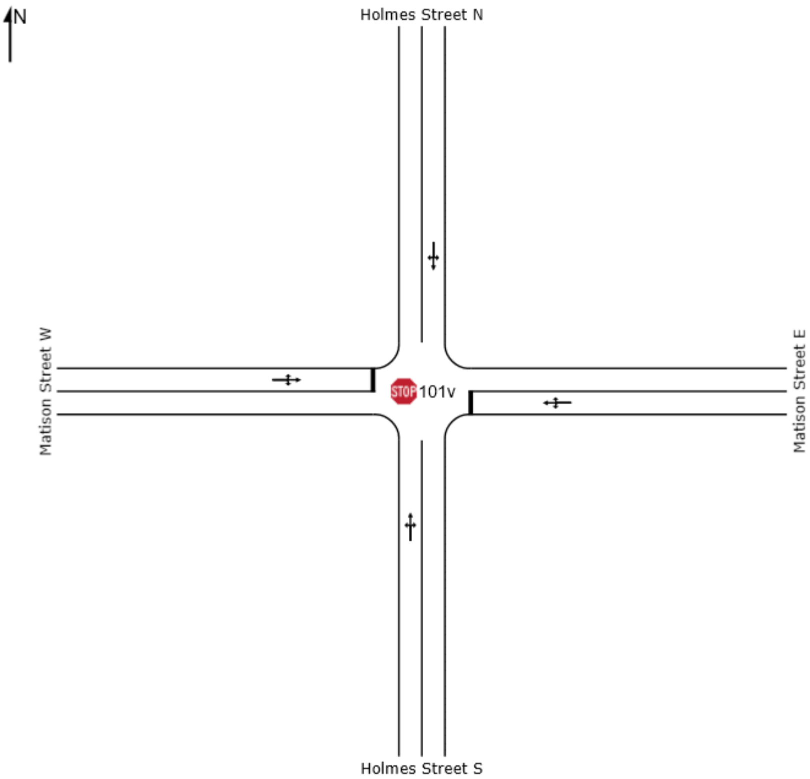

Figure 23: Modelled Interim Layout for Holmes Street / Matison Street Intersection

Table 7: SIDRA Results for Interim Holmes Street / Matison Street Intersection

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Holmes Street S											
1	L2	39	5.0	0.215	6.7	LOS A	0.5	3.6	0.16	0.11	56.5
2	T1	314	5.0	0.215	0.3	LOS A	0.5	3.6	0.16	0.11	58.3
3	R2	39	5.0	0.215	7.4	LOS A	0.5	3.6	0.16	0.11	56.2
Approach		392	5.0	0.215	1.7	NA	0.5	3.6	0.16	0.11	57.9
East: Matison Street E											
4	L2	127	5.0	0.591	13.9	LOS B	3.7	27.3	0.68	1.15	45.5
5	T1	32	5.0	0.591	20.5	LOS C	3.7	27.3	0.68	1.15	45.4
6	R2	127	5.0	0.591	23.7	LOS C	3.7	27.3	0.68	1.15	45.3
Approach		286	5.0	0.591	19.0	LOS C	3.7	27.3	0.68	1.15	45.4
North: Holmes Street N											
7	L2	41	5.0	0.225	6.7	LOS A	0.5	3.8	0.15	0.11	56.5
8	T1	330	5.0	0.225	0.3	LOS A	0.5	3.8	0.15	0.11	58.3
9	R2	41	5.0	0.225	7.3	LOS A	0.5	3.8	0.15	0.11	56.2
Approach		412	5.0	0.225	1.6	NA	0.5	3.8	0.15	0.11	57.9
West: Matison Street W											
10	L2	50	5.0	0.280	10.4	LOS B	1.1	8.0	0.60	0.99	47.5
11	T1	25	5.0	0.280	16.0	LOS C	1.1	8.0	0.60	0.99	47.3
12	R2	50	5.0	0.280	20.2	LOS C	1.1	8.0	0.60	0.99	47.3
Approach		125	5.0	0.280	15.5	LOS C	1.1	8.0	0.60	0.99	47.4
All Vehicles		1215	5.0	0.591	7.1	NA	3.7	27.3	0.32	0.45	53.2

9.4.2 Matison Street / N-S Access Street Intersection

The modelled layout is shown in **Figure 24** and results of the assessment are shown in **Table 8**. The results of the assessment indicate that this intersection would perform at a satisfactory level.

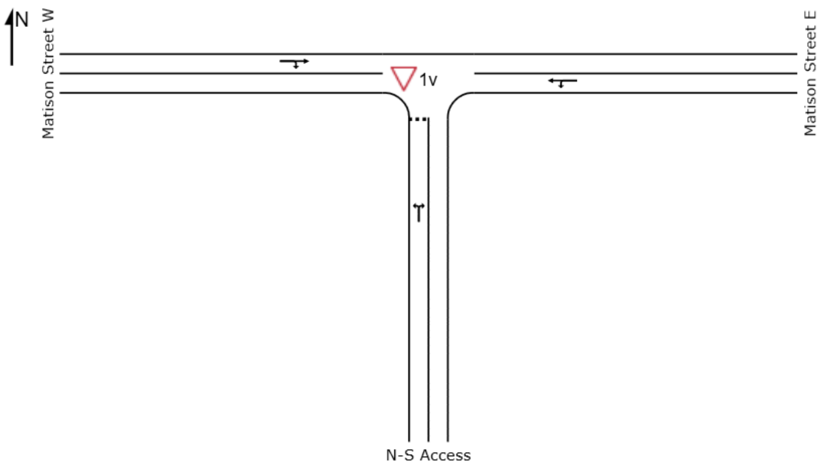

Figure 24: Modelled Layout for Matison Street / N-S Access Street Intersection

Table 8: SIDRA Results for Matison Street / N-S Access Street Intersection

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N-S Access											
1	L2	170	0.0	0.126	6.0	LOS A	0.5	3.7	0.23	0.56	52.9
3	R2	9	0.0	0.126	7.4	LOS A	0.5	3.7	0.23	0.56	52.4
Approach		179	0.0	0.126	6.0	LOS A	0.5	3.7	0.23	0.56	52.9
East: Matison Street E											
4	L2	10	0.0	0.071	5.5	LOS A	0.0	0.0	0.00	0.04	58.0
5	T1	124	5.0	0.071	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		134	4.6	0.071	0.4	NA	0.0	0.0	0.00	0.04	59.4
West: Matison Street W											
11	T1	124	5.0	0.170	0.4	LOS A	0.8	6.0	0.25	0.33	56.2
12	R2	165	0.0	0.170	5.9	LOS A	0.8	6.0	0.25	0.33	54.2
Approach		289	2.1	0.170	3.6	NA	0.8	6.0	0.25	0.33	55.0
All Vehicles		602	2.1	0.170	3.6	NA	0.8	6.0	0.19	0.34	55.3

9.4.3 Holmes Street / E-W Access Street Intersection

The modelled layout is shown in **Figure 25** and results of the assessment are shown in **Table 9**. The results of the assessment indicate that this intersection would perform at a satisfactory level as a full movement intersection.

