Ardill Payne & PARTNERS

ENGINEERS PLANNERS SURVEYORS ENVIRONMENTAL PROJECT MANAGEMENT

ROAD SAFETY AUDIT

EXISTING ROAD
Wilsons Creek Road / Alidenes Road Intersection
at Wilsons Creek

for:
St Saviour Investment Pty Ltd

August 2018

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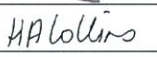
		H. Collins			
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1. Project Information

1.1 Introduction

St Saviour Investment Pty Ltd (Client) has engaged Ardill Payne & Partners (APP) to undertake a Road Safety Audit (RSA) of the Wilsons Creek Road/Alidenes Road intersection at Wilsons Creek. The requirement for a RSA is as a result of a request from Byron Shire Council for a 'functionality assessment' of the intersection.

The intersection is located approx. 5.3km south-west of Mullumbimby (GPS co-ordinates 28.5699 S, 153.4577 E).

The site location is shown in **Figure 1**.

Figure 1: Site Location

1.2 Description of the Site

Wilsons Creek Road is a two-way bitumen sealed rural road, sealed width approx. 6-7m. The road begins at its junction with Coolamon Scenic Drive, and continues west approx. 3.0km to the site. A school bus service operates past the site. The road gradient is relatively level through the intersection.

Travelling west, Alidenes Road intersects from the right. Alidenes Road is a two-way bitumen sealed rural road, sealed width approx. 5-6m. There is minor widening of the bitumen at the intersection. The road continues west approx. 1.2km to a dead end. The road grades down from the intersection over a short length before levelling out.

Both roads have 'Open Speed Limit – Drive to Conditions' signs. Local conditions would likely dictate the operating speed on sections of the road.

The existing site layout (aerial photo) is shown in **Figure 2**. Photographs of the site and approaches are provided in **Attachment 1**.

Figure 2: Site Layout

Key physical and observed features of the intersection are:

- The intersection has no line marking and minimal signage.
- Alidenes Road intersects with Wilsons Creek Road on the outside of a curve, and at an acute angle.
- There is a large gravel shoulder area on the north-east side of the intersection.
- Almost all Alidenes Road traffic approaches from and departs to the east.
- Site observations during the RSA indicate that drivers entering and leaving Alidenes Road tend to "cut the corner" across the gravel shoulder area.
- The large gravel shoulder area on the north-east side of the intersection is used to park vehicles during pick-up and set-down. During the afternoon RSA observations, a school bus used this area to set-down school children.
- On Wilsons Creek Road, approach sight distance from the west is good, but intersection definition is poor. Approach sight distance from the east is poor.
- For a vehicle exiting Alidenes Road in a safe manner, sight distance to the west is good but the angle of vision is difficult. Sight distance to the east is poor, but very few vehicles turn right out of Alidenes Road.

1.3 Information Provided by the Client

The client has provided the following traffic count information:

- Wilsons Creek Road east of the intersection – 2018 count – 1502vpd – 3.9% HV
- Wilsons Creek Road west of the intersection – 2018 count – 1162vpd – 4.8% HV
- Alidenes Road – 2018 count – 359vpd – 2.8% HV

No crashes recorded at the intersection in the last 5 years

(Note that the traffic volume and crash data was provided after the site inspection, and was not reviewed until after the audit findings were documented).

1.4 Audit Scope and Objective

This Existing Road Audit of the intersection has been undertaken in accordance with the prescribed methods in the Austroads '*Guide to Road Safety Part 6: Road Safety Audit*' (2009), with consideration of the NSW RMS '*Guidelines for Road Safety Audit Practices*' (2011).

This report is for the RSA of the Wilsons Creek Road/Alidenes Road intersection at Wilsons Creek. The scope of the RSA is limited to an assessment of the existing intersection and approaches from the perspective of all road users, from all approaches, during day and night conditions.

The objective of this RSA is to identify any potential road safety issues/deficiencies associated with the existing arrangement from the perspective of all road users that may need to be investigated and rectified. Positive aspects of the design have not been recorded.

