GYMPIE TRAFFIC STUDY

FINAL REPORT

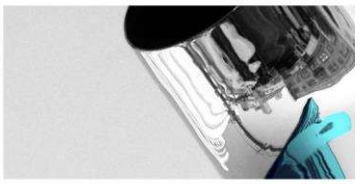
27 SEPTEMBER 2018

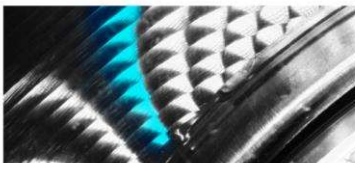
PREPARED FOR:

GYMPIE REGIONAL COUNCIL

GYMPIE REGIONAL COUNCIL

PEKOL TRAFFIC & TRANSPORT





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1.0 INTRODUCTION

1.1 Background

The previous (1996) Gympie CBD Traffic Study included a range of recommendations for improving traffic operations, safety and mobility within the Gympie town centre area. Many of these recommendations have since been implemented. More recently, the Gympie Area Transport Strategy was released by the Department of Transport and Main Roads (TMR) in 2013. Although this strategy focusses on the higher order declared road network, it nevertheless has implications for the Gympie Regional Council (GRC) controlled network.

In the meantime, a number of significant development proposals have been approved (and completed) within the study area, impacting both the GRC and TMR road network. GRC has recently reassessed its trunk road network and is considering establishing a Local Development Area (LDA) at East Deep Creek for industrial uses and has an adopted LDA at Southside for residential uses. TMR is currently progressing the implementation of the next section of the Cooroy to Curra Bruce Highway upgrade (ie the Gympie Bypass) after funding announcements made by the Federal Government.

Accordingly, it was considered timely that GRC updates its previous (1996) traffic study to account for the impact of recent and future development proposals and to incorporate higher-level land use and transport strategies being pursued by GRC and TMR.

1.2 Aim and Objectives

The primary goal of this study was to develop and calibrate a peak period traffic model that GRC could use on an ongoing basis to assess the impact of future land use and transport initiatives on traffic operations around Gympie. This was used to identify and prioritise a series of solutions to current and emerging traffic related issues including:

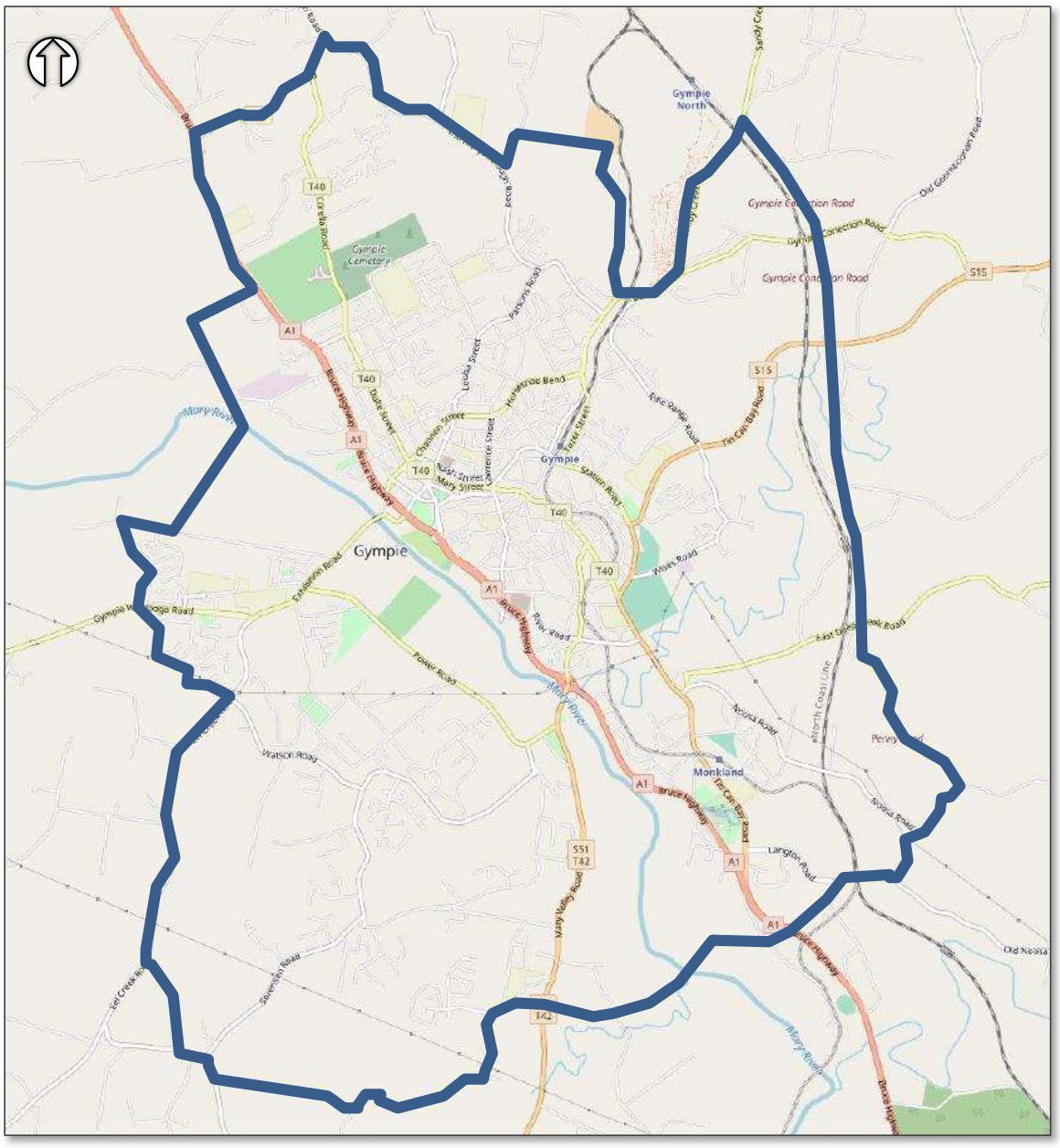
- intersection upgrades
- car parking issues around key facilities
- active transport (ie walking and cycling) routes
- potential new routes
- local area traffic management (rat running) on selected local streets
- other local investigations, including local impacts of the new Gympie Bypass

1.3 Study Scope

1.3.1 Geographic Scope

The geographic scope of the study area is shown in Figure 1.1. This is centred on Gympie, and extends to Araluen to the north, Victory Heights to the east, Jones Hill to the south and Southside to the west.

Figure 1.1: STUDY AREA



1.3.2 Temporal Scope

The adopted study base of year 2016 was chosen because it coincided with the availability of GRC's land use data for the region (ie population and employment numbers) and the majority of the recent traffic count information on the local road network. Thereafter, the performance of the study area road network was assessed at five-year intervals (ie 2021, 2026, 2031 and 2036), based on forecast population and employment numbers for the region provided by GRC.

The study brief noted the concentrated nature of travel demands on the local road network, that result in relatively short lived, but high levels of vehicle queuing and delay at key intersections in the study area. To properly account for these critical periods of the day, the study focussed on average weekday traffic operations during the morning (ie 8:00am to 9:00am) and evening (ie 3:00pm to 4:00pm) peak hours.

1.4 Data Sources

Information used in the preparation of this study was drawn from the following sources:

- GRC: traffic count data for local road network, population and employment projections
- TMR: traffic count data for state controlled network, an existing strategic transport model for the region
- PTT: surveys of existing car parking supply and demand around key facilities

1.5 Methodology

The project was undertaken in the following distinct and sequential phases:

- traffic model development
- traffic forecasting
- option testing
- reporting

The work undertaken in each of these phases is discussed in more detail in the following sections.

1.5.1 Model Development and Calibration

The starting point for this phase of the work was GRC's existing strategic transport model for the region, which is implemented in the proprietary modelling software package called EMME. This existing model was updated to increase the level of detail within the study area. This involved adding more road links to the model and disaggregating the traffic zone system to provide a finer level of detail within the study area. An intersection delay capability was also added to better account for the effect of peak period intersection delays on route choice.

