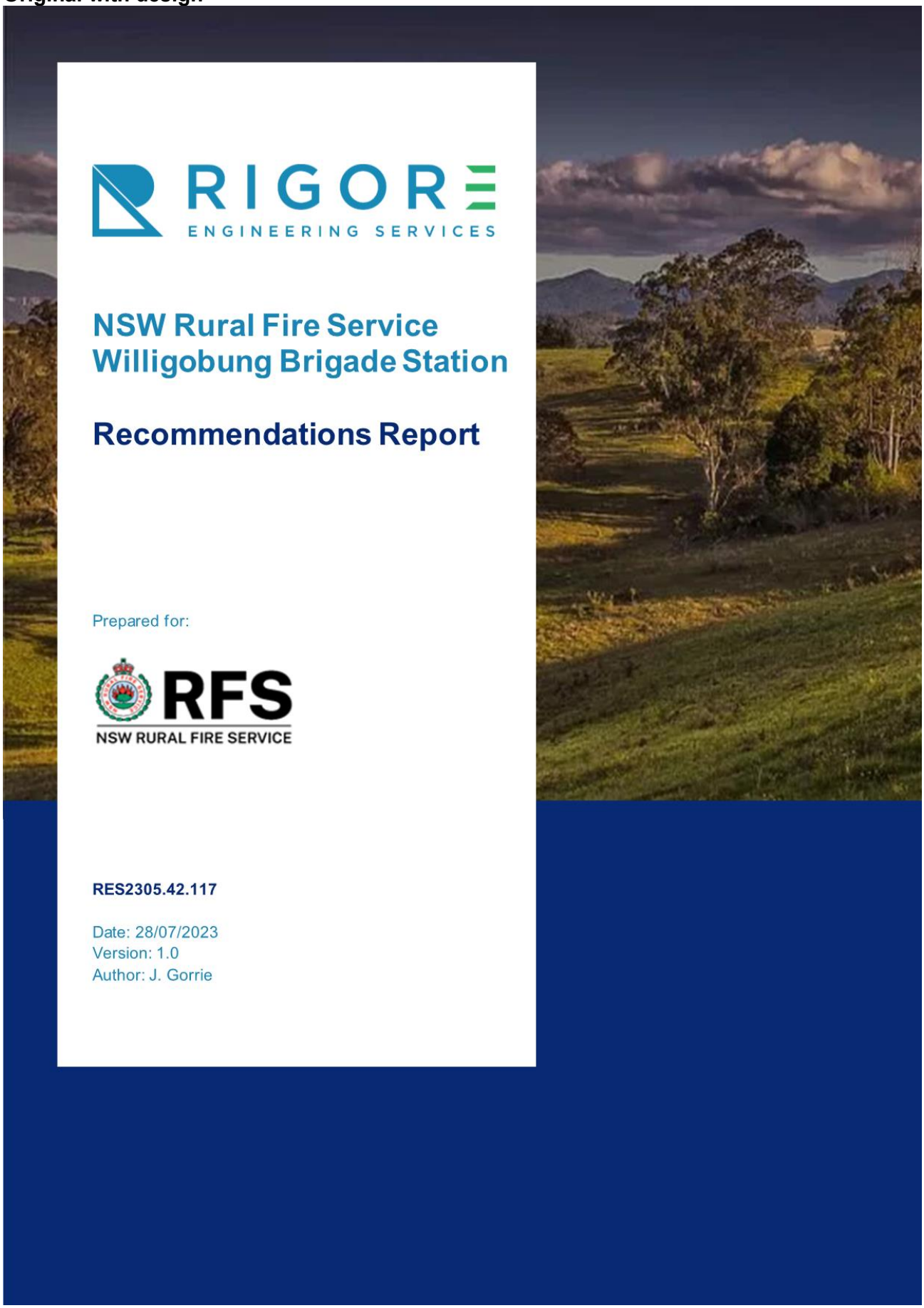
## 11.6 WILLIGOBUNG FIRE SHED - ATTACHMENTS

Attachment Titles:

1. RES2305.42.117 Willigobung Brigade Station Access - Recommendations FINAL Original with design
2. RES2405.42.168 Existing Willigobung Brigade Station - Audit Safety Audit FINAL
3. RES2405.42.168 Alternate Willigobung Brigade Station - Road Safety Audit FINAL
4. Draft Heads of Agreement for the Willigobung Shed on Batlow Road

**Attachment 1 - RES2305.42.117 Willigobung Brigade Station Access - Recommendations FINAL Original with design**



# Document Quality Information

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| Date | Version | Author | Change Reference |
|---|---|---|---|
| 28/07/2023 | 0.1 | J. Gorrie | First release for submission to NSW Rural Fire Service |

# Contents

# 1. Audit Response Statement

| | |
|---|---|
| **Project Name:** | Willigobung Brigade Station - Recommendations |
| **Client:** | NSW Rural Fire Service |
| **Client Representative:** | Jon Gregory – District Manager, Riverina Highlands |
| **Contact Details:** | Phone: 0419 460 880<br>Email: jon.gregory@rfs.nsw.gov.au |
| **Auditors:** | James Gorrie (RSA-02-0732 - Level 3) – Lead Road Safety Auditor<br>Zach Walgers (RSA-02-1502 - Level 2) – Road Safety Auditor |
| **Audit Details:** | RES2305.42.117 Willigobung Brigade Station Access – Road Safety Audits, dated 13/07/2023. |

We, the undersigned, declare that we have reviewed the material and data listed in the Willigobung Brigade Station Access – Road Safety Audit Report (Existing Road) and developed a list of treatments for the identified risks to road safety listed in Section 4. The responses are given to explain the proposed approach to addressing the identified items that have been highlighted.

It should be noted that while every effort has been made to identify appropriate treatments to the potential safety problems, no guarantee can be made that every problem or deficiency has been eliminated, however every effort has been made to significantly reduce the risk of fatal or serious injury (FSI) crashes.

It is recommended that identified treatments be implemented to address the risks to road safety as soon as practicable.

James Gorrie
Lead Road Safety Auditor (RSA-02-0732 - Level 3) Date: 28/07/2023

Zach Walgers
Road Safety Auditor (RSA-02-1502-Level 2) Date: 28/07/2023

# 2. Introduction

Rigore Engineering Services has been engaged by NSW Rural Fire Service representative Jon Gregory, District Manager – Riverina Highlands, to provide recommendations to address the findings of the recently completed Road Safety Audit on the existing conditions of the access to the Willigobung Brigade Station access on Batlow/Tumbarumba Road.