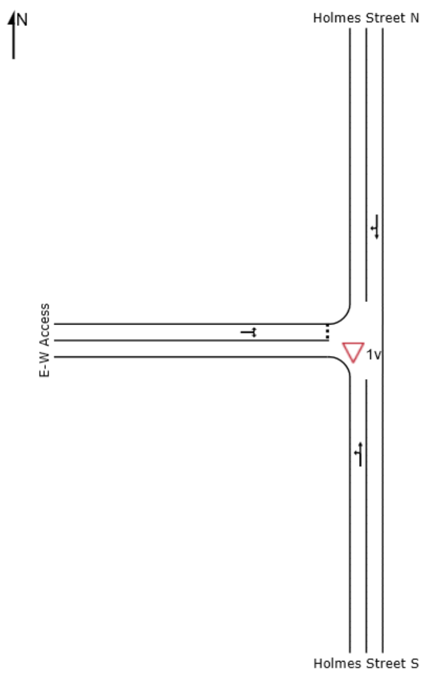

Figure 25: Modelled Layout for Holmes Street / E-W Access Street Intersection

Table 9: SIDRA Results for Holmes Street / E-W Access Street Intersection

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Holmes Street S											
4	L2	1	0.0	0.085	5.5	LOS A	0.0	0.0	0.00	0.00	58.3
5	T1	159	5.0	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		160	5.0	0.085	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Holmes Street N											
11	T1	159	5.0	0.237	0.5	LOS A	1.3	9.0	0.30	0.36	55.9
12	R2	236	0.0	0.237	6.1	LOS A	1.3	9.0	0.30	0.36	53.9
Approach		395	2.0	0.237	3.8	NA	1.3	9.0	0.30	0.36	54.7
West: E-W Access											
1	L2	231	0.0	0.164	6.1	LOS A	0.7	5.0	0.28	0.57	52.8
3	R2	1	0.0	0.164	8.5	LOS A	0.7	5.0	0.28	0.57	52.2
Approach		232	0.0	0.164	6.1	LOS A	0.7	5.0	0.28	0.57	52.8
All Vehicles		787	2.0	0.237	3.7	NA	1.3	9.0	0.23	0.35	55.1

9.4.4 Passmore Street / N-S Access Street Intersection

The modelled layout is shown in **Figure 26** and results of the assessment are shown in **Table 10**. The results of the assessment indicate that this intersection would perform at a satisfactory level.

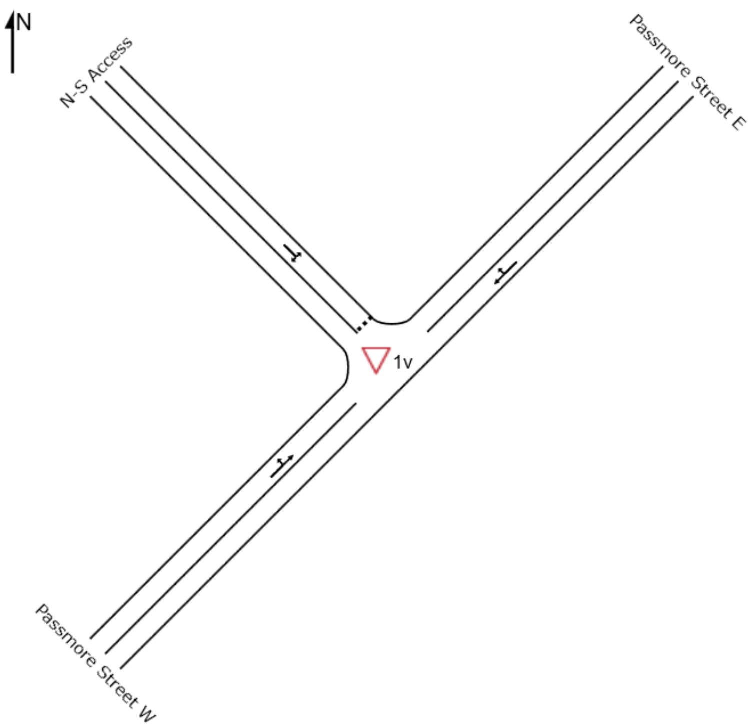

Figure 26: Modelled Layout for Passmore Street / N-S Access Street Intersection

Table 10: SIDRA Results for Passmore Street / N-S Access Street Intersection

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
Movement Performance - Vehicles											
Northeast: Passmore Street E											
11	T1	159	5.0	0.085	0.0	LOS A	0.0	0.1	0.01	0.00	59.9
12	R2	1	0.0	0.085	6.2	LOS A	0.0	0.1	0.01	0.00	57.7
Approach		160	5.0	0.085	0.0	NA	0.0	0.1	0.01	0.00	59.9
Northwest: N-S Access											
1	L2	1	0.0	0.074	6.0	LOS A	0.2	1.7	0.37	0.65	52.6
3	R2	68	0.0	0.074	6.9	LOS A	0.2	1.7	0.37	0.65	52.1
Approach		69	0.0	0.074	6.9	LOS A	0.2	1.7	0.37	0.65	52.1
Southwest: Passmore Street W											
4	L2	68	0.0	0.121	5.6	LOS A	0.0	0.0	0.00	0.18	56.8
5	T1	159	5.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.18	58.3
Approach		227	3.5	0.121	1.7	NA	0.0	0.0	0.00	0.18	57.9
All Vehicles		456	3.5	0.121	1.9	NA	0.2	1.7	0.06	0.19	57.6

10 Analysis of External Transport Networks – Ultimate (2031)

10.1 Assessment Years

The assessment of the external transport network has also been based on the full development of Precinct 3, including Sub-precinct 3D on the ultimate road network (assumed 2031). Under this scenario, the following road network changes are assumed to have been completed:

- Extension of Garden Street through to Tonkin Highway as a four-lane dual carriageway to replace Holmes Street;
- Four-way roundabout at the intersection of Garden St / Matison Street.
- Four-way intersection at Garden Street / Passmore Street.

10.2 Total Flows on the External Road Network

The long term traffic flows around the subject site were obtained from the *Southern River Precinct 3A (South) Transport Assessment* which was prepared by Transcore in 2014. Transcore have progressively developed a strategic transport model for the City of Armadale and the Metropolitan Redevelopment Authority (MRA) for various projects in the southeast corridor of the metropolitan area. The future base case traffic model (2031) incorporates urban growth detailed in various WAPC planning strategies including the future urban development within the Southern River Area. The daily traffic flows predicted by the model are shown in **Figure 27**. It is noted that the daily flows shown on Southern River Road and Garden Street were based on advice from the local authority of the 2031 traffic projections from the MRWA regional traffic model.

