Annexure

B

Further Traffic Analysis Report

North Byron Parklands Supplementary TIA Information

December 2010

North Byron Parklands - A project of Billinudgel Property Pty Ltd (Billinudgel Property Trust)

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A	Original - Review by NBP	14 Dec 2010	TvD
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1. Introduction

A concurrent Concept Plan and Project Application Environmental Assessment report (EA) for the North Byron Parklands (Parklands) project was submitted on behalf of Billinudgel Property Trust (Billinudgel Property Pty. Ltd) in September 2010. A Traffic Impact Assessment (TIA) (Parsons Brinckerhoff (PB), July 2010) was submitted in support of the EA report.

The Roads & Traffic Authority (RTA) provided comment on the traffic and transport aspects of the proposal in its letter of 21 November 2010, raising a number of issues of concern, primarily relating to the size of the proposed events and the assumptions made in modelling the impacts of the proposal.

This submission response seeks to provide clarification and supplementary information for the RTA to assist further discussions regarding the application. Table 1.1 summarises PB's understanding of the RTA's. This document seeks to provide the RTA with sufficient information, in conjunction with the discussions at the meeting on Thursday 16 December 2010 to obtain conditional agreement for the Development Application.

Table 1.1 RTA issues and preliminary responses

	RTA comment	Preliminary response	Section
1	Interchange cannot accommodate traffic for 35,000 or 50,000 event patrons.	Depends on traffic management and travel behaviour.	4
2	Traffic assessment relies on optimum values for demand management.	The TIA presents range of assumptions, including RTA's accepted car occupancy rate.	3,4
3	Demand management strategies are not described to any detail.	The strategies depending on type and size of event. Strategies for the opening event are described.	5
4	No surety that the undescribed 'measures' will be achieved or how they will be implemented.	More information provided.	3
5	Values for car occupancy, peak hour volumes (arrival percentage) and mode share are assumed.	Available information from Woodford event included.	3.2, 3.3, 3.4
6	On-line survey is inaccurate. Calibrated discrete choice model would be better.	On-line survey taken from a large number of respondents. Planning based on experience from other events. Survey results used as upper sensitivity tests.	3.1
7	Reason for using Minjungbal Drive is unclear.	Not critical to analysis. Closest location with 24 hour data on the coast outside town influences. 2007 data for Tweed Bypass site shown.	3.6
8	Traffic growth not always linear. Daily volumes change by up to 10-15,000 vpd. More robust data needed.	Method used based on method advised by the RTA Pacific Highway office. More recent data available and presented in this response. Timing of events to be considered further.	3.5
9	Insufficient detail relating to mitigation measures.	More information provided.	4,5

	RTA comment	Preliminary response	Section
10	Bluesfest example – assumed max. 25%, per hour got 31%, bridge D/S predicted at 0.49, but capacity exceeded and queues formed, contingency saved the day.	Bluesfest is different in the nature and type of patrons attracted. Arrival rate to be discussed in this response.	2.1, 3.4
11	Relying on manual traffic control and demand management not sufficient.	Traditional and accepted event operations.	6
12	Relies on assumed variables and theoretical optimum values	A range of values are tested, including the RTA's preferred car occupancy. This allows the impact of each to be determined.	3.2, 3.3, 3.4

The operation of Yelgun Interchange is a critical issue for the RTA. The assessment to date has considered a variety of scenarios, including those based on the RTA's preferred inputs (2.5 average car occupancy and 23% public transport usage). It is acknowledged that much of this analysis to date relies upon assumptions. All parties would like to have the benefit of data and experience from a real event to base any approvals for future events.

The proponent's proposed opening event included in the Environmental Assessment is 35,000 patrons, including 17,500 day patrons and 17,500 campers. The increase for day patrons is only 2,500. The opening event previously supported by the RTA and Byron Shire Council was 15,000 day patrons and 5,240 campers.

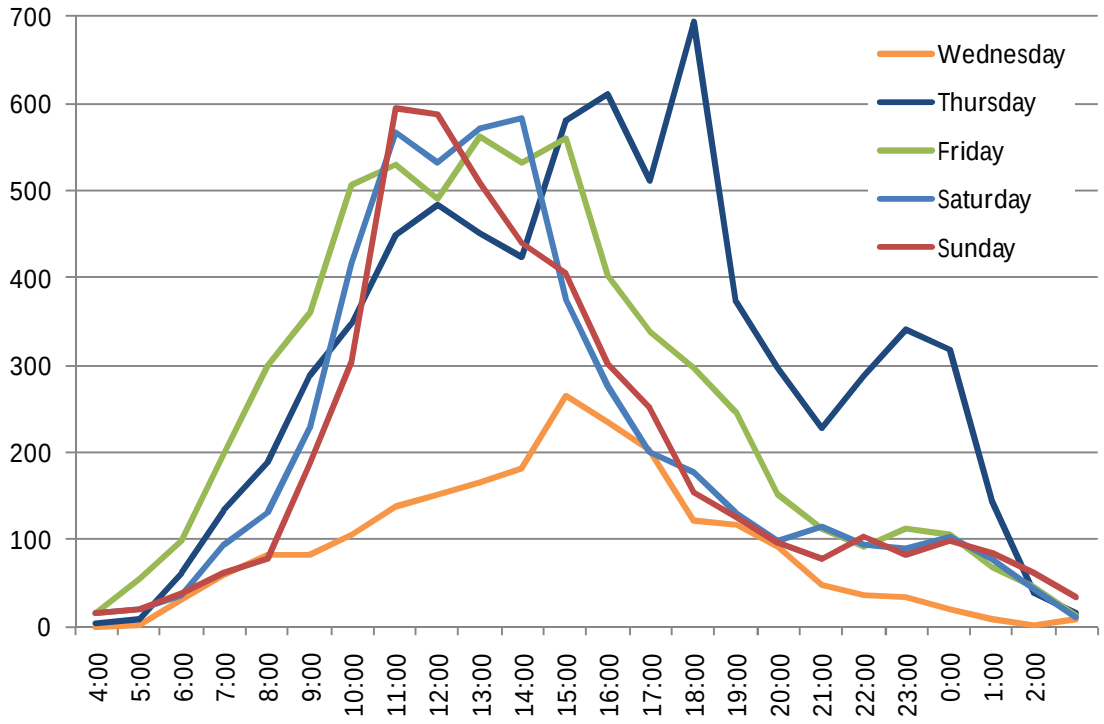
One of the aims of the further consultation with the RTA is to come to agreement about the size of the opening event. To do this, the analysis for 2015 has been analysed further to determine the details of an opening event that could be accommodated on the road network. The 2015 design year has been used to provide some scope for traffic growth with the opening event. It is anticipated that traffic demand management would have been demonstrated by this time to enable more refined planning for future events.

2. Relevant event experience

2.1 2010 Splendour in the Grass Woodford event

The Splendour in the Grass (SITG) event was held at Woodford in the Queensland Sunshine Coast hinterland in 2010. Details of the event are provided below.

