

PARKRIDGE GROUP PTY LTD

EATON DRIVE ACCESS REVIEW

April 2018



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1. EXECUTIVE SUMMARY

- 1.1. Riley Consulting has been commissioned through Calibre Consulting to provide traffic modelling of the future residential development of Parkridge, Eaton. This report is focussed on two proposed intersections to Eaton Drive to determine what control will be required. The key findings of the traffic review are:

- 1.2. The intersections of Peninsula Lakes Drive and a new northern access to Eaton Drive have been tested using 3 traffic distribution scenarios. The Sidra assessment shows that:
 - 1.3. The Peninsula Lakes Drive intersection operates in an acceptable manner with the provision of give way control to the side road. A wider median gap on Eaton Drive is required to permit right turning movements to shelter. A seagull treatment is considered appropriate for this intersection.

 - 1.4. The northern access to Eaton Drive, as presently constructed (seagull treatment) is shown to operate in an acceptable manner with the provision of give way control to the side road and the wider median on Eaton Drive.

2. INTRODUCTION AND BACKGROUND

- 2.1. Parkridge Estate is a proposed residential development in the locality of Millbridge, Eaton. There are two land development sites that are considered in this review.
- 2.2. Figure 1 shows the location of the subject land and the local road network. Appendix A shows an indicative subdivision layout for Parkridge and the location of the two access points considered in this technical review.

