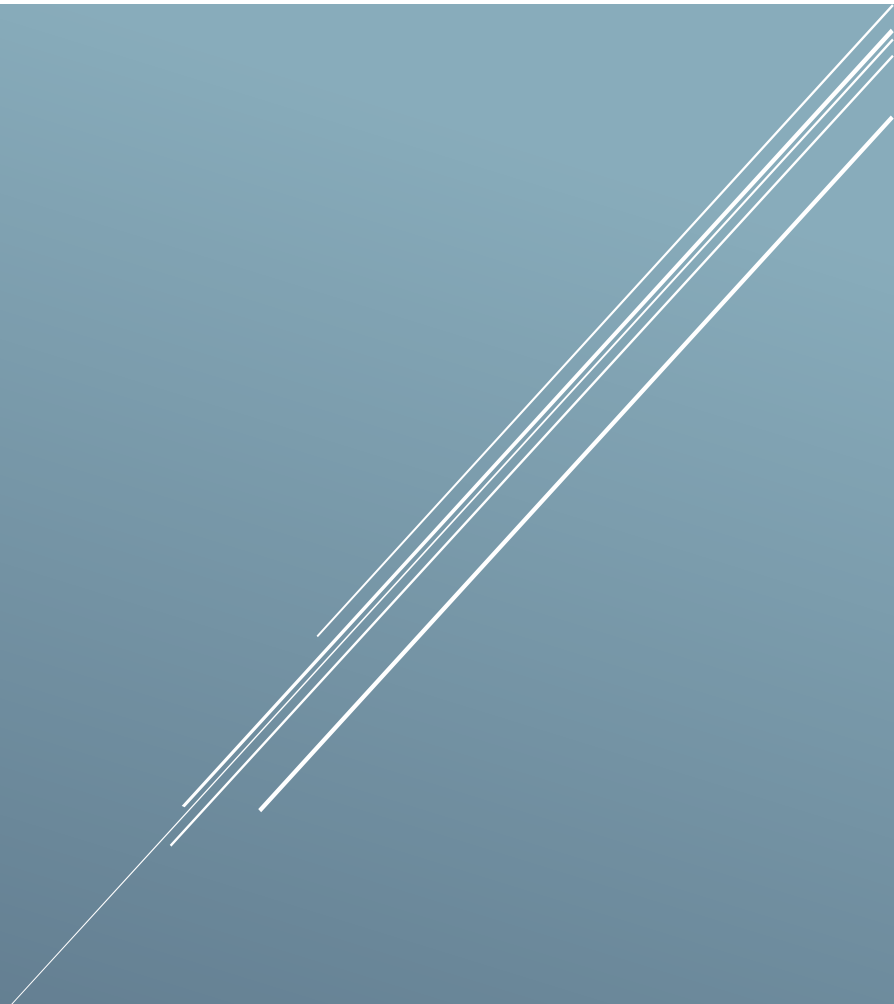


Appendix E – Precinct Traffic Considerations



SUNNYSIDE ESTATE

Traffic considerations for indicative area for the investigation

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1. Introduction

In response to the initial submissions for the proposed LEP Variation for the Sunnyside Estate development the following advice was received from WWCC:

"I confirm that Council is requesting that the planning proposal investigates, and has consideration to, infrastructure provision across a wider precinct than just the planning proposal subject site. A wider precinct area was identified, and is referenced in your planning proposal, in the 2013 Spatial Plan and this should be considered as the minimum area for further investigation and assessment for infrastructure. We would also request that this area be extended to include rural residential areas between your site and the wider precinct area (as referenced from the Spatial Plan 2013). This consideration should include that area of rural residential development through to the existing urban development".

"I have included a plan with this email which provides an indicative area for investigation and reflects that described above" (refer Figure 1).

"Following our meeting, further discussions with our Infrastructure team have identified that there are potential issues with the capacity of the Koorngal Sewerage Treatment Plant and its ability to cater for expansion and intensification across the catchment. It is anticipated that your investigations will provide further information and detail that will assist with this planning and analysis to determine the capacity of the sewerage treatment plant and any staging required to cater for any future expansion and intensification of development in the catchment."

