



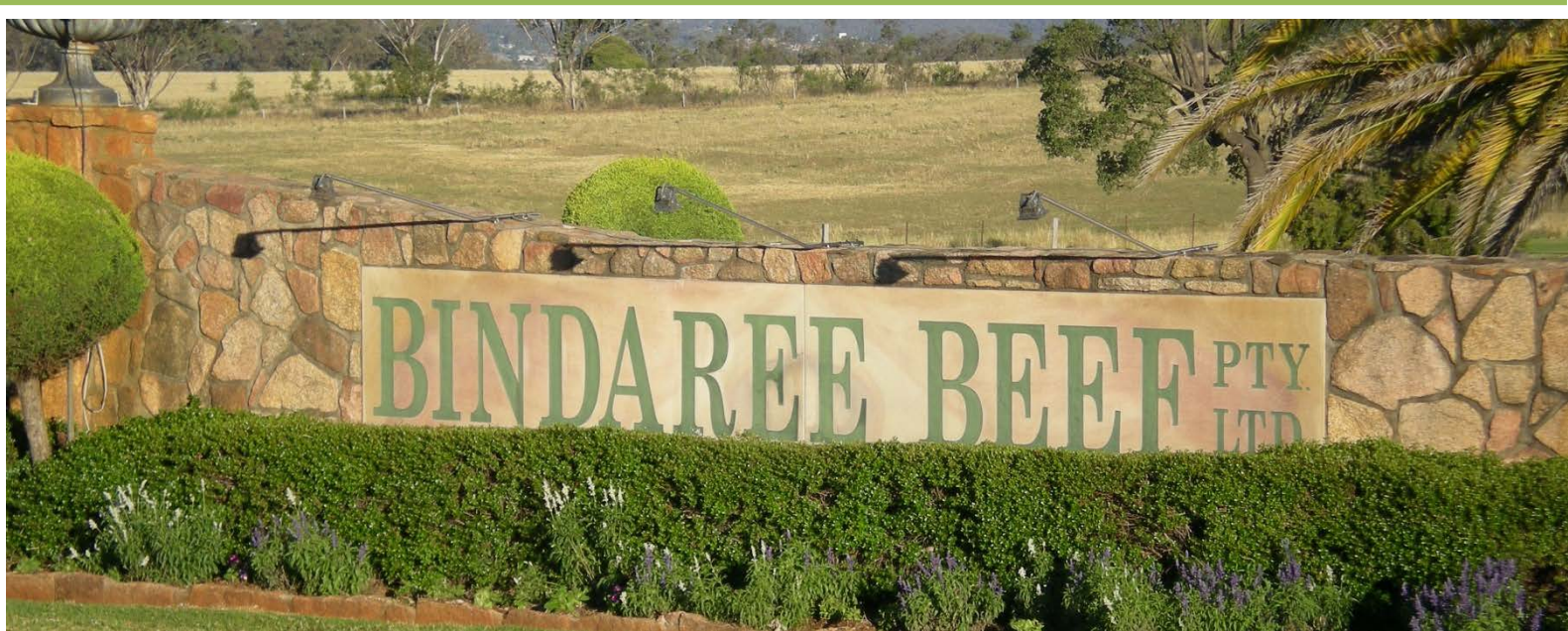
BETTER TRANSPORT FUTURES
MARK WAUGH



Bindaree Beef Proposed Facility Upgrades

Bindaree Beef Pty Ltd
C/o Mitchell Hanlon Consulting Pty Ltd

Traffic Impact Statement
December 2013



Mark Waugh Pty Ltd

ABN 67 106 169 180

Document History and Status

Issue	Ver.	Issued To			Qty	Date	Reviewed	Approved
Draft	Ver01	Mitchel	Hanlon	Consulting	1 Electronic	24 October 2013	K Barkley	K Barkley
		Pty Ltd						
Final	Ver 02	Mitchel	Hanlon	Consulting	1 Electronic	1 November 2013	K Barkley	K Barkley
		Pty Ltd						
Final	Ver03	Mitchel	Hanlon	Consulting	1 Electronic	16 December 2013	K Barkley	K Barkley
		Pty Ltd						

Printed: 16 December 2013
 Last Saved: 16 December 2013
 File Name: P1119 MH Bindaree Beef Inverell Ver03.docx
 Author: Max Stember-Young
 Name of Organisation: Mitchel Hanlon Consulting Pty Ltd
 Name of Project: Bindaree Beef
 Name of Document: Traffic and Parking Impact Statement
 Document Version: Final
 Project Number: P1119

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1 Introduction

Background

Better Transport Futures has been commissioned by Mitchel Hanlon Consulting Pty Ltd on behalf of Bindaree Beef Pty Ltd to prepare a Traffic Impact Statement for the proposed bi-digest plan and a new rendering plant. This work is required to support a Development Application for the proposal as part of a State Significant Development. Due to the potential impact of the development upon the local road network and at intersections along the Gwydir Highway (that forms part of the regional road network) the Roads and Maritime Services (RMS) will be required to review the proposal and provide comment on the proposed development.

Scope of Report

The scope of this report is to review the traffic and parking implications for the proposed development. The report will also provide advice on access issues, internal site layout and issues relating to service vehicles. Director General Requirements (DGRs) have been provided for the site and consultation has been undertaken with Inverell Shire Council and RMS, whose comments have been considered for this report.

Issues and Objectives of the study

The issues relative to the proposal are:

- Assess impact on the arterial and local road network due to the additional traffic flows;
- Assess the impact parking demand generated by the proposed development;
- Review the access arrangements for the development;
- Review the service arrangement for the development;
- Address all DGRs and consider comments from Council and RMS; and
- Assess any other transport impacts associated with the development.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required as part of the development.

Planning Context

In preparing this document, the following guides and publications were used:

- RTA Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- Inverell Shire Council DCP Parking Guidelines;
- Australian / New Zealand Standard – Parking Facilities Part 1 : off-street car parking (AS2890.1:2004); and
- Austroads Guide to Road Design Part 3: Geometric Design and Part 4A: Unsignalised Intersections.

Authority Requirements

The consent authority will be required to consider the DGRs and comments from both RMS and Council. Comments provided by each of these parties and acknowledgment of report inclusion are provided below:

■ Table 1-1 DGR Response

Comment	Report Inclusion
Details of key transport routes and traffic types and volumes likely to be generated during construction and operation.	Yes
Assessment of predicted impacts on road safety and the capacity of the road network to accommodate the facility including current traffic counts, details of truck routes and modelling of key intersections.	Yes
Assessment of where off-site infrastructure works may be required as a result of traffic impacts including detailed plans of any proposed road upgrades.	Yes
Access, including detailed consideration of various access options and justification for the proposed location of the main access points.	Yes
Provision of parking in accordance with the relevant guidelines.	Yes

Source: NSW Dept of Planning and Infrastructure, Director-General's Environmental Assessment Requirements, SSD-6093

■ Table 1-2 RMS Response

Comment	Report Inclusion
Peak hour traffic counts and accident histories for the highway, including all site access points.	Yes
Details of the existing and proposed access arrangements including consideration of Sight Distances, alignment, delineation and signposting.	Yes
Consideration of rationalisation of access points and/or alternative access arrangements.	Yes
Assess the need for any improvements to existing road infrastructure such as intersections, pavements, bridges and drainage structures.	Yes
Use AUSTROADS Fig 4.9 "Guide to Road Design Part 4A" to assess the need for any improvements for right and left-turning traffic for road junctions and accesses.	Yes
All vehicles are to enter and leave the site in forward directions. Manoeuvring paths are to demonstrate accessibility for the largest design vehicle requiring access to the site.	Yes
Recommend suitable improvements to address any identified impact upon the safety and efficiency of the classified road.	Yes
Demonstrate car parking arrangements for staff, customers and service vehicles in accordance with the applicable Australian Standards.	Yes
Impact on other transport modes (pedestrians, cyclists, public and school bus routes).	Yes
Consideration of measures to address the Road Traffic Noise and Dust.	Yes

■ *Table 1-3 Council Response*

Comment	Report Inclusion
The Development Application will need to consider, and provide information on the possible traffic impacts of the project including the increased traffic generation and type of vehicles accessing the site, the peak traffic times and how the development will relate to the Gwydir Highway.	Yes
For a development of this scale a specialist Traffic Impact Assessment and early consultation with the RMS is recommended. The traffic assessment will need to consider and assess whether this project will facilitate additional employees or shifts at the site. It is also understood that the bio-digester plant will utilise sorghum crops as fuel. The traffic implications on local roads (i.e. Copeton Dam Road) for these deliveries should be considered.	Yes
In terms of construction impacts, consideration should be given to construction traffic and deliveries.	Yes
Identify any increase in traffic movements associated with the construction phase of the project including: • Type of vehicle • Additional staff • Shift times • Access locations • Proposed traffic management	Yes
Is the proposed development to be operated by existing staff or will an increase in staff be required?	Yes
RMS prefers that the site access opposite Fernhill Road be used for emergency vehicle access only.	Yes
The existing staff access driveway is located immediately over a crest and has limited protection for left and right turning vehicles accessing the site. Consideration should be given to sight distances, intersection safety and provision of appropriate turn lanes in accordance with the applicable AUSTRROADS Guidelines. Shift work and peak turn movements should be considered.	Yes
Suitability of the main site access (western end of the site) to accommodate the largest design vehicle requiring access. Vehicles should be able to leave the site without crossing the centreline of the Gwydir Highway.	Yes
The width of existing BAR/AUL lanes and available shoulders should be considered in accordance with the AUSTRROADS Guidelines.	Yes

■ **Table 1-4 RMS Written Response 12 December 2013**

Comment	Report Inclusion
The TIS report needs to clearly demonstrate the impact of peak traffic movements on the classified road. Traffic movements at the access intersection for the identified peak hours should be presented diagrammatically to demonstrate both the observed and future movements on all legs for the intersection of the Gwydir Highway and Site Access Road. For each SIDRA analysis undertaken, a 'Summary Output Table' should be attached to the report.	Yes
The intersection of the Site Access Road and the Gwydir Highway currently provides an 'AUL' auxiliary left-turn deceleration lane and an 'AUR' auxiliary lane for through traffic to pass turning vehicles. The TIS report has stated that the existing intersection treatment meets the applicable AUSTROADS warrants. The table in <i>Figure 2-3</i> of the TIS report does not identify the peak hour turn and through volumes supporting the report's conclusion that the existing intersection treatment is appropriate. It is noted that the vehicle movements as outlined in other sections of the report would appear to indicate that peak turn movements may satisfy the AUSTROADS warrants for the CHR(S) and AUL intersection treatments. Additionally, it must be acknowledged that the current AUR auxiliary lane treatment is not recognised in NSW under the current RMS Supplement to the <i>Austrorads Guide to Road Design Part 4A</i>.	Yes
The TIS report has not provided a clear indication of on-site parking arrangements. The number of staff associated with both the existing and proposed facilities on the site is to be clearly defined so as to justify the adequacy of existing parking provision for staff, visitors and service vehicles. The TIS should clearly demonstrate that the existing facilities will accommodate the existing and proposed parking demand generated by the site.	Yes
It is noted that the TIS report has stated that the subject site does not require access for High Productivity Vehicles (Road Trains etc) currently permissible under permit from Roads and Maritime. Where access for such vehicles is proposed in the future, the suitability of the existing access intersection would need to be considered.	Yes
It is noted that the transport of materials via the site access on Copeton Dam Road will require heavy vehicles to undertake crossing movements in a rural locality. Roads and Maritime recommends that appropriate warning signage be provided to increase awareness and minimise risk to through traffic.	Yes
The proposal to restrict access to emergency vehicles only at the secondary access driveways is supported.	Yes

2 Existing Situation

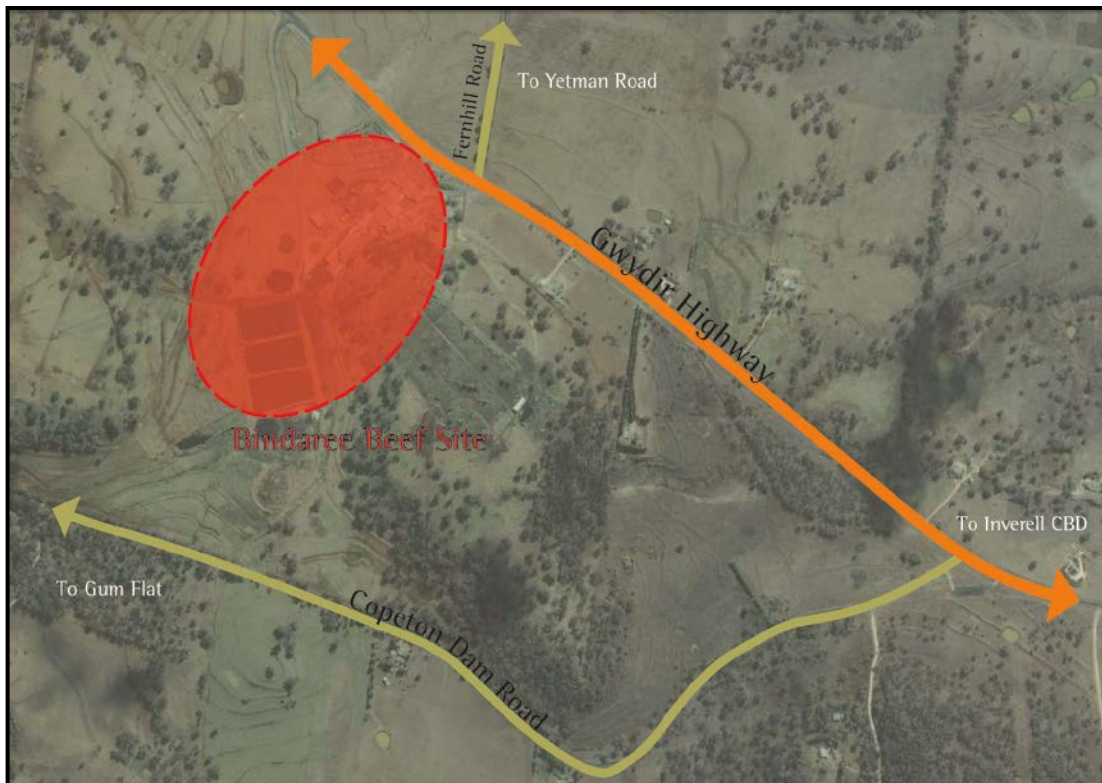
2.1 Site Description and Proposed Activity

2.1.1 Site Location and Access

The subject site is located off the Gwydir Highway approximately 5.5km west of Inverell CBD. The lot has dual road frontage to the Gwydir Highway and Copeton Dam Road. Currently, all vehicle access to the site is off Gwydir Highway only via a sealed access road.

