Annexure D
TONKIN CONSULTING GAWLER EAST INTERVENTION ASSESSMENT REPORT

Gawler East Interventions

Assessment Report

Town of Gawler

June 2018

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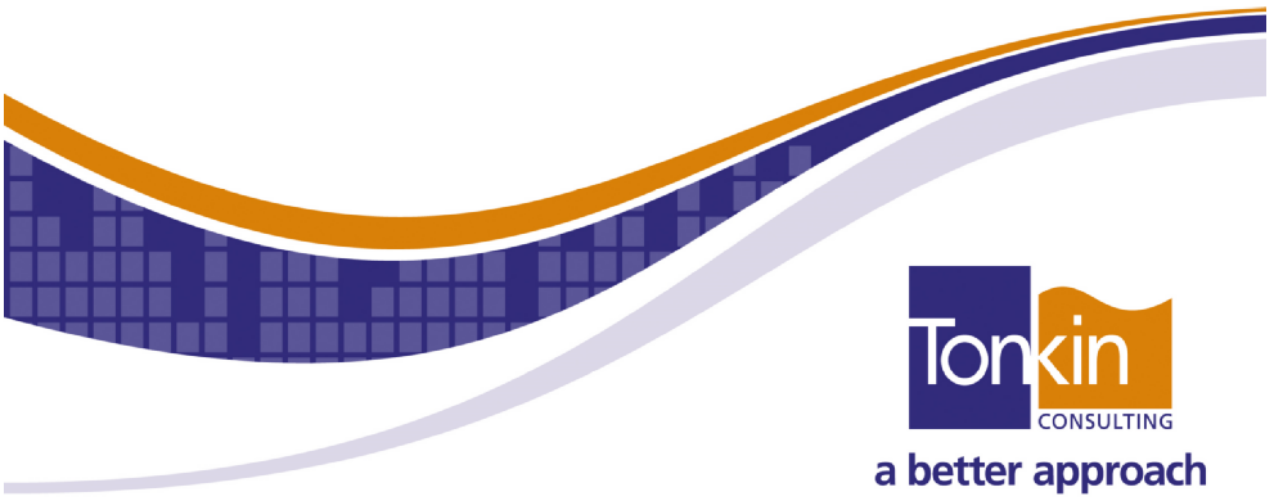

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Contents

1 Introduction 1
1.1 Background 1
1.2 Scope of Work 1
1.3 Existing Transport Infrastructure Interventions 3

2 Review of Recent Documentation 4
2.1 Gawler East DPA Traffic Assessment (QED, 2008) 4
2.2 DPTI Main North Road / Adelaide Road Management Plan – DPTI, 2008 4
2.3 Gawler Growth Areas Transport Framework (DPTI, 2009) 5
2.4 Gawler East Urban Development Local Road Traffic Assessment – Tonkin Consulting, 2009 5
2.5 Tonkin Review of the Traffic Modelling – Tonkin Consulting, July 2010 7
2.6 SMEC Review of Gawler East MASTEM Model – SMEC, March 2015 7

3 Traffic Modelling 8
3.1 Development Assumptions 8
3.2 Trip Generation and Distribution 8
3.2.1 Trip Generation 8
3.2.2 Trip Distribution 9

4 Assessment of Interventions 14
4.1 Northern Section 14
4.2 Central Section 19
4.3 South Section 22
4.4 Other Treatments 23
4.4.1 Treatments affected by Gawler East 23
4.4.2 Other Interventions 25
4.5 Proposed Interventions Triggers 25

5 Review of No Gawler East Development 28
5.1 Northern Section 28
5.2 Central Section 30
5.3 South Section 31
5.4 Other Treatment locations 31
5.4.1 Adelaide Road / Main North Road 31
5.4.2 Barossa Valley Way 32
5.4.3 Other Locations 32
5.5 Summary of Required Works 32

6 Summary of Review 35

Tables

Table 3.1	Development Yield History	8
Table 3.2	Gawler East Traffic Destination (vpd) at Full Development	10
Table 3.3	Expected Increase in Traffic Volumes (vpd)	11
Table 5.1	Comparison of intervention with / without development	33

Figures

Figure 1.1	Study location	2
Figure 1.2	Location of future developments	3
Figure 2.1	Transport Framework -proposed treatments	6
Figure 3.1	Developable areas and access for Eckerman Avenue	13
Figure 4.1	Plan of Northern Interventions	14
Figure 4.2	Plan of Central Interventions	19
Figure 4.3	Plan of Southern Interventions	22
Figure 4.4	Plan of Other Treatments	24
Figure 5.1	Location of Treatments that are required without Gawler East Development	34
Figure 6.1	Location of Preferred Treatments (including removed)	36

Appendices

Appendix A	Plan of Proposed 2012 Interventions
Appendix B	Previous Report Recommendations
Appendix C	Maps of Traffic Distribution
Appendix D	One Tree Hill Road Assessment
Appendix E	Potts Road Assessment

1 Introduction

The Town of Gawler engaged Tonkin Consulting in November 2016 to undertake a review of the transport infrastructure interventions that were originally identified as part of the Gawler East Development.

A report (20161062FR02-REVC) was prepared in April 2017 that documented the required interventions associated with the Eckerman Avenue alignment of the Gawler East Link Road. In February 2018, the Town Gawler based on advice from the Department of Transport, Planning and Infrastructure (DPTI) agreed to construct the Gawler East Link Road following the "DPTI" alignment.

1.1 Background

The Gawler East Link Road (Link Road) is planned to serve both the new and existing communities of Gawler East, with design and consultation progressing on the DPTI alignment as per the Town of Gawler's (Council) resolution on the 5th December 2017.

Previous investigations have identified a range of interventions on the local and arterial road network to support the proposed Gawler East development. These interventions were based on investigations undertaken in 2010 based on assumptions of growth and future development at that time. A number of these have changed and the interventions need to be revisited to determine whether they are still valid.

In addition, the cost distribution of the interventions was based on the proportion of traffic volume using the road. It did not take into consideration the state of the infrastructure without the proposed Gawler East development. This is particularly important for Potts Road as it forms part of the Gawler East Link Road works and construction will start in the near future.

On this basis two investigations were undertaken;

- Package 1: Potts Road Intervention.

The objective of this planning package is to understand what upgrade is required to Potts Road lower and upper section if the Link Road (and associated Gawler East rezoning) were not implemented. A separate report was prepared for this investigation (Refer Appendix E).

- Package 2: Broader Interventions.

As part of the Gawler East Rezoning and the Link Road there have been several pieces of work completed to assess the broader impacts from the rezoning and the Link Road on the broader Gawler Network. Council requires the analysis of all relevant prior documentation associated with the Gawler East Rezoning and the Link Road and to determine the validity and/or relevance of the interventions identified on the Gawler East and Environs Traffic & Transport Interventions.

The outcomes of this investigation form the basis of this report.

1.2 Scope of Work

In undertaking this project, Tonkin Consulting has:

- Reviewed the following specific studies which have contributed towards the development of the interventions map. These include:
  - Gawler East DPA Traffic Assessment – QED Report, December 2008
  - Gawler Growth Areas Transport Framework – DPTI Report, May 2009
  - Tonkin Review of the Traffic Modelling – Tonkin Consulting Report, July 2010
  - Gawler East Urban Development Local Road Traffic Assessment – Tonkin Consulting Report, 2009

- SMEC Review of Gawler East Mastem Model – SMEC Report, March 2015
- DPTI Main North Road / Adelaide Road Management Plan – DPTI Report, 2008

- Reviewed the most current traffic model(s) associated with Gawler East Rezoning.
- Investigated and accounted for changes in growth and development within Gawler and neighbouring Council areas (refer Figure 1.2).
- Reviewed how the proposed interventions align with the draft Gawler Transport & Traffic Management Plan (Mott MacDonald, March 2016) and to the DPTI Main North Road / Adelaide Road Management Plan.
- Provided recommendations on new or proposed changes to the interventions.
- Assessed and reviewed the trigger points for the proposed interventions.

In developing Council's strategy for the interventions, a review of the requirements for infrastructure works for the specific locations was undertaken without the Gawler East development. The outcomes of this review would assist with determining costs as well apportionment between the various stakeholders (Council, DPTI and Springwood Developers). Section 5 of this report details the review.

The study area and Gawler East rezoning area are shown in Figure 1.1 below.

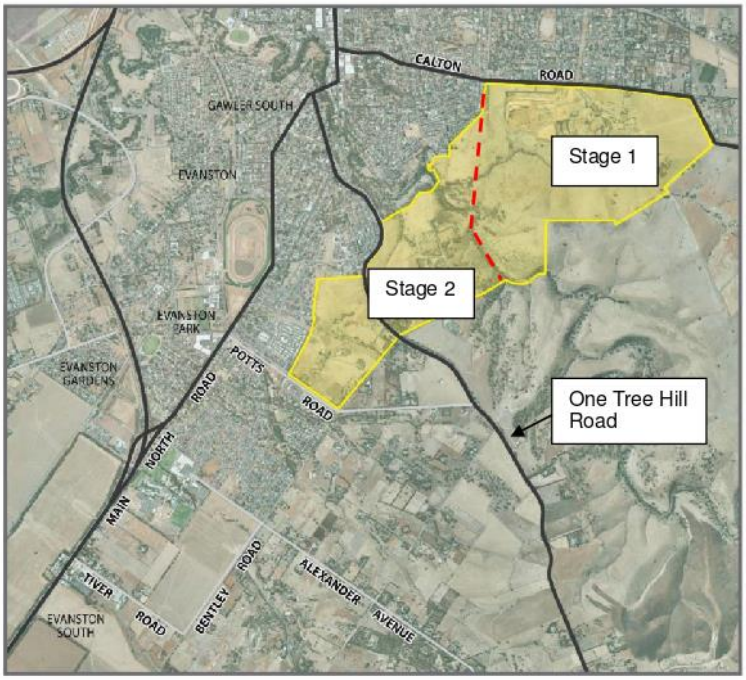

Figure 1.1 Study location

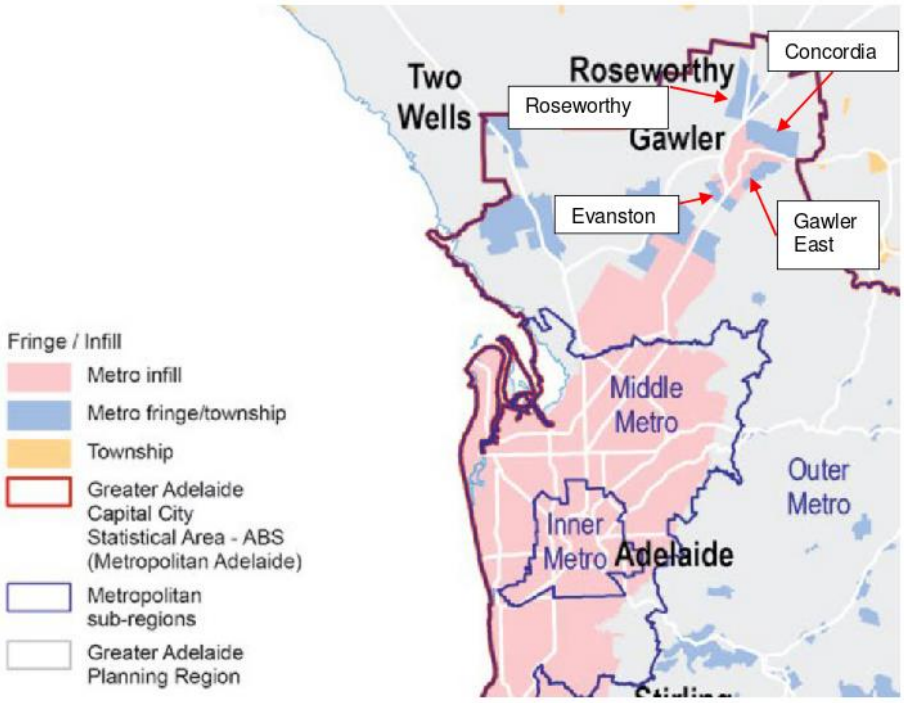

Figure 1.2 Location of future developments

1.3 Existing Transport Infrastructure Interventions

The existing interventions for the Gawler East Rezoning were initially based on the Traffic Impact Assessment report undertaken by QED for the Gawler East DPA undertaken in 2008. These interventions were discussed and agreed with the various parties over the various to 2012 including:

- Town of Gawler.
- Barossa District Council.
- Department of Planning Transport and Infrastructure.
- Delfin Lend Lease (now Springwood Communities).

Appendix A provides a list and map of the interventions as nominated in 2015. It should be noted that some of the interventions were removed from the agreed list in 2012. These are highlighted via crossed out text.

2 Review of Recent Documentation

This section provides a summary of the documentation indicated by Council. A separate section is provided for each report and they are in chronological order. Appendix B contains the summary / or recommendations from the six reports reviewed.

2.1 Gawler East DPA Traffic Assessment (QED, 2008)

This report provided the traffic and transport assessment of the Gawler East Development areas. The proposed development would comprise two stages the first being Springwood with approximately 2,700 dwellings with the second stage being the area to the south of the South Para River with a total of 1,250 dwellings.

The assessment reviewed the traffic increases and also took into consideration that there would be additional traffic attracted to the route by bypassing the Gawler Town Centre, primarily from

- traffic originating east of Gawler on Barossa Valley Way and Balmoral Road, and
- redirected residential traffic from existing Gawler East residents.

The traffic modelling took into consideration the lack of public transport within Gawler by providing a higher than normal trip generation rate. The trip distribution was based on existing traffic patterns within Gawler.

The study then assessed the impacts of the additional traffic onto the road network and identified a range of transport infrastructure improvements that would be required to ameliorate these impacts. These have since formed the basis of the intervention treatments being assessed as part of this investigation.

The study identified that the Link Road would need to be provided after completion of approximately 1,000 lots within Stage 1 to reduce impacts on Calton Road and Murray Street.

2.2 DPTI Main North Road / Adelaide Road Management Plan – DPTI, 2008

The Draft Main North Road and Adelaide Road Management Plan sought to provide an overall view of the existing operational and safety issues along these two Roads. It then provided recommendations for improvements to sections of arterial road within the Town of Gawler, including:

- Main North Road (north) and Murray Street, between Horrocks Place and the Gawler Bypass.
- Adelaide Road, between Twelfth Street and Sheriff Street.
- Main North Road (south), between Sherriff Street and Trinity Drive.

One major aspect of the study was site audits of these roadways and key intersections which informed the development of traffic treatment concepts. These were then prioritised based on a number of factors including:

- Safety benefits.
- Reduction of roadside hazards.
- Improvement to amenity and appearance of roads.
- Benefit / cost ratios.

Specific recommendations for Main North Road / Adelaide Road include upgrading sections to provide a painted median cross section where possible and to undertake minor improvements at the intersections.

2.3 Gawler Growth Areas Transport Framework (DPTI, 2009)

The Gawler Growth Areas Transport Framework Final Report (GGATF) was developed through a coalition of authorities including the Department of Transport Energy and Infrastructure (now DPTI), the Department of Planning and Local Government (now DPTI), the Town of Gawler Council, Light Regional Council and the Barossa Council.

The road network was reviewed for the Transport Framework Study with analysis undertaken using two different development scenarios to project future traffic demand based on the 2007 Urban Growth Boundary (UGB) expansion. From this, options were investigated to determine the most appropriate means to provide road access to the future urban growth areas of Gawler East and Concordia.

The major infrastructure improvements were identified as the Gawler East Link Road between Gawler East and Main North Road and a North East Connector Road between Concordia and the Sturt Highway. Route options for both these roads were developed and assessed based on the preferred Option 2E (which was subject to the ultimate development of Concordia).

This study identified the need for the Gawler East Link Road and North Eastern Connector Road to support local traffic from the developing Gawler East and Concordia areas respectively.

In term of the major infrastructure improvements to support the developments these are indicated in Figure 2.1.

Subsequent to the release of the Gawler Growth Areas Transport Framework – Final Report – May 2009, DPTI undertook a review of the preferred road network option in Gawler East as a result of the release of The 30 Year Plan for Greater Adelaide.

Central to the review was the need for the local link road between Potts Road and Tiver Road, given the reduction in area for development in Concordia within The 30 Year Plan for Greater Adelaide. DPTI revised the transport modelling undertaken for the Gawler Growth Areas Transport Framework (GGATF) incorporating potential high and low density development scenarios for Concordia.

The revised modelling identified that the daily traffic volumes on Potts Road in 2031, if the link road to Tiver Road was not provided, would be in the range of 10,500 to 16,100 depending upon the outcome for Concordia. These volumes are a significant reduction from those identified in the original GGATF, namely 21,720 to 24,620. DPTI considered that the revised volumes are well within the capacity of a two lane road (ie one lane in each direction). As a result, the link road between Potts Road and Tiver Road was not included in the Gawler East DPA gazetted in August 2010.

2.4 Gawler East Urban Development Local Road Traffic Assessment – Tonkin Consulting, 2009

Tonkin Consulting were engaged by Council undertake an assessment of the impacts of the proposed developments associated with the enlargement of the UGB (Gawler East, Concordia and Evanston Park areas) and to identify options for minimising the impact of these areas on the existing local road network. Primarily the outcomes of the report would be to assist Council in responding to the Gawler East DPA.

The study also the assessed the cost of various options and also undertook community consultation via two workshops.

The key outcomes of the assessment and options to reduce the impacts are provided below:

- Reduce the scale of the proposed development.
- Provide ample opportunities for walking and cycling to provide alternatives to driving.
- Ensure the development provides for public transport and interconnectivity with the rail line (existing and proposed).

- Consideration of a South East bypass (along Somerton Road) and directing traffic to the east north and south rather than through the Gawler Town Centre. It is noted that this is primarily associated with traffic from the larger Concordia project.
- Provide a range of routes for traffic dispersal to the north (Calton Road to Barossa Valley Way) so as not to concentrate traffic onto Cheek Avenue or Sunnydale Avenue.
- There will be a requirement to consider options along One Tree Hill Road / Seventh Avenue to allow for traffic to travel to the west.
- Develop a new connection to the south along the Bentley Road / Tiver Road alignment.

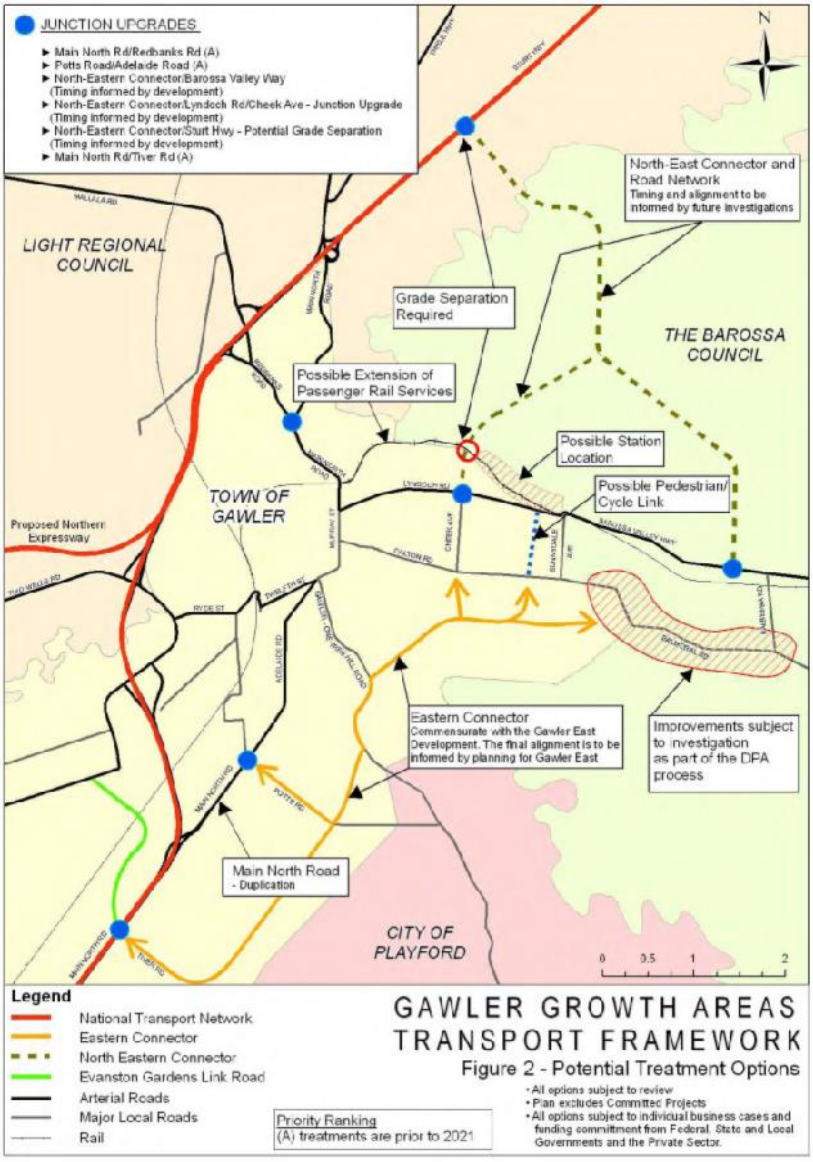

Figure 2.1 Transport Framework -proposed treatments

2.5 Tonkin Review of the Traffic Modelling – Tonkin Consulting, July 2010

Council engaged Tonkin Consulting to undertake an independent review of the traffic modelling undertaken by Aurecon (previous QED) as part of the Gawler East Traffic Assessment. This review developed an independent model and then compared assumptions and results. The key differences in the assumptions used in the model are provided below:

- The Tonkin Study utilised an end date of 2031 which included a fully developed Gawler East and Concordia areas.
- Inclusion of the Gawler racecourse developments (essentially now called Gawler Green).
- Minor change in distribution of traffic between Town Centre and destinations north compared to the QED work which transferred traffic from the south to the north.
- The size of the Concordia development which the Tonkin Study has increased significantly.

Based on the change in assumptions the following traffic volumes were estimated on Potts Road assuming no connection to Tiver Road. These volumes are all referenced to 2031.

- 6,640 – General growth of road due to background growth, Gawler Green areas and diversions.
- 11,750 – Base case with Gawler East development.
- 17,540 – Base case with Gawler East development and Concordia (6,000).
- 22,370 – Base case with Gawler East development and Concordia (11,000).

No comment was made on the traffic estimations provided on any other road within the Gawler East study area.

2.6 SMEC Review of Gawler East MASTEM Model – SMEC, March 2015

This report was commissioned by Council to review the transport modelling forecasts that were used for the planning of the transport network and land use development in the Gawler area. In particular, Council was interested in the modelling associated with the proposed Gawler East and Concordia developments.

DPTI undertake their strategic modelling using Cube Voyager via the MASTEM transport model. This model has recently been upgraded to V3.1.1. However, the earlier transport modelling was undertaken using the NESAM model which was a dedicated model for the northern metropolitan area of Adelaide.

The study assessed the two models and indicated that there were differences in volumes between the two models that can readily be explained by the more detailed later model (V3.1.1). Other key conclusions of the modelling assessment are indicated below:

- Traffic volumes on the Link Road are expected to be in the order of 20,000 in 2036.
- In terms of through traffic the NESAM model indicated a value of 6% but the updated model indicates a much higher value of 20%. It should be noted that this is similar to what was recorded as part of the original QED study in 2008.
- The Link Road has sufficient capacity to cater for both the Concordia and Gawler East developments but only if the North East Connector is provided to the Sturt Highway.

