



Byron Shire Council

# Peer Review of Traffic Impact Assessment

53 McAuleys Lane, Myocum

14 April 2021

ENGINEERING PLANNING PROJECT MANAGEMENT SURVEYING CERTIFICATION

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# TABLE OF CONTENTS

1	Intr	oduction	.4
2	Pro	posed Development Site	.5
	2.1	Site Location	.5
	2.2	Existing Development	.5
	2.3	Existing Road Conditions	.5
	2.4	Proposed Development	.6
3	Pee	er Review Findings	.7
4	Inte	ersection Upgrade Costs1	2

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## 1 Introduction

Barker Ryan Stewart have been engaged by Byron Shire Council to undertake a peer review of a Traffic Impact Assessment prepared by Ardill Payne and Partners for a proposed rural residential subdivision at Lot 8 DP 589795, 53 McAuleys Lane, Myocum.

The purpose of this report is to assess the methodology, content and conclusions of the Traffic Impact assessment report prepared by Ardill Payne and Partners in November 2020. This can be briefly outlined as follows:

- The expected traffic generation to/from the proposed development.
- The impact of the proposed development on the road network.
- Intersection analysis based on traffic counts.

### 2 Proposed Development Site

### 2.1 Site Location

The site of the proposed development is described as Lot 8 DP 589795, known as 53 McAuleys Lane, Myocum. The site is on the southern side of McAuleys Lane and is located approx. 3.5km east of the Mullumbimby CBD. The location of the site is shown in Figure 2.1 below.



Figure 2.1: Site Location (NSW Land & Property Information)

### 2.2 Existing Development

The site is approximately 34.82ha in size and contains a dwelling house and associated improvements / structures and is largely cleared with a number of scattered small stands of bushland and paddock trees. The surrounding lands are mainly rural residential properties, largely cleared with scattered stands of bushland.

### 2.3 Existing Road Conditions

McAuleys Lane is a two-lane rural road, 3.8km in length, within the Byron Shire LGA that provides a local road connection between Mullumbimby Road and Myocum Road. In addition, McAuleys Lane provides access to and from rural residential properties along its length. Traffic counts conducted in 2016/2017 by Byron Shire Council indicate that McAuleys Lane carries approximately 633 vehicles per day with 5% of these being heavy vehicles.

#### 53 McAuleys Lane, Myocum

Mullumbimby Road is a regional road connecting Gulgan Road (old Pacific Highway) in the east, to Station Street, Mullumbimby. The road is generally an undivided two-lane two-way sealed rural road with 2 x 3.5 metre travel lanes and sealed shoulders 0.5-1.0 metre wide. Edge and centre lines are marked. The speed zoning is mainly 80km/h. Traffic counts conducted on Mullumbimby Road in 2016/2017 indicate a volume of 11,275 vehicles per day.

The Mullumbimby Road / McAuleys lane intersection consists of a basic right turn treatment with a left deceleration lane on Mullumbimby Road; McAuleys Lane has tapered flares to accommodate turning vehicles.

There are no advance warning signs for the McAuleys Lane intersection on Mullumbimby Road (westbound). There are also no 'Stop' or 'Give Way' signs, or a hold line, on McAuleys Lane.

Myocum Road is a local road providing a connection between the Pacific Motorway at the Byron Bay interchange and Coolamon Scenic Drive 2.6km south of Mullumbimby. The road is generally an undivided two-lane two-way sealed rural road with a 7 metre wide pavement and sealed shoulders 0.5-1.0 metre wide. Edge and centre lines are not marked. The speed zoning is mainly 80km/h.

The Myocum Road / McAuleys Lane intersection is a sub-standard rural T-junction. No pavement widening is provided in Myocum Road to facilitate right turns into McAuleys Lane, however, tapered flares are provided in McAuleys Lane to assist turning vehicles. Traffic counts conducted in 2016/2017 indicate a volume of 1,794 vehicles per day on Myocum Road. The posted speed limit is 80km/h.