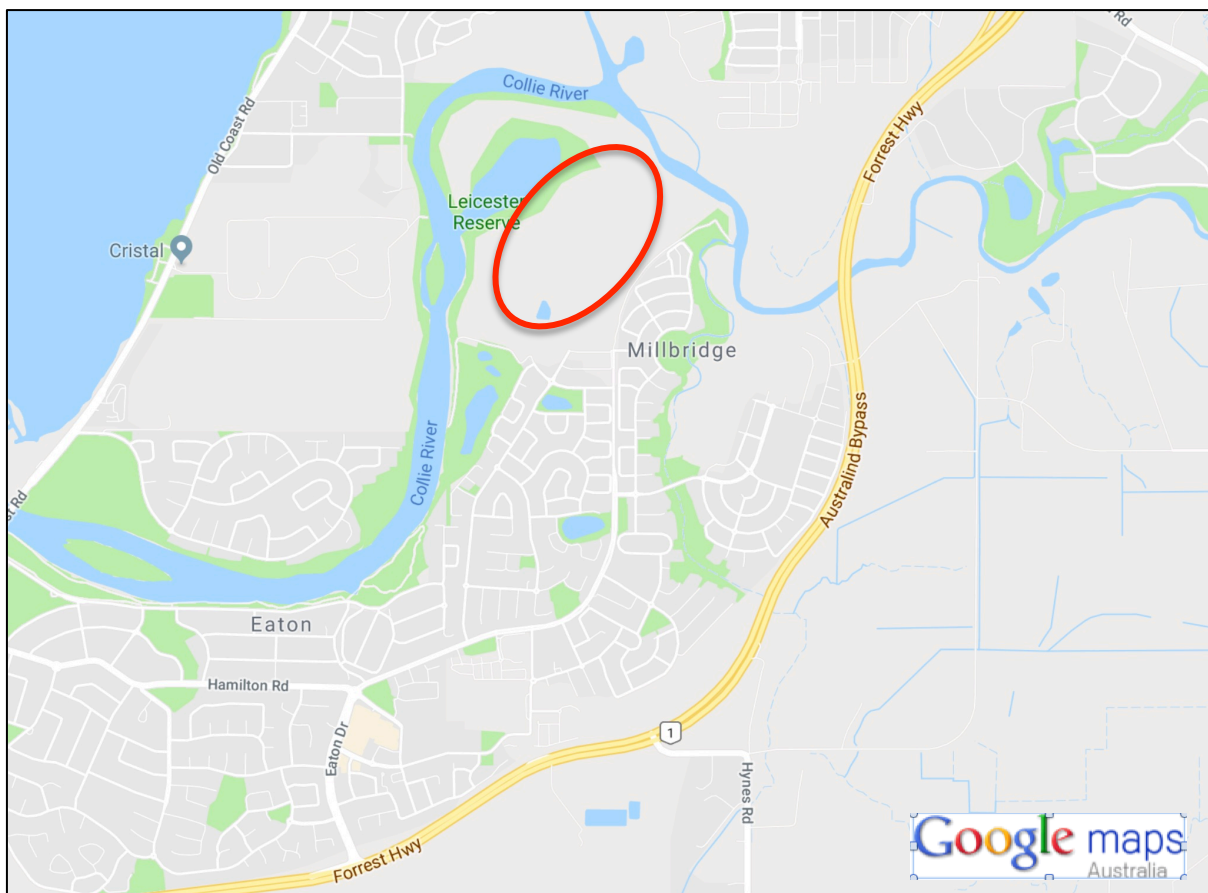


Figure 1 Site Location

Eaton Drive

- 2.3. Eaton Drive is classified as a local distributor road, linking the suburbs of Eaton and Millbridge to Forrest Highway and Bunbury. It is constructed as a four lane divided carriageway road between Forrest Highway and Millbridge Boulevard. North of Millbridge Boulevard it has a single lane in each direction.
- 2.4. At the time of writing this report a bridge is being constructed over the Collie River that will link Eaton Drive through to Treendale.
- 2.5. Traffic data provided by the Shire of Dardanup shows a demand of 1,364 vehicles per day (vpd) in 2013. The data was recorded at SLK 2.94, north of Millbridge Boulevard. Although the data is old, it shows that the AM peak

equates to 6% of the daily demand and the evening peak 10.6% of the daily demand.

- 2.6. Traffic data for Eaton Drive north of Forrest Highway recorded in 2012 is shown in Table 1.

Table 1 Eaton Drive 2012

VPD	Peak	North	South
13,882	AM 8.8%	404	825 (67%)
	PM 10.2%	962 (68%)	458

- 2.7. Future traffic forecasts for the Eaton Fair shopping centre predict 24,900vpd on Eaton Drive north of Hamilton Road. Refer Appendix B. However, these forecasts are believed to have added the shopping centre traffic to the future forecast, which would potentially double count the shopping centre attraction. Noting the shopping centre forecasts an increase of 12,000vpd to Eaton Drive, it is questioned whether sufficient residential catchment exists to the north to generate this level of traffic. Further, it is unknown if the forecast includes the Collie Bridge being constructed. The proposed bridge will allow local residents access to the Treendale shopping centre, which will reduce the demands to Eaton Fair.
- 2.8. Traffic modelling undertaken for Treendale considered the full development of the locality to predict future traffic demands accessing Forrest Highway. The model included Eaton Drive and showed a future forecast of 20,500 vpd to the north of Hamilton Road. Refer Appendix B.
- 2.9. The Treendale modelling indicates that Eaton Drive will carry 13,400vpd north of Millbridge Boulevard, 8,500vpd south of Millbridge Boulevard and 20,500vpd north of Hamilton Road.
- 2.10. The Treendale modelling indicates a slightly lower forecast than identified in the Eaton fair traffic assessment.
- 2.11. For the purpose of this study, the Collie River bridge forecast of 13,400vpd is used.

3. DEVELOPMENT TRAFFIC MODELLING

- 3.1. The concept layout for Parkridge indicates the North Stage to yield 316 lots, South Stage 211 lots and the River Stage 48 lots. In total the development could yield 575 residential lots.

- 3.2. Local structure plans have used a trip rate of 8 trips per residential lot. Applied to Parkridge, the site could generate 4,600 vehicle movements per day.
- 3.3. Southbank at Eaton indicates a yield of about 145 residential plus two R100 sites. The R100 are calculated to be able to yield about 70 units each. Overall Southbank is expected to yield 285 residential units. At 8 trips per lot per day, Southbank is forecast to generate 2,280 vehicle movements per day.
- 3.4. Existing residential traffic using Peninsula Lakes Drive is estimated to extend south to Cleveland Bay Avenue. The land area is approximately 48ha and with an R20 zoning would yield approximately 960 dwellings (48ha @ 20 lots per ha). With 8 trips per lot per day the area to the south could generate 7,680 vehicle movements per day.