Based on the overall Southern River Precinct 3 LSP, Passmore Street is likely to be upgraded to a Local Distributor / Neighbourhood Connector road. Long term traffic projections for Passmore Street were not available and it is considered conservative to estimate that the traffic flows would be equivalent to the long term flows along Matison Street on either side of Garden Street.

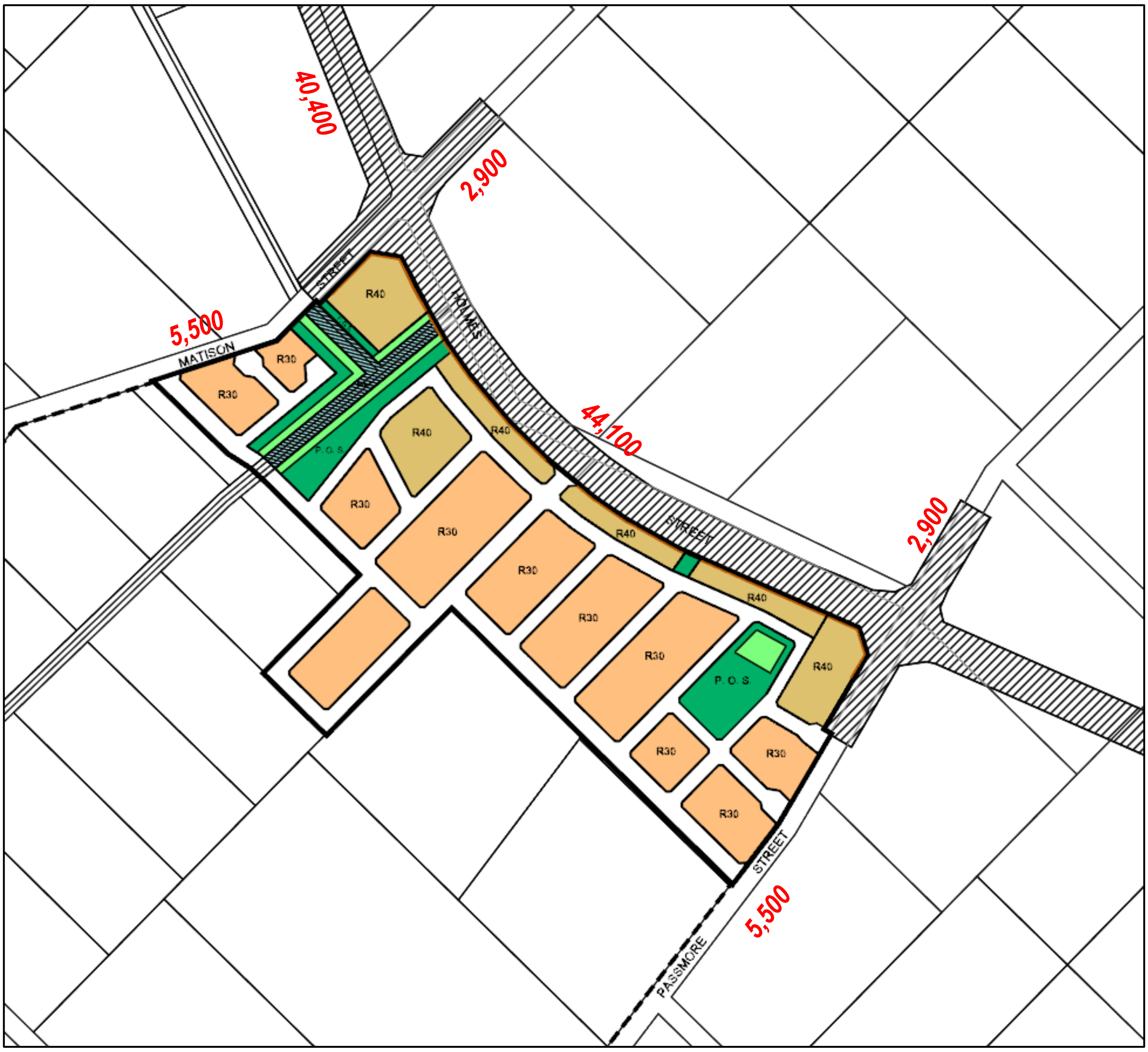

Figure 27: 2031 Weekday Base Network Traffic Volumes (*Transcore 2014)*

The 2031 peak hour traffic flows have been derived as shown in **Figure 28** using the following assumptions:

- Peak hour volumes are approximately 10% of the daily traffic volumes;
- 50/50 directional split of traffic ; and
- 5% heavy vehicle percentage for all movements.

Figure 28: 2031 Base Network Peak Hour Traffic Flows

10.3 Roads

Based on the typical midblock lane capacity between 1,500 and 2,400 pc/h on an urban road, the required road cross sections for the external road network are as below.

- Garden Street – four lanes;
- Matison Street – two lanes; and
- Passmore Street – two lanes.

10.4 Intersections

SIDRA Intersection 7.0 was used to assess the peak hour capacity of the following intersections:

- Garden Street / Matison Street roundabout;
- Garden Street / Passmore Street intersection;
- The intersections between the internal access roads with Matison Street, Garden Street and Passmore Street.

In order to establish the peak hour flows at the intersections along the boundary roads, the QRS II model was modified based on the ultimate road network and the structure plan traffic redistributed onto the road network under the assumed distribution as shown in **Figure 29**. The adjacent high school was also modelled in its ultimate form assuming 1,400 students (1,400 x 1.3 trips per student per peak = 1,820 trips).