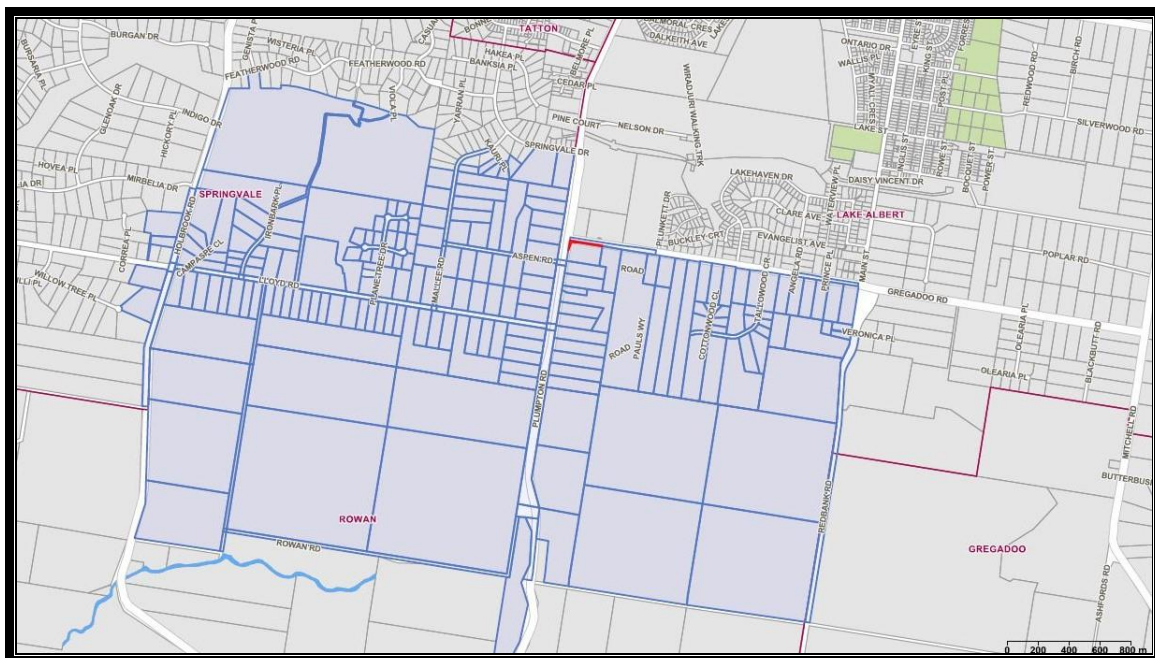


Figure 1: indicative area for investigation (source: WWCC 2020)

The indicative area for investigation is shown in Figure 1 and comprises approximately 1,111 hectares including the proposed Sunnyside Estate (110ha).

2. Zoning

The current zoning within the indicative area for the investigation comprises R5 (Large Lot Residential), RU6 (Transition) and a small area of RE1 (Public Recreation) to the north and RU1 (Primary Production) to the south.