4. TRAFFIC DISTRIBUTION

- 4.1. Appendix C shows the Parkridge and Southbank structure plans superimposed on an aerial image. Based on the location of dwellings, the attraction to the northern access and Peninsula Lakes Drive is estimated in Table 2.
- 4.2. For the purpose of this study, the existing dwellings to the south of the study area have the same assumed distribution as Parkridge south. However, only 50% of the existing dwellings are assigned to head south from Peninsula Lakes Drive. The other 50% would use internal roads to access areas to the south.

Table 2 Assumed Traffic Distribution to Eaton Drive Accesses

Land Parcel	Northbound		Southbound	
	North Access	Peninsula Lakes Drive	North Access	Peninsula Lakes Drive
Parkridge North	90%	10%	80%	20%
Parkridge South	0%	100%	0%	100%
Parkridge River	50%	50%	0%	100%
Southbank	100%	0%	100%	0%
Existing	0%	100%	0%	50%

- 4.3. An Excel spread sheet has been prepared based on the traffic generation shown in section 3 and the distribution shown in Table 2.
- 4.4. The spreadsheet considers 3 scenarios in terms of the future distribution of traffic once the bridge over the Collie River is open. The assessment is based on maintaining the forecast traffic demand of 13,400vpd crossing the Collie River.
- 4.5. Scenario #1 considers a 70% attraction for traffic to head north during the morning peak. During the evening peak 70% of traffic will return from the north.

- 4.6. Scenario #2 considers a 50/50 split in traffic heading north and south.
- 4.7. Scenario #3 considers a 70% attraction for traffic to head south during the morning peak. The reverse is assumed for the evening peak. This scenario reflects current traffic patterns with no Collie River Bridge.
- 4.8. The above scenarios are applied to the forecast traffic demand over Collie Bridge of 13,400vpd. The peak hour proportions are based on the current proportions of peak v daily flow recorded for Eaton Drive north of the Australind Bypass. Appendix D shows the forecast peak hour traffic demands at the Peninsula Lakes Drive and future northern access intersections for the 3 scenarios discussed.

5. INTERSECTION OPERATION

- 5.1. Assessment of the future operation of the intersections is undertaken using Sidra. Table 3 shows the summary of the analysis based on the worst Level of Service occurring with each scenario.

Table 3 Summary of Analysis Lowest Level of Service

Scenario	Peninsula Lakes Drive			Northern Access		
	#1	#2	#3	#1	#2	#3
AM PEAK HOUR						
Simple tee	A	D	F	B	E	F
Tee with median	N/A	A	D	N/A	A	A
PM PEAK HOUR						
Simple tee	B	F	F	D	-	-
Tee with median	N/A	C	F	N/A	A	C
1 lane roundabout	N/A	N/A	F	-	-	-

SCENARIO #1

- 5.1. The Sidra analysis using the traffic forecasts of 70% attraction to the south indicate that during both peak hours, both Peninsula Lakes Drive and the new northern access to Eaton Drive will operate with acceptable Levels of Service with simple tee intersection layouts. Level of Service D is considered acceptable.

SCENARIO #2

- 5.2. The Sidra analysis using the traffic forecasts of 50% attraction to the south indicate that during the morning peak hour, the Peninsula Lakes Drive access

to Eaton Drive will operate at Level of Service F with a simple tee intersection. The Level of Service is not considered acceptable operation for long term planning.

- 5.3. Widening of Eaton Drive to provide a boulevard style road will allow for a median gap to be provided at future intersections.
- 5.4. Based on a median gap at Peninsula Lakes Drive to allow 7 metres of storage length for vehicles turning right, the Sidra assessment shows Level of Service C will be achieved.
- 5.5. The new northern access is also shown to operate with unacceptable Levels of Service as a simple tee intersection and a median gap is also required as set out above. The provision of a median gap is shown to provide Level of Service A for the northern access.

SCENARIO #3

- 5.6. The Sidra analysis of Scenario #3 is based on 70% of traffic heading south during the morning peak. The reverse is assumed for the evening peak. This distribution reflects the current traffic patterns of Eaton Drive with no Collie River Bridge.
- 5.7. The Sidra analysis shows that a simple tee intersection will operate with Level of Service F during both peak periods. As stated previously this Level of Service is not acceptable for long term planning
- 5.8. Sidra analysis using a median gap has been undertaken and shows that during the morning peak Level of Service D is forecast. However, during the evening peak Level of Service F is shown.
- 5.9. Further analysis of the Peninsula Lakes Drive access has been undertaken with a single lane roundabout for the evening peak period. The analysis indicates Level of Service F will prevail.
- 5.10. Sidra analysis of Scenario #3 traffic demands with a dual lane roundabout shows Level of Service A can be expected for all movements.