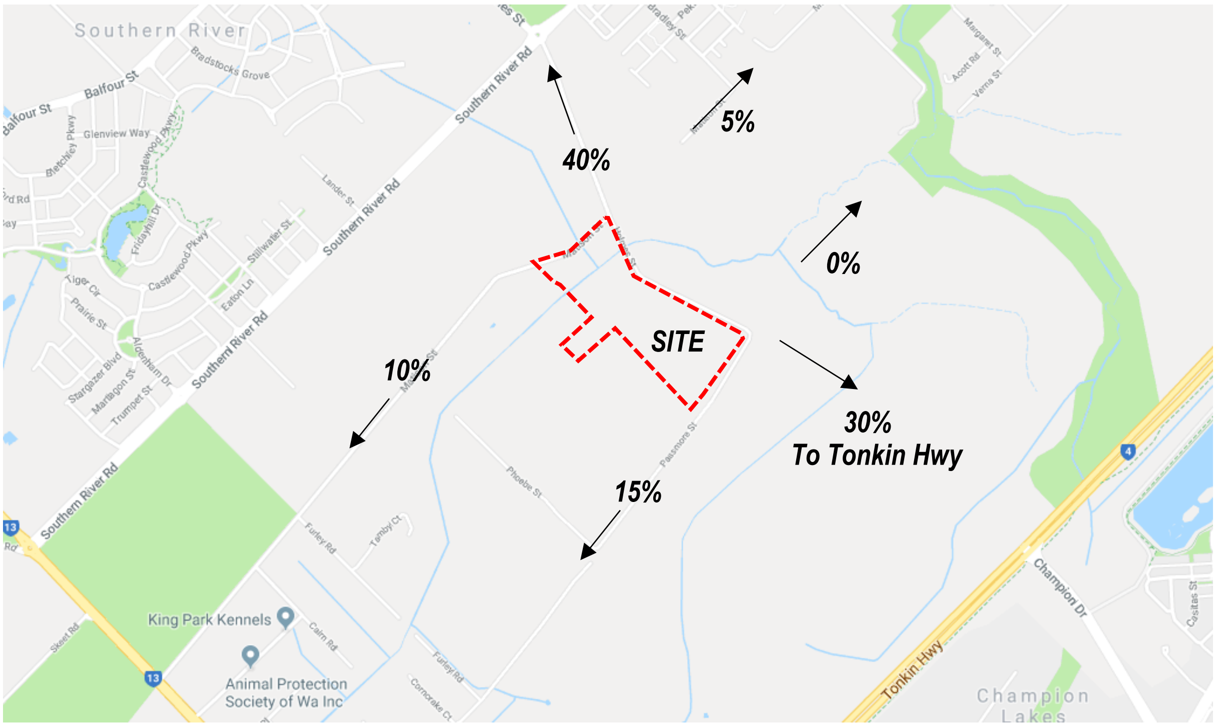

Figure 29: Assumed Distribution of Structure Plan Traffic on Ultimate Road Network

10.4.1 Garden Street / Matison Street Intersection

The modelled layout is shown in **Figure 30** and results of the assessment are shown in **Table 11**.