Deficiencies raised will be described and given a risk rating.

This RSA is not a design check, although some design issues may be raised during the audit process. APP does not take responsibility for any suggested design changes made in this report.

According to the RMS Guide, no recommendations are to be included in the RSA report. However, the Austroads Guide does permit the inclusion of recommendations (not solutions) if requested by the Client. No recommendations will be included in this report.

1.5 Audit Team

Lead Auditor – Tony Cromack

- Civil Engineer with 30 years' experience in urban and rural road design
- Completed Bachelor of Technology (Engineering) through University of Southern Queensland (1999)
- Technologist Member – Engineers Australia
- Member – Institute of Public Works Engineering Australasia (IPWEA)
- NSW RMS accreditation to Prepare Work Zone Traffic Management Plans

- Completed Road Safety Audit Course through IPWEA (2014)
- Completed Lead Road Safety Audit Course through IPWEA (2017)
- Registered Level 3 Road Safety Auditor (NSW) – Auditor # RSA-02-0414

Auditor – Hayley Collins

- Design Officer at Lismore City Council, with 11 years' experience in urban and rural road design (Richmond Valley Council and Lismore City Council)
- Certificate IV in Surveying – Brisbane North Institute of TAFE (2011)
- Diploma Civil Construction Design – TAFE NSW Riverina Institute – Leeton Campus (2013)
- Prepare a Work Zone Traffic Management Plan (2017)
- Implement Traffic Control Plans – RMS (2016)
- Designing for Pedestrians and Bicycle Riders – RMS (2016)
- Conduct Road Safety Audits (RSACRS002A) – IPWEA (2017)
- Registered Level 1 Road Safety Auditor (NSW) – Auditor # RSA-02-1277

In addition, the following person joined the audit team as an observer, for training purposes:

Trainee Auditor– Peter Brouwer

- Senior Civil Designer at Ardill Payne & Partners, with over 30 years' experience in urban and rural road design
- Associate Diploma in Surveying – Queensland Institute of Technology (1985)
- Autocad Drafting Certificate – TAFE (1999)
- Completed Road Safety Audit Course through IPWEA (2018.)

2. Road Safety Audit Program

2.1 Commencement Meeting

A pre-commencement meeting was held via teleconference between Tony Cromack (APP) and Evette Jiang (Client representative) on 28 August 2018.

In summary, the pre-commencement meeting discussed the following:

- Mr. Cromack explained to the Client the difference between a Road Safety Audit and a Traffic Impact Assessment.
- Mr. Cromack explained the audit process, reiterating that the audit is not a design check. It is the audit teams task to identify and document safety issues, and the Client's task to respond and act on those issues
- There are no existing or previous road safety audits or reports for the site
- There are no known environmental effects (fog, drainage, etc.) that will not be evident during the inspection
- No recommendations will be included in the report.

2.2 Field Audit

The field audit was carried out by the audit team on Tuesday 28 August 2018. The day time audit took place between 4:00 and 4:45pm, and the night time audit between 6:30 and 7:00pm. The team drove through the site in each direction and filmed the drive from the dashboard of the vehicle.

The weather on the day was clear and sunny. There had been some rain in the previous 48 hours prior to the audit, however the road surface was dry.

2.3 Completion Meeting

A completion meeting generally involves the auditor and the client, and is an opportunity for clarification of aspects of the audit. A completion meeting has not been held at the time of preparing this report.

3. Risk Level Determination

Deficiencies raised in relation to the audit site have been given a risk level based on the associated safety priority, as categorised using **Table 1** to **Table 4** (from Austroads '*Guide to Road Safety Part 6: Road Safety Audit*' (2009)).