Care was taken at this stage to ensure that the new GRC EMME model was compatible with the microscopic traffic model being developed concurrently by TMR for the Cooroy to Curra Bruce Highway upgrade project.

Recent and historic traffic count data collected by GRC and TMR were then input into the model and a matrix estimation process was used to generate morning and evening peak hour trip matrices for the study area road network. The adequacy of the model calibration was assessed against standard measures and reviewed by GRC prior to the next stage of work.

1.5.2 Future Traffic Growth

The growth in peak hour traffic on the study area road network was estimated by adding the additional traffic generated by new development in the study area to the calibrated base year matrices. The former was estimated by applying published peak hour trip generation rates to the projected growth in population and employment, as provided by GRC for the study area.

A spreadsheet based land use scenario editor (or cookbook) was developed to hold the land use data and the assumed peak hour trip generation rates. This cookbook allows GRC to easily and quickly test the impact of alterative land use / trip generation scenarios on the performance of the study area road network.

1.5.3 Option Assessment

Output from the traffic model was used in quantifying the performance of and assessing alternative solutions to a range of intersection and link based issues within the study area. For example:

- intersections: detailed SIDRA intersection models were developed and used to quantify peak hour performance, delays and queue lengths under existing (2016) and future year traffic loads, leading to the identification of recommended treatments for poorly performing locations
- local area traffic management investigations: the EMME model was used to assess the impact various treatments (eg speed humps, partial road closures, intersection modifications etc) targeted at reducing the amount of through traffic on selected local roads within the study area
- potential new routes: the EMME model was used to assess the impact of potential new roads, one-way links and heavy vehicle links, on the peak hour performance of the road network

Other aspects of the road network were assessed without the help of the EMME model, as follows:

- car parking at key facilities: the car parking supply / demand at key locations around the study area was quantified by way of a parking audit and parking patrol survey, which led to the identification of recommended solutions for addressing existing / future under-supply
- active transport: the adequacy of several existing pedestrian and cycle facilities were assessed based on the results of a desktop audit and site visit, leading to recommendations to address any identified short-comings
- local area investigations: a number of site specific investigations were undertaken to identify future requirements to accommodate expected increases in traffic, parking and active travel demands associated with the proposed railyards redevelopment and the Fiveways precinct

1.5.4 Reporting

The inputs, methodology, findings and recommendations associated with this study area were documented in the following two reports:

- Option Testing Report: which includes a detailed assessment of every option assessed during the study and recommended solutions for the more critical elements in the road network
- Final Report: (ie this report) which presents the inputs, methodology, summary, findings and recommendations of the study

2.0 MODEL DEVELOPMENT AND CALIBRATION

2.1 Aim

A new GRC EMME Model was developed to produce morning and evening peak hour traffic volumes on the Gympie network. The calibrated model was used to produce outputs for intersection analysis and to test the impact of potential changes in the network.

2.2 Process

2.2.1 TMR Strategic Network Model

TMR's Strategic Network Model for the region was used as a starting point for this study. The TMR model was calibrated to a different base year, with a coarser level of detail than what this study required. It is understood that the existing TMR model is being used as a starting point for a VISUM microsimulation model being developed by TMR. Therefore, it was considered important to maintain compatibility, at least at the traffic zone level.

2.2.2 Model Zone System

The TMR model zones were used as the base zones for the Gympie model. The zoning system used maintained compatibility with the TMR model by retaining original zone boundaries and disaggregating within these zones. The disaggregated Gympie zones were developed in consultation with GRC and focussed on splitting zones based on different land use and access roads. A naming convention was used to determine how the Gympie zones fit into the TMR model zones. An example of this system is shown in Table 2.1.

Table 2.1: ZONE NAMING CONVENTION

TMR ZONE	GYMPIE ZONES
136	136001
	136002
	136003
	136004
138	138001
	138002
	138003
139	139000

2.2.3 Model Road Network

The TMR model contains major roads in the Gympie network which feed into state controlled roads. The Gympie model contains all roads within the defined study area and key roads leading to / from the study area. The network includes speeds and capacity on all links. Turn bans have also been implemented on relevant intersections to reflect current operational constraints. During the

calibration process, further turn delays were introduced where the model was not adequately replicating observed conditions. This process was conducted in consultation with GRC.

2.2.4 Traffic Count Data

Traffic volume data for morning and evening peak hours was input into the model to create the 2016 base network volumes. This data was obtained from GRC and TMR as outlined in Section 1.4 and as follows:

- TMR Weekly Volume Reports (2017)
- GRC Metrocount data (2001-2017)
- GRC Intersection Turning Volumes (2001-2017)
- TMR Intersection Turning Volumes (2016)

2.2.5 Matrix Estimation Process

The demand adjustment process was undertaken iteratively to calibrate the model. This involved making small changes to intersection turning delays and updating selected traffic count data to better replicate observed peak hour operations.

The calibration achieved an R^2 value of 0.939 in the morning and 0.951 in the evening. This indicates that overall, the model accounts for 94-95% of the variation in the observed traffic count data.

The results of this calibration show that the model volumes correlate more closely with the actual counts for higher volume roads. This is consistent with the expected outcome for a strategic travel demand model such as this. Table 2.2 summarises the average percentage difference between modelled volumes and actual counts for different volume roads. The results show an average percentage difference of 21% for roads carrying more than 50vph in 2016. Typically a strategic transport model is expected to reproduce traffic volumes to within ±30% of the observed values. Therefore, the calibration results for the GRC model are within accepted limits.

Table 2.2: MODELLED COUNT CORRELATION

VOLUME RANGE (vph)	AVERAGE % DIFFERENCE	NUMBER OF LINKS
50-100	30%	291
100-200	21%	252
200-400	12%	249
400-800	9%	56
800+	3%	2
Overall	21%	850

3.0 FUTURE TRAFFIC GROWTH

3.1 GRC Cookbook

A spreadsheet based 'cookbook' was produced to import trip generation data for each zone in the model and to forecast the traffic growth in the network for each future land use scenario. The cookbook also allows changes in land use to be tested in the model.

3.2 Population and Employment Forecasts

The population and employment forecasts were based on planning data provided by GRC. This data was provided for 2021, 2026, 2031 and 2036. This data was collated into the model zones and the following broad land use types:

- residential
- industrial
- commercial
- community
- office
- school
- other

3.3 Trip Generation

The land use data was used to calculate trip generation rates for each zone. The trip generation rates were based on TMR's Road Planning and Design Manual and The Roads and Traffic Authority's (RTA) Guide to Traffic Generating Developments. Where data for the broad land uses could not be derived from this data, trip generation rates were developed in consultation with GRC based on previous experience.

3.4 Estimated Future Traffic Growth

The future growth in traffic for each zone was estimated based on the land use data and associated trip generation rates in the cookbook for each future year. This growth was added to the existing traffic volumes in the base year matrices.

The future network total growth shows more growth between 2016-2026, with growth slowing between 2026-2036. The growth is generally consistent across the total study area, with the exception of some of the outer residential areas which experience an increase in later years. This is consistent with the adopted LDA on Southside. The overall growth between 2016-2036 is consistent with the planning data supplied.

Traffic volumes in the future years are expected to grow faster than population. However, growth is consistent with the expected increase in residential, industrial, commercial and office uses.

3.5 Network Traffic Growth

The capacity of the existing network has been analysed in EMME to identify existing links nearing capacity. Figures 3.1 and 3.2 show the volume to capacity ratio in the 2016 and 2036 morning peak periods respectively. The results shown in Figure 3.1, indicate that in the 2016 morning peak, parts of the Normanby Bridge and Exhibition Road are expected to be above 50% capacity. A section of Exhibition Road will be operating above 80% capacity. The 2016 evening peak has similar results. In 2036, the same roads are operating above 50% capacity with the addition of a section of Monkland Street and River Road. This assumes that the Gympie Bypass is in place at this time. No section of road is expected to operate above 100% capacity in any scenario.