- a three day event held from Friday 30 July to Sunday 1 August, 2010
- event site location is approximately 5 kms outside of Woodford
- 30,000 patrons of which 20,000 were campers, with 10,000 day patrons
- campers were given access to the campground from noon on Wednesday 28 July to Monday 2 August, with access to the actual event site from 4.00 pm Thursday 29 July
- continual heavy rain in the days leading up to the event stopped on Thursday afternoon, as a result there was a surge of camping vehicles at this time. Queues formed on D'Aguilar Highway and Kilcoy-Beerwah Road with delays
- arrival of day patrons on the Saturday and Sunday were less intense, with delays of around 15–20 minutes in the queue for processing
- no demand management measures were applied to reduce car numbers or change travel behaviour
- traffic counts were taken at the gates as well as on the road network. The combined gate counts between 4am on Thursday 29 July and 4am Friday 30 July (the busiest 24 hour period) were approximately 7,300 vehicles, with a maximum of approx. 700 vehicles in one hour, as shown in Figure 2.1



Source: Gate entry counts taken at Woodfordia site 28/7/10 to 3/8/10

Figure 2.1 Gate traffic counts at Woodford

- public transport services were provided for the event, as shown in Figure 2.2
- complete data on car occupancy and mode split were not captured
- planning was put in place for approximately 6,600 bus passengers with 65 buses (of various sizes) operating the routes
- a small survey (approx 132 people) indicated 27% of patrons using public transport and an average car occupancy of 2.85
- a count of approximately 400 vehicles indicated average car occupancies of 2.68 for day patrons and 2.45 for campers
- shuttle buses were provided to Woodford township, but many patrons chose to use their car to get supplies (NBP would have facilities on site and well-publicised shuttle buses to Brunswick Heads).

The major lessons learned from the Woodford experience were:

- impact of weather on arrival and departure – the arrivals were more spread out than PB had assumed, but bad weather caused a mini surge of patrons
- travel demand management should be part of every event
- the need to capture travel behaviour data for future event planning
- the amount of travel between the site and the nearest major town.

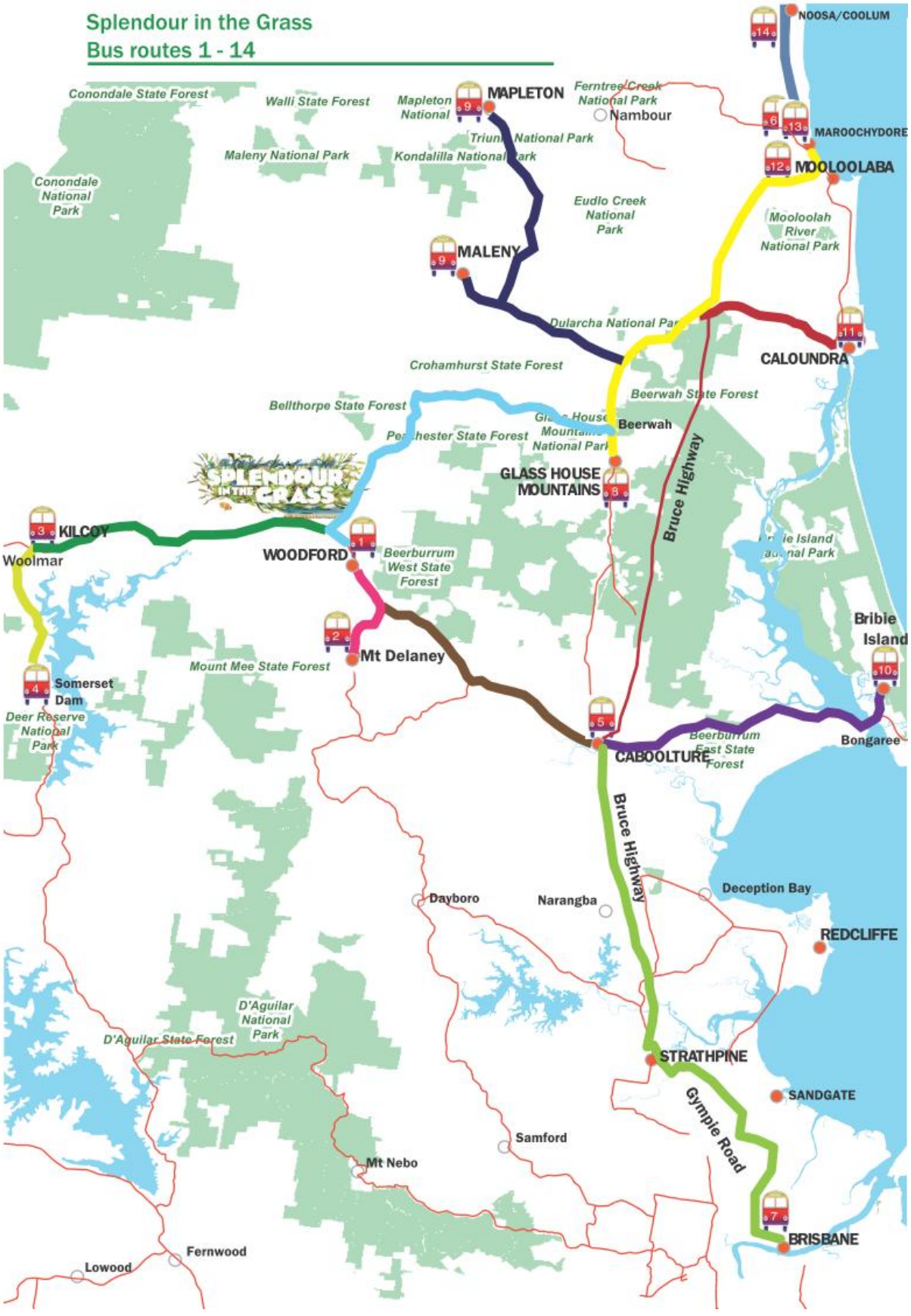


Figure 2.2 SITG Woodford 2010 bus routes

2.2 BluesFest

The Bluesfest event is held at Easter at the Tyagarah Tea Tree farm just off the Pacific Highway between Byron Bay and Brunswick Heads, with 17,500 day patrons and 6,500 campers.

The following issues distinguish the site at North Byron Parklands from the Tyagarah Tea Tree farm and the Bluesfest event:

- Bluesfest is held at Easter, coinciding with the busiest weekend of the year. Large events at the NBP site would not coincide with Easter or the Christmas – New Year's Day period to avoid busy traffic times on the Pacific Highway
- the Tyagarah Tea Tree farm is closer to the nearest interchange with the Pacific Highway, meaning that any internal traffic issues would affect the Pacific Highway sooner. Traffic management at the NBP site has approximately four times the distance to the Yelgun Interchange
- Bluesfest attracts a different type of festival patron, being more family oriented, while the SITG event is more aimed at a younger audience. The SITG audience is more likely to use public transport than a family with children.