The site currently operates as an abattoir and associated facilities with processing capacity for up to 1,100 cattle per day.

The location of the site is shown below in Figure 2-1.

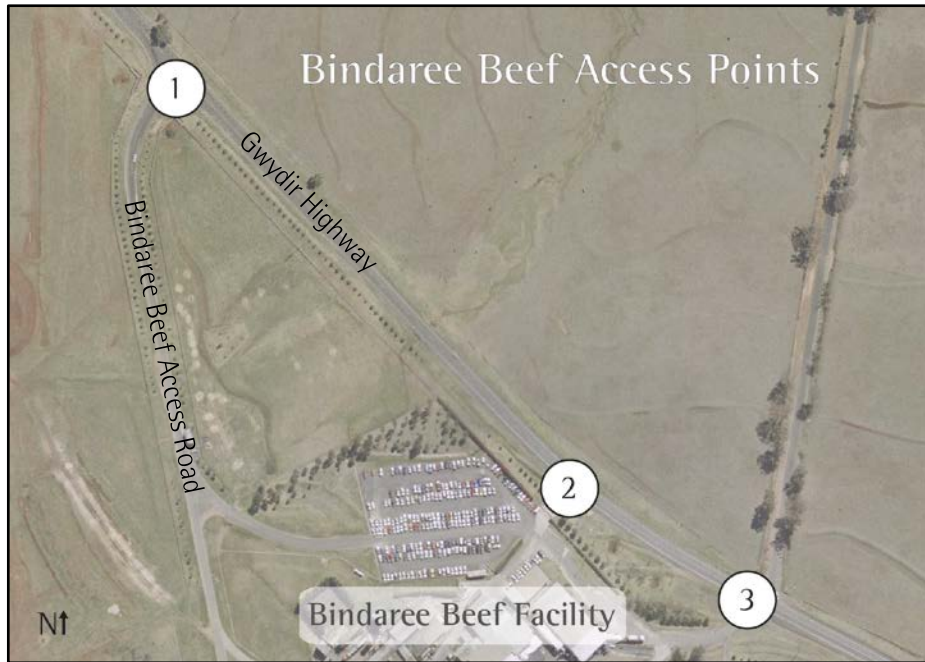


Source: Google maps

■ Figure 2-1 - Site Location

Existing land use adjacent to the site is predominately rural with a very limited amount of traffic-generating development in the vicinity.

There are three formal access points to the site, two of which are closed to all traffic with an exception made during emergencies. These access points are identified in the access point map below:



■ *Figure 2-2 Map of Access Points from Gwydir Highway*

Access Point 1

The most northern access point to the site serves as the primary access/egress between the Bindaree Beef facility and Gwydir Highway. With the exception of emergency vehicles during an emergency, all traffic enters and exits from this point.

Road widths along this access road are in the order of 7 metres and the pavement is constructed to industrial standard. The carriage way is sealed, which limits the capacity for dust pollution as a result of vehicular travel on this access road.

At the intersection with Gwydir Highway, there is a divided median along the access roadway to prevent vehicles from crossing into on-coming traffic (see Photo 1 below). This access road (and its intersection with Gwydir Highway) currently accommodates vehicles as large as B-doubles. Small cars also are required to access/egress the site through this access point.



■ *Photo 1 Access Point 1 - All traffic non-emergency traffic between Gwydir Highway and Bindaree Beef site must use this access point*

Access Point 2

Access point 2 has been closed for regular use and is now permitted for use by emergency vehicles. No other traffic uses this site access point and gates prohibit traffic movements between the site and Gwydir Highway. As such, assessment of site distances and turn treatments (as recommended by RMS) were not undertaken due to the restrictions on traffic flow through this access point.



■ *Photo 2 Access Point 2 – Closed to non-emergency vehicles*

Access Point 3

Similar to access point 2, access point 3 is only permitted for use by emergency vehicles. No other traffic uses this site access point and gates prohibit traffic movements between the site and Gwydir Highway. As such, assessment of site distances and turn treatments (as recommended by RMS) were not undertaken due to the restrictions on traffic flow through this access point.



■ *Photo 3 Access Point 3 – Closed to non-emergency vehicles*

Access Point 4 (Rear access driveway)

There is a rear access point to the Bindaree Beef facility from Copeton Dam Road. This access driveway has one lane provided, and movement is permitted in both directions. The carriageway is unsealed with a width of approximately 3.5m. There are grass verges to allow for vehicles to move off the carriageway in order to allow safe passage for any on-coming traffic. This access driveway is only permitted for use by vehicles associated with the operation of Bindaree Beef Facilities on lots opposite Copeton Dam Road (Bindaree Beef has several landholdings south of the proposed development site) and emergency vehicles. Subsequently, there is very little traffic that uses this access driveway. All other traffic is required to use the main access road from Gwydir Highway.

Sight distances at this access driveway exceed 350m in both directions due to very good road alignment. Coupled with the very low volume of traffic observed on Copeton Dam Road, it is considered the intersection of Copeton Dam Road and the Bindaree Beef rear access driveway (and access driveway to Lot DP 753638) is very safe.

2.1.2 Zoning

The site is zoned wholly within a RU1 – Primary Production zone.

2.2 Existing Traffic Conditions

2.2.1 Road Hierarchy

There are two roads of significance in the vicinity of the proposed development site.

Gwydir Highway

The major road through the locality is the Gwydir Highway, which forms part of the State Highway network (B76) and any new works to this road require consent from the Roads and Maritime Services of NSW (RMS). The Gwydir Highway operates as a major arterial rural road linking with the Pacific Highway in Grafton (in the east) to the Newell Highway and Castlereagh Highway at its western termination point in Walgett. This road is the highest order road in the vicinity of the proposed development site. An inventory of road characteristics is provided in Table 2-1 below:

■ **Table 2-1 Characteristics of Gwydir Highway in the vicinity of Bindaree Beef facility**

Variable	Characteristic
Speed Limit	100km/h
Lanes	2 (one each direction)
Pavement width	~7m
Lane Width	~3.5m
Traffic Flow	Two-way flow (E-W)
Line Markings	Centre and shoulder, in good condition
Kerbs, Gutters	None
Lighting	None
Road Markers	Yes, with reflectors
Land Uses	Rural in character
On-Street Parking	None formal, informal opportunities are available

2.2.2 Roadworks

From discussions with the RMS and Council it is understood that other than routine maintenance by the road authorities there are no plans for any major road network changes in the immediate vicinity of the subject site.

2.2.3 Traffic Management Works

Due to the overall low traffic flows along the Gwydir Highway at this location, it is understood that there are no planned traffic management works in the general locality of the subject site.

2.2.4 Pedestrian and Cycling Facilities

There are minimal pedestrian and cycling facilities within the general locality of the subject site. Cyclists can use the shoulders of the Gwydir Highway and given the low overall vehicle volumes together with the low cycling demand it can be seen that the existing facilities are adequate to accommodate the demands for cycling. There are no formalised pedestrian or cycling facilities on the local roads in the area, due to the very low cycling demands and the relatively low traffic flows through this rural area.

2.3 Traffic Flows

2.3.1 Peak Hour Flows

Traffic surveys were conducted by BTF on the evening of Tuesday, 15 October 2013 and in the morning of Wednesday, 16 October 2013. These surveys indicate there is an evening peak period between 15.45 and 16.45 and an AM peak between 8.00 and 9.00.

The PM peak is consistent with the start of the evening shift at the Bindaree Beef abattoir facility. The recorded AM peak is consistent with a typical 9AM to 5PM workday. It should be noted that Bindaree Beef operates commence at 5.00AM for Boning / Palletizing / Loading operations and kill floor operations commence at 7.15AM.

Current operations indicate approximately 660 employees are expected on site each weekday, with staff levels spread out over shifts. With the exception of the Value Adding sector (which operates over 6 days per week), all sectors work 5 days per week, Monday through Friday. The shifts at the Bindaree Beef facility are as outlined in Table 2-2 below:

■ **Table 2-2 Sector Shifts and Employees**

Sector	Shift	Employees	Start	End
Boning / Palletizing / Load Out / Cleaning	AM	320	5.00	15.15
	PM	140	15.45	23.50
Kill Floor	-	150	7.15	16.15
Value Adding (6 Days per week)		55	5.00	15.15
TOTAL	-	610	Various	Various

Shifts at the Bindaree Beef facility are designed to start and end at various times so as to limit the impact of the traffic generated during shift start/end times. The most significant of the shifts starts at 5.00 and ends at 15.15 and traffic generated by the site would be expected to peak around these shift start/end times.

Data made available by the operators of the Bindaree Beef facility suggests employee vehicles arrive/depart the site with an average vehicle occupancy of around 2.2 persons.

The maximum hourly vehicle flow was observed during the PM peak period (15.45 – 16.45) when 336 vehicles traversed the intersection of Gwydir Highway and Bindaree Beef access road. The RTA Guide to Traffic Generating Developments indicates a level rural road with 10% heavy vehicle traffic has a capacity of 2390 vehicles per hour, which indicated the current design capacity ratio is approximately 0.14 during peak periods.

2.3.2 Daily Traffic Flows

There is no data considered to be current available from the RMS on daily traffic flows through the area on Gwydir Highway. Traffic flows during a peak hour typically represent around 10% of daily traffic flows. Traffic surveys indicate average peak hour flows at this location are around 290 vehicles. Under this assumption, it is estimated average daily weekday traffic flows are approximately 2,900 vehicles.

2.3.3 Daily Traffic Flow Distribution

Traffic surveys indicate in the AM peak period there is a directional bias outbound (westward) from Inverell, where approximately 60% of traffic was observed headed westbound. In the PM peak period an opposite directional bias was observed, however, this was in large part due to a significant amount of traffic headed eastbound from the proposed development site in the direction of Inverell Town Centre.

2.3.4 Vehicle Speeds

No vehicle speed measurements have been taken as part of the study work. Observations on site would indicate that traffic appears to travel within the posted speed limits, with no obvious signs of excessive speed. There are auxiliary left and right turn treatments along Gwydir Highway at its intersection with the primary access road (Access Point 1) to Bindaree Beef which allows vehicles to safely move past vehicles turning from Gwydir Highway, which minimises the impact of turning vehicles on the speed of through traffic along this classified road.

2.3.5 Existing Site Flows

Current operations generate on average approximately 430 vehicle trips to the site per day depending on operations. This volume consists of 300 cars and 130 vans / medium trucks / B-double trucks.

Bindaree Beef records all truck movements on site. On average, up to five 25T B-double trucks and up to three 40T B-double tankers enter the site per operational day.

Current operations require coal deliveries to be made by B-double trucks up to four times per week.

All site flows enter and exit the site from the main access road (Access Point 1) to Gwydir Highway.

The most significant areas of internal road network are sealed, which limits the capacity for dust pollution as a result of traffic movements.

2.3.6 Heavy Vehicle Flows

Surveys indicate approximately 15% of flows are heavy vehicles along the Gwydir Highway. The approximate 130 vans / medium trucks / B-doubles that arrive on site indicate current heavy vehicle flows to / from the site are around 30% of all traffic.

2.3.7 Current Road Network Operation

Observations made on site show that there are little if any delays for through traffic movements along the Gwydir Highway at its intersection with the Bindaree Beef access road. Traffic entering or exiting the access road also experience very minimal delays.

It can be seen that for the current traffic flows there are very limited delays and therefore capacity modelling is not required at the intersections of Gwydir Highway and the current site access road to determine the existing situation.

The key intersection for this proposed development site is the intersection of Gwydir Highway and Bindaree Beef access road. A Sidra analysis was undertaken to determine the current operation of this intersection, which found all approaches to operate at Level of Service (LoS) A. Detailed Sidra results are provided at Appendix F.

2.4 Traffic Safety and Accident History

Data provided by RMS indicate there have been six recorded accidents since April 2008 in the vicinity of the proposed development site along Gwydir Highway. There have been two recorded accidents at the intersection of Gwydir Highway and the Bindaree Beef access road, both of which have involved heavy vehicles emerging from the access road. This accident data provided by the RMS is provided at Appendix D.

It should be noted that sight distances at the intersection of Gwydir Highway with the Bindaree Beef access road are very good. Austroad Guide to Road Design indicates sight distances along a road of 100km/h speed environment (such as Gwydir Highway at this location) require a minimum sight distance of 234m with adjustment for any road taper. A sight distance of 248m (with adjustment for taper) is considered desirable, and 262m is considered very safe. Sight distances from the access road along Gwydir Highway exceed 400m to the east and exceed 270m to the west.

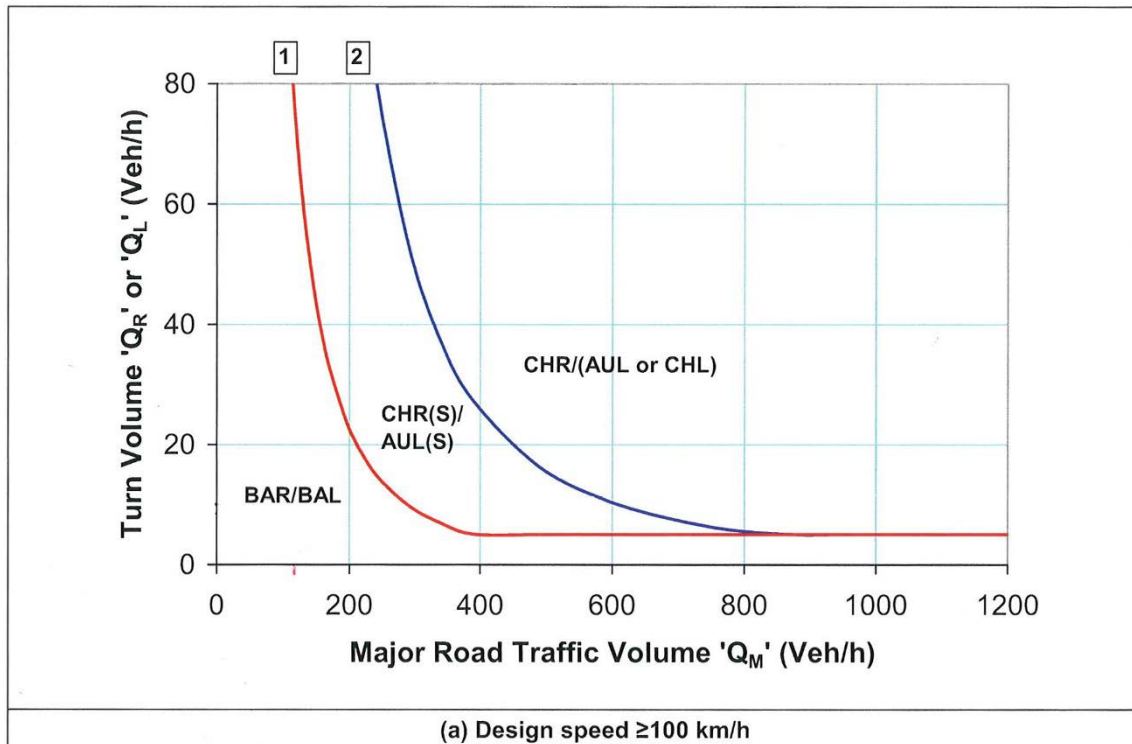


■ *Photo 4 Sight distance exceeds 400m eastward*



■ *Photo 5 Sight distance exceeds 270m westward*

It should also be noted this intersection is designed with rural auxiliary left and right turn treatments, which are suitable for the current through and turning traffic levels.