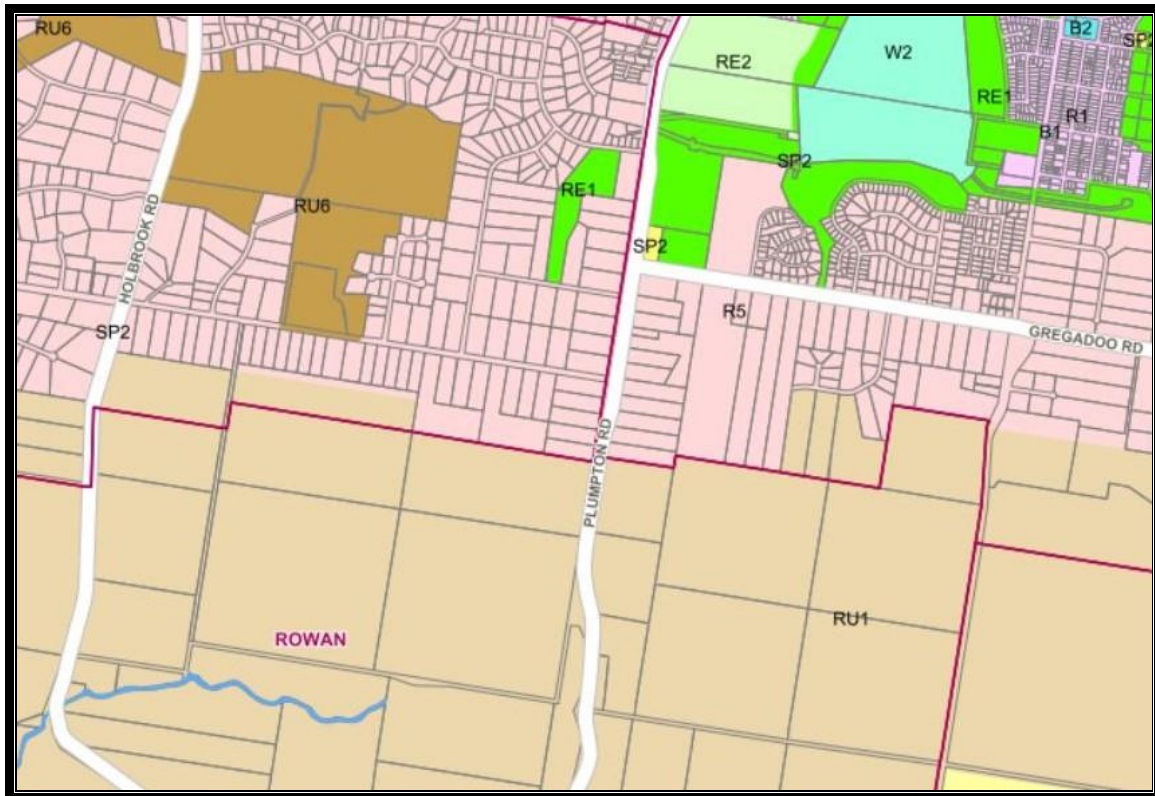


Figure 2: Zoning (source: WWCC)

3. Indicative masterplan

The area to the north of the proposed Sunnyside Estate is zoned as RU6 and R5 and has large lot rural type dwellings across the area whereas the area to the east and west of the proposed Sunnyside Estate and the proposed Sunnyside Estate area itself have limited dwellings, mostly being dwellings associated with the productive farms.

An indicative masterplan for the area and how the adjacent areas could integrate with the Sunnyside Estate development is shown in Figure 3.