Comments have been made that traffic growth at Easter has been higher than in previous years. It is noted that the number of patrons at the Bluesfest event has grown in recent years, and that some of the unseasonally high traffic growth at Easter is likely to be due to the increasing size of the Bluesfest event.

3. Traffic volumes

One major source of concern for the RTA has been the assumptions made regarding average car occupancy, the mode share for patrons and the arrival rate of patrons at the site. The RTA is concerned that the higher values assumed in the TIA report are not tested by real event conditions. The RTA has also been concerned about the traffic volumes estimated for the base network. This section provides more information and new information on the amount of traffic on the network during the events at NBP.

3.1 Validity of on-line survey

The results of the on-line survey were presented to give an indication of the types of patrons attending the larger events that could be based at the site. Data from an actual event would be preferable. But in its absence, the on-line survey results provide an indication of what could be achieved.

The sample size of over 5,000 people is large enough to provide a reasonable reflection of the patrons attending these events.

PB understands that some people may express good intentions in the survey. While the survey indicated a 3.2 average car occupancy, the lower values of 2.5 and 2.9 were adopted for the analysis. The mode share indicated in the survey was considered too high for public transport and more realistic assumptions were made. The on-line survey is good for other important and transport related information such as determining the places people would travel from, how long they would stay, what type of accommodation they would target, etc.

3.2 Car occupancy

The RTA has previously mentioned that an average car occupancy of 2.5 is applicable for large events in this area of NSW.

PB experience from major sporting events is that car occupancies of 2.9 are realistic and achievable.

The 3.2 car occupancy, based on people's responses, is achievable for day patrons, but would require substantial demand management measures. The 3.2 car occupancy was not needed to achieve acceptable operation of the interchange for all scenarios apart from the 50,000 event. However, this size of event would only be considered after several years of operation if the demand management measures could be demonstrated as being successful.

Realistically, the car occupancy for campers' vehicles is lower, due to the space requirement for the camping gear. Values for campers above 2.5 are unlikely to be achieved without focussed incentive strategies.

3.3 Mode share

A high take-up of public transport will not automatically happen, but is possible with a well-planned and connected network of bus services. To reflect this, the analysis in the TIA looked at a low and high mode share for public transport.

The previous application assumed a 40% mode share for public transport for day patrons. The analysis for the TIA assumed a similar scenario for the low mode share scenario. For the high public transport mode share scenario, a mode share of greater than 40% was assumed for day patrons.

3.3.1 Bus supply

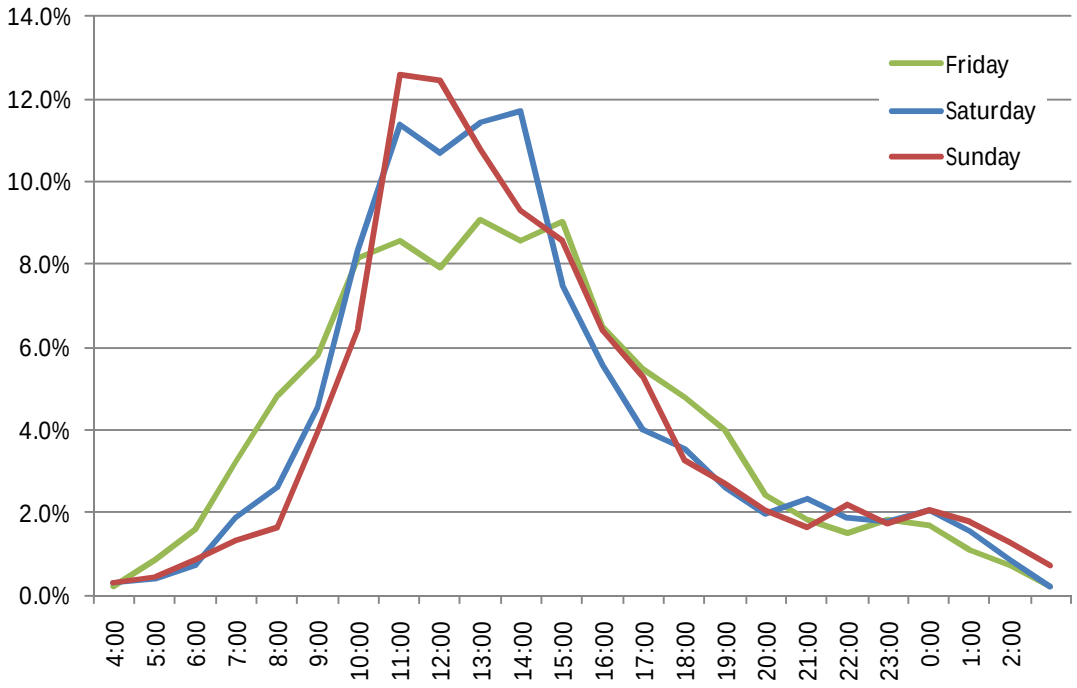
PB have investigated the supply of buses to provide the public transport services. Buses would be sourced from local and interstate companies. Surfside Coaches, who are based on the Gold Coast, provides buses for the Big Day Out concert in Southport at the Parklands Paceway centre, where they move around 13,000 patrons. They also provided buses for regular season rugby league and AFL matches on the Gold Coast, moving around 7,000 people per match. They do operate in NSW and have depot facilities in Tweed Heads. Their main constraint is servicing the weekday school peak.

3.4 Arrival rate

The arrival rate was based on the experience of the event organiser from previous SITG events. It assumed a maximum of 20% arriving in one hour for day patrons.

Campers are not arriving for a specific time, and prefer, in general, to have time to set up and enjoy their location before the event. Therefore, despite their lower car occupancy and mode share for public transport, their arrival is more spread.

Day patrons' arrival is also spread, as with a range of musical acts, not everyone arrives for the first band. Experience from the SITG event held at Woodford this year, shown in Figure 3.1, shows that day patron arrivals (Friday to Sunday) start at around 8.00 am and continue through to 8.00 pm, with the bulk between 9.00 am and 6.00 pm and a steady peak between 11.00 am and 3.00 pm.



Source: Gate entry counts taken at Woodfordia site 28/7/10 to 3/8/10

Figure 3.1 Day patron arrival SITG Woodford 2010

The maximum arrival percentage was 12.6%. Thus there could be a substantial increase in the arrival rate and numbers would still be within the arrival rate assumed in the TIA traffic analysis.

3.5 Traffic growth

The TIA report in Section 6 presented RTA traffic volume data for the years 1998, 2001 and 2004. From this it was calculated that the growth rate was linear at approximately 4.4% per year.