Figure 3.1: VOLUME TO CAPACITY RATIO 2016 MORNING PEAK NO GYMPIE BYPASS

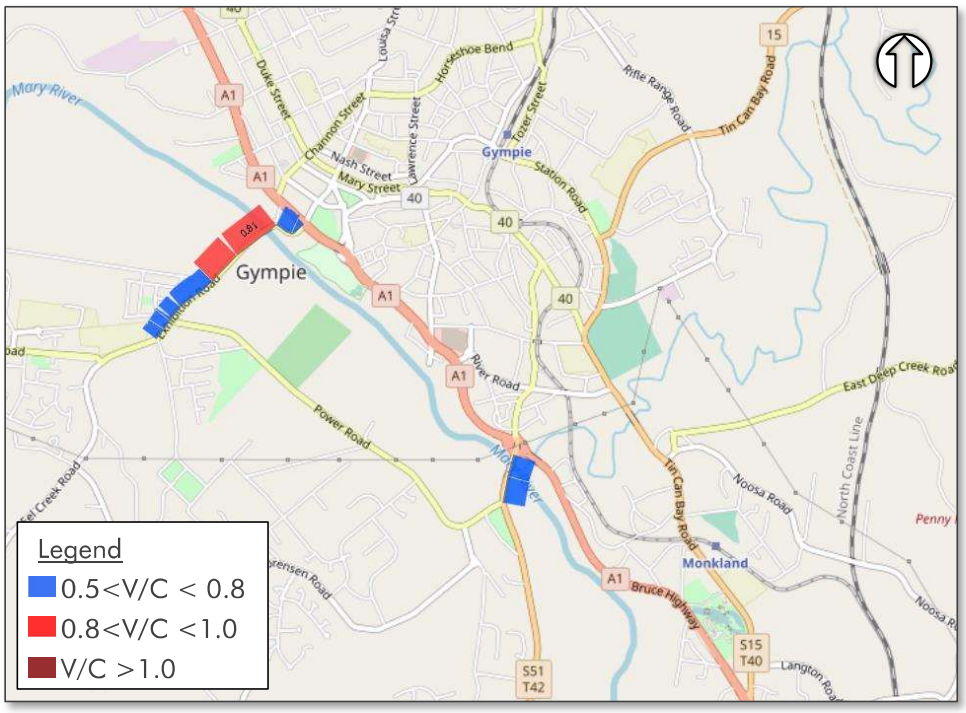


Figure 3.2: VOLUME TO CAPACITY RATIO 2036 MORNING PEAK WITH GYMPIE BYPASS

The increase in demand on Council roads has been analysed to determine which roads can expect to experience a significant increase in demand by 2036. The following roads are expected to experience a 50% or higher growth in traffic volumes by 2036:

- Duke Street (between Jane Street and Cross Street)
- Cross Street (between the Bruce Highway and Duke Street)
- Mellor Street (between Power Street and Alma Street)
- Chapple Street (between Chapple Lane and Mellor Street)
- Excelsior Road (between the Bruce Highway and Stanley Street)
- River Road (between the Bruce Highway and Calton Terrace)
- Barter Street (between Monkland Street to Channon Street)

This increase in traffic can largely be related to the increase in vehicles accessing the CBD. These links are not approaching capacity in 2036 and mostly are not of concern. However, given that Mellor Street leads into the Fiveways, this high growth will have a significant impact on the Fiveways operations.

A number of other roads are expected to experience growth of 50% or more. These roads have existing traffic volumes ranging between 3 to 70vph in the morning peak with an average of 26vph. Similarly, in the evening peak the existing traffic volumes range from 3 to 81vph with an average of 28vph. The traffic volumes are expected to increase to 7 to 185vph in the morning peak with and average of 66vph and 12 to 178vph with an average of 73vph in the evening peak by 2036. Therefore, the increase in demand is unlikely to have an adverse impact on the network.

Significant traffic growth in the Southside residential areas can be expected by 2036. This is related to the planned growth in residential dwellings in this area. Roads which can expect a 50% or greater increase in traffic volumes in the morning peak by 2036 are:

- Watson Road
- Groundwater Road
- Sorensen Road
- Waldock Road
- Heilbronn Road
- McIntosh Creek Road
- Cox Road
- Ramsey Road
- Copp Road
- Rose Road
- Smerdon Road

Although this is a significant increase with respect to percentage change, the modelled volumes are on average 200 vehicles in the 2036 morning peak. This is not expected to have a significant impact on the operation of these roads.

4.0 GYMPIE BYPASS

4.1 Aim

The proposed Gympie Bypass would have an effect on traffic operations in Gympie. Furthermore, the proposed interchanges affect accessibility to the Bypass. The EMME model was used to quantify the impact on the Gympie road network and the impact of the interchange design on accessibility for Gympie.

4.2 Process

The calibrated model was used to test the impacts of the Gympie Bypass on Gympie. This was conducted by connecting the Bypass to the existing road network and comparing the change in traffic volumes to the network without the Bypass. Select link analyses were conducted to determine which catchments were using the proposed interchanges. This was done for the 2016 and 2036 scenarios.

4.3 Results

As expected, adding the Gympie Bypass to the network results in a decrease in traffic volumes along the existing Bruce Highway, Tin Can Bay Road, Brisbane Road, Station Road and Tozer Street and a small increase along Gympie Connection Road. The implementation of the Gympie Bypass will reduce volume to capacity ratios on the Bruce Highway. There is very little impact elsewhere in the study area during the morning peak period, as shown in Figures 4.1and 4.2. The figures shows the decrease in traffic in green where the wider the bar, the greater the decrease. Increases in traffic are shown in red. The Bypass has a similar effect in the evening peak period.

