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26 September 2017

P0763 JWP H12 Pokolbin Tourist Development

J W Planning Pty Ltd
13/478 The Esplanade,
Warners Bay NSW 2282

Attn: Gareth Simpson

Dear Gareth,

Proposed Tourist Facility, Palmers Lane, Pokolbin, NSW.

Further to your email and following our site visit and review of the documentation provided for the proposed tourist development at Pokolbin, NSW, we provide the following traffic impact statement. This assessment has been prepared in accordance with the Austroads Guidelines and Section 2.3 of the RTA Guide to Traffic Generating Developments which provides the structure for the reporting of key issues to be addressed when determining the impacts of traffic associated with a development. This guide indicates that the use of this format and checklist ensures that the most significant matters are considered by the relevant road authority.

The report has also taken into consideration the planning requirements outlined within the Cessnock Development Control Plan 2010.

The subject site is located at the western end of Palmers Lane as shown in Figure 1. The surrounding area consists of mostly rural industry, vineyards and tourist facilities.

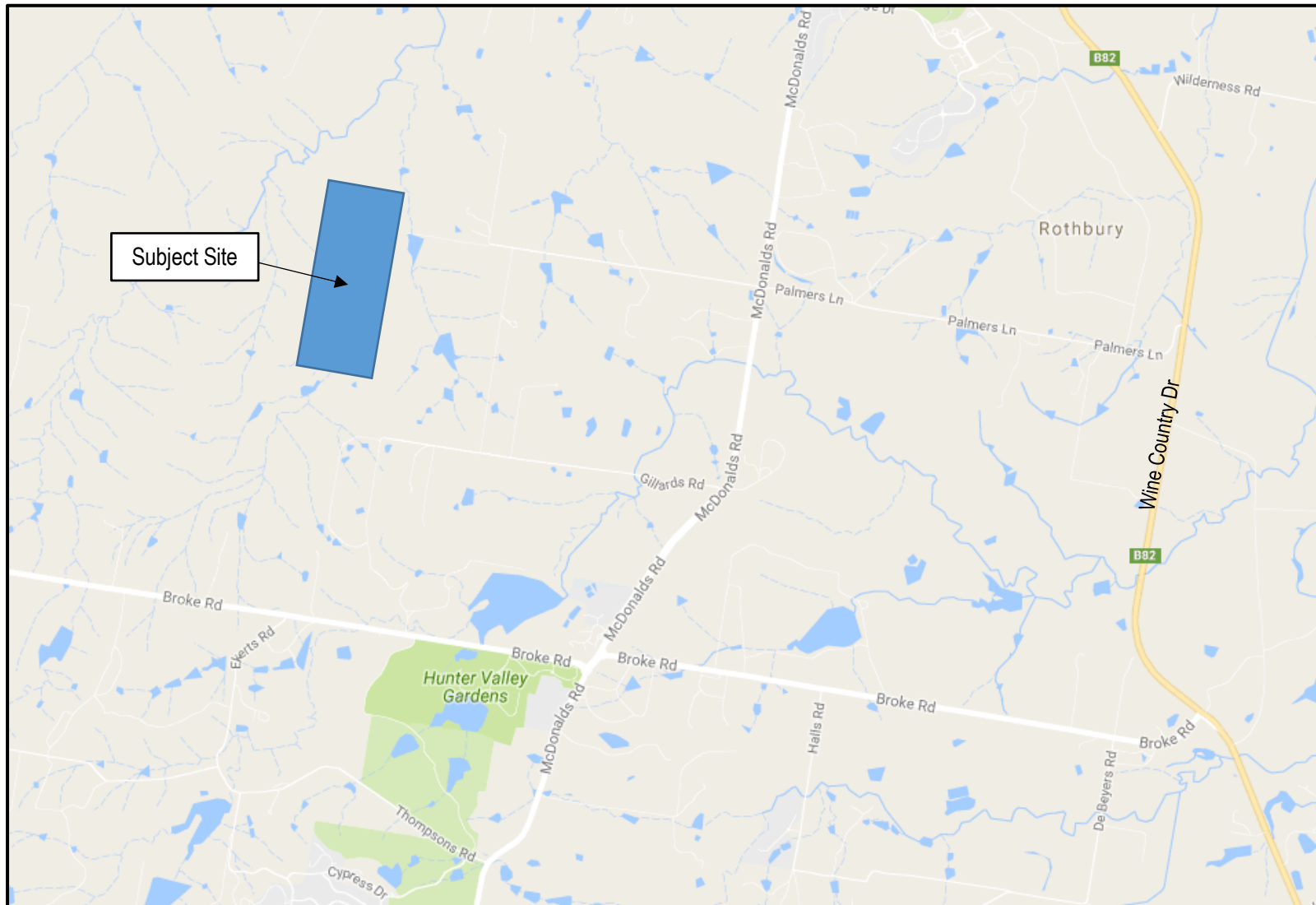


Figure 1 – Location of the subject site within the context of the local road network (Source: Nearmap).