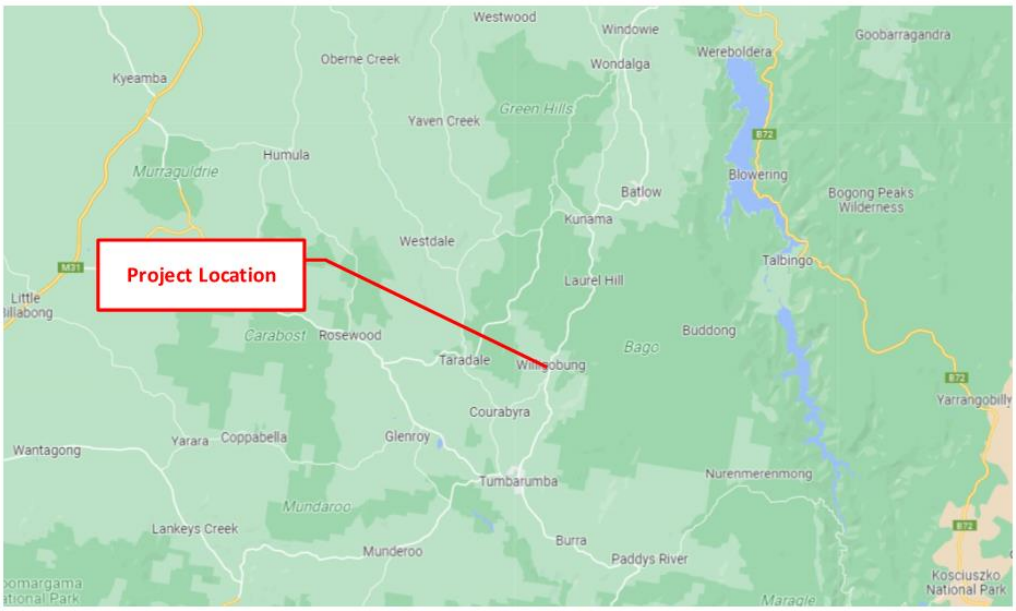



*Figure 1 - Locality Plan*

## 2.1. Project Description

Rigore representative, James Gorrie, Managing Director has been made aware that Brigade volunteer members have experienced several near miss incidents at this site and have deemed the site to be unsafe to operate from. Currently, a "Category 1" fire appliance as well as volunteer members in private vehicles regularly enter and exit Batlow Rd from this location.

Additionally, it is our understanding that some roadside clearing and minor shaping at the entry have also been undertaken recently and that some funding is available for improvements before the end of the financial year.

### 2.1.1. Project Team

**James Gorrie**

| | |
|---|---|
| Position: | Managing Director \| Lead Road Safety Auditor |
| Experience: | 17+ years |
| Education: | Master of Engineering \| Bachelor of Engineering Tech |
| Qualifications: | MIEAust CPEng NER APEC Engineer |
| Accreditations: | Level 3 Lead Road Safety Auditor NSW (RSA-02-0732) |

**Zach Walgers**

| | |
|---|---|
| Position: | Lead Civil Design Engineer \| Road Safety Auditor |
| Experience: | 7+ years |
| Education: | Associate Degree in Engineering (Civil) |
| Qualifications: | MIEAust |
| Accreditations: | Level 2 Lead Road Safety Auditor NSW (RSA-02-1502 - Level 2) |

### 2.1.2. Site Inspections

A day and night site inspection was undertaken by James Gorrie (Lead Road Safety Auditor) and Zach Walgers (Road Safety Auditor) on Wednesday 14th June 2023 between 3:30pm and 5:30pm, the weather was cold, overcast with light intermittent rain for the duration of the inspection. This enabled the project team to review the audit report in the context of the existing road environment, road user make-up and surrounding land use. The inspection involved measuring features, identifying opportunities for short and medium and long term actions to address the identified road safety deficiencies.

### 2.1.3. Client Workshop

The Client Workshop was undertaken immediately following the Completion Meeting held via MS Team Meeting on Thursday 13th July 2023 between 11:30am and 12:30pm. In attendance were James Gorrie (Lead Road Safety Auditor), Jon Gregory, Marc Donnelly, Carla Elliott and Peter Jones (NSW RFS representatives). The proposed recommendaitons were discussed in detail with a staged approach to implementing the recommendations being the preferred approach of the NSW RFS representatives.

# 3. Risk Assessment Framework

The Austroads system of risk assessment has been applied to issues identified in the audit with the relative characteristics as follows:

**Table 3.1: How often is the problem likely to lead to a crash?**

| Likelihood | Description |
|---|---|
| Almost certain | Occurrence once per quarter |
| Likely | Occurrence once per quarter to once per year |
| Possible | Occurrence once per year to once every three years |
| Unlikely | Occurrence once every three years to once every seven years |
| Rare | Occurrence less than once every seven years. |

**Table 3.2: What is the likely severity of the resulting crash type?**

| Severity | Description | Examples |
|---|---|---|
| Insignificant | Property damage | Some low speed collisions<br>Pedestrian walks into object (no head injury)<br>Car reverses into post |
| Minor | Minor first aid | Low speed collisions<br>Pedestrian walks into object (minor head injury)<br>Cyclists fall from bicycle at low speed |
| Moderate | Major first aid and/or presents to hospital (not admitted) | Some low to medium -speed collisions<br>Cyclists fall from bicycle at moderate speed<br>Left-turn rear-end crash in a slip lane |
| Serious | Admitted to hospital | High or medium -speed vehicle / vehicle collision<br>High or medium -speed single vehicle collision with fixed road side object<br>Pedestrian struck at high speed |
| Fatal | At scene or within 30 days of the crash. | High speed multi vehicle crash on Freeway.<br>Car runs into crowded bus stop.<br>Bus and petrol tanker collide<br>Collapse of bridge or tunnel |

**Table 3.3: The resulting level of risk**

| | | | Severity* | | | | |
|---|---|---|---|---|---|---|---|
| | | | Insignificant | Minor | Moderate | Serious | Fatal |
| | | | Property Damage | Minor first aid | Major first aid and/or presents to hospital (not admitted) | Admitted to hospital | Death within 30 days of the crash |
| Likelihood (includes exposure) | Almost Certain | One Per Quarter | Medium | High | High | Extreme (FSI) | Extreme (FSI) |
| | Likely | Quarter to 1-year | Medium | Medium | High | Extreme (FSI) | Extreme (FSI) |
| | Possible | 1 to 3 years | Low | Medium | High | High (FSI) | Extreme (FSI) |
| | Unlikely | 3 to 7 years | Negligible | Low | Medium | High (FSI) | Extreme (FSI) |
| | Rare | 7 years + | Negligible | Negligible | Low | Medium (FSI) | High (FSI) |

Safe System Crash Outcome Threshold

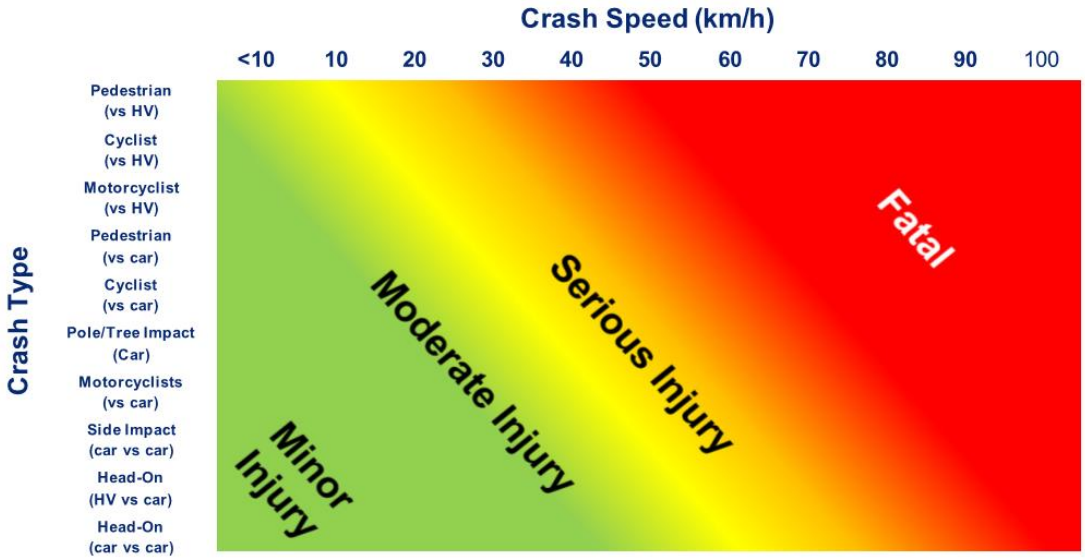
The treatment that Austroads recommend for the above levels of risk is shown in Table 3.4.