Figure 4.1: CHANGE IN 2036 MORNING PEAK PERIOD WITH BYPASS

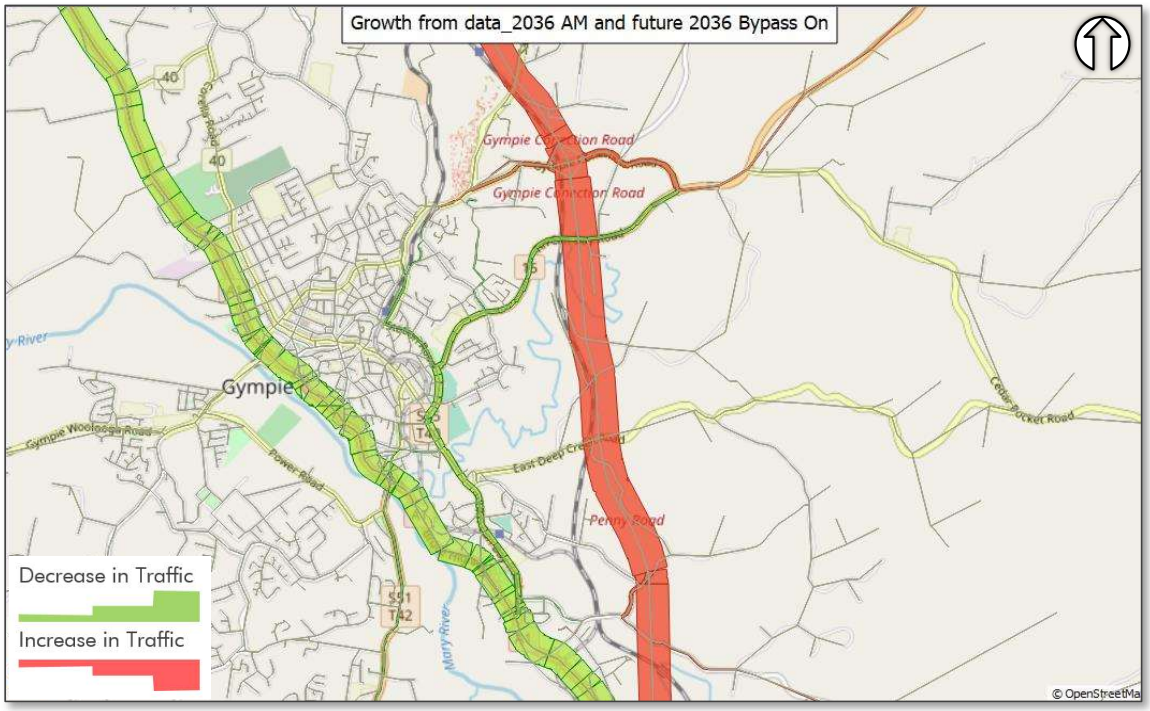


Figure 4.2: CHANGE IN 2036 MORNING PEAK PERIOD IN GYMPIE CBD WITH BYPASS

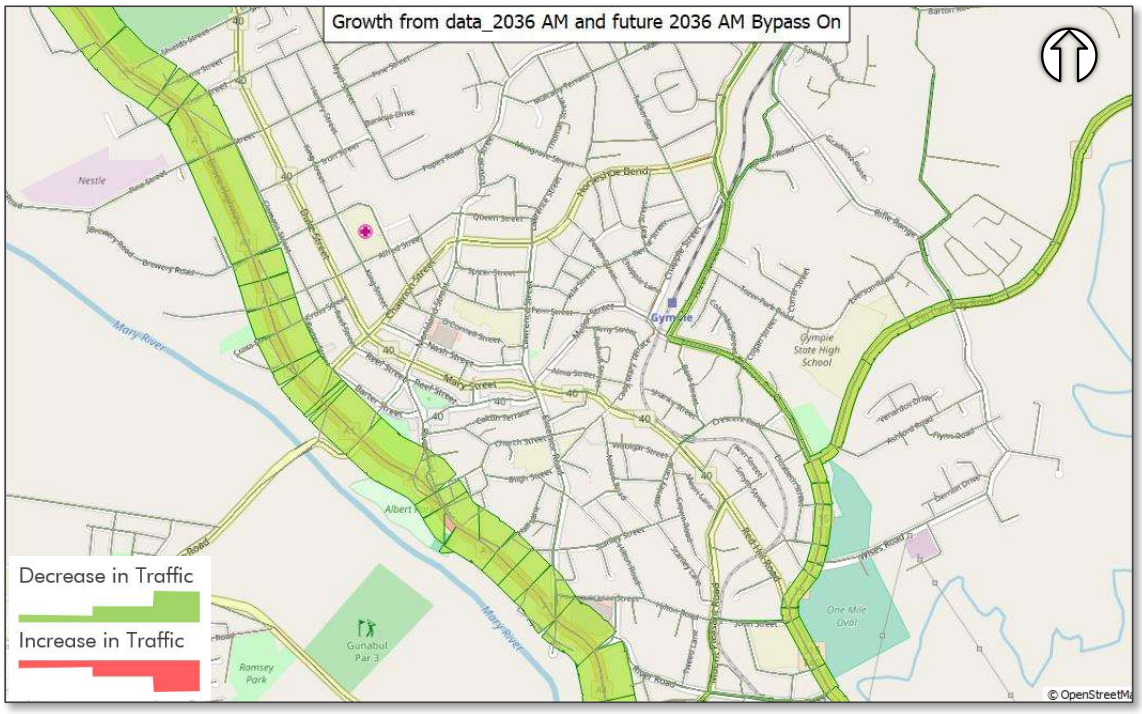


Table 4.1 shows the change in traffic volumes and percentage change with the Bypass for each of the major roads effected.

Table 4.1: EFFECT OF BYPASS IN 2036

ROAD	MORNING PEAK PERIOD		EVENING PEAK PERIOD	
	CHANGE IN VOLUME	% CHANGE	CHANGE IN VOLUME	% CHANGE
Bruce Highway (length of Highway in CBD)	-710	-31%	-940	-34%
Tin Can Bay Road (between Station Road and Rifle Range Road)	-130	-34%	-130	-33%
Tin Can Bay Road (between Station Road and the Bruce Highway)	-200	-17%	-230	-16%
Station Road (between Baker Street and Tozer Street)	-60	-8%	-80	-8%
Tozer Street (between Station Road and Stewart Terrace)	-60	-12%	-80	-12%

The impact of the Bypass is expected to be greatest on the length of the Bruce Highway in the CBD and Tin Can Bay Road between Station Road and Rifle Range Road. The traffic volumes on the Bruce Highway are expected to decrease by about 31% in the morning peak period and 34% in the evening peak period. The traffic volumes on Tin Can Bay Road are expected to decrease by 34% in the morning peak hour and 33% in the evening peak hour.

The proposed Bypass has more impact on through traffic than traffic accessing Gympie. However, the Bypass is expected to increase traffic on Gympie Connection Road, Penny Road and Noosa Road. This traffic is expected to further diverge on the connecting roads, with no one connecting road carrying more than an additional 10 vph.

This suggests that the Bypass will be used almost exclusively by through traffic and Gympie will continue to be accessed via the existing Bruce Highway.

The impact of the proposed interchanges has also been tested and these results are discussed below.

4.3.1 Gympie Connection Road Interchange

The Gympie Connection Road interchange on the Gympie Bypass has been analysed for 2016 and 2036 morning and evening peak period scenarios and detailed results are presented in the Option Testing Report. The interchange is expected to have the following effects on the surrounding network during peak hours:

- diverts traffic from Tin Can Bay Road to Gympie Connection Road
- Tin Can Bay Road can expect 90 vph less (30% decrease) west of the Gympie Connection Road intersection
- Tin Can Bay Road can expect 50 vph more (7% increase) east of the Gympie Connection Road intersection
- there is a decrease of 15 vph (40% decrease) on Randwick Road
- there is a decrease of 15 vph (20% decrease) on Ascot Road
- Gympie Connection Road can expect an additional 130 vph (32% increase) to the west of the interchange
- Gympie Connection Road can expect an additional 160 vph (57% increase) to the east of the interchange

The additional traffic on Gympie Connection Road is due to traffic heading to / from the east, for which the Gympie Bypass is now the most direct route, travelling north or south where previously this traffic would have taken other routes. This interchange is not expected to result in a significant increase in traffic on Council roads.

Most of the traffic using the interchange comes to and from the east along Tin Can Bay Road. Other traffic travels from the west onto Gympie Connection Road to access the Bypass. A small amount of traffic is expected to travel along Old Maryborough Road to access the interchange. However, there is not a large amount of demand to access the Bypass from this area during peak hours. This area is largely residential with some educational facilities.

4.3.2 Penny Road Interchange Northbound On-Ramp and Southbound Off-Ramp

The Penny Road interchange, with a northbound on-ramp and southbound off-ramp on the Gympie Bypass, has been analysed for 2016 and 2036 morning and evening scenarios and the detailed results are presented in the Option Testing Report. The interchange has the following effects on the surrounding network during the peak hours:

- Tin Can Bay Road can expect 170 vph less (20% decrease)
- Langton Road can expect 30 vph less (25% decrease)
- Penny Road and Noosa Road (between Penny Road and Hall Road) can expect 120 vph more (75% increase) to the west
- Penny Road can expect minor changes to the east
- Noosa Road (east of Hall Road) can expect 45 vph more (13% increase)
- Hall Road and Noosa Road (to the west of Penny Road) can expect little to no changes in traffic volumes

The traffic using Noosa Road (east of Hall Road) is diverted from the Bruce Highway. Penny Road, west of the interchange, is expected to carry 120 vph more during the peak hour, but this road is not expected to be nearing capacity by 2036. Most traffic using this interchange is coming from Noosa Road (east of Hall Road), with some also coming along Hall Road.