Traffic Impact Assessment:

Item	Comment
Existing Situation	
2.1.1 Site Location and Access	The subject site is located at the western end of Palmers Lane as shown in Figure 1. Access is currently provided via an unsealed right of way at the western end of both Gillards Road and Palmers Lane.
2.2.1 Road Hierarchy	The main road through the area is Wine Country Drive which provides a north-south connection between the Hunter Expressway to the north and Cessnock to the south. It forms part of the regional road network (MR220) carrying a high volume of traffic to the Hunter Valley Wine Region. McDonalds Road operates as a collector road providing the major connection between the subject site and the surrounding areas. It is a rural road providing two lanes of travel with an unsealed verge. No street lighting is provided and there are no pedestrian or cycling facilities. McDonalds Road operates under the posted speed limit of 80 km/hr past Gillards Road. To the east of the subject site, McDonalds Road connects with Gillards Road via a 'Give Way' controlled 'T-intersection' which allows for all turning movements with McDonalds Road having priority. Gillards Road is a local road which provides access to several vineyards and rural properties. It provides a sealed pavement in the order of 5.5-6 metres wide along the majority of its length which allows for a single lane of travel in each direction with an unsealed verge. It does not provide street lighting, pedestrian nor cycling facilities. The surrounding roads are all local roads under the care and control of Cessnock City Council.
2.2.2 Roadworks	A review of the Cessnock City Council website indicates that there are no roadworks planned or ongoing in the general locality. Upgrades were completed in 2015 in the vicinity of Broke Road and McDonalds Road including intersection and pathway improvements.
2.2.3 Traffic Management Works	No traffic management works planned or ongoing in the locality.
2.2.4 Pedestrian and Cycling Facilities	No pedestrian footpaths or cycling facilities are provided along the local roads, reflective of the rural nature of the area. A new cycleway is currently being constructed in conjunction with upgrades to Hermitage Road to the west of the site.
2.3 Traffic Flows	
2.3.1 Daily Traffic Flows	As part of the project work, Seca Solution collected traffic data at the intersection of Gillards Road and McDonalds Road to determining the current operation and traffic volumes along these roads. The survey was completed over one and a half hours (11:00am to 12:30pm) on Saturday, 4th February 2017. This time was selected as it represents the typical period of peak demands for this area, given its nature as a tourism destination. The current two-way traffic flows along McDonalds Road (south of Gillards Road) were 216 vehicles per hour, reasonably equally split to the north and south. Current two-way flows along Gillards Road were significantly lower with 44 vehicles per hour.

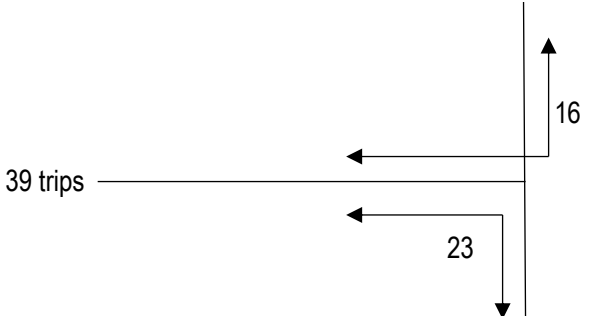
Item	Comment
	Advice from the RMS Guidelines indicate that peak hour flows typically represent around 8-12% of the daily traffic flows. As such, the daily flows along McDonalds Road (south of Gillards Road) could be in the order of 2,200 vehicles per day with daily flows on Gillards Road being in the order of 450 vehicles daily.
2.3.2 Daily Traffic Flow Distribution	Traffic flows along McDonalds Road and Gillards Road would be reasonably balanced throughout the day.
2.3.3 Vehicle Speeds	No speed surveys were completed as part of the survey work, however observations on site indicate that drivers typically travel at or above the posted speed limit due to the good road alignment and low overall traffic volumes.
2.3.4 Existing Site Flows	The subject site is currently vacant and generates minimal traffic demands.
2.3.5 Heavy Vehicle Flows	There are minimal heavy vehicle flows in this location which consist of mostly buses associated with the surrounding vineyards and tourism industry. There are some heavy vehicle movements associated with the surrounding primary industry.
2.3.6 Current Road Network Operation	Observations on site indicate that the local roads operate very well throughout the day with minimal delays or congestion.
2.4 Traffic Safety and Accident History	A review of accident data provided by the RMS indicates that there have been no accidents recorded on Gillards Road in the 5 year period between July 2011 and June 2016.
2.5 Parking Supply and Demand	
2.5.1 On-street Parking Provision	No formal on-street parking is provided on Gillards Road. Drivers can stop within the unsealed verge as required.
2.5.2 Off-street Parking Provision	No public off-street parking is provided in this location.
2.5.3 Parking Demand and Utilisation	Observations on site indicate that there is no demand for on-street parking along Gillards Road. Parking demands for the surrounding land uses are contained within their individual lots.
2.5.4 Set down or pick up areas	No set down or pick up areas in the locality of the site.
2.6 Public Transport	
2.6.1 Rail Station Locations	The nearest railway station is located at Branxton, approximately 14 km to the north of the subject site.
2.6.2 Bus Stops and Associated Facilities	No bus stops are provided within the locality of the site.
2.6.3 Transport Services	No public buses operate along Gillards Road or McDonalds Road in the locality of the site (excluding school buses and buses for special events). Buses can be chartered or hired from local operators and there are several tour companies that operate throughout the area. Bus transfers are also provided by several vineyards and tourism businesses.
2.7 Pedestrians Network	No pedestrian footpaths or cycling facilities are provided in this location, reflective of the rural nature of the area and the low overall demands.
2.8 Other Proposed Developments	There is an approved tourist accommodation and a commercial development located on McDonalds Road (Lot 89, DO755255) – DA 8/2016/189/1.
The Development	
3.1.1 Nature of Development	The proposal allows for the development of a new tourist facility which will provide the following: - Accommodation consisting of 72 hotel rooms; - Welcome Centre comprising: ➤ Function Centre / Restaurant with GFA of 395 sqm;