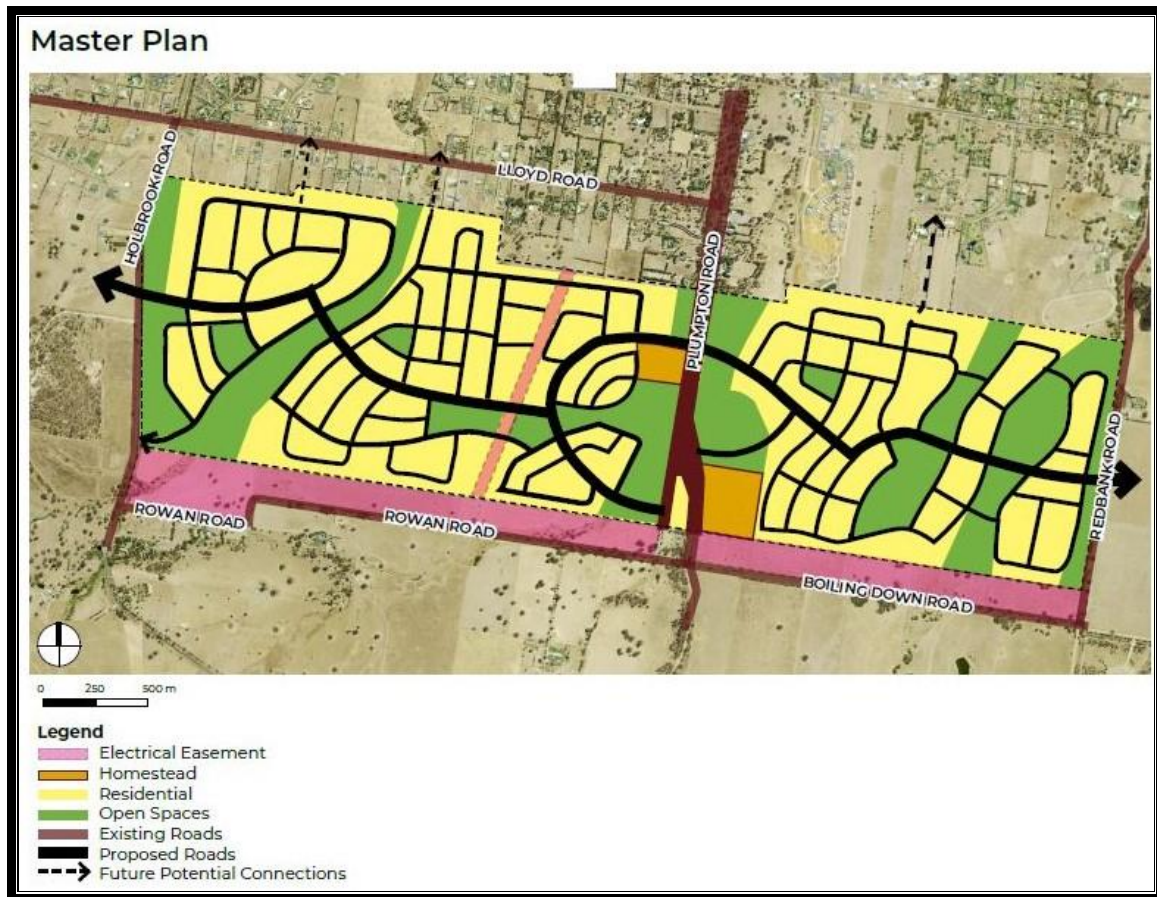


Figure 3: Indicative masterplan (source: Siva Projects 2020)

4. Dwelling yield assessment

WWCC advised that the assessment of the potential development within the area should be based on dwellings of 1,200sqm blocks or 8 dwellings per hectare.

The area across the south of the indicative area for the investigation being un-developed rural land (yellow area Figure 4) could be developed in a planned manner whereas the areas across the northern part of the indicative area for the investigation (blue area Figure 4) currently has housing on large blocks hence redevelopment would be constrained by the existing dwellings and various owners' decisions whether to redevelop or subdivide their blocks.

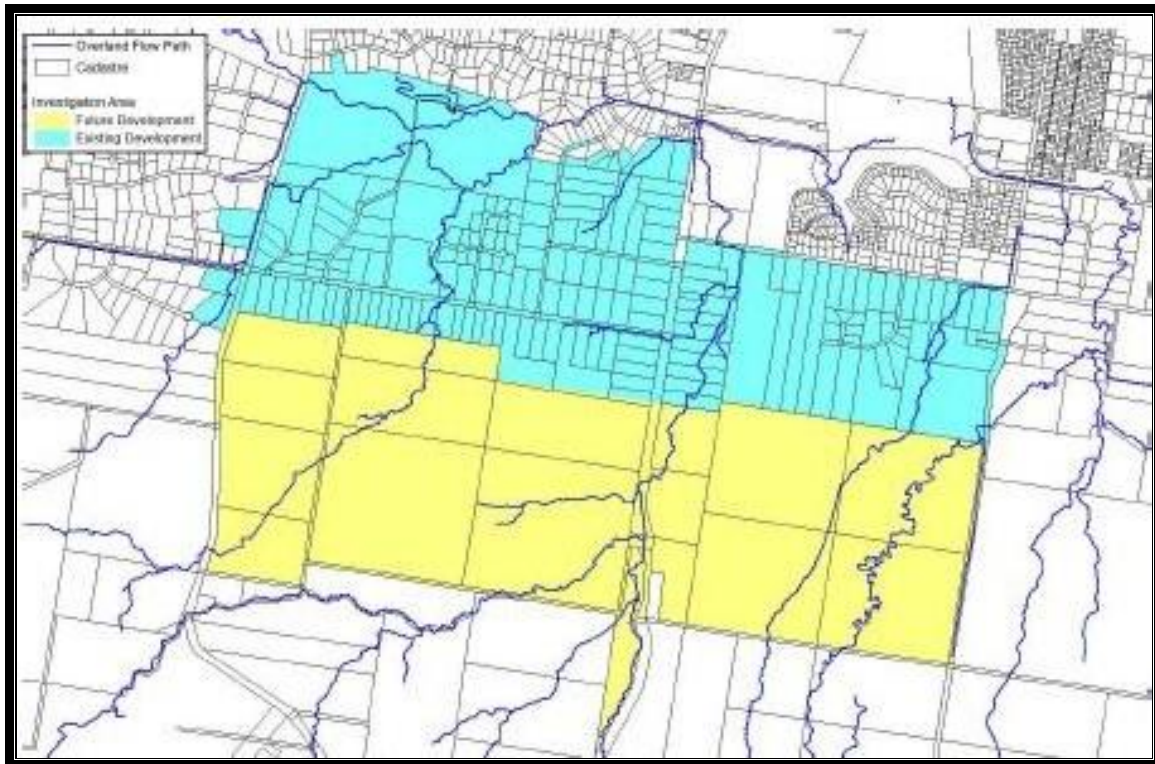


Figure 4: developed and undeveloped areas in the indicative area for the investigation