4.3.3 Penny Road Full Interchange

The Penny Road interchange on the Gympie Bypass was also analysed as a full interchange for the 2016 and 2036 morning and evening scenarios, with detailed results presented in the Option Testing Report. This interchange allows more traffic to access the interchange from the east. These vehicles are expected to use East Deep Creek Road and Flood Road instead. This effects about 50 vph in the peak periods. The interchange has the following effects on the surrounding network during the peak hours:

- Tin Can Bay Road can expect 180 vph less (22% decrease)
- Langton Road can expect 35 vph less (25% decrease)
- Hall Road can expect 70 vph less (19% decrease)
- Penny Road and Noosa Road (between Penny Road and Hall Road) can expect 120 vph more (75% increase) to the west
- Penny Road can expect 40 vph more (27% increase) to the east
- Noosa Road (east of Hall Road) can expect 100 vph more (43% increase)
- East Deep Creek Road can expect 20 vph more (15% increase)
- Flood Road can expect 30 vph more (43% increase)
- Noosa Road (to the west of Penny Road) can expect little to no changes in traffic volumes

A full interchange would be expected to increase traffic on East Deep Creek Road and Flood Road. Work may be warranted on Flood Road to provide heavy vehicle access to the Bypass. A full interchange may also result in up to 65 vph more than a half interchange on Noosa Road (east of Hall Road). This suggests that a full interchange has the most impact on the areas to the south east of the interchange. Most traffic using the full interchange comes from the same areas as the half interchange discussed in Section 4.3.2 with an additional 20 vph using East Deep Creek Road.

4.3.4 Summary of Impacts on Council Roads

The Gympie bypass will reduce traffic on the existing Bruce Highway in Gympie and on parts of Tin Can Bay Road (Brisbane Road, Crescent Road and Cootharaba Road) by over 30%.

Traffic on the Gympie Connection Road in the vicinity of the bypass (ie between Old Maryborough Road and Tin Can Bay Road) will increase by up to 32% west of the bypass and 57% to the east. The impacts of this additional traffic, particularly on intersection safety and capacity would need to be assessed by TMR.

Closer to the CBD, the bypass is generally expected to have minor impacts on roads. The most significant changes are predicted on Tozer Street (12% decrease) and Station Road (8% decrease).

There will be impacts on Council roads surrounding the proposed interchanges as follows:

- decreases on Randwick Road and Ascot Road
- decrease on Langton Road
- increases on Penny Road, Noosa Road and Hall Road

This assessment is based on TMR's current proposal for a half interchange at Penny Road which would allow traffic to enter and exit the new highway to and from the north. Impacts on intersection safety and at the single lane road-over-rail bridge on Hall Road would need to be assessed by Council and TMR.

A full interchange has also been tested in the traffic model with the following additional impacts on council roads:

- increase on East Deep Creek Road
- increase on Flood Road.

The additional traffic on East Deep Creek Road would not trigger upgrades for additional capacity but safety at intersections would need to be assessed. Flood Road would need to be upgraded to cater for the extra traffic. An upgrade of Flood Road, together with the full interchange at Penny Road would provide improved access to the new highway, including for heavy vehicles.

5.0 INTERSECTIONS

5.1 Aim

Key intersections in the Gympie network with existing capacity or operational issues were analysed to find solutions to the existing issues and assess how the intersection would operate in the future years. This analysis also considered how the intersections linked with possible CBD bypass routes.

5.2 Process

The turning volumes at these intersections were extracted from the EMME model for the base year and all future year scenarios. These turning volumes were then input into a SIDRA model of each intersection to quantify current and future year operations. The SIDRA analyses included changes in gap acceptance values and peak flow factors to cater for the specifics of each intersection. These values were derived in consultation with GRC. Safety issues including crash history were also considered for each intersection. These issues should be taken into consideration when GRC assesses priorities for intersection upgrades within available funding programs.

5.3 Key Results

We have undertaken a series of SIDRA analyses to quantify the existing and future traffic operations of the 34 intersections listed in the project brief. Table 5.1 shows the indicative timing for all Council controlled intersection upgrades and Table 5.2 shows the indicative timing for TMR controlled intersection upgrades. The intersection numbers reflect the original numbering scheme used in the project brief and do not reflect the prioritised ordering within each five year band. Figure 5.1 shows the locations of the intersections in Table 5.1 and Table 5.2. It is recommended that if a CBD Bypass is implemented, intersections effected by this are upgraded to coincide with the proposed Bypass. Further, some intersections are operating at acceptable levels of degree of saturation until 2036 but the recommended changes are minor and could be implemented at an earlier time to increase safety. Intersection upgrades typically include the following:

- signalisation
- converting to roundabout
- improving sight distance
- realigning and modifying intersection layouts

5.4 Gympie Bypass Impacts

The Gympie Bypass is expected to improve operations of a number of intersections. These include:

- Crescent Road / Tin Can Bay Road
- Red Hill Road / Tin Can Bay Road
- Graham Street / Tin Can Bay Road
- Noosa Road / Tin Can Bay Road
- Langton Road / Tin Can Bay Road

The Gympie Bypass is expected to improve operations on some of these intersections to acceptable levels through to 2036. However, a number will still require upgrading as shown in Table 5.2 and intersections along Gympie Connection Road in the vicinity of the bypass interchange will require additional investigation by TMR as the design of the bypass progresses.

Table 5.1: RECOMMENDED COUNCIL INTERSECTION UPGRADE PROGRAM

No	INTERSECTION	RECOMMENDED WORKS
2016-2026		
2	Station Road / Tozer Street	signalise intersection
3	Station Road / Cogan Street	upgrade to roundabout (already under construction)
11	Lady Mary Terrace / Mellor Street / Chapple Street	signalise intersection in conjunction with Station Road / Tozer Street intersection
27	Louisa Street / Parsons Road / Musgrave Street	realign intersection (substantial works required)
	Fiveways	refer to Chapter 10
2026-2031		
1	Tozer Park Road / Tozer Street	remove crest on Tozer Street
9	Red Hill Road / Apollonian Vale / Crescent Road	upgrade to roundabout (subject to Bent Street rat-run findings)
25	Monkland Street / O'Connell Street	signalise intersection
FUTURE WORKS		
13	Mellor Street / Fern Street	modify intersection geometry
15	Excelsior Road / Perseverance Street	install median and signage
32	Groundwater Road / Sorensen Road	modify intersection geometry
33	Young Street / Reef Street	modify intersection geometry
34	Louisa Street / Alfred Street	modify intersection geometry

The following intersections were also investigated, although no improvements were identified based on review of their expected future performance under peak period traffic loads:

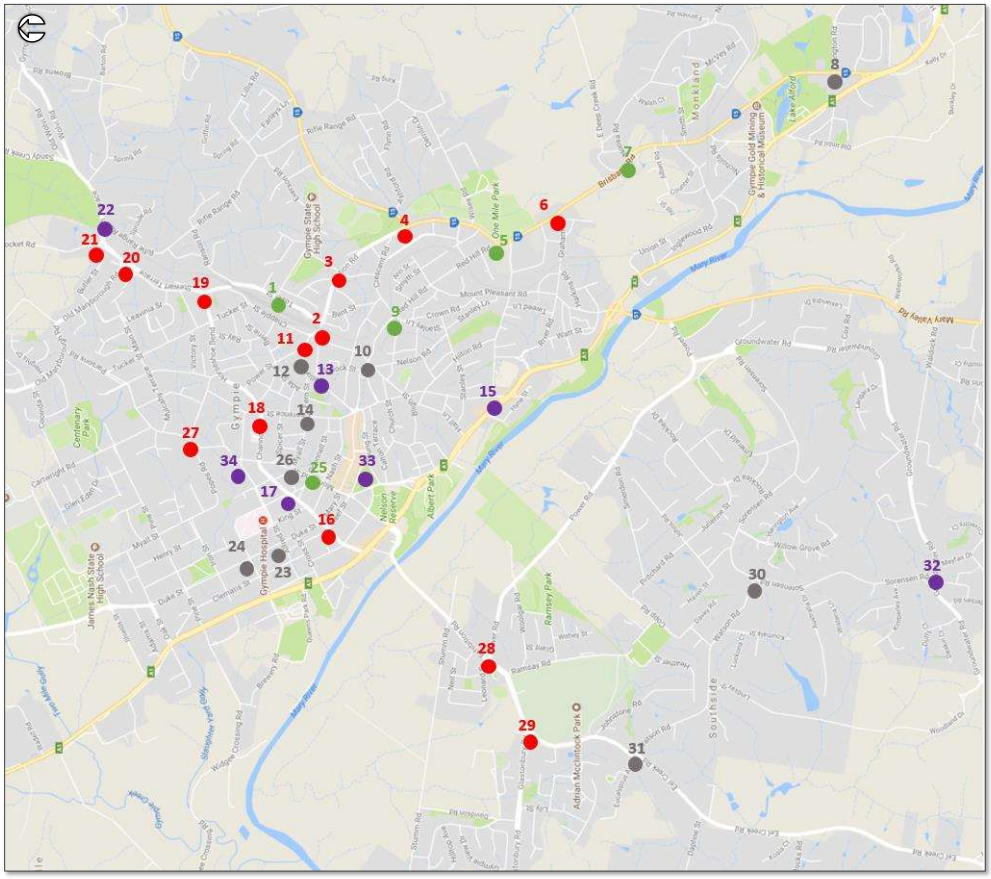
- Apollonian Vale / Lady Mary Terrace / Bligh Street / Caledonian Hill (Site 10)
- Mellor Street / Power Street (Site 12)
- Fern Street / Lawrence Street / Myall Street (Site 14)
- Duke Street / Alfred Street (Site 23)
- Duke Street / Jane Street (Site 24)
- Monkland Street / Myall Street (Site 26)
- Watson Road / Sorensen Road (Site 30)
- Watson Road / Eel Creek Road / Exhibition Road (Site 31)