6. INTERSECTION TREATMENTS

- 6.1. Based on the Sidra analysis, road upgrading may be considered to be required to cater for the long-term traffic demands. However, the assessment is based on the worst Level of Service experienced at each intersection type. It can be seen that the provision of a give-way controlled side road with wide median is shown to operate in an acceptable manner for Scenarios #1 and #2. It is only Scenario #3 which is shown to require intersection improvements.

- 6.2. It is noted that the northern intersection has already been constructed with a seagull treatment that effectively provides a wider median gap for vehicles to shelter. The present layout is considered suitable to provide the wider median gap discussed in this report. Figure 2 shows the constructed layout.



Figure 2 Seagull Intersection Treatment

- 6.3. Further, Scenario #3 is only shown to require an upgrade to the Peninsula Lakes Drive intersection to cater for the evening peak hour.
- 6.4. Interrogation of the Sidra output shows that Level of Service F is only experienced by the right turn out of Peninsula Lakes Drive during the evening peak. This movement is not considered to be a critical movement as alternative routes exist and it is not in the peak direction of traffic demand. The movement is shown to operate within capacity and the Level of Service is caused by the forecast delay to the movement of about 70 seconds. All other movements operate in an acceptable manner.
- 6.5. Assessment of a single lane roundabout shows the right turn from Eaton Drive north will interfere with the northbound flow on Eaton Drive. This is a critical movement and Level of Service F for this movement is considered unacceptable.
- 6.6. It is concluded that the provision of give way conditions for the side road and a wider median gap is the better long term planning solution.

7. CONCLUSIONS

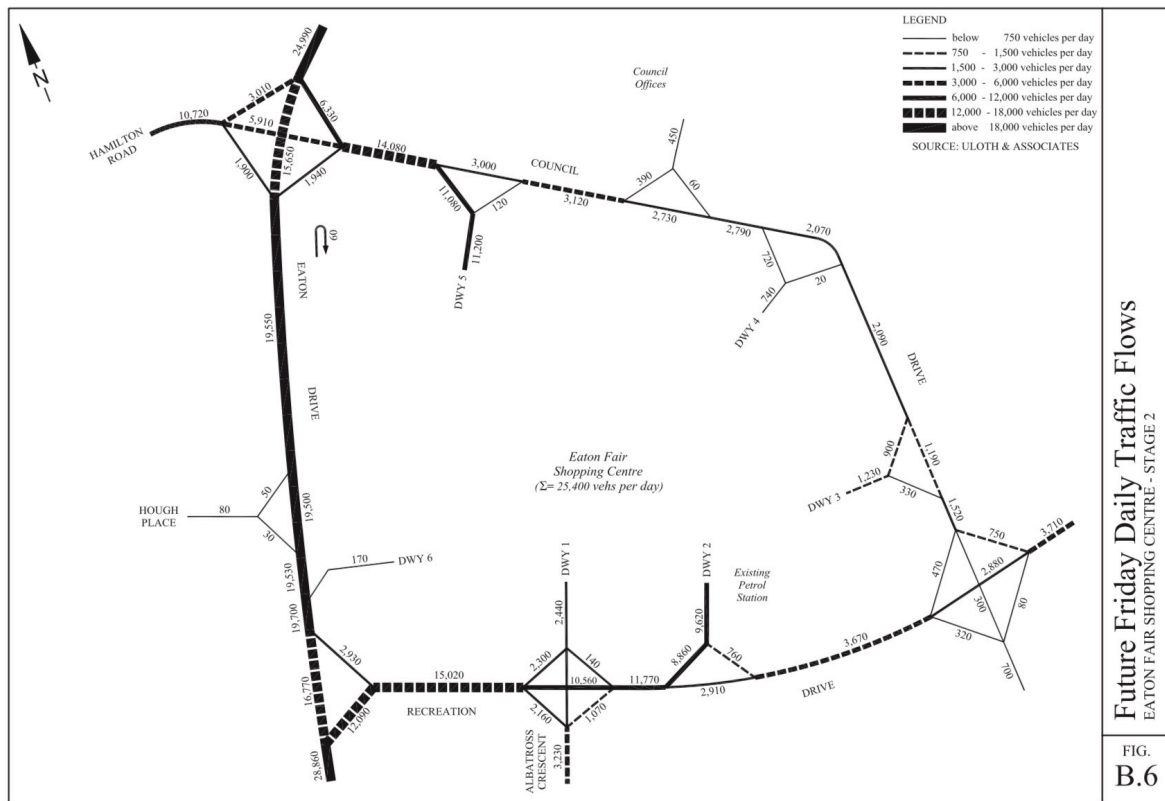
- 7.1. Analysis of the future operation of Eaton Drive at Peninsula Lakes Drive and the constructed northern access indicates that acceptable operation can be expected with a boulevard style road for Eaton Drive and a median to shelter right turning vehicles.
- 7.2. Only Scenario #3 indicates unacceptable operation for a single movement during the evening peak period.
- 7.3. Scenario #3 reflects the present day peak period traffic distribution with 70% of traffic using Eaton Drive heading south. However, a new bridge over Collie River will be completed and as a result, access to Treendale shopping centre and the Australind Bypass north (Forrest Highway) can be achieved. It can be expected that the present 70% demand for southbound movements will decrease.
- 7.4. Given the poor Level of Service applies to a single movement that is not considered to be critical and the movement operates within capacity, it is considered that the minor failure can be accepted. Further, an alternative route exists for the movement that could result in no serious delays occurring.
- 7.5. It is concluded therefore that long term planning should provide:
 - Give way conditions for Peninsula Lakes Drive and a wider central median on Eaton Drive. An intersection layout as constructed for the northern access is appropriate.
 - Give way conditions for the northern access utilising the existing intersection layout.