Table 1 - Frequency

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five to ten years
Improbable	Less often than once every ten years

Table 2 - Severity

Severity	Description
Catastrophic	Likely multiple deaths, for example: ▪ High-speed multi-vehicle crash ▪ Car runs into crowded bus stop ▪ Bridge collapse
Serious	Likely death or serious injury, for example: ▪ High/medium speed two-vehicle collision ▪ High/medium speed single-vehicle collision with fixed roadside object ▪ Pedestrian/cyclist struck at speed
Minor	Likely minor injury, for example: ▪ Low speed vehicle collision ▪ Cyclist falls from bike at low speed ▪ Rear-end collision
Limited	Likely trivial injury or property damage only, for example: ▪ Low speed vehicle collisions ▪ Car reverses into a post ▪ Pedestrian walks into object (no head injury)

Table 3 - Risk

Severity	Frequency			
	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

Table 4 - Treatment

Risk	Suggested Treatment Approach
Intolerable	Must be corrected
High	Should be corrected or the risk significantly reduced, even if the treatment cost is high.
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high.
Low	Should be corrected or the risk reduced, if the treatment cost is low.

4. Findings

The audit findings are listed in **Table 5**. Audit findings are a listing of identified safety deficiencies: what is potentially dangerous about the road or what could lead to crashes occurring or injury resulting.

Table 5 – Audit Findings

Number	Description	Risk Rating
01	**No advance warning signs in approaches** There are no advance warning signs *('Side Road Intersection on a Curve - Outside'* or similar) in any of the approaches to the intersection. Approaching vehicles may not have sufficient advance warning of the intersection. There is a risk that through traffic could collide with vehicles turning into or out of the intersection, or enter the intersection too fast and lose control, colliding with oncoming traffic and/or a roadside hazard.	Frequency: Occasional Severity: Serious Risk: High
02	**No advanced warning of curve** There are no advance warning signs, advisory speed signs, or CAM's for the curve at the intersection. Approaching vehicles may not have sufficient advance warning of the curve. There is a risk that a driver could misjudge the road alignment or travel too fast and lose control, colliding with oncoming traffic and/or a roadside hazard.	Frequency: Occasional Severity: Serious Risk: High
03	**No line marking or guide posts in intersection** There is no centre or edge line marking and no guide posts in the intersection. The lack of line marking and guide posts leads to poor delineation through the intersection. There is a risk that vehicles could stray to the incorrect side of the road whilst negotiating the bend or slowing to turn, and collide with oncoming or turning traffic. Refer to Photo No. 1.	Frequency: Occasional Severity: Serious Risk: High

04	**Street name sign missing** The finger blade street name sign is missing. Approaching vehicles wishing to turn may not have sufficient advance warning of the street name. There is a risk that vehicles could brake suddenly, causing a rear end collision, or lose control and collide with oncoming traffic. Refer to Photo No. 2.	Frequency: Improbable Severity: Minor Risk: Low
05	**Lack of sign control at intersection** There are no 'Give Way' or 'Stop' sign controls at the intersection. An approaching driver will not be clearly informed as to the intersection priorities or layout. At the time of inspection, it was observed that some drivers entering or leaving Alidenes Road did not slow down. There is a risk that an approaching vehicle would not give way or stop, and collide with another vehicle.	Frequency: Occasional Severity: Serious Risk: High
06	**Location of end of road hazard marker** The bi-directional hazard marker opposite the intersection is poorly situated. Due to the angle of approach, the hazard marker appears to be offset to the right. At the time of the inspection, the sign was also obscured by signage on the northern side of the road. An approaching driver will not be clearly informed as to the intersection layout. There is a risk that vehicles could brake suddenly and lose control and collide with another vehicle. Refer to Photo No. 3.	Frequency: Improbable Severity: Serious Risk: Medium
07	**Alidenes Road – intersection alignment** Alidenes Road intersects with Wilsons Creek Road at an acute angle. The first 30-40m is a steep grade on a curve. This makes it difficult for drivers to look west and check the line of sight. Drivers wishing to turn left into Alidenes Road would find it very difficult due to the alignment (particularly heavy vehicles). Drivers turning into or out of Alidenes Road tend to "cut the corner", thereby increasing the risk of an accident. Drivers approaching along Alidenes Road could be confused as to the road alignment. There is a risk that turning vehicles could cross into the wrong lane or lose control, and collide with another vehicle and/or a roadside hazard. Refer to Photo Nos. 4, 5 and 11(night).	Frequency: Occasional Severity: Serious Risk: High