Item	Comment
	➤ Reception, office and kitchen. Parking will be provided on site for visitors and guests with parking located in the vicinity of the Welcome Centre as well as the accommodation. A concept plan for the proposed tourist development is included in Attachment A.
3.1.2 Access and Circulation Requirements	Cessnock Development Control Plan (DCP) requires that all vehicles must be able to enter and exit the in a forward direction. Both the access driveway and internal site layout shall be consistent with AS2890 and the DCP to ensure that vehicles can manoeuvre within the site as required. This will require a minimum width of 5.5 metres to allow for two-way movements into and out of the site.
3.2 Access	
3.2.1 Driveway Location	As part of the development Gillards Road will be extended to the west within the existing road corridor to connect with the existing access road (right of access) to the site. This existing access road will be upgraded to provide a sealed driveway with access to Gillards Road only. No vehicle access will be provided to Palmers Lane.
3.2.2 Sight Distances	Sight distance requirements for vehicles exiting a site at an access driveway are specified by AS2890, based upon the speed limit along the frontage road. For the posted speed limit of 80 km/hr along Gillards Road, the standard requires a minimum sight distance of 105 metres. The proposed right of way will connect with Gillards Road at the western end of the proposed extension, located approximately 230 metres west of the existing terminus. Gillards Road will terminate at the site access and all vehicles will therefore enter the site via a right turn and exit left. There are no opposing movements at the site access with all vehicles able to freely enter and exit as required. The extension of Gillards Road will provide a relatively flat and straight road alignment. A review of the site indicates that the sight distance requirements outlines above could be easily achieved at the driveway entry point.
3.2.3 Service Vehicle Access	Access for service vehicles will be provided via the proposed access driveway off Gillards Road. This access driveway will be designed to accommodate the turning movements associated with these vehicles.
3.2.4 Queuing at entrance to site	No vehicles queues expected at the access driveway due to the low demand for vehicles entering and exiting the site and the available spare capacity on Gillards Road. Access to the site is free flowing from Gillards Road.
3.2.5 Comparison with existing site access	The location of the proposed access is consistent with the existing site access.
3.2.6 Access to Public Transport	The use of public transport to access the site is not considered appropriate given the limited availability for these services and the low overall demand. Guests who stay at the facility would likely use taxis or small tour buses (less than 22 seats) to access the site. This is consistent with other transport offered throughout the vineyards. These vehicles will be able to be accommodated along the proposed access driveway and shall access