3 Traffic Modelling

3.1 Development Assumptions

Since the approval of the rezoning for Gawler East, there have been changes in the assumptions associated with the proposed development in terms of timing and scale of the development. These are highlighted in Table 3.1 below.

As indicated in Figure 1.1, Stage 1 refers to the Springwood development and Stage 2 is the remaining areas to the south of Springwood and includes both DPTI and privately owned land through to Potts Road.

Table 3.1 Development Yield History

Report	Total Overall	Stage 1 (Springwood)	Stage 2 (DPTI and Private)	Timing (completion)
QED 2008	3,900	2,700	1,200	2019
Aurecon (May 2012)	3,500	2,500	1,000	Stage 1 by 2021
Aurecon (Feb 2015)	2,950	2,000	950	Stage 1 by 2021 Stage 2 by 2027
Council (2016)	3,300	1,700	1,600	unknown

Council advised that Springwood Communities (Springwood) has indicated that the number of lots for Stage 1 will be reduced to 1,700 dwellings. However, the number of dwellings for Stage 2 has also been revised based on achieving about 15 dwellings per hectare of available land. After further review and assessment, DPTI has indicated that 600 is the maximum number of dwellings that could be developed on land that they own.

On this basis, approximately 1,600 dwellings could be provided for Stage 2. It is noted that development has started in Stage 2 areas with the Woodvale development and one other developer has lodged an application for 80 lots to the south of One Tree Hill Road.

Council has also advised that the development requirements for Concordia have not changed in that the area within the Urban Growth Boundary is expected to contain approximately 6,100 dwellings. In terms of timing it has been assumed that it would not start until 2021 and be completed by 2031.

No changes have been assumed for the Evanston Park Gardens development areas. Previous information indicates a total of 2,500 dwellings with a completion time of 2021.

3.2 Trip Generation and Distribution

3.2.1 Trip Generation

The trip generation for this Gawler East area is not expected to change from previous investigations, that is 8 trips per day per dwelling. Whilst the proposed rate is higher than typical for metropolitan Adelaide (around 6.5), the topography, location of schools and other services in the areas together with the lack of suitable public transport suggests this rate is considered suitable in this context.

On this basis the **total traffic** generated for the entire Gawler East area is expected to be in the order of 29,600 vehicles per day (vpd) separated into each development area as follows:

- Springwood 13,600vpd.
- DPTI Lands 4,800vpd.
- Private Lands 8,000vpd.

Typically, an allowance is made for internal generated traffic within a development that takes into consideration the provision of services (retail, schools etc). This allowance can vary between 10 and 20% depending actual design / masterplan of the development. However, at this time only the retail component of Springwood is certain to proceed. Consequently, a 10% allowance is made for internal traffic generated by the Stage 1 development to cater for trips to services within the proposed Gawler East areas for example the Springwood retail area.

Hence total external traffic is expected to be in the order of 23,800vpd.

3.2.2 Trip Distribution

The various documents reviewed have confirmed the assumptions made for the overall distribution of the traffic generated by the Gawler East development. However, developments in the vicinity of Gawler Green and surplus Gawler Racecourse land as well as Roseworthy are expected to change the overall traffic distribution.

The trip distribution assumptions were originally based on 2006 Census Journey to Work and MASTEM data provided by DPTI. The level of through traffic (20%) was determined by an Origin / Destination Survey that was undertaken in late 2007. This percentage was confirmed via the SMEC modelling undertaken in 2015.

In addition, the modification at the Calton Road / Murray Street junction to remove the right turn from Calton Road will result in more traffic using Barossa Valley Way to access the Gawler Town Centre area. It is expected traffic would use a combination of Cheek Avenue and High Street to move between Calton Road and Barossa Valley Way.

Consequently, the overall traffic distribution for Gawler East was reviewed. Further, the traffic distribution onto the road network is affected by the location of the each of the development parcels. On this basis, three parcels have been assessed; Springwood, DPTI lands and Private lands. In an overall sense the traffic distribution is as indicated below:

- **East** – 15% via Barossa Valley Way or Balmoral Road. It has been assumed that 10% use Barossa Valley Way and 5% use Balmoral Road (Williamstown).
- **Gawler Town Centre** – 25% which includes the Gawler Green area, actual split will vary based on location of area (eg Town Centre area greater for Springwood compared to say area north of Potts Road which use Gawler Green).
- **Train Station** – 5% this would include Gawler Central in lieu of Concordia stop for Stage 1 / 2 areas depending on timing.
- **North / Roseworthy** – 8% this will utilise both Main North and Redbanks Roads.
- **South** – 47% made up of long distance traffic to Munno Para / Elizabeth or further south and include Main North Road (32%) and Northern Expressway (15%) travel.

Table 3.2 below provides a breakdown of the total external traffic demands (vpd) by destination based on the percentages described above.

Table 3.2 Gawler East Traffic Destination (vpd) at Full Development

Destination	Secondary destination	Stage 1	Stage 2		Total (vpd)
		Springwood (1700)	DPTI Lands (600)	Private Lands (1000)	
East	Barossa Valley Way	1,300	400	700	**2,400**
	Balmoral Road	600	200	350	**1,150**
Gawler	Town Centre	2,500	550	600	**3,650**
	Rail Station	650	200	350	**1,200**
	Gawler Green	600	550	1,200	**2,350**
North		950	350	600	**1,900**
South	Main North Road	3,900	1,400	2,300	**7,600**
	Northern Expressway	1,800	650	1,100	**3,550**
	Total	**12,300**	**4,300**	**7,200**	**23,800**

Appendix C contains a map for each of the development areas with the proposed traffic volume increases. Based on these figures, the estimated increase in traffic generated by the three component areas of the Gawler East development was estimated for key roads and is highlighted in Table 3.3.

The change in dwelling forecasts together with the revised alignment for the Link Road (DPTI Alignment) has resulted in a change in traffic demands compared to previous (QED and Aurecon) investigations as indicated below:

- An increase in the traffic volumes for the Link Road due to changes in access arrangements with the proposed Link Road alignment.
- An increase in traffic on One Tree Hill Road north of the developable areas based on an increase dwellings and possible access points from these developments.
- Review of existing traffic patterns indicating Ryde Street / Two Wells Road is preferred route to access the Northern Expressway rather than Main North Road / Redbanks Road.
- Increase in traffic on Eckerman Avenue. This was not highlighted in previous investigations. However, it is expected that generated traffic from the private lands areas would use this road to access either the Link Road or One Tree Hill Road.

It should be noted that for the proposed Link Road (along the DPTI alignment), access from the developable areas to the Link Road can be undertaken at various locations. This allows traffic to be distributed from the various areas of Stage 2 of Gawler East (Private Lands and DPTI) onto the Link Road. The location of the future access points will need further investigation to ensure they meet the requirements of the Austroads guidelines and final design of the Link Road.

Table 3.3 Expected Increase in Traffic Volumes (vpd)

Road	Section	Stage 1	Stage 2		Other[1]	Total Development	Existing (2026)[2]	2026 Total with Development
		Springwood	DPTI	Private				
Barossa Valley Way	Murray to Cheek	2,950	350		-1,500	**1,800**	15,100	16,900
	Cheek to Kalbeeba	400	350	600	-750	**600**	8,600	9,200
	East of Kalbeeba	1,300	450	700		**2,450**	6,800	9,250
Calton Road	Murray to Cheek	3,100	200		-1,500	**1,800**	8,700	10,500
Balmoral Road	Link Road to Kalbeeba	1,500	300	500	750	**3,050**	4,100	7,150
	East of Kalbeeba	600	200	350		**1,150**	3,000	4,150
Kalbeeba Road	Barossa Valley Way to Balmoral	900	100	150	750	**1,900**	NA	NA
Cheek Avenue	Calton to Barossa Valley Way	3,300	700	600	1,500	**6,100**	2,500	8,600
Link Road	North of South Para River	4,200	1,100	1,100	3,000	**9,400**	-	9,400
	North of One Tree Hill Road	4,200	2,200	1,700	3,000	**11,100**	-	11,100
	South of One Tree Hill Road	3,550	2,000	2,200	3,000	**10,750**	-	10,750
	North of Potts Road	3,550	1,800	2,200	3,000	**10,550**	-	10,550
Potts Road	Link Road to Main North Road	3,550	1,800	4,100	3,000	**12,450**	2,850	15,300
Main North Road	Redbanks to Kestral	950	350	600		**1,900**	14,000	15,900
	Barossa Valley Way to Redbanks	1,850	350	600		**2,800**	19,900	22,700

Road	Section	Stage 1	Stage 2		Other[1]	Total Development	Existing (2026)[2]	2026 Total with Development
		Springwood	DPTI	Private				
Murray Street	Barossa Valley Way to Calton	650	300	950	-1,500	**400**	18,100	18,500
	Calton to One Tree Hill	1,900	350	1,100	-3,000	**350**	20,500	20,850
Adelaide Road	To 12th St	1,250	450	1,200	-3,000	**-100**	23,500	23,400
	Fifth to Potts	1,400	200	1,100	-3,000	**-300**	24,900	24,600
	Potts to Trinity	4,200	1,650	2,700		**8,550**	30,800	39,350
	Trinity to Gawler Bypass	3,900	1,400	2,300		**7,600**	28,800	36,400
One Tree Hill Road	At Bridge St	0	550	1,200		**1,750**	1,000	2,750
	South of Fifth St	650	1,200	2,000		**3,850**	2,600	6,450
	North of Link Rd	650	700	1,500		**2,850**	2,400	5,250
	South of Link Rd	0	200	600		**800**	2,400	3,200
Eckerman Avenue	Full length	0	0	1500		**1,600**	100	1,700
Fifth Street	East of Adelaide	650	700	900		**2,250**	1,200	3,450
	West of Adelaide	1,600	900	1,450		**3,950**	2,000	5,950
Ryde Street	East of Bridge	1,000	600	950		**2,550**	11,700	14,250

Note (1) This includes diverted traffic from Balmoral Road and Barossa Valley Way (2,000vpd) and diverted traffic from existing residential areas of Gawler East (1,000vpd) (based on year 2026)

(2) 2026 volume based on 1 percent per annum growth from previous information (2007 or 2013) but no development volumes.

In the area north of One Tree Hill Road to Springwood development currently has access to both Eckerman Avenue and One Tree Hill Road (WoodVale). With the provision of the Link Road the DPTI owned areas would primarily gain access to the Link Road. Access to the private lands would be centred between the Link Road (via an extended Eckerman Avenue), One Tree Hill Road and Eckerman Avenue. On this basis traffic generated in this area has a number of alternative routes to access the Link Road and consequently traffic volumes are likely to be evenly distributed along these roads. Consequently, it is expected that at full development of Gawler East Stage 2 Eckerman Avenue would have traffic volumes ranging between 1,500 and 2,000vpd based on providing 20 dwellings per Hectare with 8 trips per dwelling.

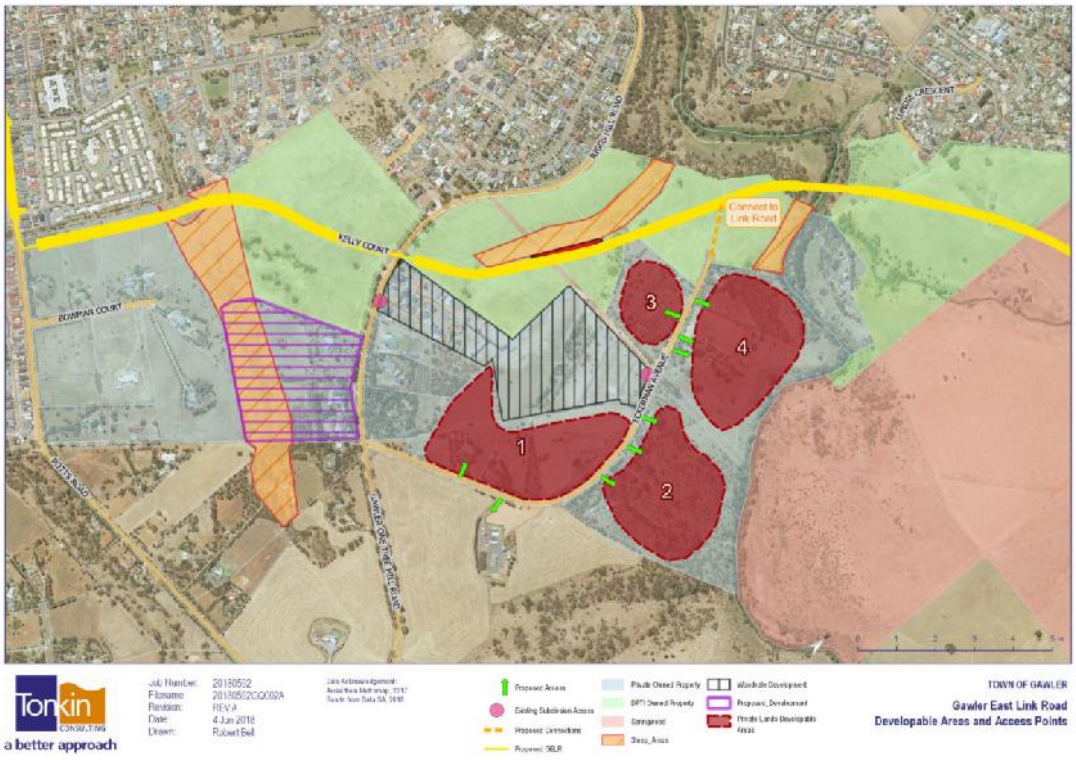

Figure 3.1 Developable areas and access for Eckerman Avenue

4 Assessment of Interventions

This section details the assessment of the transport infrastructure interventions to support primarily the Gawler East development. The original interventions were identified partially in the Gawler East DPA Traffic Assessment and then developed further during consultation and discussion with the various stakeholders. Appendix A contains a list and map of the overall interventions.

The review of the interventions takes into consideration the updated traffic modelling undertaken in the previous section as well as previously agreed requirements between DPTI, Council and the Springwood developers.

The assessment follows the designation that was undertaken as part of the previous intervention investigations. A brief description of the proposed intervention is provided follow by assessment of the change in volumes and whether there is a need to modify the proposed intervention.

4.1 Northern Section

This area is essentially all of the Springwood (Gawler East Stage 1) area to the north of the South Para River. The location the proposed interventions for this section are shown in Figure 4.1 below.

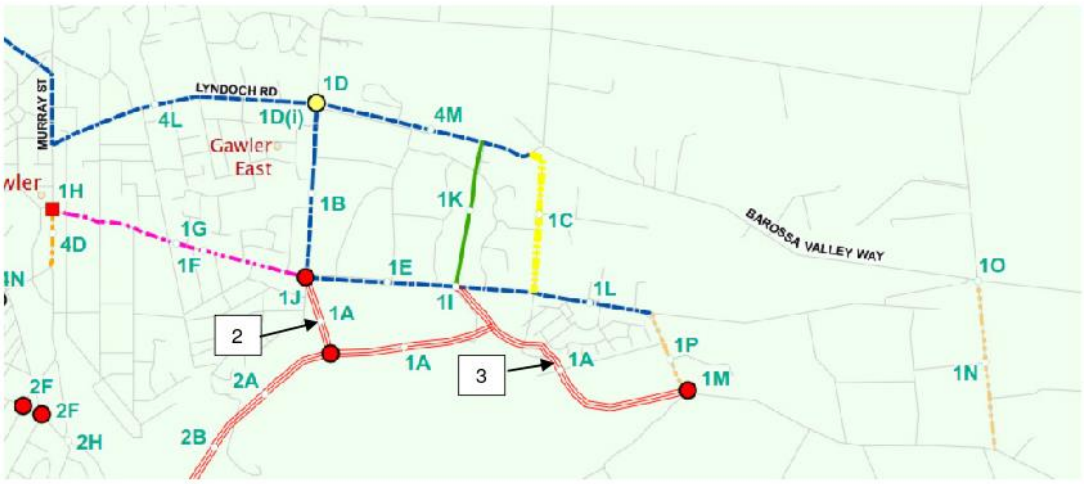

Figure 4.1 Plan of Northern Interventions

1A – Link Road

The provision of the Link Road (1A) is a requirement of the Gawler East development. The Link Road as part of this intervention assessment continues through to Calton Road. Additional connections between the Link Road and Cheek Avenue and Link Road to Balmoral Road are shown in Figure 4.1 as route 2 and 3 respectively.

Cheek Avenue Extension – 1A (2)

This road link was also shown as one of the three connections to Calton Road as part Gawler Growth Areas Transport Framework. There has been no change in the nature of this road over time. The main objective of this road link is to provide access from western parts of Stage 1 and sections of Stage 2 to Barossa Valley Way and the Gawler Town Centre

Local Connection – 1A (3)

This road link was initially shown as one of the three connections to Calton Road as part Gawler Growth Areas Transport Framework. From a traffic volume standpoint this link is expected to cater for eastbound traffic from Stage 2 (DPTI or private lands) and bypass traffic.

The Link Road would be classified as a collector road with a single lane in each direction and connections to Calton Road in three locations as indicated in the Gawler Growth Areas Transport Framework. The initial treatment indicated provision of a bike lane. However, it is considered that parking lanes may be required based on abutting land uses.

Traffic volumes were not estimated for the internal road network within Springwood as the Neighbourhood Centre and abutting land uses have yet to be finalised. However, it is expected that they would range between 3,000 and 10,000vpd.

The form of the intersection treatments is still to be determined but should direct local traffic away from Calton Road.

Recommendation – No change to intervention with connection points at Cheek Avenue, to the west of Sunnydale Avenue and at Balmoral Road.

1B – Cheek Avenue Upgrade

The upgrade of Cheek Avenue is required due to the expected increase in traffic from the Gawler East development area. Expected daily volume without the development is in the order of 2,500vpd. Indicative increase in traffic is likely to be in the order of 9,050vpd comprising Stage 1 and 2 areas as well as some increase from diverted traffic from adjacent residential areas and through traffic.

The proposed intervention is to include a pavement upgrade as well as road widening and traffic control. Retain single lane in each direction plus provision for parking lane. Issues with existing services were not resolved in the initial assessment.

The level of traffic increase warrants the upgrade of this road.

A preliminary review of the proposed treatment suggests that the proposed intervention is feasible within the current road reserve width allowing for the location of the power poles.

Recommendation – No change in proposed intervention treatment.

1C – Sunnydale Avenue Traffic Treatment

This intervention was removed from the original list.

Proposed improvement was to consist of traffic management treatments that were to be determined after further investigation. Traffic increase is expected to be minor (in absolute number) at about 500vpd. The issue will be how the traffic accesses Barossa Valley Way given the layout of the junction.

The preference is to direct traffic towards Cheek Avenue for trips into Gawler and Balmoral Road / Kalbeeba Road for trips east to the Barossa Valley Way.

In the short term until the Link Road is constructed to Potts Road and Balmoral Road there is expected to be a minor increase in traffic on Sunnydale Avenue. Based on current development patterns the increase is expected to be in the order of 100 to 200 vehicles per day.

Recommendation – No treatment required.

1D – Barossa Valley Way / Cheek Avenue Intersection

The increase in traffic volumes on Barossa Valley Way (both directions) and Cheek Avenue would significantly increase turning volumes at the intersection. Hence, there is a need to improve the intersection to cater for the extra volumes. No detailed examination of traffic

volumes was originally undertaken to determine actual treatment. However, it was likely to require extension of turn lanes and provision of separate right and left turn lanes on the Cheek Avenue approach.

Revised traffic modelling confirms the increase in traffic volumes.

The interim upgrade provides for improved channelisation and widening for the intersection. Further analysis (via SIDRA) of future volumes indicates that a further upgrade would be required to cater for the turning volumes. A roundabout is the preferred treatment for the long term upgrade based on expected traffic volumes from the Gawler East Development.

It is recommended that this location be monitored as the operation of the intersection is reliant on the volume of traffic turning into Cheek Avenue south and the right turn from Cheek Avenue south as well as growth in movements along Barossa Valley Way. The more critical turn is the right turn from Cheek Avenue south. If the right turn movement from Cheek Avenue is encouraged early (rather than directing eastbound traffic to Balmoral Road / Kalbeeba Road), then there may be a need to bring forward works.

Recommendation – No change is proposed for the interim or long term treatments.

1E – Calton Road Upgrade – Cheek Ave to Eastern Drive

Original intervention treatment for Calton Road required that it be upgraded to a kerbed collector road. The type of cross section would also be dependent on whether there is direct access from the proposed development.

The traffic volumes were not estimated as the layout for the Neighbourhood Centre and land uses have not been finalised.

Recommendation – No change in proposed intervention.

1F – Calton Road Upgrade – Murray Street to Cheek Ave

This treatment was based on an increase in traffic volume from the Springwood development with some traffic from the eastern end of Stage 2. The original intervention proposed provision of painted median and improved pavement marking to improve traffic flow and safety particularly with turning traffic into properties.

The revised traffic volumes indicate that the increase in traffic likely to be less than previously estimated at around 1,800vpd. Hence total volume is expected to be in order of 10,500vpd.

This intervention is still required as the overall traffic volume is significant. It is noted that that current volumes would suggest that a median treatment is required for Collector Road status.

Recommendation – No change in proposed intervention.

1G – Calton Road Upgrade – Murray Street to Cheek Ave

The original intervention treatment proposed that pavement rehabilitation be required for the full length of Calton Road based on a staged implementation for the Link Road.

This is not likely to occur. Hence, construction traffic for the Springwood development is likely to be diverted to the Link Road once completed.

It is recommended that full rehabilitation not be provided for but allowance be made for a reseal and minor rehabilitation depending traffic patterns at completion of the Link Road.

Recommendation – Reduce extent of treatment to provide a reseal with minor rehabilitation.

1H – Calton Road / Murray Street intersection

This intervention treatment provided for traffic signals.

Recent works to restrict the right turn out of Calton Road has improved operation and safety. Hence this intervention is not required unless the safety for the right turn movement into Calton Road becomes an issue.

Recommendation – Remove intervention.

1I – Calton Road / Link Road Intersection @ Hamilton Reserve

The proposed intervention is based on the revised Masterplan for Springwood.

The traffic volumes for internal areas within Springwood have not been estimated.

However, this intersection and/or connection is required. The key requirement is that traffic is directed into / along the Link Road and not along Calton Road beyond this location.

The detailed design for the Link Road and connection to Calton Road has reviewed this junction and based on impacts a roundabout is the preferred treatment. It is understood that DPTI as part of the construction of the Link Road is undertaking a traffic assessment of the connection to Calton Road.

Recommendation – A roundabout is to be provided as the junction treatment at this location.

1J – Calton Road / Link Road Intersection @ Cheek Avenue

The proposed intervention treatment comprises a single lane roundabout.

The reduced number of dwellings within the Stage 1 (Springwood) results in a reduced number of movements at this location. However, there is still significant turn movements expect at this location from all four approaches. On this basis a single lane roundabout is still the preferred intersection treatment.

Recommendation – No change in proposed intervention.

1K – Hike / Bike between Barossa Valley Way and Calton Road

The proposed intervention treatment comprises a sealed shared path. The timing / delivery to be reviewed taking into consideration upgrade to Town of Gawler's bicycle and pedestrian plan.

It should be noted that this is not a road traffic intervention and will be assessed separately by Council as part review of a broad pedestrian / cycling strategy.

Recommendation – No change in proposed intervention.