The following TMR controlled intersections have been identified as requiring upgrades over the lifetime of this study as shown in Table 5.2 assuming that the Gympie Bypass has been constructed by 2026. No works are recommended at the Langton Road / Tin Can Bay Road intersection (Site 8) provided the Gympie Bypass is constructed. Upgrade solutions would be sought with TMR and Council going forward.

Table 5.2: RECOMMENDED TMR INTERSECTION UPGRADE PROGRAM

No	INTERSECTION	RECOMMENDED WORKS
2016-2026		
4	Crescent Road / Tin Can Bay Road	upgrade to roundabout
6	Graham Street / Tin Can Bay Road	signalise intersection (additional upgrades required by 2036)
16	Gympie Connection Road / Reef Street	signalise intersection
18	Gympie Connection Road / Lawrence Street	signalise intersection
19	Gympie Connection Road / Stewart Terrace	upgrade to roundabout
20	Gympie Connection Road / Old Maryborough Road	modify intersection geometry
21	Gympie Connection Road / Banks Pocket Road	modify layout (after intersection upgrades at Gympie Connection Road / Old Maryborough Road)
28	Exhibition Road / Power Road	signalise intersection and modify shop access
29	Exhibition Road / Glastonbury Road	signalise intersection
2026-2036		
5	Red Hill Road / Tin Can Bay Road	upgrade to roundabout
7	Noosa Road / Tin Can Bay Road	realign intersection
FUTURE WORKS		
17	Gympie Connection Road / Henry Street	modify intersection geometry
22	Gympie Connection Road / Rifle Range Road	subject to TMR investigations for the bypass

Figure 5.1: LOCATIONS OF INTERSECTIONS ANALYSED



6.0 CAR PARKING

An audit of the existing car parking supply has been conducted for each area identified in the project brief. The car parking supply has been compared to the requirement under the local planning scheme and options to alleviate issues have been analysed as shown in Table 6.1. The location of each area identified is shown in Figure 6.1.

Table 6.1: CAR PARKING KEY RECOMMENDATIONS

LOCATION	KEY RECOMMENDATIONS
Gympie Funeral Home	The current car parking provision is inconsistent with GRC planning scheme with a shortfall of 18 spaces. Key recommendations include: - develop an on-site overflow car parking plan - investigate the possibility of redesigning the funeral home car park to provide more car parking spaces
Sporting Fields	The masterplan proposes approximately 450 sealed car parks, 25 unsealed parks and some overflow car parking. This future supply is considered adequate to cater for the demand on-site. Key recommendations include: - mark on-street parallel parking bays as per those on Gympie Connection Road - provide access to the Brisbane Road car park by a fourth leg on the proposed Brisbane Road / Red Hill Road roundabout - restrict other accesses to left-in / left-out
Gympie Public Hospital	The current on-site car parking provision is inconsistent with planning scheme requirements with a shortfall of 171 spaces. Key recommendations include: - the existing public car park is extended - a multi-storey car park containing a minimum of 171 car parks is considered
Cooloola Private Hospital / Medical Precinct	Current on-site parking demands at the Cooloola Private Hospital / Medical Precinct are above capacity, resulting in a high demand for on-street parking on the surrounding streets. It is recommended that a public carpark is considered to reduce on-street parking demand.

Table 6.1: CAR PARKING KEY RECOMMENDATIONS cont…

LOCATION	KEY RECOMMENDATIONS
Victory Store and Recreation Facility	The car parking and access arrangements of the Victory Store and recreational facility have not been formalised resulting in parking along Bath Terrace (Gympie Connection Road). It is recommended that two additional car parks are provided at the store and queuing area and pumping spaces are formalised
Victory Hotel	The Victory Hotel car parking has not been formalised resulting in parking along Bath Terrace (Gympie Connection Road). Key recommendations include: - on-site car parking is line marked and signage directing drivers is installed - car parking along Bath Terrace is formalised
Parking along Channon Street / Horseshoe Bend	The impact of the Gympie Bypass may increase traffic along this section of road making parking less desirable. Our modelling suggests that the Gympie Bypass does not have a significant impact on traffic volumes along this section of road. Therefore, parking on this road should be able to continue as now.
St Patricks College	There is significant congestion in vicinity of the school during pick-up / drop-off times. Key recommendations include: - a right turn on Calton Hill into Church Street is provided - the relocation of the school to a non-CBD site is considered
Gympie South State School	The operations of the Gympie South State School impact on the external road network during school drop-off / pick-up times. It is recommended that a detailed study of this site is undertaken to improve traffic operations.

Figure 6.1: LOCATIONS OF PARKING AREAS ANALYSED

7.0 ACTIVE TRANSPORT

The project brief identified a number of locations within the CBD that required an assessment of the adequacy of the existing pedestrian / cycle infrastructure and desire lines. An audit of these sites has been conducted to identify any gaps or substandard infrastructure. The location of each area identified is shown in Figure 7.1 with a summary of each site shown in Table 7.1. This study is not an exhaustive review of the pathway needs in Gympie and does not replace the Gympie Regional Walk and Cycle Strategy 2012 which has been adopted by Council. Rather it is a review of specific locations within Gympie and the findings should serve to supplement the long term plan which is detailed in the adopted strategy.