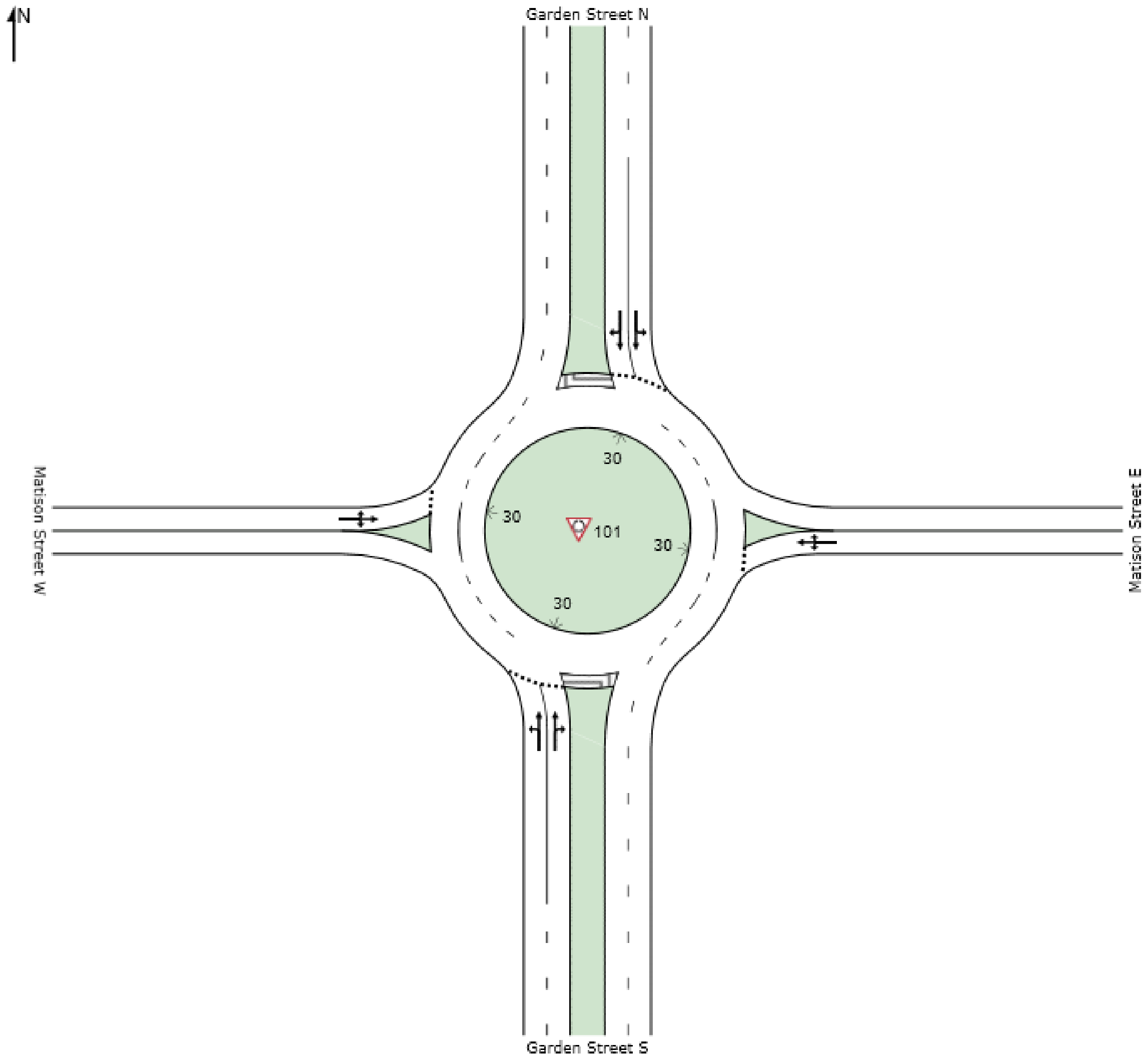

Figure 30: Modelled Layout for Garden Street / Matison Street Future Roundabout

Table 11: SIDRA Results for Garden Street / Matison Street Future Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Garden Street S											
1	L2	221	5.0	0.874	10.2	LOS B	18.8	137.5	0.98	0.88	51.4
2	T1	1764	5.0	0.874	11.3	LOS B	18.8	137.5	0.99	0.93	51.8
3	R2	221	5.0	0.874	18.5	LOS B	18.7	136.9	1.00	0.99	50.6
Approach		2206	5.0	0.874	11.9	LOS B	18.8	137.5	0.99	0.93	51.7
East: Matison Street E											
4	L2	58	5.0	0.467	14.6	LOS B	2.6	19.1	0.91	1.01	47.2
5	T1	29	5.0	0.467	14.7	LOS B	2.6	19.1	0.91	1.01	48.5
6	R2	58	5.0	0.467	20.4	LOS C	2.6	19.1	0.91	1.01	48.7
Approach		145	5.0	0.467	16.9	LOS B	2.6	19.1	0.91	1.01	48.0
North: Garden Street N											
7	L2	202	5.0	0.861	12.0	LOS B	17.7	129.3	0.99	1.00	50.2
8	T1	1616	5.0	0.861	13.1	LOS B	17.7	129.3	0.99	1.05	50.5
9	R2	202	5.0	0.861	20.5	LOS C	17.2	125.9	1.00	1.11	49.2
Approach		2020	5.0	0.861	13.8	LOS B	17.7	129.3	0.99	1.05	50.4
West: Matison Street W											
10	L2	110	5.0	0.962	71.5	LOS F	12.2	88.8	0.99	1.67	27.5
11	T1	55	5.0	0.962	71.6	LOS F	12.2	88.8	0.99	1.67	28.0
12	R2	110	5.0	0.962	77.3	LOS F	12.2	88.8	0.99	1.67	28.0
Approach		275	5.0	0.962	73.9	LOS F	12.2	88.8	0.99	1.67	27.8
All Vehicles		4646	5.0	0.962	16.5	LOS B	18.8	137.5	0.99	1.03	48.5

The results of the assessment indicate that all movements at the modelled roundabout would perform at a satisfactory level under the 2031 traffic flows. The exception is the westbound approach on Matison Street which is predicted to operate over capacity with average delays above typically acceptable levels. A modified intersection layout has been modelled with the inclusion of a short separate left turn lane on this approach as shown in **Figure 31**. The results of this analysis is shown in **Table 12**. Under this configuration, the intersection is predicted to operate satisfactorily.

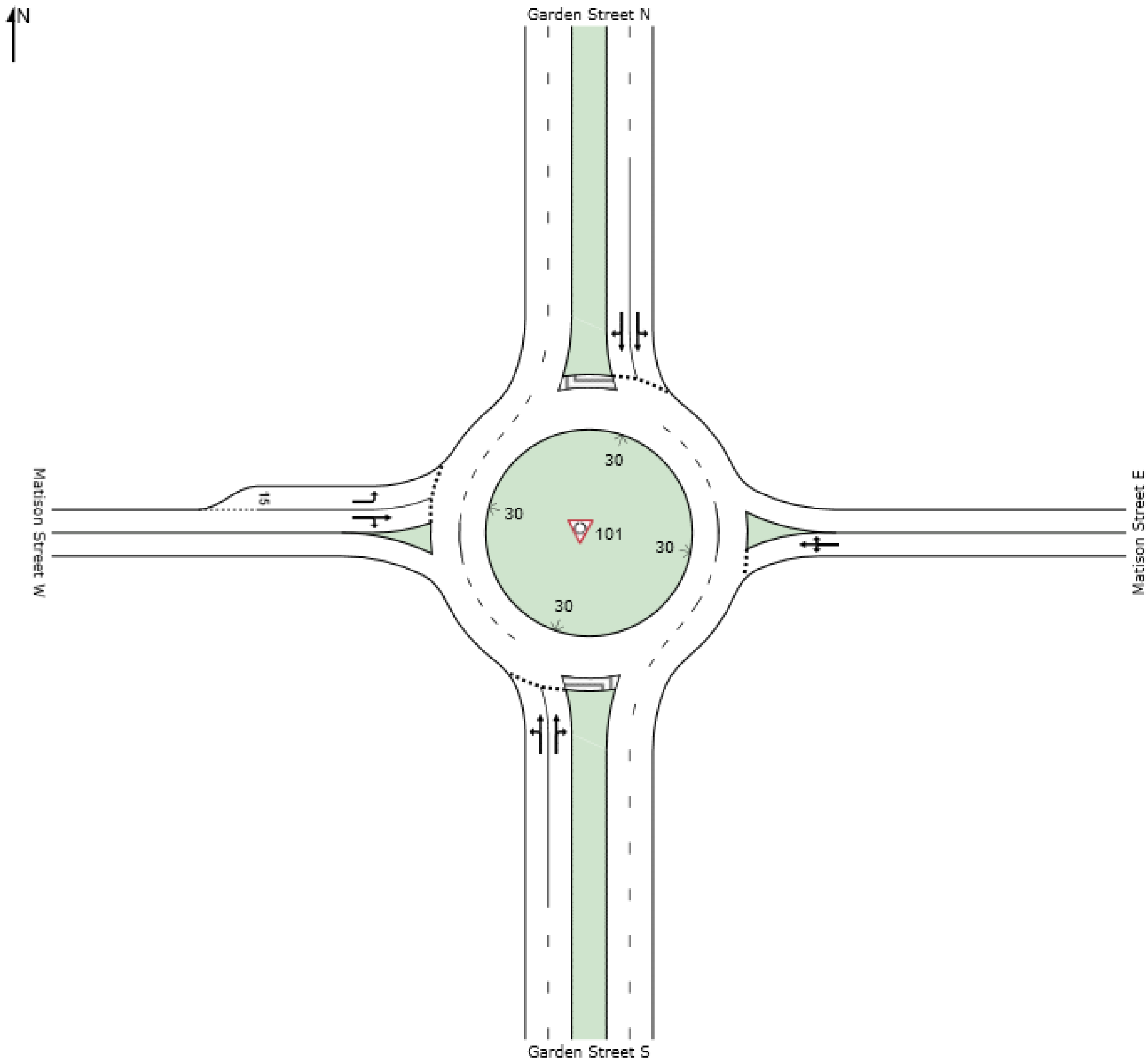

Figure 31: Modelled Alternate Layout for Garden Street / Matison Street Future Roundabout