1L – Calton Road Upgrade – Eastern Drive to Balmoral Road

The initial treatment recommended that this section be upgraded to a collector road. However, this was modified to improvements to southern side only as a result of change to road layout within Springwood. It also provided for consistency of treatment and integration with the Barossa and Gawler councils walking and cycling plans.

The traffic volumes were not estimated as the layout for the Neighbourhood Centre and land uses have not been finalised.

However, the upgrade is still required.

Recommendation – No change in proposed intervention.

1M – Link Road / Balmoral Road intersection

The initial treatment for this location was a T-junction located midway between the Calton Road junction and the bend in Balmoral Road. During development of the Springwood Masterplan the developer indicated a preference for the location to be at the bend in Balmoral Road and that a T-junction be provided.

Previously a roundabout was proposed for this intervention treatment. This was recommended to provide an entry statement to the Springwood development and provide a means of speed reduction, particularly coming from the east where the current speed is 80km/hr.

Springwood has indicated that they would prefer a T-junction at the location with the priority being from the Link Road through to Balmoral Road. This would assist with diverting traffic away from Calton Road to the west. However, there is a concern that without some form entry statement the traffic speeds at the eastern end of the Link Road may be too high and result in a higher crash risk.

Recommendation – No change in proposed intervention albeit consideration should be given to methods of ensuring that the traffic speeds are maintained at either 50 or 60 km/hr.

1N – Kalbeeba Road upgrade

Kalbeeba Road is considered to be the preferred route for travel to the Barossa Valley from Stage 1 of the Gawler East development lands. A section of this road is unsealed and to achieve the required objective it was recommended that it be sealed.

This treatment was originally included in the intervention list, however, it was removed. It is understood that the reason was that it could be included in Council's asset improvement program.

The traffic volumes for Kalbeeba Road are expected to increase by about 2,000 vehicles per day from Gawler East of which about 750vpd could be from diverted traffic. It is noted that there is a review of the land zoning within Kalbeeba area to permit increased density and this would also increase traffic on this road.

On this basis it is suggested that this treatment be retained on the list or be formally included in Council's asset plan.

Recommendation – Retain the proposed intervention.

1O – Kalbeeba Road / Barossa Valley Way intersection

This intersection is proposed to be upgraded to provide a left turn lane (or widened shoulder) into Kalbeeba Road from Barossa Valley Way. This is required as this was likely to be the dominant movement for the increased traffic.

The expected increase in traffic volumes are likely to be in the order of 2,000vpd from Gawler East. As the majority of this traffic on Kalbeeba Road results from Stage 1 of the Gawler East development there are few realistic alternative routes (Cheek or Sunnydale Avenues) as well as diverted traffic from Barossa Valley Way / Murray Street.

On this basis it recommended that the increase in traffic be monitored over time to better understand traffic routes.

Recommendation – Retain the proposed intervention but monitor as required.

1P – Balmoral Road upgrade (Calton Road to Link Road)

The original intervention treatment was to widen the existing seal between the Calton Road junction and the proposed junction with the Link Road.

Originally houses along Balmoral Road were to have direct access. However, this cannot be provided due to issues with the SEAGAS pipeline.

On this basis there is no requirement to upgrade this section of Balmoral Road

Recommendation – Remove the intervention.

1Q – Balmoral Road / Calton Road junction

There was no initial intervention identified for this junction.

There is a sight distance issue at the junction. In addition, priority for the eastbound movement to Balmoral Road is difficult to achieve due to the layout of the junction

On this basis it recommended that junction be upgraded to provide priority to Balmoral Road and improve sight lines.

Recommendation – Add the proposed treatment as an intervention.

1R – Balmoral Road upgrade (Link Road to Kalbeeba Road)

There was no intervention identified for Balmoral Road east of the connection with the Link Road.

The expected increase in traffic volumes to Kalbeeba Road are likely to be in the order of 2,100vpd from Gawler East development and a 750vpd diversion from Barossa Valley Way to bypass the Gawler Town Centre.

The existing seal width is 6.8 to 7.0m with unsealed shoulders. The increase in traffic volumes could be expected to double the existing volume at full development. This together with future development of the Kalbeeba area could result in additional access points onto Balmoral Road and result in a higher crash rate.

On this basis it recommended that the increase in traffic be monitored over time to better understand traffic routes.

Recommendation – Do not include proposed intervention but monitor as required.

4.2 Central Section

This section is takes into consideration the area south of Springwood to Potts Road (essentially Gawler East Stage 2). The location the proposed interventions for this section are shown in Figure 4.2 below.

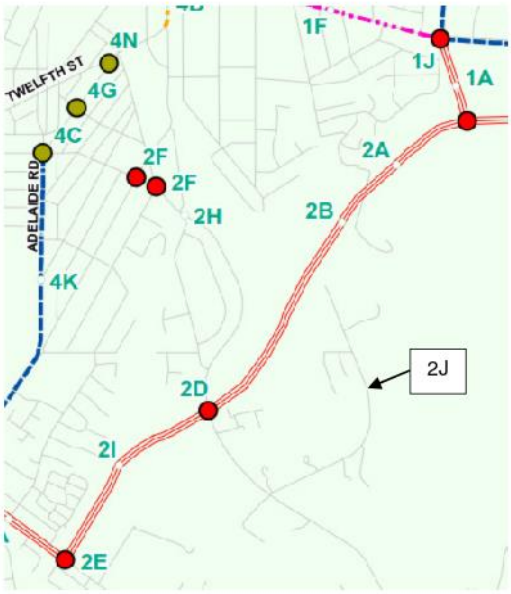

Figure 4.2 Plan of Central Interventions

2A – Link Road to One Tree Hill Road

The intervention is the provision of the Link Road as a collector road with a single lane in each direction along the DPTI original corridor. The proposed cross section is to include bike lanes and a raised median with a footpath on one side initially. The road reserve width should allow for the footpath to be provided on both sides of the road, depending on the rate of future development.

The expected volume on the Link Road could vary between 10,000 and 12,000 vehicles per day but more likely at the higher end depending on access from abutting development.

No change to cross sectional requirement is proposed.

Recommendation – No change in proposed intervention.

2B – Link Road / South Para Crossing

Provision of the bridge over the South Para River will be retained.

Recommendation – No change in proposed intervention.

2D – Link Road / One Tree Hill Road Intersection

Original intervention recommended a roundabout.

Recommendation – No change in proposed intervention.

2I – Link Road between One Tree Hill Road and Potts Road

This intervention is the provision of the Link Road as a collector road with a single lane in each direction along the DPTI corridor as per Intervention 2A.

The expected volume on the Link Road could vary between 10,000 and 12,000 vehicles per day.

No change is proposed to the cross sectional requirement with a single lane in each direction. However, the full width of the solid median may not be required as there is unlikely to be direct property access along this section of road.

Recommendation – No change in proposed intervention.

2E – Link Road / Potts Road Intersection

The proposed treatment at this location initially was a roundabout and then modified to provide a T-junction.

Council is investigating the provision of a new road link from Potts Road connecting to Tiver Road along the Bentley Road corridor. If this is the preferred long term objective, then consideration should be given to a road/junction layout at this location that directs longer distance traffic to Tiver Road. In the short term a roundabout is considered the appropriate treatment until the future Bentley Road corridor is provided.

Recommendation – Change layout to a roundabout.

2F – First Street, Fifth Street / Hill St Intersection

These locations were highlighted to be investigated based on increase in traffic from One Tree Hill Road travelling to Ryde Street / Northern Expressway or the Gawler Central train station.

It is understood that Council has undertaken some modifications to these streets in recent years.

The expected volume on these roads could increase by approximately 2,300vpd. It is expected that this increase is likely when Stage 2 is fully developed. The initial increase is likely to be significantly less. However, this is dependent on future development patterns in the area, particularly the rate of Stage 2 development surrounding One Tree Hill Road.

It is suggested that a review be undertaken of traffic patterns once the Link Road is opened.

Recommendation – No change in proposed intervention.

2H – Gawler to One Tree Hill Road intersection

This road was highlighted to be investigated but would be dependent on provision of future sections of the Link Road. As previously indicated, the Link Road was to be provided in sections, but will now be completed as one link.

Future residential development for Stage 2 of Gawler East is expected to be located along One Tree Hill Road through to Eckerman Avenue. Consequently, there is a need to consider the length of One Tree Hill Road from Eckerman Avenue through to Hill Street.

A review of the traffic volumes indicates that there could be a significant variation in demands on this road due to the preferred alignment. Furthermore, there is expected to be a significant increase in the number of dwellings originally envisaged at the time of the rezoning (1,600 compared to 1,250). The variation in traffic volumes could be in the order of about 5,300vpd at the proposed roundabout increasing to 6,500vpd just to the south of Hill Street and then reducing to just below 2,800vpd south of Bridge Street.

A review of this section of road (Refer Appendix D) indicates that the road cross section is too narrow (no or poorly graded shoulders) and areas of pavement distress that need to be rehabilitated to cater for existing volumes. Furthermore, there would be a need to provide safety barriers along the Riggs Hill Road section for the existing speed zone (80km/hr). It is noted that these are existing deficiencies but the traffic volumes are low and hence the risk is considered manageable. However, with the increased volumes from the proposed development the risk is expected to increase significantly.

The investigations indicate that this section of One Tree Hill Road requires upgrading due to existing deficiencies as well as increase in traffic from development in the DPTI / Private lands (Stage 2). In addition, consideration should be given to reducing the speed zone from 80 km/hr to 60 km/hr as this may have an impact on the requirement to provide safety barriers. The timing of the improvements is dependent on rate of development but considering that WoodVale has begun it is suggested that a trigger of 800 to 1,000 dwellings for Stage 2 is considered appropriate.

Recommendation – Widen the road to provide shoulders, rehabilitate the pavement and upgrade to improve safety. In addition, consideration should be given to reducing the speed zone to 60 km/hr from the existing 80 km/hr speed zone through to Eckerman Avenue. Consideration should also be given to developing a treatment plan for any proposed junctions to the Gawler East Development.

2J – Eckerman Avenue

Eckerman Avenue was not identified in the original list of interventions. The existing road is narrow and with increased development would not be able to cater for the increased traffic volumes without a significant increase in the risk of crashes.

Traffic analysis for the area surrounding the Link Road, One Tree Hill Road and Eckerman Avenue indicates that traffic can be distributed evenly between the roads as long as a connection is made from Eckerman Avenue to the Link Road. On this basis it is expected that traffic volumes on Eckerman Avenue would increase between 1,500 and 2,000vpd at full development. On this basis, the function of Eckerman Avenue would remain as a local road based on Council's Road Hierarchy. A minimum cross section width of 7.4m would be required, together kerb and gutter.

If this connection is not provided, then the majority of traffic will travel either through the WoodVale development onto Filsell Road, or along Eckerman Avenue to One Tree Hill Road.

This is expected to increase traffic volumes on Eckerman Avenue to close to 3,000vpd, which is defined as a Collector Road.

Recommendation – Ensure connection is made from Eckerman Avenue to the Link Road. Provide minor widening to maintain function as a local access road.

4.3 South Section

This section includes Potts Road and the section of Main North Road south of the junction with Potts Road. The location of the proposed interventions for this section are shown in Figure 4.3 below.

Figure 4.3 Plan of Southern Interventions

3A – Potts Road Upgrade

The original intervention treatment indicated that Potts Road would be upgraded to provide a single lane in each direction with bike lanes, raised median and a parking lane on the northern side of the road. The extent of the treatment was from the proposed junction with the Link Road to Adelaide / Main North Road. The raised median was considered appropriate if a roundabout was to be provided.

The preferred alignment changes the road cross section slightly by changing the median to a painted median to allow right turn access to abutting properties.

The expected volume on Potts Road could increase to about 15,300 vehicles per day. This also includes through traffic diverted from Barossa Valley Way and Calton Road as well as diverted existing traffic from residential areas north of Calton Road. Note this increase is expected when both stages are fully developed, but the initial increase is likely to be less. However, this is dependent on future development patterns in the area.

Recommendation – Change cross section to a painted median.

3B – Main North Road / Potts Road intersection

Traffic signals are the proposed intervention for this location.

Recommendation – No change in proposed intervention.

3C – Main North Road duplication (south of Potts Road)

The proposed intervention treatment is the duplication of Main North Road from Potts Road through to the Gawler Bypass. No scheme had been developed for this intervention as the priority was considered low.

The expected increase in traffic volumes are likely to be in the order of 7,500 to 8,600vpd to around the 39,000vpd without the Tiver Road extension. With the Tiver Road extension the increase could reduce to between 3,000 and 5,000vpd depending on how access is provided to Trinity College from Tiver Road.

Recommendation – No change in proposed intervention at this point in time. However, it is recommended that more detailed traffic modelling be undertaken to confirm future traffic volumes.

4.4 Other Treatments

The interventions listed in this section are located outside the specific Gawler East DPA area but are affected by the traffic generated. The location the proposed interventions for this section are shown in Figure 4.4 below. The interventions have been separated into those being directly related to the Gawler East development or have been identified by other studies.

Figure 4.4 shows two 4C interventions; one at the Redbanks Road / Main North Road junction and the other at the Adelaide Road / Fifth Street junction. It is noted that the upgrade at the Redbanks Road / Main North Road junction has been constructed and can be removed from the list.

4.4.1 Treatments affected by Gawler East

4C – Adelaide Road / Fifth Street / 19th Street Intersection

Whilst this intersection is highlighted on the treatment plan there is no description for it. The Road Management Plan indicated a high priority for improvement works to assist with road safety. A roundabout was indicated as the preferred treatment by Council and this has since been constructed.

There is expected to be an increase in traffic along Fifth Street as drivers access the train station and travel to the Northern expressway. The intersection should be monitored as turning movements may be difficult during peak periods.

Recommendation – Remove intervention but monitor safety and operation.

4G – Adelaide Road / Sixth Street Intersection

The proposed intervention indicated minor intersection works and the Road Management Plan suggested a medium priority of improvement works to assist with pedestrian safety. There is expected to be an increase in traffic along both Adelaide Road and Sixth Street. The intersection should be monitored as turning movements may be difficult during peak periods.

Recommendation – No change in proposed intervention.

4I – Main North Road between Kestral Road and Redbanks Road

The Main North Road Management Plan indicates the proposed treatment is to provide a central median has a medium priority. Traffic volumes have increased as a result of the developments to the north and are expected to further with development of the Roseworthy area.

Future traffic increases on this section of the road from the Gawler East development are in the order of 1,900vpd.

Recommendation – No change in proposed intervention.

4J – Main North Road between Redbanks Road and Barossa Valley Way

As per Intervention 4I except that the volume increase will be slightly higher at 2,800vpd as some traffic from Springwood would use Redbanks Road to access the Northern Expressway.

Recommendation – No change in proposed intervention.

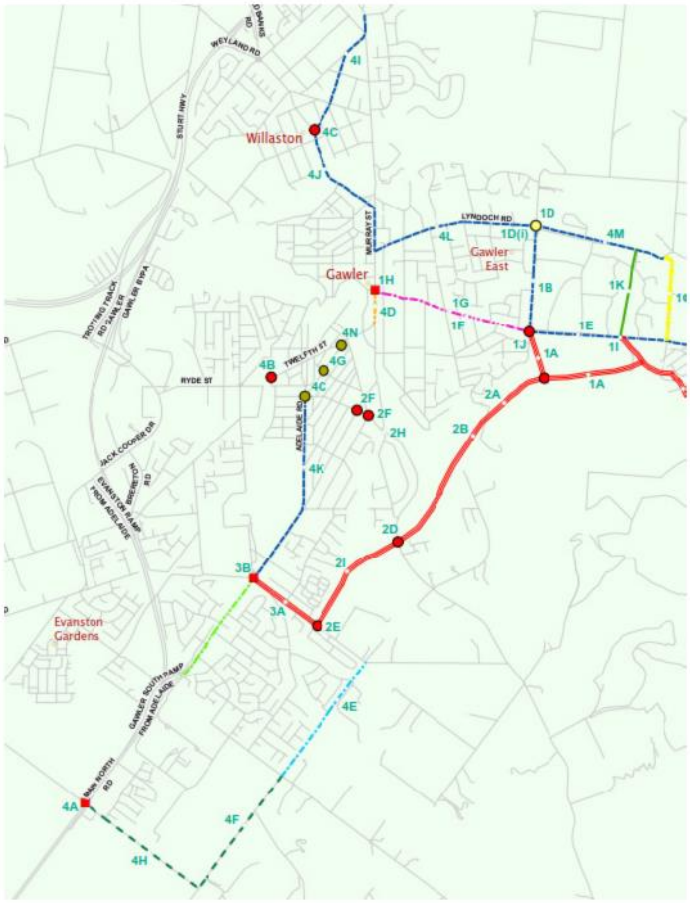

Figure 4.4 Plan of Other Treatments

4K – Adelaide Road between 19th Street and Potts Road

The Main North Road Management Plan indicates the proposed treatment to provide a central median has a high priority.

Future traffic increases on this section of the road from the Gawler East development are expected to be minor and are offset by the diversion of traffic. Hence it is expected that traffic would remain as is or with a slight increase of less than 500vpd.

Recommendation – No change in proposed intervention.

4L – Barossa Valley Way between Murray Street and Cheek Avenue

The proposed treatment was viewed as minor line marking works to provide a painted median. The actual form and timing of the treatment was dependent on traffic growth.

The revised traffic modelling indicates that at full development the expected traffic increase on this section of Barossa Valley Way would be in the order of 2,000 vpd but is minimised due to the traffic diversion to the Link Road.

Recommendation – No change in proposed intervention.

4M – Barossa Valley Way between Cheek Ave and Sunnydale Ave

Refer intervention treatment 4L.

The revised traffic modelling indicates that at full development the expected traffic increase on this section of Barossa Valley Way would be minimal as less than 1,000vpd.

Recommendation – No change in proposed intervention.

4N – Adelaide Road / 12th Intersection

The proposed intervention indicated minor intersection works and the Road Management Plan suggested a medium priority of improvement works to assist with pedestrian safety. There is expected to be an increase in traffic along Adelaide Road. The intersection should be monitored as turning movements may be difficult during peak periods.

Recommendation – No change in proposed intervention.

4.4.2 Other Interventions

In addition, various treatments identified with the future Tiver Road Extension (4E, 4F, and 4H) have been removed as they are not required as a result of the Gawler East development.

4A – Main North Road / Tiver Road intersection

This intersection was recently upgraded and should be removed from the list.

Recommendation – Remove intervention.

4B – 15th Street / Twelfth Street / Overway Bridge upgrade

A roundabout is proposed at this intersection as part of the intervention treatments.

It is understood that the location was included this road is likely to be most direct route for access to Northern Expressway for Gawler based traffic. A review of travel / time and distance confirms this. From a safety viewpoint a total of 7 crashes (2 Casualty) have occurred at this location over the last 5 years.

The increase in traffic volume is expected to be in the order of 2,000 to 3,000vpd depending on access to the train station.

Recommendation – No change in proposed intervention.

4C – Redbanks Road / Main North Road intersection

This intersection was identified in the Main North Road Management Plan as requiring treatment. This work has been completed and now can be removed from the list.

Recommendation – Remove intervention.

4D – Murray Street upgrade

The upgrading of Murray Street streetscape has progressively been undertaken over various stages with the final stage to Adelaide Road being undertaken at present.

Recommendation – Remove intervention when works are completed.

4.5 Proposed Interventions Triggers

As part of the intervention assessment this investigation has reviewed the triggers for the interventions. The review has taken into consideration the change in traffic volumes and the likelihood that parts of Stage 2 development will occur prior to completion of Stage 1 at Springwood.

Table 4.1 indicates the current and proposed triggers for the interventions listed and a brief description if the trigger has changed.

Table 4.1 Intervention triggers

Intervention location	Description of intervention	Original Trigger	New Trigger	New Trigger and discussion
1A(2)	Cheek Ave Extension (Link Road to Calton Road)		1000 Stage 1 only	The requirement for this road is based on development of the western portions of Stage 1 as well as additional traffic from Stage 2 eastern sections. At 1000 dwellings development would have started in the areas to the south of the Link Road. However, this could also be affected by future development patterns of Stage 2.
1A(3)	Link Road connection to Balmoral Road			The trigger for this is difficult to determine and may be more of an issue of timing of development on the southern side of the Link Road.
1B – Cheek Ave	Upgrade and widen	2300	1500 combined	At this level, traffic increase (excluding diverted traffic) is 2000 vehicles per day from Gawler East (Stage 1 and 2). Hence total traffic on Cheek Avenue likely to be between 4,000 and 4,500vpd. This is significantly over requirement for an upgrade of the road to Collector Road status.
1D – Barossa / Cheek I/S - Interim	Improve turn lanes	1000	No Change	
1D – Barossa / Cheek I/S - Ultimate	Improve turn lanes	2300	No Change	Trigger is considered appropriate. However, if the crash rate increases significantly then there may be a need to provide upgrade to a roundabout earlier. Further if traffic from Stage 2 increases significantly with traffic heading east then this could also impact on priority.
1E – Calton – Cheek to Eastern	Upgrade and widen	1000	No Change	
1F – Calton – Murray to Cheek	Provide line marking changes	2300	1000 (Stage 1 only)	There is a need for this treatment now to improve safety.
1G – Calton – Murray to Cheek	Rehabilitate existing pavement	2300	1000 (Stage 1 only)	This project would coincide with the line marking improvements.
1I – Calton Road / Link Road @ hamilton	Provide intersection treatment			Being provided as part of Springwood Development.
1J – Calton / Cheek I/S	Provide roundabout	1000	No change (or at completion of Link	The trigger point is based on assumption that all components of the Link Road being provided in one project.

Intervention location	Description of intervention	Original Trigger	New Trigger	New Trigger and discussion
			Road)	
1K – Hike Bike trail	Provide shared path			Being provided as part of Springwood Development.
1L – Calton – Eastern to Balmoral	Widen through to junction			Being provided as part of Springwood Development.
1N – Kalbeeba Road upgrade	Seal and widen		1300 (Stage 1 only)	Trigger should be provided at 75% of capacity of Springwood (Stage 1). However, timing could change depending on actual growth in traffic and use of Cheek Ave / Barossa Valley Way.
1O – Kalbeeba Road / Barossa Valley Way I/S	Widen approach		1300 (Stage 1 Only)	See above - provide at same timeframe as Kalbeeba Road upgrade
1Q – Calton / Balmoral junction	Upgrade			Being provided as part of Springwood Development
2F – First / Fifth / Hill I/S	Intersection upgrades	3600	1,000 (Stage 2 only)	Intersection improvements required primarily from Stage 2 traffic.
2H – One Tree Hill Road	Upgrade existing junctions		1,000 (Stage 2 only)	The intervention treatment assumes that One Tree Hill Road is upgraded now to address existing issues. Hence trigger is based on additional traffic impacting on existing junction operation and safety. It is considered that this intervention should be undertaken at same time frame as 2F.
2I – Eckerman Avenue	Widen existing		Stage 2 only	Once development starts for properties fronting Eckerman Avenue
4L – Barossa Valley Way – Murray to Cheek	Provide line marking changes	1600	No Change	
4M – Barossa Valley Way – Cheek to Sunnydale	Provide line marking changes	1600	2300 (combined)	The change is based on future demands for traffic to head east to Barossa Valley. The priority may change if more traffic uses Cheek Ave to head east compared to Balmoral Road.
4N – Adelaide Rd Twelfth I/S	Intersection improvement	3900	3300	Change required as total number of dwellings has reduced.