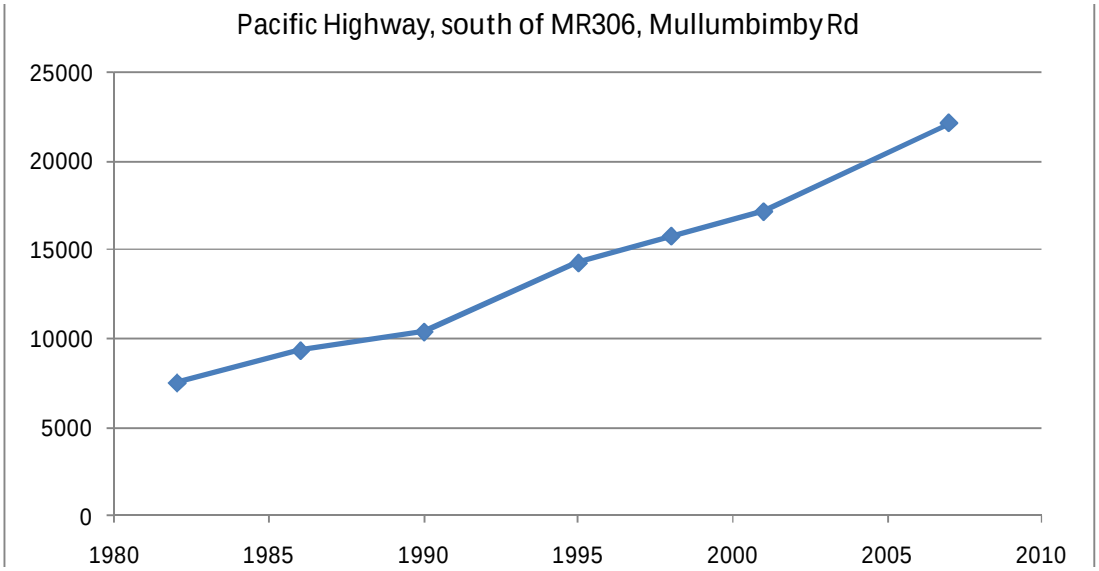
It also presented the results of the Bureau of Infrastructure, Transport and Regional Economics 2009, *National road network intercity traffic projections to 2030, Working Paper 75*. This report forecast based on a compound growth rate of 1.76% per annum.

The linear 4.4% growth rate was used as it produced higher traffic volume forecasts over the North Byron Parklands study timeframe, and was therefore considered to be conservatively high.

The RTA has recently released 2007 traffic volumes for the Northern Region. The site used for the TIA (04.273 Pacific Highway at Brunswick Heads) was not counted. However, sites to the south of Brunswick Heads were.

The RTA comment was that traffic growth not always linear. Daily volumes change by up to 10,000–15,000 vpd, and that more robust data is needed.

The forecasting method is a traditional method of growth calculation and was confirmed with the RTA Pacific Highway Office at the beginning of the study. The 2007 data, shown in Figure 3.2, shows a linear trend between 1982 and 2007. The overall growth rate for this location was 4.9% per annum from 2001.



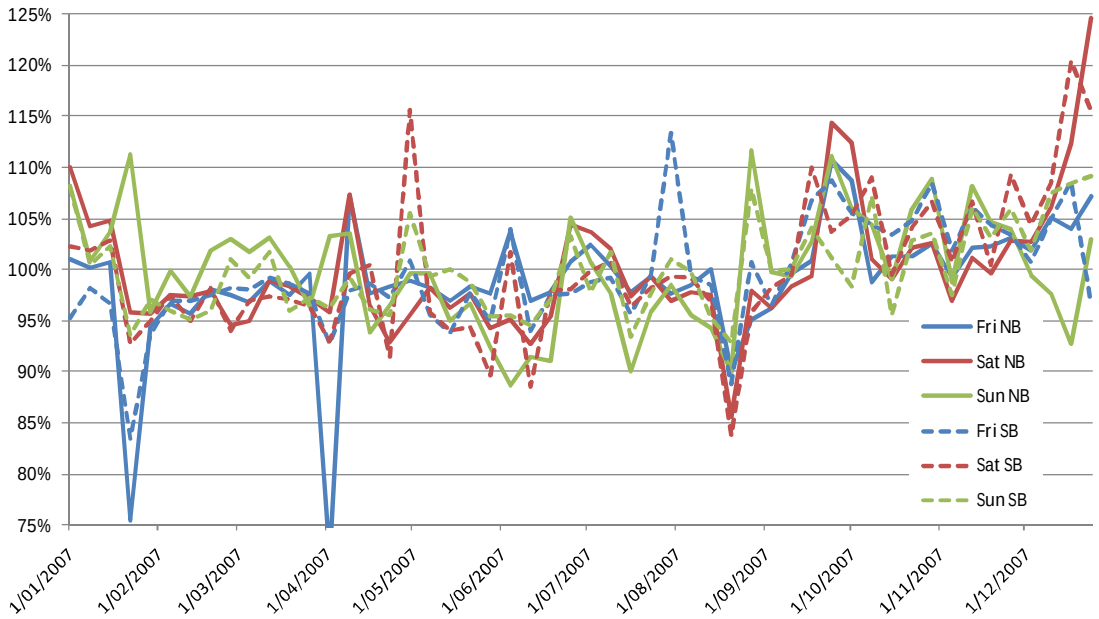
Source: Roads & Traffic Authority 2008, *Traffic Volume Data for Hunter and Northern Regions 2007* site 04.070, Pacific Highway, south of MR306 Mullumbimby Road

Figure 3.2 Pacific Highway growth, south of Mullumbimby Road

While daily traffic volumes do vary, the peak times are matched to public holidays. It is recognised that the type and scale of event would need to be matched to the time of year.

3.6 Daily variation

Using the Tweed Bypass as a guide, and excluding Christmas, traffic volumes are typically not expected to increase by greater than 15% above the annual average for that day.



Source: Roads & Traffic Authority 2008, *Traffic Volume Data for Hunter and Northern Regions 2007* site 04.010, Tweed Bypass at Terranora Creek Bridge

Figure 3.3 Daily variation in Friday, Saturday and Sunday traffic volumes on the Tweed Bypass

To simulate the effects of higher than average traffic volumes, the base traffic volumes have been increased by 15% above their annualised amounts. As can be seen from Figure 3.3, there are only a few instances when this volume would be matched or exceeded across the year.

As discussed in the TIA, the event promoters would take out newspaper advertisements informing local residents of the additional traffic in the area and asking that locals change the time or avoid the area around the site to reduce the base traffic load. This is an established method for communicating for events.

4. Interchange operation

The TIA assessed that the Yelgun Interchange could remain open provided that queuing did not encroach on the Stopping Sight Distance (SSD) with a safety margin of 100 m on each off-ramp. The interchange layout is shown in Figure 4.1.

