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NOOSA TRAFFIC STUDY TO 2036

For

NOOSA COUNCIL

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NOOSA TRAFFIC STUDY TO 2036 - EXECUTIVE SUMMARY

As part of the process of preparing a new Noosa planning scheme, and to inform the new Local Government Infrastructure Plan, this traffic study has been commissioned to assess road system upgrading requirements within Noosa Shire to the year 2036.

Importantly, given the 20-year time horizon to 2036, it will be necessary to regularly (every 4-5 years) review and revise this traffic study to ensure recommended infrastructure improvements correctly align with actual and future population growth and evolving future traffic projections. This will also allow Council's forward infrastructure planning and capital works program to more accurately reflect the actual demand required for the road network.

Subsequent supporting studies will also be necessary to assess the future public transport, pedestrian, and cyclist requirements of the network. In this respect, greater uptake of public transport, walking and cycling will reduce traffic demand on the Noosa road network and reduce the extent and cost of infrastructure upgrading that would otherwise be required. Critically this is also reflective of the aims of the Noosa Biosphere Reserve that encompasses Noosa Shire, which under the United Nations Educational, Scientific and Cultural Organisation (UNESCO) aims to promote living in a healthy and sustainable way.

This traffic study has adopted a similar philosophy to that adopted in the preceding "*Coastal Area Traffic and Transport to 2016*" study prepared by Beard Traffic Engineering in August 2002. In particular, this assessment has been undertaken in the absence of area wide road network modelling, and has been undertaken on the basis of applying growth factors to existing traffic volumes.

An important input to the study is adherence to the strategic traffic management philosophy adopted in Noosa over a long period of time, of maintaining a free flowing road system, based on a network having roundabouts at major junctions.

There are two distinct parts to the road system within the Noosa Shire area. The more heavily populated coastal area comprising Tewantin, Noosaville, Noosa Heads, Sunshine Beach, and extending along the coast to Peregian Beach, comprises a major road system that is administered solely by Noosa Council (without any State-controlled roads). Beyond that coastal area, the major road system within Noosa Shire comprises State-controlled roads administered by the Department of Transport and Main Roads (DTMR). This study, focused on the Council-controlled network, has therefore concentrated on the coastal area, but it has also assessed critical locations on the State-controlled network, even though responsibility for funding upgrading at those critical locations rests with the State government.

Future traffic growth in the Noosa area will be driven primarily by population growth, as well as by new commercial developments. The Queensland State government has supplied population projections for the Noosa Shire area and they indicate low rates of growth. Growth rates in employment are also projected to be low.

Because intersection capacities essentially define the traffic carrying capacity of an urban road network, extensive traffic counts were undertaken throughout the road system as a basis for intersection analysis using the SIDRA intersection analysis software program, following application of growth factors.

The study concludes that the existing Noosa road network can be suitably upgraded to satisfactorily accommodate traffic flow projections to the 2036 design year, while retaining the free flowing roundabout based system, without new fully controlled signalised intersections.

Flow metering at one or two critical roundabouts will be necessary during peak periods to maintain the roundabout based system. Upgrading of the road network to achieve that outcome, and associated suggested timing to maintain congestion free conditions during the busy holiday times of the year, are recommended and outlined further in this report.

The most critical part of the Noosa road system is the section of Eumundi Noosa Road between Beckmans Road and Eenie Creek Road. Critically, if future developments within the coastal area are approved that add significant traffic flows to that part of the road system, then it is unlikely that the free flowing roundabout based system could be retained, and that upgrading of intersections to traffic signal control would then be required. Such an outcome would be very costly to implement and is contrary to Noosa's traffic management philosophy.

The study also includes recommendations regarding some upgrading of State-controlled roads in Noosa Shire to facilitate cooperation with the Queensland State government regarding planning for implementation of State-controlled roads. In this respect it is suggested that for the benefit of the Noosa community and visitors to the region that Council pursue such infrastructure improvements with the State government. It is also recommended that the duplication of Beckmans Road be pursued with the State government as a matter of urgency, as this road is already in need of upgrading and there is a Deed of Agreement in place for DTMR to undertake such works.

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1 INTRODUCTION

Noosa Council is preparing a new planning scheme. As part of that process, Holland Traffic Consulting Pty Ltd has been commissioned to undertake a traffic study of the Noosa Shire area with the aim of assessing past and present traffic conditions of the Major Road Network of Noosa Shire, and predicting traffic growth and identifying road system upgrading requirements to the year 2036.

This study deals only with the private vehicle based travel component of the transport system. Subsequent studies will be undertaken to assess public transport, pedestrian and cycle requirements.

1.1 Traffic planning principles

Noosa's road planning philosophy to date has been to avoid traffic lights, maintain free flow traffic conditions without queues or delay (managed by roundabouts), and to promote Active Transport and Public Transport to reduce traffic demand on the road network and the need for costly major road upgrades.

Noosa has a long history of having a documented strategic direction to maintain a free flowing road system, based on having roundabouts at major intersections, so that vehicles are not delayed at traffic signal controlled junctions. This is seen by the Council as an important part of the "feel" of the Noosa area and as an important strategic differentiator compared to other tourist areas. This is an important strategic input to this study.

The recently released "Noosa Vision" document – "*Noosa Design Principles – How Noosa has been shaped*" outlines the following principles:

- *Provide a transport network that caters for the needs of the community and blends into the environment rather than dominates it.*
- *Avoid the introduction of traffic lights wherever possible and use roundabouts instead.*
- *Design road systems to spread traffic loads across the network.*

1.2 State roads and Council roads

The whole of Noosa Council is shown in Figure 1. The majority of traffic issues in Noosa are contained within the Coastal area where the majority of the population and commercial areas are located (which is also shown in Figure 1) comprising Tewantin, Noosaville, Noosa Heads, Sunshine Beach, and extending south to Peregian Beach.

The existing road hierarchy of Noosa Council is also depicted in Figure 1, which also identifies State-controlled roads including the Bruce Highway, Eumundi Noosa Rd south of Beckmans Rd, Emu Mountain Rd, Cooroy Noosa Rd (west of Gyndier Dr), Cooroy Connection Rd and Pomona Connection Rd, Kin Kin Rd, Louis Bazzo Drive and McKinnon Drive, all of which are administered by the Department of Transport and Main Roads (DTMR).

DTMR is currently conducting a separate study to plan for upgrading requirements to their roads, which is known as NORCATS (Northern Sunshine Coast Area Transport Study).

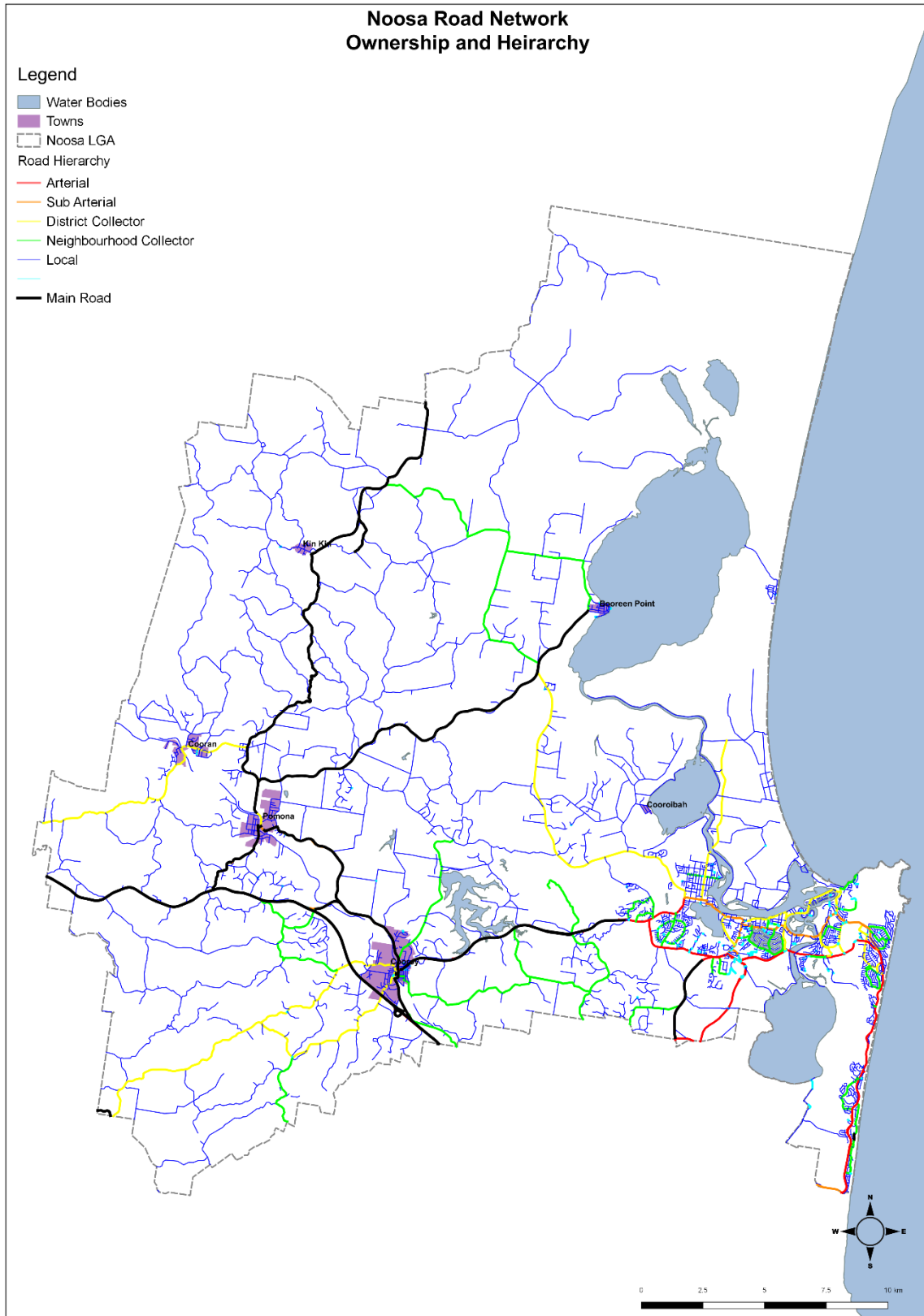


Figure 1: Noosa Shire Road Network

It can be seen from inspection of Figure 1 that State-controlled roads within Noosa Council extend to the fringes of the Coastal area, but do not intrude into that Coastal area. In addition, the State-controlled roads provide the primary access routes used by those parts of Noosa outside of the Coastal area. Thus, State-controlled roads provide the primary access routes to the Coastal area, and to the Noosa areas outside of the Coastal area, but all of the roads within the Coastal area are administered by Noosa Council. For this reason, and also because the majority of traffic issues are located within the Coastal area, a large part of this study is devoted to roads within that Coastal area. However, the road system in the areas of Noosa that lie outside of the Coastal area are also considered, particularly in Cooroy, where there are significant concerns at several locations on the State-controlled road system.

1.3 Previous Noosa Traffic Study (August 2002)

The previous Noosa Traffic Study was documented within the “Coastal Area Traffic and Transport to 2016” study prepared by Beard Traffic Engineering Pty Ltd in August 2002. Since that was prepared, the then planned major road links have been completed, including Eenie Creek Road and Walter Hay Drive. Those new road links provided significant relief to congestion on the road system, while also facilitating new infill residential development throughout the Coastal area, as well as commencement of a significant part of the Shire Business Centre (Noosa Civic) at Noosaville.

This study adopts a similar philosophy to that adopted in the preceding study.

1.4 Variations in traffic throughout the year

Since preparation of the previous Noosa Traffic Study, a number of well-located permanent traffic counting stations have been installed at strategic locations on major roads within the Coastal area. These have recorded hourly traffic flow data at those locations throughout the year. Unfortunately, not all of the data is complete due to intermittent equipment issues but interrogation of the available data provides a wealth of information to inform this study. For example, while traffic in some parts of Noosa are significantly influenced by school holiday periods and events such as the Noosa Triathlon, a large proportion of the Coastal area experiences peak daily traffic flows in the peak holiday season and are only marginally higher than peak daily traffic flows that occur outside of school holiday periods. Thus, for a large part of the Coastal area road network, traffic flows are relatively consistent throughout the year irrespective of tourist and special event periods, while other parts are heavily influenced by those tourist and special event periods (such as Noosa Heads north of Noosa Junction being the most heavily influenced). The influence of those tourist and special events periods on the road system diminishes the further you move from the most heavily tourist influenced part of Noosa Heads.

1.5 Traffic growth

Traffic growth in the Noosa region into the future will be driven primarily by population growth, as well as by new commercial developments. Population projections have been supplied by the Queensland State Government to the year 2036, and these indicate that population growth within Noosa will be low. Noosa Council town planners have advised that additional

commercial development within Noosa over the period of this study is also expected to occur at a low rate.

1.6 Study methodology

In the circumstances outlined above, with expected low rates of population and commercial area growth, this traffic study has reasonably been undertaken in the absence of area wide road network modelling, and has been undertaken on the basis of applying growth factors to existing traffic movements. Because intersection capacities essentially define the capacity of an urban road network, extensive traffic counts were undertaken throughout the road system as a basis for intersection analysis following application of growth factors.

The study analysed all critical intersections under 2015 peak hour conditions. It then analysed all critical intersections under predicted 2036 peak hour traffic conditions, at the end of the design horizon for this study. For the intersections that are insufficient under 2036 conditions, further analysis was then undertaken to identify recommended upgrading measures and when those upgrading measures are likely to be required.

1.7 Conclusion

The study concludes that the existing Noosa road network can be suitably upgraded to satisfactorily accommodate traffic flow projections to the 2036 design year while retaining the free flowing roundabout based system without signalised intersections. Importantly however, flow metering of one or two critical roundabouts will be necessary during Peak periods to maintain the roundabout based system. Upgrading of the road network to achieve that outcome, and associated suggested timing to maintain congestion free conditions during the busy holiday times of the year, are recommended and outlined in this report.

The most critical part of the Noosa road system is the section of Eumundi Noosa Road between Beckmans Road and Eenie Creek Road. Critically, if future developments within the coastal area are approved that add significant traffic flows to that part of the road system, then it is unlikely that the free flowing roundabout based system could be retained, and that upgrading of intersections to full traffic signal control would then be required. Such an outcome would be very costly to implement and is contrary to Noosa's traffic management philosophy

This study also includes recommendations regarding some upgrading of State-roads within Noosa Shire to facilitate cooperation with the State government regarding planning for implementation of State-controlled roads. In this respect it is suggested that for the benefit of the Noosa community and visitors to the region, Council pursue such infrastructure improvements with the State government. It is also recommended that the duplication of Beckmans Road be pursued with the State government as a matter of urgency, as this road is already in need of upgrading and there is a Deed of Agreement in place for DTMR to undertake such works.

2 TRAFFIC DATA

2.1 Coastal area traffic data

There are a series of well-located permanent traffic count installations within the coastal area. These were installed in about 2010. While the data obtained from those permanent traffic count locations is incomplete in many instances due to intermittent equipment issues, the information nonetheless provides a very good basis for examining the distribution of traffic throughout the coastal area across the day and at different times of the year.

Figure 2 shows the locations of the permanent traffic counters, as well as the approximate average annual daily traffic (AADT) for the years 2001, 2011, and 2014. The 2011 and 2014 data was obtained from the permanent traffic counter information, while the 2001 data was obtained from the “Coastal Area Traffic and Transport to 2016” study prepared by Beard Traffic Engineering Pty Ltd in August 2002.

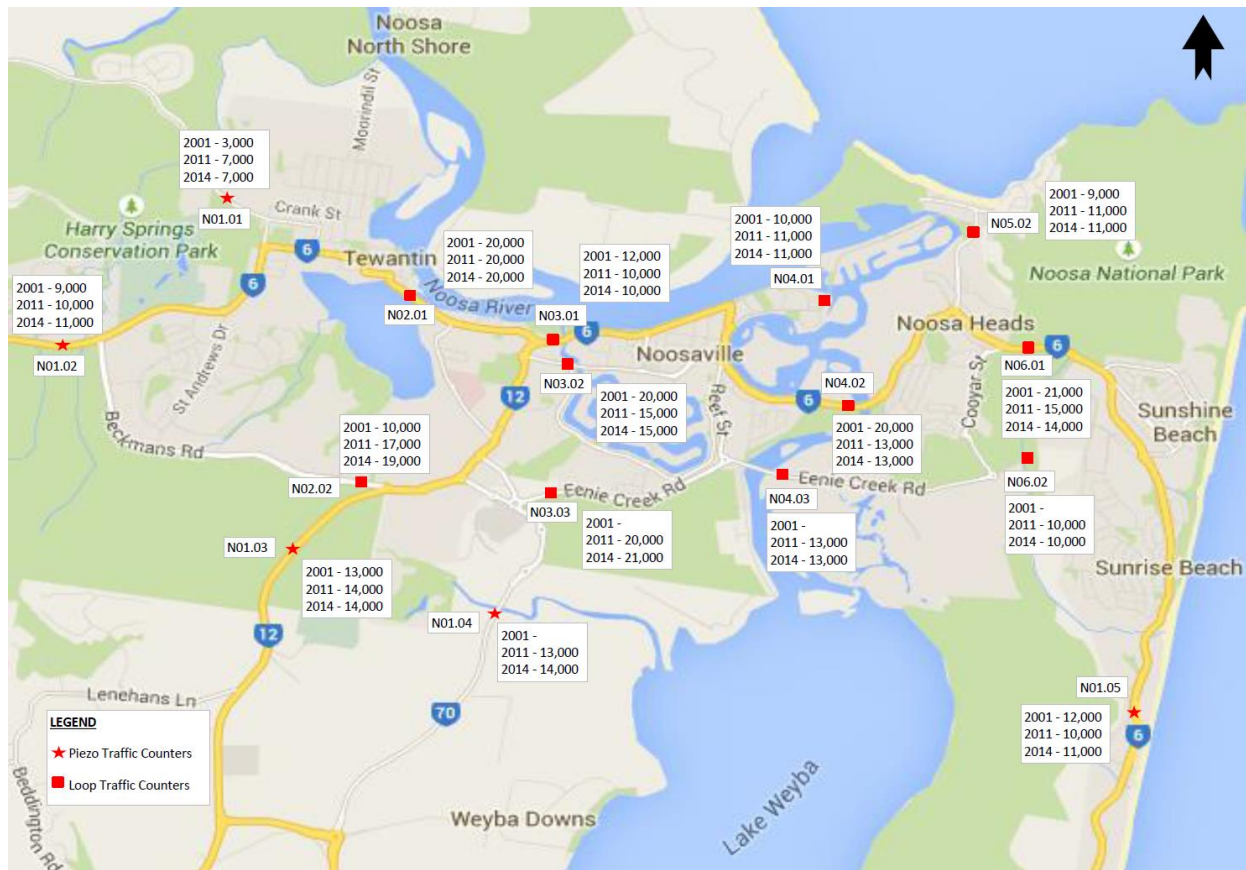


Figure 2: Permanent traffic count locations and historical daily traffic

An important observation from inspection of Figure 2 is that traffic flows on most roads have not changed significantly since 2001, with the exception of Beckmans Road. Walter Hay Drive and Eenie Creek Road have been implemented since 2001 and those new roads have accommodated most of the traffic growth that has occurred since 2001.

A further important observation relates to two lane road capacity which is generally accepted to

be about 16,000 - 20,000 vehicles per day, depending on the amount of “friction” (access points, on-street parking pedestrian crossings, etc.) along the road. Notably, Poinciana Avenue, Memorial Avenue, Beckmans Road, and the southern end of David Low Way are all approaching that capacity limit. Other parts of the road network are at or approaching capacity as a result of intersection capacity constraint, which is the typical capacity inhibitor within an urban road network.

As a basis for intersection capacity assessment, traffic counts were undertaken at a large number of intersections throughout Noosa. Some pre-existing traffic counts from 2014 were utilised, but the vast majority of traffic counts were undertaken specifically for this study in April / May 2015 at specific times as described later in this Section.

Permanent traffic counter output was interrogated to firstly determine the busiest times of the day and week in April and May so that the new traffic surveys could be undertaken at appropriate times of the week in the most efficient manner possible. For example, in some areas the busiest periods were clearly at the morning and evening school and commuter peaks, whereas at other locations the middle of the day on the weekday was potentially busiest, and at other locations the busiest periods occurred on the weekend (Saturday).

The timing of new traffic counts was coordinated to ensure the surveys were not undertaken during the period of closure of Walter Hay Drive due to roadworks, which significantly impacted traffic flows throughout the coastal area during that time.