5 Review of No Gawler East Development

This section describes a review of the road network within the Gawler East environs without the Gawler East Development. The primary objective of this review is to identify if any treatments / infrastructure works would be required at the locations of the nominated intervention treatments. This would then be used to assist with the apportionment of costs for the proposed interventions.

The basis for the assessment is the 2026 existing traffic volumes indicated in Table 3.3. These are based on traffic counts undertaken as part of previous investigations undertaken in 2007 and 2013 for the original QED Traffic Assessment and Council's Transport and Traffic Management Plan respectively.

The layout is similar to that used for the assessment of the interventions. Interventions that are associated with the Link Road are not included in this review.

5.1 Northern Section

1B – Cheek Avenue Upgrade

Expected daily volume without the development is in the order of 2,500vpd. This road is currently indicated as a Collector Street 2 in the existing road hierarchy but is classified as a District Road with the future hierarchy due to future growth. However, as volumes are significantly lower without the development, Cheek Avenue would be classified as a Local Street (less than 3,000vpd).

Only one crash has occurred on this road over the last 5 years.

The pavement is in satisfactory condition but is showing signs of crazing etc and would need rehabilitation in the near future, particularly as the road is a bus route.

On this basis, Cheek Avenue would not require widening to cater for future volumes without Gawler East. However, it is expected that pavement rehabilitation would be required.

1D – Barossa Valley Way / Cheek Avenue Intersection

The intersection is currently widened along Barossa Valley Way to provide left and right turn lanes. A recent traffic count indicates turning movements are not significant and that the major turn movement is the right turn from the west to the south and vice versa.

The crash history indicates only one crash over the last five years.

On this basis, there is no requirement to upgrade the intersection without the Gawler East Development.

1E – Calton Road Upgrade – Cheek Ave to Eastern Drive

Traffic volumes on this section of Calton Road could vary between 5,000 and 7,000vpd. This section of Calton Road is classified as a Collector Street 1 in the current road hierarchy.

There is no crash history on this section of Calton Road.

The road is narrow at 6.2m wide (maximum) and there is no kerbing albeit there is no direct access to abutting properties. The pavement condition varies with minor cracking but it appears in satisfactory condition.

On this basis, there could be a need to widen the roadway (to a minimum of 10m wide if travel speed remained at 60 km/hr) to provide for cyclists as part of a hierarchy upgrade.

1F and 1G – Calton Road Upgrade – Murray Street to Cheek Ave

Traffic volumes on this section of Calton Road are expected to vary between 8,000 and 9,000vpd. This section of Calton Road is classified as a Collector Street 1 in the current hierarchy.

The road is 12.0m wide and kerbing is provided for the full length of the road. Direct access is provided to abutting properties.

Crash statistics indicate that there have been 18 crashes over the last 5 years with 8 resulting in casualty. Eleven of the crashes occurred at the junctions. It is noted that three casualty crashes occurred at the intersection with East Terrace.

The pavement condition varies with minor cracking but it appears in satisfactory condition, albeit it may need surface treatment in the near future.

On this basis, line marking (provide a painted median treatment) improvements are required to improve safety and resurfacing would be required in the future.

1H – Calton Road / Murray Street intersection

This location is to be removed from the list of interventions and consequently not assessed.

1J – Calton Road / Cheek Ave Intersection

Traffic growth is not significant for this location without the proposed development.

The crash history indicates 4 property damage only crashes have occurred at this location. Three of these were right angle crashes indicating cause to be drivers from Cheek Avenue crossing Calton Road without seeing oncoming traffic.

No major works are required but sight lines may need improvement due to existing vegetation.

1L – Calton Road Upgrade – Eastern Drive to Balmoral Road

Traffic volumes on this section of Calton Road could vary between 4,000 and 6,000vpd. This section of Calton Road is classified as a Collector Street 1 in the current hierarchy.

Four crashes (1 casualty) have occurred on this section of Calton Road all of them at junctions.

The road is narrow at 6.2m wide (maximum) and there is no kerbing. There is no direct access to abutting properties, except on the northern side of the road east of Sunnydale Avenue. The pavement condition varies with minor cracking but it appears in satisfactory condition.

There could be a need to widen the roadway to meet the requirements of a Collector Road as per the road hierarchy.

However, it is recommended that no upgrade be considered given that the low crash rate and existing access conditions are not expected to change.

1N – Kalbeeba Road Upgrade

The section of road is a combination of sealed and unsealed road. There has been 1 property damage only crash in the last five years.

Future growth is expected to be minimal with no change in development patterns in the short to medium term.

In the medium to long term Barossa Council would be expected to seal the unsealed section as a minimum.

1O – Kalbeeba Road / Barossa Valley Road Intersection (left turn treatment)

Future traffic growth for the left turn is expected to be minimal for this location without the proposed development.

The crash history indicates only 1 property damage only crashes have occurred at this location.

On this basis, no treatment is required without Gawler East development for this movement.

1P – Balmoral Road Upgrade (Calton to Project Entrance)

This location is to be removed from the list of interventions and consequently not assessed.

1Q – Calton Road / Cheek Ave Intersection

Traffic growth is not significant for this location without the proposed development.

The crash history indicates 2 property damage only crashes have occurred at this location, both of which were hit fixed object crashes.

On this basis no major works are required without the development.

5.2 Central Section

2F – First Street, Fifth Street / Hill St Intersection

There is expected to be minimal growth in traffic on these roads without the Gawler East Development, due to infill. The existing safety record on these streets indicates there are no safety issues that need to be addressed.

Pavement condition is satisfactory although some rehabilitation may be required at the roundabout with First Street.

On this basis there is no requirement for works without the proposed development.

2H – Gawler to One Tree Hill Road intersection

As indicated in Section 4.2 a detailed review of this section of road was undertaken as part of the proposed interventions (Refer Appendix D). This review indicated that the road has a cross section that is too narrow (no or poorly graded shoulders). Traffic growth without the Gawler East development would continue the pavement deterioration process with no treatment. Furthermore, there would be a need to provide safety barriers at the bend for the existing speed zone (80km/hr).

Future traffic volumes without Gawler East are expected to range between 2,000 and 2,600vpd and primarily result from areas to the south east of Gawler.

The crash history highlights there have been seven crashes of which 5 have resulted in a casualty. This indicates that the road could be classified as a black spot.

On this basis, there would be a need to upgrade this section of One Tree Hill Road to improve safety and rehabilitate the existing pavement at Seventh Street and along Riggs Hill Road. The preferred treatment would be to widen and seal shoulders on both sides of the road with the pavement rehabilitation undertaken at the same time. In addition, consideration should be given to reducing the speed environment to 60 km/hr.

2I – Eckerman Avenue

This road provides access to existing properties and the WoodVale development. Traffic growth without the Gawler East development is expected to be minimal and the road would be able to cater for the existing traffic. No crashes have occurred on Eckerman Avenue of the last five years.

The pavement and seal condition is satisfactory with only minor cracking.

On this basis there is no requirement to upgrade the road.

5.3 South Section

No discussion is provided for the upgrades in this section as the treatments are required due to the provision of the Link Road. It is noted that the DPTI Road Management Plan for Adelaide Road indicates various upgrades these locations to improve safety and operation and many of which have been implemented.

It is noted that a separate report has been provided to Council regarding the upgrade of Potts Road without the Gawler East Development (refer Appendix E).

5.4 Other Treatment locations

5.4.1 Adelaide Road / Main North Road

The locations identified below have previously been investigated as part of the 2008 Adelaide Road / Main North Road - Road Management Plan.

4I and 4J – Main North Road between Kestral Road and Barossa Valley Way

The Main North Road Management Plan indicates the proposed treatment is to provide a central median has a medium priority. Traffic volumes have increased as a result of the developments to the north and are expected to increase further with development of the Roseworthy area.

Crash statistics for this section of road indicate the following:

- A total of 26 crashes have occurred between Kestral Road and Redbanks Road, the majority of which are property damage with 5 casualty crashes and 1 fatal crash.
- A total of 42 crashes have occurred at along this section of road, the majority of which are property damage with 9 casualty crashes.

As no change has occurred to development patterns this treatment is required to cater for growth outside of Gawler East.

4C – Adelaide Road / Fifth Street / 19th Street Intersection

This location has been upgraded. Traffic growth is expected to increase marginally from Evanston areas and infill development.

Some delays have been experienced to side road traffic during peak periods but unless safety issue arises there is unlikely to be a need to upgrade the intersection further.

4G – Adelaide Road / Sixth Street Intersection

As per 4C above.

4K – Adelaide Road between 19th Street and Potts Road

Future growth without Gawler East will primarily come from commercial development at the Racecourse and Gawler Green areas as well as Evanston Gardens.

The Main North Road Management Plan indicates the proposed treatment to provide a central median has a high priority. Some of this work has been implemented but areas still need to be modified.

Crash statistics for this section of road have indicate a total of 45 crashes have occurred, the majority of which are property damage with 10 casualty crashes.

Future works would continue to implement recommendations of the Road Management Plan.

4N – Adelaide Road / 12th Street Intersection

As per 4C above.

4C – Redbanks Road / Main North Road intersection

This intersection has been upgraded and no further upgrades required.

4A – Main North Road / Tiver Road intersection

This intersection has been upgraded and no further upgrades required.

5.4.2 Barossa Valley Way

4L – Barossa Valley Way between Murray Street and Cheek Avenue

This section of road would cater for 15,000vpd close to Murray Street and then reduce to about 8,000vpd at Cheek Avenue. Direct access is provided along the road way and there are a number of junctions along the road.

31 crashes of which 5 were 5 casualty occurred on this section of Barossa Valley Way with half occurring at junction with High Street and another 6 at Daly Street,

On this basis there is a need to review crash history at the High Street junction.

4M – Barossa Valley Way between Cheek Avenue and Sunnydale Avenue

Traffic volumes reduce significantly as the road travels east. In addition, the crash history has also improved.

On this basis there is no requirement to undertake interim works along this section of roadway.

5.4.3 Other Locations

4B – 15th Street / Twelfth Street / Overway Bridge upgrade

From a safety viewpoint a total of 7 crashes (2 Casualty) have occurred at this location over the last 5 years.

On this basis, there may be a need to review the operation of the junction to improve safety.

4D – Murray Street upgrade

The upgrading of Murray Street streetscape has progressively been undertaken over various stages with the final stage to Adelaide Road being undertaken at present. No further upgrades are considered.

5.5 Summary of Required Works

The above review has indicated that there are various road sections / locations that require upgrade without the Gawler East Development. These locations are indicated in Figure 5.1 and include:

- Calton Road
- Cheek Avenue
- One Tree Hill Road
- Potts Road.

A summary / comparison of the interventions with and without the development are provided in Table 5.1. The Link Road and those treatments that were identified to be removed are not included in the comparison.

Table 5.1 Comparison of intervention with / without development

Intervention location	Description of intervention with development	Treatment required without development
1B – Cheek Ave	Upgrade and widen	Pavement rehabilitation required
1D – Barossa / Cheek I/S	Improve turn lanes	No upgrade required
1E – Calton – Cheek to Eastern	Upgrade and widen	No upgrade required
1F – Calton – Murray to Cheek	Provide line marking changes	Provide painted median
1G – Calton – Murray to Cheek	Rehabilitate existing pavement	Require resurfacing
1J – Murray / Cheek I/S	Provide roundabout	NA
1L – Calton – Eastern to Balmoral	Widen through to junction	No upgrade required
1N – Kalbeeba Road upgrade	Widen and seal	No upgrade required in short term
1O – Kalbeeba Road / Barossa Valley Way	Upgrade left turn movement	No upgrade required
1Q – Calton / Balmoral junction	Upgrade	Upgrade for safety
2F – First / Fifth / Hill I/S	Upgrade intersections	No upgrade required
2H – One Tree Hill Road	Upgrade and widen with speed reduction and safety barrier	Provide sealed shoulders and rehabilitate pavement with speed reduction.
2J – Eckerman Avenue	Widen to provide 7.4m	No upgrade
3A – Potts Road Upgrade	Upgrade and widen	Widen and pavement rehabilitation
4B – 15th St / Twelfth / Overway I/S	Upgrade to roundabout	Upgrade for safety improvements
4C – Adelaide / Fifth /19th I/S		NA
4D – Murray St Upgrade	Being undertaken	NA
4G – Adelaide / Sixth I/S		NA
4I – Main North Rd – Kestrel to Redbanks	Widen as per Road Management Plan	Require upgrade
4J – Main North Rd – Redbanks to BVW	Widen as per Road Management Plan	Require upgrade
4K – Adelaide Rd – 19th St to Potts	Widen as per Road Management Plan	Require upgrade
4L – Barossa Valley Way – Murray to Cheek	Provide line marking changes	Review High St junction
4M – Barossa Valley Way – Cheek to Sunnydale	Provide line marking changes	NA
4N – Adelaide Rd Twelfth I/S		NA

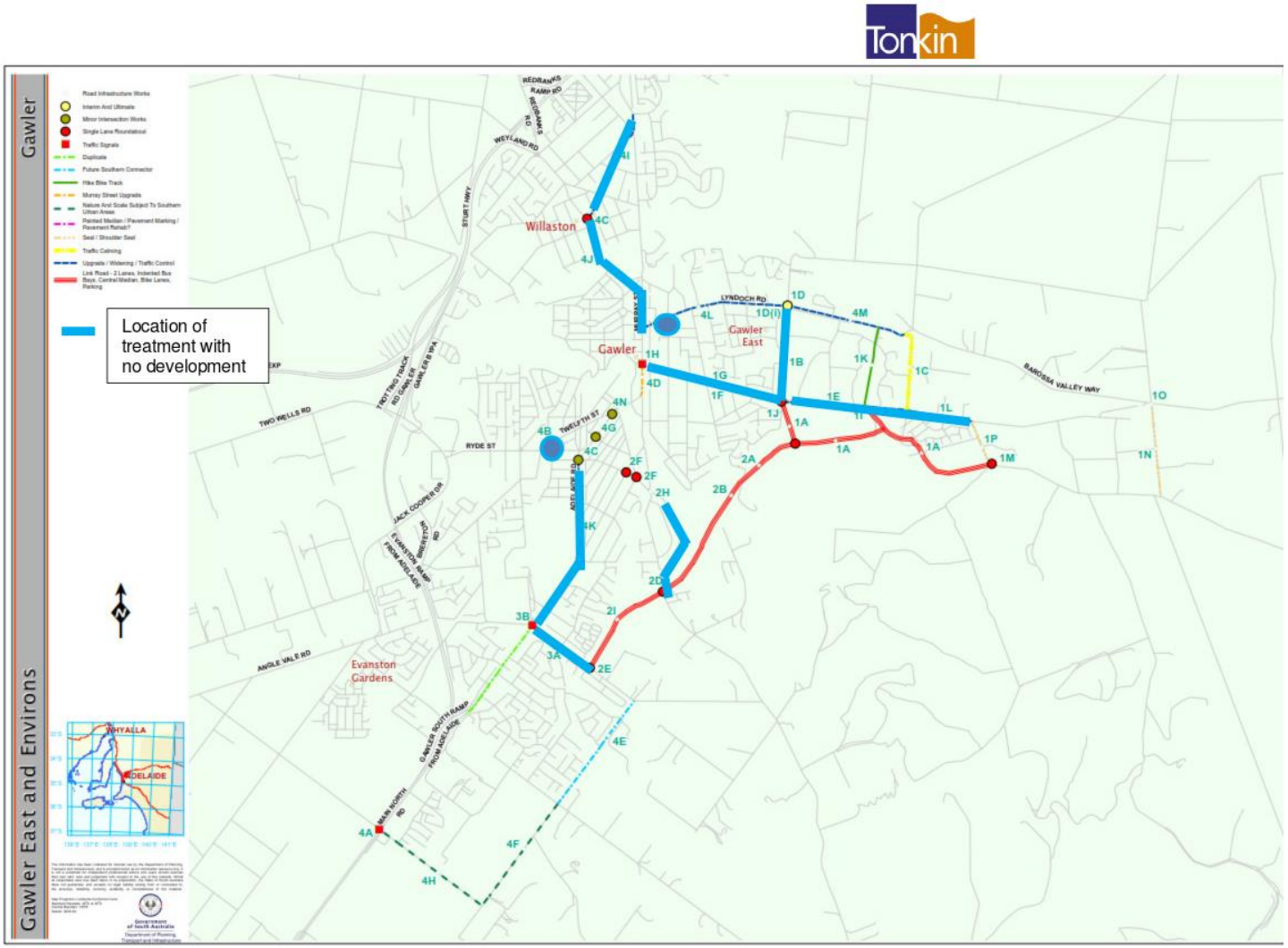

Figure 5.1 Location of Treatments that are required without Gawler East Development

6 Summary of Review

This assessment reviewed a range of documentation associated with the development of the Gawler East area to confirm the requirements of the transport infrastructure interventions identified by the developers, councils (Town of Gawler and Barossa Council) and DPTI.

The review included assessment of previous reports, identifying changes in assumptions and review of transport modelling. Based on this assessment, the interventions identified and agreed in 2015 were reviewed and modified.

The development potential for the Gawler East area has changed over time from the original 3,950 dwellings (2,700 in Springwood – Stage 1) in 2008 to 3,300 dwellings in 2016 (1,700 in Springwood). In addition to this change there has also been new developments (Gawler Green and Roseworthy), together with modifications to the road network (Murray Street / Calton Road intersection) that will impact on traffic patterns within Gawler. Consequently, a review of the traffic modelling has been undertaken.

The revised traffic modelling has indicated the following:

- The previous trip generation and distribution assumptions are valid.
- The overall **total traffic** generated by the development is 26,400 vehicles per day (vpd) comprising 13,600vpd for Stage 1 and 12,800vpd for Stage 2 (DPTI and Private lands).
- The total external traffic generated by the Gawler East Development is indicated in Table 3.2 and is 12,300vpd for Springwood, 4,300 for DPTI lands and 7,200 Private lands.
- The changes in trip patterns and dwelling distribution results in:
  - A reduction in volume of traffic on Calton Road due to reduced number of dwellings for Stage 1 and changes in the Murray Street / Calton Road intersection.
  - An increase in traffic on One Tree Hill Road north of the developable areas based on an increase in number of Stage 2 dwellings and possible access points from these developments.
  - Review of existing traffic patterns indicating Ryde Street / Two Wells Road is preferred route to access the Northern Expressway rather than Redbanks Road.
  - Slight increase in traffic on Cheek Avenue / Barossa Valley Way as a result of restricting the right turn movement from Calton Road at the intersection with Murray Street.

The revised modelling has then been used to review the intervention treatments for the Gawler East development. A number of the intervention treatments have been completed since the original list was agreed and these should now be removed including;

- 1H - Calton Road / Murray Street junction being redesigned to remove right turn from Calton Road.
- 4A - Tiver Road / Main North Road intersection signalisation.
- 4C - Main North Road / Redbanks Road junction upgrade.
- 4D - Murray Street upgrade.

In addition, various treatments identified with the future Tiver Road Extension (4E, 4F, and 4H) have been removed as they are not required as a result of the Gawler East development.

The upgrade of Eckerman Avenue (Intervention 2J) has been included as an intervention due to the increased traffic from abutting development.

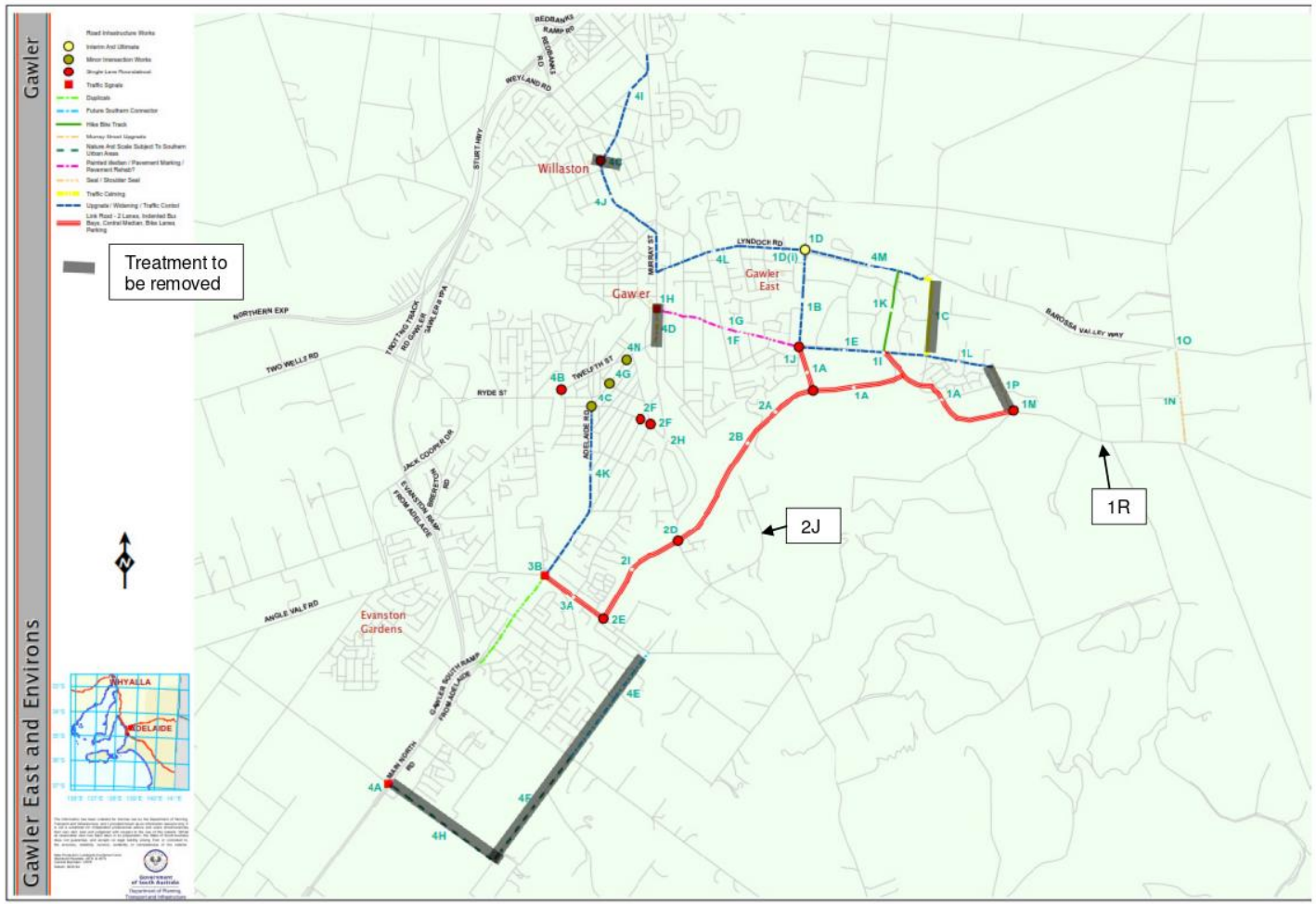

Figure 6.1 Location of Preferred Treatments (including removed)

The following intervention treatments have been modified based on the review:

- 1C – Sunnydale Avenue Traffic Treatment – remove from list as traffic to be diverted to Cheek Avenue or Kalbeeba Road.
- 1G – Calton Road Upgrade – Murray Street to Cheek Ave, Pavement rehabilitation – modify works to provide for reseal only.
- 1M – Link Road / Balmoral Road intersection – review form of junction.
- 1N – Kalbeeba Road upgrade – seal remaining unsealed section – retain on list but identify that should be part of Council's Asset Management Plan.
- 1O – Kalbeeba Road / Barossa Valley Way intersection – review traffic volumes and determine if need still warranted.
- 1P – Balmoral Road upgrade – remove as direct access no longer provided.
- 1Q – Balmoral Road / Calton Road junction – add treatment to upgrade junction
- 2E – Link Road / Potts Road Intersection – roundabout but to consider long term objective to direct traffic to the Bentley Road corridor.
- 2H – One Tree Hill Road - Gawler to Link Road intersection – Rehabilitate pavement and widen the road to provide shoulders, and upgrade to improve safety as well as considering a reduction in the speed zone to 60 km/hr. Consideration should also be given to developing a treatment plan for any proposed junctions to Stage 2 developments.
- 3A – Potts Road Upgrade – Change to a painted median.