APPENDIX A SUBJECT LAND AREA



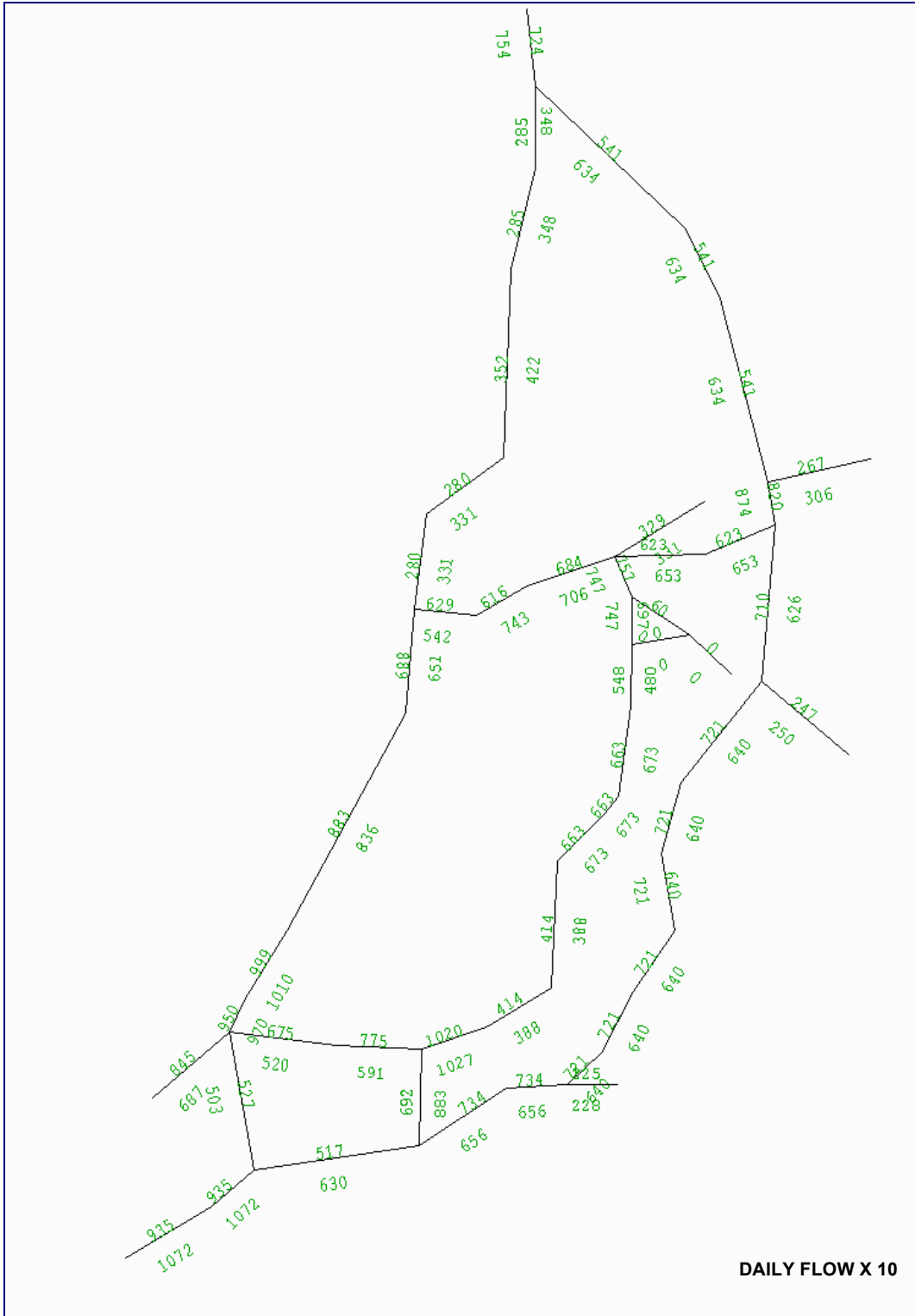
Areas are indicative.