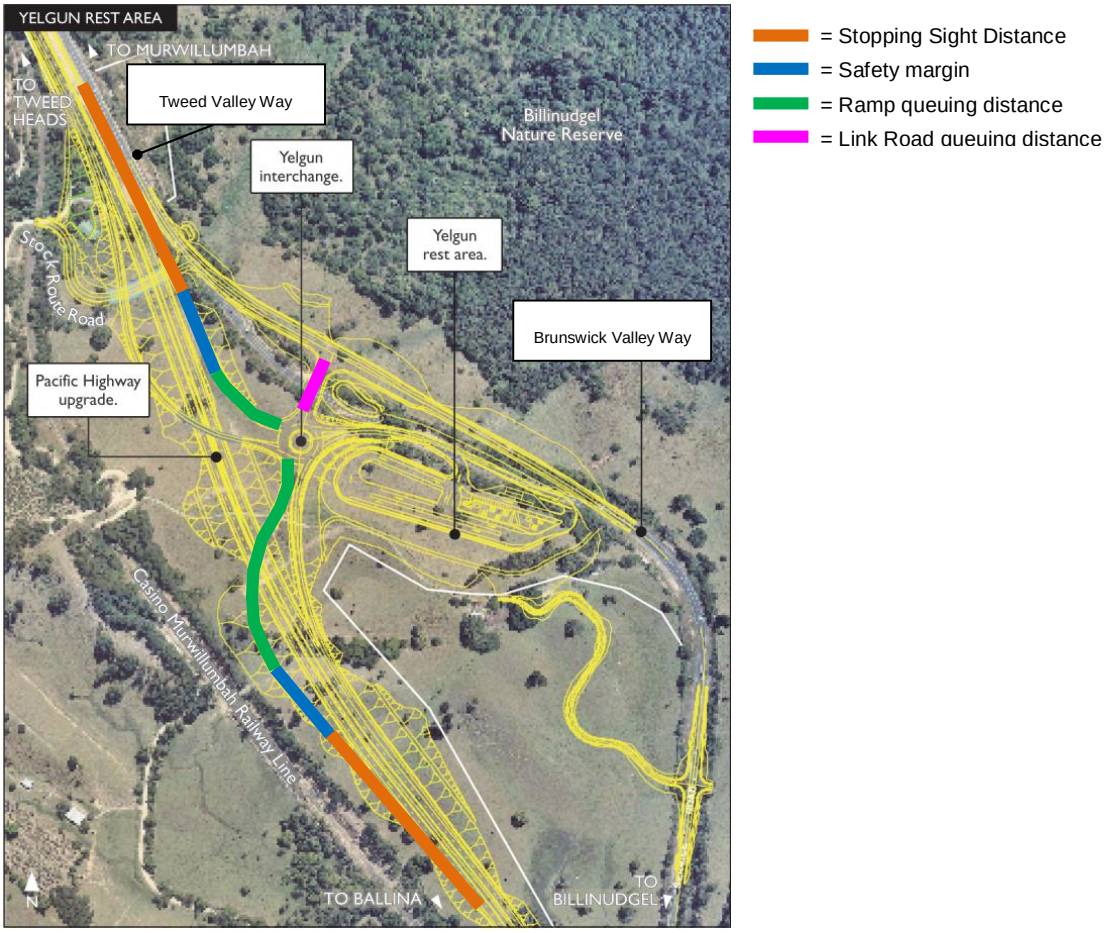


Figure 4.1 Yelgun Interchange stopping and queue distances

PB understands that the RTA has concerns about queuing of traffic from the left turn into Tweed Valley Way back along the Link Road and into the roundabout at the Yelgun Interchange.

4.1 More conservative analysis

For the purposes on agreeing on the details of an opening event and to get real data about the performance of the Interchange under event conditions, it is proposed that queuing at Tweed Valley Way be limited to the length of the Link Road only – i.e. approximately 75 m. Queuing would still occur on the Pacific Highway ramps, but it would not be influenced by any overspill from the Link Road.

Therefore, it is proposed that the opening event be planned on:

- the queue of vehicles waiting to turn onto Tweed Valley Way not extend beyond Link Road (the pink section on Figure 4.1); and

- the queue of vehicles on the Pacific Highway ramps not extend beyond 97 m on the southbound off-ramp and 247 m on the northbound off-ramp.

4.2 Event scenarios tested

To test the maximum allowable traffic to fit within these limits, the event arrival peaks were modelled against the traffic peaks, irrespective of whether they are scheduled to coincide.

The TIA tested the impact of a car occupancy of 2.5, low mode share for bus (23%) and maximum arrival percentages per hour of 17.5% for Friday and 20% for Sunday. It also tested reduced traffic sensitivity tests in 10% reduction increments. This process has been repeated with base traffic volumes increased by 15% (to simulate higher than average traffic volumes, as discussed in Section 3).

The results indicate that the queue of cars turning left from the link road onto Tweed Valley Way would not reach the roundabout for:

Day patrons

- Friday afternoon peak – 85% of the full traffic scenario
- Sunday midday peak – 75% of the full traffic scenario.

Campers

The maximum volume of campers on the Thursday is 61% of the maximum Friday volume. Therefore, the spread arrival of the campers means that there is sufficient capacity to accommodate the traffic generated by all 17,500 campers.

4.3 Achieving the traffic reduction

The full traffic scenario is achievable without undertaking travel demand measures beyond those used at Woodford. The reduction in traffic attraction during peak times could be achieved through various means, including:

- reducing the arrival rate to a maximum of 15% per hour
- increasing car occupancy to 2.6 and the mode share for public transport of 40%
- increasing car occupancy to 2.7 and the mode share for public transport of 38%
- increasing car occupancy to 2.8 and the mode share for public transport of 36%
- increasing car occupancy to 2.9 and the mode share for public transport of 34%
- or a combination of arrival time, car occupancy and more share changes.

Based on this, the proponent is proposing that for the opening event, strategies to achieve a more spread arrival profile, high public transport usage (40% public transport) and 2.9 car occupancy would be employed.

Specific measures include:

- reduced price combination bus and event entry tickets
- selling timed entry passes for campers driving to the site
- pre-paid parking for all patrons driving to the site
- partial reimbursement voucher for day patron vehicles arriving before 12.00 pm
- partial reimbursement voucher for vehicles with three or more ticket holders
- restricted numbers of parking tickets available
- information for alternative park and ride arrangements for tickets sold without parking
- resolution bay for vehicles arriving without valid parking pass
- convenient and well-planned network of public transport services to the site
- well-publicised shuttle bus offering trips from site to Brunswick Heads
- facilities provided on site to reduce the need to travel off-site
- separate gate entry for bus services.