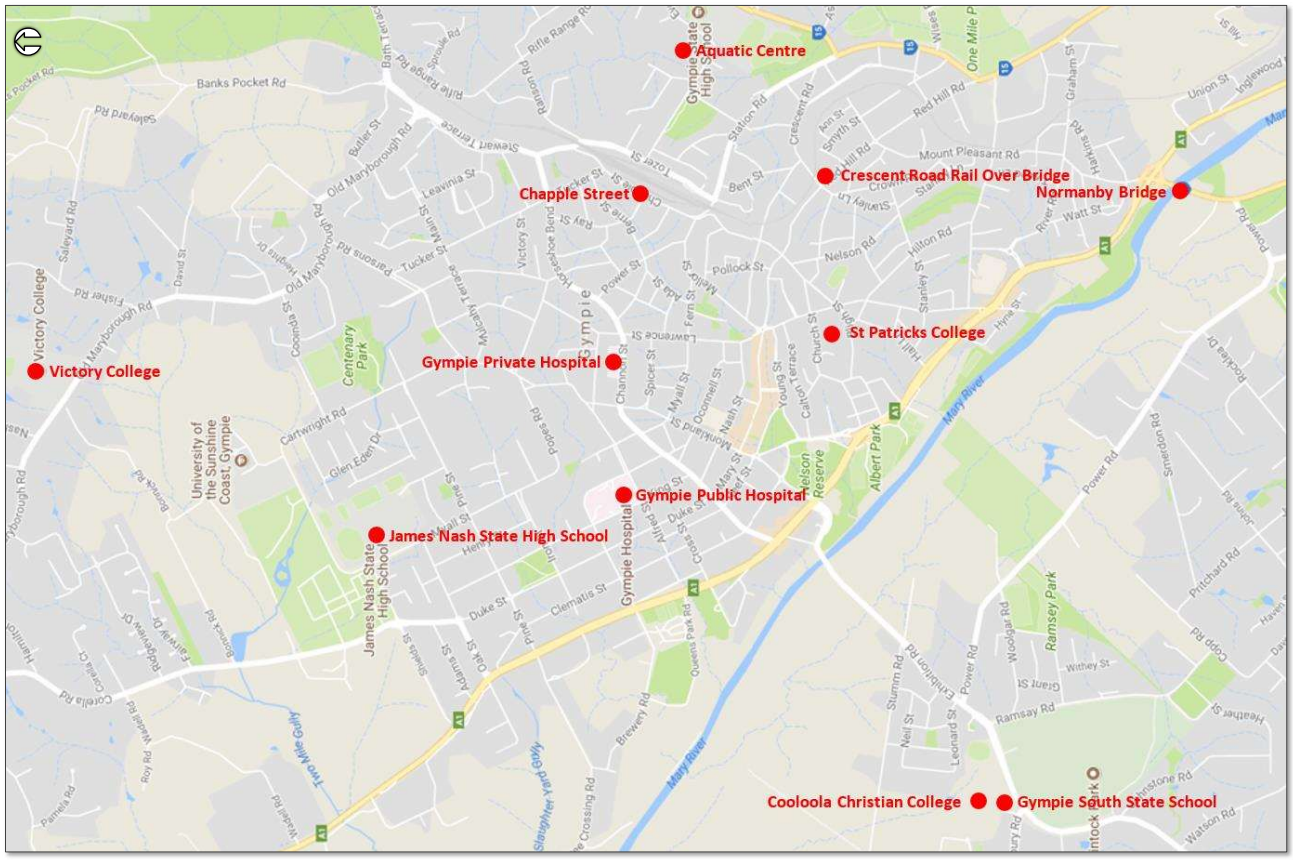
Table 7.1: ACTIVE TRANSPORT KEY RECOMMENDATIONS

LOCATION	KEY RECOMMENDATIONS
New Aquatic Centre	We have not identified any major issues with the existing pedestrian connectivity to the aquatic centre. Possible improvements to the active transport infrastructure to provide greater connectivity to the development include: - pedestrian crossing between the aquatic centre and car park - footpath along Everson Road, Batchelor Road and Farleys Lane
Gympie Public Hospital	There are gaps within the existing pedestrian infrastructure surrounding the hospital. There is also a lack of pedestrian connectivity between the new public carpark to the north-west of the hospital to the existing network. It is recommended that additional footpaths are along the hospital boundary.
Cooloola Private Hospital / Medical Precinct	Patients are often required to cross Channon Street (state-controlled). There is one pedestrian crossing at the western end of the block, which many pedestrians are unlikely to use because this is not the most direct route. A pedestrian refuge has recently been installed along Channon Street which provides a more direct route. It is recommended that: - if the Channon Street / Lawerence Street intersection is signalised, that a pedestrian crossing be incorporated - the footpath on the southern side of Channon Street is extended

Table 7.1: ACTIVE TRANSPORT KEY RECOMMENDATIONS cont…

LOCATION	KEY RECOMMENDATIONS
Crescent Road Rail Over Bridge	The road narrows under the Crescent Road rail bridge. This pinch point forces pedestrians to walk on the road, which is considered to be unsafe and highly undesirable. It is recommended that a 1.5m wide footpath is provided along the northern side of the carriageway under the bridge. It is recommended that signage warning drivers to the likely presence of pedestrians be provided on approaches to this section of road.
Normanby Bridge	The Normanby Bridge currently has no pedestrian footpaths and there is a lack of north-south connection for pedestrians across the Mary River. Additionally, there is no existing pedestrian infrastructure either side of the Mary River to connect to the bridge. It is recommended that a footbridge is constructed. It is recommended that a footbridge crossing is also provided over the Bruce Highway.
Chapple Street	There are currently no pedestrian facilities along Chapple Street. It is recommended that pedestrian facilities are provided along the eastern side of Chapple Street. Alternatively, a link to Tozer Street could be provided.
Schools	There is a lack of shared pathways to connect a number of schools in the Gympie Region to the broader network. It is recommended that additional pathways and shared paths are considered to provide greater connectivity.

Figure 7.1: LOCATIONS OF ACTIVE TRANSPORT AREAS ANALYSED



8.0 ROUTE INVESTIGATIONS

A number of possible new routes were coded into the EMME model to test the impact on traffic volumes in the area. Comparison plots were used to show the impact on the surrounding areas in terms of the forecast change in traffic volume. Select link analyses have also been undertaken when necessary to determine the catchments using the new routes. The results of these analyses are detailed in the Option Testing Report and summarised in Table 8.1.

Table 8.1: ROUTE INVESTIGATIONS KEY RECOMMENDATIONS

LOCATION	KEY RECOMMENDATIONS
Bruce Highway to Saleyards Connection	Two potential links from the Bruce Highway to the Saleyards were tested. The link between Wadell Road and Old Maryborough Road would remove heavy vehicles from residential areas and may have some merit in the future.
Henry Street / Jane Street to Iron Street	A link between Henry Street / Jane Street and Iron Street was tested. This is link is not preferred over the Jane Street to Popes Road link.
Jane Street to Popes Road	A link between Jane Street and Popes Road was tested. This link would not require a large amount of earthworks and may warrant further investigation in the future.
Myall Street / Channon Street to Popes Road	A link between Myall Street / Channon Street and Popes Road was tested. This new link would require significant regrading at the Myall Street / Channon Street intersection and is therefore not preferred.
Pine Street to Old Maryborough Road	A link between Pine Street and Old Maryborough Road was tested. This link may be of some merit in the future and may be worth investigating further as it removes through traffic from residential areas.
Heavy Vehicle Access to Nolans Meats and East Deep Creek Industrial PIA	An alternative heavy vehicle route was examined. It is recommended that in the long-term upgrades to Flood Road and Hall Road are conducted so that these roads can cater for heavy vehicles.

9.0 LOCAL AREA TRAFFIC MANAGEMENT

A number of "rat runs" were listed in the project brief. The concerns with respect to these routes included vehicles using residential streets to bypass congestion or intersection delays on higher order roads. Alternative solutions were identified and tested using the EMME Model. Each "rat run" was analysed in isolation and the key results are summarised in Table 9.1.

Table 9.1: LATM KEY RECOMMENDATIONS

LOCATION	KEY RECOMMENDATIONS
Bent Street / Crescent Road / Stanley Street	This route is used by local traffic to travel between the Gympie Central Shopping Centre and Gympie State High School and other areas north of the railyards. This "rat run" is used instead of higher order parallel roads such as Bligh Street, Lady Mary Terrace and Station Road. It is recommended that upgrades are made to intersections along the preferred routes. Once intersections have been upgrades, traffic calming devices could be considered along the "rat run".
Julienne Street / Pritchard Road / Copp Road	This "rat run" is used by drivers wishing to avoid the right turn from Power Road at the Power Road / Exhibition Road intersection. It is recommended that the Power Road / Exhibition Road intersection is upgraded to improve traffic operations.
Rose Road / Davey Road / Copp Road	This "rat run" is used as a bypass to Watson Road and Exhibition Road during school peak periods. It is recommended that a detailed study of the Gympie South State School and Cooloola Christian College be undertaken to identify measures targeted at reducing traffic congestion in this area during school peak periods.
Grevillea Avenue / Johns Road / Pritchard Road / Copp Road	This "rat run" is also used to bypass school traffic and avoid the right turn from Power Road onto Exhibition Road. Improving school operations and signalising the Power Road / Exhibition Road intersection would reduce traffic on this "rat run".
Watt Street / Blake Street	This "rat run" is used to bypass the River Road / Graham Street / Hughes Terrace signalised intersection. Creating two culs-de-sac by closing one leg of the Watt Street / Blake Street intersection would prevent vehicles using this "rat run".