**Table 3.4: Treatment approach**

| Risk | Treatment |
|---|---|
| Extreme | Must be corrected regardless of cost |
| 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 even if the treatment cost is moderate, but not high |
| Low | Should be corrected or the risk significantly reduced if the treatment cost is low |
| Negligible | No action required |

The risk matrix above shown in *Table 3.3*, is aligned to Safe System principles and has been designed to be used with consideration of a severity guidance sheet which was developed by the Project Working Group. The PWG comprising of representatives from state and local road agencies was established with the primary objective of consolidating and updating the previously issued Parts 6 and 6A (Austroads 2019).

**Table 3.5: The severity guidance sheet – to be used with the risk matrix**



# 4. Audit Results

The results of the audit observations and findings have been reported in two categories:

4.1 General Observations
4.2 Identified Risks

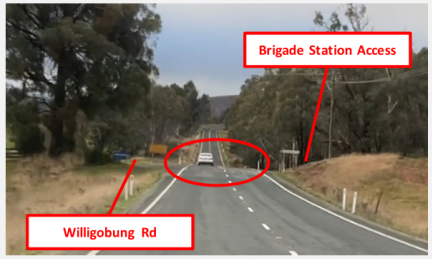
The audit findings, suggested treatments, and client responses are listed in Table 4.1 and Table 4.2, together with the risk ranking, as determined using the risk assessment tables in Section 3.

The project team have provided draft client response / comments on behalf of the client, however, it is ultimately at the client's discretion as to which treatments be adopted or implemented based on the available capital and operational funding capacity.

## 4.1 General Observations

| ID | General Observations | Photos / Reference | Recommended Actions |
|---|---|---|---|
| GO-1 | The transition of yellow to white pavement marking occurs approximately 10m south of the Willigobung Road intersection. The linemarking colour transition indicates a likely area for snow and ice. Consideration should be given to relocating the transition to the higher elevation further up the hill, approximately 350m south of the intersection. |  *Looking south on Batlow Road* | **SHORTER TERM / LOWER COST**<br>- Liase with TfNSW and Snowy Valleys Council to investigate the warrants of Australian Standards 1742, TfNSW Delination Manual and other relevant standards and guidelines to determine the most appropriate location for the Snow & Ice Area transition.<br>**LONGER TERM / HIGHER COST**<br>- Implimentation a conforming Snow & Ice Area signage and linemarking scheme. |
| GO-2 | At the time of inspection, dense roadside vegetation was observed along both sides of Batlow Road. This vegetation will require regular maintenance to ensure unrestricted sight lines to/from the Willigobung Brigade Station access. |  *Looking south on Batlow Road*<br>  *Looking north on Batlow Road from brigade access.* | **SHORTER TERM / LOWER COST**<br>- Liase with TfNSW and Snowy Valleys Council regarding the establishment of hazard free zones and sight line envelopes as indicated by *Attachment A – Stage 1: Shorter Term / Lower Cost Layout.*<br>**LONGER TERM / HIGHER COST**<br>- Liase with TfNSW and Snowy Valleys Council regarding regular and ongoing maintenance of roadside vegetation to ensure that established hazard free zones and sight line envelopes are retained as per as indicated by *Attachment A – Stage 1: Shorter Term / Lower Cost Layout.* |

## 4.2. Identified Risks

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level | Recommended Actions | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|---|---|---|---|
| ID-1 | Batlow Road Sight Restriction |  *Looking south on Batlow Road towards the intersection/access.*<br>  *Looking north on Batlow Road towards the intersection/access.* | The crest on Batlow Road north of the intersection with Willigobung Road restricts Approach Sight Distance (ASD) and Stopping Sight Distance (SSD) when travelling south on Batlow Road.<br><br>This may result in high-speed intersection crash types involving road users travelling southbound on Batlow Road and those entering/exiting Willigobung Road and/or the Willigobung Brigade Station access. The likely travel speeds and impact angles may result in a high energy transfer at impact causing serious harm to occupants.<br><br>NOTES:<br>- Should road users travel at excessive speeds it will further reduce the time available for drivers to react and brake.<br>- This hazard will be exacerbated during adverse weather and at night time. | Unlikely | Serious | H (FSI) | **SHORTER TERM / LOWER COST**<br><br>Impliment the recommended actions as shown by *Attachment A – Stage 1: Shorter Term / Lower Cost Layout:*<br><br>- Provide barrier linemarking through the intersection to prevent overtaking within the intersection.<br><br>- Provide additional visual qeues (signage, guide posts and intersection linemarking) for the approaching/trailing road users that vehicles are to expected to be turning into or out of the Willigobung Brigaade Station access (as well as Willigobung Road).<br><br>- Provide a clear sightline envelope free of obstructions to ensure intervisibility between approaching vehicles on the through road and the entering vehicles from the Willigobung Brigade Station access.<br><br>- Provide active signage signage to alert approaching road users that vehicles are to expected to entering the through road from the Willigobung Brigade Station access.<br><br>*NOTE: due to the nature of this access, greater consideration is needed. Particularly usage during a high pressure emergency scenario.* | **RESIDUAL RISK**<br><br>**Unlikely** | **Moderate** | **M** |
| | | | | | | | **LONGER TERM / HIGHER COST**<br><br>Impliment the recommended actions as shown by *Attachment A – Stage 2: Longer Term / Higher Cost Layout:*<br><br>- Provide an all weather access to the Wilibobung Brigade Stations by realigning the access and installing a storm water culvert.<br><br>- Provide a basic right turn tratement (BAR) to assit trailing road users to pass a right turning vehicle into the Willibobung Brigade Stations access. | **RESIDUAL RISK**<br><br>**Rare** | **Moderate** | **L** |