APPENDIX B TRAFFIC FORECASTS



Paris Road, Treendale

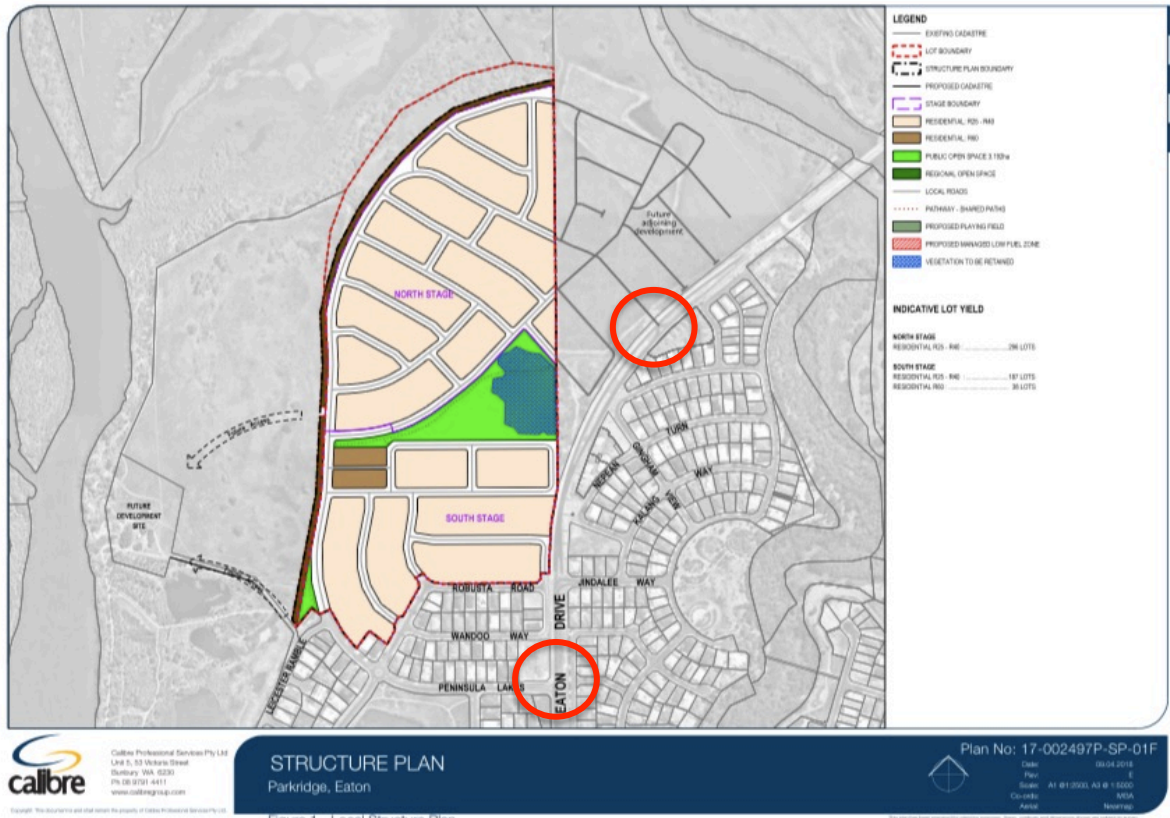
APPENDIX I
MILLBRIDGE / TREENDALE LINK MODELLING



DAILY FLOW X 10

TREENDALE 2010 WITH COLLIE BRIDGE - AUSTRALIND BYPASS STUDY 5- 2-08