Table 12: SIDRA Results for Alternate Garden Street / Matison Street Future Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Garden Street S											
1	L2	221	5.0	0.874	10.2	LOS B	18.8	137.5	0.98	0.88	51.4
2	T1	1764	5.0	0.874	11.3	LOS B	18.8	137.5	0.99	0.93	51.8
3	R2	221	5.0	0.874	18.5	LOS B	18.7	136.9	1.00	0.99	50.6
Approach		2206	5.0	0.874	11.9	LOS B	18.8	137.5	0.99	0.93	51.7
East: Matison Street E											
4	L2	58	5.0	0.467	14.6	LOS B	2.6	19.1	0.91	1.01	47.2
5	T1	29	5.0	0.467	14.7	LOS B	2.6	19.1	0.91	1.01	48.5
6	R2	58	5.0	0.467	20.4	LOS C	2.6	19.1	0.91	1.01	48.7
Approach		145	5.0	0.467	16.9	LOS B	2.6	19.1	0.91	1.01	48.0
North: Garden Street N											
7	L2	202	5.0	0.861	12.0	LOS B	17.7	129.3	0.99	1.00	50.2
8	T1	1616	5.0	0.861	13.1	LOS B	17.7	129.3	0.99	1.05	50.5
9	R2	202	5.0	0.861	20.5	LOS C	17.2	125.9	1.00	1.11	49.2
Approach		2020	5.0	0.861	13.8	LOS B	17.7	129.3	0.99	1.05	50.4
West: Matison Street W											
10	L2	110	5.0	0.420	15.9	LOS B	2.2	16.2	0.90	0.99	47.4
11	T1	55	5.0	0.415	12.6	LOS B	2.6	19.0	0.95	1.01	48.9
12	R2	110	5.0	0.415	18.3	LOS B	2.6	19.0	0.95	1.01	49.1
Approach		275	5.0	0.420	16.2	LOS B	2.6	19.0	0.93	1.00	48.4
All Vehicles		4646	5.0	0.874	13.1	LOS B	18.8	137.5	0.98	0.99	50.8

10.4.2 Garden Street / Passmore Street Intersection

In the absence of projected traffic flows along Passmore Street, the same flows through the Garden Street / Matison Street intersection have been used as a conservative estimate. The intersection has been modelled firstly as a four-way signalised intersection under single diamond phasing.

The modelled layout is shown in **Figure 32** and results of the assessment are shown in **Table 13**.

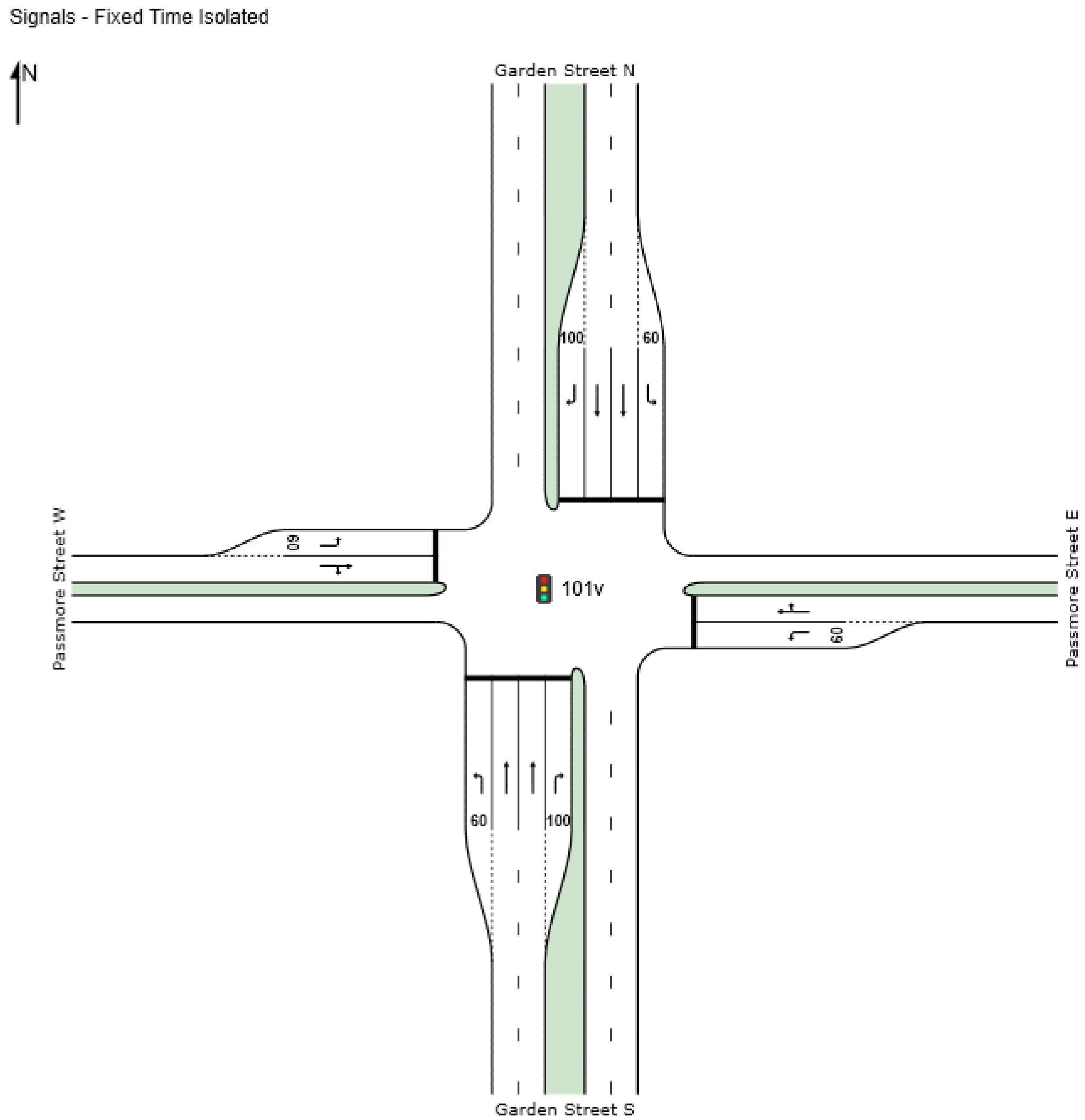

Figure 32: Modelled Layout for Garden Street / Passmore Street Signals

Table 13: SIDRA Results for Garden Street / Passmore Street Future Signals

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Garden Street S											
1	L2	221	5.0	0.208	17.6	LOS B	5.6	41.2	0.52	0.72	45.4
2	T1	1764	5.0	0.911	36.4	LOS D	49.1	358.1	0.84	0.92	37.5
3	R2	221	5.0	0.872	66.4	LOS E	13.4	97.9	1.00	0.98	28.4
Approach		2206	5.0	0.911	37.5	LOS D	49.1	358.1	0.83	0.91	37.0
East: Passmore Street E											
4	L2	58	5.0	0.229	52.2	LOS D	2.8	20.7	0.93	0.75	31.8
5	T1	15	5.0	0.508	53.6	LOS D	3.9	28.8	0.99	0.77	30.9
6	R2	58	5.0	0.508	59.2	LOS E	3.9	28.8	0.99	0.77	30.6
Approach		131	5.0	0.508	55.5	LOS E	3.9	28.8	0.96	0.76	31.1
North: Garden Street N											
7	L2	202	5.0	0.193	18.0	LOS B	5.2	38.0	0.52	0.72	45.2
8	T1	1616	5.0	0.841	23.2	LOS C	35.2	257.3	0.81	0.78	43.5
9	R2	202	5.0	0.854	65.2	LOS E	12.0	87.8	1.00	0.96	28.7
Approach		2020	5.0	0.854	26.9	LOS C	35.2	257.3	0.80	0.79	41.5
West: Passmore Street W											
10	L2	110	5.0	0.434	53.9	LOS D	5.6	40.7	0.96	0.78	31.3
11	T1	28	5.0	0.855	62.7	LOS E	8.4	61.6	1.00	1.00	28.7
12	R2	110	5.0	0.855	68.4	LOS E	8.4	61.6	1.00	1.00	28.4
Approach		248	5.0	0.855	61.3	LOS E	8.4	61.6	0.98	0.90	29.7
All Vehicles		4605	5.0	0.911	34.7	LOS C	49.1	358.1	0.83	0.85	38.1

The results of the assessment indicate that the modelled signalised intersection would perform close to capacity but within typically accepted levels for high volume intersections.