The triggers for the proposed intervention treatments have been assessed and reviewed based on the investigations undertaken. Table 4.1 provides a detailed list of the proposed triggers.

A review of the operation of the area without the Gawler East Development indicates that there some of the interventions are required now to address existing deficiencies. The key locations are indicated in Figure 5.1 and include:

- 1B – Cheek Avenue – undertake pavement rehabilitation.
- 1F – Calton Road Upgrade – Murray Street to Cheek Avenue, Line marking treatment – provide painted median.
- 1G – Calton Road Upgrade – Murray Street to Cheek Avenue, Pavement rehabilitation – modify works to provide for reseal only.
- 2G – One Tree Hill Road – widen shoulders, rehabilitate pavement at selected locations and consider a speed reduction to 60 km/hr.
- 3A – Potts Road – Adelaide Road to Mueller Drive – Upgrade pavement and widen.
- 4B – 12th Street / Overway Bridge upgrade – provide safety improvement
- 4I and 4J– Main North Road – Kestral Road to Barossa Valley Way – improve as per Road Management Plan
- 4K – Adelaide Road – 19th Street to Potts Road – improve as per Road Management Plan
- 4L – Barossa Valley Way – Murray Street to Cheek Avenue – improve safety at High Street junction

Appendix A

Plan of Proposed 2012 Interventions

ANNEXURE 1

***(Draft)* Traffic Intervention Schedule 1 – Lend Lease Development**

Map Reference	Responsible Party	Road Infrastructure Works			Cost (2016) ($million)	Trigger Timing (Allotments)	Contributions Schedule (% and $million)			
		Component	Treatment	Intent			Springwood	Minister	Town of Gawler	Barossa Council
		Sector (Northern)								
1A	SC	Link Road (Eastern Connector)	One lane in each direction with bike lane, ~~indented bus bays, parking, footpaths and standard median~~. 3 connections to north / north-east	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre	4.90	1000	100% 4.90			
1B	TOG	Cheek Avenue Up-grade	Pavement up-grade, widening & traffic control (excludes relocation of stobey poles)	Upgrade road to facilitate future traffic growth and improve safety	1.83	2300	32% 0.59	13% 0.24	55% 1.00	
1D	TOG	Barossa Valley Way / Cheek Avenue Intersection - interim	Channelisation and widening	Upgrade intersection to facilitate future traffic growth and improve safety	0.26	1000			100% 0.26	
1D(i)	DPTI	Barossa Valley Way / Cheek Avenue Intersection - ultimate	Roundabout	Upgrade intersection to facilitate future traffic growth	5.26	2300		100% 5.26		
1E	SC	Calton Road Up-Grade - Cheek to Project entrance	Upgrade to kerbed collector road	Formalise. Improve drainage.	2.74	1000	100% 2.74			
1F	SC	Calton Road - Murray Street to Cheek Avenue	Pavement marking & painted median treatment	Improve safety and traffic flow	0.26	2300	100% 0.26			
1G	TOG	Calton Road - Murray Street to Cheek Avenue	Pavement rehabilitation	Improve road surfacing	1.88	2300			100% 1.88	

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Map Reference	Responsible Party	Road Infrastructure Works			Cost (2016) ($million)	Trigger Timing (Allotments)	Contributions Schedule (% and $million)			
		Component	Treatment	Intent			Springwood	Minister	Town of Gawler	Barossa Council
1H	TOG	Calton Road / Murray Street Intersection	Traffic signals (ducting already installed)	Upgrade intersection to improve safety and facilitate future traffic growth	0.92 review	1000	20% 0.18		80% 0.74	
1I	SC	Calton Road / Link Road Intersection @ Hamilton Reserve	T Junction plus cycle/pedestrian crossing	Upgrade intersection to facilitate future traffic growth, including access for peds/cyclists	0.13	1000	100% 0.13			
1J	SC	Calton Road / Link Road Intersection @ Cheek Avenue	~~Round-about~~ Staggered T junction (as proposed by Springwood)	Upgrade intersection to facilitate future traffic growth	0.66	1000	100% 0.66			
1K	SC	Hike/Bike Calton to Barossa Valley Way	Sealed path (connection to Jack Bobridge bikeway)	Width of mixed use path to match with Barossa Council and Gawler Council cycling and walking plans	0.22	1600	100% 0.22			
1L	SC	Calton Road Upgrade – Project entrance to Balmoral Road	Sealed shared use path	Upgrade southern side of road (where allotments have frontages to Calton Road) to align with Barossa Council and Gawler Council local connectivity cycling and walking plans	0.73	1000	100% 0.73			
1M	SC	Link Road / Balmoral Road Intersection	T-junction	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre	0.66	1000	100% 0.66			

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ANNEXURE 1

***(Draft)* Traffic Intervention Schedule 2 – Town of Gawler DPA**

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Map Reference	Responsible Party	Road Infrastructure Works			Cost (2016) ($million)	Trigger Timing (allotments)	Contributions Schedule (% and $million)			
		Component	Treatment	Intent			Springwood	Minister	Town of Gawler	Barossa Council
		Sector (Central)								
2A	DPTI	Link Road (Lend Lease boundary to One Tree Hill Road)	One 4.0m lane in each direction with 1.5m bike lane on road and footpaths	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre	27.8	1000		100% 27.8		
2B	DPTI	Link Road / South Para Crossing	Bridge	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre						
2D	DPTI	Link Road / One Tree Hill Road Intersection	Round-about	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre						
2I	DPTI	Link Road (One Tree Hill Road to Potts Road) Alignment to be determined	One lane in each direction with bike lane, ~~indented bus bays, parking, footpaths and standard median~~ (3.0m approx painted or otherwise).	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre						
2E	DPTI	Link Road / Potts Road Intersection	Round-about Treatment to be determined	Provide local Gawler East traffic with direct access to Main North Road (via Potts Rd), without travelling through the Gawler town centre	???	1000	50%	50%		
2F	TOG	First Street intersection, Fifth Street / Hill Street Intersection	Treatment investigation required	Upgrade intersection to cater for projected traffic volumes	0.39	3600		50% 0.20	50% 0.20	

Map Reference	Responsible Party	Road Infrastructure Works			Cost (2016) ($million)	Trigger Timing (allotments)	Contributions Schedule (% and $million)			
		Component	Treatment	Intent			Springwood	Minister	Town of Gawler	Barossa Council
2H	DPTI	Gawler - One Tree Hill Road (Deadmans Pass/Town Entry)	Treatment investigation required	??	0.13	1600		100% 0.13		
		Sector (Southern)								
3A(i)	TOG	Potts Road Up-grade (Main North Road to DPTI alignment)	One lane in each direction.	Upgrade Potts Road to facilitate future traffic growth	1.6	1000	80% 1.28	20% 0.32		
3A(ii)	TOG	Potts Road Up-grade (DPTI alignment to ToG alignment)	One lane in each direction.	Upgrade Potts Road to facilitate future traffic growth	2.4	1000			100% 2.4	
3B	DPTI	Main North Road / Potts Road Intersection	Realign Para Road to form a 4-way, signalised intersection with Potts Road	Upgrade intersection to facilitate future traffic growth and cater for pedestrian movements	11.65	1000		100% 11.65		
3C	DPTI	Main North Road duplication (south of Potts Road)	Duplicate Main North Road between Potts Road and approx. Trinity Drive	Duplicate road to facilitate future traffic growth	5.97	3900		100% 5.97		
		Other Interventions								
4G	DPTI	Adelaide Road/Sixth Street intersection	Minor intersection works	Improve pedestrian safety	0.27	3900		100% 0.27		
4I	DPTI	Main North Road - btwn Kestrel and Redbanks	Painted median scheme with right turn lanes, bicycle lanes & ped refuges at high ped points. Review road lighting	Improve safety and traffic flow	4.38	*		100% 4.38		
4K	DPTI	Adelaide Road - btwn 19th Street & Potts Road	Painted median scheme with right turn lanes, bicycle lanes & ped refuges at high ped points. Review road lighting	Improve safety and traffic flow	3.62	1600		100% 3.62		

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Map Reference	Responsible Party	Road Infrastructure Works			Cost (2016) ($million)	Trigger Timing (allotments)	Contributions Schedule (% and $million)			
		Component	Treatment	Intent			Springwood	Minister	Town of Gawler	Barossa Council
4L	DPTI	Barossa Valley Way - btwn Murray Street & Cheek Avenue	Painted median scheme with right turn lanes, bicycle lanes & ped refuges at high ped points. Review road lighting	Improve safety and traffic flow	0.12	1600		100% 0.12		
4M	DPTI	Barossa Valley Way - btwn Cheek & Sunnydale Avenues	Painted median scheme with right turn lanes, bicycle lanes & ped refuges at high ped points. Review road lighting	Improve safety and traffic flow	3.89	1600		100% 3.89		
4N	DPTI	Adelaide Road / Twelfth Street intersection	Minor intersection works	Improve pedestrian safety	0.22	3900		100% 0.22		
~~1C~~		~~Sunnydale Avenue Traffic Treatment~~	~~Traffic control to be determined~~			~~1000~~				~~100%~~
~~1N~~		~~Kalbeeba Road Up-grade~~	~~Seal~~			~~2200~~				~~100%~~
~~1O~~		~~Kalbeeba Road / Barossa Valley Way Intersection~~	~~Channelisation~~			~~2200~~				~~100%~~
~~1P~~		~~Balmoral Rd upgrade~~	~~Seal/widening~~							

Notes:

*Timing not dependent on development

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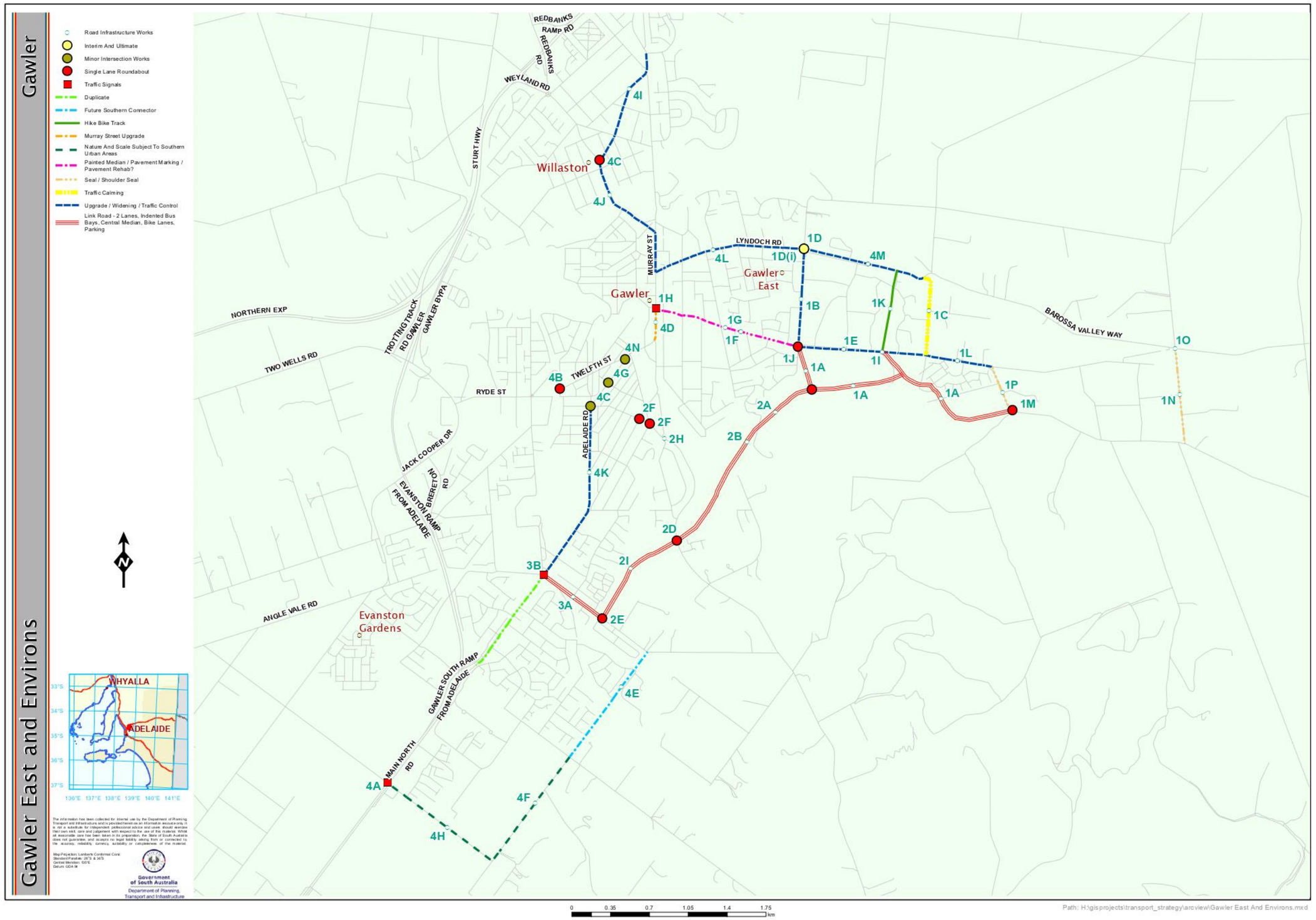


Produced by: Technical Services, DPTI - September 2016

Appendix B

Previous Report Recommendations

Executive Summary

QED Pty Ltd have been engaged by Delfin Lend Lease (Delfin) to undertake a traffic assessment for the proposed re-zoning of the former Gawler Quarry site and adjacent lands at Gawler East. The traffic assessment is to be used as part of the investigation process for the re-zoning of land to permit residential and other development on the proposed sites.

The proposed re-zoning of the land is expected to result in the provision of 3,900 dwellings (2,700 for Phase 1) as well as a town centre and schools in two phases in areas that are within the current Urban Growth Boundary.

The existing and future traffic demands, without the proposed Gawler East development are expected to result in locations on the road network in Gawler such as Murray Street and Adelaide Road operating close to capacity with congestion at peak periods.

There is expected to be increased traffic demands within Gawler, particularly on Calton Road, Murray Street, Cheek Avenue and Adelaide Road as a result of the proposed development. A Link Road through the proposed development to the south east of Gawler is expected to reduce the traffic impacts within the Gawler Town Centre and surrounding road network by the proposed development and surrounding residential areas. The timing of the Link Road is dependant on the rate of development, and traffic volumes but is expected to be required between 2014 and 2017. This is based on traffic volumes of 14,000 to 15,000 vpd or when there are about 1,500 dwellings occupied. This Link Road will ultimately extend to Potts Roads as the development progresses past 2017.

Traffic modelling undertaken by the Department for Transport, Energy and Infrastructure (DTEI) for the Gawler Transport Plan has confirmed the basic assumptions with regard to traffic generation for this assessment. In addition it has also confirmed the need for the Link Road to reduce traffic volumes on Calton Road / Murray Street within the Gawler Town Centre area.

There are a number of improvements to the road network that are required to cater for the future demands. These involve the probable widening of Sunnydale and Cheek Avenues as well as Potts Road, providing a painted median on Calton Road and improvements to a number of junctions. The form and timing of these improvements will need to be discussed with the Town of Gawler and Delfin.

The key outcomes of the traffic assessment are:

- On the basis of this assessment, Phase 1 of The Gawler East Development could proceed with interim traffic measures (up to 2014 -2017, without the need for the Link Road)
- The opportunity exists within Phase 2 of the development to provide an integrated solution for the early provision of the Link Road (South Eastern Connection) by all parties, being land owners, Delfin, Town of Gawler and DTEI
- The scope of this study does not take into consideration the future development of Concordia (within the UGB) beyond 2021. Not withstanding the ability for Gawler East to proceed ahead of this, detailed analysis with DTEI, Town of Gawler and District Council of Barossa is required to identify appropriate connections and links to reduce traffic demands on the Barossa Valley Way.

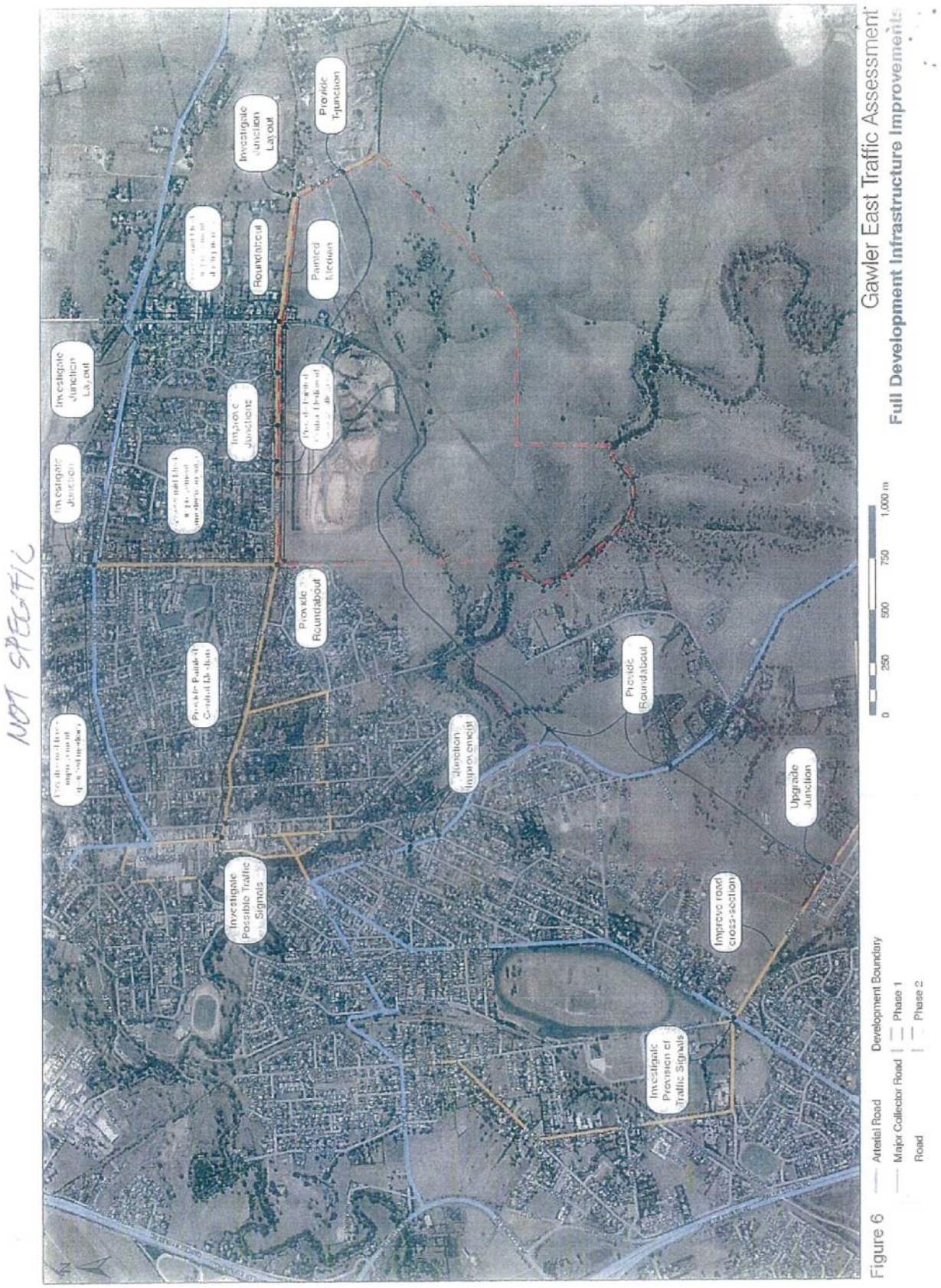

NOT SPECIFIC
Gawler East Traffic Assessment
Full Development Infrastructure Improvements
Investigate Junction Layout
Provide T-junction
Investigate Junction Layout
Roundabout
Improve Junctions
Provide Roundabout
Junction Improvement
Provide Roundabout
Upgrade Junction
Investigate Possible Traffic Signals
Improve road cross-section
Investigate Provision of Traffic Signals
0 250 500 750 1,000 m
Arterial Road
Major Collector Road
Road
Development Boundary
Phase 1
Phase 2

Figure 6

8 TREATMENT SUMMARY

A number of traffic management and road maintenance improvements have been recommended in this report. Recommendations are summarised in the following tables, included in the table is a priority rating for each recommendation.

Three levels of priority are indicated – High (RED), Medium (ORANGE) and Low (YELLOW).

The priority of treatments has been determined based on:

safety benefits, to improve safety for vulnerable road users,

reducing roadside hazards

improving amenity and appearance of the roads

benefit/cost appraisal of treatment

8.1 INTERSECTION/ JUNCTION TREATMENTS

Priory of treatments has been made by experienced practitioners within DTEI.

ROAD SECTION	TREATMENT	PRIORITY
Main North Road Redbanks Road/ Paxton Street	Installation of signals or roundabout at Redbanks Road and modification to Paxton St	High
Main North Road Flinders Street	Installation of a painted right turn lane into Flinders Street.	Medium
Murray Street Horrocks Place	No recommendation – monitor operation	Monitor
Adelaide Road Twelfth Street/ Seventh Street	improve left turn from 12th Street	Medium
Adelaide Road Sixth Street	Improvements to pedestrian safety	Medium
Adelaide Road Nineteenth Street and Fifth Street	Rationalisation of movements out of Nineteenth and Fifth Street	High
Main North Road Barnet Street	Installation of a painted median scheme to reduce the number of lanes (short term treatment)	Medium
Main North Road Trinity Drive	No recommendation – monitor operation	Monitor

8.2 MID-BLOCK TREATMENTS

ROAD SECTION	TREATMENT	PRIORITY
Adelaide Road Fourth St – Fifth St	Consider the installation of a raised pedestrian refuge	Monitor
Main North Road Kestrel Rd - Redbanks Rd	It is recommended to further upgrade this section as per the preferred layout in figure 4.1	Medium
Main North Road Redbanks Rd – Horrocks Pl	It is recommended to further upgrade this section as per the preferred layout in figure 4.1	Medium
Adelaide Road Nineteenth St – Second St	It is recommended to further upgrade this section as per the preferred layout in figure 4.1	High
Adelaide Road Second St – Sheriff St	It is recommended to further upgrade this section as per the preferred layout in figure 4.1	High
Main North Road Sheriff St – Potts Rd	It is recommended to further upgrade this section as per the preferred layout in figure 4.1	High
Main North Road Potts Rd – Krieg Rd	It is recommended to further upgrade this section as per the preferred layout in figure 4.1	High

9 CONCLUSION

This RMP has made a number of recommendations to address the operational and safety issues that have been identified.