With the new intersection traffic count data being obtained in April and May, outside of the school holiday periods, the permanent traffic counter information was also interrogated to determine how traffic flows in April and May compared to those at the busiest times of the year, such as the Christmas school holiday period and events such as the Noosa triathlon. For that purpose, peak hour and peak daily traffic flows were examined for each permanent counter location in the week of the Noosa triathlon, the last week in November (before school holidays), the week before Christmas, the peak day in the Christmas week, the week after New Year, the first week in February (after school holidays), and the first week of May. This enabled May traffic flows at each permanent traffic count location to be related to the traffic flows at that location at the busiest times of year. Note that peak daily traffic flows at the majority of locations occurred in the Christmas week, although some occurred in the week of the Noosa triathlon.

Interestingly, the impacts of holiday and special event periods on large parts of the coastal area road network are relatively minor, but those impacts increase substantially the closer you are geographically to the main Noosa Heads tourist strip along the coast and on the southern side of the Noosa River. This is illustrated in Figure 3 which has been derived from the analysis of the permanent traffic count information to identify three Zones - A, B and C within the coastal area within which the variation between the daily traffic in May (when the new intersection surveys were undertaken), and the daily traffic at the peak times of the year, are similar to each other.

Figure 3 shows that in Zone A there is a large variation between daily traffic during peak holiday / event periods and traffic at other times of the year, with May daily traffic being approximately 65% of daily traffic at the busiest times of year. For Zone B the variation between peak and off-peak periods is less than Zone A at about 85%, and within Zone C (which is the largest part of the coastal area) the impacts of holiday / event periods are the least, with daily traffic flows in May being about 95% of daily traffic flows that occur at the busiest times of the year.

The analysis of the permanent counter traffic data also indicates that peaks within the main tourist area (Zone A) typically occur on weekends, whereas in Zones B and C peaks typically occur on weekdays. Furthermore, within Zones A and B, traffic flows were typically spread relatively evenly throughout the day, with peaks occurring at any time of the day, whereas in Zone C, the distribution of traffic throughout the day and week is more typical, with defined AM and PM weekday peaks.

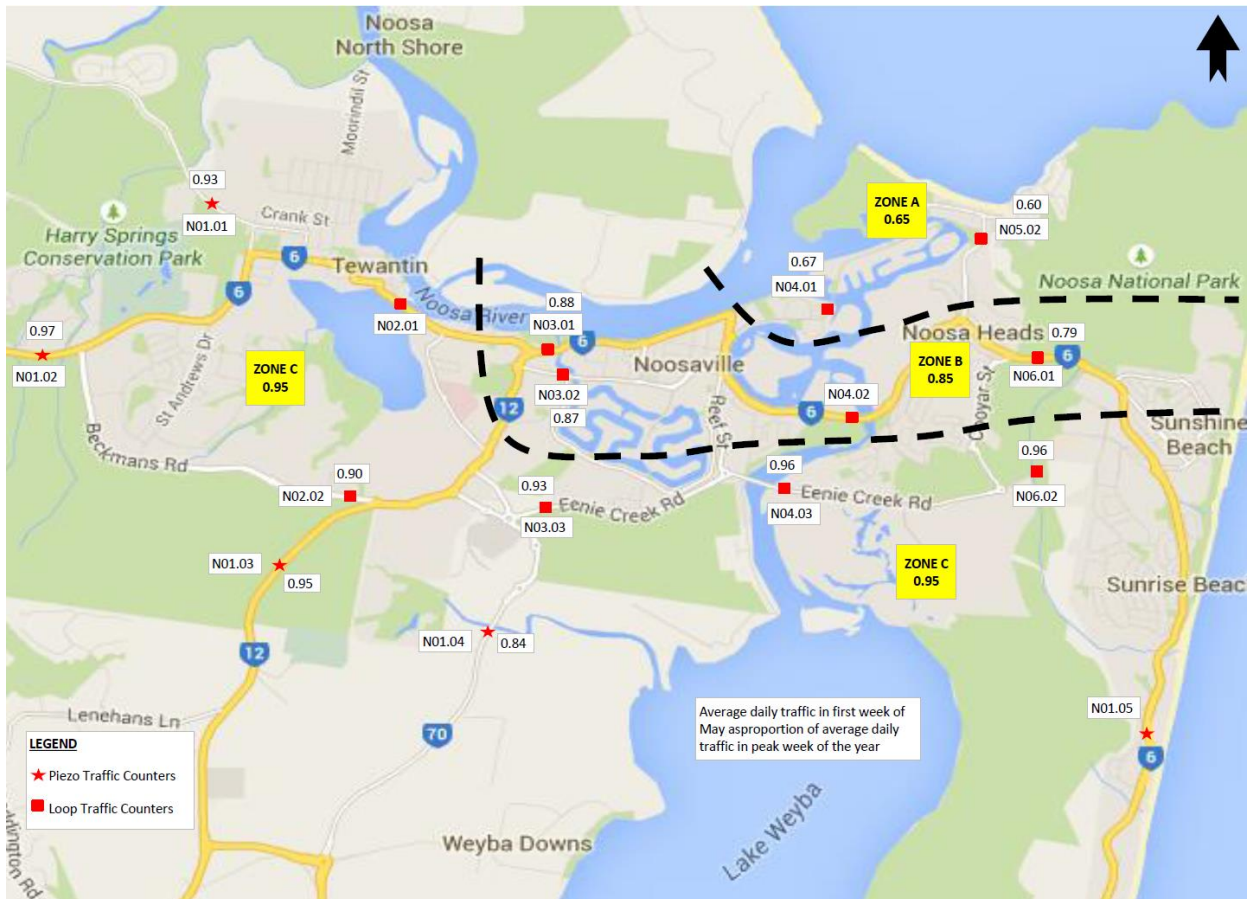


Figure 3: Variation between daily traffic in May and daily traffic at the peak week of the year

2.2 Rural areas traffic data

The majority of higher traffic carrying roads within Noosa, outside of the Coastal area, are State-controlled roads administered by the DTMR. Those roads include the Bruce Highway, Eumundi Noosa Rd (south of Beckmans Rd), Emu Mountain Rd, Cooroy Noosa Rd (west of Gyndier Dr), Cooroy Connection Rd and Pomona Connection Rd, Kin Kin Rd, Louis Bazzo Dr and McKinnon Dr.

As already stated, DTMR is currently conducting a separate study to plan for upgrading requirements to their roads, which is known as NORSCATS (Northern Sunshine Coast Area Transport Study)

Existing daily traffic flows on the major roads outside of the Coastal area (except the Bruce

Highway) are depicted in Figure 4. Inspection of Figure 4 indicates traffic flows outside of the Coastal area are highest through Cooroy, and to a lesser extent Pomona.

Further information showing historical daily traffic flows on roads in Cooroy are depicted in Figure 5.

Even though the busiest road system components of Cooroy and Pomona are on the State-controlled road system, the critical intersections through those townships have been assessed as part of this study.

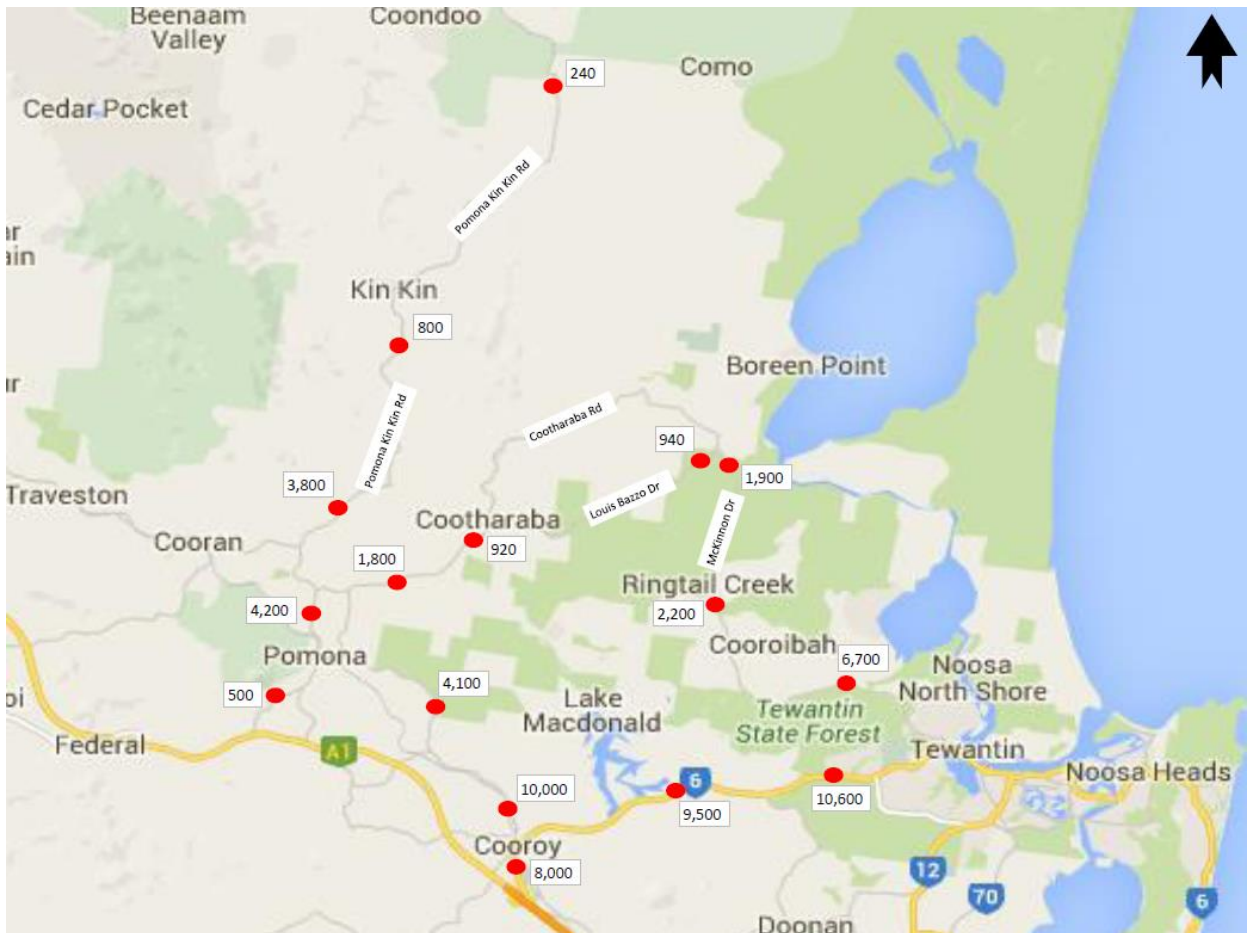


Figure 4: Daily traffic flows on roads in the rural areas of Noosa in 2013

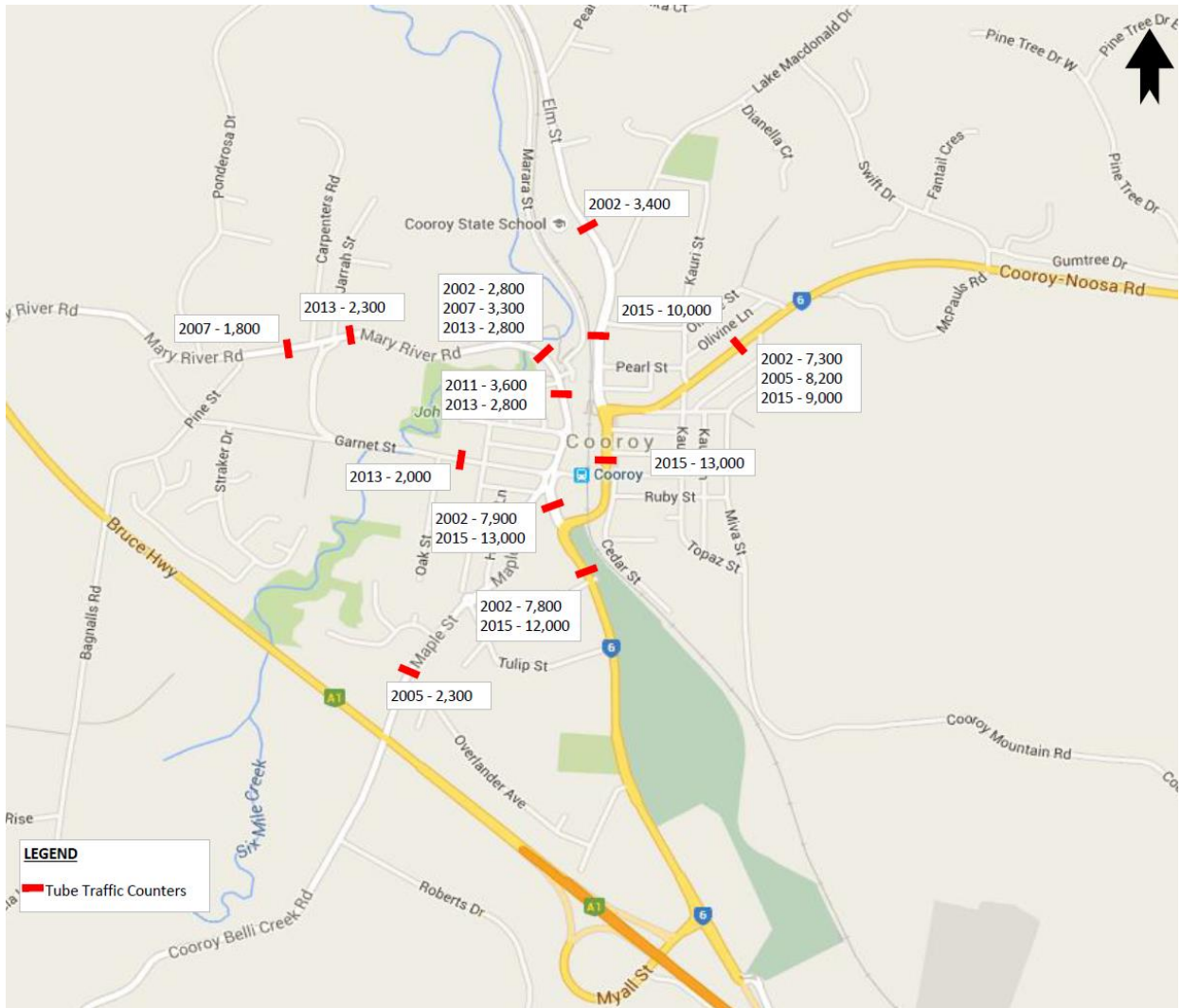


Figure 5: Historical Daily traffic flows on roads in Cooroy

3 YEAR 2015 TRAFFIC ANALYSIS – EXISTING CONDITIONS

3.1 Discussion of traffic analysis principles

The majority of traffic capacity issues in an urban road network occur at intersections. Therefore, this study has primarily focused on the performance of intersections at critical locations throughout the network. The majority of traffic capacity issues will arise in the populated coastal areas, but there are also existing issues outside of the main population areas, such as at Cooroy, which are also assessed.

Capacity analysis of the intersections has been undertaken using the industry standard SIDRA computer based intersection modelling package. The SIDRA package is widely used throughout Australia and is recommended by the DTMR. It has been refined over several decades, and is calibrated based on large amounts of research and case studies.

It is noted that there was initial concern expressed that the standard SIDRA roundabout operational parameters may not be representative of Noosa Conditions due to Noosa being a tourist town, and also due to Noosa having a higher than average proportion of the retirees. The inference being that SIDRA may overestimate the capacity of roundabouts in Noosa, because the higher proportion of tourists and retiree road users may wait for larger gaps in traffic before entering the roundabouts. However, critical operating times at the majority of major intersections within the Coastal Area road network occur during the AM and PM weekday commuter peaks, when tourist traffic and retiree traffic is typically a low proportion of the network demand. Furthermore, review of the intersection video recordings, used to identify peak period traffic flows, at the more critical intersections of the Noosa Road network, indicates that SIDRA appropriately models those critical intersections. The reviewed intersections included the following:

- Poinciana Avenue / Moorindil Street
- Memorial Avenue / Doonella Street
- Ernest Street / Hilton Terrace
- Beckmans Road / Eumundi Noosa Road
- David Low Way / Heron Street

The intersection layout (traffic lanes, traffic lane lengths, slip lanes, etc.), form of intersection control (“give way”, roundabout, traffic signals), traffic volumes, and other parameters are input to the SIDRA package. The model then outputs a series of parameters to indicate how the intersection is operating under the input traffic loadings.

Intersection performance in a capacity sense is measured primarily by the “Degree of Saturation” (DOS), which is one of the performance parameters output by the SIDRA package. This is the most commonly quoted intersection capacity analysis parameter and identifies the proportion of intersection capacity utilised. For example, a DOS of 0.80 means that 80% of intersection capacity is being utilised. A DOS of 1.0 indicates that the intersection is operating at capacity, with constant queuing on critical approaches to the intersection.

For traffic planning at roundabouts, which are the form of intersection at most major junctions within Noosa, the widely quoted desirable limit for the degree of saturation is 0.85. When a roundabout reaches a degree of saturation of 0.85 during the peak hour, there will be periods of queuing and delays at the roundabout, and there will also be periods of more free flowing conditions. A degree of saturation reaches 1.0 indicates that there will be a constant queue on

one or more of the approaches to the roundabout for virtually the entire peak period.

For roundabouts, when the DOS is below 0.75, delays and queuing are minimal. At DOS 0.85, average delays would typically be about 15 seconds per vehicle, increasing to 20 seconds at DOS 0.90, and greater than 30 seconds per vehicle for DOS 1.00. For example, the Moorindil St / Poinciana Ave intersection operates over-capacity in the morning peak (DOS 1.10) with long queues and delays on the Moorindil St approach at peak times. The Beckmans Rd / Eumundi Noosa Rd intersection also operated over capacity (DOS greater than 1.0) during peak periods when Walter Hay Drive was closed for reconstruction works in March 2015, resulting in delays of over 10 minutes on the Beckmans Road approach.

For “give way” and “stop” controlled junctions, the industry standard DOS limit is 0.80, and for signalised junctions it is 0.90. These have also been adopted in this study as being the trigger points for upgrading of intersections.

It is noted that the Noosa Planning Scheme and current Noosa Priority Infrastructure Plan identifies a desirable upper limit DOS of 0.70 for all intersections within Noosa. This was selected about 20 years ago, with the aim of inherently making allowance for busier holiday periods when applied to intersection analysis based on traffic counts in the non-holiday periods. Now that there is more data available within Noosa in relation to the variation in traffic flows during the holiday and non-holiday periods throughout various parts of the Council area, it is appropriate in this study to make specific allowance in the traffic flows where appropriate for the holiday periods, and then use the industry standard 0.85 DOS as the appropriate planning limit for roundabouts.

Importantly, the upper limit DOS of 0.70 as outlined in the Noosa Planning Scheme and current Noosa Priority Infrastructure Plan will be maintained for use by the development industry and in the assessment of development applications as they will unlikely have access to the extensive traffic data used in this study.

3.2 Year 2015 capacity analysis – Tewantin / Noosaville

Capacity analysis under existing conditions indicates degrees of saturation (DOS) at strategic intersections within the Tewantin / Noosaville area at peak times as depicted in Figure 6.