Item	Comment
	the site using Gillards Road, consistent with the existing situation for other facilities within the vicinity.
3.3 Circulation	
3.3.1 Pattern of circulation	All vehicles will enter/exit the site via Gillards Road. The proposed internal roads and access driveway allow for two way movements in accordance with AS2890.
3.3.2 Road width	Access to the site will be provided via a right of way connecting to Gillards Road which will also be extended to the west within the existing road corridor. The extension of Gillards Road shall be designed and constructed in accordance with Council's standard specifications (Engineering Requirements for Development- Sec 4 Road Design) which for a semi rural road designates a minimum pavement width of 6m. The proposed driveway will provide a minimum width of 5.5 metres, which is consistent with the requirements of AS2890 for two-way movements. This provides access to the site for all vehicles including small buses up to 22 seats.
3.3.3 Internal Bus Movements	There will be a demand for internal bus movements. A large percentage of guests are expected to arrive to the site by shuttle bus (less than 22 seats), either as part of a tour or a group associated with use of the Function Centre. These vehicles can be accommodated within the site with the driveway and internal circulating roads providing sufficient width to cater for these vehicles.
3.3.4 Service Area Layout	No dedicated service area proposed for the site.
3.4 Parking	
3.4.1 Proposed Supply	Parking will be provided on site to accommodate the typical parking demands associated with overnight guests, restaurant use/Function Centre. The facility has been designed to accommodate the demands of international travellers with the majority arriving as small tour groups. As such the demand for individual car arrivals and subsequent parking demands will be reduced.
3.4.2 Authority Parking	Cessnock Development Control Plan provides the following parking requirements for the proposed tourist facility: Accommodation (Serviced Apartments): 1 space per unit plus 1 space per two employees. Function Centre / Restaurant: 1 space per 7 m² of gross floor area or 1 space per three seats, whichever is greater. If restaurant and/or function room is to be included (with serviced apartments) parking will be required at the adopted rate for such facilities. Council is willing to review this requirement if it can be demonstrated that the time of peak demand at each facility does not coincide or if the facilities will serve serviced apartment customers. Submissions will be assessed on a merit basis.

Item	Comment
	Welcome Centre: This space is used to welcome guests to the venue acting as a foyer and providing appropriate space to manage the needs of tourist groups. This space is ancillary to the other services on site and creates no parking nor traffic demands.
3.4.3 Parking Layout	Parking spaces for guests and visitors will be provided throughout the site with individual parking areas being designed in accordance with AS2890 and the Cessnock DCP.
3.4.4 Parking Demand	Parking demands associated with the various uses on the site have been calculated based upon the above rates, and are summarised below: Staff Advice from the study team indicates that there will be up to 35 staff employed at the site during each shift, requiring 18 parking spaces. Accommodation: The proposed services apartments require 72 parking spaces for guests. Given the nature of the proposed development and the surrounding area as a popular tourist destination, it is considered that many of the guests who stay at the site could arrive by small bus as part of a tour group. Function Centre / Restaurant: The Function Centre / Restaurant has a GFA of 395 sq metres and based on a parking rate of 1 space per 7 sq m the parking demand would be for 57 parking spaces. Cross Use of Facilities The proposed development provides for significant cross use of facilities. The restaurant will provide onsite dining facilities for guests in the serviced apartments providing ancillary facilities not requiring additional parking. Assuming 50% of guests are utilising the Function Centre / Restaurant with the balance of guests external to the site the parking for this component of the site would be 29 spaces. Assuming of the guests staying on site 50% have arrived by car compared with tour groups in small buses the parking associated with the accommodation would be 36 spaces. Plus 18 spaces for staff. Total parking demand 83 spaces Per the concept plans attached, formal parking will be provided throughout the site for 115 spaces – 73 adjacent to the Welcome Centre including Function Centre/Restaurant and 42 adjacent to the Accommodation. The parking provision is therefore in excess of the likely parking demand and represents only a 22% discount over the Cessnock DCP requirements.
3.4.5 Service Vehicle Parking	A service / loading dock will be provided at the end of the shared access road adjacent to the accommodation area. Other service vehicles

Item	Comment
	associated with site servicing (eg restaurant) will be able to park adjacent to the various buildings as required while loading or unloading. Consideration will be required for the standing of small buses associated with tour groups being able to alight upon arrival or for day trips.
3.4.6 Pedestrian and Bicycle Facilities	Unsealed pedestrian walkways will be provided throughout the site to connect the various facilities including the various carparks.
Traffic Assessment	
4.1 Traffic Generation	The RTA Guide to Traffic Generating Developments does not provide standard traffic generation rates for the proposed tourist facility. It does however provide traffic generation rates for restaurants but acknowledges that these rates vary substantially depending on the nature, location and type of restaurant as well as the number of services it provides. Traffic generation for the site have been calculated from first principles, with a summary of the potential traffic generation provided below: Accommodation: Based on the RMS rate for motel accommodation the on-site accommodation could generate 3 trips per day per unit, which consists of one trip per day associated with check in / check out and two trips per day (one inbound and one outbound) associated with travel to nearby vineyards and tourist attractions. The evening peak hour trip rate is 0.4 trips per unit. The RMS Guide indicates that accommodation is rarely fully utilised however assuming 100% usage, for the 72 bedrooms, the accommodation could generate up to 216 vehicle trips per day, 29 trips in the evening peak. Allowing for 50% of guests to arrive by bus as part of a tour group, this would reduce the overall traffic generation for the accommodation to 108 vehicles per day with up to 8 bus movements (4 inbound 4 outbound). The evening peak would be 15 car trips plus up to 8 buses. Function Centre / Restaurant: The RMS Guide specifies that the traffic generation rate for a restaurant should be based upon 85% of the seating capacity. Evening peak hour vehicle trips = 5 per 100 m² GFA Daily vehicle trips = 60 per 100m² gross floor area. These rates reflect a high private transport usage, with a mean mode split for cars of 0.85 and a mean car occupancy of 2.2. The Function Centre / Restaurant will have a GFA of 395m². This would result in an evening peak hour trip generation of 20 trips. The daily rate would be 474 trips based on both lunch and dinner sittings. The cross-use between the function centre / restaurant and accommodation detailed above sees a discount of 50% of these trips.