All of the proposed recommendations are conceptual only, and will therefore require further development and consultation with the Town of Gawler and the community prior to any proposed implementation.

Importantly, funding commitments to the initiatives detailed in this plan are subject to normal budgetary processes and priorities.

Initially, implementation of recommendations is likely to be limited to the higher priority and more cost effective treatments that target specific sites with higher crash rates. The design of specific treatments will aim at consistency with and target the longer-term functional outcomes outlined in this Road Management Plan.

EXECUTIVE SUMMARY

This framework has been developed in response to the announcement by the Minister for Urban Development and Planning on 20 December 2007 that the State Government has expanded the Urban Growth Boundary (UGB) in several areas of Adelaide. This expansion included changes in the vicinity of Gawler, including 320 hectares in Gawler East, 500 hectares in Concordia, and 79 hectares in Evanston Gardens (refer figure 1).

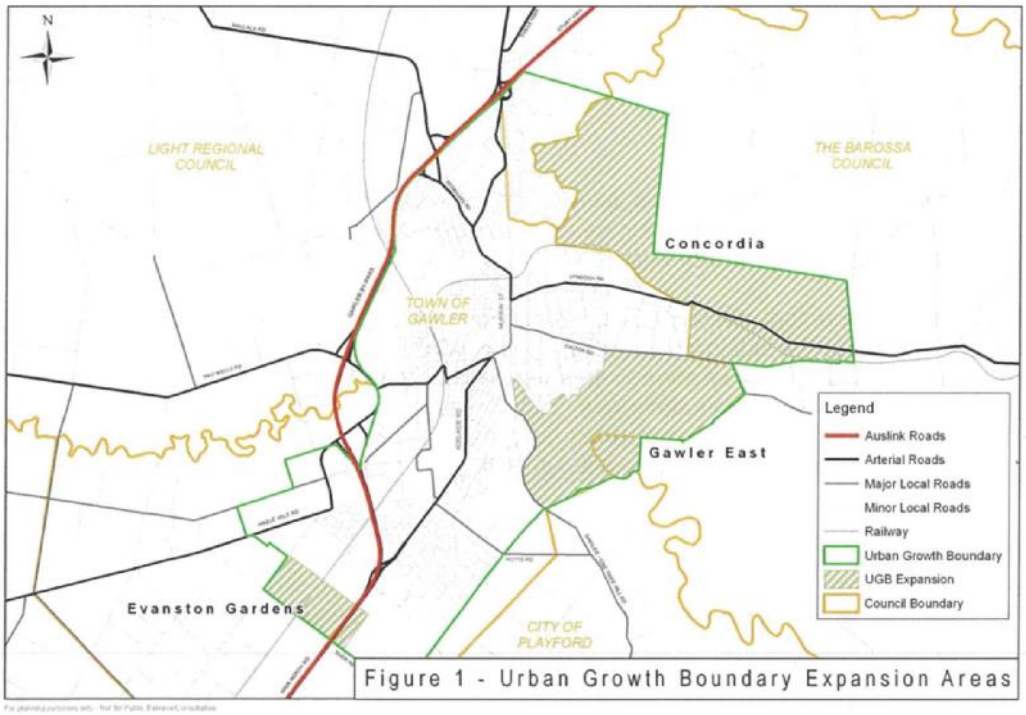


Figure 1 - Urban Growth Boundary Expansion Areas

The current level of road access into these areas is limited. In September 2007 it was agreed to undertake a collaborative study between the Department for Transport, Energy and Infrastructure (DTEI), the Department of Planning and Local Government, the Land Management Corporation (LMC) and the Town of Gawler to identify transport improvement needs to support the proposed urban growth in Gawler. A Steering Committee was established to oversee this study. The Barossa Council requested to be included in this committee and the Light Regional Council were then subsequently invited to join.

Current Transport Infrastructure

The road network is made up of arterial and local roads. The most important component of the arterial road network is the western bypass, which forms part of the National Transport Network. Adelaide Road – Main North Road is currently the major gateway between Gawler and the remainder of Adelaide, however it is anticipated that an increased number of trips will use roads in the west of Gawler to access the Northern Expressway upon its completion.

Access to the proposed eastern and north eastern developments is limited and is currently only serviced by the local road network.

The broad gauge rail network is utilised to provide passenger train services to Gawler and freight services from the Barossa Valley and Roseworthy to grain export facilities and processing plants on the Le Fevre Peninsula.

State Government run public transport within the study area is provided by rail services to five stations at Evanston, Tambelin, Gawler, Gawler Oval and Gawler Central stations, as shown in Figure 3. The public transport initiatives announced in the June 2008 State Budget are expected to deliver an increase in capacity for the Gawler train line with faster more frequent rail services between Gawler and the City.

Future Traffic Demands

The growth in traffic in the area is likely to be a direct reflection of the UGB expansion and other developments. These developments are expected to occur for 10 -15 years in the east and up to 25 years in the north-east.

Two land development scenarios were used for this study. The first scenario reflects the current UGB (i.e. including the recent expansions). The second scenario considers the potential for an additional larger development in the Concordia area. It should be noted that a larger development in Concordia has not been adopted by the State or Local Government to date. It was nevertheless appropriate to consider the implications of such a development option as part of assessing the potential future transport needs for Gawler.

Options Analysed

The purpose of the analysis was to identify the location and potential nature of major improvement needs to the transport network to facilitate urban growth. This study does not identify the specific improvement concepts at each location, as this would be subject to further more detailed studies. These improvement needs include locations outside of the proposed developments to facilitate the developments.

The following road network options (in addition to the existing road network) were investigated to determine the most appropriate means to provide road access for Gawler East and Concordia.

Scenario 1 – Current UGB

- Option 1A – An eastern connector road, linking Calton Road to Potts Road. Connections to Calton Road are at Sunnydale Ave and Cheek Ave..
- Option 1B – An eastern connector road, linking Calton Road to Main North Road/Tiver Road (i.e. around Evanston South). Connections to Calton Road are at Sunnydale Ave and Cheek Ave.
- Option 1C – A north eastern connector, linking Lyndoch Road to the Sturt Highway.
- Option 1D – A combination of Option 1A and Option 1C.
- Option 1E - A combination of Option 1B and Option 1C.
- Option 1F– Option 1A, except with multiple connections to Calton and Balmoral Roads

- Option 1G – Option 1B, except with multiple connections to Calton and Balmoral Roads as per Option 1F
- Option 1H – A combination of Option 1F and Option 1C
- Option 1I – A combination of Option 1G and Option 1C

Scenario 2 – Potential Additional Larger Concordia Development

- Option 2A – A north eastern connector, linking the Barossa Valley Way to the Sturt Highway. This option has two connections to the Barossa Valley Way.
- Option 2B - A combination of Option 1A and Option 2A.
- Option 2C - A combination of Option 1B and Option 2A.
- Option 2D - A combination of Option 1F and a variation of Option 2A.
- Option 2E - A combination of Option 1G and a variation of Option 2A.

A potential road link between Main North Road and Angle Vale Road (being considered as part of the proposed Evanston Gardens development) was included in all options. At the beginning of the study a grade separation of the railway line was assumed to form part of this road link, and was adopted for the purposes of the study. The grade separation is, however, no longer being considered as part of the Evanston Gardens development.

The possibility of the extension of the rail services to cater for the urban expansion was also included in all options. The notional change was the extension of services along the Barossa rail line to a new station, 3 to 4 kilometres east of the Gawler Central station, possibly within the Wheatsheaf area.

Recommendations

The analysis indicates that an eastern connector road will be required to service the Gawler East development. The analysis further demonstrated that this road will be a local road to service the development and existing urban areas, and not an arterial road bypass of Gawler. Upgrades of existing local roads will likely be required as part of this road provision, dependant upon the final chosen alignment. This road should be constructed as part of the development of Gawler East.

A potential route for this road can be seen in Figure 2, and connects to the Tiver Road/Main North Road junction to the south, and Calton Road to the north. Multiple connection points to Calton Road are preferred. Cheek Avenue will provide the most direct connection to the Barossa Valley Way. The final alignment of this road will nevertheless be subject to the planning of Gawler East. The community will have the opportunity to provide input into the structure of the Gawler East development, including the road access strategy, as part of the upcoming Development Plan Amendment process.

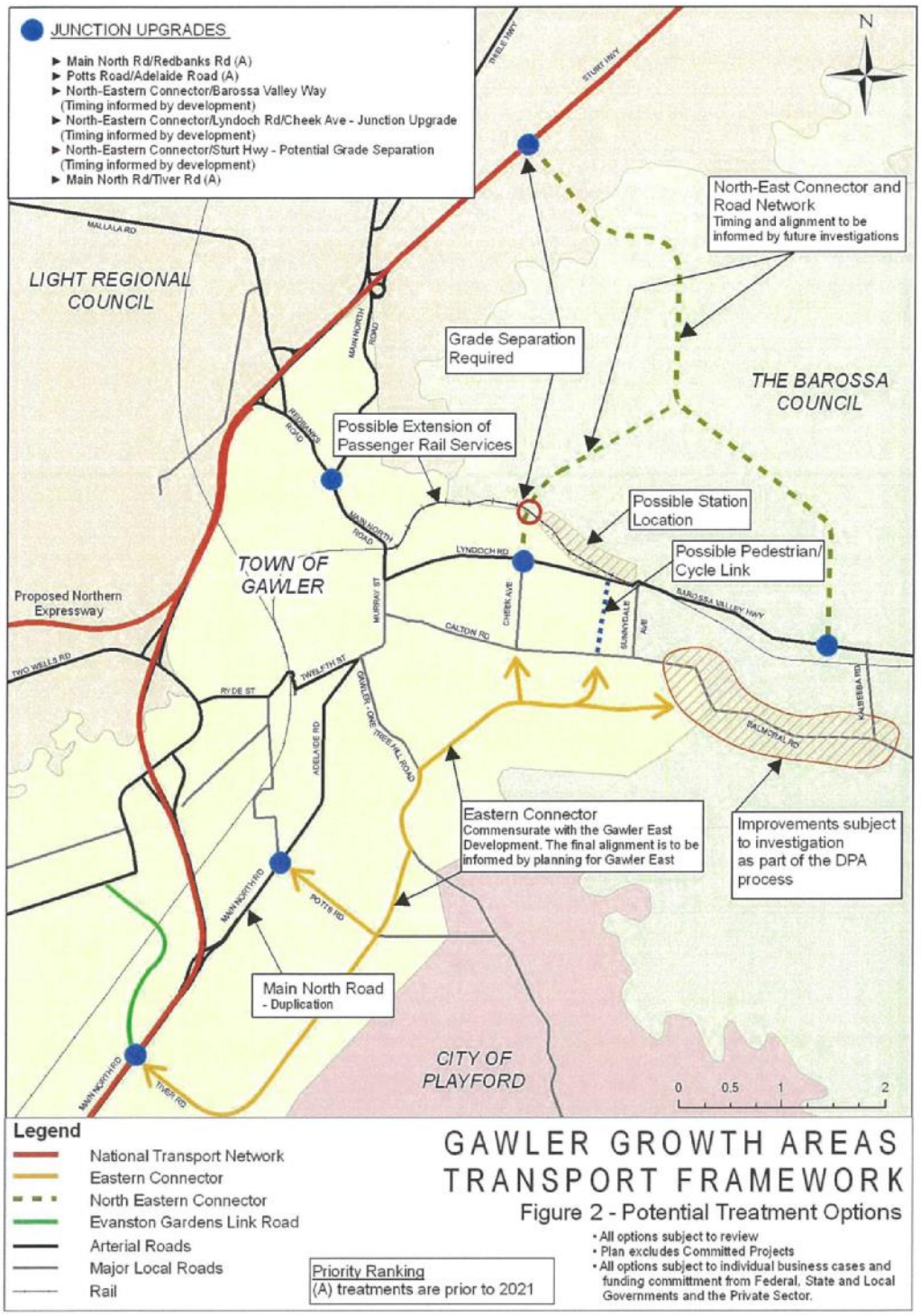
Irrespective of the ultimate development scenario for Concordia, the analysis determined that a north-eastern link would also be required to service the development. While a number of route options were considered, a decision on a preferred route will be subject to the future development of the area. A single connection to the Sturt Highway, and two connections to the Barossa Valley Way (at Cheek Avenue, and to the east of Sunnydale Avenue) is preferred. Construction of these links should occur as part of the development of the Concordia area.

The existing network within Gawler, both arterial and local, will be subject to ongoing review as developments occur to determine the potential scale and timing of major improvements/upgrades. Analysis of the arterial network, as part of this study, has nevertheless identified that Main North Road (between Potts Road and the Western Bypass) will likely need to be duplicated. Given the local nature of the Twelfth Street - Ryde Street link to Two Wells Road, there no intention to encourage increased use of this link through any major road upgrading. DTEI will investigate potential traffic calming measures in conjunction with the council. In regards to the local road network, there will be a need to identify improvements required as part of the traffic assessment of the Gawler East development.

Figure 2 below shows the potential major treatment options on the network. The delivery of justified upgrades identified in this report will depend on securing the necessary funds on a case-by-case basis from the Federal, State and Local Governments, as well as the private sector. These potential improvements do not replace the potential smaller scale improvements identified in the draft Road Management Plan for Main North Road and Adelaide Road (prepared by DTEI).

Consideration of improvements to the public transport system will be included as part of the Master Planning for the Future Public Transport Network being undertaken by the State Government. Further investigations into the costs and benefits of extending the public transport services to a new station to the east of Gawler will also be carried out.

Disclaimer: Although every effort has been made to ensure the accuracy of the statistical information included in this report, the Department for Transport, Energy and Infrastructure, its divisions and employees make no representations, either expressly or implied, that the information is accurate or fit for any purpose and expressly disclaims all liability for loss or damage arising from the reliance upon the information with it.



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7. Summary and Recommendations

There has been considerable work already undertaken addressing the likely traffic generation associated with various development areas around Gawler and alternative road network scenario. The DTEI Draft Gawler Growth Areas Transport Framework outlines the most likely road and transport scenario taking into account the impacts of all development areas.

The community is very concerned over the likely impacts of the developments on existing road network, and the 'style of living' that Gawler current provides. The community is also frustrated over the lack of consultation on the future 'macro' road and transport impacts of all possible development areas.

Our assessment has been prepared on the assumption that the DPA gets approval and the development proceeds. Our assessment should not be considered support or otherwise for the development.

Preliminary estimates indicate that the Gawler East and Environs development area could generate over 30,000 vehicle trips per day. There is no one single best solution to managing this traffic, or any other additional traffic generated around the DPA site (including the Evanston South/Gardens or Concordia sites).

This report has been prepared to assist Council respond to the Gawler East and Environs DPA. Specifically the review was to consider :

- options for minimizing the impacts on Sunnydale Avenue, Cheek Avenue, Balmoral Rd, Calton Rd, Potts Rd; and
- any available information regarding options for new connector roads or adjustments to Bentley Rd from Potts Rd through to Tiver Rd; and Calton and Balmoral Rds through to Lyndoch Rd/Barossa Valley Highway.

The solution to minimising the impact of the development on the existing local road network involves a range of options as outlined below.

1. Reduce the overall scale of the development.

   Detailed consideration should be given to the ultimate traffic volumes across the existing road network and whether they are sustainable and appropriate for the network. This information should be outlined in the DPA and associated structure plan. Additional traffic modelling should be undertaken to consider the impact on the existing local streets with lesser residential development.

2. Ensure the development includes adequate provision for cycling and walking

   The provision of cycling and walking corridors should be integral within the DPA structure plan to ensure that a safe and convenient alternative for local trips.

3. Ensure the development provides for public transport routes and interconnectivity with rail local and long distance trips

   The provision of public transport for local and longer distant trips should also be integral to the development, rather than relying on the common premise of relying on private motor vehicle usage.

4. Further consideration to the benefit of a SE bypass (along Somerton Road) and directing traffic to the east-north and south rather than west into Gawler Town Centre.

   This option should be considered once the alignment of the local distributor road within the development area is established. While the bypass will better serve through traffic movements between the east and south, consideration should be given to establishing some connectivity between the route and the development area to lessen the traffic loads on other existing routes. While this option may not be justified by the Gawler East and Environs Development area, it may be justified with any future development of the Concordia area to the north.

5. Disperse traffic to the north using Cheek Avenue, Sunnydale Avenue, Balmoral Road (and potentially the Electricity Corridor)

   Traffic volumes to the north of the site should be dispersed between Cheek Avenue (major collector), Sunnydale Avenue (minor collector) and a new connection to Balmoral Road . The potential use of the electricity corridor should also be explored further to minimise the amount of traffic that must use either Cheek Avenue or Sunnydale Avenue.

6. Use of existing linkages to the west.

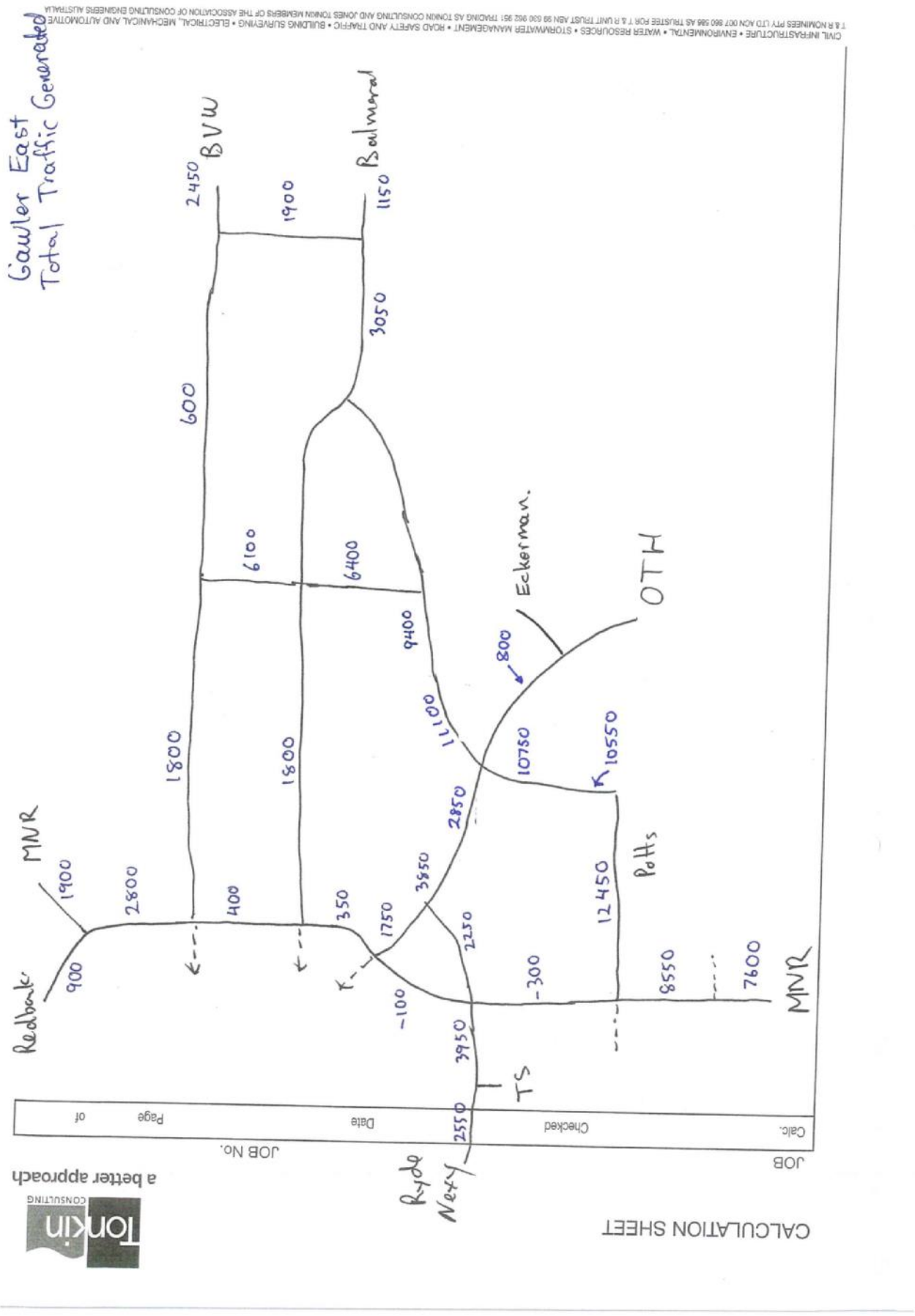
   Current options along One Tree Hill Road – Seventh Avenue and Potts Road will need to be upgraded to accommodate additional traffic movements between the development site, Main North Road and the Gawler Town Centre.

7. Develop a new connection to the south most likely along Bentley – Tiver alignment.

   Subject to the alignment of the eastern distributor road within the DPA structure plan, and any discussion concerning the potential development of the SE Bypass route, Bentley Road and Tiver Road may need to be upgraded to a major collector route to facilitate traffic movements between the development area and the southern areas. Further consider the realignment of the road to the eastern side of the water pipe between Potts Road and Alexander Avenue.