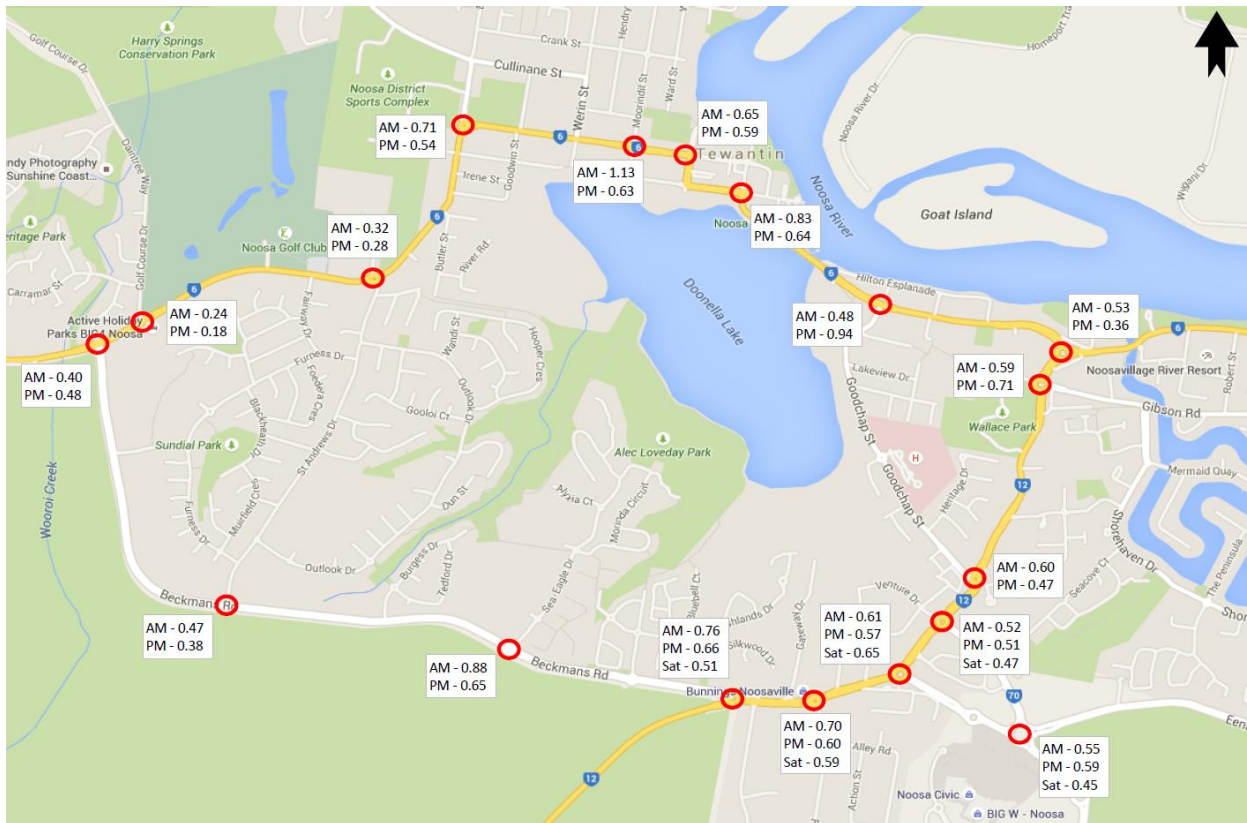


Figure 6: Year 2015 AM and PM peak hour Degrees of Saturation in Tewantin / Noosaville

The critical traffic related issues in this part of the network are:

- (i) Beckmans Road and rat-running along St Andrews Drive
- (ii) Poinciana Ave / Moorindil St intersection and westbound queuing along Poinciana Ave in the PM peak.
- (iii) Ernest St / Hilton Tce intersection
- (iv) Memorial Ave / Doonella St intersection
- (v) Eumundi Noosa Rd between Beckmans Rd and Gympie Tce

Each of those issues are discussed in more detail in the balance of Section 3.2 below. Note that Section 3.2 discusses what the existing traffic issues are, but does not recommend solutions, other than for Beckmans Rd. Possible solutions for intersection upgrades are discussed in later sections of this report, with section 6.0 providing a summary of recommended improvements.

3.2.1 Year 2015 – Beckmans Rd upgrading and St Andrews Drive rat-running

Beckmans Road is a two lane road carrying almost 20,000 vehicles per day, which is the normal upper capacity limit for a two lane road. In addition, the Beckmans Road intersection with Eumundi Noosa Road is operating with a DOS of 0.76 in the AM peak and the Beckmans Road / Sea Eagles Drive intersection is operating with a DOS of 0.88 in the AM peak. All of these factors indicate that Beckmans Road needs to be duplicated in the near future, at least between St Andrews Drive and Eumundi Noosa Road.

Upgrading of Beckmans Road (also referenced as the Tewanin Bypass) formed part of the year 2000 de-maining agreement between Noosa Council and DTMR, which specified that DTMR would plan, design and construct the bypass. In that regard, negotiation between Council officers and DTMR, including upgrading of the Beckmans Rd / Eumundi Noosa Rd intersection, is proceeding.

At the time of writing this report, traffic modelling of the corridor had been completed by DTMR. This modelling highlighted the existing traffic impacts and the need for upgrading works to commence as soon as practically possible as the existing road does not meet current demand and is far from being able to cater for future traffic growth.

Significant rat-running currently occurs along St Andrews Drive because St Andrews Drive is a “short-cut” for travel between eastern end of Beckmans Road and Butler Street. In that regard, traffic flows in Beckmans Rd west of St Andrews Dr are only slightly greater than those in St Andrews Dr. St Andrews Dr is a residential collector street with traffic calming along its length. St Andrews Dr was not planned or designed to operate as a rat-run. There is the potential to reduce rat running along St Andrews Dr through innovative planning of the Beckmans Rd upgrade. One possible solution to this would be as generally depicted in Figure 7, in which case 4 lanes would be required along the full length of Beckmans Rd.

While the degrees of saturation at the Beckmans Rd / Cooroy Noosa Rd intersection are not high, this is primarily because the volumes of traffic turning right from Beckmans Rd into Cooroy Noosa Rd (toward the north-east) are relatively low, with the vast majority of the demand for that right turn movement currently rat-running northbound along St Andrews Dr. Even so, average delays of about 30 seconds per vehicle are currently experienced by vehicles undertaking that critical right turn movement from Beckmans Road into Cooroy Noosa Road. Upgrading this intersection to a roundabout configuration would significantly reduce those delays, would contribute to a reduction in rat running along St Andrews Dr, and would be essential if the Beckmans Rd arrangement depicted in Figure 7 (or similar duplication) is implemented.

Duplication of Beckmans Road would require a dual lane roundabout at the Sea Eagles Drive intersection, which would resolve the existing capacity issue at that intersection.

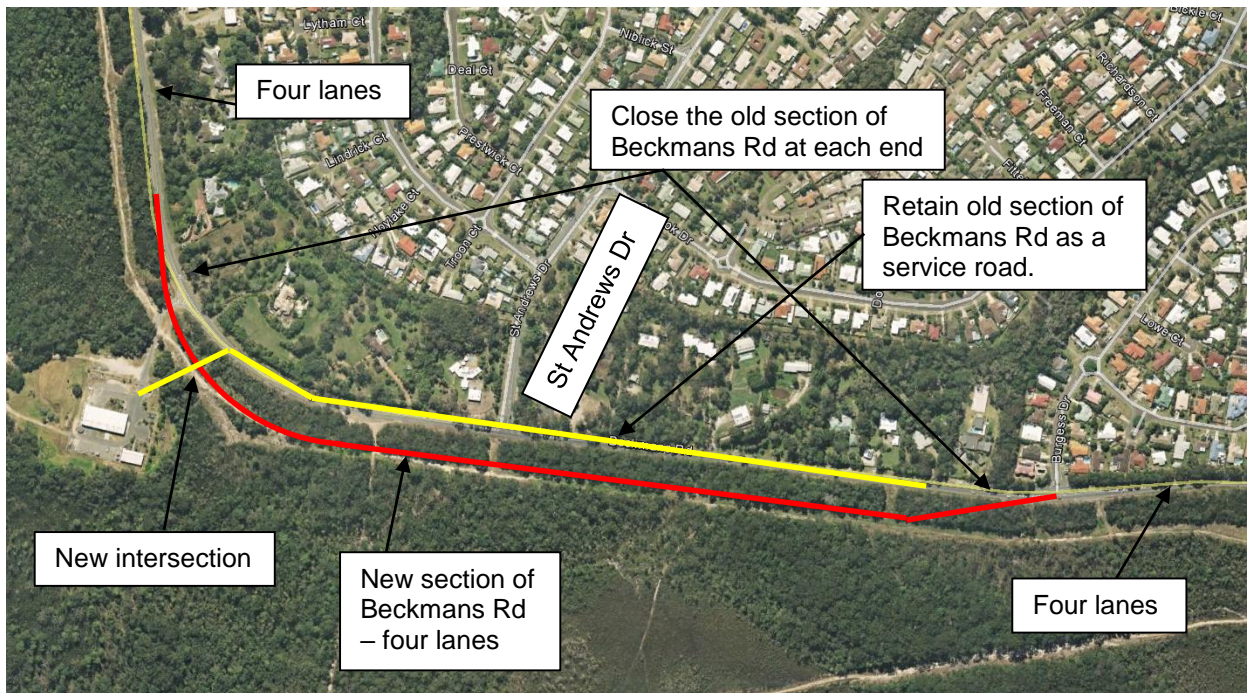


Figure 7: Possible planning for Beckmans Rd to eliminate rat-running along St Andrews Dr

3.2.2 Year 2015 – Poinciana Ave / Moorindil St intersection

The Poinciana Ave / Moorindil St intersection is already operating at capacity with long delays and queuing on the northern Moorindil St approach to the intersection in the AM peak. There are also some westbound PM peak congestion issues along Poinciana Ave that appear to originate at this intersection, with observation indicating that although there are two lanes on the westbound approach to the intersection, traffic on that approach rarely splits into two lanes because the opposing traffic volumes, from Moorindil St (north), are low. Thus, traffic on the westbound Poinciana Ave approach forms a single lane slow moving queue, with that single lane comprising both westbound through traffic and the relatively high volume turning right into Moorindil St (north).

This intersection needs to be upgraded in the near future and as part of these works the roundabout should be designed to be consistent with other roundabouts along the Poinciana Avenue corridor, such as the Werin St roundabout and the Butler St roundabout, both of which have a dedicated right turn lane for the westbound approach.

3.2.3 Year 2015 – Ernest St / Hilton Tce intersection

The Ernest St / Hilton Tce intersection is operating near absolute capacity levels in the AM peak, with long queues and delays to traffic turning from Ernest St into Hilton Tce. This intersection needs upgrading in the near future.

3.2.4 Year 2015 – Memorial Ave / Doonella St intersection

The Memorial Ave / Doonella St intersection is approaching its 0.85 DOS limit during the AM peak. This is on the western Doonella St approach to the intersection, and is due to the high volume on that approach having to give way to the moderate volume of traffic that moves north through the roundabout on Memorial Ave, and turns right into Lake St.

3.2.5 Year 2015 – Eumundi Noosa Road

Eumundi Noosa Road between Beckmans Road and Goodchap Road is a four lane divided urban arterial road having dual lane roundabouts along its length. The roundabouts are currently operating with degrees of saturation at the weekly peaks as follows:

- Beckmans Rd 0.76
- Rene St / Gateway Dr 0.70
- Eenie Ck Rd 0.65
- Walter Hay Dr 0.52
- Goodchap St 0.60

Capacity of the Beckmans Road / Eumundi Noosa Road intersection will be addressed as part of the DTMR works when duplicating Beckmans Road.

There are opportunities for improving capacity of the existing Eumundi Noosa Road roundabouts at Eenie Ck Rd, Walter Hay Dr, and Goodchap St. However, there are no obvious opportunities for improving capacity of the existing Rene St / Gateway Dr / Eumundi Noosa Rd intersection, which is likely to be the ultimate location of capacity constraint along the Eumundi Noosa Road route.

Careful management of growth in traffic demands along the Eumundi Noosa Road route between Beckmans Rd and Gympie Terrace will be required if the free flowing roundabout based nature of the network is to be maintained. This is discussed in more detail later in this report.

3.3 Year 2015 capacity analysis – Noosaville / Noosa Heads / Sunshine Beach

Capacity analysis under existing conditions indicates degrees of saturation (DOS) at strategic intersections within the Noosaville / Noosa Heads / Sunshine Beach area at peak times as depicted in Figure 8.

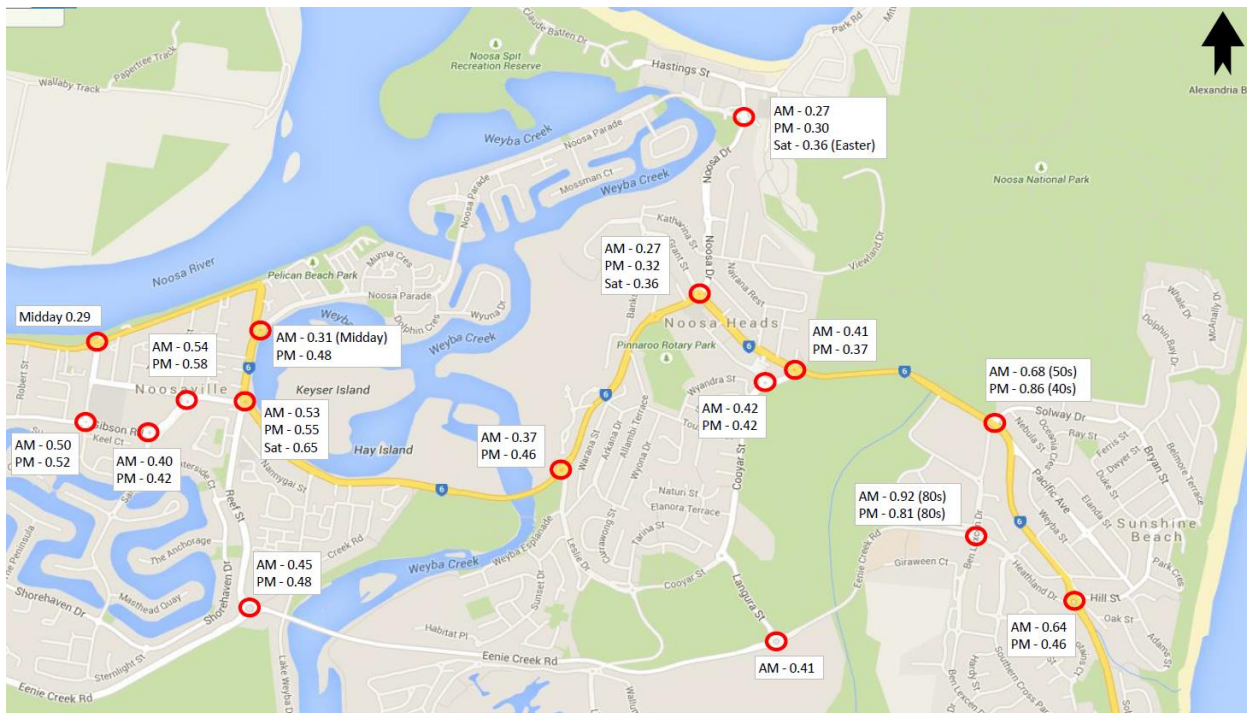


Figure 8: Year 2015 AM and PM peak hour Degrees of Saturation in Noosaville / Noosa Heads / Sunshine Beach

The critical traffic related issues in this part of the network are:

- (i) Reef St / Weyba St / Mary St intersection
- (ii) Hastings St area
- (iii) Ben Lexcen Dr / Eenie Ck Rd intersection

Each of those issues are discussed in more detail in the balance of Section 3.3 below. Note that Section 3.3 discusses what the existing traffic issues are, but does not recommend solutions. Possible solutions for intersection upgrades are discussed in later sections of this report, with Section 6 providing a summary of recommended improvements.

3.3.1 Year 2015 – Reef St / Weyba St / Mary St intersection

With the heavier influence of holiday traffic loadings in this part of the network, the Reef St / Weyba Rd intersection will require additional capacity over the period of this study. However, if congestion and delays at that location during peak holiday periods are tolerable, then the

upgrading could occur later rather than sooner.

3.3.2 Year 2015 – Hastings St area

There is existing congestion in the Hastings St area at peak times. However, intersection analysis indicates that intersection capacity does not inhibit capacity of the network at the busy Hastings St area. Rather, inspection indicates that performance of the intersections in that area at peak times is impaired by vehicles queuing back into the roundabouts from other nearby road user activities such as usage of zebra crossings and other on-road pedestrian activity, slow moving vehicles searching for parking spaces, and vehicles being delays while other vehicles wait for and access on-street parking. Increasing the capacity of intersections in that area will not resolve the congestion issues. This is a matter that will need to be addressed (if it is to be resolved at all) by further strategic studies in relation to transport and parking, and detailed traffic management in that area.

3.3.3 Year 2015 – Ben Lexcen Way / Eenie Ck Road intersection

The intersection analysis indicates relatively high degrees of saturation at the signalised Ben Lexcen Dr / Eenie Ck Rd intersection. However, the peak period traffic signal cycle time is not considered excessive, so there is scope to increase the traffic signal cycle length in order to create greater capacity at the intersection with its existing configuration.

Observation also indicates unnecessary delays to Eenie Ck Rd traffic at the Ben Lexcen Dr intersection during off-peak periods. This appears to be a result of inefficient operation of the existing signals, rectification of which should be discussed with the consultant that manages existing operation of the traffic signals.

Further upgrading of this intersection will be required before the year 2036, details of which are discussed later in this report.

3.4 Year 2015 capacity analysis – Peregian Beach North

Capacity analysis under existing conditions indicates degrees of saturation (DOS) at strategic intersections within the Peregian Beach North area at peak times as depicted in Figure 9.

The critical traffic related issue in this part of the network is that the priority controlled Lowry St / David Low Way / Peregian Esplanade intersection operates near ultimate capacity in the morning peak, with a DOS of 0.89 (the standard practical limit for “give way” and “stop” controlled junctions is DOS 0.80). The critical movements are the right turn from Peregian Esplanade to David Low Way (north) and the right turn from Lowry St to David Low Way (south). Alternative routes for those movements are very circuitous, so upgrading of the intersection is recommended.

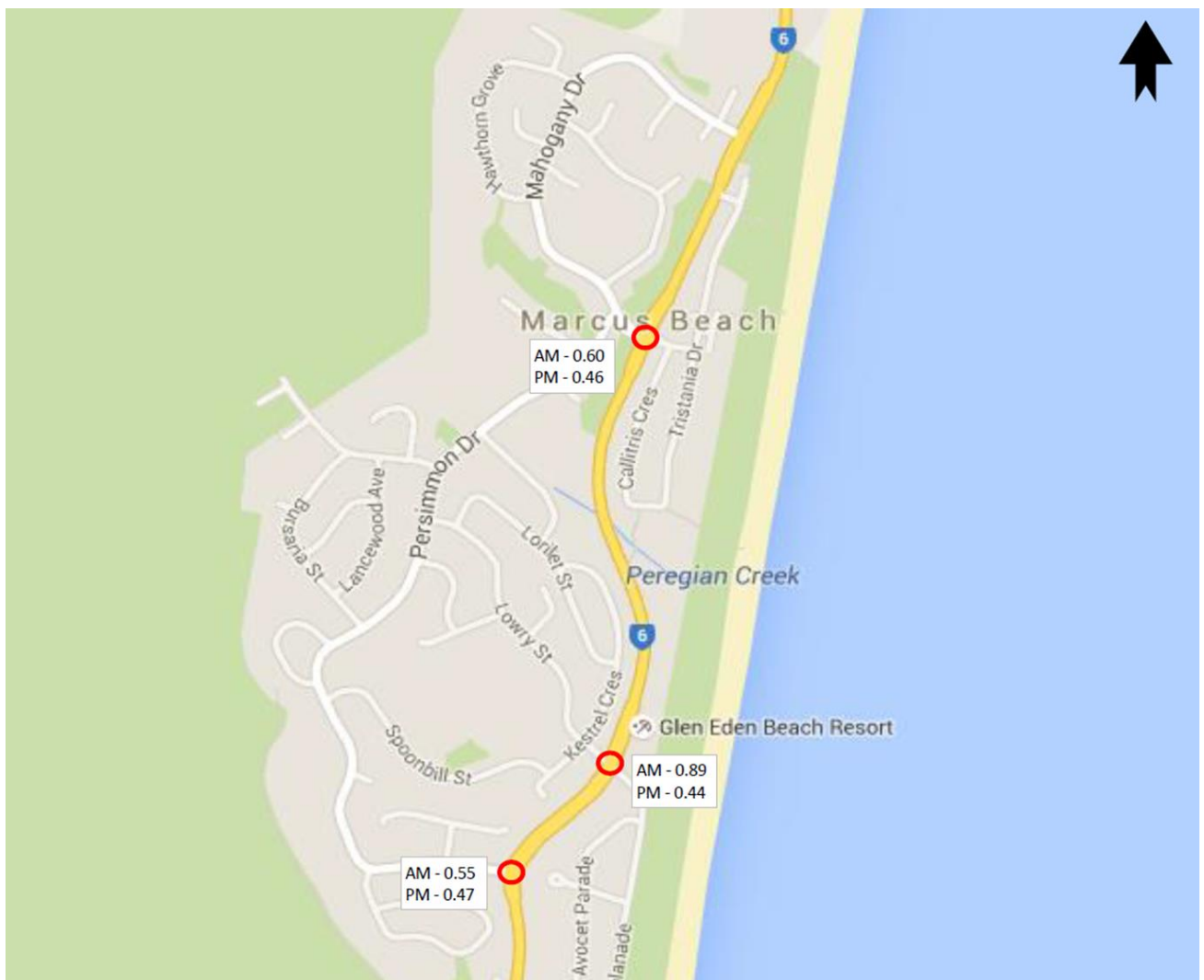


Figure 9: Year 2015 AM and PM peak hour Degrees of Saturation in North Peregian

3.5 Year 2015 capacity analysis – Peregian Beach South

Capacity analysis under existing conditions indicates degrees of saturation (DOS) at strategic intersections within the Peregian Beach South area at peak times as depicted in Figure 10.