RES2305.42.117 NSW RURAL FIRE SERVICE WILLIGOBUNG BRIGADE STATION

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level | Recommended Actions | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|---|---|---|---|
| ID-2 | Intersection/access linemarking, delineation and signage |  *Looking North on Batlow Road from the intersection/access.*<br>  *Looking South on Batlow Road towards the intersection/access.* | There is a general lack of visual queues on approach to the Willigobung Brigade Station access that would advise approaching drivers that a vehicle may be entering from (or exiting into) the eastern side of Batlow Road.<br><br>There is no central barrier linemarking on approach to the Willigobung Road intersection restricting overtaking manoeuvres. There is also a lack of guideposts, raised retroreflective pavement markers and warning signage to alert approaching road users that there is an access to the Willigobung Brigade Station.<br><br>Approaching road users may fail to safely brake or take evasive action should a road user mistakenly enter Batlow Road without an adequate gap in through traffic. This may result in a high-speed intersection crash. The likely travel speeds and impact angles may result in a high energy transfer at impact causing serious harm to occupants.<br><br>NOTES:<br>- The excessive travel speeds recorded at the site will further reduce the time available for an approaching driver to react and brake.<br>- This hazard will be exacerbated during adverse weather and at night time. | Rare | Serious | M (FSI) | **SHORTER TERM / LOWER COST**<br><br>Impliment the recommended actions as shown by *Attachment A – Stage 1: Shorter Term / Lower Cost Layout:*<br><br>- Provide barrier linemarking through the intersection to prevent overtaking within the intersection.<br><br>- Provide additional visual qeues (signage, guide posts and intersection linemarking) for the approaching/trailing road users that vehicles are to expected to be turning into or out of the Willigobung Brigaade Station access (as well as Willigobung Road).<br><br>- Provide a clear sightline envelope free of obstructions to ensure intervisibility between approaching vehicles on the through road and the entering vehicles from the Willigobung Brigade Station access.<br><br>- Provide active signage signage to alert approaching road users that vehicles are to expected to entering the through road from the Willigobung Brigade Station access.<br><br>*NOTE: due to the nature of this access, greater consideration is needed. Particularly usage during a high pressure emergency scenario.* | **RESIDUAL RISK**<br><br>Rare | Moderate | L |
| | | | | | | | **LONGER TERM / HIGHER COST**<br><br>Impliment the recommended actions as shown by *Attachment A – Stage 2: Longer Term / Higher Cost Layout:*<br><br>- Provide an all weather access to the Wilibobung Brigade Stations by realigning the access and installing a storm water culvert.<br><br>- Provide a basic right turn tratement (BAR) to assit trailing road users to pass a right turning vehicle into the Willibobung Brigade Stations access. | **RESIDUAL RISK**<br><br>Rare | Moderate | L |

RES2305.42.117 NSW RURAL FIRE SERVICE WILLIGOBUNG BRIGADE STATION

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level | Recommended Actions | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|---|---|---|---|
| ID-3 | Sight restriction to the south from the Willigobung Brigade Station access |  *Looking South on Batlow Road from the intersection/access (hold point).*<br>  *Looking South on Batlow Road from the intersection/access (approach).* | The Safe Intersection Sight Distance (SISD) from the Willigobung Brigade Station access is restricted by a cut embankment and signage arrangement on the east side of Batlow Road on approach to the hold point.<br><br>The cut embankment as well as the directional fingerboard signage arrangements restrict sight lines to potential vehicles on the through road and entering traffic from the brigade station.<br><br>A road user may mistakenly enter Batlow Road without an adequate gap in through traffic and result in a high-speed intersection crash. The likely travel speeds and impact angles may result in a high energy transfer at impact causing serious harm to occupants.<br><br>NOTES:<br>- The excessive travel speeds recorded at the site will further reduce the time available for an approaching driver to react and brake. | Rare | Serious | M (FSI) | **SHORTER TERM / LOWER COST**<br><br>Impliment the recommended actions as shown by *Attachment A – Stage 1: Shorter Term / Lower Cost Layout:*<br><br>- Provide barrier linemarking through the intersection to prevent overtaking within the intersection.<br><br>- Provide additional visual qeues (signage, guide posts and intersection linemarking) for the approaching/trailing road users that vehicles are to expected to be turning into or out of the Willigobung Brigaade Station access (as well as Willigobung Road).<br><br>- Provide a clear sightline envelope free of obstructions to ensure intervisibility between approaching vehicles on the through road and the entering vehicles from the Willigobung Brigade Station access.<br><br>- Provide active signage signage to alert approaching road users that vehicles are to expected to entering the through road from the Willigobung Brigade Station access.<br><br>*NOTE: due to the nature of this access, greater consideration is needed. Particularly usage during a high pressure emergency scenario.*<br><br>**LONGER TERM / HIGHER COST**<br><br>Impliment the recommended actions as shown by *Attachment A – Stage 2: Longer Term / Higher Cost Layout:*<br><br>- Provide an all weather access to the Wilibobung Brigade Stations by realigning the access and installing a storm water culvert.<br><br>- Provide a basic right turn tratement (BAR) to assit trailing road users to pass a right turning vehicle into the Willibobung Brigade Stations access. | **RESIDUAL RISK**<br><br>Rare<br><br>**RESIDUAL RISK**<br><br>Rare | **RESIDUAL RISK**<br><br>Moderate<br><br>**RESIDUAL RISK**<br><br>Moderate | **RESIDUAL RISK**<br><br>L<br><br>**RESIDUAL RISK**<br><br>L |

RES2305.42.117 NSW RURAL FIRE SERVICE WILLIGOBUNG BRIGADE STATION

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level | Recommended Actions | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|---|---|---|---|
| ID-4 | Northbound Approach to the intersection/access |  *Looking north on Batlow Road towards the intersection/access.* | All visual queues (direction and intersection warning signage) on approach to the northbound approach to the Willigobung Road intersection (left turn) and adjacent Willigobung Brigade Station access (right turn) provide a message provided to trailing vehicle looking to overtake that only a left turn option is available. Should a road user turn on their right turn indicator with the intention of turning into the brigade access, this may be misinterpreted by trailing vehicles as a signal that they can overtake.<br><br>This may result in high-speed overtaking type crash involving road users travelling northbound on Batlow Road and those entering Willigobung Brigade Station access or an opposing southbound road user travelling on Batlow Road. The likely travel speeds and impact angles may result in a high energy transfer at impact causing serious harm to occupants.<br><br>NOTES:<br>- The excessive travel speeds recorded at the site will further reduce the time available for an approaching driver to react and brake.<br>- This hazard will be exacerbated during adverse weather and at night time. | Unlikely | Serious | H (FSI) | **SHORTER TERM / LOWER COST** | **RESIDUAL RISK** | | |
| | | | | | | | Impliment the recommended actions as shown by *Attachment A – Stage 1: Shorter Term / Lower Cost Layout:*<br><br>- Provide barrier linemarking through the intersection to prevent overtaking within the intersection.<br><br>- Provide additional visual qeues (signage, guide posts and intersection linemarking) for the approaching/trailing road users that vehicles are to expected to be turning into or out of the Willigobung Brigaade Station access (as well as Willigobung Road).<br><br>- Provide a clear sightline envelope free of obstructions to ensure intervisibility between approaching vehicles on the through road and the entering vehicles from the Willigobung Brigade Station access.<br><br>- Provide active signage signage to alert approaching road users that vehicles are to expected to entering the through road from the Willigobung Brigade Station access.<br><br>*NOTE: due to the nature of this access, greater consideration is needed. Particularly usage during a high pressure emergency scenario.* | Unlikely | Moderate | M |
| | | | | | | | **LONGER TERM / HIGHER COST** | **RESIDUAL RISK** | | |
| | | | | | | | Impliment the recommended actions as shown by *Attachment A – Stage 2: Longer Term / Higher Cost Layout:*<br><br>- Provide an all weather access to the Wilibobung Brigade Stations by realigning the access and installing a storm water culvert.<br><br>- Provide a basic right turn tratement (BAR) to assit trailing road users to pass a right turning vehicle into the Willibobung Brigade Stations access. | Rare | Moderate | L |