08	**Gravel on road** There is a large gravel area on the north-east corner of the intersection. Drivers turning into or out of Alidenes Road tend to "cut the corner" (across the gravel area). As a result, there is loose gravel in the through lanes, and on the outside of the bend. There is a risk that vehicles could lose control in the loose gravel, and collide with another vehicle and/or a roadside hazard. Refer to Photo Nos. 6 and 7.	Frequency: Occasional Severity: Serious Risk: High
09	**Sight distance from the east on Wilsons Creek Road** Approach sight distance from the east is sub-standard. Approaching drivers cannot see approaching traffic from the west until they are in the intersection. The Alidenes Road intersection (and Alidenes Road itself) is also not clearly visible in the approach. There is a risk that vehicles could collide with vehicles turning into or out of the intersection, or enter the intersection too fast and lose control, colliding with oncoming traffic and/or a roadside hazard. Refer to Photo No. 4 and 12 (night).	Frequency: Occasional Severity: Serious Risk: High
10	**Sight distance to the east from Alidenes Road** Sight distance to the east from Alidenes Road is sub-standard. Vehicles turning right from Alidenes Road would not have sufficient warning of an approaching vehicle from the left. There is a risk that vehicles turning right from Alidenes Road could collide with through traffic. Refer to Photo No. 7.	Frequency: Improbable Severity: Serious Risk: Medium
11	**Power pole near intersection** There is a power pole located on the north-west corner of the intersection. The pole is located outside the clear zone, however given the bend in the road, the intersection alignment, and the loose gravel present, the likelihood of a collision is increased. There is a risk that if a vehicle approaching from the east were to lose control it could leave the road and collide with the power pole. Refer to Photo No. 8.	Frequency: Improbable Severity: Serious Risk: Medium

12	**Condition of road surface** The existing bitumen surface on Alidenes Road at the intersection is in poor condition, with some potholes, patches and broken edges. There is a risk that vehicles could lose control due to the road surface condition, and collide with another vehicle and/or a roadside hazard. Refer to Photo No. 9.	Frequency: Improbable Severity: Minor Risk: Low
13	**Bus drop-off location** During the site audit, a school bus was observed dropping off passengers in the gravel area on the north-east corner of the intersection. The bus approached from the east, crossed Wilsons Creek Road, and stopped. Passengers alighted from the left of the bus towards Wilsons Creek Road. The bus then continued west. The bus manoeuvres and the passengers alighting towards the roadway are both considered unsafe. There is a risk that the bus could collide with through or turning traffic, or an alighting passenger could be impacted by a vehicle. Refer to Photo No. 7.	Frequency: Improbable Severity: Serious Risk: Medium
14	**Setting sun** The setting sun reduces visibility of the intersection in the afternoon. An approaching driver may be blinded by the sun and not see the intersection or turning vehicles. There is a risk that vehicles could stray into the wrong lane and collide with an oncoming or turning vehicle. Refer to Photo No. 10	Frequency: Improbable Severity: Serious Risk: Medium

5. Concluding Statement

We, the audit team, declare that we are independent of the project and have appropriate experience and training.

The audit has been carried out for the sole purpose of identifying any features of the intersection and approaches which could compromise road safety at the site. The identified issues have been noted in this report in **Table 5**.

It should be noted that while every effort has been made to identify potential safety hazards, there is no guarantee that every deficiency has been identified.

No 'intolerable' risks were identified during the audit. As per **Table 4**, risks with a 'high' ranking '*should be corrected or the risk significantly reduced, even if the treatment cost is high*'. Risks with a 'medium' ranking '*should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high.*'

It is recommended that audit findings be investigated with satisfactory corrective actions identified and implemented.