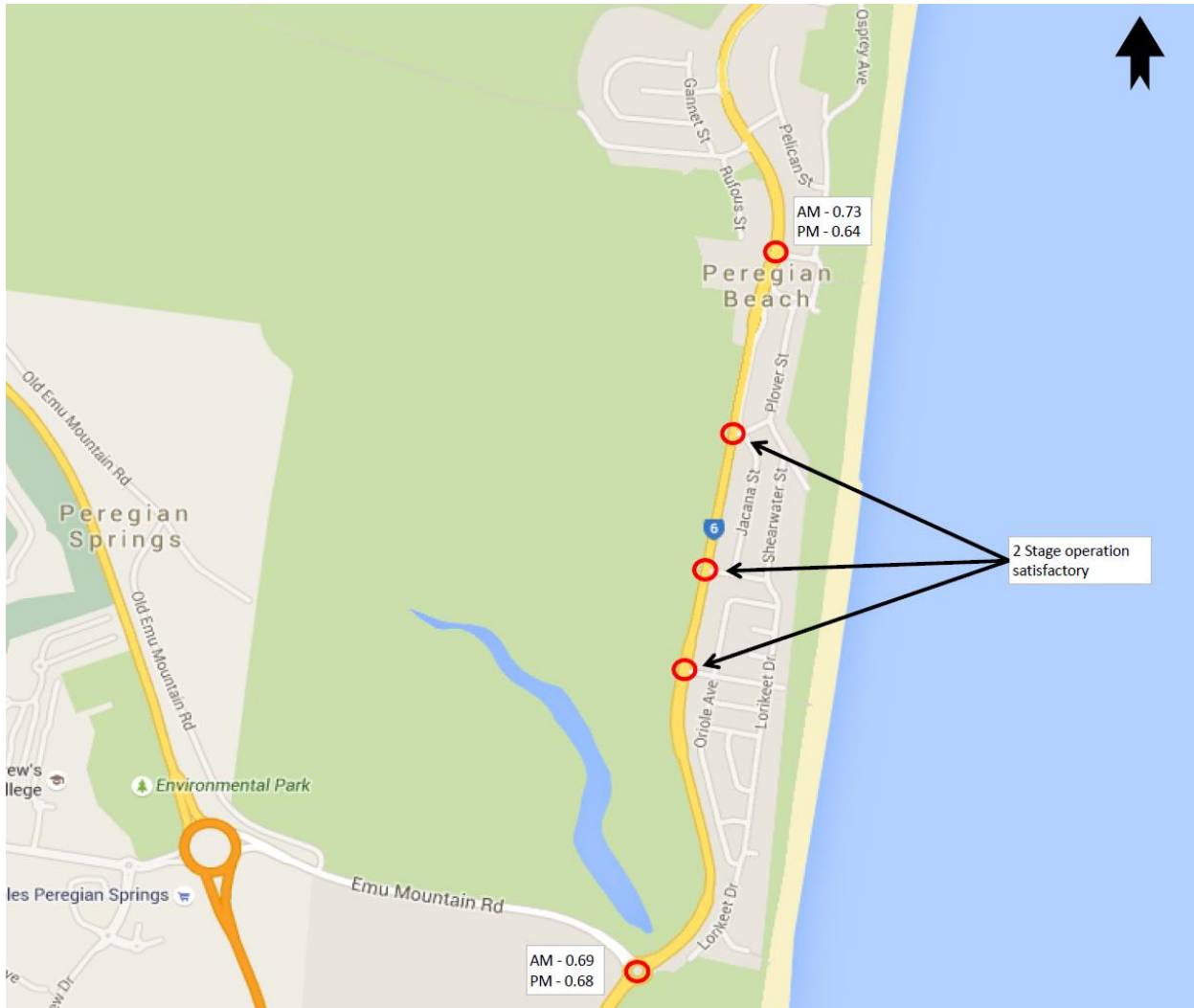


Figure 10: Year 2015 AM and PM peak hour Degrees of Saturation in South Peregian

The critical traffic related issues in this part of the network are:

- (i) High traffic flows along David Low Way
- (ii) Heron St / David Low Way intersection
- (iii) David Low Way / Emu Mountain Rd intersection

Each of those issues are discussed in more detail in the balance of Section 3.5. Note that Section 3.5 discusses what the potential traffic issues are, but does not recommend solutions. Potential solutions for intersection upgrades are discussed in later sections of this report, with Section 6 providing a summary of recommended improvements.

3.5.1 Year 2015 – High traffic flows along David Low Way

There are several priority controlled (“give way”) t-junctions within this area that need to contend with relatively high traffic flows along David Low Way. Those intersections operate in a satisfactory manner and will continue to do so into the future because they are constructed with wide median areas in David Low Way so that traffic turning right from the side streets is able to undertake that critical right turn movement in two stages, by firstly crossing one direction of David Low Way traffic, and then waiting within the wide median area before then entering the other direction of David Low Way traffic.

3.5.2 Year 2015 - Heron St / David Low Way intersection and David Low Way / Emu Mountain Rd intersection

To accommodate future traffic growth, upgrading to the Heron St / David Low Way roundabout and the northern leg of the David Low Way / Emu Mountain Rd roundabout (controlled by DTMR) are likely to be required.

3.6 Year 2015 capacity analysis – Cooroy

Capacity analysis under existing conditions indicates degrees of saturation (DOS) at strategic intersections within the Cooroy area at peak times as depicted in Figure 11.

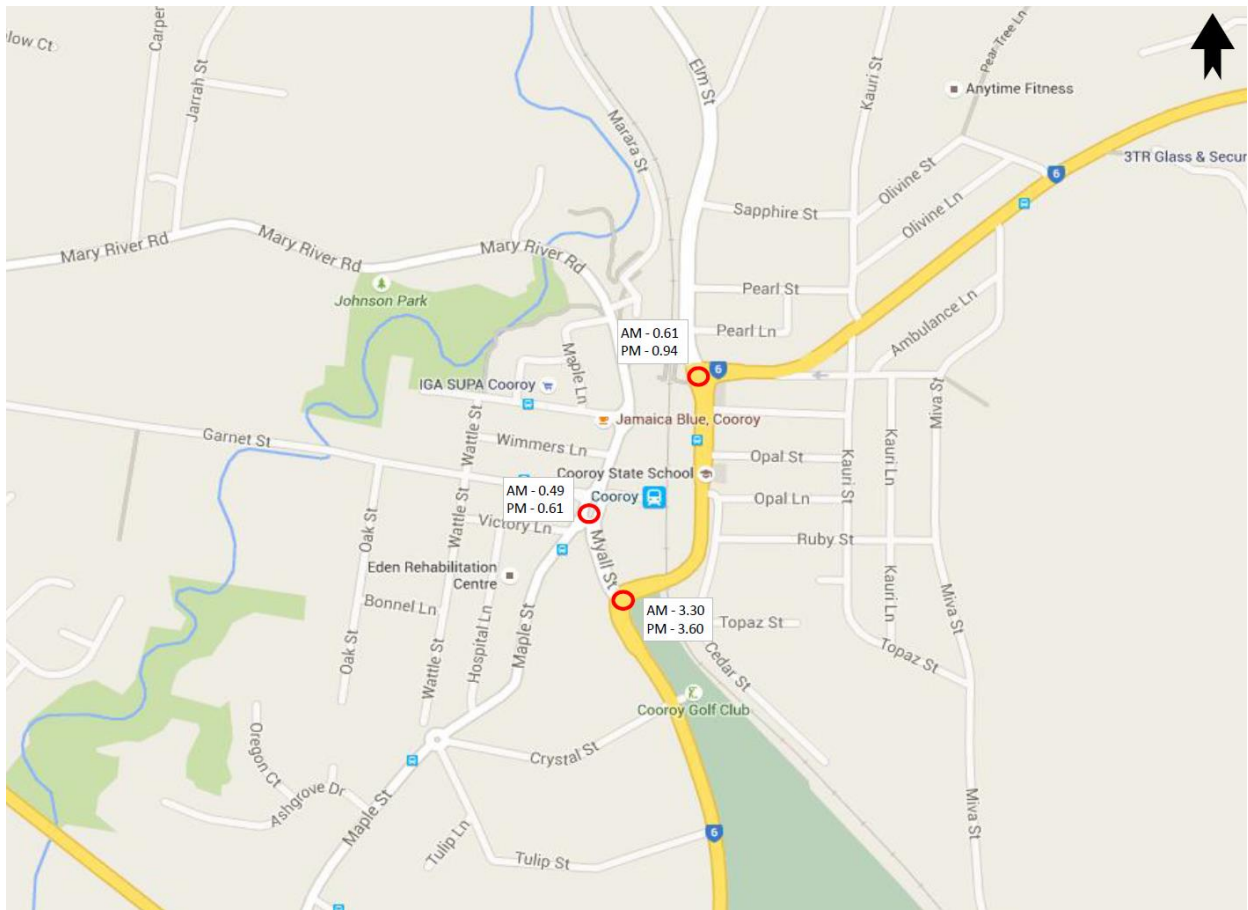


Figure 11: Year 2015 AM and PM peak hour Degrees of Saturation at Cooroy

The critical traffic related issues in this part of the network are:

- (i) Myall St / Elm St intersection
- (ii) Diamond St / Elm St intersection

The Myall St / Elm St intersection is operating way over capacity. The only way this intersection conveys the volume of traffic that it does from Myall St (south) into Elm St (east) is due to the low speed environment and the courtesy of other drivers using the intersection. This intersection is part of the State-controlled road network and negotiations have commenced with DTMR in relation to its upgrading.

The Diamond St / Elm St intersection is almost at absolute capacity, with there being issues turning right from Diamond St into Elm St (north) in the afternoon peak. This intersection is also part of the State-controlled road network and negotiations have commenced with DTMR in relation to its upgrading.

4 FUTURE TRAFFIC GROWTH

Traffic growth to the end of the design horizon of this study in 2036 will be governed by population growth and further commercial development.

The state has provided population projections to the year 2036. The population projections have been grouped into “Statistical Areas” (SA’s).

The population projections within the Noosa Shire area according to the “Statistical Areas” (SA’s), with 2011 being actual census data and later years being forecasts, are as follows:

Year	<u>2011</u>	<u>2016</u>	<u>2021</u>	<u>2026</u>	<u>2031</u>	<u>2036</u>
Noosa Hinterland	17769	19004	20204	21649	22496	23156
Noosa Heads	4221	4348	4721	5101	5491	5871
Noosaville	8064	9003	9257	9518	9771	10077
Peregian Beach	3929	4141	4286	4412	4457	4485
Sunshine Beach	6697	6767	6914	7098	7295	7475
Tewantin	<u>10358</u>	<u>10526</u>	<u>10767</u>	<u>11102</u>	<u>11416</u>	<u>11696</u>
Total	51038	53818	56150	58881	60925	62759

Important conclusions to be drawn from inspection of this data is as follows:

- (i) Population growth is spread relatively evenly across all the broader areas of Noosa Shire.
- (ii) Population growth is predicted to occur at a relatively consistent rate as time progresses.
- (iii) Average population growth from 2016 to 2036 is 0.77%pa, while from 2011 to 2036 it is 0.83%.

Given that it is now 2016, and that traffic counts for this study were undertaken in 2015, the appropriate rate of growth for this study is likely to be closer to the rate of population growth from 2016 to 2036, rather than that from 2011 to 2036. On that basis, this study has adopted a growth rate of 0.8%pa from 2015 to 2036 across the Noosa Shire network, which equates to a factor of 1.18 to increase 2015 traffic volumes to 2036 traffic volumes.

It is noted that car ownership rates have stabilised, and projections are for the average age of Noosa’s population to increase over the horizon of this study. Thus, there is an argument that the rate of growth in traffic may actually be slightly less than the rate of population growth in Noosa.

Consideration has also been given to the Peregian Springs development area located beyond, but on the on the fringe of, the Noosa Shire boundary. Population projections for Peregian Springs are increasing from 4069 people in 2011, to 5911 people in 2016, and 10264 people by 2026, and then very low further growth to 2036.

Peregian Springs is located slightly closer to the Tewantin / Noosaville commercial facilities than to the Nambour and Maroochydore commercial centres (Coolum is located closer to Nambour and Maroochydore than to Tewantin / Noosaville). Peregian Springs has its own

supermarket, primary and secondary schools (both State and private), and other facilities, so will continue to have a good level of self-containment. While there will be some level of demand for connection between Peregrian Springs and Noosa Shire, particularly the Noosa Beaches, the majority of external Peregrian Springs traffic would be oriented in the south to the more extensive facilities in the more heavily populated areas of Sunshine Coast Regional Council. For this reason, it has not been considered necessary to allow for specific additional growth on Noosa Roads, as a direct result of growth in Peregrian Springs, over and above the broad rate of growth adopted in this study.

In order to indicate predicted 2036 traffic conditions during holiday and non-holiday periods, assessment has been undertaken at each intersection firstly using the factor of 1.18 to inflate 2015 non-holiday conditions to represent 2036 non-holiday periods, and then the further factors depicted in Figure 3 for zones A, B, and C have been used to represent 2036 holiday periods. The overall factors applied to the 2015 non-holiday conditions to represent the 2036 holiday / event periods are as follows:

Zone A (1.18/0.65)	1.82 factor
Zone B (1.18/0.85)	1.39 factor
Zone C (1.18/0.95)	1.24 factor

In addition to population growth, there also needs to be allowance made for some expansion of the commercial areas of Noosa. Although given the low population growth projections, it would be expected that growth in commercial areas and employment growth would be similarly low, and to a large extent taken into account by allowance for population growth, as the growth in commercial areas is typically to service population growth, unless an existing centre changes size and form sufficiently to increase its attractiveness to areas beyond the study area.

Specific commercial area expansions that have been included in this assessment to 2036, in terms of impacts on the roads in the vicinity of those developments, are as follows:

- (i) There is an approval for an 11,500 sq m “Masters Home Improvement” retail showroom development within area E5 of the Shire Business Centre.
- (ii) In the absence of any further information, this study has made an allowance for a total additional 12,000 sq m GFA of office area in the Shire Business Centre to the year 2036.

5 YEAR 2036 ROAD NETWORK IMPLICATIONS

The primary purpose of this study is to assess road system upgrading requirements within Noosa Shire to the year 2036. Year 2015 road system capacity analysis has been documented and discussed in Section 3 of this report. Section 5 of the report now considers traffic issues likely to occur under predicted year 2036 conditions, at the end of the design horizon of this study. For deficiency issues that are identified, further analysis is then undertaken to identify potential recommended upgrading solutions to those issues. Section 6 provides a summary of recommended improvements and Section 7 provides details on the recommended timing for implementation of those upgrades.

5.1 Year 2036 Daily traffic flows

Application of the 0.8% rate of growth to existing daily traffic flows at the permanent traffic count locations of the coastal area indicates predicted 2036 daily traffic flows as depicted in Figure 12.

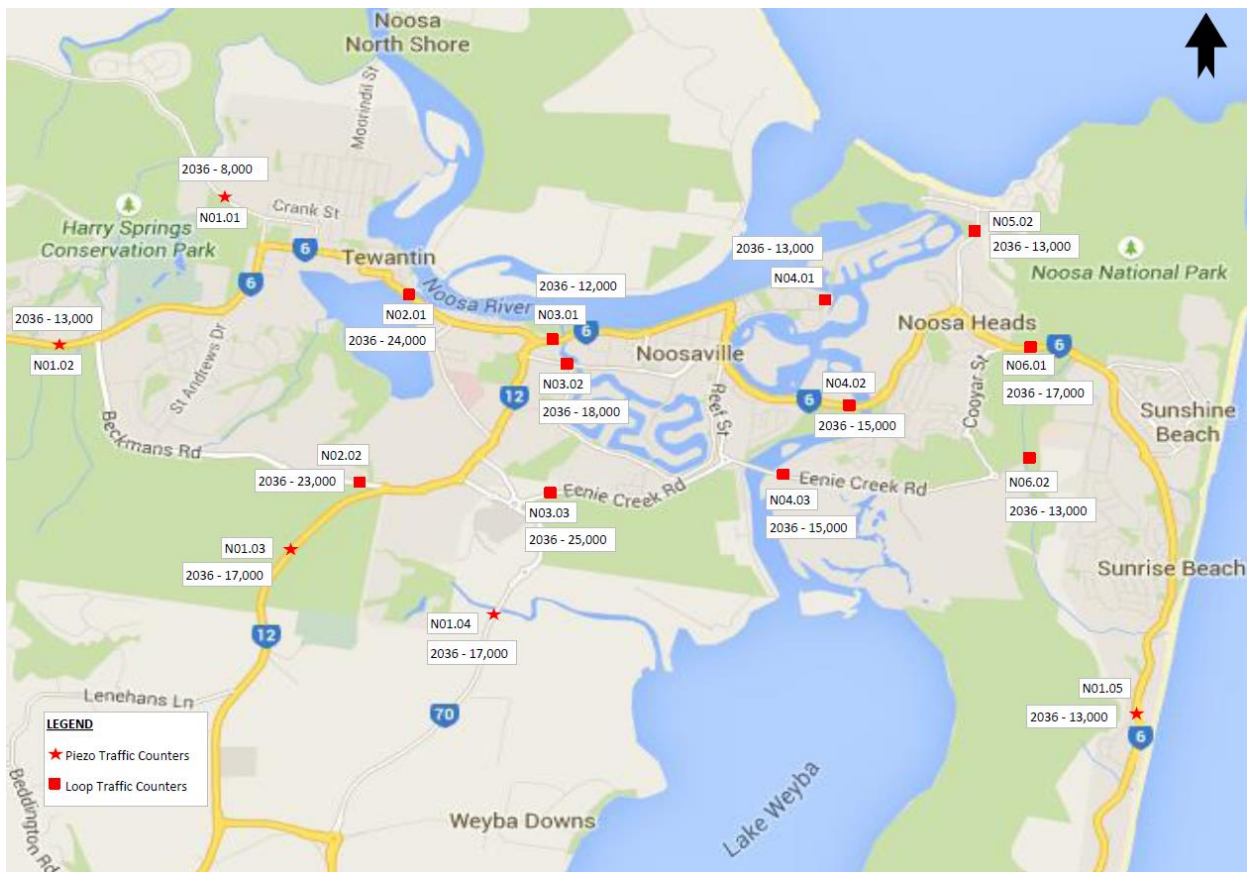


Figure 12: Predicted 2036 daily traffic flows in the coastal area

It is important to recognise that a critical aspect of the Council-controlled parts of the road network in the longer term will be the capacity to accommodate travel demands on the east-west oriented roads between Tewantin and Noosaville. That traffic must use either the Poinciana Ave – Doonella St - Memorial Ave – Hilton Tce route, or the Beckmans Rd –

Eumundi Noosa Rd route. In the longer term (assuming Beckmans Road is duplicated by DTMR), the capacity of the Eumundi Noosa Road route is likely to be constrained by the Rene St / Gateway Dr intersection, for which there are no obvious options for upgrading. Thus, it will be necessary to either maximise the traffic capacity of the Poinciana Ave – Doonella St - Memorial Ave – Hilton Tce route within the existing framework (which is recommended in this report), or require planning for conversion of Eumundi Noosa Road intersections to full traffic signal control (which is not recommended and which would be contrary to Noosa's road planning philosophy).

It is noted that the daily traffic flows depicted in Figure 12 indicate 24,000 vehicles per day on the Memorial Ave bridge (also known as Doonella Bridge), which is greater than the normal two lane road traffic flow limit. However, 2-lane bridges often carry in excess of 20,000 vehicles per day provided the intersections at each end have sufficient capacity. For example, the two-lane Walter Taylor Bridge at Indooroopilly in Brisbane carries 32,000 vehicles per day. Recommended upgrades of the Ernest St / Hilton Tce intersection and the Doonella St / Memorial Ave intersection (as discussed later in this report) at each end of the bridge would enable the estimated 24,000 vehicles per day on the bridge to be achieved.