Source: Austroads Guide to Road Design Part 4: Unsignalised and Signalised Intersections

■ Figure 2-3 Justification for turn treatments

While Figure 2-3 indicates the key intersection of Gwydir Highway and Bindaree Beef Access Road would generally require a CHR (S) / AUL (S) turn treatment, the demand for right turns from Gwydir Highway into the Bindaree Beef Access Road is very low. This very low demand was confirmed during traffic surveys where the demand for this right turn is just one vehicle during the AM peak period and two vehicles during the PM peak period.

■ Table 2-3 Right Turn Demand During Peak Hours

Right Turn Demand (Vehicles) from Gwydir Highway	
Peak Hour	
AM	1
PM	2

The very low demand for right turns from Gwydir Highway at this key intersection indicate there is a directional bias for traffic related to the proposed development site with the majority of demand for movements into the Bindaree Beef Access Road demanded from westbound traffic (left turn into Bindaree Beef Access Road). This directional bias has been noted before as an auxiliary left-turn lane (AUL) treatment has been provided for westbound traffic in lieu of the auxiliary left-turn treatment – short turn lane (AUL(S)) treatment recommended at Figure 2-3 above.

Overall, it is considered that the intersection Gwydir Highway and the Bindaree Beef access road is well laid out in accordance with the Austroads Guidelines and while the RMS Supplement to the Austroads Guide to Road Design Part 4A does not recognise auxiliary right-turn treatments (AUR), the existing geometry coupled with extremely low demand for right turns at this intersection indicates the current turn treatments allow the intersection to operate in a relatively safe manner.

It should also be noted that all vehicles access / egress the site in a forward motion.

2.5 Parking Supply and Demand

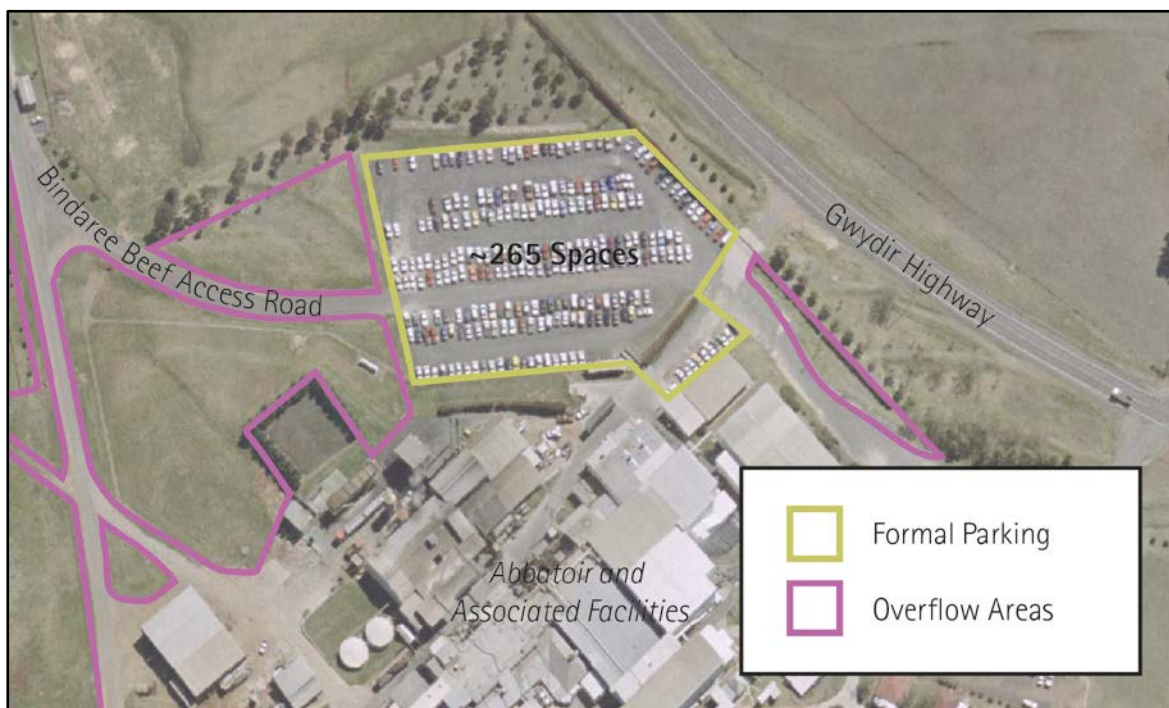
2.5.1 On-street Parking Provision

Currently there are no restrictions on parking on either side of Gwydir Highway in the vicinity of the site on grass verges. Observations made while on site indicate that current on-street parking demands are very low as only one vehicle was observed parked on a the grass verge in the vicinity of the Bindaree Beef facility. The driver of this vehicle was observed to partake in landscape maintenance of the road-side vegetation, which is undertaken occasionally as required

2.5.2 Off-Street Parking Provision

There are approximately 265 formal parking available on the subject site in paved parking areas. This quantum of parking is able to accommodate the normal parking demands of the site at all periods. A significant portion of vehicles that arrived at the site during a site visit and traffic survey were observed to have a high vehicle occupancy rate, which is likely possible due to the nature of the shift work on site.

Additionally, there are a number of areas available on the site that would be suitable for any parking demands in excess of the normal parking demanded (potential overflow parking areas) as shown in Figure 2-4 below.



■ **Figure 2-4 Parking Areas in the vicinity of the Bindaree Beef Facility**

Some areas on the site are currently used for temporary parking and loading of heavy vehicles. The availability of parking for heavy vehicles on the site is also able to accommodate the normal heavy vehicle parking demands of the site. These temporary parking areas are paved which limits the capacity for dust pollution.

2.5.3 Parking Demand and Utilisation

The Inverell Development Control Plan (DCP) 2013 outlines the normal parking demands in the Inverell local government area. In relation to industrial developments (which would be the most closely related use to an abattoir), the DCP requires parking at a rate of one space per 100m² of industrial GFA and one space per 40m² of office space thereafter. It has been assumed the provision of parking at the Bindaree Beef Facility is in accordance with this rate. Observations made during a site visit indicated there were some parking spaces available throughout the day which indicates the current quantum of parking satisfies the existent normal parking demands of the site.

All parking demands generated by the site are able to be accommodated for by the site wholly within the site boundary and there are areas that could be made available for any parking overflow.

2.5.4 Set down or pick up areas

There are no designated set down or pick up areas in the locality of the site. Pick up and set down on the site could occur with the use of normal parking bays provided on the site.

Loading of heavy vehicles occurs in a designated area towards the north of the facility with dedicated loading facilities in place at this location.

2.6 Public Transport

2.6.1 Rail Station Locations

Moree Railway Station is located approximately 140km west of the proposed development site, which provides one daily CountryLink service each way between Sydney via Narrabri and Gunnedah.

2.6.2 Bus Stops and Associated Facilities

There are no bus stops within the general locality of the subject site. Two school buses were observed travelling by the proposed development site on Gwydir Highway during each site visit. There is a very low demand for bus services in this rural location.

2.7 Other Proposed Developments

It is understood that there are no other developments of significance in the general locality of the subject site.

3 Proposed Development

3.1 The Development

The proposed development seeks consent to develop the following new facilities:

- bio-digester plant; and
- render plant facility.

The proposed development and the ensuing process would eliminate the need for coal and reduce electricity needs. No additional staff will be added as a result of the development proposal (although some staff will be re-trained) and as such, no additional traffic nor parking demands will be generated by the site upon completion of the construction phase.

Demands for coal on the site will also be reduced, which would eliminate up to 4 B-double arrivals on site each week (around 170 deliveries per annum). Some coal deliveries may still occur, but only when coal is used to power the site in the event the bio-digester fails to produce electricity. It is estimated new coal deliveries will occur, on average, once per year.

Demands for sorghum will be generated by the proposed works upon completion of the construction phase, however, this sorghum will be produced on an adjacent farm and delivery of sorghum to the bio-digester will not significantly impact on the external road network as sorghum crops will be produced to the south of the site, immediately opposite Copeton Dam Road from the site. Delivery vehicles will use the rear access from Copeton Dam Road to complete Sorghum deliveries to the proposed development site. The precise number of deliveries of sorghum that will be required is yet to be determined.



■ **Figure 3-1 Location of sorghum production site relative to the Bindaree Beef Facility**

Sight distances at this access road exceed 350m in both directions and road alignment is very good.

3.1.1 Phasing and Timing

Current projections anticipate construction could begin in July 2014 with completion scheduled for March 2015.

A 10% increase in traffic flows to/from the site during the construction phase is expected. Given the current site generates approximately 430 trips to the site per day, an additional 43 trips to the site would be expected during the construction phase. It is estimated up to 64 construction labourers will be on site at any given time during the construction phase, and the traffic generated by these construction crews has been factored into the construction traffic demand generation.

Some of the increase in traffic would be in the form of private vehicles and flat top tray, ridged and articulated truck types. The largest design vehicle that will access the site during the construction phase could be B-doubles, which is a vehicle design the site currently accommodates for.

Construction crews are anticipated to work 10-hour days, 6 days per week over a period of 9 months.

3.1.2 Access and Circulation Requirements

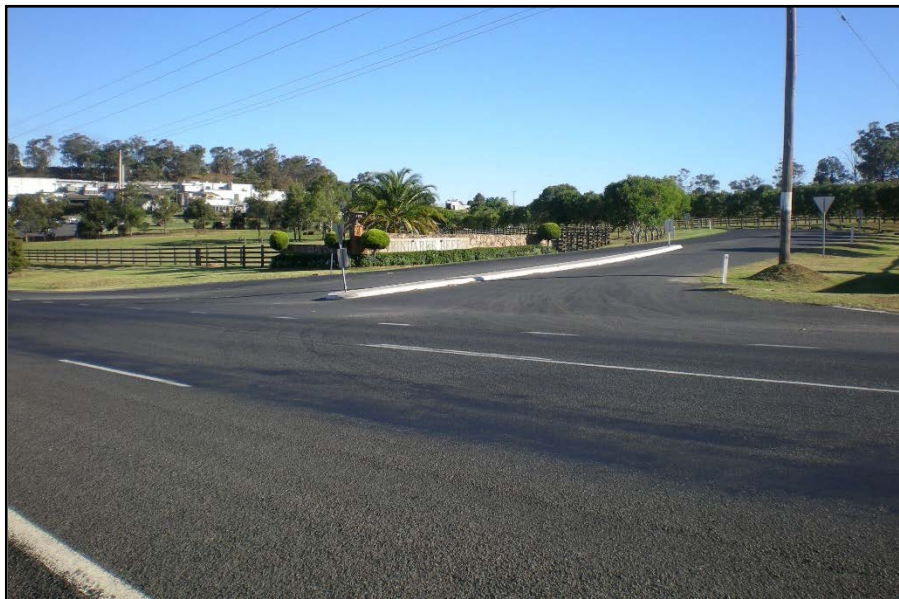
The development will continue to accommodate both light vehicles and heavy vehicles up to the size of B-double trucks. Discussions with operators of the Bindaree Beef facility indicate there is currently no scope for B-triple trucks under current operations. It should be noted operation of B-triple trucks along the Gwydir Highway requires a permit, and any change to the current operations to permit B-triples should be evaluated during the permit application process.

3.2 Access

3.2.1 Driveway (Road) Location

All vehicle access to the subject site will continue to occur via the existing access main point from Gwydir Highway. There is very good signage upon egress from the site with two give way present at this location.

This access point was upgraded in 2008 to include a centre divider to prevent traffic from crossing into opposing lanes when turning as shown in the photos below:



■ *Photo 6 View to Bindaree Beef access road from Gwydir Highway*



■ *Photo 7 View from Bindaree Beef access road to Gwydir Highway*

3.2.2 Service Vehicle Access

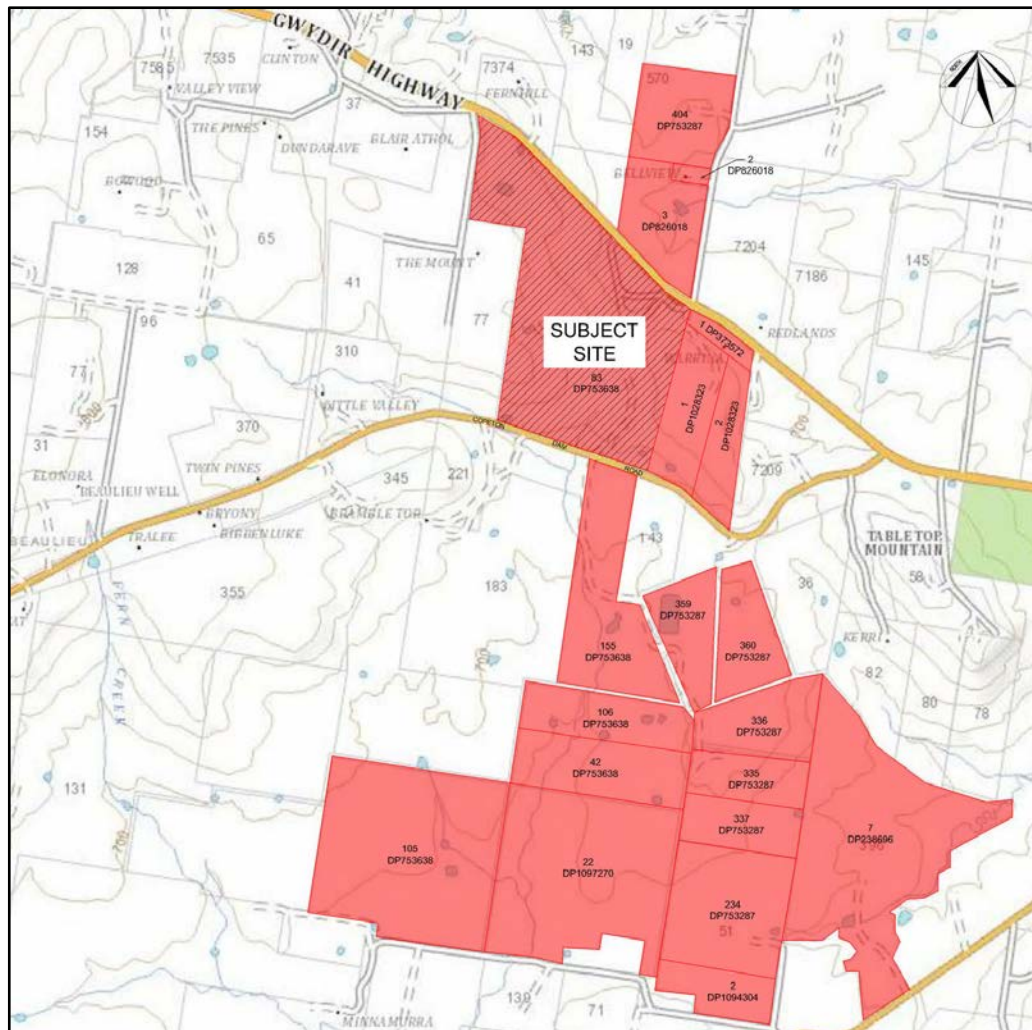
All service vehicles will continue to access the site via the existing main access road from Gwydir Highway.