4.4 Contingency measures

In revising the traffic analysis of the interchange for the opening event, the following contingency measures have been allowed:

4.4.1 As outlined in the TIA

- Assumed day patron arrival rates 60% higher than observed arrival rates at Woodford, assumed camper arrival were around 85% higher than the arrival rates observed at Woodford.
- Advertising in local newspapers advising of traffic management measures and potential delays.
- Traffic management measures introduced if the queue of vehicles on the Pacific Highway Ramps extends beyond 97 m on the southbound off-ramp and 247 m on the northbound off-ramp. These values include a 100 m buffer to the stopping sight distance:
    - hold northbound movement on the Tweed Valley Way allowing uninterrupted discharge of Link Road queue
    - hold northbound off-ramp queue if arrival rate on southbound off-ramp continues to cause queuing issues

- close northbound off-ramps if queuing extends beyond 97 m on the southbound off-ramp and 247 m on the northbound off-ramp.

4.4.2 Additional contingency measures for the opening event

- additional 15% base traffic volumes to allow for a daily variation in traffic
- no queuing beyond the Link Road.

5. Parking management

Concerns have been raised about the ability of parking restriction to be effectively implemented. The following provides information on the strategies planned. The measures mentioned in this section should be read in conjunction with those proposed in the TIA and Section 4.

5.1 Timed parking ticket

Patrons wishing to park at the site would be required to pre-purchase their parking ticket along with their event ticket. They would be required to select their time of arrival. Only a certain number of tickets would be sold for each timeslot. Timeslots would be:

- Wednesday AM & PM - 20% of campers
- Thursday AM - 20% of campers and PM - 30% of campers
- Friday AM - 30% of campers.

This would:

- spread arrivals across the day
- cap the number of arriving vehicles to an amount agreed with the RTA to not threaten the capacity of the Yelgun Interchange.

Tickets would specify the arrival period, i.e. between 6.00 am and 12.00 pm. Campers who miss their slot would be directed the day patron parking area and transferred to the site by shuttle bus.

5.2 Prevention of illegal parking

The proposed management scheme to prevent parking includes:

- installation of Special Event Clearway signs
- roving parking patrols by event staff
- verbal requests to move any vehicles illegally parked if possible
- towing vehicles on stand-by, funded by the event organiser
- requests to the RTA or user-pays Police for fining/towing of illegally parked vehicles
- holding area for illegally parked vehicles, not strictly an impound facility.

5.3 Internal car park operation

5.3.1 Camper mode

Campers would enter the site via Gate A and then pass through a processing area before being allowed to use the Spine Road to get to the northern part of the site. The vehicle processing area is located within the site alongside Tweed Valley Way, between Gates A and C, as shown on Figure 5.1. This configuration would be used on the Wednesday and Thursday (camper entry only).

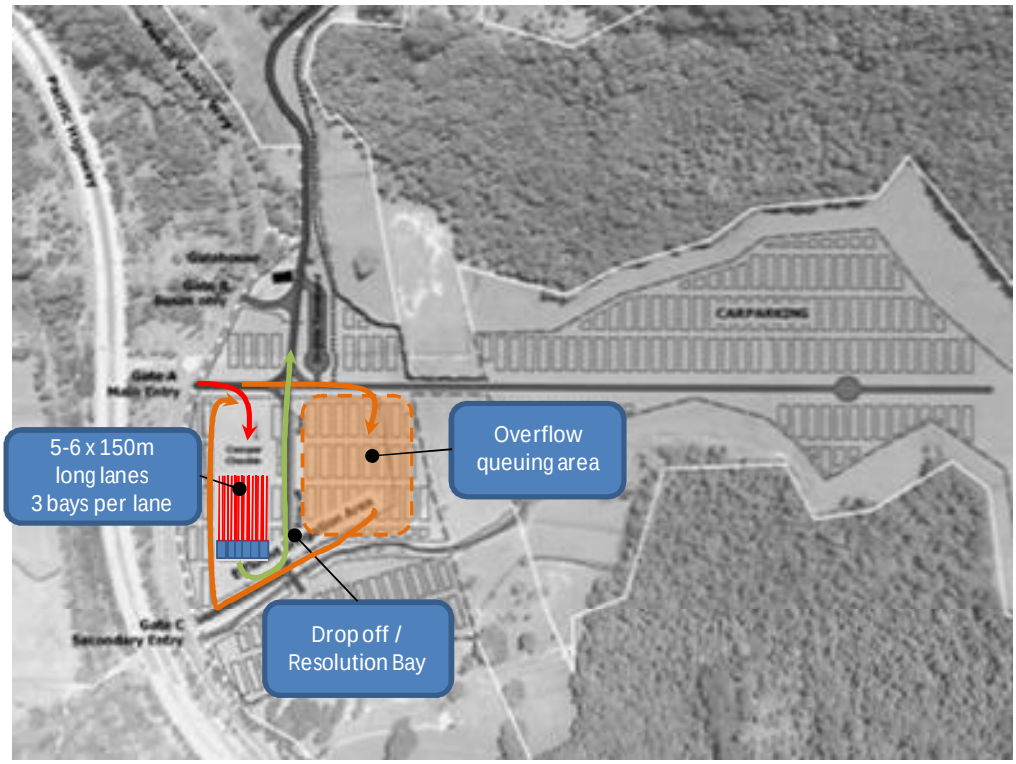


Figure 5.1 Campers' vehicle processing area

At this processing area, tickets would be checked and vehicles would be inspected for alcohol and banned substances. This area would consist of five to six lanes with three inspection bays per lane, with approximately 150 m queuing space for each lane. If all queues were to become full, site marshals would direct any overflow through the event laneways to begin a new queue within the site, within an overflow area.

Based on experience from the Woodford event, processing times of 1–2 minutes are anticipated. Assuming a processing time of 2 minutes per vehicle, this processing area would have a capacity of 540 vehicles per hour. Apportioning the camper numbers for Woodford and the 17,500 camper opening event, the maximum arrival volume required to be processed is 610 vph during one of the hours. Options to improve or manage this arrival include:

- adding an extra lane (with three bays)
- improving the processing time to an average of 1minute 45 seconds, or

- utilising the overflow queuing area.

5.3.2 Day patron mode

During days with day patron entry, the camper check-in vehicle processing area would be converted to parking. All vehicles would park and then use the shuttle bus to access the event area.

The southern car park operation is described below and shown on Figure 5.2:

- Campers arriving on these days would have to park in the parking area (incentive to turn up on camper-only early).
- Vehicle processing for on these patrons would be limited to confirming valid pre-paid parking pass and handing out high-occupancy vehicle reimbursement vouchers. This would occur in lanes between Gate A and the intersection of the Spine Road and the cross-intersection of the Spine Road and the parking road.
- Vehicles without a parking pass would be directed to a resolution area and directed to Mullumbimby to park and use the bus service to get to the site.
- Experience from previous events suggests that a maximum of 5% of vehicles would require the resolution bay.