The concept plan for the proposed Sunnyside Estate which covers 110ha has the following land take:

Landuse	Ha	% of estate
Residential	48.75	44.32%
Shop	0.56	0.51%
Homestead	3.25	2.95%
Open space corridors	25.19	22.90%
Ponds/wetlands	4.20	3.82%
Roads	11.70	10.64%
Electrical easements	16.35	14.86%
Totals	110.00	100.00%

Table 1: Sunnyside Estate landuse (source: Siva Projects 2020)

The areas to the east and west of the proposed Sunnyside estate both have significant areas of open space/waterway areas/wetlands.

As noted above, the indicative area for the investigation comprises approximately 1,111ha of land. Assuming 30% of the area is dedicated to roads, wetlands, open space, easements etc. and 8 dwellings per hectare the yield for the indicative area for the investigation would be 6,222 dwellings, say 6,000 dwellings (or 6,000 ET) and at 2.6 persons per dwelling this would equate to a potential population of 15,600 people. (1ET = 2.6 persons per tenement in 2011 and expected to decrease to approx. 1ET = 2.47 in 2031).

5. Road Network

The road network surrounding and through the indicative area for the investigation is detailed in Figure 5. To the west of the indicative area for the investigation is Holbrook Road, a Regional Road central to the area is Plumpton Road, a sub-arterial road and to the east is Redbank Road, an unsealed local access road. To the south of the area extending from Holbrook Road to Plumpton Road is Rowan Road, an unsealed local access road and extending from Plumpton Road to Redbank Road is Boiling Down Road an unsealed local access road.



Figure 5: Road network (source: WWCC)

The road hierarchy for the roads through and around the indicative area for the investigation is detailed in Table 2 and Figure 6. The road hierarchy nominates the following categories for various roads in the vicinity of the indicative area for the investigation:

Road	Category
Plumpton Road	Sub-arterial
Lake Albert Road	Collector
Holbrook Road	Regional
Red Hill Road	Sub-arterial
Koorungal Road	Sub-arterial
Boiling Down Road	Local road
Redbank Road	Local road
Rowan Road	Local road

Table 2: Road categories (source: WWCC reports)

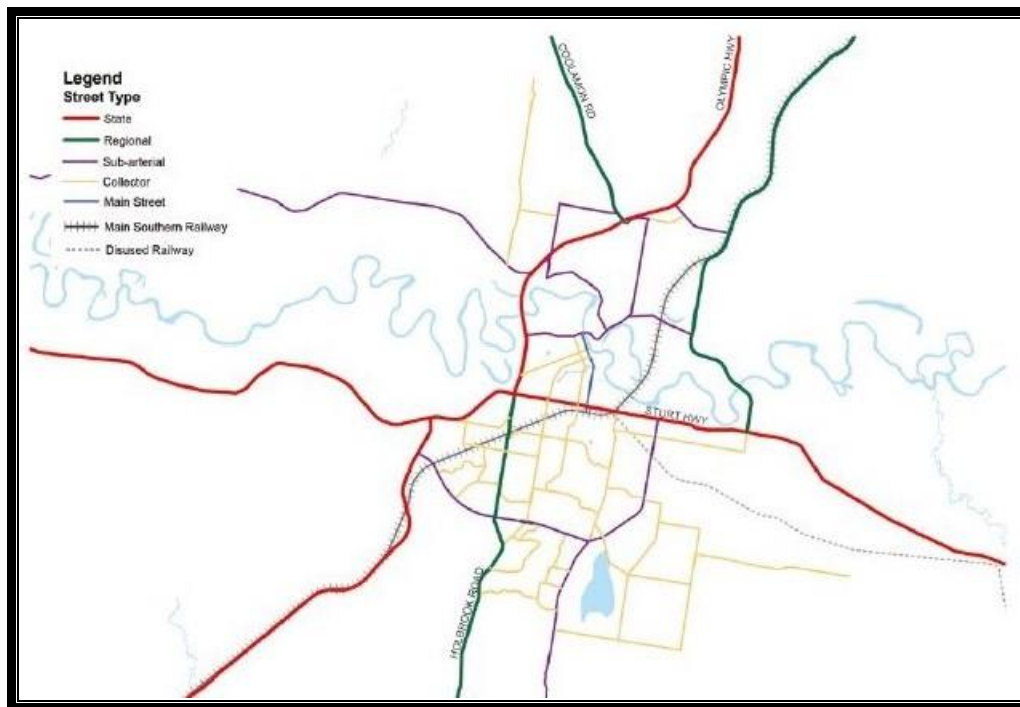


Figure 6: Road Hierarchy (source: WWCC)