If implemented as a roundabout, the results would be similar to those results for the Garden Street / Matison Street intersection. It is understood that Main Roads WA typically discourage the construction of new traffic signals where an alternative treatment can be justified. In this instance, as the intersection is likely to perform at a higher level as a roundabout, then the recommended intersection treatment would be a roundabout. The current MRS road reservation for Garden Street and its intersection with Passmore Street appears to allow sufficient area to accommodate a future roundabout.

10.4.3 Matison Street / N-S Access Street Intersection

The modelled layout is shown in **Figure 33** and results of the assessment are shown in **Table 14**. The results of the assessment indicate that this intersection would perform at a satisfactory level under the 2031 traffic flows.

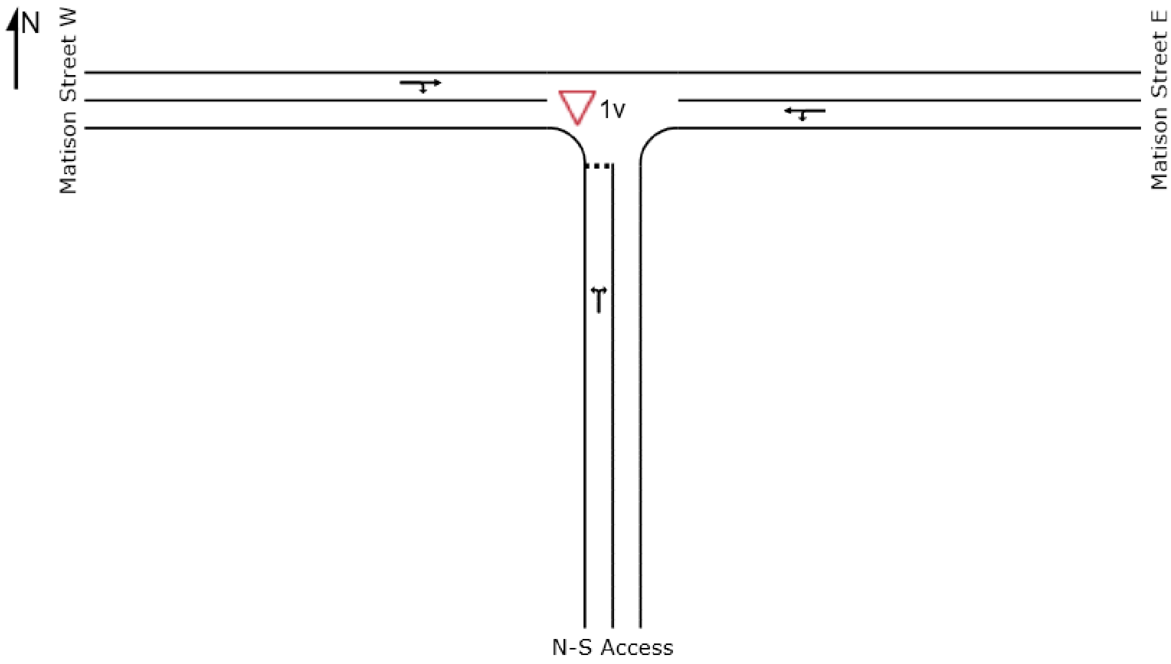

Figure 33: Modelled Layout for Matison Street / N-S Access Street Intersection

Table 14: SIDRA Results for Matison Street / N-S Access Street Intersection

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N-S Access											
1	L2	100	0.0	0.091	6.5	LOS A	0.4	2.5	0.36	0.61	52.5
3	R2	8	0.0	0.091	8.9	LOS A	0.4	2.5	0.36	0.61	52.0
Approach		108	0.0	0.091	6.7	LOS A	0.4	2.5	0.36	0.61	52.5
East: Matison Street E											
4	L2	10	0.0	0.151	5.6	LOS A	0.0	0.0	0.00	0.02	58.1
5	T1	275	5.0	0.151	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		285	4.8	0.151	0.2	NA	0.0	0.0	0.00	0.02	59.7
West: Matison Street W											
11	T1	275	5.0	0.219	0.5	LOS A	0.8	5.8	0.25	0.17	57.6
12	R2	100	0.0	0.219	6.7	LOS A	0.8	5.8	0.25	0.17	55.5
Approach		375	3.7	0.219	2.1	NA	0.8	5.8	0.25	0.17	57.0
All Vehicles		768	3.6	0.219	2.1	NA	0.8	5.8	0.17	0.18	57.3

10.4.4 Garden Street / E-W Access Street Intersection

The modelled layout is shown in **Figure 34** and results of the assessment are shown in **Table 15**. The results of the assessment indicate that this intersection would perform at a satisfactory level as a left-in/left-out intersection under the 2031 traffic flows.