5.2 Year 2036 Capacity analysis – Tewantin / Noosaville

Capacity analysis has been undertaken under predicted year 2036 peak hour conditions for both the non-holiday and the holiday / special event periods. This indicates degrees of saturation (DOS) at strategic intersections within the Tewantin / Noosaville area at peak times, with existing intersection configurations, as depicted in Figure 13.

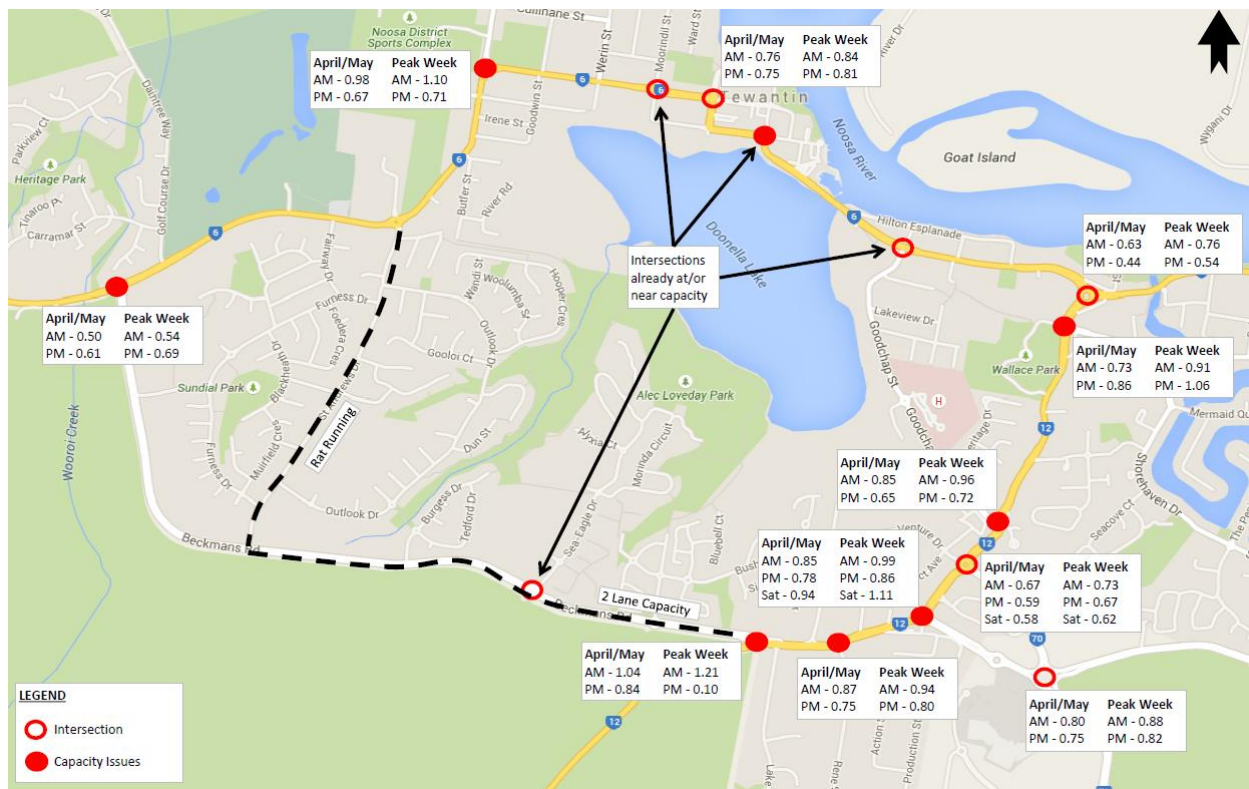


Figure 13: Year 2036 AM and PM peak hour Degrees of Saturation in Tewantin / Noosaville

The critical traffic related issues in this part of the network, without upgrading of that network, under projected 2036 traffic loadings are:

- (i) Beckmans Rd and St Andrews Dr rat running
- (ii) Poinciana Ave / Moorindil St intersection and westbound queuing along Poinciana Ave in the PM peak.
- (iii) Ernest St / Hilton Tce intersection
- (iv) Memorial Ave / Doonella St intersection
- (v) Butler St / Poinciana Ave intersection
- (vi) Gibson Rd / Eumundi Noosa Rd intersection
- (vii) Eumundi Noosa Rd between Beckmans Rd and Goodchap St

Each of those issues, together with recommended solutions, are discussed in more detail hereunder.

5.2.1 Year 2036 – Beckmans Rd and St Andrews Dr rat-running

Resolution of traffic issues along Beckmans Rd and rat-running along St Andrews Dr were discussed in Section 3.2.1.

In summary, Beckmans Road will need duplication in the very near future, including upgrading of intersections. The design and implementation of those works are a requirement of DTMR, as outlined in the year 2000 de-maining agreement between Noosa Council and DTMR. A possible configuration of the Beckmans Rd upgrading works to eliminate rat-running along St Andrews Dr is depicted in Figure 7.

5.2.2 Year 2036 – Poinciana Ave / Moorindil St intersection

Under 2015 peak hour conditions, the Poinciana Ave / Moorindil St intersection is already operating at absolute capacity levels in the AM peak, and westbound PM peak queuing along Poinciana Ave appears to originate at this intersection and then extend back into the Tewantin commercial area. These issues will be exacerbated as traffic growth continues to the year 2036.

Capacity analysis to identify upgrading requirements to accommodate project year 2036 peak hour traffic demands indicates that upgrading incorporating the following features would be required:

- Incorporation of two eastbound lanes through the roundabout on Poinciana Ave
- Provision of a separate left turn lane on the southbound Moorindil St approach
- Provision of a dedicated right turn lane on the westbound Poinciana Ave approach (with only a single westbound lane through the roundabout)

Upgrading of the southbound Moorindil St leg and the eastbound Poinciana Ave parts of the roundabout overcome the AM peak hour issue of capacity constraint on the southbound Moorindil St approach. Altering the lane markings on the westbound Poinciana Ave route would assist with the existing PM peak slow moving westbound queue issue because it would separate westbound and right turning traffic into separate lanes on the approach to the roundabout, whereas they mostly only use a single lane at present (even though there are two westbound lanes – as discussed in Section 3.2.2). This change to the westbound approach would also bring consistency with other roundabouts along the Poinciana Avenue corridor, such as the Werin St roundabout and the Butler St roundabout, both of which have a dedicated right turn lane.

With those improvements, the intersection is predicted to operate with a degrees of saturation of 0.83 and 0.58 in the 2036 AM and PM normal peaks, and 0.92 and 0.62 in the AM and PM holiday peaks.

5.2.3 Year 2036 – Ernest St / Hilton Tce intersection

The Ernest St / Hilton Tce intersection is already operating close to absolute capacity levels under existing conditions and this will be exacerbated as traffic growth to the year 2036 continues. Sufficient capacity at the end of the design horizon in the year 2036 would be

achieved with implementation of a single lane roundabout at that intersection, although with a second short lane on the southern Ernest St approach for through/right turn movements. To fit an appropriate roundabout at that location would most likely require removal of that part of the existing building on the south-west corner of the intersection that appears to encroach into the road reserve, as well as resumption of a truncation on the north-eastern side of the intersection. Ideally, a dedicated right turn lane would also be provided on the eastbound Hilton Tce approach, but it is doubtful that this could be achieved without further property resumption (the analysis results outlined below do not include this additional intersection feature).

With those improvements, under predicted 2036 conditions, the intersection is predicted to operate with a degrees of saturation of 0.80 and 0.67 in the 2036 AM and PM normal peaks, and 0.84 and 0.71 in the AM and PM holiday peaks.

5.2.4 Year 2036 – Memorial Ave / Doonella St intersection

The Memorial Ave / Doonella St intersection is already approaching its 0.85 DOS limit during the AM peak and will need upgrading in the short term future.

The issue arises at the intersection during the AM Peak when there is a very heavy right turn movement from Doonella St (west) into Memorial Ave (south) that must give way to traffic travelling north through the roundabout on Memorial Ave, and also from Memorial Ave (south) into Lake St (east). These opposing movements are relatively low, but due to their random nature, are sufficient to cause a capacity issue with the heavy right turn movement from west to south.

Upgrading to achieve sufficient capacity to the year 2036 would involve provision of separate approach lanes on the southern Memorial Drive leg, with the left turn lane separated from the through/right lane using a raised median, so that the through/right lane can be separately metered, while leaving the high left turn volume from Memorial Ave (south) into Doonella St (west) to continue to occur as a free flowing “give way” controlled movement as it does at present.

The proposal is to meter the movements that oppose the heavy right turn from west to south, so that those movements move through the intersection in a “block” rather than randomly, and thus only interrupt the heavy right turn movement for short, defined periods of time, thus significantly increasing the capacity of the heavy right turn movement.

Although Sidra analysis does not indicate any improvement in operating conditions at the roundabout as a result of implementing the additional roundabout approach lane without metering, it is possible that there would be some improvement in operating conditions with only the additional lane. Hence, the works could be staged, with the additional lane implemented on the southern Memorial Avenue leg first, potentially providing some operating improvement. The roundabout metering to that leg of the intersection could be implemented as a second stage as operating conditions worsen.

Importantly, the need for roundabout metering would only be only activated at the critical times of each day, which in this case would be during the weekday morning peak hour only. At all other times of the day and on weekends, the roundabout would operate without metering.

With those improvements, the intersection is predicted to operate with a degrees of saturation

of 0.85 and 0.94 in the 2036 AM non-holiday and holiday peaks (when metering would be operational), and 0.78 and 0.83 in the PM non-holiday and holiday peaks (when metering would not be operational). It is noted that degrees of saturation in excess of the normal 0.85 practical limit at roundabouts is acceptable when the roundabout is metered because the queues and associated delays are then much better managed.

5.2.5 Year 2036 – Butler St / Poinciana Ave

By 2036, with the existing intersection configuration, the Butler St / Poinciana Ave intersection is predicted to be operating with a degree of saturation of 0.89 in the morning non-holiday period and 1.00 in the morning holiday period. Sufficient additional capacity would be achieved, to satisfactorily accommodate year 2036 traffic projections, by upgrading the roundabout by means of provision of a short additional left turn lane on the northern Butler St approach.

With those improvements, the intersection is predicted to operate with a degrees of saturation in the critical AM peak hour period of 0.69 and 0.73 in the 2036 non-holiday and holiday peaks.

5.2.6 Year 2036 – Gibson Rd / Eumundi Noosa Rd

By 2036, with the existing intersection configuration, the Gibson Road / Eumundi Noosa Road intersection is predicted to be operating with a degree of saturation of 0.82 in the afternoon non-holiday period and 1.00 in the afternoon holiday period. Sufficient additional capacity would be achieved, to satisfactorily accommodate year 2036 traffic projections, by upgrading the roundabout through provision of a short additional lane (with storage of about 40m) on the eastern Gibson Rd approach, so that there would be full left turn lane and a short through/right turn lane on that approach.

With those improvements, the intersection is predicted to operate with a degrees of saturation of 0.44 and 0.53 in the 2036 AM and PM normal peaks, and 0.54 and 0.63 in the AM and PM holiday peaks.

5.2.7 Year 2036 – Eumundi Noosa Rd (Beckmans Rd to Goodchap St)

To achieve sufficient capacity on Eumundi Noosa Road, with maintenance of the existing free flowing roundabout based network, to accommodate growth to the year 2036 with the approved “Masters Home Improvement” and 12,000 sq m of additional office GFA at the Shire Business Centre, the following would be required:

- (i) Minor upgrading of the Eumundi Noosa Rd / Goodchap St intersection through alteration to existing line marking to achieve a dual right turn from Goodchap St into Eumundi Noosa Rd (south).
- (ii) Provision of a separate left turn lane in Eumundi Noosa Road on the southern approach to the Eenie Creek Rd intersection.

- (iii) It is assumed that DTMR would implement upgrading works to achieve sufficient additional capacity at the Eumundi Noosa Road / Beckmans Road intersection, when they duplicate Beckmans Road.
- (iv) Facilitate diversion of traffic from the Eumundi Noosa Road route to the Emu Mountain Road / Walter Hay Drive route as generally depicted in Figure 15. This diversion would occur naturally during periods congestion on Eumundi Noosa Rd, provided capacity is improved on the alternative Walter Hay Drive route through implementation of the following intersection improvements:
 - (a) Provision of short second approach and departure lanes on the northern Walter Hay Dr leg of the Eenie Creek Rd intersection so as to accommodate two lanes through the roundabout in each direction on Walter Hay Drive.
 - (b) Alter line marking on the Walter Hay Drive approach to the Eumundi Noosa Road intersection to enable right turns from Walter Hay Drive to occur from both approach lanes.

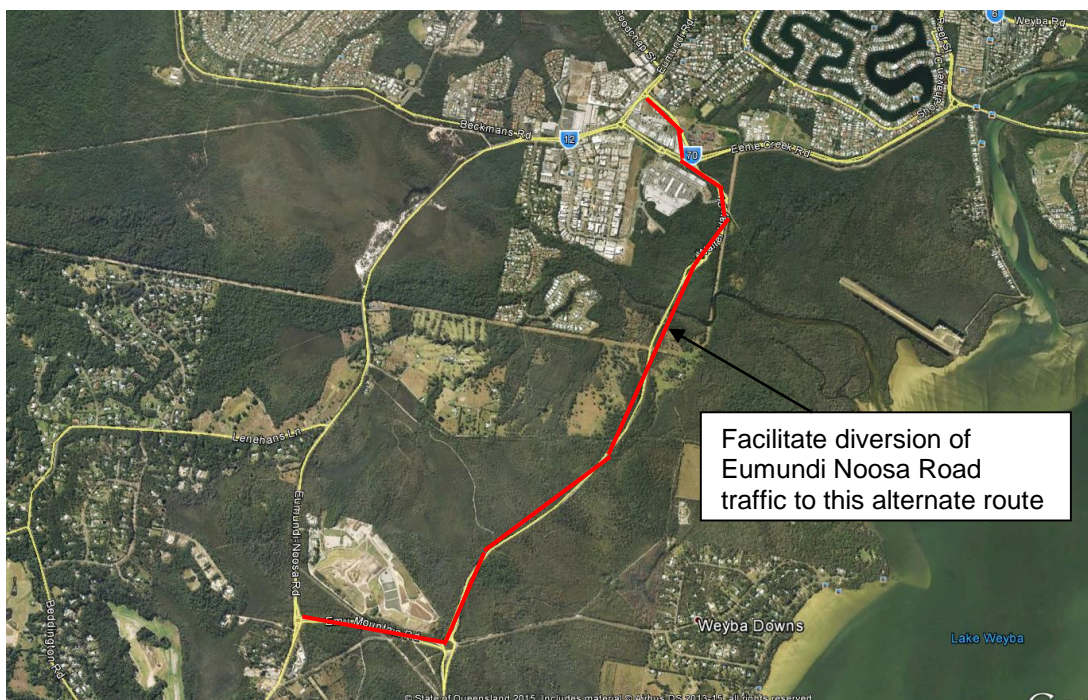


Figure 14: Encourage diversion of traffic

As identified above, there are opportunities for improving capacity of the existing Eumundi Noosa Road roundabouts at Eumundi Noosa Road, Eenie Ck Rd, Walter Hay Dr, and Goodchap St. However, there are no apparent opportunities for improving capacity of the existing Rene St / Gateway Dr / Eumundi Noosa Rd intersection, which is likely to be the ultimate location of capacity constraint along the Eumundi Noosa Road route.

It is important to note that with the above recommended works (i) to (iv) there would not be spare capacity to accommodate significant further additional traffic loadings, and if significant traffic growth were to occur over and above what has been assumed, then conversion to a traffic signal controlled road system would most likely be required along Eumundi Noosa Road.

That is, traffic signal controlled intersections would most likely be required at all major intersections.

5.3 Year 2036 capacity analysis – Noosaville / Noosa Heads / Sunshine Beach

Capacity analysis under predicted year 2036 peak hour conditions for both the non-holiday and the holiday / special event periods indicates degrees of saturation (DOS) at strategic intersections within the Noosaville / Noosa Heads / Sunshine Beach area at peak times, with existing intersection configurations, as depicted in Figure 15.

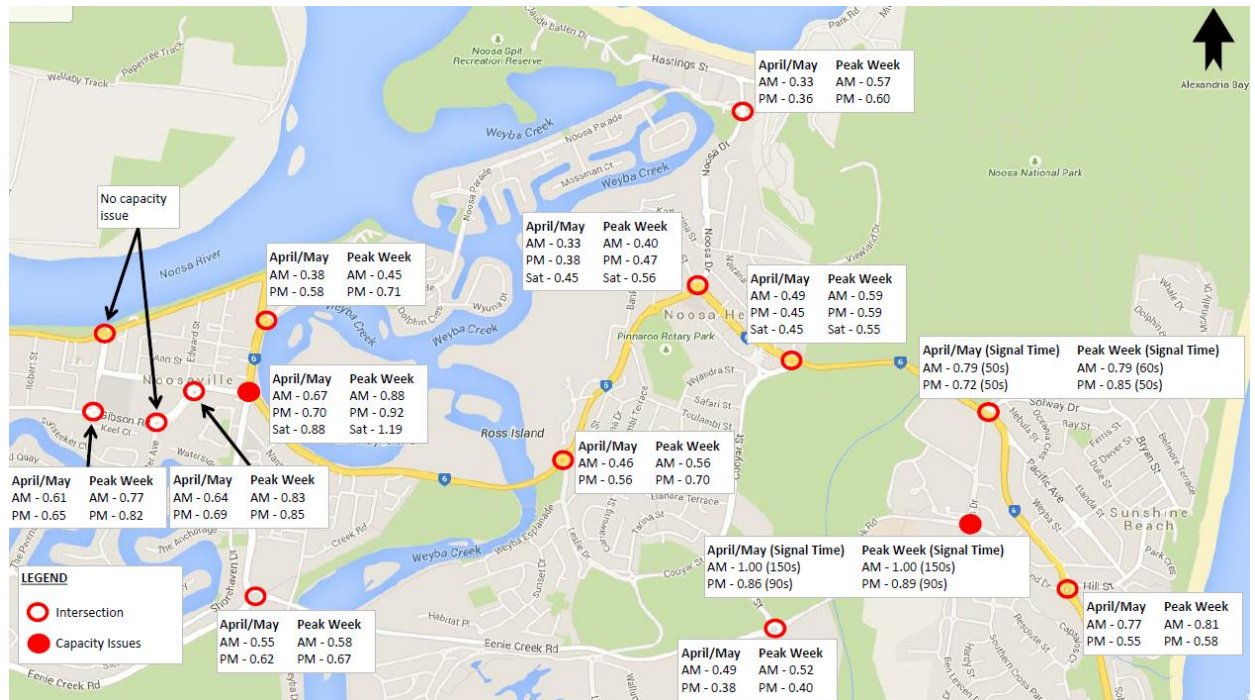


Figure 15: Year 2036 AM and PM peak hour Degrees of Saturation in Noosaville / Noosa Heads / Sunshine Beach

The critical traffic related issues in this part of the network, without upgrading of that network, under projected 2036 traffic loadings are:

- (i) Weyba Road / Reef St / Mary St intersection
- (ii) Noosa Dr / Noosa Pde intersection
- (iii) Ben Lexcen Dr / Eenie Ck Rd intersection

Each of those issues, together with recommended solutions, are discussed hereunder.

5.3.1 Year 2036 – Weyba Road / Reef St / Mary St intersection

By 2036 the Weyba Road / Reef St / Mary St intersection is predicted to be operating with a degree of saturation of 0.88 in the Saturday non-holiday period and 1.19 in the Saturday holiday period, with the intersection in its existing configuration. Weekday operating conditions are predicted to remain below DOS 0.85 in the non-holiday period, but will exceed DOS 0.85 in the weekday holiday periods by the year 2036. Sufficient additional capacity to accommodate the Saturday holiday period would be achieved through provision of two northbound lanes through the roundabout from Reef St to Weyba Rd, and provision of a short additional right turn lane on the south eastern Weyba Rd approach so that traffic on that approach can queue separately whether travelling to Weyba Rd (north) or to Mary St (west). With those works, year 2036 operating conditions of DOS 0.80 and 0.59 are predicted on the critical Saturday peak in the holiday and non-holiday periods respectively. If delays and congestion can be accepted on Saturdays, then these works could be delayed until about 2030 or beyond.

5.3.2 Year 2036 – Noosa Drive / Noosa Parade intersection

There is already significant congestion during peak times at the Noosa Drive / Noosa Parade intersection, and this will continue to worsen into the future. As previously indicated, this congestion is not due to a lack of roundabout capacity but is rather caused by congestion at other nearby road system elements that causes queuing back and into the roundabout. Improvements to this roundabout will not overcome the congestion issue in this area. This is a matter that will need to be addressed (if it is to be resolved at all) by further strategic studies in relation to transport and parking, and detailed traffic management in that area.