The various categories of roads generally carry the following traffic volumes:

Road category	Traffic volumes (vehicles per day)	Description
Arterial road	>15,000vpd	Arterial roads carry longer distance traffic to, from and across the urban area. They have connections with the state or national road network running between urban areas and operate as truck routes and carry heavy goods vehicles. The level of service for traffic flow should encourage rather than discourage traffic from using these roads. These roads are the responsibility of RMS.
Regional		Regional roads perform an intermediate function between the main arterial network of State Roads and council controlled local roads.
Sub-arterial	6,000 to 20,000vpd	Sub-arterial roads carry traffic between industrial, commercial, and residential areas. These roads generally form a grid with roads spaced around 1.5 kilometres apart and link specific land use areas or "cells" and carry a range of vehicle types including heavy goods vehicles.
Collector	5,000 to 10,000vpd	Collector roads link local roads to the arterial and sub-arterial roads. The route of collector roads discourages through traffic so that the cell formed by the grid only carries traffic belonging to or serving the cell. A 50 km/h speed limit would normally apply. While heavy vehicles are discouraged, bus services are permitted on these roads.
Local	1,500 to 2,000vpd	Local or access roads provide access to individual properties. An upper speed limit of 50 km/h will normally apply.

Table 3: Road capacities and descriptions

6. Traffic generation

As noted in Section 4 of this report, the yield across the 1,111 hectares of the indicative area for the investigation would be approximately 6,000 dwellings at 8 dwellings per hectare. As noted in Section 5, the two main roads servicing the area are Holbrook Road (west) and Plumpton Road (central) and a minor road Redbank Road (east) which would require upgrading in the future as traffic volumes increased.

Traffic generation levels for the indicative area for the investigation are established using the rates suggested in the RMS Guide to Traffic Generating Developments Technical Direction and TDT 2013/04a Updated Traffic Surveys. Traffic generation rates for Dwelling Houses (regional areas) are used for the residential estate. Assumed generation rates are as follows:

Residential Dwellings Houses (8 dwellings per ha)

- Daily vehicle trips (vpd) = 7.4 per dwelling
- Weekday average peak hour vehicle trips (vph) = 0.78 per dwelling

The total traffic generated for the fully developed residential estate for approx. 6,000 dwellings is shown below:

- Daily vehicle trips = 44,400vpd
- Weekday average peak hour vehicle trips = 4,680vph

The areas currently zoned R5 and developed as large blocks are unlikely to be developed in an orderly manner due to the fragmented ownership and will likely result in less dense housing (assume 6 dwellings per ha) than the areas that are currently zoned RU1 (8 dwellings per ha). The split in the areas across the indicative area for the investigation is approx.:

- R5 520 hectares
- RU1 591 hectares

Based on the lower yield within the R5 areas and assuming 30% of the area is assigned to roads, wetlands, open space etc the generated traffic would be as follows:

- Daily vehicle trips = 40,653vpd
- Weekday average peak hour vehicle trips = 3,869vph

Traffic generated by the development throughout the indicative area for the investigation will be distributed throughout the broader road network depending on origin/destination and route choices. This can be estimated by assessing likely origins and destinations based on existing traffic flows.

The following assumptions have been made in determining the distribution of traffic, the values in brackets being for the reduced density in the R5 zoned areas:

Assumption	Justification
In the AM peak, 70% of traffic generated by the Residential estate will be outbound, and 30% inbound. In the PM peak, the corresponding split will be 30% outbound and 70% inbound. Weekday outbound AM Peak 3,276vph (2,708vph) Weekday inbound AM Peak 1,404vph (1,161vph) Weekday outbound PM Peak 1,404vph (1,161vph) Weekday inbound PM Peak 3,276vph (2,708vph)	Industry standard based on <i>RMS Guide to Traffic Generating Developments</i> and a review of existing traffic movement data.
25% of the traffic will use Holbrook Road to the east 50% of the traffic will use Plumpton Road being central to the area 25% of the traffic will use Redbank Road to the west	Shortest route to a main road