Item	Comment
	Thus, the evening peak hour trip generation would be 10 trips whilst the daily trips would be in the order of 237. This makes no further discount for the level of occupancy. Allowing for the above, the proposed development could generate, as a worst-case scenario, 453 vehicles per day (227 inbound and outbound) with up to 39 vehicles in the evening peak hour. Being: 100% Accommodation - 216 vehicle trips per day, 29 trips in the evening peak 50% external use of the restaurant - 237 daily trips, evening peak hour 10 trips
4.1.1 Daily and Seasonal Factors	Given the location of the site within the Hunter Valley Wine Region, a popular tourist destination, it is considered that there would be periods of increased demand associated with tourists seeking accommodation during the summer months and school holiday periods.
4.1.2 Pedestrian Movements	Given the rural nature of the site there would be minimal demand for pedestrian movements external to the site.
4.2 Traffic Distribution and Assignments	Vehicles travelling north towards the Hunter Expressway or New England Highway would turn left out of Gillards Road and use McDonalds Road to connect with Wine Country Drive to the north. Vehicles travelling south towards the M1 Pacific Motorway for connection to the Central Coast and Greater Sydney Area would turn right out of Gillards Road and use McDonalds Road and Broke Road to connect with Wine Country Drive to the east. Vehicles travelling to nearby vineyards and tourist attractions within the Hunter Valley wine region could turn left or right out of Gillards Road depending on their desired destination.
4.2.1 Origin / destinations assignment	The following origin/destination assignment has been applied: 40% of vehicles have an origin/destination north along McDonalds Road towards the New England Highway. 60% of vehicles have an origin/destination south along McDonalds Road towards the nearby vineyards and tourist attractions as well as to the M1 Pacific Motorway (via Cessnock and Freemans Waterhole). This is consistent with the existing travel patterns in the locality. 

Item	Comment
4.3 Impact on Road Safety	It is noted that sight distances at the intersection of Gillards Road with McDonalds Road are restricted for drivers turning into McDonalds Road due to existing well-established trees to the left and an existing Cessnock City Council tourist information sign to the right. Drivers turning right into McDonalds Road are able to move slightly forward, allowing them to observe vehicles approaching from the north (right) prior to pulling out of Gillards Road. To the left, drivers are able to see between the tree trunks to determine a suitable gap in the traffic movements to turn right out of the side road. Note that for drivers turning right into Gillards Road there are no sight line issues. No accidents were recorded at this intersection or along Gillards Road in the 5 years between July 2011 and June 2016, showing that the existing intersection can operate in a safe and appropriate manner for all drivers. The proposed development will increase the number of vehicles passing through this intersection each day with the highest demands over a weekend. However, this increase is low and well within the capacity of this intersection, with Sidra intersection analysis confirming the current and future operations are good with minimal delays and congestion. As such it is considered the increased traffic associated with the development of the site will have an acceptable impact to road safety at this intersection and within the general locality of the subject site. The roads in this location are generally well laid out, and McDonalds Road has been upgraded by Council to allow for increasing traffic flows and other intersections have also been upgraded e.g. Broke Road and McDonalds Road which ensure that road safety is improved as part of the on-going development in the area.
4.4 Impact of Generated Traffic	
4.4.1 Impact on Daily Traffic Flows	Allowing for the traffic distribution and assignments above and based on a robust assessment scenario with all accommodation and additional restaurant capacity driving to the site, the proposed development will have the following impact upon daily traffic flows in the locality: • Increase daily flows along Gillards Road by 453 vehicles per day and peak hour flows by 39 vehicles per hour. • Increase daily flows along McDonalds Road (south of Gillards Road) by 272 vehicles per day and peak hour flows by 23 vehicles per hour. While there are no specific limits on daily traffic flows, The RTA Guide to Traffic Generating Developments does provide standards for assessing the capacity of a rural road, which are based upon the peak hour flows. This guide indicates that the capacity of both McDonalds Road and Gillards Road would be in the order of 1,300 vehicles per hour (based upon level terrain with up to 5% heavy vehicles), corresponding to Level of Service (LoS) D. The current peak hour flows on McDonalds Road (south of Gillards Road) are 216 vehicles during the weekend peak, and the proposed development will increase this to 239 vehicles. The existing flows together with the development traffic will be significantly less than 300 vehicles per hour, and will therefore be well within the capacity of the road network (corresponding to LoS A).