### 2.4 Proposed Development

The proposed development is a rural residential subdivision consisting of:

- 35 x large residential lots;
- 6 x neighbourhood/community title lots; and
- 1 x association/community title lot

Access to the site will be from McAuleys Lane with a new internal road constructed approximately 600 metres from the Mullumbimby Road intersection.

### 3 Peer Review Findings

This section outlines the findings of the peer review in relation to the methodology, content and recommendations of the Traffic Impact Assessment prepared by Ardill Payne and Partners. This section also provides recommendations to address the identified deficiencies to enable a more comprehensive and accurate assessment of the proposed development. The section numbers provided below relate to the relevant sections within the Ardill Payne report.

#### 3.3.3 Existing Traffic Volumes and Conditions

This section has adopted the 2016/17 Byron Shire traffic counts as the base pre-development traffic volumes for Mullumbimby Road (11,275 vehicles per day) and McAuleys Lane (633 vehicles per day).

This section has also adopted an annual compound growth factor for traffic volumes of 2.5% per annum to calculate the adopted pre-development traffic volumes for 2020. (Over 3 years @ 2.5% per annum the growth factor is calculated to be 1.075).

Table 2 provides the adopted pre-development traffic volumes for Mullumbimby Road and McAuleys Lane. While it correctly shows the Mullumbimby Road 2020 volumes as 12,142 vehicles per day (11,275 x 1.075), it incorrectly shows the McAuleys Lane 2020 volumes at 633 (the 2016/2017 traffic count).

The 2020 volumes for McAuleys Lane should be 680 (633 x 1.075).

#### 4.1.1 Trip Generation

The trip generation rates have been correctly adopted from the RMS 'Technical Direction TDT 2013/04: Guide to Traffic Generating Developments, Updated Traffic Surveys'.

Development level	AADT	Peak Hour Vehicle Trips Volume	
Low Density Residential Dwellings	7.4 trips/dwelling	0.78 trips/dwelling	
Community Title Lots	7.4 trips/dwelling	0.78 trips/dwelling	

#### Table 3: Trip Generation Rates

These comparative daily and peak hour trip rates indicate that the peak hour trips equate to 10.5% of the daily trips. This factor is relevant to subsequent traffic volume calculations in the TIA report.

#### 4.2 Through Traffic

The traffic volumes at the 10-year horizon using a growth rate of 2.5% per year over a 10-year period have been calculated incorrectly, primarily due to the incorrect McAuleys Lane 2020 volume.

McAuleys Lane 2030 volume should be 850 vehicles per day instead of 810. Mullumbimby Road 2030 volume should be 15,178 vehicles per day instead of 15,543.

#### 4.3 Total Estimated Traffic

The existing and projected through traffic is combined with the additional site traffic for both the current year and 10-year development horizon for the determination of traffic flows in the following four cases:

- Case 1 Undeveloped traffic flow 2020
- Case 2 Developed traffic flow 2020
- Case 3 Undeveloped traffic flow 2030
- Case 4 Developed traffic flow 2030

The total traffic volumes adopted for the above scenarios for the should be updated as shown in the table below:

Road	Case 1	Case 2	Case 3	Case 4
McAuleys Lane	72	102	90	120
Mullumbimby Road	1,274	1304	1,594	1,624

Table 6: Peak Hour Total Traffic Volumes (2020 and 2030)

#### 5.2 Road Capacities and Level of Service

The updated traffic volume calculations do not impact on the existing or future levels of service for McAuleys Lane or Mullumbimby Road.

#### 5.3.1 Intersection Capacity

The updated traffic volume calculations do not impact on the existing or future levels of service for the Mullumbimby Road / McAuleys Lane intersection.

Council has raised concerns regarding the impact of the steep downhill grade in Mullumbimby Road on the level of service and average delay calculations in the Sidra modelling. The gradient of approach roads to an intersection is part of the input data for a Sidra model and the model considers these factors when processing the input data and calculating the average delays.

The Sidra Data file for the analysis of the operational performance of the Mullumbimby Road / McAuleys Lane intersection has been obtained from Ardill Payne and reviewed as part of this assessment. The input data includes gradients of 5% for the McAuleys Lane approach and the eastern approach on Mullumbimby Road. It is therefore confirmed that the assessment of the average delays and level of service for the existing and future scenarios at this intersection has included the impact of the approach grades.