Appendix C

Maps of Traffic Distribution


Gawler East
Total Traffic Generated
BVW
Balmoral
Eckerman.
OTH
MNR
Redbank
Ryde Nexy
TS
Potts
2450
1900
1150
3050
600
6100
6400
9400
800
1800
1800
11100
10750
10550
2850
3850
12450
1900
2800
400
350
1750
2250
900
-100
-300
8550
7600
3950
2550
CIVIL INFRASTRUCTURE • ENVIRONMENTAL • WATER RESOURCES • STORMWATER MANAGEMENT • ROAD SAFETY AND TRAFFIC • BUILDING SURVEYING • ELECTRICAL, MECHANICAL AND AUTOMOTIVE
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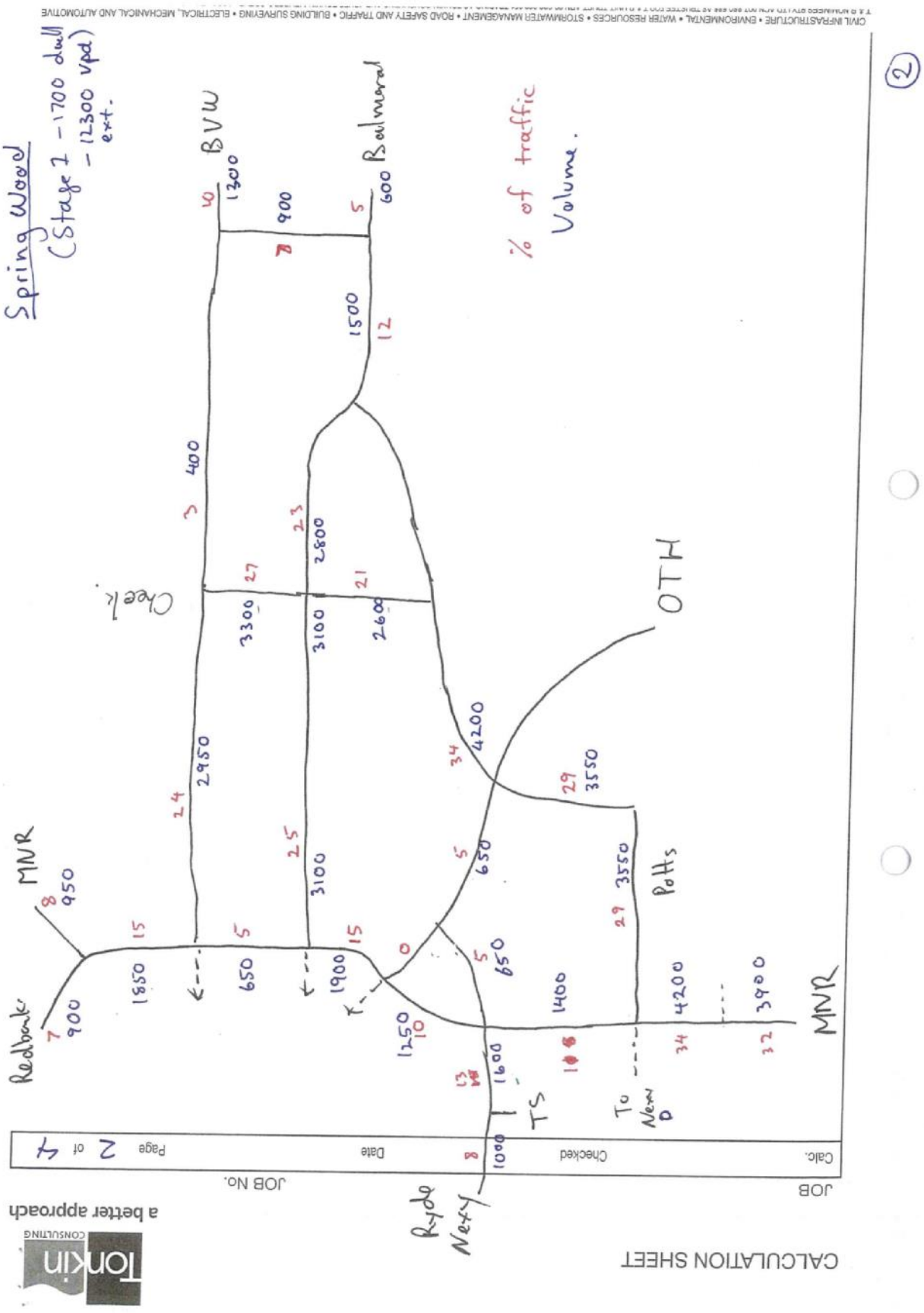
Spring Wood
(Stage 1 - 1700 dwell
- 12300 vpd)
ext.
% of traffic
Volume.
BVW
Boulevard
Creek
OTH
MNR
Redbank
PoHs
MNR
Ryde
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TS
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Page 2 of 4
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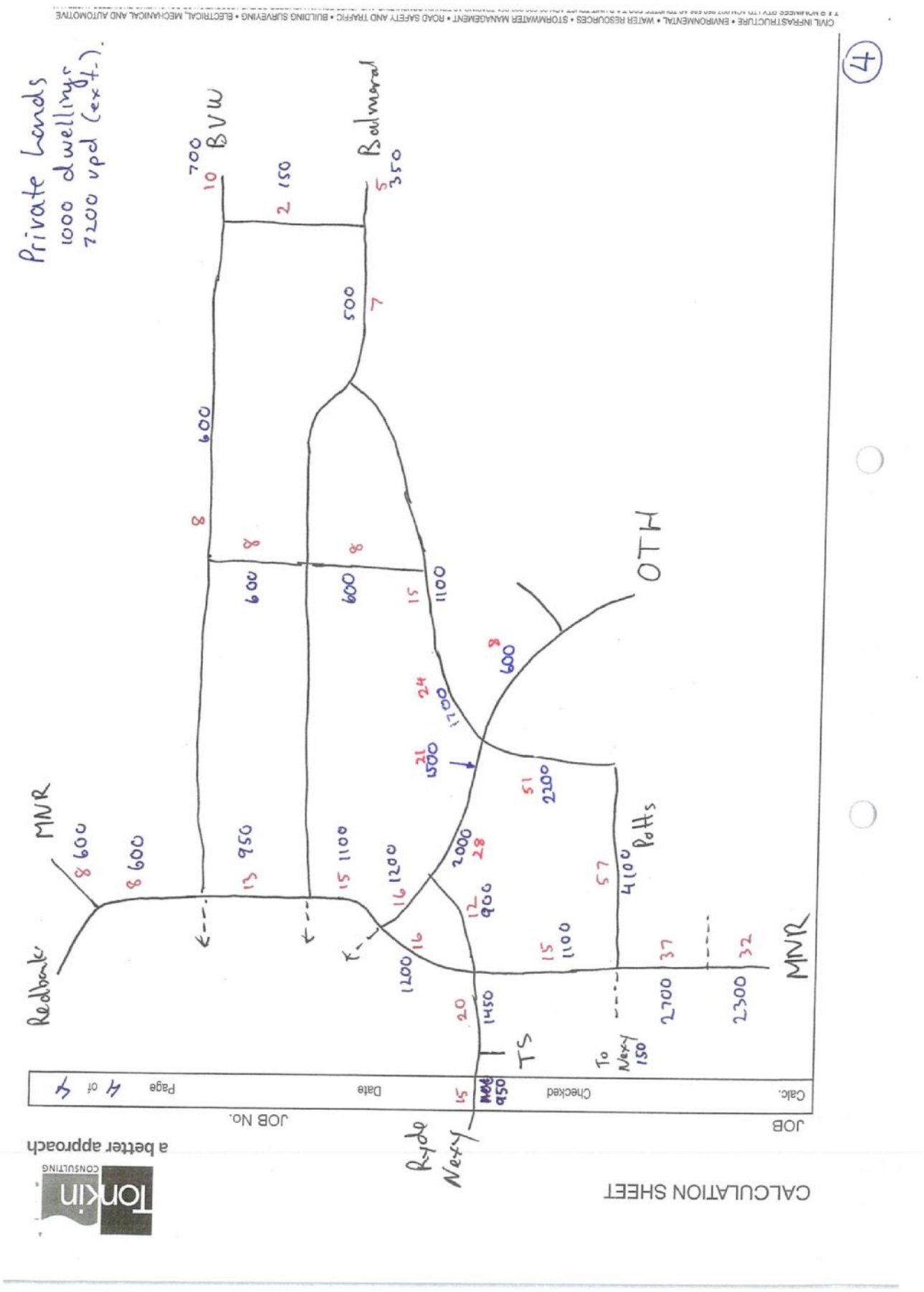
Private Lands
1000 dwellings
7200 vpd (ext.)
BVW
Balmoral
OTH
MNR
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Ryde Nexy
TS
To Nexy 150
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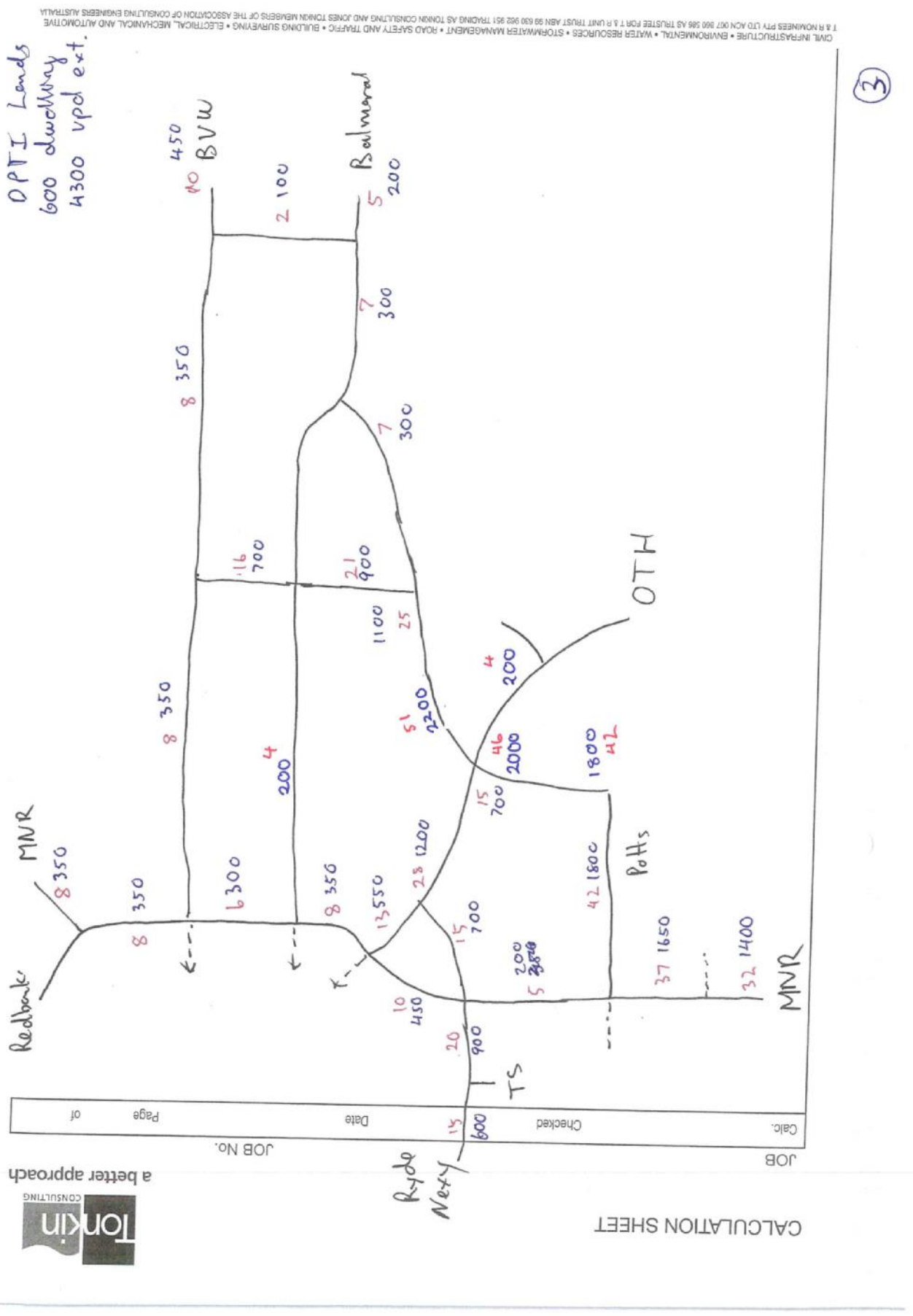
OPTI Lands
600 dwelling
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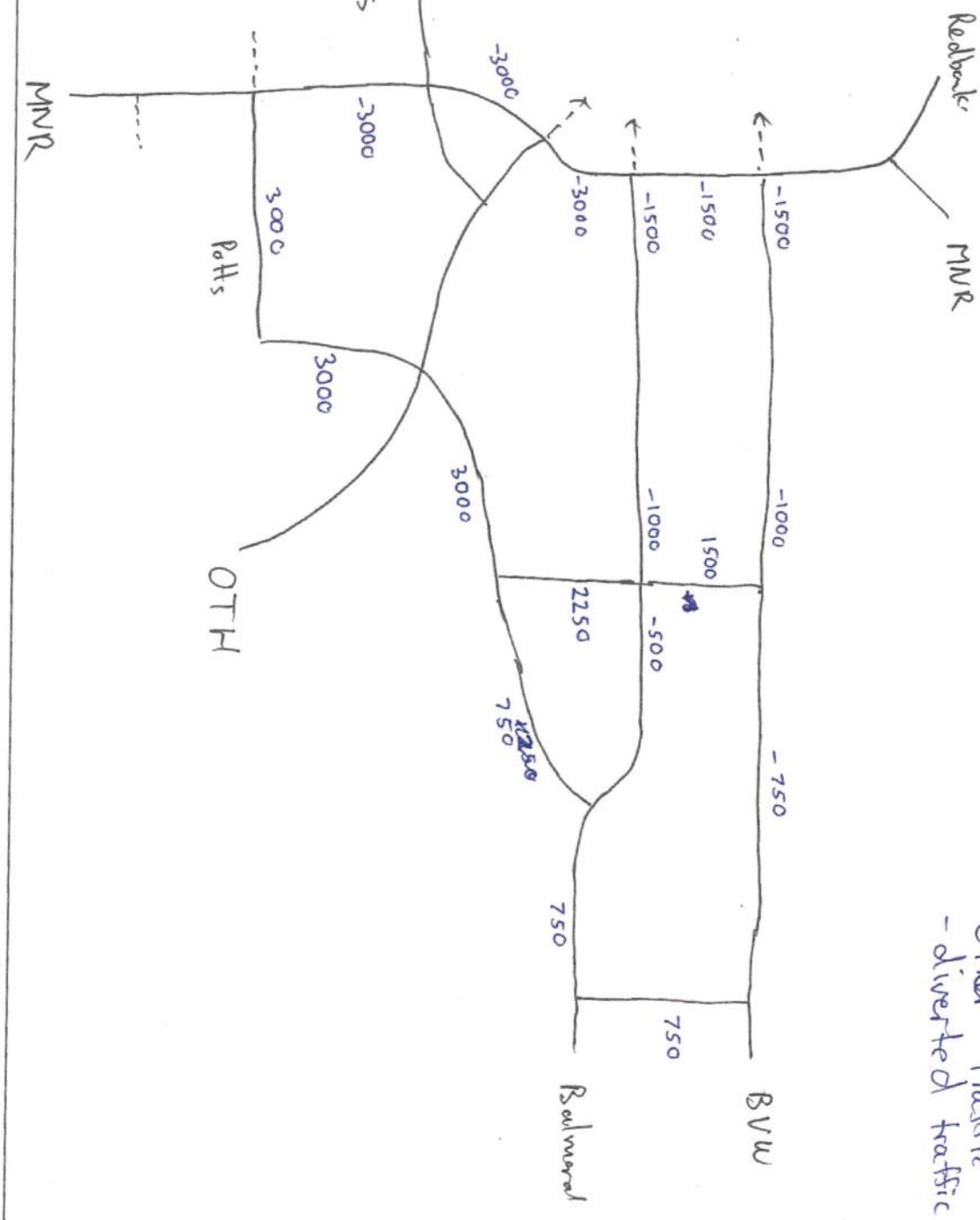


Appendix D

One Tree Hill Road Assessment

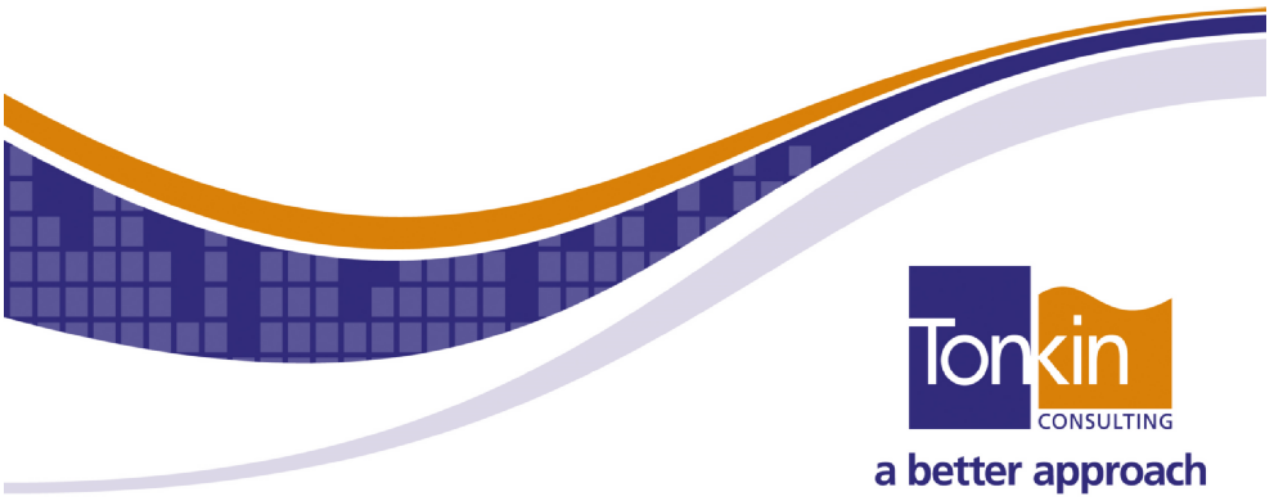
One Tree Hill Road Intervention Upgrade

Investigations Report

Town of Gawler

June 2018

Ref No. 20180592R002C



Document History and Status

Rev	Description	Author	Reviewed	Approved	Date
A	Draft For Client Comment	PZ/RB	RB	RB	15 November 2016
B	Final	PZ/RB	RB	RB	January 2017
C	Update to incorporate new Link Road alignment	RB	PZ	RB	June 2018

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Contents

1 General Discussion 1
1.1 Background 1

2 Existing Conditions 2
2.1 Cross Section and Alignment 2
2.1.1 Seventh Street 2
2.1.2 Riggs Hill Road 2
2.1.3 One Tree Hill Road 4
2.2 Pavements 6
2.3 Stormwater 8
2.4 Lighting 8
2.5 Pedestrian, Cycling and Public Transport Network 8
2.6 Parking 9
2.7 Traffic Volumes and Crash Data 9
2.8 Functional Classification 10

3 Future Road Development 11
3.1 Future Development and Operation 11
3.2 Future Road Hierarchy 12
3.3 Junctions to One Tree Hill Road 12

4 Treatments 13
4.1 Design Speed 13
4.2 Cross Sectional Alignment 13
4.3 Pavement 14
4.4 Stormwater 14
4.5 Lighting 14
4.6 Pedestrian and Cycling 15

5 Recommendation 16

Tables

Table 2.1 Crash data 9
Table 2.2 Town of Gawler Road Classification Guidelines 10

Figures

Figure 1.1 Subject Site 1
Figure 2.1 Seventh Street at the intersection with Fifth Street, looking south 2

Figure 2.2	Looking south along Riggs Hill Road from Seventh Street and the side entry pit located at the start of Riggs Hill Road on the western side	3
Figure 2.3	Unsealed shoulder on eastern side looking south along Riggs Hill Road and a steep slope adjacent to the unsealed shoulder	3
Figure 2.4	Wide unsealed shoulder and stobie poles on eastern side of Riggs Hill Road looking south	4
Figure 2.5	Looking south along One Tree Hill Road from the Gawler Terrace junction and looking south along One Tree Hill Road after Gawler Terrace	4
Figure 2.6	BAR treatment for the right turn into Filsell Terrace and a left turn storage lane for southbound traffic into Filsell Terrace	5
Figure 2.7	Junction with Eckerman Avenue looking south along One Tree Hill Road and a Telstra pit located on the northern shoulder	5
Figure 2.8	Junction with One Tree Hill Road looking west along Eckerman Avenue toward One Tree Hill Road	6
Figure 2.9	Sight distance from Eckerman Avenue looking south onto One Tree Hill Road and looking north onto One Tree Hill Road	6
Figure 2.10	General deterioration of the parking bays on Seventh Street	7
Figure 2.11	Ravelling of the travel lane and an example of some crazing observed in the travel lane	7
Figure 2.12	Two example of pavement edge damage which was consistently present throughout the subject site	8
Figure 2.13	Two example of pavement edge damage which was consistently present throughout the subject site	9
Figure 3.1	Future traffic volumes as a result of the Gawler East development (does not include existing traffic volumes)	11
Figure 4.1	Treatment plan	15

1 General Discussion

1.1 Background

The Town of Gawler have identified that an intervention assessment of Seventh Street, Riggs Hill Road and One Tree Hill Road is required to understand what upgrade is required to these roads between Eckerman Avenue and Fifth Street, due to development of the Link Road and associated Gawler East rezoning.

Previous investigations have identified a range of interventions on the local and arterial road network to support the proposed Gawler East development, including the highlighted roads in Figure 1.1. These interventions were based on investigations undertaken in 2010 based on assumptions of growth and future development at that time. A number of these have changed and the interventions need to be revisited to determine whether they are still valid. A similar investigation has recently been undertaken by Tonkin Consulting for Potts Road.

This report presents a review of the existing nature of One Tree Hill Road as part of the Gawler network, and the necessary interventions required for upgrade as a result of future developments and an increase in traffic volumes. Particular focus will be given to the section of road spanning Seventh Street, Riggs Hill Road and One Tree Hill Road, located between Eckerman Avenue and Fifth Street, due to impact from increased residential development as part of the Gawler East rezoning.

Figure 1.1 outlines the subject site.

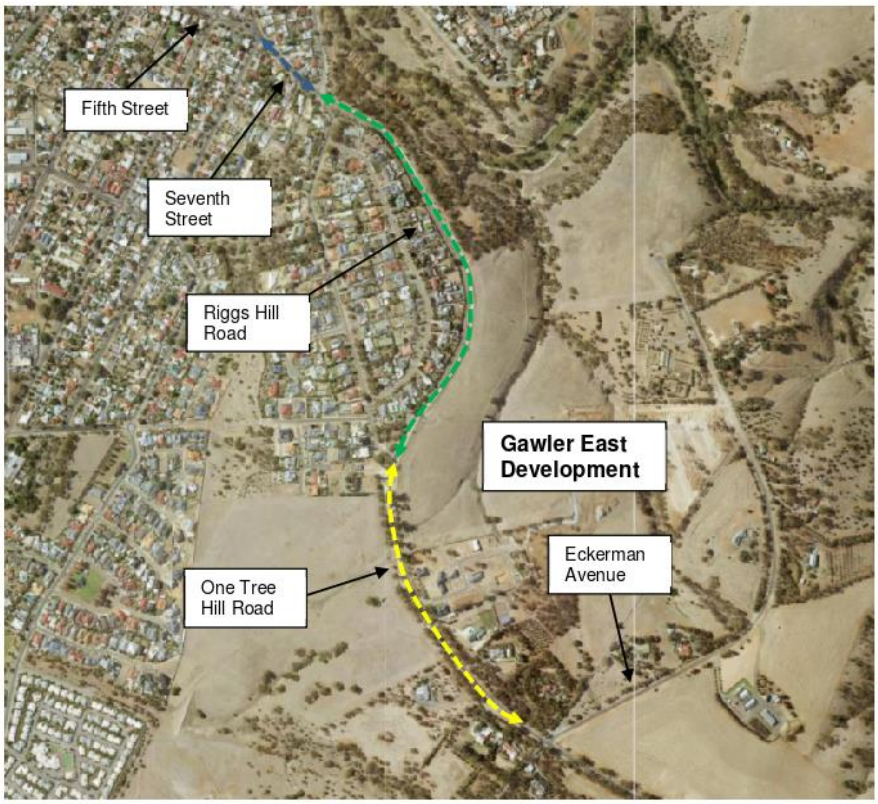

Figure 1.1 Subject Site

2 Existing Conditions

This section outlines the existing conditions of the subject site.

2.1 Cross Section and Alignment

The roads in the subject site are sealed two-way single carriageways (one lane in each direction), with One Tree Hill Road providing a connection between Gawler South and Golden Grove.

2.1.1 Seventh Street

Seventh Street has a posted speed limit of 50km/h and provides for a sealed 12.2m carriageway, comprising of 2.3m parking bays on each side of the road and 3.45m travel lanes. This section of road provides for residential dwellings adjacent to the road with a number of property access points. Overhead power is provided on the west side of the road with some street lighting also provided.

Figure 2.1 Seventh Street at the intersection with Fifth Street, looking south

2.1.2 Riggs Hill Road

Riggs Hill Road continues from Seventh Street and has a sign posted speed limit of 50 km/hr to approximately 150m south of Seventh Street, and the 80km/h thereafter. A short length of kerbing south of the junction provides for a carriageway width of 7.0m. Beyond the kerbing the road narrows to 6.6m with unsealed shoulders. Overhead power and roadside street lighting also ends at this location. There is a side entry pit located on the west side of Riggs Hill Road at the end of the kerbing (Figure 2.2).