Item	Comment
	As McDonalds Road operates at an acceptable level during the busy Saturday peak hour, the additional vehicles will therefore have an acceptable impact upon the local road network throughout the day.
4.2 Peak Hour Impacts on Intersections	Sidra modelling for the existing traffic flows has been completed for the intersection of McDonalds Road and Gillards Road to determine its current operation and capacity to support the additional traffic demands associated with the proposed development. This modelling shows that the intersection of McDonalds Road and Gillards Road currently operates well with minimal delays or congestion during the peak, providing LoS A on all approaches. This is consistent with the observations on site. In the peak hour, the proposed development could increase the flows through the intersection of McDonalds Road and Gillards Road by up to 39 vehicles per hour. This represents a worst-case scenario as described in Section 4.1. Sidra modelling has been completed for this intersection allowing for development traffic and background growth to increase the existing flows by 100 vehicles per hour. It shows that these additional vehicles would have a negligible impact upon the operation of this intersection, with each approach continuing to operate with LoS A. The impact upon the surrounding intersections would be significantly lower due to traffic dispersing across various routes.
4.4.3 Impact of Construction Traffic	Due to the large site area, all construction works, including the parking demands associated with construction vehicles and workers will be contained within the site with no external impacts. There will be a requirement for construction vehicles to access the site as well as additional traffic movements associated with workers. These movements can be catered for within the local road network. Construction works associated with the extension of Gillards Road will be managed by a construction traffic management plan to be developed as part of the detailed design.
4.4.4 Other Developments	There is an approved tourist accommodation and a commercial development located at Lot 89 McDonalds Road (DA 8/2016/189/1) which may increase traffic flows along McDonalds Road. Given that this road currently operates well within its capacity, these additional vehicles would not have a significant impact upon this road.
4.5 Public Transport	
4.5.1 Options for improving services	None required.
4.5.2 Pedestrian Access to Bus Stops	There are no bus services which operate in the locality.
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	The access driveway and carpark shall be designed and constructed in accordance with AS2890 with a driveway width of 5.5m.
4.6.2 Improvements to External Road Network	Gillards Road shall be extended past its present terminus to connect with the right of access and associated driveway to the subject site. This extension will be designed and constructed to Council standard specifications allowing a 6m wide pavement for this additional length of road. It is noted that Gillards Road currently provides a pavement in the order of 5.5-6 metres along the majority of its length which has been provided to

Item	Comment
	the appropriate standards. As there will be no significant change in the use of this road over the existing, with the proposed development allowing for passenger vehicle and small bus access consistent with other development within the vicinity it is considered that the existing road layout will be suitable with no upgrades required.
4.6.3 Improvements to Pedestrian Facilities	None required.
4.6.4 Effect of Recommended Works on Adjacent Developments	The extension of Gillards Road will have an acceptable impact on the adjacent development and its associated driveway.
4.6.5 Effect of Recommended Works on Public Transport Services	None.
4.6.6 Provision of LATM Measures	None Required
4.6.7 Funding	The cost associated with the extension of Gillards Road west of its current terminus and the construction of the site access and driveway shall be funded by the developer.

Site Photos:



Photo 1 – Existing unsealed access road at the western end of Gillards Road.



Photo 2 – Access to the Constable Estate Winery located adjacent to the existing site access from Gillards Road.



Photo 3 – Gillards Road looking east from the existing unsealed access.



Photo 4 – Intersection of Gillards Road with McDonalds Road.



Photo 5 – Visibility looking right (south) along McDonalds Road from the intersection with Gillards Road. Shows existing tourist signage which impacts upon the sight lines for drivers turning onto McDonalds Road.



Photo 6 – Visibility looking left (north) along McDonalds Road from the intersection with Gillards Road. Shows existing vegetation adjacent to the road which restricts the sight lines for drivers turning onto McDonalds Road.

Conclusion:

From the site work undertaken and the review of the development proposal and associated plans against the requirements of the RMS Guide to Traffic Generating Developments and Austroads Guide to Traffic Management, it is considered that the proposed development application should have no objections raised on traffic and access grounds. The development allows for considerable cross use of facilities with the function centre/restaurant complimenting the accommodation providing dining opportunities for the guests on site. Traffic counts were undertaken during a Saturday to reflect the peak traffic demands associated with the various tourist demands throughout the area and the proposed development. The additional traffic movements generated by the development were assessed taking into consideration the existing traffic flows and the performance of the local road network and the intersection of Gillards Road and McDonalds Road. These development flows will have an acceptable impact on the surrounding road network with the level of service continuing to be LoS A.

Parking has been assessed considering the various uses on site and allowing for both tourist and vehicle traffic demands. Parking will be provided on site to accommodate greater than the typical parking demands associated with the development site to allow for periods of peak demand.