The majority of heavy vehicles accessing the site will continue to be the trucks delivering cattle to the facility or transporting meat products from the facility. These will continue to be a mixture of semi-trailers and B-double trucks.

RMS have requested BTF examine the scope for B-triples to access the site as a result of the recent approval of the Livestock Loading Scheme, which would allow B-triples along various routes (including some sections of Gwydir Highway) under a permit. Discussions with operators at the Bindaree Beef facility indicate there are currently no plans for B-triples to service this facility. As such, detailed study for the site to accommodate B-triple movements was not undertaken as part of this study.

Detailed analysis of the existing access road from Gwydir Highway (including swept paths) should be evaluated as part of any B-Triple permit application to make deliveries to the site.

The bio-gas utilisation system will occasionally require sorghum deliveries to be made to the proposed development site. Bindaree Beef currently operates a farm to the south of the proposed development site directly opposite Copeton Dam Road which will produce the required sorghum. The map below identifies landholdings of Bindaree Beef in red.



■ **Figure 3-2 Lots under ownership of Bindaree Beef Pty Ltd**

Some areas to the south of the subject site (opposite Copeton Dam Road) will be used to produce the required sorghum. This sorghum will then be transported to the Bindaree Beef bio-digester facility via the Bindaree Beef rear access road from Copeton Dam Road.



■ **Figure 3-3 Movements Associated with Sorghum Production**

Movement of sorghum to the subject site will therefore not impact on Gwydir Highway. Given a very low volume of traffic was observed along Copeton Dam Road and sight distances are greater than 350m at the access driveways (due to very good road alignment), the movements associated with sorghum movements across Copeton Dam Road between access driveways (as shown below) will have a very low impact on existing traffic. With the exception of crossing Copeton Dam Road, all movements associated with sorghum delivery will be made internally and not impact on the surrounding public road network.

3.2.3 Access to Public Transport

There will be no requirement for public transport to access the site, however, having been designed to accommodate a variety of heavy vehicles including B-doubles, the proposed development site could accommodate coach buses if ultimately required.

There is a very low demand for public transport facilities in the vicinity of the proposed development site.

3.3 Circulation

3.3.1 Pattern of circulation

No modifications are proposed to the existing pattern of circulation.

It should be noted a new roundabout was recently constructed on the site to accommodate heavy vehicle turns upon egress from the loading area, which has decreased the need for heavy vehicles to reverse while on site. The access road is sealed between the Gwydir Highway, staff parking areas, and heavy vehicle loading areas, which limits the capacity for dust pollution as a result of traffic movements.

3.3.2 Internal Road width

No modifications are proposed to the existing internal road width, which currently accommodates up to B-double trucks and is built to industrial standard.

3.3.3 Internal Bus Movements

There is a very low demand for bus movements on or in the vicinity of the proposed development site, and the proposed works will not generate any additional demands for buses. Having been designed for B-doubles, the proposed development site could also accommodate buses if required.

3.3.4 Service Area Layout

No modifications are proposed to the existing service area layout.

3.4 Parking

3.4.1 Proposed Supply

The existing supply of parking on the site is currently able to accommodate the normal parking demands of the site. The DCP (which outlines the parking-demand rates for developments in the Inverell local government area) states in relation to existing developments: "Alterations and additions to existing premises which result in an increase in floor space, and/or intensified use, should provide additional on-site parking in accordance with Clause 5.3 for the alterations and additions."

The proposed development will not generate additional parking demand (as no additional employees will be required on the site as result of the proposed development) upon completion of the construction phase and the existing supply of approximately 265 spaces is therefore considered sufficient as it can be seen the existing parking provision satisfies the normal parking demands of the site. There are various parking areas that can be used as overflow parking (refer to Figure 2-4) to accommodate additional parking demands if required during times of unusual parking demand. All parking that occurs as a result of the Bindaree Beef facility will continue to be wholly contained within the site.

There are also areas available on the site for motorcycle parking for those who choose to arrive by motorbike.

3.4.2 Parking Layout

No modifications are proposed to the existing parking layout and no additional parking demands will be generated by the proposed development upon completion of the construction phase. The existing layout is considered an existing situation and the development proposal will not generate additional parking demand outside of the construction phase.

3.4.3 Service Vehicle Parking

There are some existing service vehicle parking demands on the site. There are various areas around the site suitable for service and heavy vehicle parking as required. The internal roads on the site are designed to allow for the movement of vehicles through the site as the site already caters for the movements of large trucks including B-Doubles.

Upon completion of the construction phase, no additional service vehicle parking demands will be generated as a result of this proposal. Any additional parking demands generated during the construction phase can be accommodated for in the various overflow parking areas provided on the proposed development site.

3.4.4 Pedestrian and Bicycle Facilities

There are no dedicated pedestrian and/or bicycle facilities proposed. There are very low pedestrian and cycling demands on and around the proposed development site.

4 Transportation Analysis

4.1 Traffic Generation

The proposed development will not generate additional staffing on the site nor increase the frequency of heavy vehicles to the site upon completion of the construction phase.

4.1.1 Daily and Seasonal Factors

The existing facility operates from 5.00 to 23.50 daily. Staffing is managed with shift work with boning / palletizing and loading shifts occurring from 5.00 to 15.15 and from 15.45 to 23.50. The abattoir facilities operate from 7.15 to 16.15.

The timing of the shifts indicate the site would have a peak generation rate around 15.30, when employees from the early shift depart the site and employees of the evening shift arrive on the site.

4.1.2 Sight Distances

Sight distances at the intersection of Gwydir Highway with the Bindaree Beef access road (Access Point 1) are very good. Austroads Guide to Road Design indicates sight distances along a road of 100km/h speed environment, such as Gwydir Highway at this location, require a minimum sight distance (reaction time of 1.5 seconds) of 234m with adjustment for any road taper. A sight distance of 248m, with adjustment for taper, is considered desirable (2.0 seconds reaction time), and 262m is considered very safe (2.5 seconds reaction time). Sight distances from the access road along Gwydir Highway exceed 400m to the east and exceed 270m to the west.

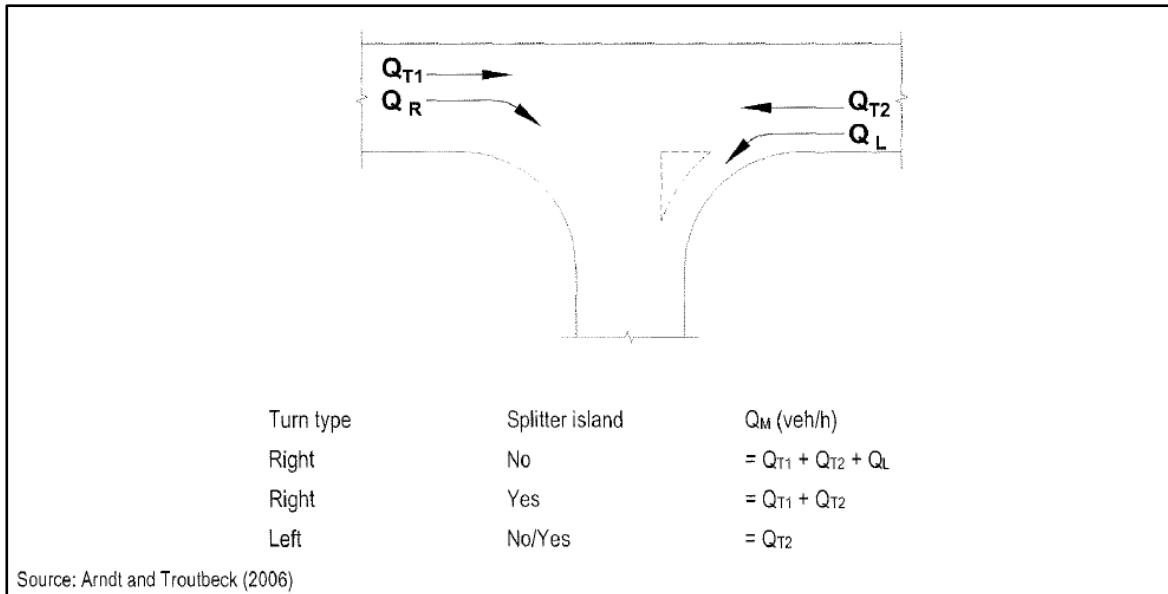
4.1.3 Queuing at entrance to site

Given the overall traffic flows along the Gwydir Highway and the Bindaree Beef access road, it is considered that there will be negligible queues associated with the traffic movements into the subject site via a rural auxiliary right hand turn lane in to the access road from eastbound traffic on Gwydir Highway. There is also an auxiliary left hand turn lane for westbound traffic on Gwydir Highway into the Bindaree Beef access road.

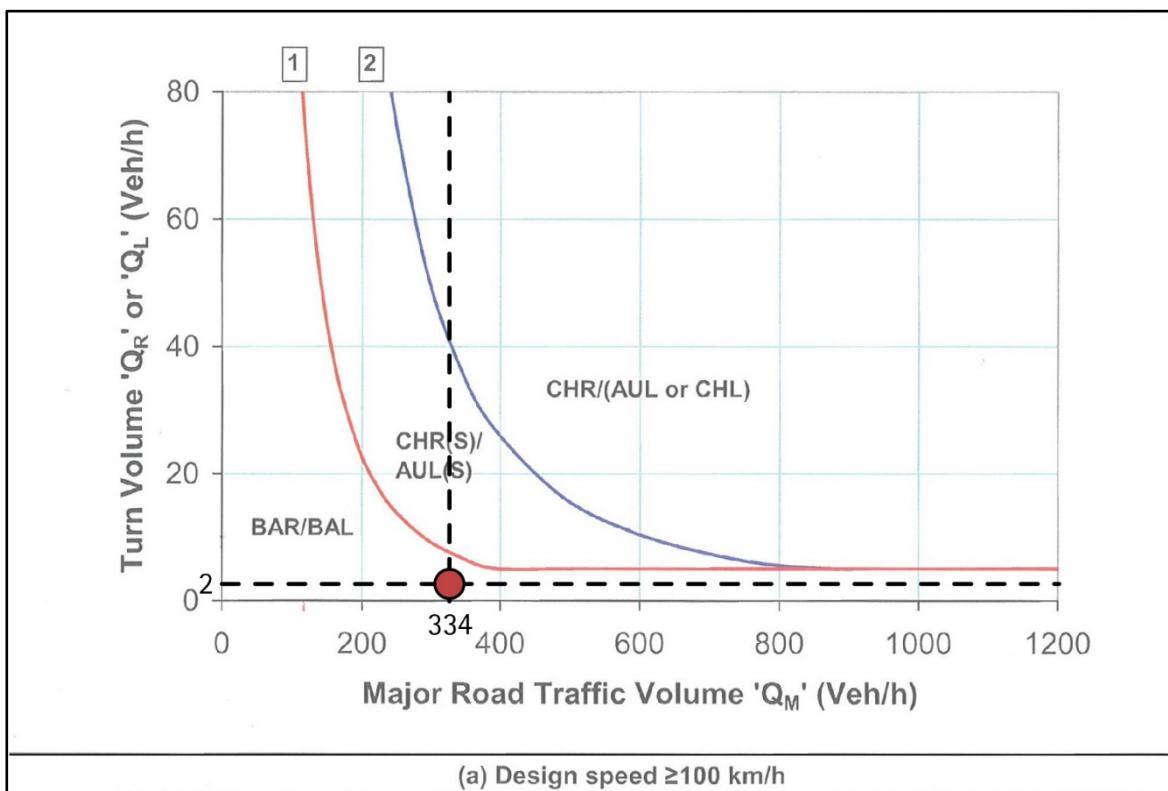
4.1.4 Comparison with existing site access

No modifications are proposed to the existing accesses. Recent modifications to the site access include a central median, which prevents traffic entering the site from crossing into opposing traffic along the Bindaree Beef access road and has decreased the likelihood of vehicles crossing into opposing lanes when turning into the Bindaree Beef access road.

While the existing traffic flows along Gwydir Highway indicate that the key intersection with Bindaree Beef Access Road would normally require a CHR(S)/AUL intersection treatment, there is a very significant directional bias where movements between the Bindaree Beef site and Gwydir Highway tend to have an origin / destination east of the site and there is a very low demand for right-hand turns from Gwydir Highway into the Bindaree Beef site. The traffic surveys indicate that demand for this right turn during peak hour is very low (up to Two vehicles per hour) and given the proposed development will not impose any additional impact on this intersection as a result of the development proposal upon completion of the construction phase, no modifications to this access point will be required in conjunction with this development proposal.



■ **Figure 4-1 Determination of Q_m** (Source: Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections Figure 4.10; to be used on conjunction with Figure 4-2 (Figure 4.9 in Austroads Guide to Road Design Part 4A) below)



■ **Figure 4-2 Very Low Demand for Right Turns Indicates BAR treatment is Warranted at Intersection of Gwydir Highway and Bindaree Beef Access Driveway** (Background image source: Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections Figure 4.9)

Figure 4-1 and Figure 4-2 above when used in conjunction with the traffic surveys provided at Appendix D (which determined the $Q_m = 334$ vehicles) indicate that only a BAR turn treatment is required from Gwydir Highway eastbound into Bindaree Beef Access Road. The existent AUR turn treatment is therefore in excess of the required turn treatment under the provisions of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, despite the AUR not being recognised in the current RMS Supplement to the Austroads Guide to Road Design.