# Attachment A

## Stage 1 - Shorter Term / Lower Cost Layout

## Stage 2 - Longer Term / Higher Cost Layout

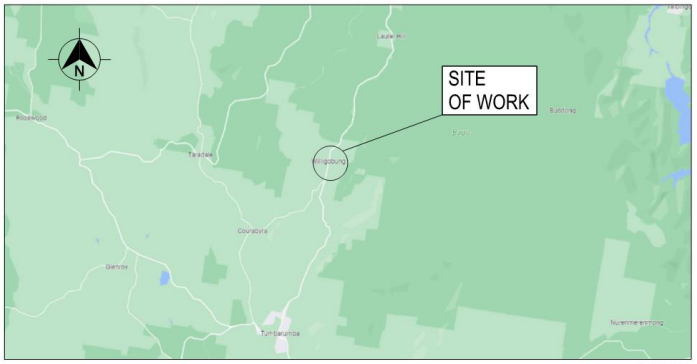
NSW RURAL FIRE SERVICE

# SNOWY VALLEYS COUNCIL

## BATLOW ROAD

## NSW RURAL FIRE SERVICE
## ROAD SAFETY AUDIT TREATMENTS

# STRATEGIC ROAD DESIGN




LOCALITY PLAN



| SHEET INDEX | |
|---|---|
| SHEET CODE | SHEET DESCRIPTION |
| GE | GENERAL ARRANGMENT ( 3 SHEETS) |
| GE-0100 | COVER |
| GE-0101 | RURAL FIRE SERVICE TREATMENT - SHORT TERM LOW / MED COST |
| GE-0102 | RURAL FIRE SERVICE TREATMENT - LONG TERM MED / HIGH COST |

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LINEAR REFERENCING: START: N/A FINISH: N/A

PLOT DATE / TIME: 28/07/2023 PLOT BY: ThomasHunter

CLIENT: NSW RURAL FIRE SERVICE

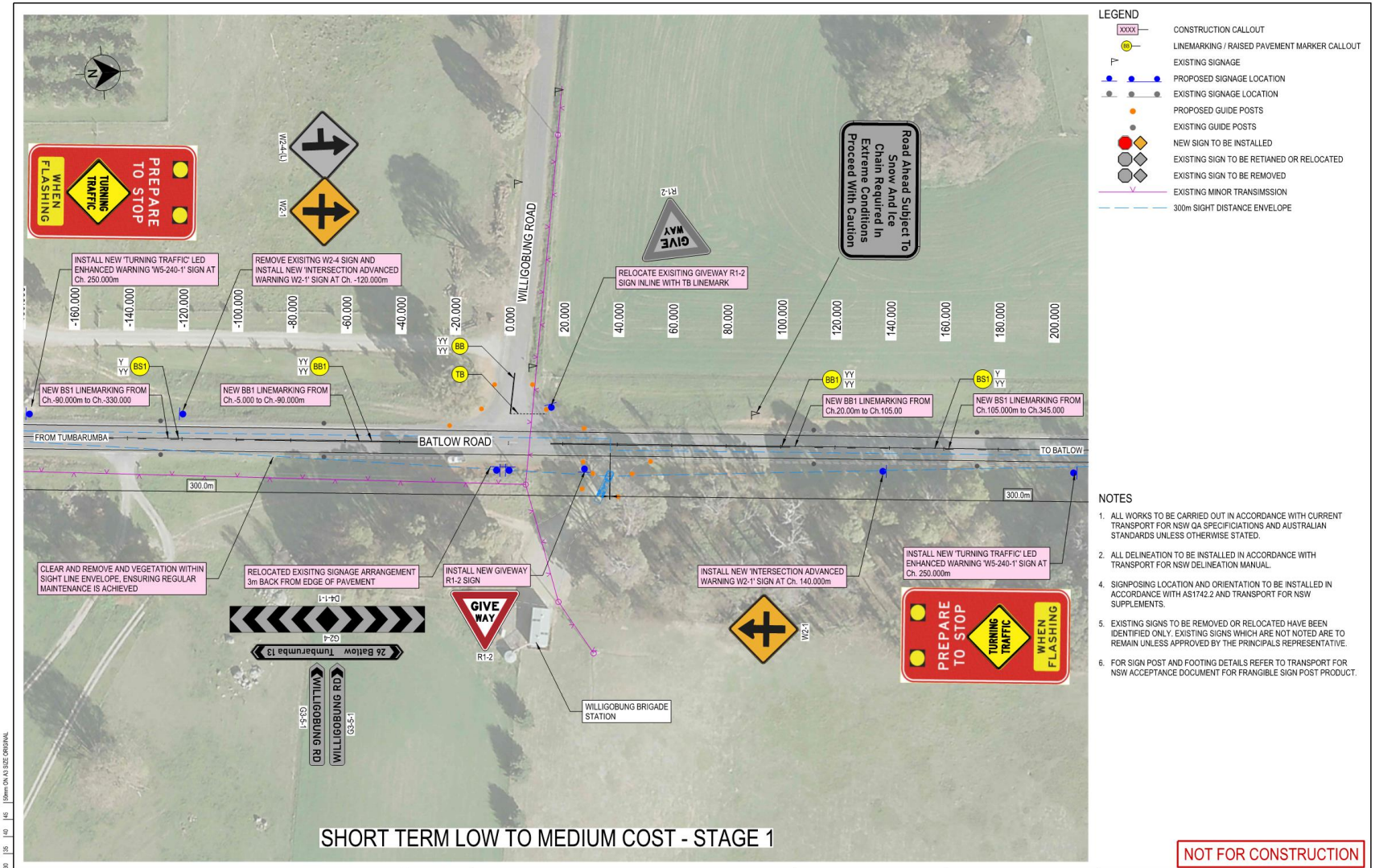
PREPARED FOR: NSW RURAL FIRE SERVICE

SNOWY VALLEYS COUNCIL
BATLOW ROAD
NSW RURAL FIRE SERVICE
ROAD SAFETY AUDIT TREATMENTS

A3

| PREPARED BY | DESIGNED | VERIFIED | PROJECT MANAGER | COUNCIL CLIENT REPRESENTATIVE |
|---|---|---|---|---|
| RIGORE ENGINEERING SERVICES | SIGNED | SIGNED | SIGNED | SIGNED |
| | NAME T.HUNTER | NAME Z.WALGERS | NAME J. GORRIE | NAME J. GREGORY |
| | TITLE JUNIOR DESIGN ENGINEER | TITLE LEAD ROAD DESIGNER | TITLE PROJECT MANAGER | TITLE CLIENT REPRESENTATIVE |
| | DATE | DATE | DATE | DATE |

RIGORE PROJECT No.: CLIENT PROJECT No.:
PMO REGISTRATION No.: RES2305.42.117
ISSUE STATUS: STRATEGIC DESIGN
SHEET No.: GE-0100
ISSUE: 1