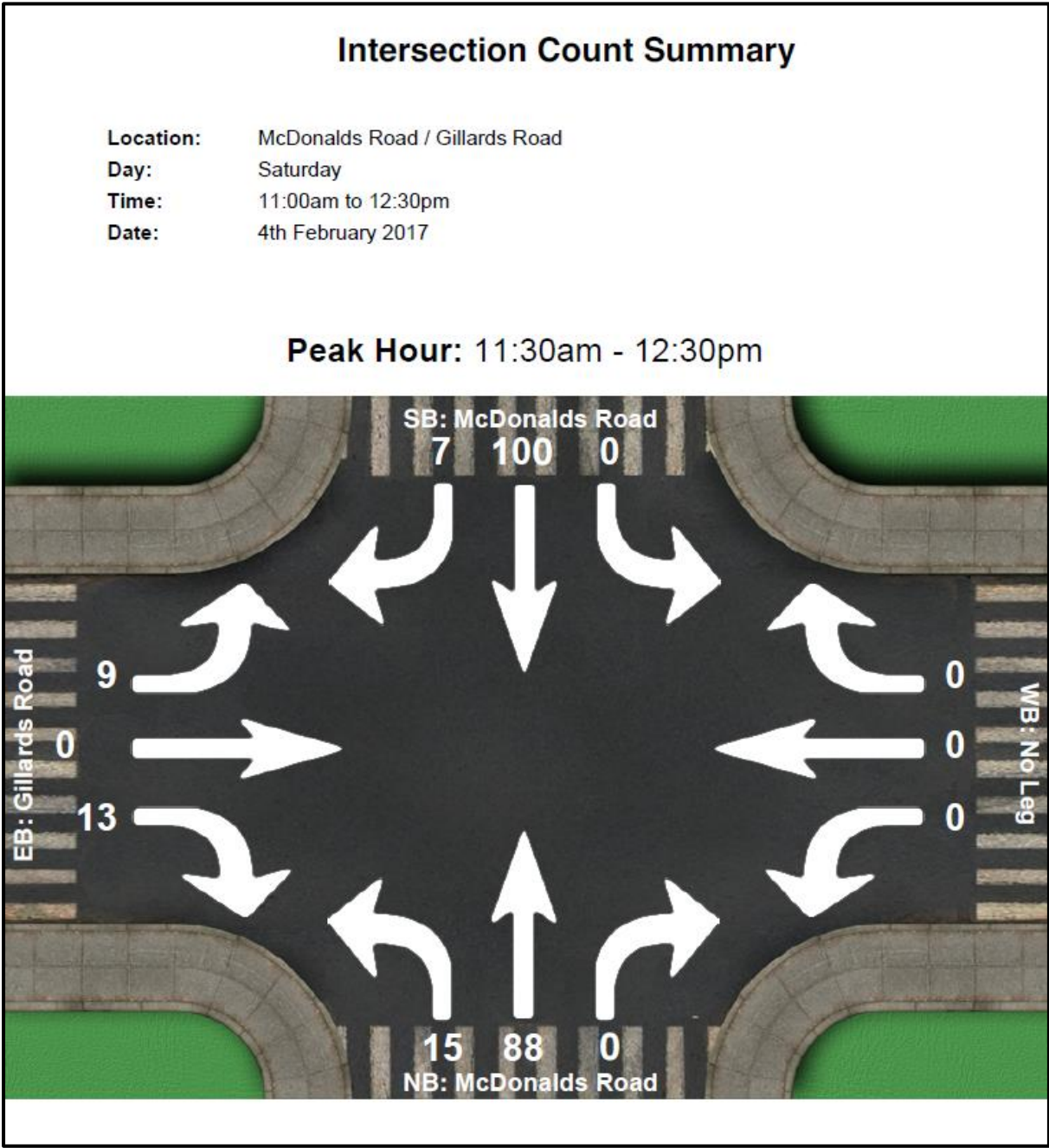
Please feel free to contact me on 4032 7979, should you have any queries.

Yours sincerely,



Sean Morgan
Director

Attachment B: Traffic Data



Attachment C: Sidra Results

Criteria for interpreting Sidra results:

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

3-Degree of Saturation (D/S)

The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity, and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

MOVEMENT SUMMARY



Site: 101 [McDonalds Road / Gillards Road]

McDonalds Road / Gillards Road

Existing Flows

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV				Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: McDonalds Road											
1	L2	15	0.0	0.053	6.9	LOS A	0.0	0.0	0.00	0.10	73.1
2	T1	88	0.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.10	78.2
Approach		103	0.0	0.053	1.0	NA	0.0	0.0	0.00	0.10	77.5
North: McDonalds Road											
8	T1	100	0.0	0.056	0.0	LOS A	0.0	0.3	0.03	0.04	79.0
9	R2	7	0.0	0.056	6.9	LOS A	0.0	0.3	0.03	0.04	73.1
Approach		107	0.0	0.056	0.5	NA	0.0	0.3	0.03	0.04	78.6
West: Gillards Road											
10	L2	9	0.0	0.018	7.2	LOS A	0.1	0.4	0.20	0.60	64.7
12	R2	13	0.0	0.018	7.3	LOS A	0.1	0.4	0.20	0.60	64.2
Approach		22	0.0	0.018	7.2	LOS A	0.1	0.4	0.20	0.60	64.4
All Vehicles		232	0.0	0.056	1.4	NA	0.1	0.4	0.03	0.12	76.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Sidra folders\P0763 H12 Pokolbin.sip7