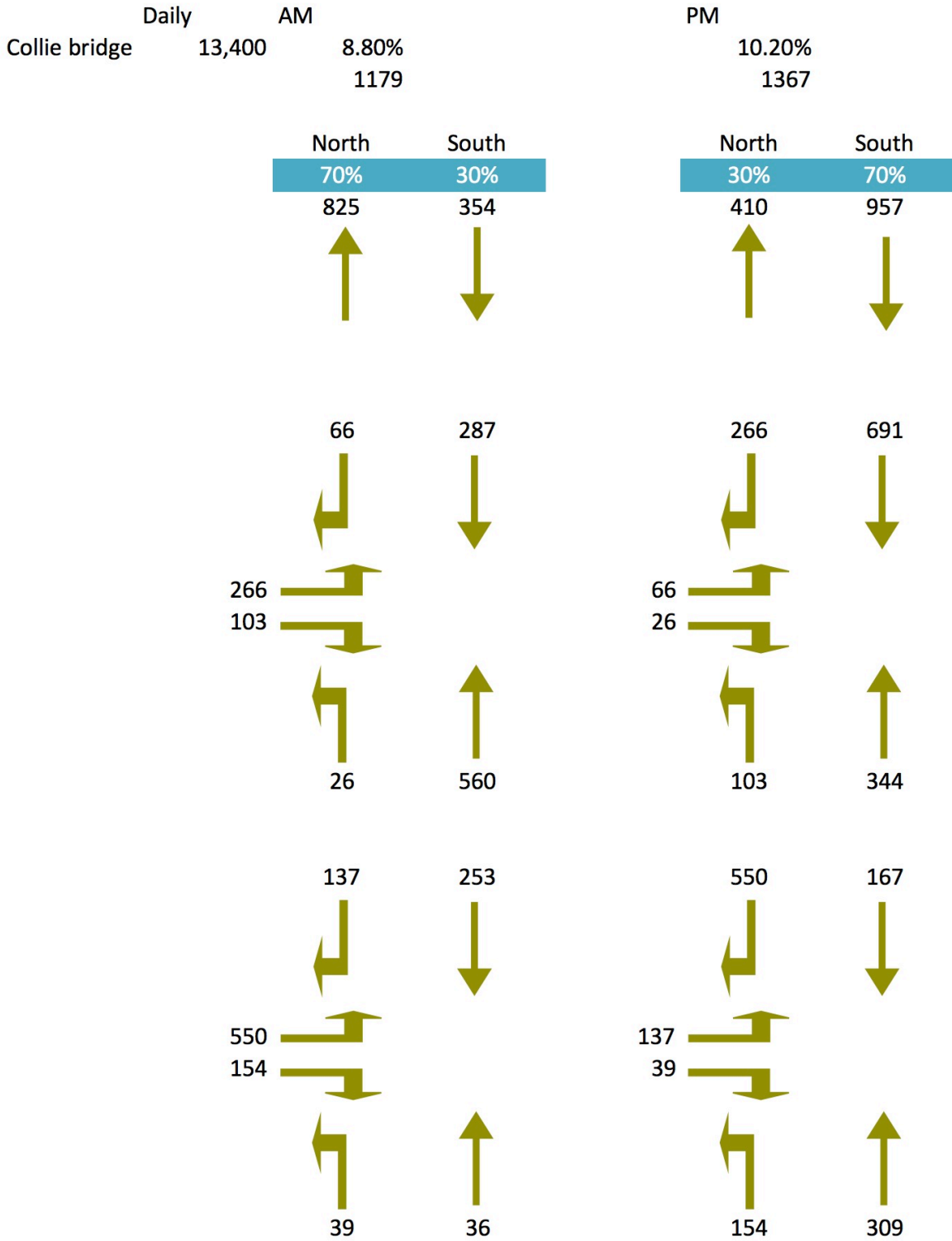
APPENDIX C DEVELOPMENT STRUCTURE PLANS AND ACCESS LOCATIONS



APPENDIX D TRAFFIC FORECAST SCENARIOS

SCENARIO #1

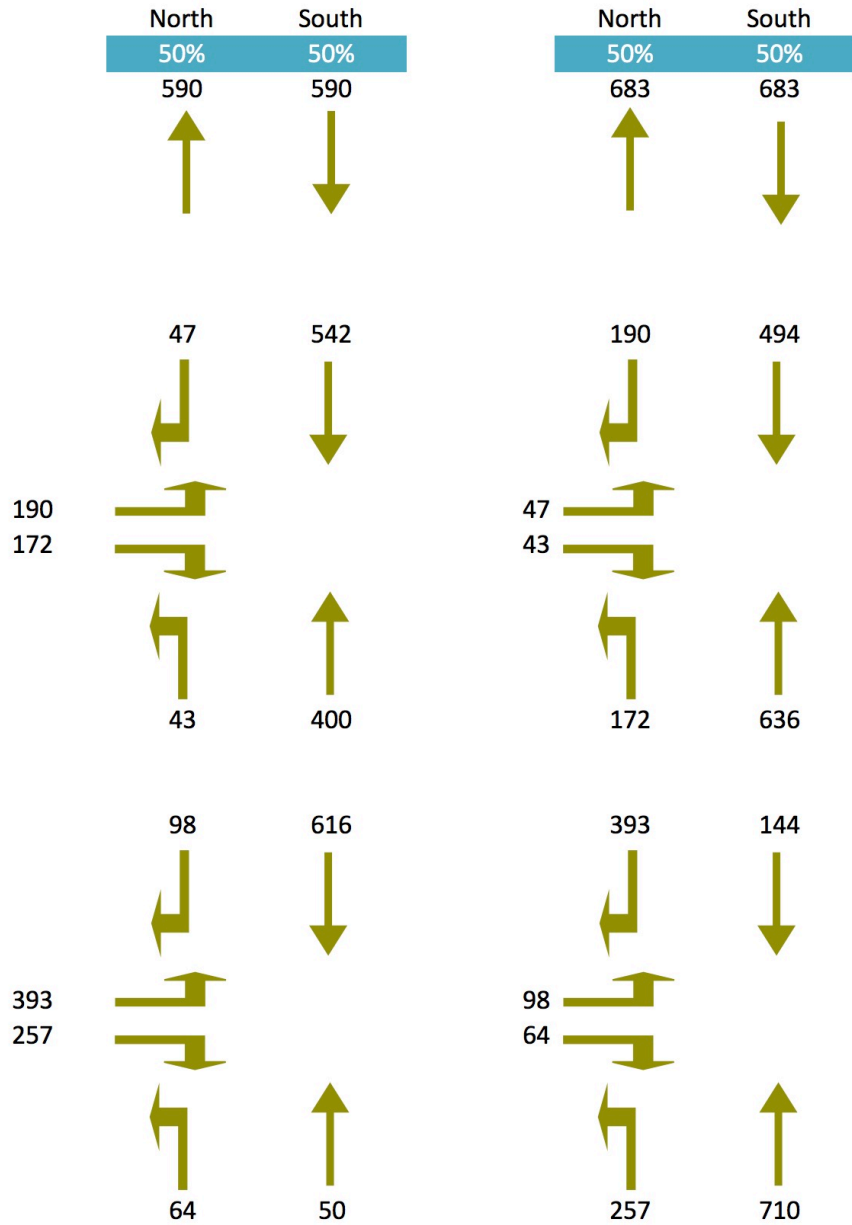
**Eaton Drive Traffic Scenarios
70% attraction to the North**



SCENARIO #2

**Eaton Drive Traffic Scenarios
50 / 50 Distribution**

	Daily	AM		PM
Collie bridge	13,400	8.80%	1179	10.20%
				1367



SCENARIO #3

**Eaton Drive Traffic Scenarios
70% Attraction to the South**