LEGEND
CONSTRUCTION CALLOUT
LINEMARKING / RAISED PAVEMENT MARKER CALLOUT
EXISTING SIGNAGE
PROPOSED SIGNAGE LOCATION
EXISTING SIGNAGE LOCATION
PROPOSED GUIDE POSTS
EXISTING GUIDE POSTS
NEW SIGN TO BE INSTALLED
EXISTING SIGN TO BE RETIANED OR RELOCATED
EXISTING SIGN TO BE REMOVED
EXISTING MINOR TRANSIMSSION
300m SIGHT DISTANCE ENVELOPE
PREPARE TO STOP WHEN FLASHING
TURNING TRAFFIC
W2-4-L
W2-1
INSTALL NEW 'TURNING TRAFFIC' LED ENHANCED WARNING 'W5-240-1' SIGN AT Ch. 250.000m
REMOVE EXISITNG W2-4 SIGN AND INSTALL NEW 'INTERSECTION ADVANCED WARNING W2-1' SIGN AT Ch. -120.000m
WILLIGOBUNG ROAD
R1-2
GIVE WAY
RELOCATE EXISITNG GIVEWAY R1-2 SIGN INLINE WITH TB LINEMARK
Road Ahead Subject To Snow And Ice Chain Required In Extreme Conditions Proceed With Caution
-160.000
-140.000
-120.000
-100.000
-80.000
-60.000
-40.000
-20.000
0.000
20.000
40.000
60.000
80.000
100.000
120.000
140.000
160.000
180.000
200.000
BB
TB
BS1
BB1
NEW BS1 LINEMARKING FROM Ch.-90.000m to Ch.-330.000
NEW BB1 LINEMARKING FROM Ch.-5.000 to Ch.-90.000m
NEW BB1 LINEMARKING FROM Ch.20.00m to Ch.105.00
NEW BS1 LINEMARKING FROM Ch.105.000m to Ch.345.000
FROM TUMBARUMBA
BATLOW ROAD
TO BATLOW
300.0m
300.0m
CLEAR AND REMOVE AND VEGETATION WITHIN SIGHT LINE ENVELOPE, ENSURING REGULAR MAINTENANCE IS ACHIEVED
RELOCATED EXISITNG SIGNAGE ARRANGEMENT 3m BACK FROM EDGE OF PAVEMENT
INSTALL NEW GIVEWAY R1-2 SIGN
INSTALL NEW 'INTERSECTION ADVANCED WARNING W2-1' SIGN AT Ch. 140.000m
INSTALL NEW 'TURNING TRAFFIC' LED ENHANCED WARNING 'W5-240-1' SIGN AT Ch. 250.000m
D4-1-1
G2-4
26 Batlow Tumbarumba 13
WILLIGOBUNG RD
WILLIGOBUNG RD
G3-5-1
G3-5-1
WILLIGOBUNG BRIGADE STATION
SHORT TERM LOW TO MEDIUM COST - STAGE 1
NOTES
1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT TRANSPORT FOR NSW QA SPECIFICIATIONS AND AUSTRALIAN STANDARDS UNLESS OTHERWISE STATED.
2. ALL DELINEATION TO BE INSTALLED IN ACCORDANCE WITH TRANSPORT FOR NSW DELINEATION MANUAL.
4. SIGNPOSING LOCATION AND ORIENTATION TO BE INSTALLED IN ACCORDANCE WITH AS1742.2 AND TRANSPORT FOR NSW SUPPLEMENTS.
5. EXISTING SIGNS TO BE REMOVED OR RELOCATED HAVE BEEN IDENTIFIED ONLY. EXISTING SIGNS WHICH ARE NOT NOTED ARE TO REMAIN UNLESS APPROVED BY THE PRINCIPALS REPRESENTATIVE.
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J. GORRIE
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J. GORRIE
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PROJECT MNGR
J. GORRIE
24/07/2023
CLIENT REP
J. GREGORY
24/07/2023
PREPARED FOR
NSW RURAL FIRE SERVICE
SNOWY VALLEYS COUNCIL
BATLOW ROAD
NSW RURAL FIRE SERVICE
ROAD SAFETY AUDIT TREATMENTS
STRATEGIC DESIGN
RURAL FIRE SERVICE TREATMENT - SHORT TERM LOW / MED COST
A3
RIGORE REGISTRATION No. RES2305.42.117
STAGE 1
ISSUE STATUS
STRATEGIC DESIGN
SHEET No. GE-0101
ISSUE 1
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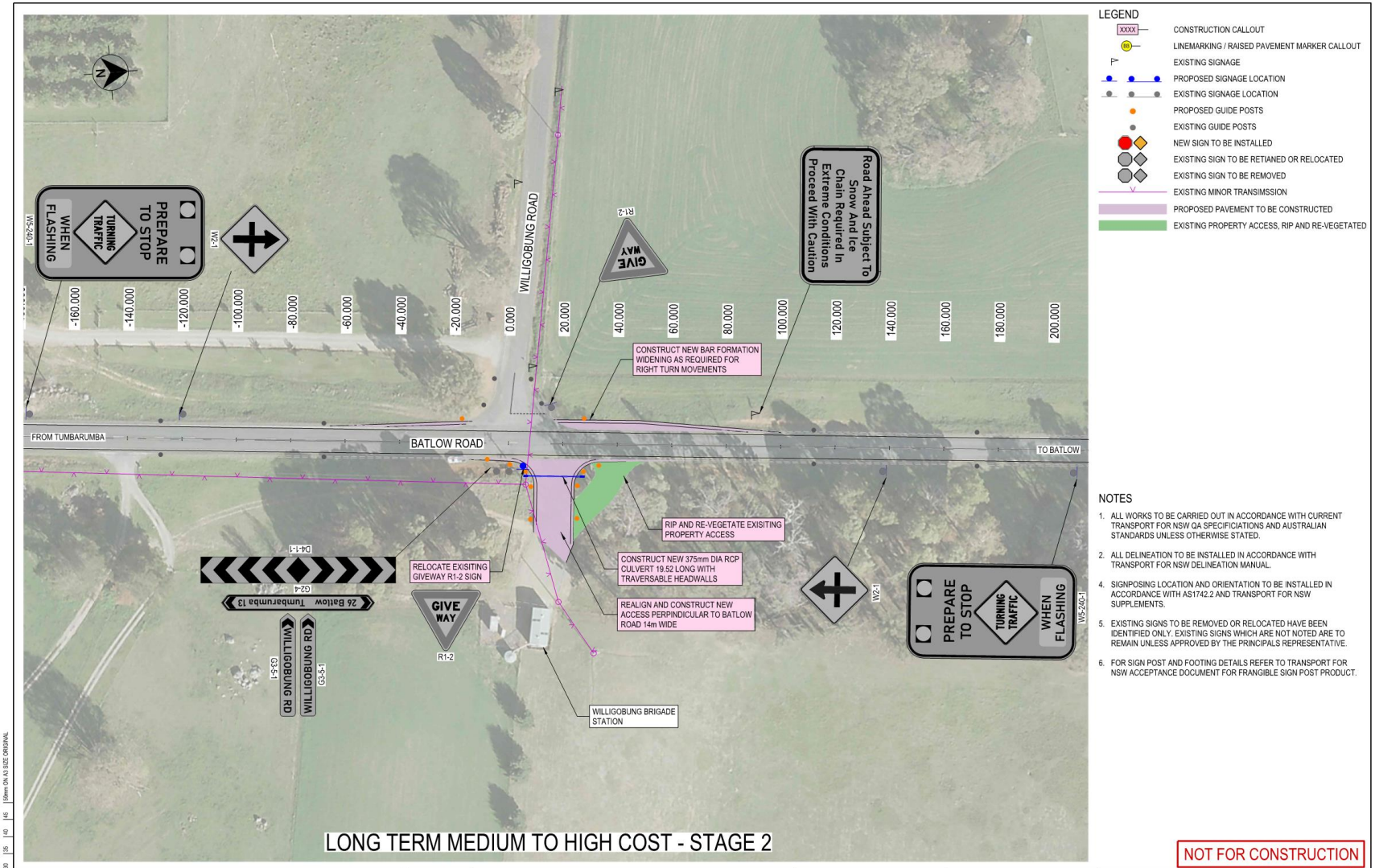
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LINEMARKING / RAISED PAVEMENT MARKER CALLOUT
EXISTING SIGNAGE
PROPOSED SIGNAGE LOCATION
EXISTING SIGNAGE LOCATION
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EXISTING SIGN TO BE REMOVED
EXISTING MINOR TRANSIMSSION
PROPOSED PAVEMENT TO BE CONSTRUCTED
EXISTING PROPERTY ACCESS, RIP AND RE-VEGETATED
WILLIGOBUNG ROAD
BATLOW ROAD
FROM TUMBARUMBA
TO BATLOW
PREPARE TO STOP WHEN FLASHING
TURNING TRAFFIC
GIVE WAY
Road Ahead Subject To Snow And Ice Chain Required In Extreme Conditions Proceed With Caution
CONSTRUCT NEW BAR FORMATION WIDENING AS REQUIRED FOR RIGHT TURN MOVEMENTS
RIP AND RE-VEGETATE EXISITING PROPERTY ACCESS
CONSTRUCT NEW 375mm DIA RCP CULVERT 19.52 LONG WITH TRAVERSABLE HEADWALLS
REALIGN AND CONSTRUCT NEW ACCESS PERPINDICULAR TO BATLOW ROAD 14m WIDE
RELOCATE EXISITING GIVEWAY R1-2 SIGN
WILLIGOBUNG BRIGADE STATION
26 Batlow Tumbarumba 13
WILLIGOBUNG RD
NOTES
1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT TRANSPORT FOR NSW QA SPECIFICIATIONS AND AUSTRALIAN STANDARDS UNLESS OTHERWISE STATED.
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NSW RURAL FIRE SERVICE
ROAD SAFETY AUDIT TREATMENTS
STRATEGIC DESIGN
RURAL FIRE SERVICE TREATMENT - LONG TERM MED / HIGH COST
RIGORE REGISTRATION No. RES2305.42.117
STAGE 2
ISSUE STATUS STRATEGIC DESIGN
SHEET No. GE-0102
ISSUE 1
A3
RIGORE ENGINEERING SERVICES
NSW RURAL FIRE SERVICE
PREPARED FOR NSW RURAL FIRE SERVICE
PREPARED BY Rigore Pty Ltd
CO-ORDINATE SYSTEM MGA ZONE 55
HEIGHT DATUM AHD
SCALE 1:1000m
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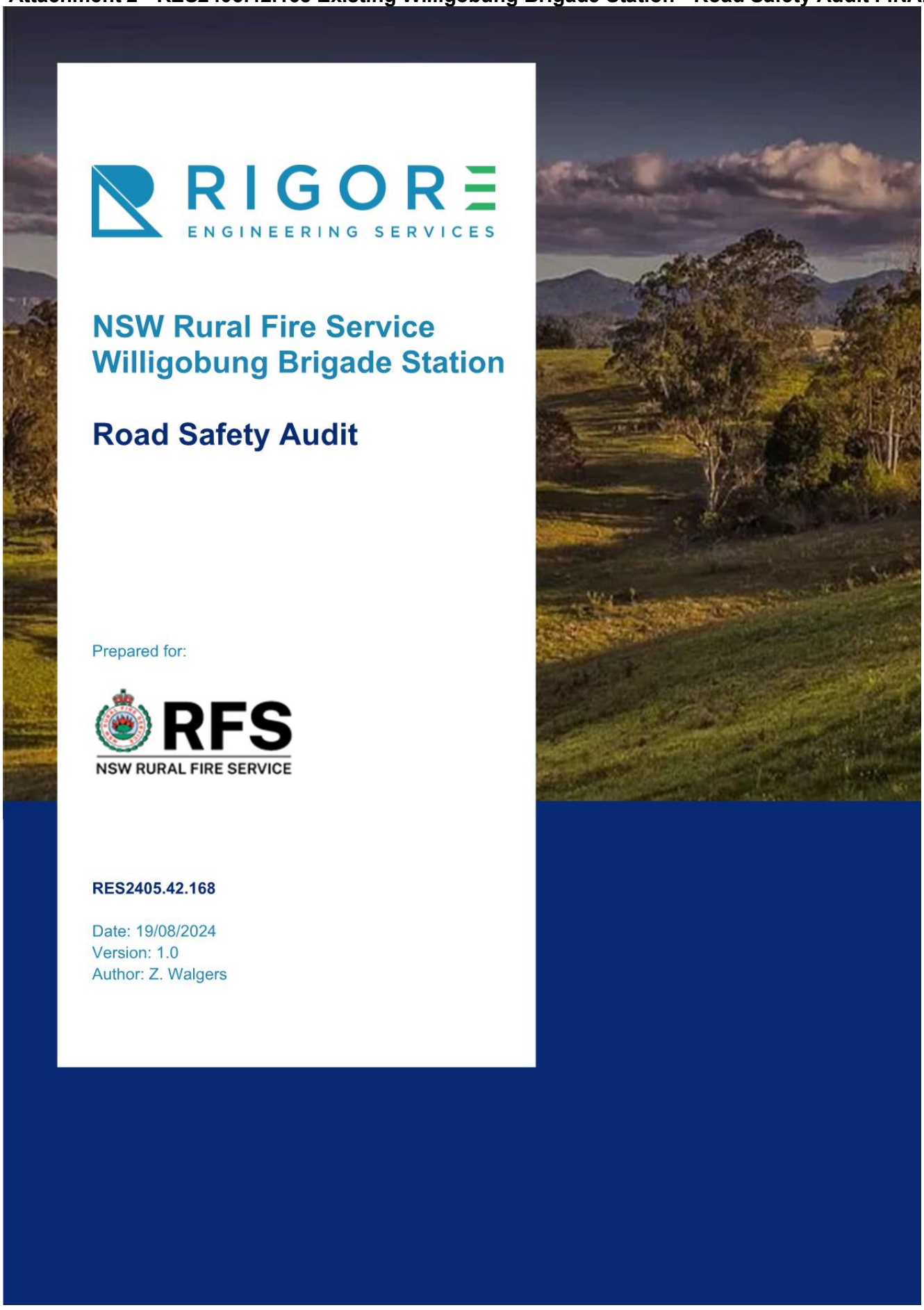
**Attachment 2 - RES2405.42.168 Existing Williigobung Brigade Station - Road Safety Audit FINAL**