It should also be noted that the proposed development will not impact this key intersection upon completion of the construction phase as no additional employees, visitors or service vehicles will be required to access the site in relation to the proposed site modifications, which are anticipated to reduce traffic demand on Gwydir Highway as coal deliveries will no longer be required to the site.

4.1.5 Pedestrian Movements

The proposed development site currently generates a very low number of pedestrian movements on the adjacent road network. Pedestrians are able to walk along the grass verges of Gwydir Highway if required.

4.2 Traffic Distribution and Assignments

4.2.1 Origin / destinations assignment

Surveyed traffic at the intersection of Gwydir Highway and Bindaree Beef access road indicates around 95% of traffic from the site heads east along Gwydir Highway towards Inverell town centre. Similarly, approximately 95% of all traffic that arrives on the site has an origin from point further east along Gwydir Highway. This same distribution pattern is also expected of additional traffic that would be temporarily generated during the construction phase.

4.3 Modal Split

No modal split was recorded during traffic surveys, however, motorcycles, small private vehicles, 4-wheel drives and various heavy vehicles were observed to enter or exit the site.

Heavy vehicles currently account for approximately 30% of daily traffic movements between the site and Gwydir Highway. Heavy vehicles account for approximately 15% of traffic flows along Gwydir Highway.

4.4 Impact of Generated Traffic (Capacity and Level of service)

4.4.1 Impact on daily Traffic Flows

The existing daily traffic flows are well within acceptable limits for their classifications. The Gwydir Highway in the vicinity of Bindaree Beef is classified as a rural road acting as an arterial road. A level, rural two lane arterial road with 10% of traffic being heavy vehicles is capable of carrying over 2,350 vehicles per hour (Source Table 4.5 Peak Hour Flow on Two Lane Rural Roads, RTA Guide to Traffic Generating Developments 2002), which is significantly higher than the current hourly flow of 336 vehicles per hour recorded during traffic surveys. Current traffic flows indicate Gwydir Highway currently operates at LoS B, which is highest possible level of service for rural roads.

Given the proposed development will not generate additional employee or truck trips to the site, the Gwydir Highway will continue to operate with a high LoS. Given no additional traffic will be generated as a result of the development proposal upon completion of the construction phase, no additional noise will be generated from traffic as a result of the development proposal.

4.4.2 Peak Hour Impacts on Intersections

Observations recorded on site and surveyed traffic volumes indicate there is very little to no delay for road users at the intersection of Gwydir Highway and the Bindaree Beef access road.

The proposed development when constructed will not generate additional traffic on the surrounding road network and therefore will not cause additional delays nor queue lengths at this intersection.

4.4.3 Background traffic and other developments

In accordance with normal RMS requirements, the impact of the additional traffic has been assessed allowing for 10 years background growth along the Gwydir Highway. An allowance of 1.5% per annum, giving 15% overall growth, has been used. This growth rate could be considered high range for a rural area of regional NSW such as the locality around Bindaree Beef.

Given the current peak period on Gwydir Highway in the vicinity of the Bindaree Beef facility experiences around 290 vehicles per hour, it is estimated that with 15% background growth the 10 year

design flows will be in the order of 334 vehicles per hour. This quantum of traffic would indicate the Gwydir Highway in the vicinity of the Bindaree Beef facility will continue to operate at LoS B. Daily flows would therefore be estimated to be approximately 3,340 vehicles.

With a worst-case scenario with a 2% growth rate in background traffic over 10 years, Gwydir Highway would have traffic volumes in the order of 348 vehicles per hour, which would indicate this road would continue to operate at LoS B. Daily traffic flows would therefore be estimated to be 3,480 vehicles per day.

4.4.4 Impact of Construction Traffic

The construction work will require a number of vehicles to deliver construction crews and materials to the site. This will occur over a number of months and as such, materials will have to be delivered at various points in the construction process.

The construction phase of the project will increase traffic generated to the site by approximately 10% over a 9 month period, which will equate to around an additional 43 trips per day, 6 days per week. The typical peak construction staff during the construction phase will be 64 labourers. Flat top tray, ridged and articulated heavy vehicles will also be required to access the site and are included in the 43 additional trips to the site per day during the construction phase. The majority of these trips to the site will be generated from the east of the site in the direction of Inverell town centre.

The current intersection of Gwydir Highway and Bindaree Beef access driveway has suitable turn treatments to accommodate the additional traffic anticipated to / from the site during the construction phase.

It should be noted that these construction crews would be anticipated to arrive and depart the site outside the peak traffic generation times of the Bindaree Beef facility, which will limit the impact of additional traffic arriving / departing the site during the construction phase.

There will also be a number of construction workers who will arrive and depart the site as required, and there will be some temporary additional traffic generated by these workers. Traffic generated by the site will return to existing levels upon completion of the construction phase. Origin and destination assignments of the traffic associated with the construction phase is assumed to follow the existing pattern of traffic between the Gwydir Highway and the Bindaree Beef access road where approximately 95% of traffic has an origin / destination from points further east towards Inverell Town Centre.

Access for construction work on the site will be made via the existing primary access to the Bindaree Beef facility from Gwydir Highway, where sight distances and turn treatments suitable for the current traffic conditions are provided.

All works on site will be governed by the relevant EP&A rules and as stipulated within any development consent granted by the consent authority. This will include hours permitted for work on the site.

4.5 Impact on Road Safety

The additional traffic flows associated with the development of the subject site will have no impact upon traffic safety. The proposed development, upon completion of the construction phase, will not generate additional trips to or from the site above the current generation.

The intersection of the existing site access road with the Gwydir Highway provides a high level of control and access, with auxiliary turn lanes provided for both eastbound and westbound traffic along the Gwydir Highway. These turn treatments are justified for the level of traffic currently through this intersection.

There may be a slight increase in the potential for incidents during the construction phase given the small amount of additional traffic in the area, however, given the relatively low quantum of additional traffic and the current turn treatments provided, this impact on safety is considered to be negligible. Existing intersection geometry is suitable to accommodate for this temporary increase in traffic during the construction phase in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections.

4.6 Parking Analysis

While the construction phase of the proposed development will place temporary additional parking demands on the site, there are various informal (overflow) parking areas that can accommodate a significant amount of additional parking if required. This is in addition to the approximately 265 formal parking spaces available on the site that currently meet the normal parking demands generated by the Bindaree Beef facility.

Upon completion of the construction phase, no additional parking demands will be generated on the site as there will be no increase in staffing or frequency of deliveries to / from the site.

4.7 Public Transport

4.7.1 Options for improving services

The proposed development will not provide additional opportunities to improve public transport services. There are very low demands for formal public transport services in this area of Inverell.

4.7.2 Pedestrian Access to Bus Stops

No specific pedestrian access to any new bus stops along the Gwydir Highway need to be provided. There is currently a very low demand for public transport services in this area of Inverell.

4.8 Pedestrian and Cyclists

A very low number of cyclists (3 total over approximately 7 hours of traffic surveys) were observed to cycle along Gwydir Highway in the vicinity of the proposed development site. The proposed development site will not generate additional cycling demands in the area. Cyclists are able to use the shoulders of the Gwydir Highway and given the relatively low overall vehicle volumes together with the low cycling demand it can be seen that the existing facilities are adequate to accommodate the demands for cycling.

5 Improvement Analysis

5.1 Improvements to Accommodate Existing Traffic

No improvements will be required to the existing intersection of Gwydir Highway and the Bindaree Beef access road. Under the provisions of the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, this intersection (where traffic volumes on the major road are in the order of 200 vehicles per hour) requires an auxiliary left turn treatment and a basic right turn treatment. It should be noted an auxiliary right turn treatment is provided, which is considered safer than the minimum basic right turn treatment required under the current traffic volumes. An auxiliary left turn treatment is currently provided to allow for safe left turn movements into the Bindaree Beef access road.

No modifications will be required to accommodate internal traffic within the site as the development proposal will not generate additional trips outside of the construction phase. The current layout at the intersection of Gwydir Highway and Bindaree Beef access road is suitable to accommodate the anticipated additional 43 trips to (and from) the site generated daily during the construction phase.

The development proposal will not generate additional trips on the surrounding road network upon completion of the construction phase. As such, the existing situation on a significant stretch of Gwydir Highway, where the provisions of the Austroads Guide to Road Design recommend a 1m sealed shoulder for rural roads designed for 3,000 vehicles per day, is recommended to be examined by the RMS for long-term solutions. The proposed development will not generate any additional traffic along this road above the current quantum of traffic generated. Additionally, with the estimated 10-year growth in traffic volumes along Gwydir Highway, long-term upgrades to geometric design in accordance with Austroads Guide to Road Design for rural roads with an annual average daily traffic (AADT) count above 3,000 vehicles be considered by the RMS. Any upgrades to the Gwydir Highway should be undertaken concurrently by the RMS as significant areas of the Gwydir Highway in both directions of the proposed development site do not conform to these provisions. The proposed development will not generate any additional traffic on the surrounding road network upon completion of the construction phase.

5.2 Improvements to Accommodate Background Traffic

Current traffic volumes indicate that even in the event of a 2% growth in background traffic occur over 10 years, Gwydir Highway will continue to operate at LoS B, which is the highest level of service achievable for a rural road. Consideration should be given to the geometric design of Gwydir Highway given the expected increase in traffic above the 3,000 AADT would require additional shoulder width of 1m under the provisions of the Austroads Guide to Road Design Part 3A: Geometric Design. This is considered an existing issue and it is recommended RMS explore long-term options for this shoulder width increase.

Further analysis of these shoulder widths reveals there a very substantial portion of the Gwydir Highway that does not conform to this provision that generally extends for several kilometres in both directions along Gwydir Highway from the proposed development site.



■ *Photo 8 Example of non-conforming sealed shoulders on Gwydir Highway approximately 1km west of Bindaree Beef site*



■ *Photo 9 Example of non-conforming sealed shoulder width on Gwydir Highway approximately 1km east of Bindaree Beef site (towards Inverell town centre)*

Given the length of Gwydir Highway with departures from the required sealed shoulder width under the Austroad provisions, it is recommended RMS explore long-term options to achieve the required sealed shoulder width concurrently. The proposed development will reduce traffic numbers along the Gwydir Highway and given the existing daily traffic volume along this road, the shoulder widths are considered an existing issue that is solely the responsibility of RMS.

5.3 Additional Improvements to Accommodate Development Traffic

No additional improvements will be required to accommodate traffic from the proposed development given the proposed development will not generate any additional trips on the surrounding road network. The proposed development upon completion of the construction phase will not generate additional traffic on the surrounding road network.

5.4 Alternative Improvements

No additional alternative traffic, parking or access improvements are recommended for the proposed development given no additional traffic will be generated outside of the construction phase.

5.5 Status of Improvements Already Funded, Programmed or Planned

No planned, programmed or funded improvements have been noted in the vicinity of the proposed development site.

5.6 Evaluation

The proposed development will not generate any additional traffic on the surrounding road network upon completion of the construction phase and as such, no modifications will be required to the existing situation on Gwydir Highway as a result of this proposal.

6 Summary and Recommendations

6.1 Summary

The following conclusions are drawn from the investigations into the proposed bio-digester plant and rendering plant facilities along the Gwydir Highway in Inverell, NSW:

1. The proposed development site is located on the Gwydir Highway and is bounded by this Classified Road to the north, Copeton Dam Road to the south and various rural properties zoned RU1 – Primary Production to the east and west.
2. The proposed development site currently operates as an abattoir with associated facilities. The existing facility can process up to 1,100 cattle per day.
3. Current traffic generated by the site includes approximately 430 vehicles per day, 130 of which are heavy vehicles (30% of all site flows). The site is able to accommodate the current parking demands of all vehicle types wholly within the site. The internal layout and access road (including its intersection with Gwydir Highway) currently accommodates B-double trucks. All access / egress to the site occurs from Gwydir Highway via an existing access road (Access Point 1).
4. Access points 2 and 3 are prohibited for use by all non-emergency vehicles. The development proposal will not require these access points to be open to traffic and as such, evaluation for safety at these points was not completed. Some traffic associated with sorghum movements will require vehicle to access the subject site via the rear access driveway from Copeton Dam Road.
5. The development proposal is a State Significant Development, and therefore the consent authority will be the NSW State Government. Gwydir Highway is a RMS Classified Road and comments provided by the RMS have been considered in this report (see Table 1-2).
6. As part of the development, traffic survey data has been collected at the existing intersection of Gwydir Highway and the Bindaree Beef site access road (See Appendix C). This data indicates Gwydir Highway in the vicinity of the proposed development site operates at LoS B, which is the highest achievable LoS for a rural road.
7. The assessment of the key intersection with Sidra (Appendix F) confirms that this intersection will continue to operate well within acceptable limits, with minimal delays for road users. LoS A is currently achieved for all approaches. The geometric design of this intersection is considered very good and in compliance with the provisions of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections as there are good sight distances and recent upgrades to provide a centre median discourage traffic from crossing into opposing traffic on the Bindaree Beef access road.
8. Upon completion of the construction phase, there will be no additional traffic generated on the surrounding road network as a result of the proposed development. There will be a reduction of traffic along the Gwydir Highway as coal deliveries will no longer be required, which currently accounts for up to 8 B-triple movements (4 arrivals and 4 departures) generated by the site.
9. It is recommended long-term options are explored by RMS to concurrently achieve the sealed shoulder width design standards of Austroads Guide to Road Design Part 3: Geometric Design for a rural road with an AADT over 3,000.
10. No modifications to the existing external road network nor internal road circulation pattern will be required for this project. While traffic may temporarily increase during the construction phase of the project, the proposed development will not generate additional trips on the surrounding road network upon completion of the construction phase. The existing turn treatments are suitable to accommodate the additional traffic that will occur during the construction phase and no additional controls at the intersection of Gwydir Highway and the

Bindaree Beef access road will be required to accommodate this construction traffic. Construction traffic origins and destinations would be similar to the existing traffic pattern between Gwydir Highway and the Bindaree Beef access road where approximately 95% of all traffic arrives or departs to destinations further east in the direction of Inverell Town Centre from the subject site.