Table 9.1: LATM KEY RECOMMENDATIONS cont…

LOCATION	KEY RECOMMENDATIONS
Harkins Street	This "rat run" is used to bypass the right turn from Graham Street at the River Road / Graham Street / Hughes Terrace signalised intersection. It is recommended that upgrades to the River Road / Graham Street / Hughes Street intersection are made to make this more desirable to traffic. This could include optimising the phasing and introducing high angled slip lanes. To further reduce traffic on Harkins Street, traffic calming devices could be installed.
Stumm Road / Bushland Drive	This "rat run" is used to bypass school traffic on Glastonbury Road and Exhibition Road. The "rat run" goes through residential areas. It is recommended that further study regarding the congestion associated with Gympie South State School and Cooloola Christian College be undertaken.

10.0 LOCAL INVESTIGATIONS

10.1 Aim

The aim of this phase of the project was to undertake a number of local investigations to promote the use of the state controlled and GRC arterial road network at key points around the study area. Making these routes more attractive to road users aims to reduce through traffic in the CBD (including the Fiveways) without detracting from the CBD as an attractive destination hub.

The local investigations include:

- CBD Bypass routes for other than destination traffic
- Fiveways

Figure 10.1 shows the location of the state controlled and arterial road network and the local investigations routes.

10.2 CBD Bypass Routes

The EMME model estimates that there are approximately 4,500 vehicles per hour crossing the CBD sub-area cordon in the 2036 morning peak hour. Of these 4,500 trips, approximately 1,000 are through trips.

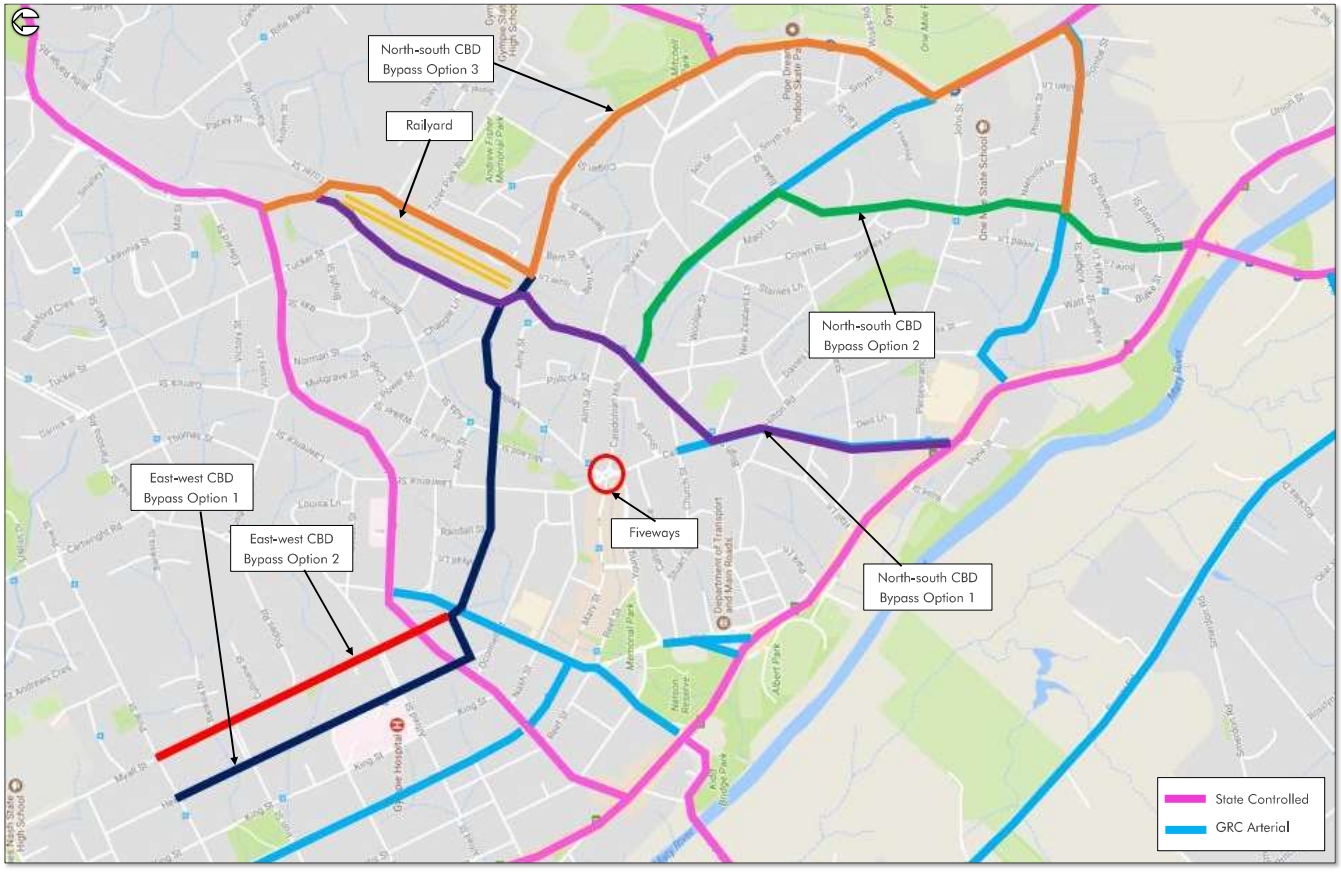
Several options were developed and tested in the model for north–south and east–west bypasses of the Gympie CBD. These are shown in Figure 10.1.

Each of the possible bypass routes would require a number of intersection upgrades and would have some detrimental impacts, such as increasing traffic past the hospital or schools.

The results of the modelling show that the network is not sensitive to changes along the potential bypass routes. This is due to the additional travel distances involved in using the routes compared with travelling through the CBD. Therefore, significant reductions in travel times would be required along a bypass route in order to generate a significant reduction in traffic in the CBD and Fiveways.

The study has concluded that significant expenditure specifically targeted at developing a bypass of the CBD is unlikely to be warranted before the study horizon of 2036.

Figure 10.1: LOCAL INVESTIGATIONS MAP



10.3 Fiveways Roundabout

The 'Fiveways Roundabout' is the iconic five-legged roundabout located in the centre of the Gympie CBD. It connects four major arterial roads that run through Gympie to the CBD and is a key node in the CBD traffic network. The roundabout currently experiences large vehicle delays and operates at a low level of service, particularly in the evening peak period.

A series of SIDRA analyses were conducted to quantify the existing and future traffic operations at the Fiveways. We have modelled the Fiveways as a SIDRA network in conjunction with the nearby Calton Hill / Young Street priority controlled intersection, given the large turning volumes from / to Young Street and the intersection's close proximity to the Fiveways.

On-site observations indicate that significant queuing occurs on Mary Street during peak periods which is reflected in the SIDRA modelling.

A number of options were developed and tested. Those warranting further consideration are summarised in Table 10.1. It is recommended that a more detailed investigation be performed for the Fiveways Roundabout to further develop Options B and C and also to consider other options.

Table 10.1: FIVEWAYS OPTION TESTING

LOCATION	KEY RECOMMENDATIONS
A. Modify roundabout short-term	This option may include: - extending median on Calton Hill and installing keep clear zone for right turns into Young Street - speed humps on approaches at Lawrence Street, Mellor Street and Caledonian Hill - increase the centre island radius This option is recommended in the short term to improve safety, particularly for pedestrian crossings. However, it will not improve traffic operations.
B. Traffic management to re-route traffic away from Fiveways	This option may include: - traffic calming and "pedestrianisation" of sections of Lawrence Street and Mellor Street in proximity to the roundabout Modelling results show that implementing traffic calming on Mellor and Lawrence Streets would decrease traffic on all legs except for Mary Street and Appollonian Vale (which would increase). This option would remove a substantial amount of traffic from the Fiveways but the impacts on other roads would need to be further investigated. Therefore, this option is recommended for further investigation.
C. Redesign roundabout	This option may include reconstructing the Fiveways roundabout and the Calton Hill / Young Street intersection as two adjacent, connected roundabouts Analysis shows this arrangement would function adequately. It would be a high cost option and is not recommended at the current time.