# Document Quality Information

**Prepared for:**

NSW Rural Fire Service
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PO Box 401, Tumut NSW 2720
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**Prepared by:**

Rigore Pty Ltd (Rigore Engineering Services)
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PO Box 5666, Wagga Wagga NSW 2650
www.rigore.com.au

| Date | Version | Author | Change Reference |
|---|---|---|---|
| 05/08/2024 | 0.1 | Z. Walgers | Draft release for submission to NSW Rural Fire Service |
| 19/08/2024 | 1.0 | Z. Walgers | Final release for submission to NSW Rural Fire Service |

# Contents

# 1. Audit Statement

| | |
|---|---|
| **Project Name:** | Existing Willigobung Brigade Station Road Safety Audit |
| **Client:** | NSW Rural Fire Service |
| **Client Representative:** | Jon Gregory – District Manager, Riverina Highlands |
| **Contact Details:** | Phone: 0419 460 880<br>Email: jon.gregory@rfs.nsw.gov.au |
| **Auditors:** | James Gorrie (RSA-02-0732 - Level 3) – Lead Road Safety Auditor<br>Zach Walgers (RSA-02-1502 - Level 3) – Lead Road Safety Auditor |
| **Audit Type** | Post-Construction |
| **Commencement Meeting:** | Monday 8th July 2024 |
| **Audit Date:** | Wednesday 10th July 2024 & Friday 2nd August 2024 |
| **Completion Meeting:** | Monday 12th August 2024 |
| **Previous Audits:** | RES2305.42.117 Willigobung Brigade Station Access - Road Safety Audit FINAL.pdf |

We, the undersigned, declare that we have reviewed the material and data listed in this report and identified the risks to road safety listed in Section 4. The reasons are given to explain why an identified item is considered a risk to road safety. The auditors listed are independent to the project.