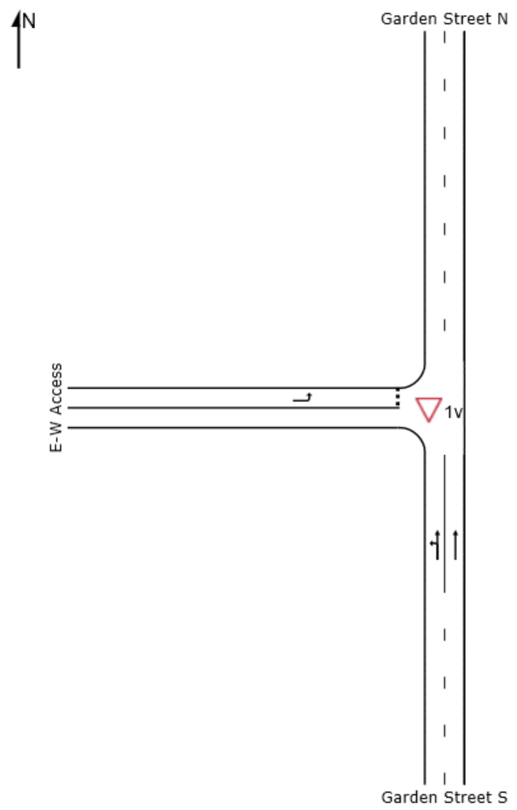

Figure 34: Modelled Layout for Garden Street / E-W Access Street Intersection

Table 15: SIDRA Results for Garden Street / E-W Access Street Intersection

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Garden Street S											
4	L2	268	0.0	0.656	5.7	LOS A	0.0	0.0	0.00	0.13	57.0
5	T1	2205	5.0	0.656	0.2	LOS A	0.0	0.0	0.00	0.06	59.2
Approach		2473	4.5	0.656	0.8	NA	0.0	0.0	0.00	0.06	58.9
West: E-W Access											
1	L2	267	0.0	0.558	16.9	LOS C	2.9	20.3	0.85	1.08	46.0
Approach		267	0.0	0.558	16.9	LOS C	2.9	20.3	0.85	1.08	46.0
All Vehicles		2740	4.0	0.656	2.3	NA	2.9	20.3	0.08	0.16	57.3

10.4.5 Passmore Street / N-S Access Street Intersection

The modelled layout is shown in **Figure 35** and results of the assessment are shown in **Table 16**. The results of the assessment indicate that this intersection would perform at a satisfactory level under the 2031 traffic flows.

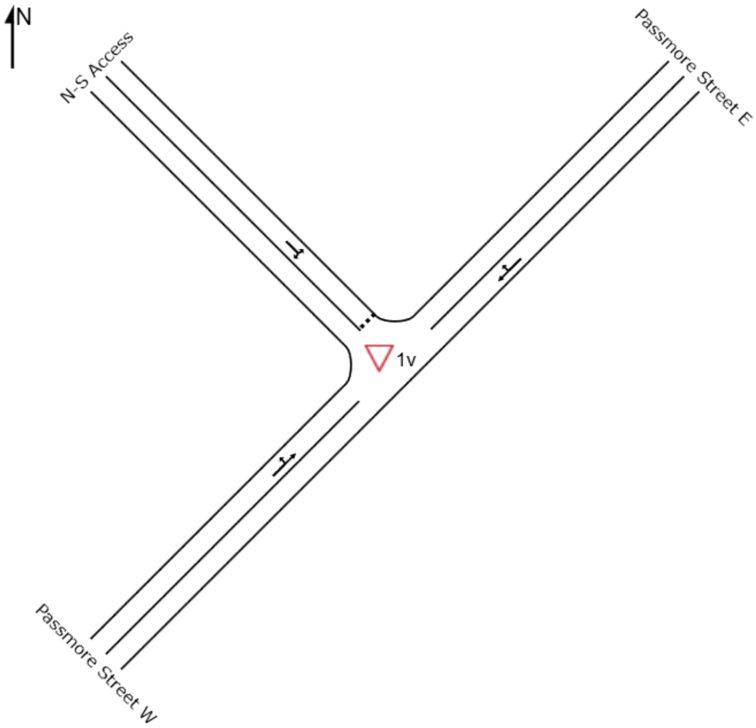

Figure 35: Modelled Layout for Passmore Street / N-S Access Street Intersection

Table 16: SIDRA Results for Passmore Street / N-S Access Street Intersection

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
Northeast: Passmore Street E											
11	T1	275	5.0	0.270	1.1	LOS A	1.3	9.4	0.39	0.25	56.6
12	R2	149	0.0	0.270	7.4	LOS A	1.3	9.4	0.39	0.25	54.6
Approach		424	3.2	0.270	3.3	NA	1.3	9.4	0.39	0.25	55.9
Northwest: N-S Access											
1	L2	152	0.0	0.339	7.1	LOS A	1.6	10.9	0.48	0.75	51.1
3	R2	128	0.0	0.339	11.0	LOS B	1.6	10.9	0.48	0.75	50.6
Approach		280	0.0	0.339	8.9	LOS A	1.6	10.9	0.48	0.75	50.9
Southwest: Passmore Street W											
4	L2	128	0.0	0.215	5.6	LOS A	0.0	0.0	0.00	0.19	56.7
5	T1	275	5.0	0.215	0.0	LOS A	0.0	0.0	0.00	0.19	58.2
Approach		403	3.4	0.215	1.8	NA	0.0	0.0	0.00	0.19	57.7
All Vehicles		1107	2.5	0.339	4.2	NA	1.6	10.9	0.27	0.35	55.2

10.5 Pedestrian / Cycle Networks

The requirements for safe crossing facilities on the external road network has been assess in accordance with Table 2 of the WAPC TIA Guidelines. For two-lane undivided roads, the threshold is 1,100 vehicles per hour (two-way traffic). For four-lane divided roads, the threshold is 1,600 vph.

Based on the above, safe crossing facilities would be required across Garden Street. The appropriate crossing locations will ultimately depend on the location of public transport services and stops, the layout of the development on the opposite side of Garden Street and any other location where there is likely to be a high demand for pedestrians and cyclists to cross. Crossing facilities (pram ramps, median breaks and pedestrian refuge islands) are also recommended adjacent to the proposed intersections with Matison Street and Passmore Street.

11 Conclusions

A detailed Transport Impact Assessment of the revised Outline Development Plan for Southern River Sub-precinct 3D has concluded the following:

- The proposed internal transport network is assessed as being compliant with the criteria of the WAPC Liveable Neighbourhoods guidelines.
- It has been recommended that all internal intersections operate under priority control and that local area traffic management measures are implemented at the subdivision stage.
- The proposed spacing between the internal connector road to Matison Street and one of the Precinct 3E roads is below the minimum spacing recommendation of Liveable Neighbourhoods. It has been justified that this is acceptable based on low traffic volumes through the Precinct 3E connection, low cross traffic demand and negligible queuing at the Precinct 3D connection.
- The structure plan traffic can be accommodated within the existing and the ultimate external road network. Matison Street and Passmore Street will need to be upgraded to a suitable urban Neighbourhood Connector standard. Should development within the site precede the proposed extension of Garden Street adjacent to the site, then the section of Holmes Street south of the proposed access into the site may need to be widened to accommodate the structure plan traffic, particularly the vehicle trips generated by the proposed high school.
- A concept path network has been recommended to allow the efficient movement of pedestrian and cyclists in the area.
- PTA have advised of preliminary plans for future public transport services through the Southern River Precinct 3. These plans are not currently funded and are also be subject to resource availability, staging of development in the area and associated demand. Public transport accessibility should be assessed in further detail at the subdivision stage.

Overall, it is concluded that the proposed street network will provide an acceptable range of choices for travel and ensure that traffic volumes on individual streets can be kept below threshold levels to ensure the amenity of the area is preserved and safe movement options exist for pedestrians, cyclists and local traffic.