11. Sorghum will be required to be delivered to the site as part of the bio-digester plant. This sorghum will be produced to the south of the Bindaree Beef abattoir facility, immediately opposite Copeton Dam Road. Sorghum will be transported across Copeton Dam Road to the rear access driveway of the Bindaree Beef site. Sorghum deliveries will therefore have no impact on Gwydir Highway and have a very minimal impact on Copeton Dam Road. The intersection of the access driveways with Copeton Dam Road are considered very well laid out with good sight distances and alignment.
12. The proposed development will not require B-triples to access the site and as such, assessment for B-triple access from the Gwydir Highway was not undertaken as part of this project. It is recommended that this intersection and access road from Gwydir Highway be evaluated as part of any future B-triple permit application.

6.2 Recommendations

The overall conclusion from the investigations is that traffic and parking arrangements for the development proposal are satisfactory and that there is no traffic or parking impediments to the development.

Appendix A. Response to Director-General Requirements

Comment	Report Inclusion
Details of key transport routes and traffic types and volumes likely to be generated during construction and operation.	No additional traffic will be generated as a result of the proposed development upon completion of the construction phase. Traffic generated during the construction phase is expected to occur in a similar pattern to the existing traffic pattern between Gwydir Highway and the Bindaree Been access road, where approximately 95% of all traffic has an origin / destination from / to points further east in the direction of Inverell Town Centre. With daily construction traffic expected to be in the order of 45 vehicles, and additional 40 vehicles could be expected along Gwydir Highway east of the proposed development site. Upon completion of the construction phase, traffic volumes generated by the subject will be reduced relative to existing levels (430 vehicle arrivals per day, 130 of which are heavy vehicles) by up to 4 B-double arrivals per week associated with coal movements.
Assessment of predicted impacts on road safety and the capacity of the road network to accommodate the facility including current traffic counts, details of truck routes and modelling of key intersections.	An estimated AADT of 2,900 (based on average peak hourly flows of 290 vehicles) along the Gwydir Highway with 10% heavy vehicle flows indicates this road operates at LoS B, which is the highest achievable LoS for a rural road. The RTA Guide to Traffic Generating Developments indicates the maximum capacity for a level rural road with 10% heavy vehicle flows is 2390 vehicle per hour. When peak traffic volumes along Gwydir Highway in the vicinity of the Bindaree Beef facility occur in the evening peak hour, there is a total vehicle flow of approximately 340 vehicles per hour. This volume of traffic indicates the vehicle-capacity ratio is around 0.14. Trucks enter the site from the approved heavy vehicle route of Gwydir Highway and distribute to various destinations as required. The overwhelming majority of heavy vehicles were observed to have an origin from / destination to points further east from the subject site in the direction of Inverell Town Centre. The key intersection of Gwydir Highway and Bindaree Beef access road was modelled with the Sidra intersection modelling program. The results indicate all approaches to this intersection operate at LoS "A", which is the highest achievable LoS.
Assessment of where off-site infrastructure works may be required as a result of traffic impacts including detailed plans of any proposed road upgrades.	The development proposal will have minimal traffic impacts as traffic volumes will be reduced by up to 4 B-double truck arrivals per week upon completion of the construction phase. Parking demand, as a result of the proposed development, will also not be impacted upon completion of the construction phase. All non-compliance issues along the Gwydir Highway are considered an existing situation and solely the responsibility of RMS given the proposed reduction in traffic as a result of the proposal. The existing access road from Gwydir Highway currently accommodates suitable access B-double trucks and the development proposal will not require larger vehicles to access the site. Geometry and turn treatments at this intersection are in accordance with Austroad Guide to Road Design Part 4A: Unsignalised and Signalised Intersections.

Access, including detailed consideration of various access options and justification for the proposed location of the main access points.	Detailed consideration has been undertaken as part of previous development proposals by Bindaree Beef, which closed access points 2 and 3 (as labelled in the Traffic Impact Statement) to all vehicles except in an emergency. The existing access road from Gwydir Highway (the main access point to the site) has suitable sight distances and turn treatments in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections. A central median was constructed on the Bindaree Beef access road at its intersection with Gwydir Highway in 2008 to prevent turning vehicles from crossing into (or cutting across) on-coming traffic. Overall, the design of this intersection is considered to be very good.
Provision of parking in accordance with the relevant guidelines.	The proposed development will not generate additional parking demand on the site and additional parking supply will not be required. During the construction phase, vehicles will be able to park in the various areas available wholly within the site for overflow parking as required. The existing parking will not be modified as a result of this proposal.

Appendix B. Response to RMS Comments

Comment	Report Inclusion
Peak hour traffic counts and accident histories for the highway, including all site access points.	Peak hour traffic surveys have been undertaken by BTF and are provided at Appendix D. Accident history has been provided by RMS, which indicates there have been some accidents in the vicinity of the proposed development site. All site access points were identified in Section 2 of the Traffic Impact Statement. There are four access points, three of which are from an RMS-Classified Road (Gwydir Highway). The facility's main access is from Gwydir Highway.
Details of the existing and proposed access arrangements including consideration of Sight Distances, alignment, delineation and signposting.	No modifications are proposed to the existing site access points. The main access road from Gwydir Highway will continue to accommodate the overwhelming majority of traffic to / from the site. Geometry and turn treatments at this intersection are designed in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections in terms of sight distances and delineation. Along the frontage of the Bindaree Beef facility site, there are road markers with reflectors that appropriately delineate the carriageway, including during times after sunset.
Consideration of rationalisation of access points and/or alternative access arrangements.	There are no changes proposed to the existing access points to the site. The main access road currently accommodates for the largest design vehicle required to access the site (B-double). Access points 2 and 3 (as labelled in the Traffic Impact Statement) are currently closed to all traffic with an exception made during emergencies.
Assess the need for any improvements to existing road infrastructure such as intersections, pavements, bridges and drainage structures.	There will be no need for any improvements to the existing road infrastructure as a result of the proposed development.
Use AUSTROADS Fig 4.9 "Guide to Road Design Part 4A" to assess the need for any improvements for right and left-turning traffic for road junctions and accesses.	There are currently rural auxiliary right and left turn treatments from Gwydir Highway into the Bindaree Beef access road in accordance with the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections. These turn treatments are justified for the current volumes of traffic at this intersection (and the projected temporary increase in traffic during the construction phase) in accordance with Figure 4.9 of Austroads Guide to Road Design Part 4A.
All vehicles are to enter and leave the site in forward directions. Manoeuvring paths are to demonstrate accessibility for the largest design vehicle requiring access to the site.	All vehicles are able to access and egress the site in a forward motion. Given the existing layout at the intersection of Gwydir Highway and Bindaree Beef access road currently suitably accommodates B-double trucks (and a larger design vehicle is not proposed to access the site as a result of this development proposal), a swept path analysis was not undertaken given the existing situation is able to accommodate these movements. It should be noted the development proposal, upon completion of the construction phase, will reduce the need for up to 4 B-double trucks to arrive on the site per week (8 total weekly B-double trips).

Recommend suitable improvements to address any identified impact upon the safety and efficiency of the classified road.	A growth in background traffic could increase AADT on Gwydir Highway to over 3000 vehicles. After this threshold, rural roads are recommended to have a paved shoulder of 1.5m under the provisions of Austroad Guide to Road Design Part 3: Geometric Design. This issue is considered an existing situation and given the proposed development upon completion of the construction phase will reduce the volume of traffic generated by the site, this shoulder width is considered the sole responsibility of RMS. It is also recommended that due to the extent of non-complying shoulder width (minimal shoulder width is highly prevalent in several kilometres in either direction along Gwydir Highway from the proposed development site) that shoulder widening be undertaken concurrently by RMS.
Demonstrate car parking arrangements for staff, customers and service vehicles in accordance with the applicable Australian Standards.	The existing parking arrangements are able to cater to the existing parking demand on the site, with overflow parking areas available if required. It is anticipated some of these overflow parking areas (which could accommodate a large number of vehicles if required) could be used during the construction period. The development proposal will not generate additional parking demand on the site upon completion of the construction phase and therefore all parking has been assumed to have been built in accordance with the relevant Australian Standards. All parking on the site is considered an existing situation. Parking will not be impacted by the development proposal upon completion of the construction phase.
Impact on other transport modes (pedestrians, cyclists, public and school bus routes).	While the construction phase of the project may moderately increase traffic levels along Gwydir Highway (approximately 45 additional daily trips to the site), it is expected Gwydir Highway will continue to operate the highest LoS achievable for a rural road and therefore have a negligible impact on pedestrians, cyclists and bus (public and school) routes.
Consideration of measures to address the Road Traffic Noise and Dust.	Given the proposed development will reduce traffic generated by the subject site upon completion of the construction phase (including a reduction of up to 4 B-double arrivals per week), there will be a negligible (slight reduction) in noise generated by traffic associated with the proposed development site. The main access point from Gwydir Highway (where the overwhelming majority of traffic accesses / egresses the site) is a sealed road, which limits the potential for dust pollution. The key internal roads that service the majority of vehicles on the site are also sealed and limit the potential for dust pollution. Traffic movements associated with proposed sorghum deliveries to the site will access the site via the rear access driveway from Copeton Dam Road. While the frequency and quantum of sorghum deliveries to be made to the site are yet to be determined, it is anticipated that sorghum deliveries will be relatively infrequent and therefore have minimal impact on dust pollution as a result of these movements. These sorghum deliveries would be the only additional movements along this access driveway.

Appendix C. Response to Council Comments

Comment	Report Inclusion
The Development Application will need to consider, and provide information on the possible traffic impacts of the project including the increased traffic generation and type of vehicles accessing the site, the peak traffic times and how the development will relate to the Gwydir Highway.	While the construction phase of the proposal could generate an additional 45 trips to the site per day, no additional traffic will be generated by the proposed development site upon completion of the construction phase as a result of the development proposal. Access to the site and circulation around the site has been designed to suitably accommodate B-double design vehicles, which currently access the site. No larger design vehicles are proposed to access the proposed development site as a result of this development proposal. The development proposal will not increase staff levels on the subject site, but is anticipated to reduce movements associated with coal deliveries by up to 4 B-double arrivals per week. The development proposal will therefore reduce traffic movements along Gwydir Highway upon completion of the construction phase.
For a development of this scale a specialist Traffic Impact Assessment and early consultation with the RMS is recommended. The traffic assessment will need to consider and assess whether this project will facilitate additional employees or shifts at the site. It is also understood that the bio-digester plant will utilise sorghum crops as fuel. The traffic implications on local roads (i.e. Copeton Dam Road) for these deliveries should be considered.	BTf has been engaged by Mitch Hanlon Associates to undertake the relevant traffic studies. The development proposal will not generate additional employment levels on the site (some employees will be re-trained). Sorghum will be required to be transported to the site for use in the bio-digester plant. This sorghum will be produced on the area of land owned by Bindaree Beef immediately opposite Copeton Dam Road from the proposed development site. Sorghum will be transported internally to the access driveway from Copeton Dam Road, where delivery vehicles will then cross Copeton Dam Road (but not travel along this road) into the Bindaree Beef (rear) access driveway from Copeton Dam Road. Given there is a very low volume of traffic along Copeton Dam Road and the good visibility provided by the alignment of Copeton Dam Road, there will be a minimal impact of this traffic additional traffic on Copeton Dam Road.
In terms of construction impacts, consideration should be given to construction traffic and deliveries.	All traffic associated with construction work will access / egress the proposed development site via Gwydir Highway. The construction phase could generate an additional 45 trips to the site per day (this quantum includes construction crews and construction vehicles). This additional traffic will not require additional controls at the intersection of Gwydir Highway and Bindaree Beef access road.
Identify any increase in traffic movements associated with the construction phase of the project including: • Type of vehicle • Additional staff • Shift times	The construction phase will require flat top tray, ridged and articulated heavy vehicle types. It should be noted the site currently accommodates B-double design vehicles and the heavy construction vehicles will not exceed this design vehicle size. During the construction phase, peak construction periods could demand 64 construction labourers to be on site at any given time. Construction work is proposed to take place between 6.00 and 16.00. All construction access could occur through the intersection of Gwydir Highway and Bindaree Beef access driveway,

• Access locations • Proposed traffic management	where the existing turn treatments are suitable to accommodate for this temporary increase in traffic during the construction phase. No traffic management will be required from Gwydir Highway as the existing turn treatments have been designed in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections for the anticipated traffic levels during the construction phase.
Is the proposed development to be operated by existing staff or will an increase in staff be required?	The proposed development will be operated by existing staff, some of whom will be re-trained. No additional staff will be required as a result of the development proposal.
RMS prefers that the site access opposite Fernhill Road be used for emergency vehicle access only.	Consultation with RMS indicates the site access opposite Fernhill Road is restricted to emergency vehicle access only. This is also true for the access driveway approximately 100m west of the Gwydir Highway / Fernhill Road intersection (access point 2 as labelled in the Traffic Impact Statement). All traffic (with the exception of traffic associated with sorghum production / delivery) will continue to access / egress the site via the Bindaree Beef access road from Gwydir Highway.
The existing staff access driveway is located immediately over a crest and has limited protection for left and right turning vehicles accessing the site. Consideration should be given to sight distances, intersection safety and provision of appropriate turn lanes in accordance with the applicable AUSTROADS Guidelines. Shift work and peak turn movements should be considered.	A site visit revealed this driveway is currently closed to all traffic with the exception of emergency vehicles and no modifications to this access point are proposed. As such, turning lanes are not required at this access point.
Suitability of the main site access (western end of the site) to accommodate the largest design vehicle requiring access. Vehicles should be able to leave the site without crossing the centreline of the Gwydir Highway.	The intersection of Gwydir Highway and Bindaree Beef access road currently suitably accommodates B-double heavy vehicle types and larger design vehicles will not be required to access / egress the site as a result of this development proposal.
The width of existing BAR/AUL lanes and available shoulders should be considered in accordance with the AUSTROADS Guidelines.	A site visit confirmed there are auxiliary right and left turn treatments to the main site access road. These turn treatments are in accordance with the provisions of the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections given the existing traffic volumes along Gwydir Highway and Bindaree Beef access driveway.