Notwithstanding the above, approach grades at an unsignalized intersection will have only a minor impact, if any, on level of service and average delay. Approach grades are only significant at signalised intersections where vehicles are required to decelerate to stop on a red signal and accelerate from stop on a green signal.

#### 5.3.2 Turn Lane Warrants

The PM peak turning and through volumes used in assessing the warrant for turn lanes at the Mullumbimby Road / McAuleys Lane intersection are actually AM peak volumes. However, when using the actual PM volumes, the graph still indicates the need for a CHR type intersection.

#### 5.3.3 Intersection Sight Distances

Table 10, reproduced below, provides details of actual and required sight distances at the existing Mullumbimby Road / McAuleys Lane intersection and the proposed McAuleys Lane / New Internal Road intersection and comments that all intersections satisfy Austroads sight distance requirements.

#### **Table 10: Intersection Sight Distances**

Intersection	Sight Distance Actual (Left)	Sight Distance Actual (Right)	SISD Required	ASD Required	Intersection Suitability
McAuleys Lane / Mullumbimby Road	>200m	180m	*181m	114m	Compliant
New Internal Road / McAuleys Lane	120m	*90m	123m	73m	Generally compliant

However, the required Safe intersection Sight Distance (SISD) on Mullumbimby Road (westbound) from McAuleys Lane should be increased by 20 metres from 181 metres to 201 metres due to the downhill grade correction requirement specified in Table 3.4 in Austroads Guide to Road Design Part 4A. The actual sight distance to the right (180 metres) is therefore deficient by 21 metres as shown in the diagram below.



To address the substandard sight distance, the Ardill Payne report has recommended the installation of an advance warning sign ("Side Road Intersection") on Mullumbimby Road westbound for the McAuleys Lane intersection, however, more effective driver awareness would be achieved by installing an "Advance Road Name" sign (G1-207) near the crest of the hill on the southern side of Mullumbimby Road and a "Rural Road Name" sign (G3-5) on the northern side of Mullumbimby Road opposite McAuleys Lane. Examples of these signs are provided in Section 8 of the report.

It is also clear that the sight distance to the right from the proposed intersection of the New Internal Road and McAuleys Lane (90 metres) is deficient by 33 metres as the required SISD is 123 metres for a design speed of 60km/h. The sight distance in this direction is limited by the small radius curve in McAuleys Lane.

In addition, it appears that the actual sight distance to the left from this proposed intersection along McAuleys lane has been overestimated at 120 metres. The actual sight distance is approximately only 80 metres also due to the curved alignment of McAuleys Lane.

The actual and required sight distances are shown in the diagram below.



Consequently, the installation of intersection warning signs ("Side Road Intersection") in McAuleys Lane in both directions approaching this proposed intersection is recommended as a road safety treatment to raise the awareness of approaching drivers of the presence of the new intersection.

#### 6.1.1 Intersection Upgrade

It is proposed to upgrade Mullumbimby Road / McAuleys Lane intersection to cater for the increased traffic volumes from future traffic growth and the proposed development. The upgrade will also improve road safety at this intersection. The concept plan for the intersection upgrade extracted from the Ardill Payne report is provided at **Appendix A**.

The proposed intersection upgrade retains the existing left deceleration/turn lane (westbound) in Mullumbimby Road, and adds a channelised right turn lane and acceleration lane (eastbound). The Sidra modelling confirms that the upgraded intersection will operate at a satisfactory level of service for the future traffic, post-development conditions.

Council has raised concern about the impact of the steep grade in Mullumbimby Road on the lengths of auxiliary lanes, particularly, the length of the proposed acceleration / merge lane for right turns onto Mullumbimby Road.

Austroads Guide to Road design Part 4A provides guidance on the required lengths of acceleration lanes for various deign speeds as well as corrections for grade. In this regard the length of an acceleration lane for a design speed of 80km/h is 235 metres when vehicles are required to accelerate from a stop position. For uphill grades of 5% to 6% this length should be increased by a factor of 1.5 which equates to a length of 350 metres, including merge taper.