5.3.3 Year 2036 – Ben Lexcen Dr / Eenie Ck Rd intersection

The 2036 analysis indicates that the existing Ben Lexcen Dr / Eenie Ck Rd intersection will have reached its capacity during holiday periods, and will be operating close to capacity during non-holiday periods.

One option to achieve satisfactory operating conditions under year 2036 conditions, would be to increase the length of right turn lanes on each intersection approach, in conjunction with implementation of left turn slip lanes on each approach. With those improvements, predicted operating conditions in the year 2036 during the critical AM holiday period would be DOS 0.85 with a 90 second traffic signal cycle time.

It is noted that the potential left turn slip lanes suggested above could be signalised, so as to remove pedestrian safety concern with such lanes in this environment having a number of schools in the vicinity.

There is a myriad of options for potential improvements to satisfactorily improve the capacity of this intersection in order to accommodate future traffic demands. It is beyond the scope of this study to consider all of those options in detail in order to then make firm recommendations.

In the short term, rectification of the off-peak operational efficiency issues is recommended, through improvements to the efficiency of operation of the traffic signal timing.

5.4 Year 2036 capacity analysis – Peregian Beach North

Capacity analysis under predicted year 2036 peak hour conditions for both the non-holiday and the holiday / special event periods indicates degrees of saturation (DOS) at strategic intersections within the Peregian Beach North area at peak times, with existing intersection configurations, as depicted in Figure 16.

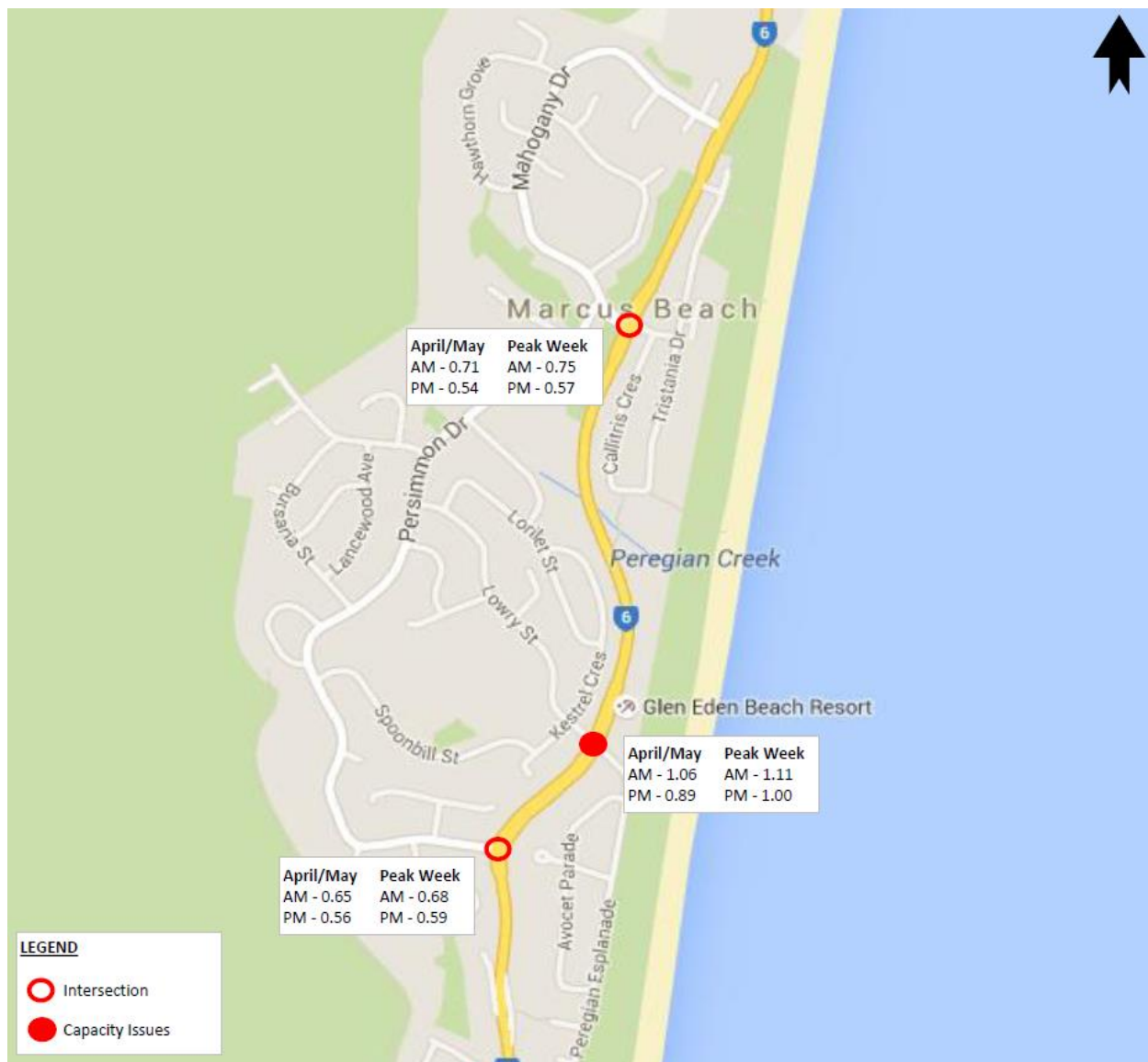


Figure 16: Year 2036 AM and PM peak hour Degrees of Saturation in Peregian Beach North

5.4.1 Year 2036 – David Low Way / Lowry St / Peregian Esp. intersection

The area of concern, as highlighted in Figure 16, is the four-way priority controlled (give way) Lowry St / David Low Way / Peregian Esplanade intersection which is predicted to operate over capacity by the year 2036 in both the non-holiday and holiday periods. It is noted that this intersection is already operating with a DOS of 0.89 under existing conditions in the AM peak,

and is predicted to operate with a DOS of 1.11 in 2036.

A wide central median treatment is a potential solution to improve capacity at this intersection, but those treatments are more appropriate a t-junctions rather than at cross intersections. Hence, it is recommended this intersection be upgraded to a roundabout to overcome the identified capacity issue. This would also assist with speed control along David Low Way.

With a single lane roundabout, year 2036 operating conditions are predicted to be DOS 0.71 and 0.54 in the AM and PM peaks respectively during holiday periods.

5.5 Year 2036 capacity analysis – Peregian Beach South

Capacity analysis under predicted year 2036 peak hour conditions for both the non-holiday and the holiday / special event periods indicates degrees of saturation (DOS) at strategic intersections within the Peregian Beach South area at peak times, with existing intersection configurations, as depicted in Figure 17.

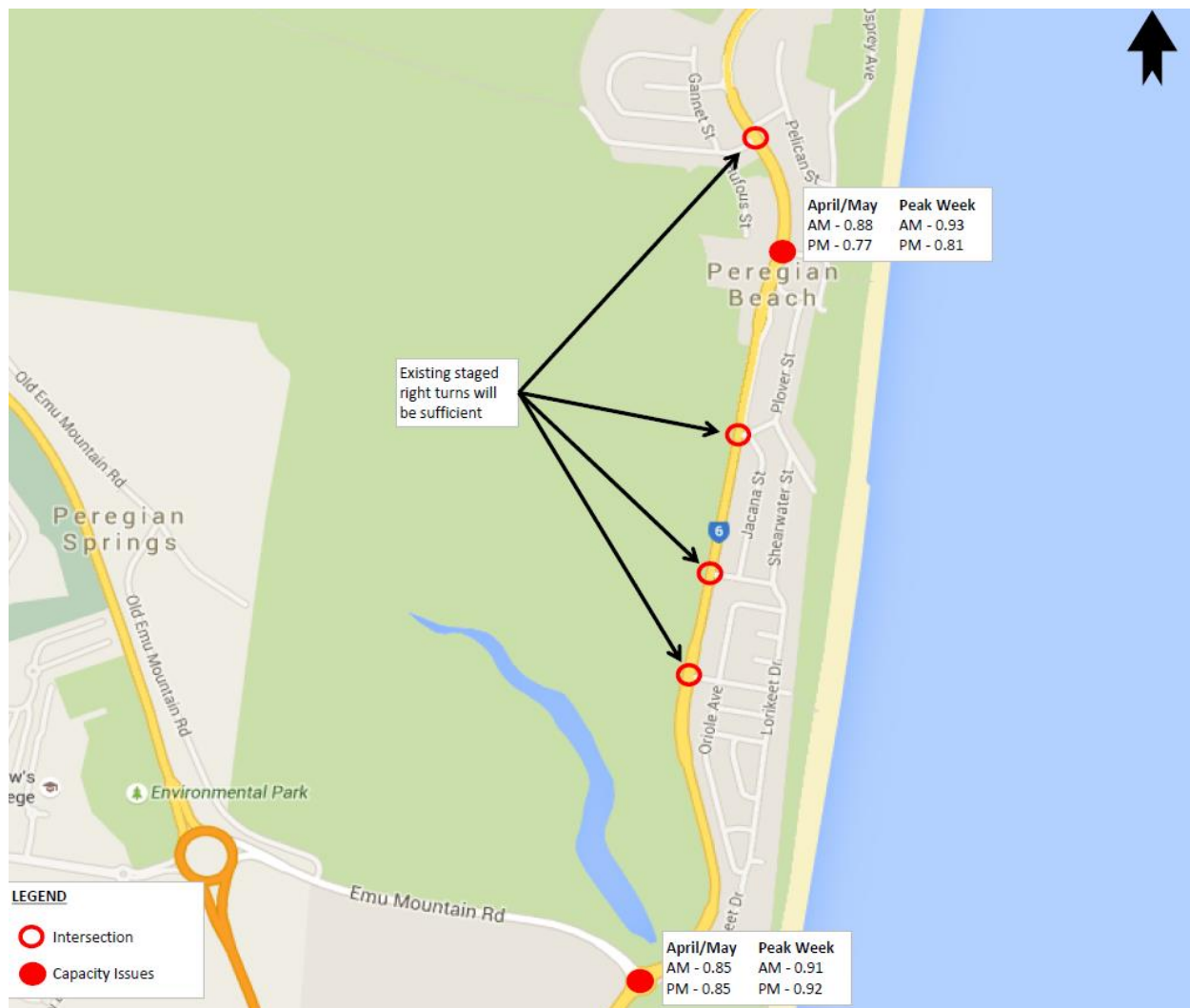


Figure 17: Year 2036 AM and PM peak hour Degrees of Saturation in Peregian Beach South

The critical traffic related issues in this part of the network, without upgrading of that network, under projected 2036 traffic loadings are:

- (i) High traffic flows on David Low Way
- (ii) Heron St / David Low Way intersection
- (iii) David Low Way / Emu Mountain Rd intersection

Each of those issues, together with recommended solutions, are discussed hereunder.

5.5.1 Year 2036 – High traffic flows on David Low Way

As discussed in Section 3.5.1, there are several priority controlled t-junctions within this area that need to contend with relatively high traffic flows along David Low Way. Those intersections operate in a satisfactory manner and will continue to do so into the future because the intersections have wide median areas so that critical right turn movements from the minor roads can occur satisfactorily in a two-stage manner.

5.5.2 Year 2036 – Heron St / David Low Way intersection

To accommodate future traffic growth, upgrading to the Heron St / David Low Way roundabout is likely to be required by implementing a second lane for right turn movements on the southern David Low Way approach to the roundabout.

With that improvement, an intersection DOS of 0.77 is predicted during the critical AM holiday period peak.

5.5.3 Year 2036 – David Low Way / Emu Mountain Rd intersection

To accommodate future traffic growth, upgrading to the northern leg of the David Low Way / Emu Mountain Rd roundabout (a Department of Transport and Main Roads controlled intersection) is likely to be required, to achieve second short lanes on the approach and departure on that northern leg.

5.6 Year 2036 capacity analysis – Cooroy

Capacity analysis under predicted year 2036 peak hour conditions for both the non-holiday and the holiday / special event periods indicates degrees of saturation (DOS) at strategic intersections within the Cooroy area at peak times, with existing intersection configurations, as depicted in Figure 18.

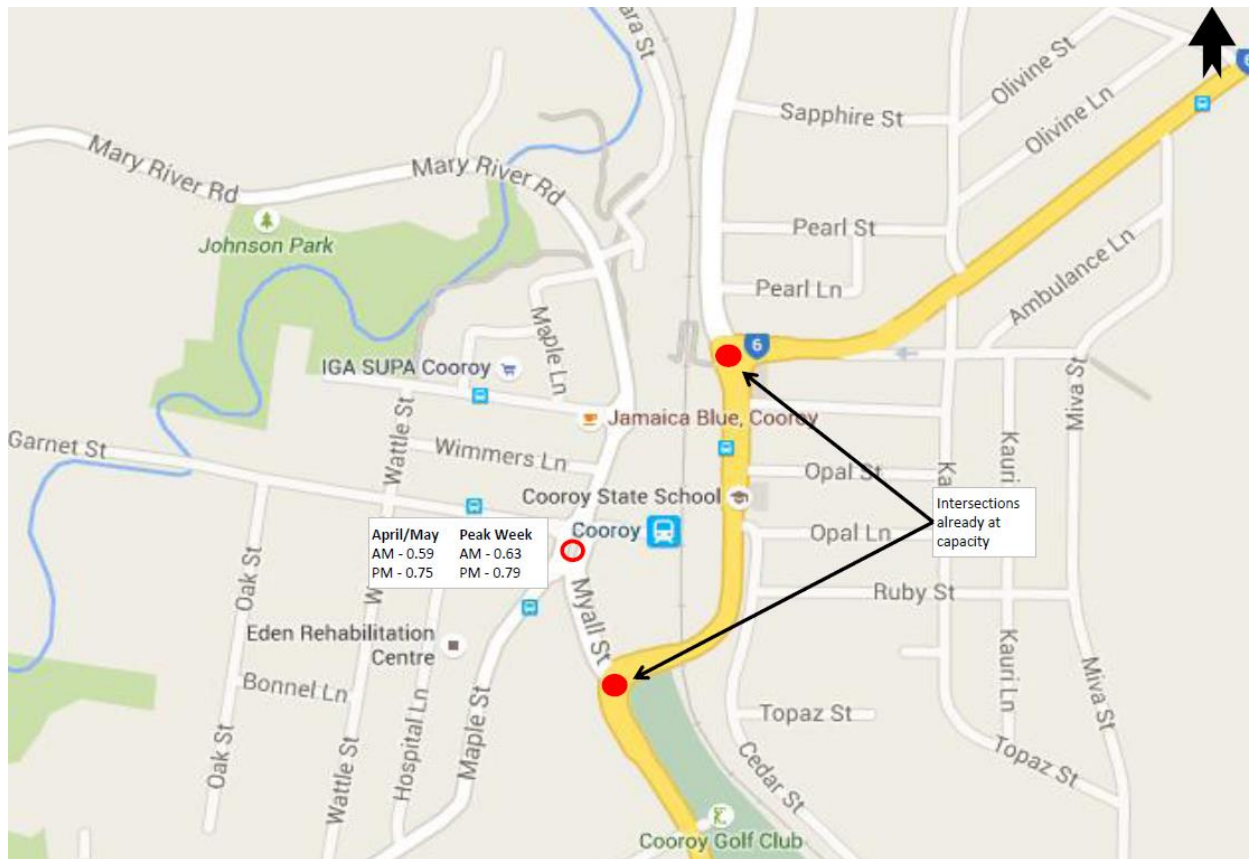


Figure 18: Year 2036 AM and PM peak hour Degrees of Saturation in Cooroy

Areas of concern are highlighted in Figure 18 and are at intersections on the State-controlled road system, being the Myall St / Elm St intersection and the Diamond St / Elm St intersection.

Issues and the course of action in relation to rectification of those issues were discussed in Section 3.6 of this report, but are ultimately the responsibility of DTMR to address.

6 SUMMARY OF RECOMMENDED IMPROVEMENTS FOR COUNCIL CONTROLLED ROADS

Recommended upgrading works to Council-controlled intersections within Noosa Shire to satisfactorily accommodate traffic projections to the year 2036 are depicted in preliminary sketch planning layouts contained in the balance of Section 6 of this report below.

It is noted that in all cases, appropriate on-road cycle lanes would need to be incorporated with the upgrading works, as well as safe and appropriate pedestrian facilities.

It is important to recognise that some of the recommended road improvements / upgrades may be able to be delayed or avoided (particularly beyond 2020) if Council can be successful at encouraging more people to walk, cycle, and catch public transport for their journeys through the provision of appropriate active transport infrastructure and behavioral change strategies. This is also likely to be more economical than undertaking extensive road upgrades.