Appendix D. Surveys Data

Location: Bindaree Beef Access Driveway at Gwydir Highway, Inverell, NSW
GPS Coordinates: N = -29.761052, W= 151.057425
Date: 16/10/2013
Day of week: Wednesday
Weather:
Analyst: MSY

Total vehicle traffic

Interval starts	Northbound			Eastbound			SouthBound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:44	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	5	0	7	2	0	0	0	29	18	0	61
07:00	0	0	4	0	12	0	0	0	0	9	12	0	37
07:15	0	0	3	0	7	0	0	0	0	4	17	0	31
07:30	0	0	0	0	10	0	0	0	0	5	21	0	36
07:45	0	0	2	0	24	0	0	0	0	3	13	0	42
08:00	0	0	2	0	29	0	0	0	0	6	17	0	54
08:15	0	0	2	0	45	1	0	0	0	2	20	0	70
08:30	0	0	0	0	34	0	0	0	0	1	19	0	54
08:45	1	0	1	0	33	0	0	0	0	4	22	0	61
09:00	1	0	2	0	22	0	0	0	0	4	11	0	40
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0

Car traffic

Interval starts	Northbound			Eastbound			SouthBound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:44	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	5	0	7	2	0	0	0	28	10	0	52
07:00	0	0	3	0	10	0	0	0	0	9	5	0	27
07:15	0	0	3	0	6	0	0	0	0	4	15	0	28
07:30	0	0	0	0	8	0	0	0	0	4	17	0	29
07:45	0	0	1	0	23	0	0	0	0	2	11	0	37
08:00	0	0	2	0	27	0	0	0	0	6	14	0	49
08:15	0	0	1	0	36	0	0	0	0	1	20	0	58
08:30	0	0	0	0	30	0	0	0	0	1	19	0	50
08:45	0	0	0	0	29	0	0	0	0	3	20	0	52
09:00	1	0	1	0	19	0	0	0	0	3	7	0	31
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0

Truck traffic

Interval starts	Northbound			Eastbound			SouthBound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:44	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	1	8	0	9
07:00	0	0	1	0	2	0	0	0	0	0	7	0	10
07:15	0	0	0	0	1	0	0	0	0	0	2	0	3
07:30	0	0	0	0	2	0	0	0	0	1	4	0	7
07:45	0	0	1	0	1	0	0	0	0	1	2	0	5
08:00	0	0	0	0	2	0	0	0	0	0	3	0	5
08:15	0	0	1	0	9	1	0	0	0	1	0	0	12
08:30	0	0	0	0	4	0	0	0	0	0	0	0	4
08:45	1	0	1	0	4	0	0	0	0	1	2	0	9
09:00	0	0	1	0	3	0	0	0	0	1	4	0	9
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
06:44	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	1	0	5	0	141	1	0	0	0	13	78	0	239
Factor	0.25	0.00	0.62	0.00	0.78	0.25	0.00	0.00	0.00	0.54	0.89	0.00	0.85
Approach factor	0.75			0.77			0.00			0.88			

Peak Hour Vehicle Summary

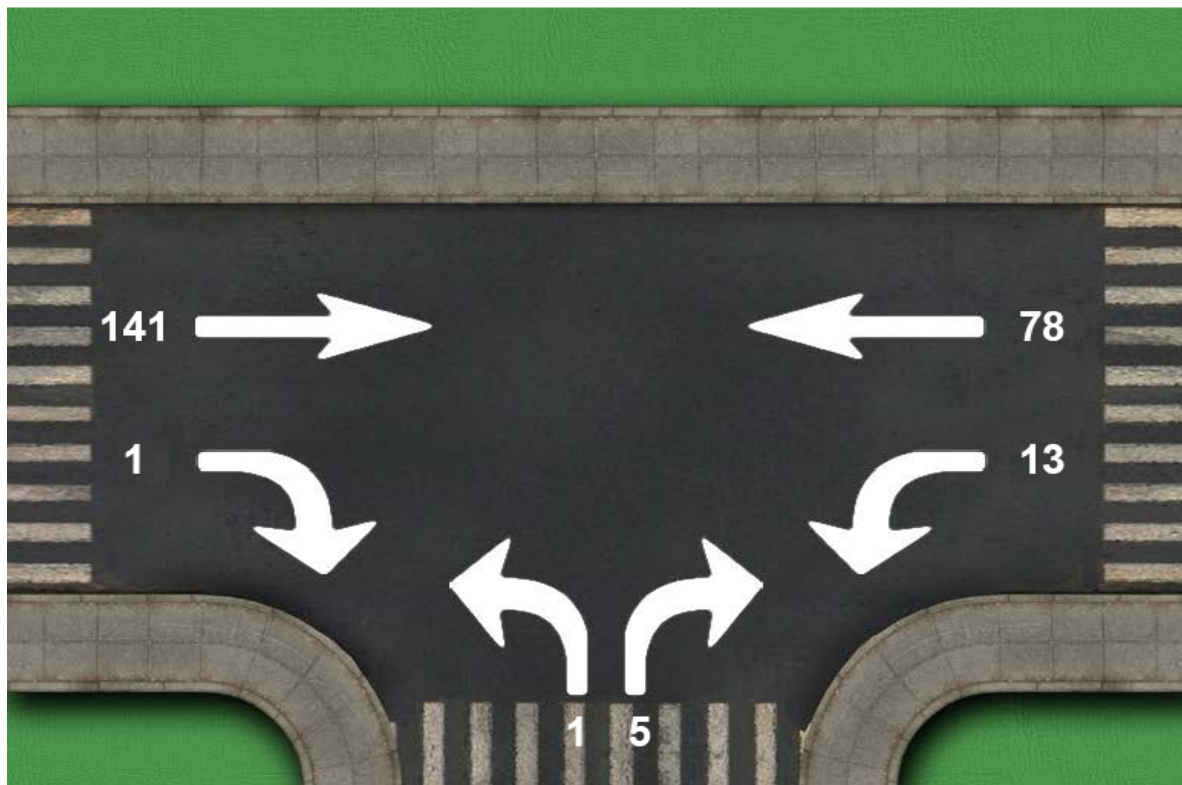
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	3	0	122	0	0	0	0	11	73	0	209
Truck	1	0	2	0	19	1	0	0	0	2	5	0	30

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

Location: Bindaree Beef Access Driveway at Gwydir Highway, Inverell, NSW
GPS Coordinates: N = -29.760990, W= 151.057404
Date: 2013-10-15
Day of week: Tuesday
Weather:
Analyst: MSY



Intersection Peak Hour

08:00 - 09:00

	South Bound			Westbound			North bound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	16	126	0	6	0	114	0	72	2	336
Factor	0.00	0.00	0.00	0.57	0.85	0.00	0.75	0.00	0.58	0.00	0.72	0.50	0.86
Approach factor	0.00			0.81			0.59			0.74			

Turn Count Summary

Location: Bindaree Beef Access Driveway at Gwydir Highway, Inverell, NSW
GPS Coordinates: N = -29.760990, W= 151.057404
Date: 2013-10-15
Day of week: Tuesday
Weather:
Analyst: MSY

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:32	0	0	0	9	22	0	0	0	20	0	16	0	67
15:45	0	0	0	7	37	0	1	0	32	0	20	1	98
16:00	0	0	0	3	26	0	2	0	49	0	9	0	89
16:15	0	0	0	4	27	0	2	0	28	0	18	1	80
16:30	0	0	0	2	36	0	1	0	5	0	25	0	69
16:45	0	0	0	1	35	0	0	0	2	0	20	1	59
17:00	0	0	0	1	31	0	1	0	5	0	19	0	57
17:15	0	0	0	3	29	0	0	0	3	0	17	1	53
17:30	0	0	0	8	31	0	0	0	4	0	17	0	60
17:45	0	0	0	4	15	0	0	0	8	0	12	2	41
18:00	0	0	0	1	2	0	0	0	0	0	0	0	3

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:32	0	0	0	9	20	0	0	0	19	0	14	0	62
15:45	0	0	0	5	33	0	1	0	32	0	16	0	87
16:00	0	0	0	3	23	0	0	0	49	0	8	0	83
16:15	0	0	0	3	25	0	1	0	27	0	16	1	73
16:30	0	0	0	2	33	0	1	0	5	0	22	0	63
16:45	0	0	0	1	33	0	0	0	2	0	15	1	52
17:00	0	0	0	1	31	0	1	0	5	0	16	0	54
17:15	0	0	0	3	27	0	0	0	3	0	13	1	47
17:30	0	0	0	8	29	0	0	0	4	0	16	0	57
17:45	0	0	0	2	15	0	0	0	8	0	11	0	36
18:00	0	0	0	1	2	0	0	0	0	0	0	0	3

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:32	0	0	0	0	2	0	0	0	1	0	2	0	5
15:45	0	0	0	2	4	0	0	0	0	0	4	1	11
16:00	0	0	0	0	3	0	2	0	0	0	1	0	6
16:15	0	0	0	1	2	0	1	0	1	0	2	0	7
16:30	0	0	0	0	3	0	0	0	0	0	3	0	6
16:45	0	0	0	0	2	0	0	0	0	0	5	0	7
17:00	0	0	0	0	0	0	0	0	0	0	3	0	3
17:15	0	0	0	0	2	0	0	0	0	0	4	0	6
17:30	0	0	0	0	2	0	0	0	0	0	1	0	3
17:45	0	0	0	2	0	0	0	0	0	0	1	2	5
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

15:45 - 16:45

	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	16	126	0	6	0	114	0	72	2	336
Factor	0.00	0.00	0.00	0.57	0.85	0.00	0.75	0.00	0.58	0.00	0.72	0.50	0.86
Approach factor	0.00			0.81			0.59			0.74			

Peak Hour Vehicle Summary

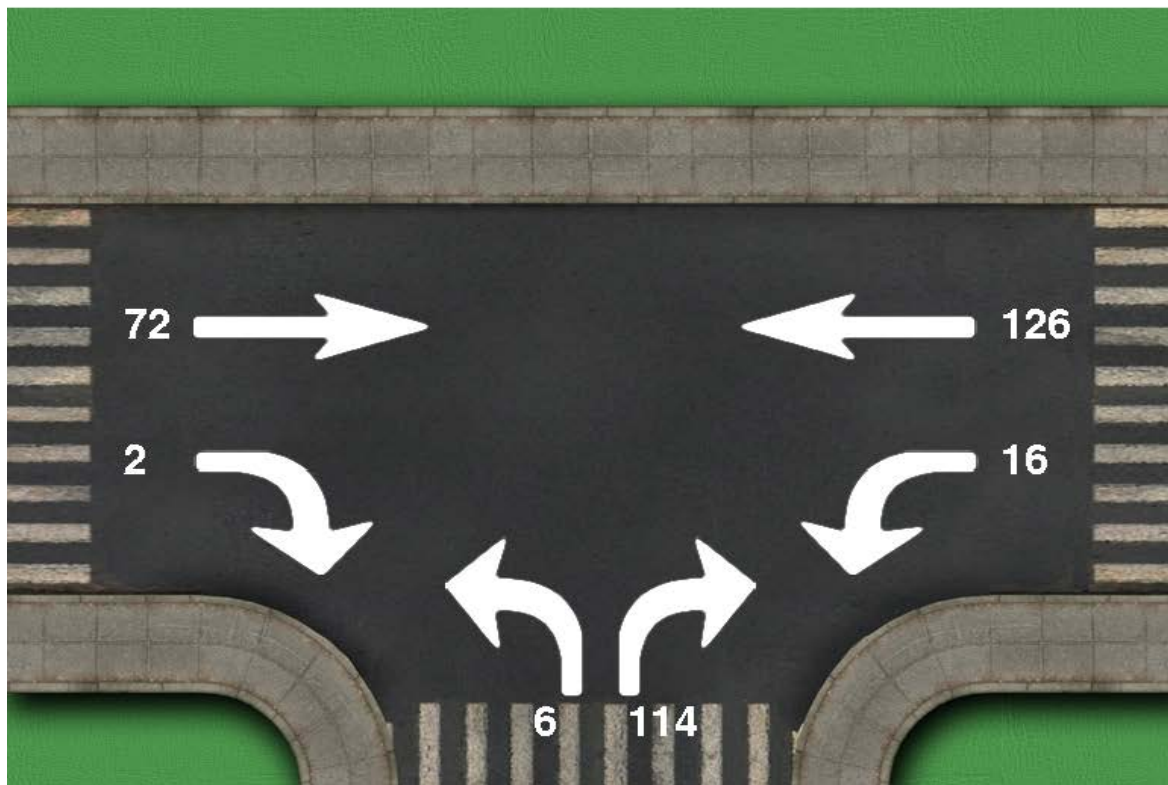
Vehicle	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	13	114	0	3	0	113	0	62	1	306
Truck	0	0	0	3	12	0	3	0	1	0	10	1	30

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	1	0	1	0	0	0	0	1	1	2

Intersection Peak Hour

Location: Bindaree Beef Access Driveway at Gwydir Highway, Inverell, NSW
GPS Coordinates: N = -29.760990, W= 151.057404
Date: 2013-10-15
Day of week: Tuesday
Weather:
Analyst: MSY