The length of the proposed acceleration / merge lane is 210 metres which is well short of the Austroads requirement. However, the limiting factor is the location of The Saddle Road intersection that effectively prevents the provision of a longer acceleration lane.

The reduced acceleration lane length will impact on the ability of vehicles turning right from McAuleys Lane to accelerate to the desired merge speed of 80km/h, however, any impact on eastbound through traffic in Mullumbimby Road will be minor as the merging vehicles are required to merge into the through traffic flow with safety in accordance with the NSW Road Rules. Consequently, any delays associated with this merge manoeuvre is expected to be primarily impact on the right turning vehicles from McAuleys Lane.

All of these factors (acceleration length, grade, traffic volumes) have been included as inputs to the Sidra model, therefore, the results in the Sidra output reports provide an accurate representation of the delays expected at the intersection for the existing and post-development scenarios.

#### 8 Recommendations

The recommendations listed in this section of the Ardill Payne report are considered to be adequate and appropriate to cater for the increased traffic volumes that will be generated by the proposed development and to increase road safety at the Mullumbimby Road / McAuleys Lane intersection and the section of McAuleys Lane from Mullumbimby Road to the new subdivision access.

The only additional recommendation is to upgrade the intersection warning signage on Mullumbimby Road to include "Advance Road Name" signs (G1-207) on each approach to McAuleys Lane and to include "Rural Road Name" signs (G3-5) on the northern side of Mullumbimby Road opposite the McAuleys Lane intersection. Examples of these signs are provided below.

These signs will provide enhanced advance warning and intersection identification for drivers and assist in mitigating the impacts of the reduced sight distance (westbound) and acceleration length (eastbound).



Advance Road Name (G1-207)



### 4 Intersection Upgrade Costs

The cost of upgrading the Mullumbimby Road / McAuleys Lane intersection will be at full cost to the developer of the proposed residential subdivision at 53 McAuleys Lane, to be paid through developer contributions.

A concept plan for the intersection upgrade included in the Ardill Payne TIA report indicates that the upgrade works can be implemented within the extent of the existing pavement in Mullumbimby Road, consisting of additional line marking to provide a channelised intersection (Austroads type CHR). The concept design will need to be confirmed by detailed survey and design and there is a possibility that shoulder widening may be required along the northern side of Mullumbimby Road to provide sufficient pavement width for the required extent of the works.

Indicative costs for the intersection upgrade have therefore been provided for the following two scenarios:

- Line marking and signposting only; and
- Pavement widening, line marking and signposting.

#### Line Marking and Signposting

Line marking has been costed at a rate of \$1 per metre, plus chevrons and pavement arrows. In addition, a minimum fee of \$2,500 has been estimated for the line marking crew and machinery to be on site. Additional costs will be incurred if the line marking is required to be conducted at night. Approximate line marking costs are expected to range from \$5,000 to \$8,000.

The supply and installation of signs is based on 2 x "Advance Road Name" signs (G1-207) plus 2 x "Rural Road Name" signs (G3-5). Approximate cost = \$3,000.

Total cost for line marking and signposting is expected to range from \$8,000 to \$11,000.

#### Pavement widening, line marking and signposting

The cost of pavement widening has been based on extending the existing pavement by 1.5 metres along the length of the work (375 metres) at a rate of \$250 per lineal metre. This equates to a cost of \$140,000.

The total cost, including line marking and signposting, would be in the range of \$148,000 to \$151,000.

As stated above, these are indicative costs only based on the intersection upgrade concept plan provided in the Ardill Payne TIA report and should be used for initial planning purposes only. The actual extent of the work involved and therefore the cost of the work will need to be confirmed by engineering survey and detailed design.

If insufficient funds are available through Council's Developer Contributions Plan, it is recommended that further funding should be acquired through the development and implementation of a Voluntary Planning Agreement.

Appendix A Concept Intersection Layout



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Issue	Date					Desc	ription	

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