6.1 Ernest St / Hilton Tce

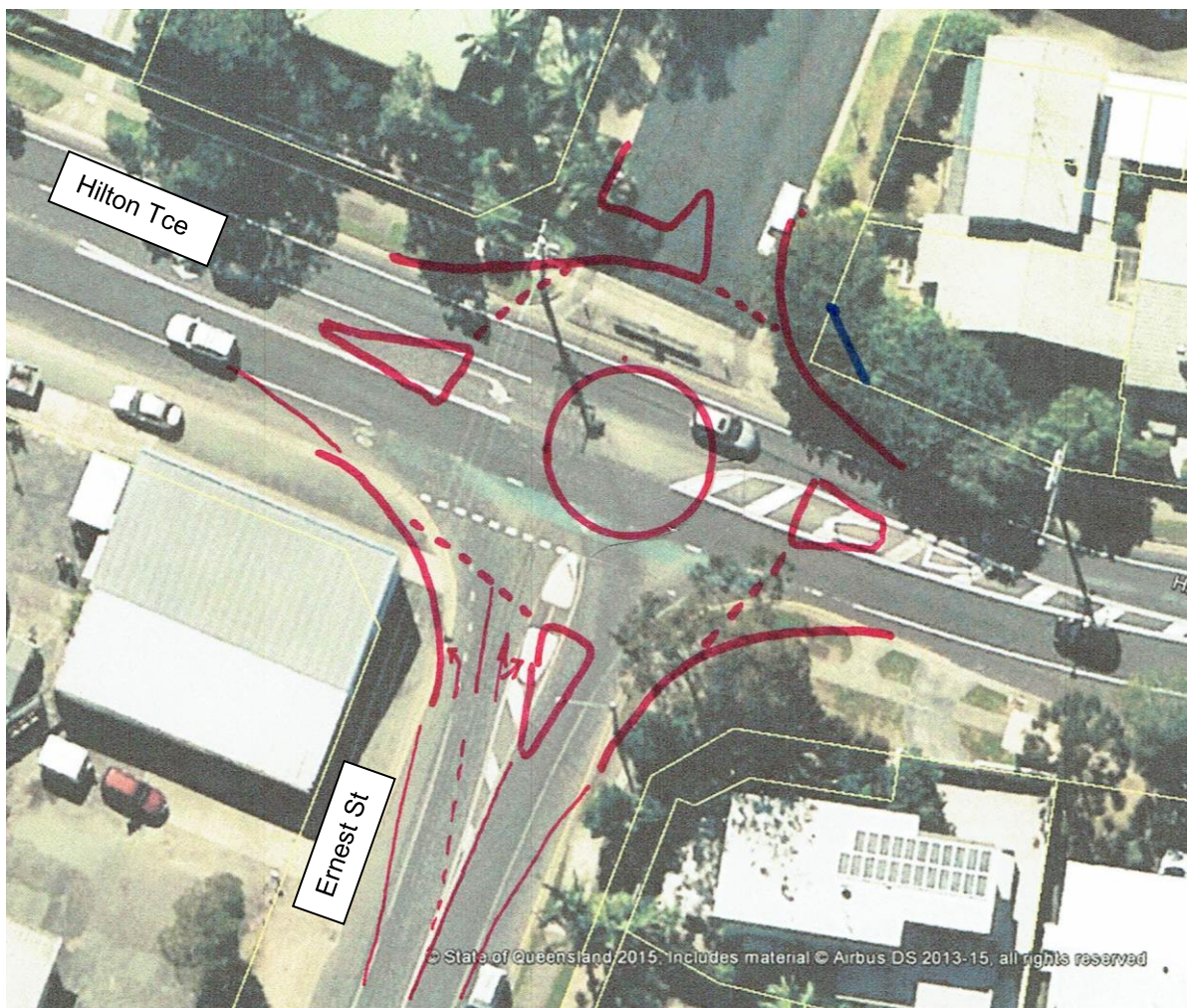


Figure 19: Recommended roundabout at the Ernest St / Hilton Tce intersection

6.2 Poinciana Ave / Moorindil St

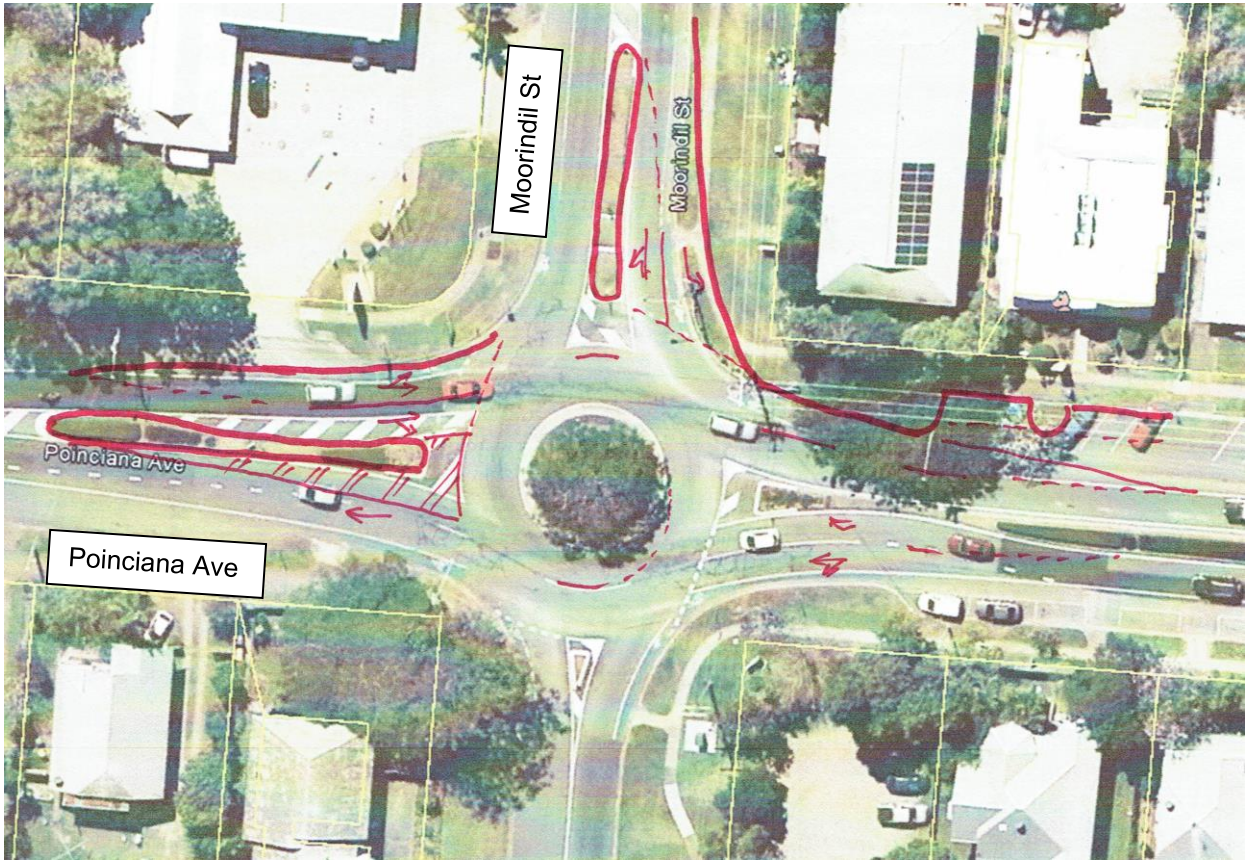


Figure 20: Recommended upgrading to the Poinciana Ave / Moorindil St intersection

6.3 Memorial Ave / Doonella St

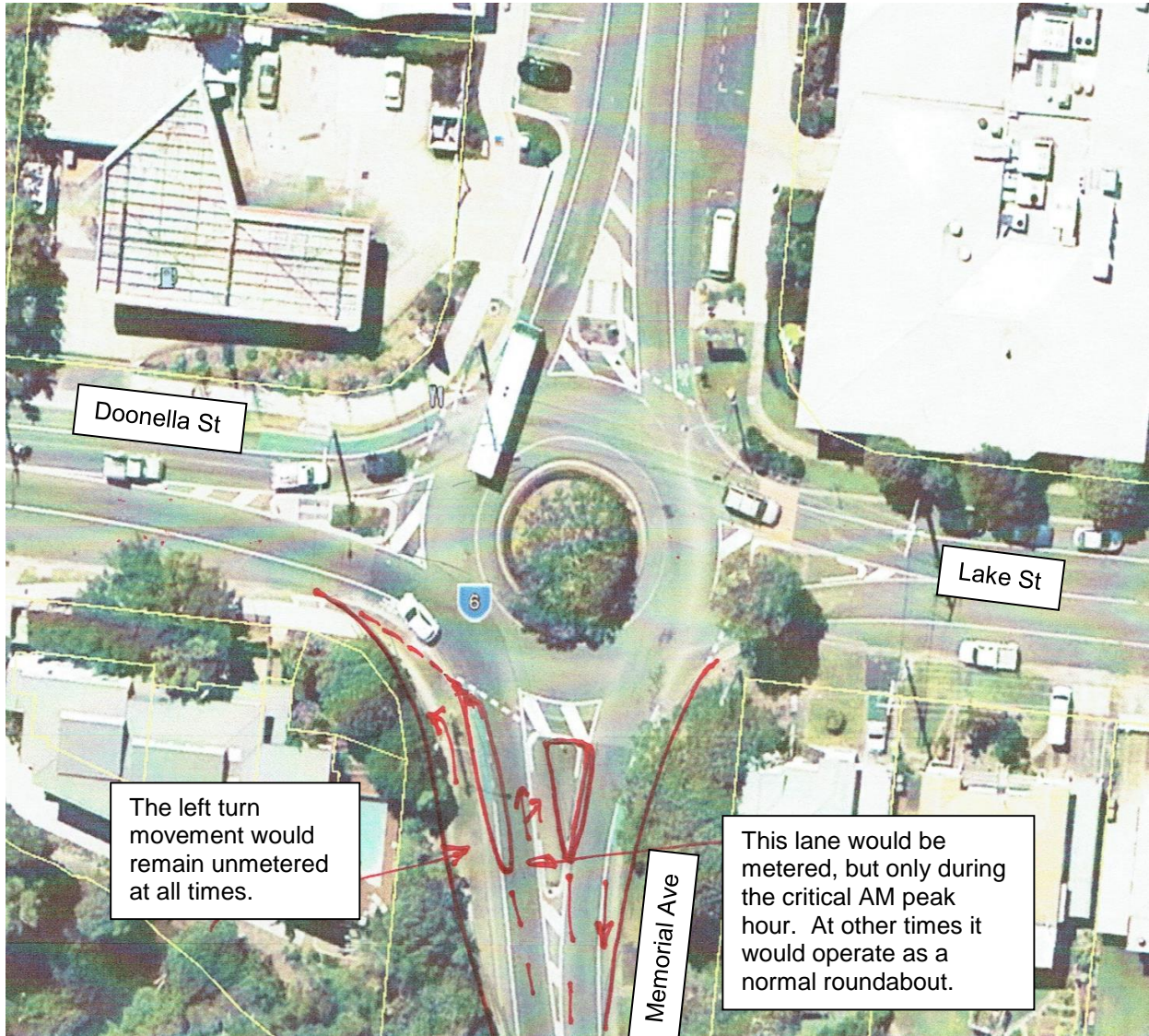


Figure 21: Recommended upgrading of the Memorial Ave / Doonella St intersection

6.4 Gibson Rd / Eumundi Noosa Rd

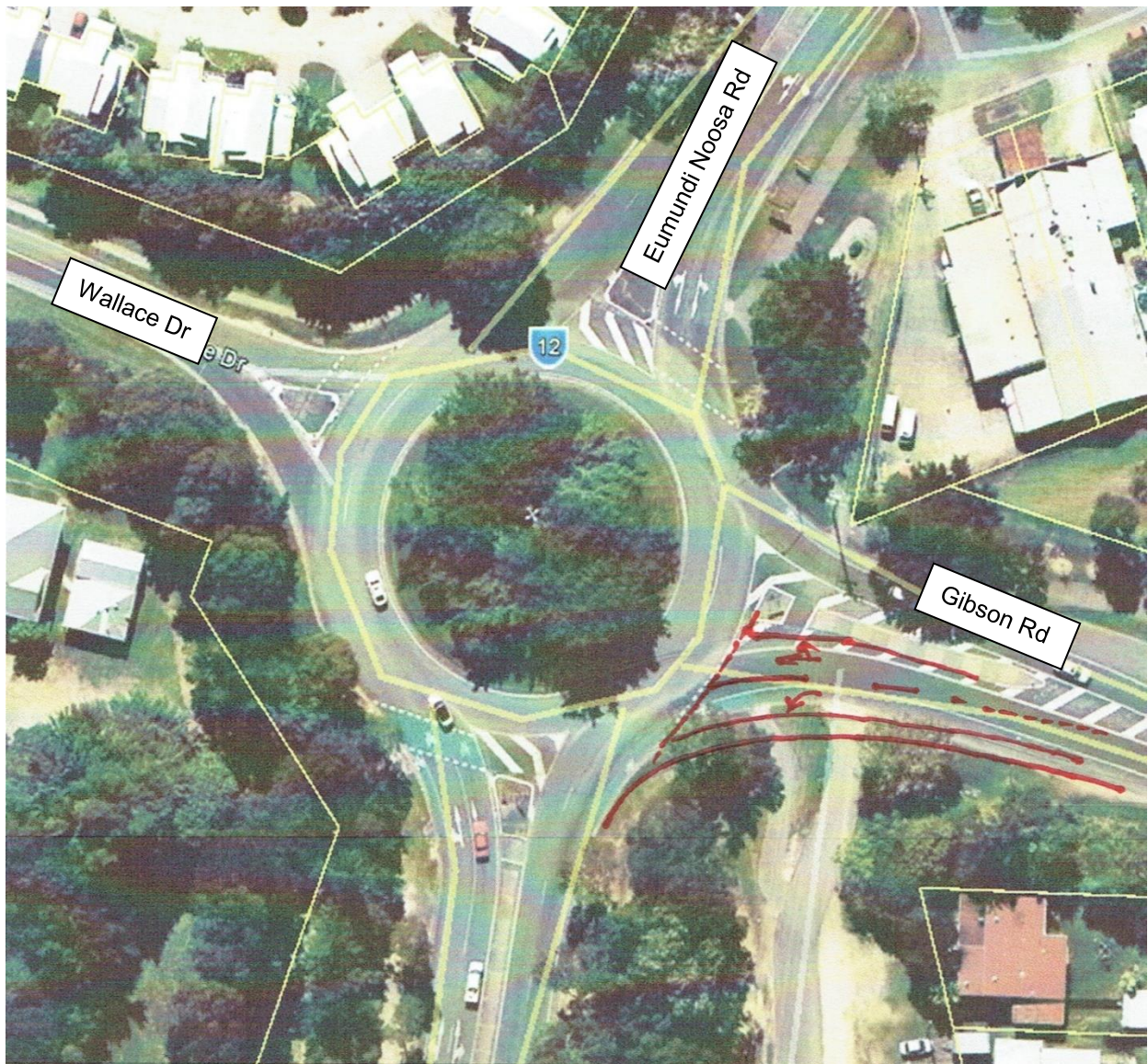


Figure 22: Recommended upgrading of the Gibson Rd / Eumundi Noosa Rd intersection

6.5 Butler St / Poinciana Ave



Figure 23: Recommended upgrading of the Butler St / Poinciana Ave intersection

6.6 Heron St / David Low Way

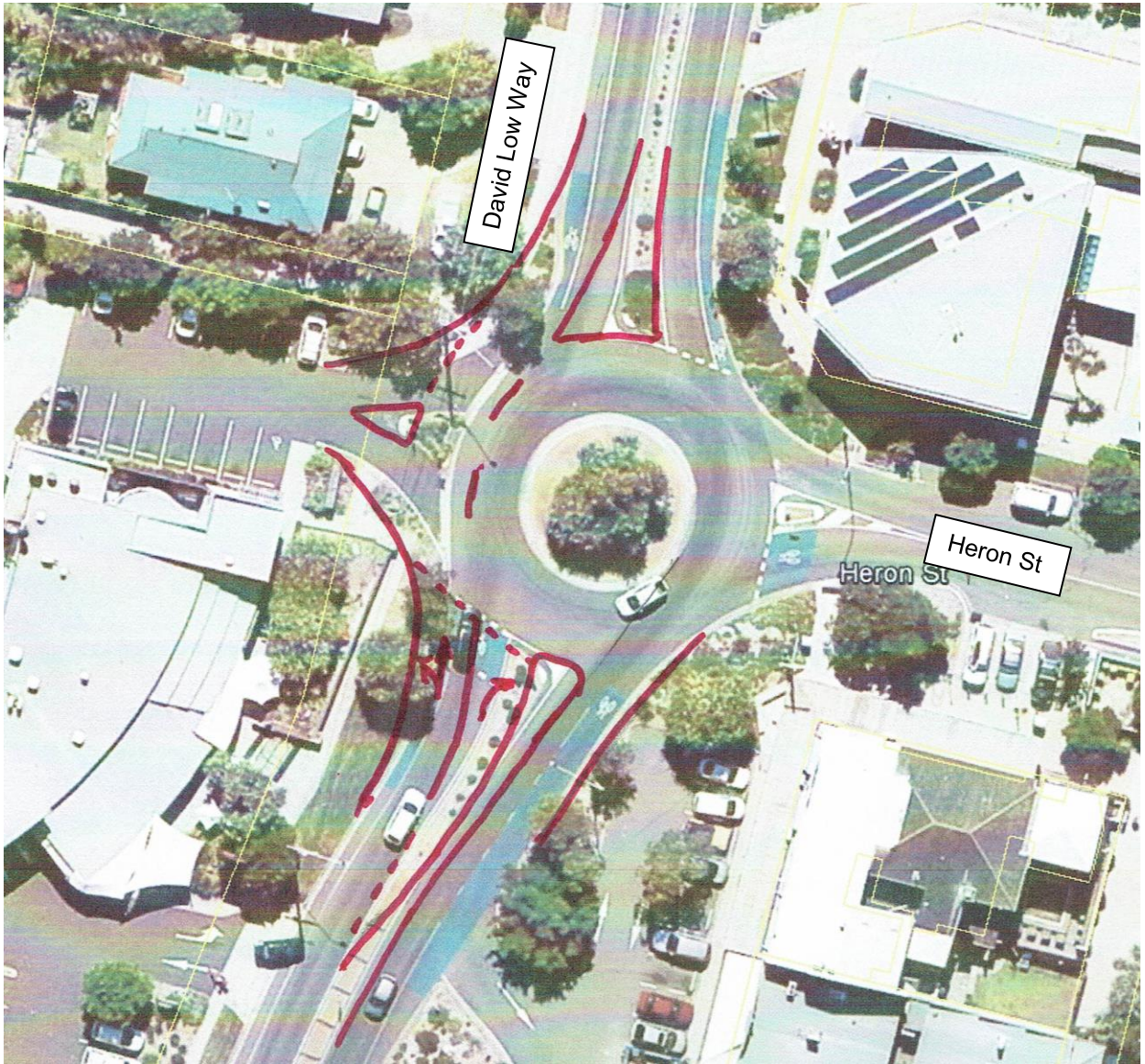


Figure 24: Recommended upgrading of the Heron St / David Low Way intersection

6.7 David Low Way / Lowry St / Peregian Esplanade

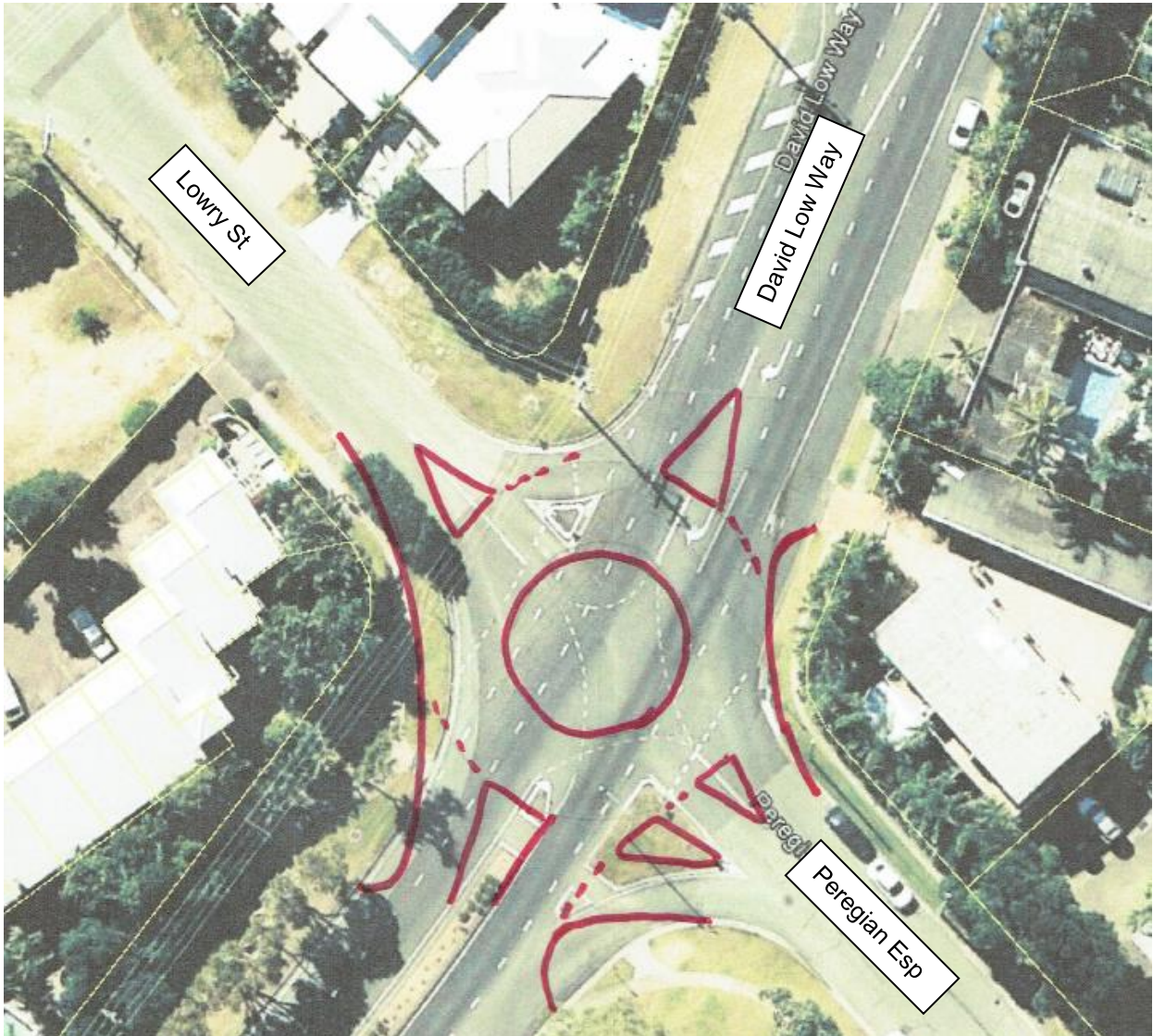


Figure 25: Recommended upgrading of the David Low Way / Lowry St / Peregian Esplanade intersection

6.8 Upgrades to Walter Hay Dr roundabouts (Eenie Ck Rd and Eumundi Noosa Rd) to facilitate alternative route from Eumundi Noosa Rd



Figure 26: Recommended upgrading of the Walter Hay Drive / Eenie Creek Road intersection to facilitate diversion of traffic to the route depicted in Figure 14