There is approximately 2.2m of unsealed shoulder on the eastern side of the road, with limited space provided for a shoulder on the western side (Figure 2.3). At the bend adjacent to the 80km/h speed sign and for approximately 200m further south, there is a steep slope adjacent to the eastern unsealed shoulder (Figure 2.3).

There are also delineation guide posts located on the eastern side of the road.

Figure 2.2 Looking south along Riggs Hill Road from Seventh Street and the side entry pit located at the start of Riggs Hill Road on the western side

Figure 2.3 Unsealed shoulder on eastern side looking south along Riggs Hill Road and a steep slope adjacent to the unsealed shoulder

Riggs Hill Road then curves to the right with a large section of unsealed shoulder approximately 5.5m wide (Figure 2.4). Between this point of Riggs Hill Road and Gawler Terrace there is approximately 3.9m of unsealed shoulder provided on the eastern side, which is then bounded by a property fence line (Figure 2.4).

Two stobie poles are located prior to Gawler Terrace on the eastern side of Riggs Hill Road. The larger stobie pole is located approximately 3.9m from the edge of road and the smaller stobie pole is located approximately 6.8m from the edge of road. The road width is approximately 6.5m from edge of seal to edge of seal.

No overtaking is permitted on Riggs Hill Road at any location.

No safety barriers are provided along Riggs Hill Road.

Figure 2.4 Wide unsealed shoulder and stobie poles on eastern side of Riggs Hill Road looking south

2.1.3 One Tree Hill Road

One Tree Hill Road continues south from Riggs Hill Road. There is a 2.7m wide left turn storage lane for northbound traffic turning into Gawler Terrace which is approximately 65m in length. One Tree Hill Road is orientated in a north-south direction with a width of approximately 7.3m from edge of seal to edge of seal. The speed zone along One Tree Hill Road is 80km/hr.

Unsealed shoulders of varying widths are provided on the both sides of the road due to the location of trees and other vegetation (Figure 2.5).

Figure 2.5 Looking south along One Tree Hill Road from the Gawler Terrace junction and looking south along One Tree Hill Road after Gawler Terrace

One Tree Hill Road then forms a junction with Filsell Terrace as part of the Woodvale development. A BAR treatment has been provided for northbound right turning vehicles into Filsell Terrace, with a left turn storage lane provided for southbound vehicles (Figure 2.6). Kerbing is provided on the east side of One Tree Hill Road with associated side entry pit (Figure 2.6). Target street lighting is provided at this junction.

Figure 2.6 BAR treatment for the right turn into Filsell Terrace and a left turn storage lane for southbound traffic into Filsell Terrace

One Tree Hill Road then forms an unsignalised junction with Eckerman Avenue. A Telstra pit is located on the northern shoulder (Figure 2.7). The westbound lane on Eckerman Avenue widens when it meets One Tree Hill Road and there are two property access points also opposite the junction (Figure 2.8).

Figure 2.7 Junction with Eckerman Avenue looking south along One Tree Hill Road and a Telstra pit located on the northern shoulder

Figure 2.8 Junction with One Tree Hill Road looking west along Eckerman Avenue toward One Tree Hill Road

Sight distance was assessed based on the requirements outlined in the Austroads Guidelines. Safe Intersection Sight Distance (SISD) to the south is considered acceptable, with SISD to the north considered unacceptable due to roadside vegetation obscuring southbound traffic (Figure 2.9).

Figure 2.9 Sight distance from Eckerman Avenue looking south onto One Tree Hill Road and looking north onto One Tree Hill Road

2.2 Pavements

There is no existing pavement asset data available for One Tree Hill Road.

A site inspection was undertaken to observe the existing condition of the pavement. Key observations included:

- General degradation of the parking bays on Seventh Street.
- General ravelling in sections of Seventh Street, Riggs Hill Road and One Tree Hill Road was observed.
- Crazing of the pavement in some sections, particularly in the outer wheel path of both lanes of Riggs Hill Road.

- There was consistent edge break and edge deterioration along the pavement in the subject site
- Wide unsealed shoulder areas are generally in good condition

Overall the pavement on Seventh Street, Riggs Hill Road and One Tree Hill Road (between Fifth Street and Eckerman Avenue) was in satisfactory condition. However, the pavement edge consistently showed signs of deterioration, edge break and general damage. This is particularly so on the downhill lane where there is no sealed shoulder provided along its length with associated crazing.

It is anticipated that the pavement condition will worsen over time if the existing distressed areas are not rehabilitated and the shoulders not improved / sealed.

An increase in traffic volumes due to additional residential development in the Gawler East region could have further detrimental effects on the pavement condition.

Figure 2.10 General deterioration of the parking bays on Seventh Street

Figure 2.11 Ravelling of the travel lane and an example of some crazing observed in the travel lane

Figure 2.12 Two example of pavement edge damage which was consistently present throughout the subject site

2.3 Stormwater

There is minimal stormwater infrastructure throughout the subject site. Stormwater runoff flows north along Seventh Street and is collected by side entry pits beyond the subject site in this direction.

Runoff on the western side of the start of Riggs Hill Road is collected by a side entry pit before Seventh Street, and runoff on the eastern side of Riggs Hill Road falls off the road and into the adjacent land.

Runoff on One Tree Hill Road is directed to fall off both sides of the road into the adjacent land, except at the Filsell Terrace junction where a side entry pit is located on the eastern side of One Tree Hill Road.

2.4 Lighting

Minor street lighting is provided along Seventh Street as individual poles and integrated with the overhead power stobie poles.

No lighting is provided on Riggs Hill Road.

Lighting is provided at the junction with Filsell Terrace on One Tree Hill Road.

2.5 Pedestrian, Cycling and Public Transport Network

Pedestrian and cycling connectivity along the subject site is limited. There are no dedicated bicycle lanes along the subject site resulting in cyclists sharing the carriageway with vehicles.

There is a dedicated footpath on the west side of Seventh Street with no footpath provided on the east side.

Reference to the 'Town of Gawler Walking and Cycling Plan 2008' and site inspection showed there is an existing off road path to the east of Riggs Hill Road used by both pedestrians and cyclists. The plan then indicates the off road route joins to One Tree Hill Road at 'Dead Man's Pass', before continuing along the east side of One Tree Hill Road before crossing the road prior to Gawler Terrace. The site inspection however did not indicate an obvious crossing point at this location (Figure 2.13).

Figure 2.13 Two example of pavement edge damage which was consistently present throughout the subject site

There is no formal bus route along this road.

2.6 Parking

Dedicated on street parking is provided on both sides of Seventh Street, approximately 2.3m wide. There is no dedicated parking on Riggs Hill Road however a wide verge provided on the eastern side would allow a vehicle to pull over out of the path of through traffic.

One Tree Hill Road does not provide for any on street parking, however there are areas where parking may be undertaken within the verge.

2.7 Traffic Volumes and Crash Data

Traffic volumes on the roads under investigation were obtained from DPTI, indicating an Annual Average Daily Traffic (AADT) of 2,100vpd. Crash data during 2010 – 2015 was obtained from the LocationSA website along the, with Table 2.1 below summarising the crash data.

Table 2.1 Crash data

Location	Crashes	Casualty	Fatalities
Seventh Street – Between Fifth Street and Riggs Hill Road	1	0	0
Riggs Hill Road	2	1	0
One Tree Hill Road	4	4	0

The four crashes with casualties recorded on One Tree Hill Road were made up of two hit fixed object and two leaving the road.

2.8 Functional Classification

The 'Town of Gawler Land Development Engineering Standards Guidelines, Standards and Requirements for Land Development and Land Division' define the existing Town of Gawler road hierarchy based on the following parameters outlined in Table 2.2.

Table 2.2 Town of Gawler Road Classification Guidelines

Road Classification	Design Speed (km/h)	Reserve Width (m)	Verge Width (m)	Footpath Width (m)	Minimum Pavement Width (m)	Dedicated on street parking (No. of)	Cycle Lane
Collector Road 1	60	25	5	1.5 or 1.8	15	2	Dedicated cycle lane
Collector Road 2	60	22	5	1.5 or 1.8	12	2	Shared path
Residential (local) Road	50	15.4	4	1.2 or 1.5	7.4*	0	Carriageway
Access Road	50	11.2	3.70	0 or 1.2	7*	0	Carriageway
Cul-de-sacs	40	40.2	3	0 or 1.2	36	0	Carriageway

Based on the information in Table 2.2 and the 'Draft Transport and Traffic Management Plan 2014', the roads in the subject site could be classified within the **existing road hierarchy** of Gawler as the following:

- Seventh Street – Collector Road 1 (Council)
- Riggs Hill Road – Collector Road 1 (Council)
- One Tree Hill Road – Collector Road 1 (Council)

3 Future Road Development

3.1 Future Development and Operation

This assessment assumes full development of the Gawler East rezoning and the implementation of the Gawler East Link Road (GELR). Council has approved the DPTI alignment as the preferred GELR alignment and is shown in Figure 3.1. A roundabout will be constructed at the intersection with the GELR and One Tree Hill Road.

Future traffic volumes on One Tree Hill Road are expected to be generated from the following developments:

- Springwood (Gawler East Stage 1)
- DPTI land area
- Private land areas (including Woodvale)

The expected additional traffic volumes directed onto One Tree Hill Road are shown in Figure 3.1. The future traffic volumes as a result of the above developments are expected to range from 2,500vpd to 4,000vpd, depending on the number of dwellings constructed and location of future access points.

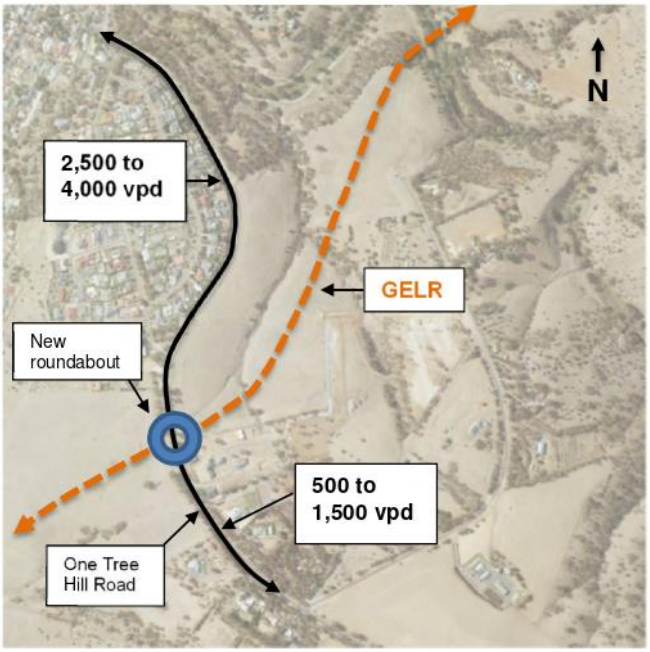

Figure 3.1 Future traffic volumes as a result of the Gawler East development (does not include existing traffic volumes)

Taking into account natural traffic growth (approximately 1% per year) of the existing traffic volumes on One Tree Hill Road, it can be expected in 10 years the existing traffic volumes will grow to approximately 2,200 vpd.

Therefore, expected traffic volumes on One Tree Hill Road in the next 5 – 10 years as a result of natural traffic growth and the Gawler East development could range from **4,700 vpd to 6,480 vpd.**

The predominate driver for upgrading One Tree Hill Road is the expected traffic volumes as a result of the Gawler East development. Particularly as the existing road width of Riggs Hill Road and One Tree Hill Road does not meet the required standards for these roads. In addition, sections of the existing pavement require rehabilitation to address areas of pavement failure.

3.2 Future Road Hierarchy

The 'Draft Transport and Traffic Management Plan 2014' classifies One Tree Hill Road as a Distributor Road, primarily due to the impact of the Gawler East Link Road and Gawler East developments on traffic volumes.

On this basis, the function of One Tree Hill Road would be consistent with a Collector Road as indicated below.

Table 7.2: Future Functional Road Hierarchy Definition

Label	Characteristics	Average Daily Traffic	Care and Control (generally)
Metropolitan	carries through traffic metropolitan-wide origin	Above 35,000	DPTI
Regional	carries traffic of a regional-wide origin	20,000 to 35,000	DPTI
Distributor	carries traffic of a district wide origin	8,000 to 20,000	Town of Gawler
Collector	carries traffic of a neighbourhood wide origin	3,000 to 8,000	Town of Gawler
Local	carries local traffic from immediate streets	Below 3,000	Town of Gawler

This is considered to be equivalent to a Collector 2 road as indicated in Table 2.2.

3.3 Junctions to One Tree Hill Road

As part of the GELR and Gawler East rezoning, there will be new road connections to One Tree Hill Road from the east and west directions.

Existing junctions on One Tree Hill Road include:

- Gawler Terrace
- Kelly Court (no development at present but will be replaced by the Link Road)
- Filsell Terrace

It is expected that with development of the areas abutting One Tree Hill Road, new junctions will need to be constructed to provide the required access, particularly for the privately owned lands. At this time the location of these new junctions are unknown as development applications have not been approved for lands and there is no formal structure plan for the area. However it is expected new junctions would be required between the roundabout with the Link Road and Eckerman Avenue.

4 Treatments

This section outlines the treatments required in order to upgrade Seventh Street, Riggs Hill Road and One Tree Hill Road to accommodate future traffic volumes, improve connectivity and repair areas of damage/deficiency.

Investigation into the existing operation of the roads within the subject site has yielded some deficiencies that require upgrade. These include:

- Generally satisfactory pavement condition with deficiencies in some areas including deteriorated parking bays on Seventh Street, ravelling/cracking/crazing in various sections of the travel lane (mainly outer wheel paths), and consistent poor pavement edge condition. Increasing traffic volumes without the Gawler East development will continue the deterioration process if no pavement treatment was implemented.
- There is no dedicated off road shared use path throughout Riggs Hill Road / One Tree Hill Road which results in providing poor pedestrian connectivity. Crossing points are poorly defined.
- Lack of a safety barrier along Riggs Hill Road.

The existing pavement condition suggests the road is not in immediate need of major repair. There is a need to rehabilitate areas of significant crazing along the existing outer wheel path on Riggs Hill Road. Future development of the Gawler East area is expected to accelerate pavement deterioration, hence upgrade should be implemented before damage to the pavement is able to worsen from an increase in traffic volumes.

The proposed upgrading will be undertaken in two sections; Seventh Street and Riggs Hill Road / One Tree Hill Road as one segment.

4.1 Design Speed

The current speed limit is predominantly 80km/hr from Seventh Street through to Eckerman Avenue along One Tree Hill Road. East of Eckerman Avenue the speed limit increases to 100km/hr.

The increase in development proposed for the area together with the new roundabout at the One Tree Hill Road / Link Road intersection suggests that the speed limit for the road should be reviewed.

It is recommended that once the Gawler East Link Road is completed the speed zone between Seventh Street and Eckerman Avenue should be reduced to 60 km/hr. It then should increase to 80km/h then to 100 km/hr east of the Eckerman Avenue.

4.2 Cross Sectional Alignment

The proposed cross section will comprise the following;

Seventh Street

- 3.5m wide travel lanes
- 2.3m wide parking lanes
- 1.5m wide footpath on east side

Riggs Hill Road / One Tree Hill Road

- 3.5m wide travel lanes
- 1.0m wide sealed and 1.0m wide unsealed shoulder on both sides of the roads. In areas of cutting the unsealed shoulder could be replaced by a spoon drain or similar.

- 2.5m wide shared path on east side along Riggs Hill Road with a defined crossing point at Gawler Terrace. Shared path to continue south from existing access to Dead Man's Pass along One Tree Hill Road, providing a connection to Eckerman Avenue.
- The installation of a safety barrier on the east side of Riggs Hill Road adjacent to a steep batter slope should be investigated further.

As indicated in Section 3 there is expected to be additional access points along One Tree Hill Road to provide access for future development of the DPTI and privately owned lands. Two options are possible for the treatments at the access points; wide sealed shoulders (BAL / BAR treatments) or channelised junctions. Given that there is uncertainty regarding the location of future access points and the speed zone is expected to be 60km/hr, the provision of a wide sealed shoulder is considered appropriate. In addition, the provision of sealed shoulders allows flexibility with widths where vegetation impact could be an issue.

4.3 Pavement

The pavement condition is generally satisfactory with some deficiencies primarily on Seventh Street and Riggs Hill Road. It is recommended to upgrade the road in two stages, with the first being an interim treatment, and once the Gawler East rezoning is close to completion with higher traffic volumes, an ultimate treatment can be undertaken.

Interim treatment

- Provide 1m wide sealed (14/5 double seal) shoulders on Riggs Hill Road and One Tree Hill Road. This may require some earthworks cut on the west side of Riggs Hill Road.
- Rehabilitate the existing failed areas of the outer wheel paths. This should be undertaken in conjunction with the widening indicated above.
- Reseal the existing roadway with a 14/5 double seal.

Ultimate treatment

- Full pavement reconstruction with a typical 50mm AC10 surface and 325mm granular pavement depending on condition of pavement at full development.

4.4 Stormwater

No change required for Seventh Street, Riggs Hill Road or One Tree Hill Road.

If dwellings are constructed fronting One Tree Hill Road, then the appropriate kerbing and underground drainage should be implemented.

4.5 Lighting

It is proposed to upgrade the lighting for Seventh Street to achieve the V3 lighting standard required for this road by either upgrading existing luminaires or constructing new 10.5m high poles at 40m spacing's.

Lighting to be implemented at the One Tree Hill Road / Gawler Terrace junction and to achieve the V3 lighting standard, which will also light the formalised pedestrian / cycling crossing point.

Lighting to be implemented at the Eckerman Avenue / One Tree Hill Road junction and to achieve the V3 lighting standard.

Lighting to be provided along the shared path to the relevant standard (refer AS1158).

Lighting is currently provided at the Filsell Terrace / One Tree Hill Road junction and is assumed to be of the relevant standard. If not the lighting is to be upgraded.

4.6 Pedestrian and Cycling

Footpaths will be provided on both sides of Seventh Street at 1.5m wide.

On the east side of Riggs Hill Road where the existing shared use path joins at Dead Man's Pass, it is proposed to extend the shared path south along the east side of Riggs Hill Road and provide a formalised crossing point over the road at the Gawler Terrace junction. The shared path can then continue south along One Tree Hill Road on the western side providing a connection to Eckerman Avenue.

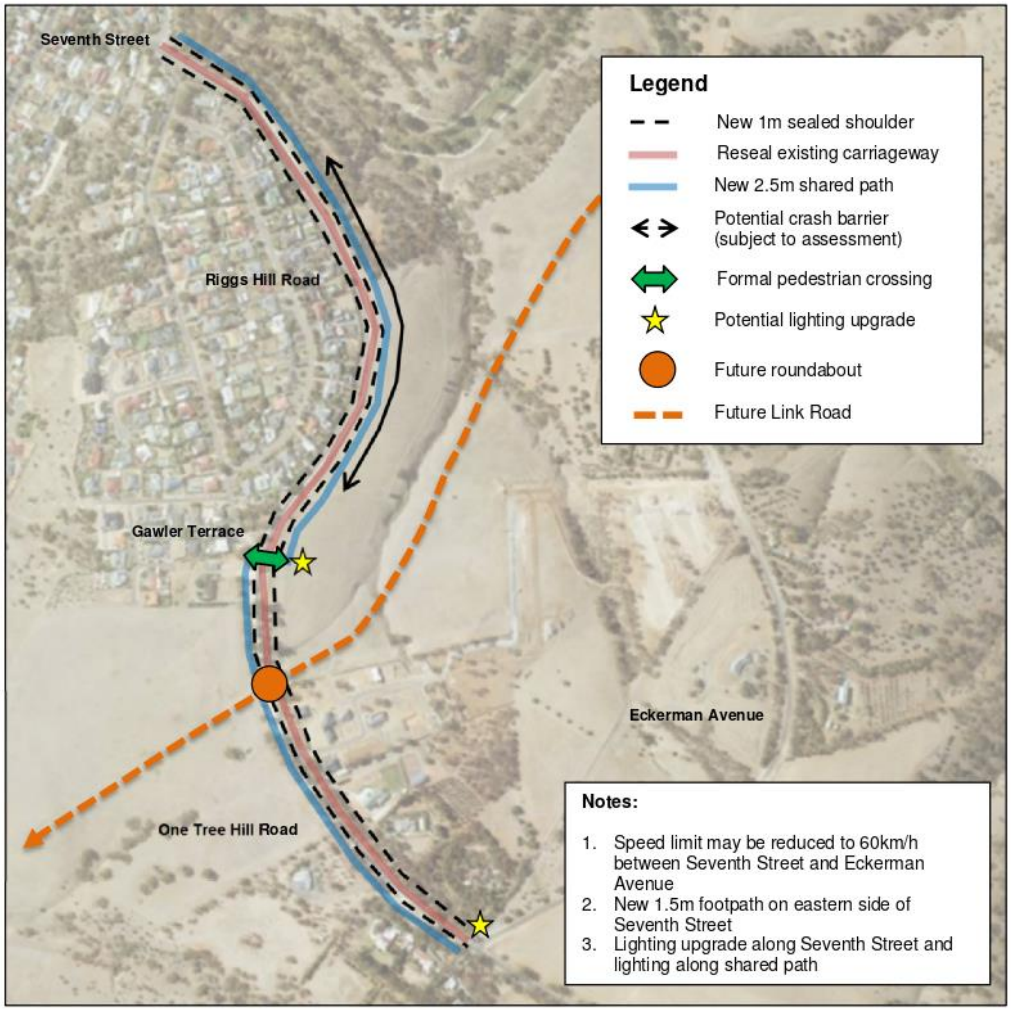

Figure 4.1 Treatment plan

5 Recommendation

The roads within the subject site are generally in satisfactory condition. However, there are various deficiencies that require upgrading to cater for the existing and expected future traffic volumes due to the Gawler East development and associated works.

A review of the road hierarchy and traffic volumes indicated that Seventh Street, Riggs Hill Road and One Tree Hill Road would function as a Distributor Road in the future (refer Draft Transport and Traffic Management Plan 2014), which is equivalent to a Collector Road as outlined in Table 2.2.

The speed limit of Riggs Hill Road and One Tree Hill Road up to Eckerman Avenue should be reduced from 80km/h to 60km/h due to the increase in traffic volumes and level of development within the area.

Based on the requirements indicated in Table 2.2 for a Collector Road the following cross section would be required for Seventh Street, Riggs Hill Road and One Tree Hill Road where there is access by abutting residential properties.

Travelling lane	3.5m wide
Parking lane	2.3m wide
Footpaths	1.5m wide on west side
	1.5m wide on east side

Where there is no access by abutting residential properties there is no requirement for parking lanes. In this instance, a 1.0m wide sealed and 1.0m wide unsealed shoulder on each side of the road should be provided. Where the road is in cut the unsealed shoulder should be replaced by a spoon drain or similar.

Installation of a safety barrier on the east side of Riggs Hill Road from Seventh Street to Dead Man's Pass should be investigated and implemented if justified according to Austroads / DPTI guidelines.

The footpath on the east side would form a shared path at Riggs Hill Road which would then connect to One Tree Hill Road and continue to Eckerman Avenue.

Improvements to the pavement condition and street lighting are also required for Seventh Street, Riggs Hill Road and One Tree Hill Road. The pavement widening works and pavement rehabilitation should be undertaken simultaneously.

Appendix E

Potts Road Assessment