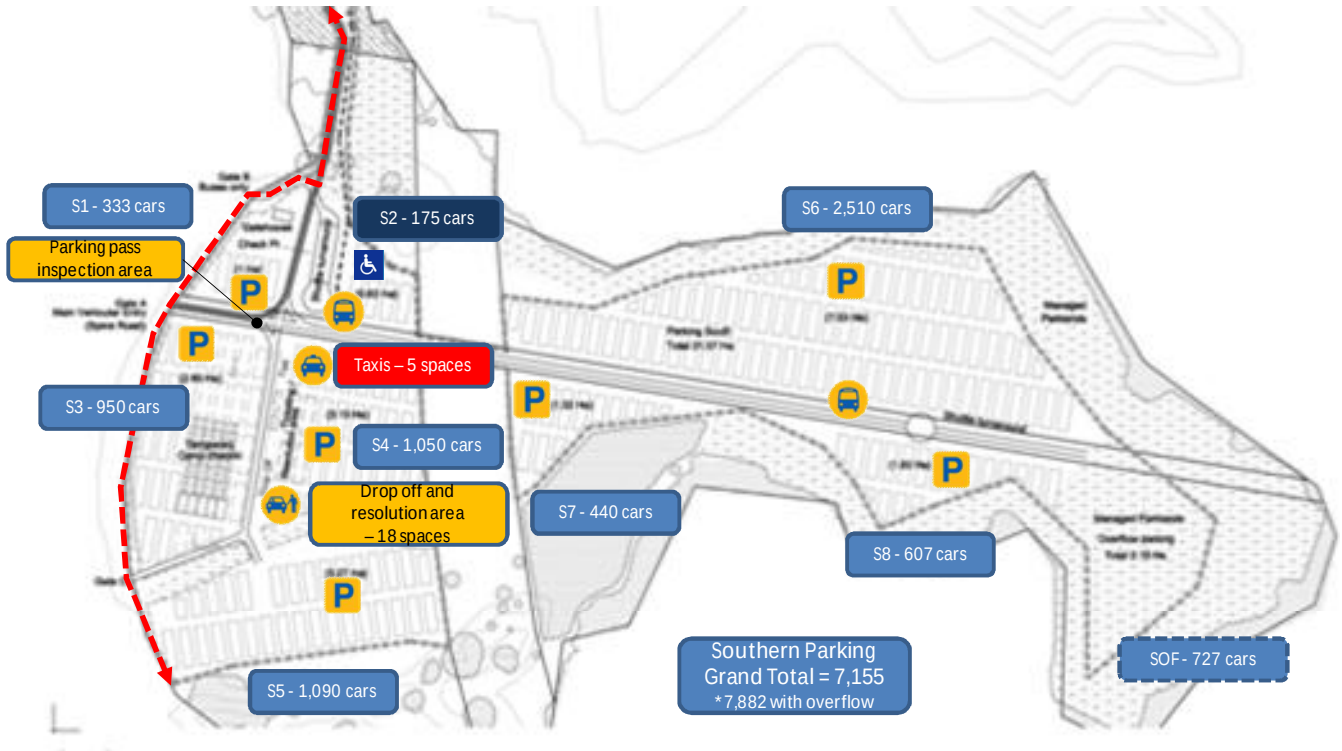


Figure 5.2 Southern car park – day patron mode

6. Traffic management

Concerns have also been expressed by the RTA regarding the ability of manual traffic control to respond quickly enough to queuing situations on the Pacific Highway ramps to prevent queues of vehicles reaching the stopping sight distance. To address these concerns, the following traffic management measures are proposed:

- manually operated portable traffic signals at the intersection of Tweed Valley Way and the Yelgun Interchange Link Road, and on the northbound and southbound off-ramps
- traffic control staff with two-way communication stationed on Pacific Highway off-ramps (behind barriers)at buffer zone to advise of queuing issues
- advanced warning signs advising of the potential use of traffic signals
- advanced VMS signs advising of the potential queuing on off-ramps
- crews with barriers positioned at beginning of Pacific Highway off-ramps with 'Ramp closed proceed to next exit' signs
- VMS to be changed if ramp closed.

If the northbound off-ramps were closed, the signposted diversion route would be via the Wilfred Street turnoff into the Billinudgel industrial area, as shown in Figure 6.1. Bonanza Drive, Brunswick Valley Way and Tweed Valley Way would be used to get back to the site. This would be a diversion of approximately 950 m compared to the Pacific Highway.