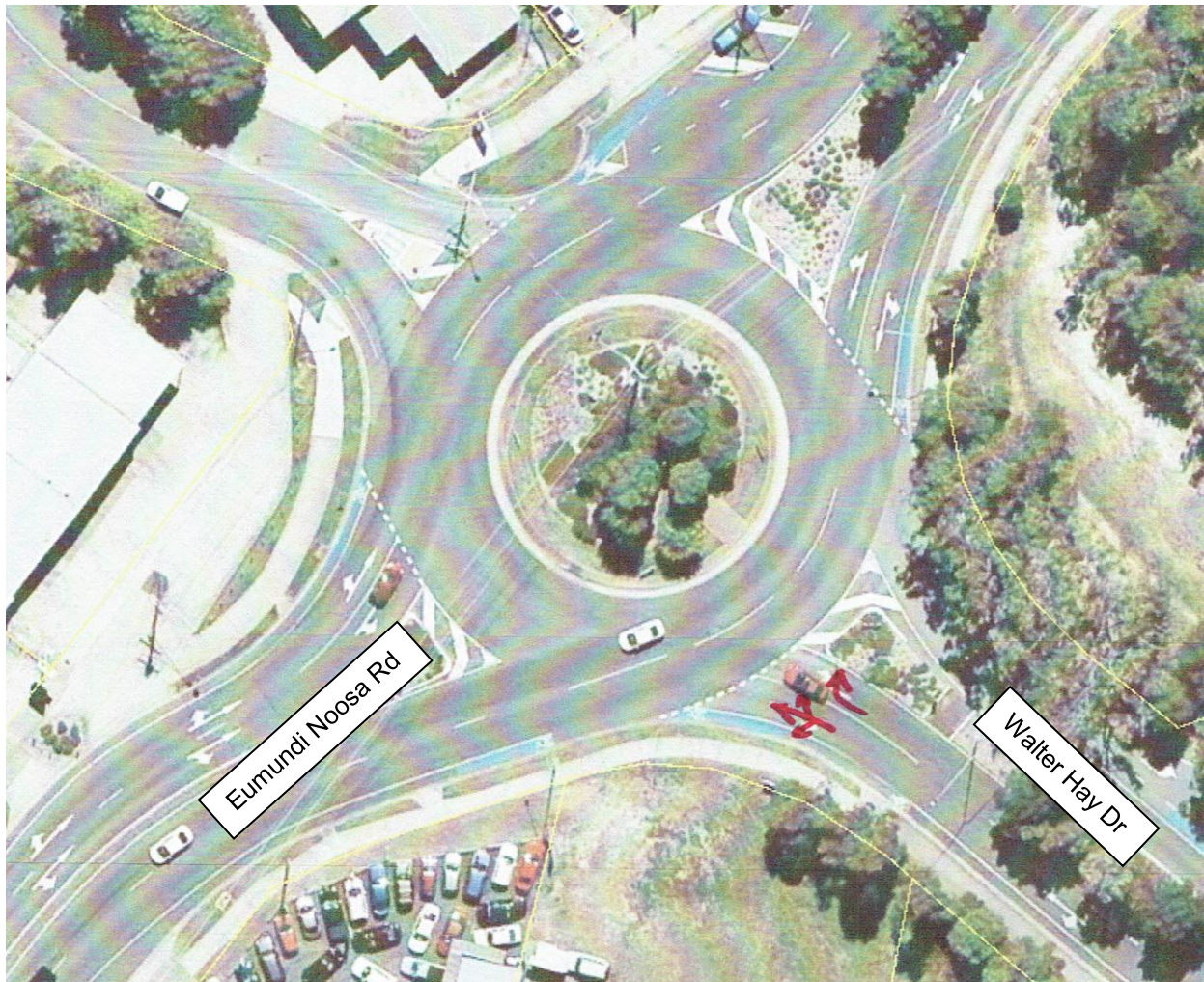


Figure 27: Recommended alteration to the Walter Hay Drive / Eumundi Noosa Road intersection to facilitate diversion of traffic to the route depicted in Figure 14

6.9 Eenie Ck Rd / Ben Lexcen Dr

The Eenie Creek Road / Ben Lexcen Drive intersection will require upgrading within the horizon of this study. Being a signalised junction, there is a myriad of potential upgrading options to achieve sufficient additional traffic capacity at the intersection. It is beyond the scope of this study to evaluate all of the potential upgrading options for the intersection in order to arrive at a recommended upgrading solution.

6.10 Eumundi Noosa Rd / Eenie Ck Rd

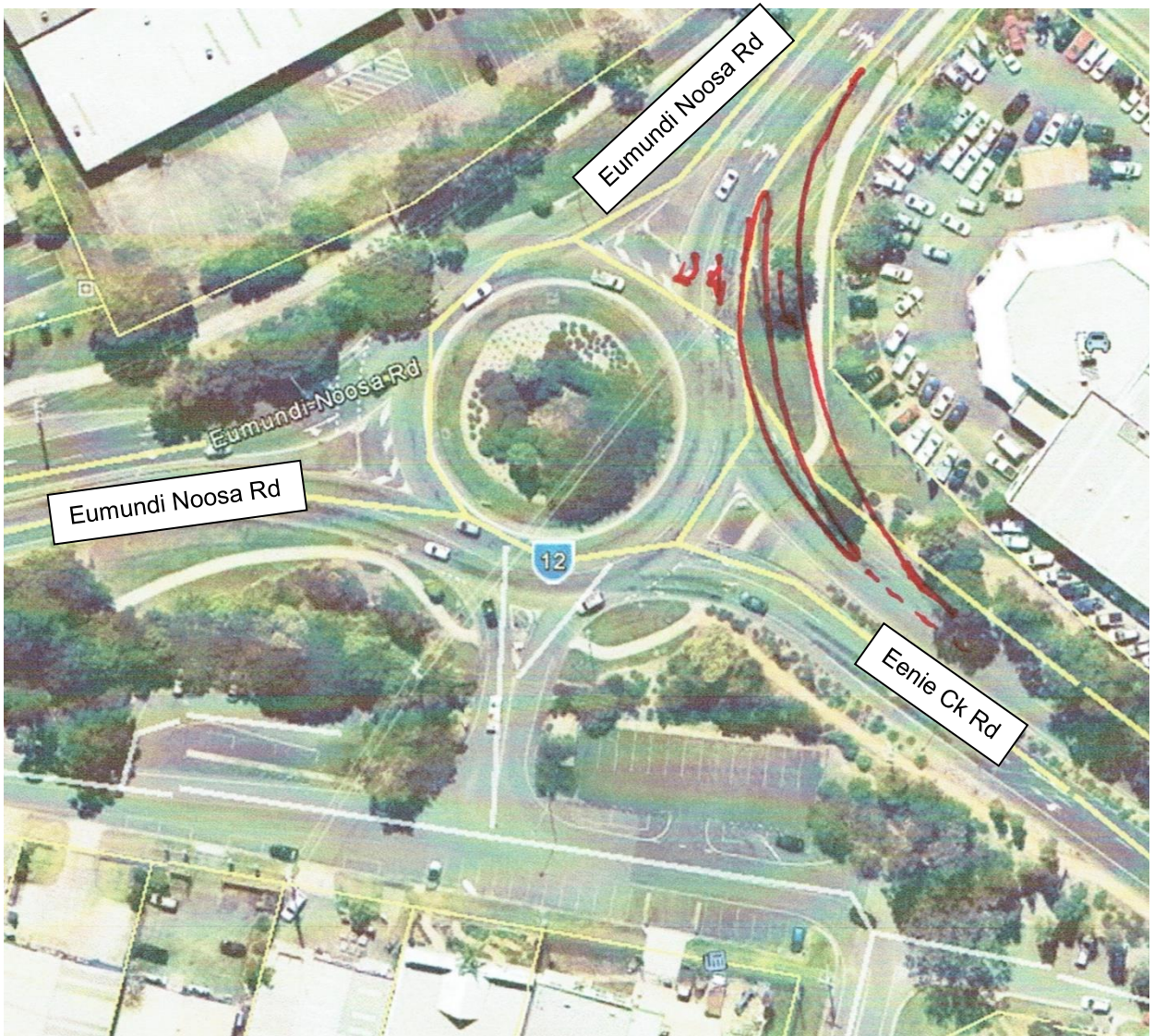


Figure 28: Recommended upgrading to the Eenie Creek Road / Eumundi Noosa Road intersection

6.11 Reef St / Mary St / Weyba Rd



Figure 29: Recommended upgrading to the Reef St / Mary St / Weyba Rd intersection

6.12 Eumundi Noosa Rd / Goodchap St



Figure 30: Recommended alteration to the Goodchap Street / Eumundi Noosa Road intersection

7 TIMING OF UPGRADING WORKS

Sections 5 and 6 of this report makes various recommendations in relation to road system upgrades to facilitate satisfactory operation of the road network to the year 2036. Recommended timing for implementation of those upgrading works has also been assessed and is detailed below.

7.1 Department of Transport and Main Roads upgrading works

DTMR administer a large number of roads within Noosa including Bruce Highway, Eumundi Noosa Rd south of Beckmans Rd, Emu Mountain Rd, Cooroy Noosa Rd (west of Gyndier Dr), Cooroy Connection Rd and Pomona Connection Rd, Kin Kin Rd, Louis Bazzo Drive and McKinnon Drive.

There is also an agreement from when previously State-controlled roads in the Coastal area were “de-mained”, that DTMR would be responsible for duplication of Beckmans Road and its intersections (including its intersections at each end). Planning for duplication of Beckmans Road needs to commence as soon as possible, with implementation prior to 2020, at least for the section between St Andrews Drive and Eumundi Noosa Road, for the following reasons:

- (i) The existing Beckmans Rd / Eumundi Noosa Rd intersection is currently operating close to practical capacity and would likely need upgrading within the next 5 years.
- (ii) The Sea Eagle Dr / Beckmans Rd intersection is already operating over practical capacity and this needs immediate attention.
- (iii) The eastern end of Beckmans Rd is already at the normal limit for a 2 lane road.
- (iv) The Cooroy Noosa Rd / Beckmans Rd intersection is not predicted to reach capacity over the design horizon, but delays to traffic turning right from Beckmans into Cooroy Noosa Rd are already relatively high and will become greater as time passes. Those delays add to the demand for rat running along St Andrews Dr. Provision of a roundabout at that intersection will facilitate reduction in rat running along St Andrews Dr, and rat running would be eliminated if the Beckmans Road configuration depicted in Figure 7 is adopted. The roundabout at that intersection should be implemented when Beckmans Rd is duplicated, although this intersection upgrade is not a driver for the duplication.

There are also existing issues on Cooroy Noosa Road through the Cooroy township, with the Myall St / Elm St intersection already operating way over capacity, and the Diamond St / Elm St intersection operating almost at absolute capacity under existing conditions. Planning and design work needs to occur immediately, with implementation of upgrading to those intersections to occur as soon as possible.

By 2036 it is predicted that upgrading of the northern leg of the Emu Mountain Road / David Low Way intersection is likely to be required, as generally depicted in Figure 29.

DTMR is currently undertaking a planning study of the entire sunshine coast northern area, which is known as NORCATS (Northern Sunshine Coast Area Transport Study). It is understood that study is currently assessing whether to plan to duplicate Cooroy Noosa Road

or Eumundi Noosa Road. Based on Council's knowledge and understanding of the Noosa Road network and future transport needs of the region, Council's preference is for Eumundi Noosa Road to be duplicated, but only south of Emu Mountain Road, with the section of Emu Mountain Road between Eumundi Noosa Road and Walter Hay Drive then also being duplicated. This would facilitate encouragement of the diversion route identified in Figure 14, thus enabling maintenance of Council's free flowing roundabout based road network.

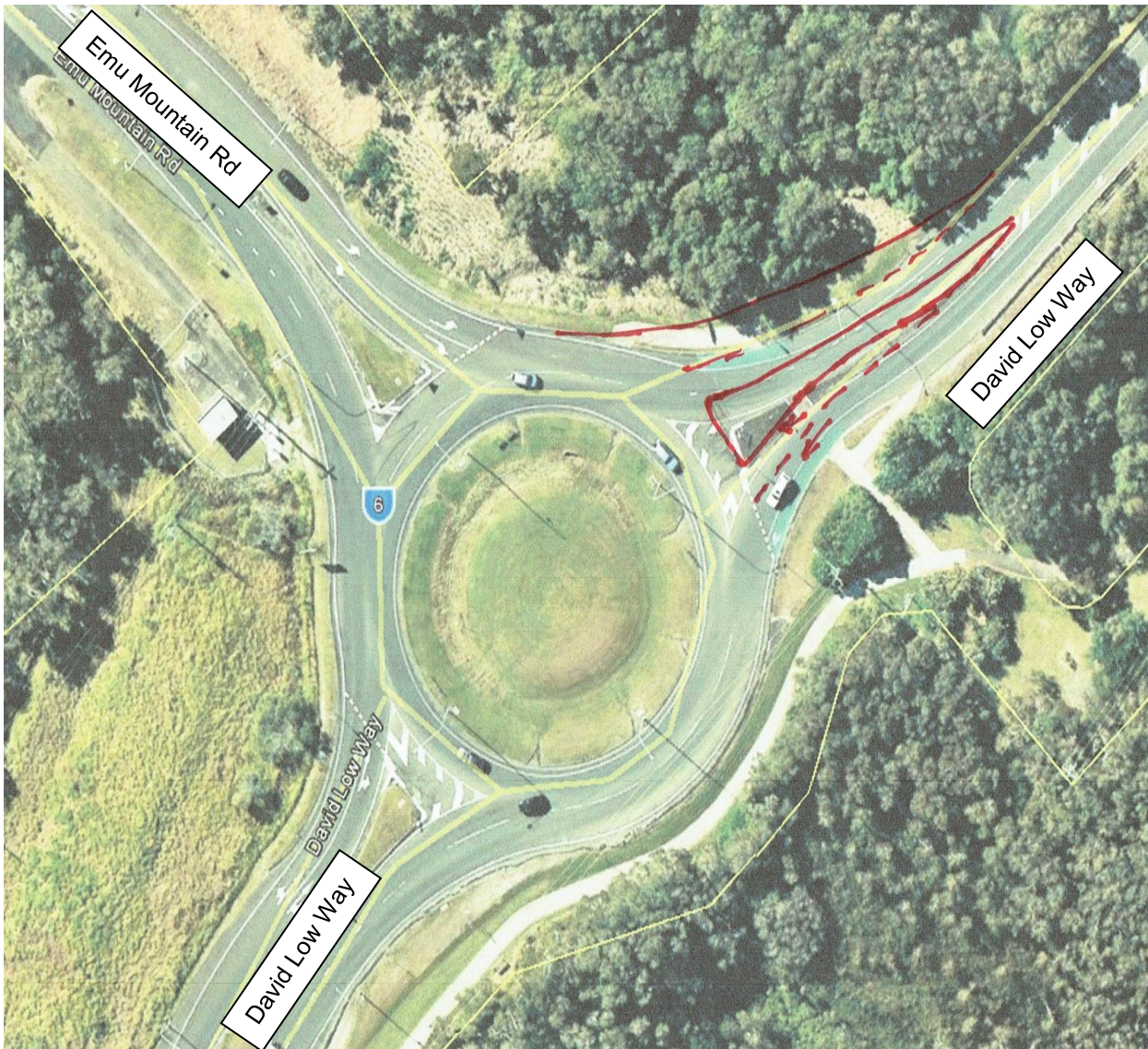


Figure 31: Possible future upgrading to the David Low Way / Emu Mountain Road intersection

7.2 Council upgrading works

Recommended road network improvements to the Council-controlled road network to the year 2036 have been outlined under Section 6. Based on the detailed traffic analysis and future traffic growth predictions each Council controlled intersection upgrade has been prioritized, with suggested implementation timing as follows:

1.	Ernest St / Hilton Tce	2016
2.	Poinciana Ave / Moorindil St	2016
3.	Memorial Ave / Doonella St.	2017
4.	Gibson Rd / Eumundi Noosa Rd	2020
5.	Butler St / Poinciana Ave	2020
6.	Heron St / David Low Way	2022
7.	David Low / Lowry St / Peregian Esplanade	2023
8.	Upgrades to Walter Hay Dr roundabouts (Eenie Ck Rd and Eumundi Noosa Rd) to facilitate alternative route from Eumundi Noosa Rd	2024
9.	Ben Lexcen Dr / Eenie Creek Rd	2025
10.	Eumundi Noosa Rd / Eenie Ck Rd	2025
11.	Reef St / Mary St / Weyba Rd	2025
12.	Eumundi Noosa Rd / Goodchap St	2028

The above suggested timing for implementation of intersection upgrades is based on maintaining a degree of saturation of 0.85 at the intersections during the busier holiday periods. If some congestion and delays on the road network at those busier times can be tolerated, then the suggested timings for implementation from 2020 onwards could be progressively delayed.

Importantly, it is recommended that the timing for upgrading of the various individual components of the network be reassessed for each component, closer to the suggested time of implementation, as traffic conditions may change over time.

It is equally important to recognise that some of the abovementioned recommended road improvements / upgrades may be able to be delayed or avoided (particularly beyond 2020) if Council can be successful at encouraging more people to walk, cycle, and catch public transport for their journeys through the provision of appropriate active transport infrastructure and behavioral change strategies. This is also likely to be more economical than undertaking extensive road upgrades.

8 CONCLUSION

Noosa Council is preparing a new planning scheme. As part of that process, and to inform the new Local Government Infrastructure Plan, this traffic study was commissioned to identify road system upgrading requirements within the Noosa Council area to the year 2036.

This study deals only with the car based travel component of the transport system. Subsequent studies will be undertaken to assess public transport, pedestrian and cycle requirements.

Noosa has a long history of having a documented strategic direction to maintain a free flowing road system, based on having roundabouts at major intersections, so that vehicles are not delayed at traffic signal controlled junctions. This is an important strategic input to this study.

The majority of traffic issues in Noosa are contained within the Coastal area comprising Tewantin, Noosaville, Noosa Heads, Sunshine Beach, and extending down to Peregian Beach, where the majority of the population and commercial areas are located, however, there are also issues at Cooroy.

The coastal area road network comprises roads that are controlled only by Noosa Council. State-controlled roads provide the major access to the coastal area, but do not intrude into the coastal area.

Beyond the coastal area of Noosa Shire, the primary roads are State-controlled roads administered by DTMR including Bruce Highway, Eumundi Noosa Rd south of Beckmans Rd, Emu Mountain Rd, Cooroy Noosa Rd (west of Gyndier Dr), Cooroy Connection Rd and Pomona Connection Rd, Kin Kin Rd, Louis Bazzo Drive and McKinnon Drive. DTMR is currently conducting a separate study to plan for upgrading requirements to their roads.

Traffic growth within the Noosa Shire into the future will be driven primarily by growth in the population of the area, as well as by new commercial developments within Noosa. Population projections have been supplied by the State to the year 2036, and these indicate that population growth within Noosa will be low. Noosa town planners have advised that additional commercial development within Noosa over the period of this study is also expected to occur at a low rate.

In the circumstances outlined above, with expected low rates of population and commercial area growth, this traffic study has reasonably been undertaken in the absence of area wide road network modelling, and has been undertaken on the basis of applying growth factors to existing traffic movements. Because intersection capacities essentially define the capacity of an urban road network, extensive traffic counts were undertaken throughout the road system as a basis for intersection analysis using the SIDRA package, following application of growth factors.

The study concludes that the existing road network can be suitably upgraded to satisfactorily accommodate traffic flow projections to the 2036 design year, while retaining the free flowing roundabout based system, without need to create fully controlled signalised intersections, unless there is significant development that has not been anticipated. Recommended upgrading of intersections to achieve that outcome and associated suggested timing to maintain congestion free conditions during the busy holiday times of the year were outlined in Section 6 and Section 7 respectively.

The study also recognises that some of the abovementioned recommended road improvements / upgrades (particularly beyond 2020) may be able to be delayed or avoided if Council can be successful at encouraging more people to walk, cycle, and catch public transport for their journeys through the provision of appropriate active transport infrastructure and behavioral change strategies. This is also likely to be more economical than undertaking extensive road upgrades. Critically this is also reflective of the aims of the Noosa Biosphere Reserve that encompasses Noosa Shire, which under the United Nations Educational, Scientific and Cultural Organisation (UNESCO) aims to promote living in a healthy and sustainable way.

The most critical part of the Noosa road system will be the section of Eumundi Noosa Road between Beckmans Road and Eenie Creek Road. If developments not envisaged in this study, are approved that add significant traffic flows to that part of the road system, then it is unlikely that the free flowing roundabout based system could be retained, and that upgrading of intersections to full traffic signal control would then be required.

In relation to State works, that is, works that will be required to be undertaken by DTMR, these too have been outlined in Section 7 of this report. Given the importance of these upgrades to achieving acceptable traffic flow conditions, it is recommended that Council continue to pursue the undertaking of such works by DTMR.

Given the changing nature of traffic it is also recommended that this study be revised / reviewed every 4-5 years so that Council's forward infrastructure planning and capital works program more accurately reflects the actual demand required for the road network.