INTERSECTION SUMMARY

 **Site: 101 [McDonalds Road / Gillards Road]**

McDonalds Road / Gillards Road

Existing Flows

Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	76.5 km/h	76.5 km/h
Travel Distance (Total)	234.5 veh-km/h	281.4 pers-km/h
Travel Time (Total)	3.1 veh-h/h	3.7 pers-h/h
Demand Flows (Total)	232 veh/h	278 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.056	
Practical Spare Capacity	1659.4 %	
Effective Intersection Capacity	4165 veh/h	
Control Delay (Total)	0.09 veh-h/h	0.11 pers-h/h
Control Delay (Average)	1.4 sec	1.4 sec
Control Delay (Worst Lane)	7.2 sec	
Control Delay (Worst Movement)	7.3 sec	7.3 sec
Geometric Delay (Average)	1.3 sec	
Stop-Line Delay (Average)	0.1 sec	
Idling Time (Average)	0.0 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.1 veh	
95% Back of Queue - Distance (Worst Lane)	0.4 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	28 veh/h	33 pers/h
Effective Stop Rate	0.12 per veh	0.12 per pers
Proportion Queued	0.03	0.03
Performance Index	3.3	3.3
Cost (Total)	75.99 \$/h	75.99 \$/h
Fuel Consumption (Total)	16.3 L/h	
Carbon Dioxide (Total)	38.3 kg/h	
Hydrocarbons (Total)	0.004 kg/h	
Carbon Monoxide (Total)	0.091 kg/h	
NOx (Total)	0.012 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY



Site: 101 [McDonalds Road / Gillards Road Development]

McDonalds Road / Gillards Road
Existing Flows with Full Development
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV				Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: McDonalds Road											
1	L2	49	0.0	0.072	7.0	LOS A	0.0	0.0	0.00	0.23	71.0
2	T1	88	0.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.23	75.8
Approach		137	0.0	0.072	2.5	NA	0.0	0.0	0.00	0.23	74.0
North: McDonalds Road											
8	T1	100	0.0	0.070	0.1	LOS A	0.2	1.3	0.12	0.14	76.6
9	R2	29	0.0	0.070	7.0	LOS A	0.2	1.3	0.12	0.14	71.1
Approach		129	0.0	0.070	1.7	NA	0.2	1.3	0.12	0.14	75.3
West: Gillards Road											
10	L2	31	0.0	0.065	7.2	LOS A	0.2	1.6	0.21	0.62	64.7
12	R2	47	0.0	0.065	7.5	LOS A	0.2	1.6	0.21	0.62	64.2
Approach		78	0.0	0.065	7.4	LOS A	0.2	1.6	0.21	0.62	64.4
All Vehicles		344	0.0	0.072	3.3	NA	0.2	1.6	0.09	0.29	72.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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INTERSECTION SUMMARY

 **Site: 101 [McDonalds Road / Gillards Road Development]**

McDonalds Road / Gillards Road
Existing Flows with Full Development
Giveaway / Yield (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	72.0 km/h	72.0 km/h
Travel Distance (Total)	347.9 veh-km/h	417.5 pers-km/h
Travel Time (Total)	4.8 veh-h/h	5.8 pers-h/h
Demand Flows (Total)	344 veh/h	413 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.072	
Practical Spare Capacity	1123.2 %	
Effective Intersection Capacity	4810 veh/h	
Control Delay (Total)	0.32 veh-h/h	0.38 pers-h/h
Control Delay (Average)	3.3 sec	3.3 sec
Control Delay (Worst Lane)	7.4 sec	
Control Delay (Worst Movement)	7.5 sec	7.5 sec
Geometric Delay (Average)	3.1 sec	
Stop-Line Delay (Average)	0.2 sec	
Idling Time (Average)	0.0 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.2 veh	
95% Back of Queue - Distance (Worst Lane)	1.6 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	99 veh/h	118 pers/h
Effective Stop Rate	0.29 per veh	0.29 per pers
Proportion Queued	0.09	0.09
Performance Index	5.5	5.5
Cost (Total)	136.63 \$/h	136.63 \$/h
Fuel Consumption (Total)	28.4 L/h	
Carbon Dioxide (Total)	66.7 kg/h	
Hydrocarbons (Total)	0.008 kg/h	
Carbon Monoxide (Total)	0.144 kg/h	
NOx (Total)	0.024 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.