10/9/2018

Tony Cromack
AUDIT TEAM LEADER
LEVEL 3 AUDITOR # RSA-02-0414

10/9/2018

Hayley Collins
AUDIT TEAM MEMBER
LEVEL 1 AUDITOR # RSA-02-1277

10/9/2018

Peter Brouwer
AUDIT TEAM MEMBER (TRAINEE)

Attachments

Attachment 1 Site Photographs (taken 28/8/2018)

ATTACHMENT 1

Attachment 1: Site Photographs
(taken 28/8/2018)

Photo No. 1: Lack of line marking and signage

Photo No. 2: Missing street name sign

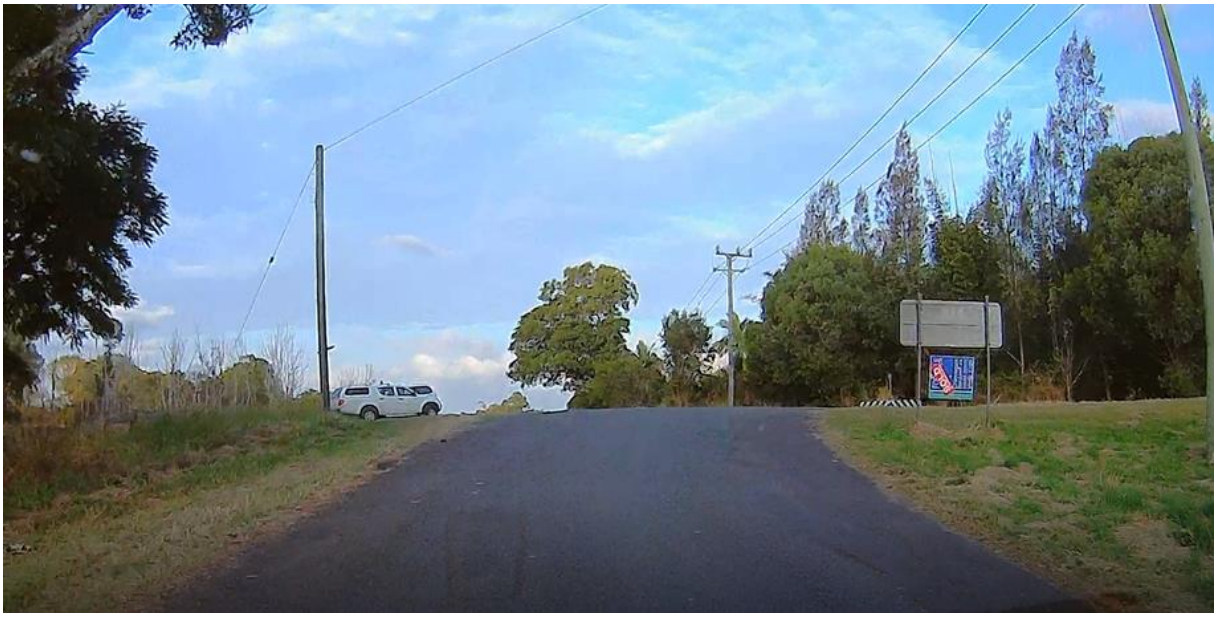

Photo No. 3: Lack of 'Give Way' and/or 'Stop' signs and markings; poorly located hazard marker sign

Photo No. 4: Poor intersection alignment – approach from east. Note the sub-standard sight distance.

(Photo from Google Street View)

Photo No. 5: Poor intersection alignment – approach from Alidenes Road. Intersection is offset to the right of the photo behind the power poles

Photo No. 6: Loose gravel on road

Photo No. 7: Sub-standard sight distance to the east.
Note the large gravel area to the left of the photo

Photo No. 8: Power pole near intersection (middle of photo)
(Photo from Google Street View)

Photo No. 9: Condition of road surface

Photo No. 10: Setting sun

Photo 11: Alidene Road at intersection – night approach – low beam

Photo 12: Eastern approach to intersection – night time – high beam.
Note lack of definition of intersection
(intersection just beyond parked cars)