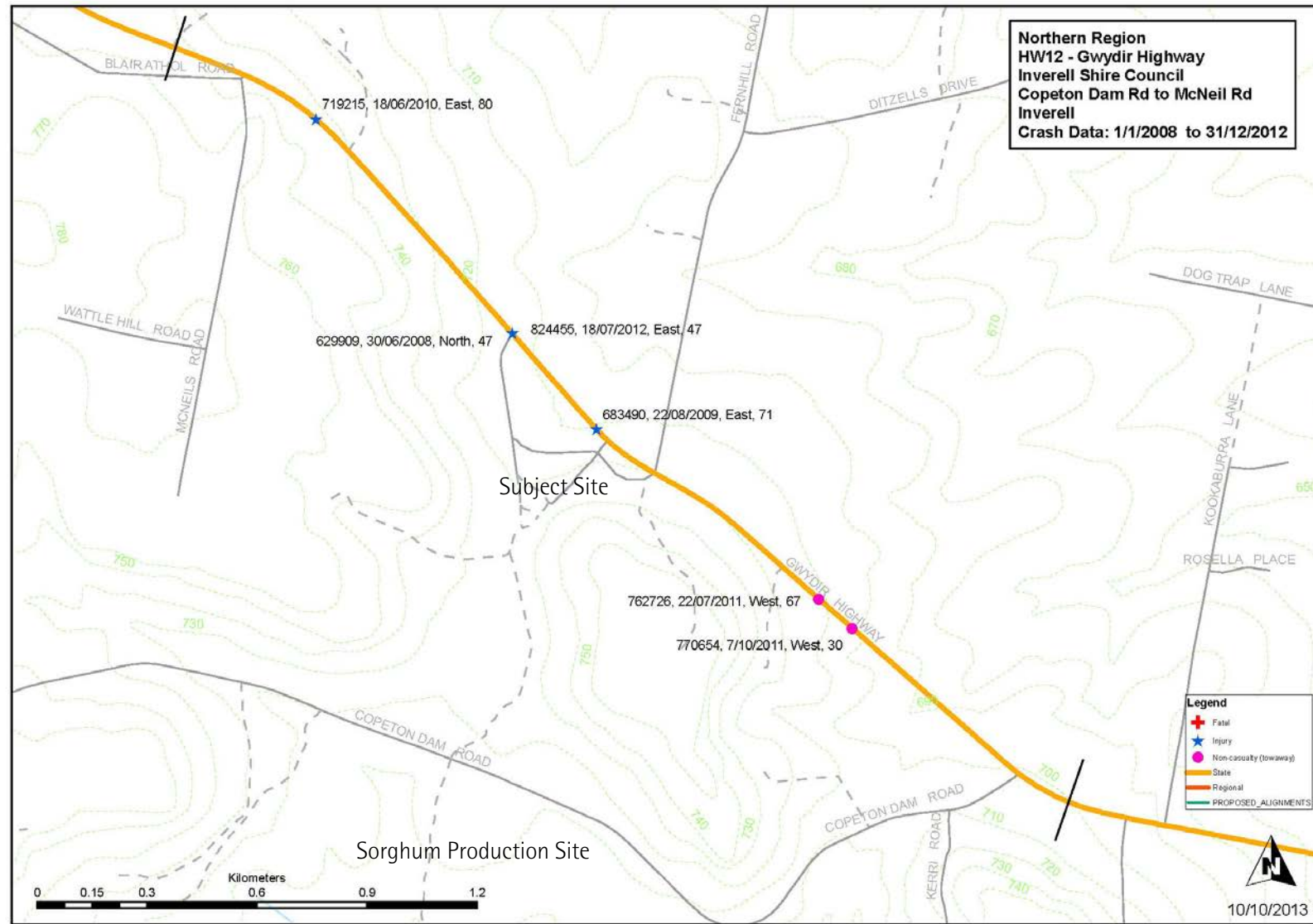


Intersection Peak Hour

15:45 - 16:45

	South Bound			Westbound			North bound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	16	126	0	6	0	114	0	72	2	336
Factor	0.00	0.00	0.00	0.57	0.85	0.00	0.75	0.00	0.58	0.00	0.72	0.50	0.86
Approach factor	0.00			0.81			0.59			0.74			

Appendix E. Accident Data



Summary Crash Report

# Crash Type	Contributing Factors	Crash Movement	CRASHES	CASUALTIES
Car Crash 6 100.0%	Speeding 1 16.7%	Intersection, adjacent approaches 0 0.0%	Fatal crash 0 0.0%	Killed 0 0.0%
Light Truck Crash 2 33.3%	Fatigue 0 0.0%	Head-on (not overtaking) 0 0.0%	Injury crash 4 66.7%	Injured 6 100.0%
Rigid Truck Crash 0 0.0%	Alcohol 0 0.0%	Opposing vehicles; turning 0 0.0%	Non-casualty crash 2 33.3%	^ Unrestrained 0 0.0%
Articulated Truck Crash 1 16.7%		U-turn 0 0.0%	^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn	
'Heavy Truck Crash (1) (16.7%)	Weather	Rear-end 1 16.7%	Time Group	% of Day
Bus Crash 0 0.0%	Fine 6 100.0%	Lane change 0 0.0%	00:01 - 02:59 0 0.0%	12.5%
"Heavy Vehicle Crash (1) (16.7%)	Rain 0 0.0%	Parallel lanes; turning 0 0.0%	03:00 - 04:59 0 0.0%	8.3%
Emergency Vehicle Crash 0 0.0%	Overcast 0 0.0%	Vehicle leaving driveway 2 33.3%	05:00 - 05:59 0 0.0%	4.2%
Motorcycle Crash 0 0.0%	Fog or mist 0 0.0%	Overtaking; same direction 0 0.0%	06:00 - 06:59 0 0.0%	4.2%
Pedal Cycle Crash 0 0.0%	Other 0 0.0%	Hit parked vehicle 0 0.0%	07:00 - 07:59 0 0.0%	4.2%
Pedestrian Crash 0 0.0%	Road Surface Condition	Hit railway train 0 0.0%	08:00 - 08:59 0 0.0%	4.2%
* Rigid or Artic. Truck * Heavy Truck or Heavy Bus		Hit pedestrian 0 0.0%	09:00 - 09:59 0 0.0%	4.2%
# These categories are NOT mutually exclusive		Permanent obstruction on road 0 0.0%	10:00 - 10:59 0 0.0%	4.2%
Location Type	Wet 0 0.0%	Hit animal 1 16.7%	11:00 - 11:59 0 0.0%	4.2%
*Intersection 0 0.0%	Dry 6 100.0%	Off road, on straight 0 0.0%	12:00 - 12:59 0 0.0%	4.2%
Non intersection 6 100.0%	Snow or ice 0 0.0%	Off road on straight, hit object 1 16.7%	13:00 - 13:59 1 16.7%	4.2%
* Up to 10 metres from an intersection		Out of control on straight 0 0.0%	14:00 - 14:59 1 16.7%	4.2%
~ 07:30-09:30 or 14:30-17:00 on school days		Off road, on curve 1 16.7%	15:00 - 15:59 1 16.7%	4.2%
Collision Type	Natural Lighting	Off road on curve, hit object 0 0.0%	16:00 - 16:59 2 33.3%	4.2%
Single Vehicle 3 50.0%	Dawn 0 0.0%	Out of control on curve 0 0.0%	17:00 - 17:59 0 0.0%	4.2%
Multi Vehicle 3 50.0%	Daylight 5 83.3%	Other crash type 0 0.0%	18:00 - 18:59 0 0.0%	4.2%
			19:00 - 19:59 1 16.7%	4.2%
Road Classification	Speed Limit	~ 40km/h or less 0 0.0%	20:00 - 21:59 0 0.0%	8.3%
Freeway/Motorway 0 0.0%	40 km/h or less 0 0.0%	80 km/h zone 0 0.0%	22:00 - 24:00 0 0.0%	8.3%
State Highway 6 100.0%	50 km/h zone 0 0.0%	90 km/h zone 0 0.0%	Street Lighting Off/Nil	% of Dark
Other Classified Road 0 0.0%	60 km/h zone 0 0.0%	100 km/h zone 6 100.0%	1 of 1 in Dark	100.0%
Unclassified Road 0 0.0%	70 km/h zone 0 0.0%	110 km/h zone 0 0.0%		
Day of the Week	# Holiday Periods	New Year 0 0.0%	Queen's BD 0 0.0%	Easter SH 0 0.0%
Monday 1 16.7%	Thursday 0 0.0%	Aust. Day 0 0.0%	Labour Day 0 0.0%	June/July SH 0 0.0%
Tuesday 0 0.0%	Friday 3 50.0%	Easter 0 0.0%	Christmas 0 0.0%	Sept./Oct. SH 1 16.7%
Wednesday 1 16.7%	Saturday 1 16.7%	Anzac Day 0 0.0%	January SH 0 0.0%	December SH 0 0.0%
	WEEKDAY 5 83.3%			
	WEEKEND 1 16.7%			

Crashid dataset HW12 - Copeton Dam Rd to McNeils Road, Inverell Crash data 1/4/2008 to 30/3/2013

Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Rep ID: REG01 Office: Grafton User ID: synottj

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Generated: 11/10/2013 13:15

Detailed Crash Report

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
Northern Region																				
Inverell LGA																				
Inverell																				
Gwydir Hwy																				
824455	18/07/2012	Wed	13:45		at BINDAREE BEEF GTE	2WY	STR	Fine	Dry	100	2	BDBL M48	E in GWYDIR HWY		Unk	Forward from drive		I	0	1
E48443447						RUM:	47	Emerging from drive				CAR F74	N in GWYDIR HWY		80	Proceeding in lane				
629909	30/06/2008	Mon	16:20		at BINDEREE BEEF ENT	2WY	STR	Fine	Dry	100	2	TRK M23	N in GWYDIR HWY		20	Forward from drive		I	0	3
E36575988						RUM:	47	Emerging from drive				4WD F38	W in GWYDIR HWY		100	Proceeding in lane				
770654	07/10/2011	Fri	14:08	600 m	W COPETON DAM RD	2WY	STR	Fine	Dry	100	2	TRK M18	W in GWYDIR HWY		60	Proceeding in lane		N	0	0
E45928134						RUM:	30	Rear end				CAR F45	W in GWYDIR HWY		40	Proceeding in lane				
762726	22/07/2011	Fri	19:15	500 m	E FERNHILL RD	2WY	STR	Fine	Dry	100	1	CAR F18	W in GWYDIR HWY		90	Proceeding in lane		N	0	0
E44443060						RUM:	67	Struck animal				Kangaroo								
683490	22/08/2009	Sat	15:45	200 m	W FERNHILL RD	2WY	STR	Fine	Dry	100	1	UTE M17	E in GWYDIR HWY		110	Proceeding in lane		I	0	1
E38424504						RUM:	71	Off rd left => obj				Drain/culvert								S
719215	18/06/2010	Fri	16:15	250 m	E MCNEILS RD	2WY	CRV	Fine	Dry	100	1	CAR M54	E in GWYDIR HWY		90	Proceeding in lane		I	0	1
E41180313						RUM:	80	Off left/right bend												
Report Totals:																				
				Total Crashes: 6		Fatal Crashes: 0		Injury Crashes: 4		Killed: 0		Injured: 6								

Crashid dataset HW12 - Copeton Dam Rd to McNeils Road, Inverell Crash data 1/4/2008 to 30/3/2013

Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Appendix F. Sidra Results

Criteria for interpreting results of SIDRA

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.

4- LoS Summary

AM Peak Existing Situation

MOVEMENT SUMMARY

 **Site: AM Peak**

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bindaree Beef Access Road											
1	L2	1	30.0	0.001	8.6	LOS A	0.0	0.0	0.19	0.50	48.1
3	R2	5	30.0	0.008	10.3	LOS A	0.0	0.3	0.40	0.56	46.7
Approach		6	30.0	0.008	10.0	LOS A	0.0	0.3	0.36	0.55	47.0
East: Gwydir Highway											
4	L2	14	15.0	0.008	8.2	LOS A	0.0	0.0	0.00	0.60	49.0
5	T1	82	15.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		96	15.0	0.046	1.2	NA	0.0	0.0	0.00	0.09	89.5
West: Gwydir Highway											
11	T1	148	15.0	0.042	0.2	LOS A	0.2	2.0	0.11	0.01	93.7
12	R2	1	15.0	0.042	12.9	LOS A	0.2	2.0	0.22	0.02	87.9
Approach		149	15.0	0.042	0.3	NA	0.2	2.0	0.11	0.01	93.6
All Vehicles		252	15.4	0.046	0.9	NA	0.2	2.0	0.07	0.05	90.3

Level of Service (LOS) Method: Delay (RTANSW).

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 6**

PM Peak Existing Situation

MOVEMENT SUMMARY

 **Site: PM Peak**

New Site
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bindaree Beef Access Road											
1	L2	6	30.0	0.006	8.8	LOS A	0.0	0.2	0.25	0.52	47.9
3	R2	120	30.0	0.177	10.6	LOS A	0.7	6.5	0.43	0.64	46.5
Approach		126	30.0	0.177	10.5	LOS A	0.7	6.5	0.42	0.64	46.5
East: Gwydir Highway											
4	L2	17	15.0	0.010	8.2	LOS A	0.0	0.0	0.00	0.60	49.0
5	T1	133	15.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		149	15.0	0.074	0.9	NA	0.0	0.0	0.00	0.07	91.6
West: Gwydir Highway											
11	T1	76	15.0	0.022	0.3	LOS A	0.1	1.0	0.13	0.04	91.4
12	R2	2	15.0	0.022	12.9	LOS A	0.1	1.0	0.27	0.08	83.5
Approach		78	15.0	0.022	0.7	NA	0.1	1.0	0.13	0.04	91.2
All Vehicles		354	20.4	0.177	4.3	NA	0.7	6.5	0.18	0.26	70.9

Level of Service (LOS) Method: Delay (RTANSW).

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 6**

AM Peak Future (10-Year Design at 2% growth per annum)

MOVEMENT SUMMARY

 **Site: AM Peak Future**

New Site

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 veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bindaree Beef Access Road											
1	L2	1	30.0	0.001	8.6	LOS A	0.0	0.0	0.21	0.50	48.0
3	R2	5	30.0	0.008	10.6	LOS A	0.0	0.3	0.42	0.57	46.5
Approach		6	30.0	0.008	10.2	LOS A	0.0	0.3	0.38	0.56	46.7
East: Gwydir Highway											
4	L2	14	15.0	0.008	8.2	LOS A	0.0	0.0	0.00	0.60	49.0
5	T1	99	15.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		113	15.0	0.055	1.0	NA	0.0	0.0	0.00	0.07	91.0
West: Gwydir Highway											
11	T1	154	15.0	0.043	0.3	LOS A	0.3	2.1	0.12	0.01	93.1
12	R2	1	15.0	0.043	13.0	LOS A	0.3	2.1	0.24	0.02	87.0
Approach		155	15.0	0.043	0.4	NA	0.3	2.1	0.12	0.01	93.1
All Vehicles		274	15.3	0.055	0.8	NA	0.3	2.1	0.08	0.05	90.6

Level of Service (LOS) Method: Delay (RTA NSW).

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 (Akcelik M3D).

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

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PM Peak Future (10-Year Design at 2% growth per annum)

MOVEMENT SUMMARY

▽ Site: PM Peak Future

New Site

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bindaree Beef Access Road											
1	L2	6	30.0	0.007	9.0	LOS A	0.0	0.2	0.28	0.52	47.7
3	R2	120	30.0	0.189	11.2	LOS A	0.8	6.9	0.47	0.68	45.9
Approach		126	30.0	0.189	11.1	LOS A	0.8	6.9	0.46	0.67	46.0
East: Gwydir Highway											
4	L2	17	15.0	0.010	8.2	LOS A	0.0	0.0	0.00	0.60	49.0
5	T1	160	15.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		177	15.0	0.089	0.8	NA	0.0	0.0	0.00	0.06	92.8
West: Gwydir Highway											
11	T1	91	15.0	0.026	0.4	LOS A	0.2	1.3	0.15	0.03	90.9
12	R2	2	15.0	0.026	13.1	LOS A	0.2	1.3	0.30	0.06	82.7
Approach		93	15.0	0.026	0.7	NA	0.2	1.3	0.15	0.03	90.7
All Vehicles		396	19.8	0.189	4.1	NA	0.8	6.9	0.18	0.25	72.7

Level of Service (LOS) Method: Delay (RTA NSW).

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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