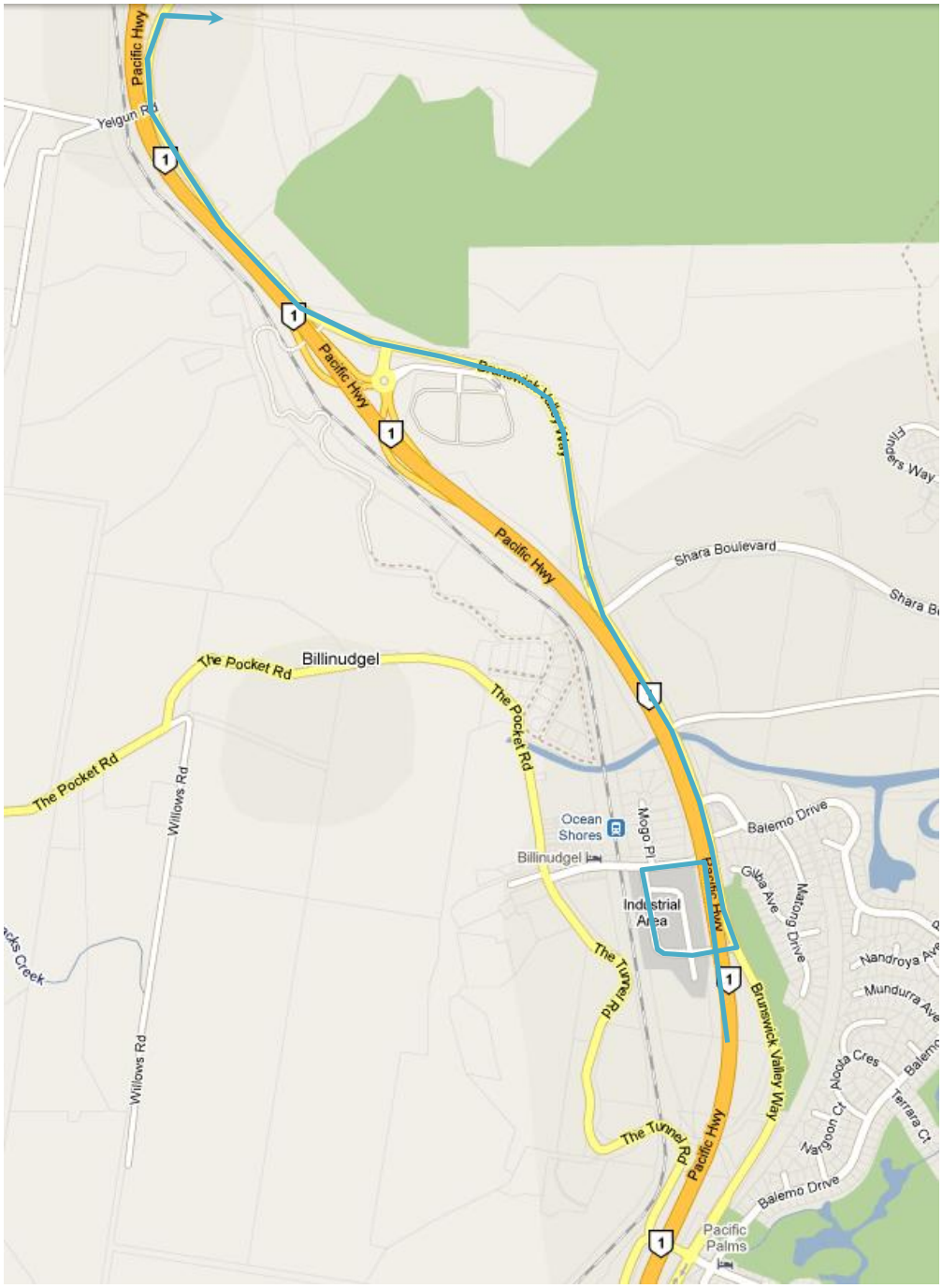


Figure 6.1 Diversion route for northbound vehicles

If vehicles miss this exit, the next northbound off-ramp would be at Cudgera Creek Road, with access back to the site via Mooball-Pottsville Road and Tweed Valley Way, as shown in Figure 6.2. This would involve a longer diversion of 30.7 km (compared to the Yelgun Interchange route), including 12.5 km on Cudgera Creek Road and Mooball Pottsville Road.

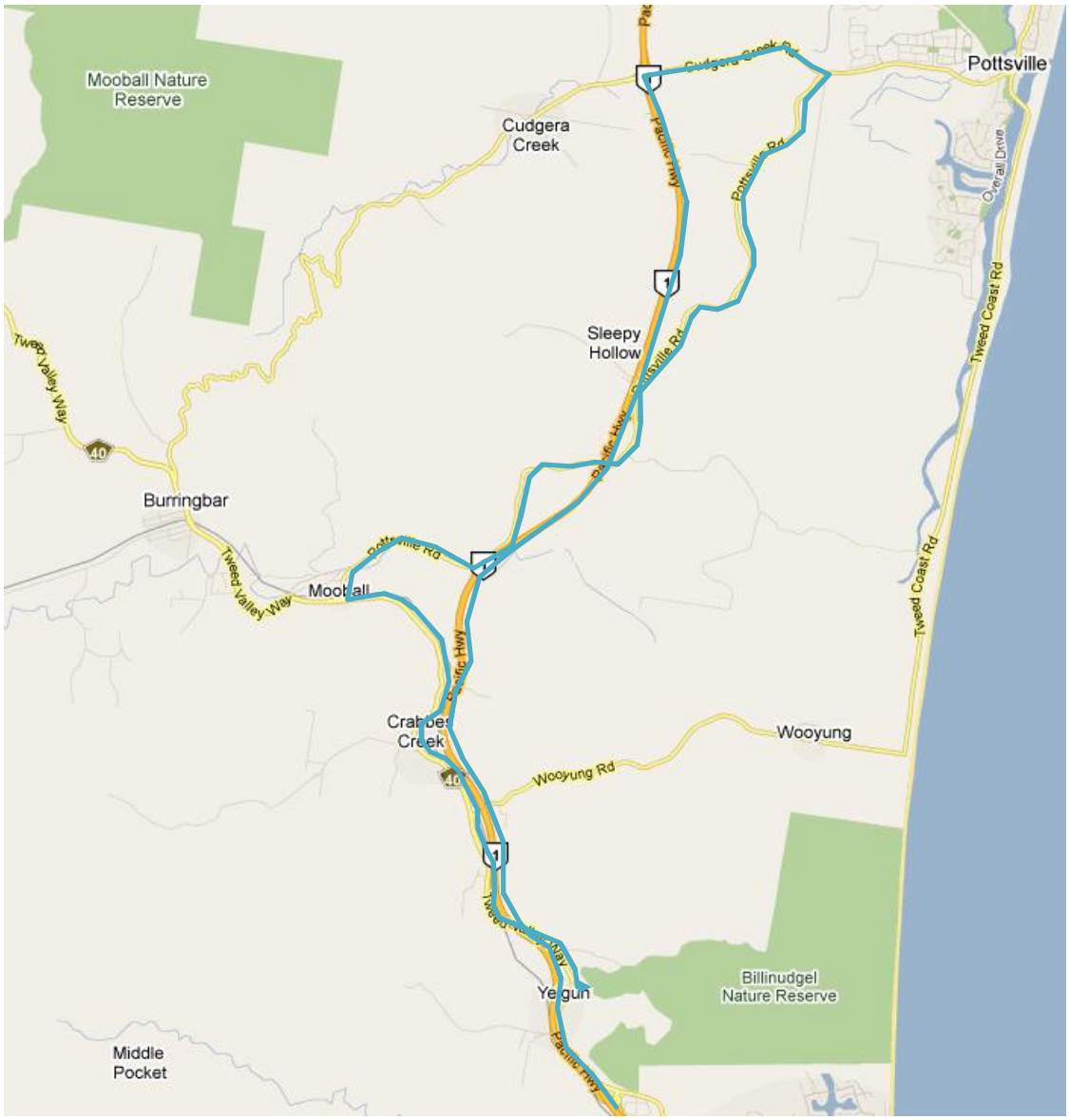


Figure 6.2 Diversion for vehicles that miss the Billinudgel turn-off

6.1 Review of traffic management

The site would host events of different sizes and type. The opening event would be used to gather information on travel behaviour and the success of traffic management and travel demand management.

The proponent would organise an annual debrief with the Police, RTA and Council to determine if any modifications are required to manage traffic. Data would be gathered at the first and second year events to enable an assessment of travel behaviour. Beyond that, counts would be done as necessary.

The event traffic management plan and traffic control plans would be prepared by each event promoter for consideration by both the North Byron Parklands management and the RTA. These plans would take into consideration any outcomes from the annual debriefing after the event(s) of the previous year.

Any events larger than the opening event would be subject to submission of a traffic management plan and approval by the RTA.

7. Conclusion

The supplementary information presented in this submission response has provided additional analysis based on updated traffic data and actual experience from a recent event together with further sensitivity analysis of assumptions on applicable parameters.

The analysis included more conservative values. Further contingency measures are proposed. It has demonstrated that an opening event can occur on the site without significant impact on the safety and performance of the Pacific Highway and surrounding road network.

The following conclusions are made:

- The Pacific Highway Yelgun Interchange can function acceptably with a reasonable level of contingency.
- The travel assumptions required to stay below this threshold of traffic are achievable with only modest changes to behaviour experienced at an event with no travel demand management.
- The opening event as described represents a suitable level of festival patronage that could be initially achieved at the North Byron Parklands site.