Table 4 Traffic distribution assumptions

Road	% of generated traffic	Volume of generated traffic (vpd)	Traffic during peak (vph)	Road category	Road Capacity (vpd)
Holbrook Road	25%	11,100 (10,163)	1,170 (927)	Regional	
Plumpton Road	50%	22,200 (20,326)	2,340 (1,854)	Sub-arterial	6,000 to 20,000vpd
Redbank Road	25%	11,100 (10,163)	1,170 (927)	Local	1,500 to 2,000vpd

Table 5: Traffic distribution

7. Traffic impact on the network

Holbrook Road and Plumpton Road, roads to which traffic from the indicative area for the investigation would travel, already carry significant traffic volumes. Redbank Road carries traffic but a smaller volume than the other two roads.

The *Report for Wagga Wagga Planning Studies, Traffic Management Lloyd, GHD Sept 2008*, indicates that the traffic on Holbrook Road in 2008 was 2,040 vpd. At a growth rate of 1.1% per annum this would represent approx. 2,325vpd in 2021.

The *Traffic Impact Assessment, 52 Plumpton Road, Proposed Residential Rezoning, Wagga Wagga, NSW Report September 2017, Peter Meredith Consulting* indicates that the traffic on sections of Plumpton Road (eg Plumpton Road between Red Hill Road and Lansdowne Avenue both directions) is 50% of its nominal capacity as a sub-arterial road.

While the above considerations have been simplistic in application and assume the area is residential, should the indicative area for the investigation be developed to its full capacity at 8 dwellings per hectare or the lesser density with 6 dwellings per hectare in the R5 zoned areas and 8 dwellings per hectare in the RU1 zoned areas, significant traffic volumes would be generated. The road which appears would be impacted the greatest by such a development is Plumpton Road with the potential volume of traffic exceeding its classification as a sub-arterial road and becoming an arterial road.

Traffic travelling to Redbank Road may travelling along Gregadoo Road and then join with Plumpton Road or may travel along Main Street then Lake Albert Road, possibly joining with Plumpton Road closer to the city centre.

Planning of the area will determine the ultimate traffic volumes and direction of flows. If the area is purely residential then significant volumes of traffic will flow towards the city and employment areas however if the planning includes employment centres, shops, childcare facilities etc and promotes active travel then the traffic flows could be significantly different to a primarily residential estate.

Further detailed traffic analysis and modelling would be required as the indicative area for the investigation was planned and developed.

8. Road upgrades

The existing roads in the indicative area for the investigation would require upgrading as the development of the area progressed. The increase in the traffic would be gradual and the road upgrading could be undertaken over time as funds became available. The road upgrading could involve provision of kerb and gutter, pavement rehabilitation, construction of footpaths/bicycle paths, stormwater drainage works, improved lighting, linemarking and signposting and landscape works.

9. Proposed Sunnyside Estate

The proposed Sunnyside Residential Estate with circa 400 dwellings would be developed over a period of several years with possibly 50 to 100 blocks in the initial stage then subsequent stages of approx. 50 blocks per year depending on demand. In this development scenario, the maximum traffic generation would not occur for approx. 8 to 10 years. The generated traffic would all travel to Plumpton Road then disperse through the wider road network. As noted in the Sunnyside Estate Wagga Wagga, Preliminary Traffic Report, July 2020, Plumpton Road has sufficient capacity to accommodate all traffic generated from the proposed Sunnyside Residential Estate development without upgrading of the road.

10. References

1. Sunnyside Estate Wagga Wagga, Preliminary Traffic Report, July 2020 John Randall Consulting Pty Ltd
2. Wagga Wagga Draft LSPS - September 2020
3. Wagga Wagga City Council website
4. Wagga Wagga City Council Engineering Guidelines for Subdivisions and Development Standards
5. The Wagga Wagga Integrated Transport Strategy and Implementation Plan 2040
6. Traffic Impact Assessment, 52 Plumpton Road, Proposed Residential Rezoning, Wagga Wagga, NSW Report September 2017, Peter Meredith Consulting
7. Wagga Wagga Planning Studies – Traffic Management Lloyd, GHD Sept 2008
8. Report for Wagga Wagga Planning Studies, Traffic Management Lloyd, GHD Sept 2008