It should be noted that while every effort has been made to identify potential safety problems, no guarantee can be made that every problem or deficiency has been identified.

It is recommended that identified risks to road safety be investigated and corrective actions implemented as soon as practicable.

James Gorrie
Lead Road Safety Auditor (RSA-02-0732 - Level 3) Date: 19/08/2024

Zach Walgers
Road Safety Auditor (RSA-02-1502-Level 3) Date: 19/08/2024

# 2. Introduction

Rigore Engineering Services has been engaged by NSW Rural Fire Service representative Jon Gregory, District Manager – Riverina Highlands, to undertake a Road Safety Audit following the recent works undertaken at Willigobung Brigade Station on Batlow Road.


*Figure 2-1 –Locality Plan*

## 2.1. Project Description

NSW Rural Fire Service representative Jon Gregory, District Manager – Riverina Highlands has requested a post-construction road safety audit following the mitigation measures undertaken by Transport for NSW (TfNSW) near the existing access to the Willigobung Brigade Station on Batlow/Tumbarumba Road.

Rigore representative, James Gorrie, Lead Road Safety Auditor has been made aware that TfNSW has made recent changes to the signage and delineation provided along Batlow Road to assist in addressing the existing conditions road safety audit findings outlined within RES2305.42.117, dated 16th July 2023. The scope of this post-construction road safety audit is to assess the adequacy of the mitigation measures applied in addressing the previously identified road safety risks.


*Figure 2-2 – Willigobung Brigade Station Access*

## 2.2. Supporting Information

The following background data and reference material were provided by NSW Rural Fire Service representative Jon Gregory | District Manager, Riverina Highlands to assist with the audit:

- Vehicle Fleet | Category 1 Appliance Specifications
- Traffic Data | Traffic Volume Viewer / Ad-hoc Traffic Data

### 2.2.1. Vehicle Fleet | Category 1 Appliance Specifications

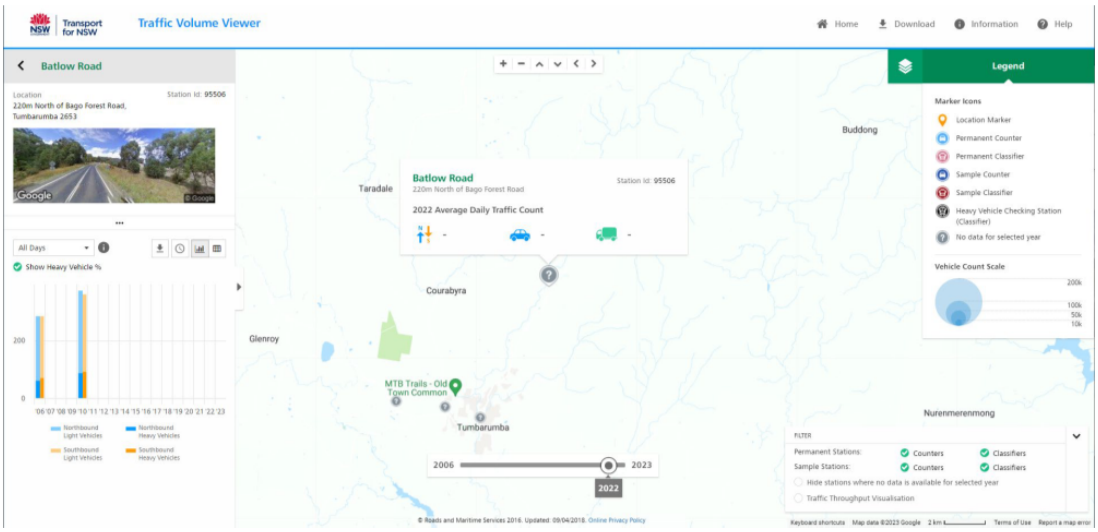
It has been advised by Jon Gregory, the Willigobung fire brigade station has been upgraded to accommodate a Category 1 fleet vehicle. The increased vehicle size was considered during the audit process.

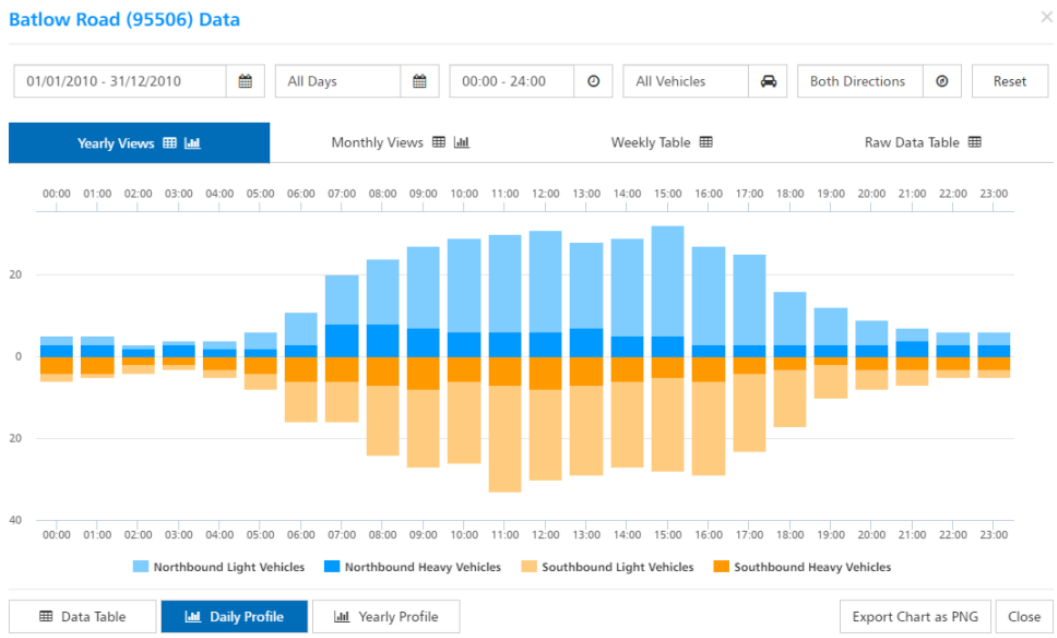


Refer to Attachment A – Cat 1 Appliance Specifications

## 2.2.2. Traffic Data

The following traffic data was extracted from the Transport for NSW Traffic Volume Viewer at Station ID 95506 located 220m north of the Batlow Road intersection with Brogo Forest Road:




***Reference:*** https://roads-waterways.transport.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html#/?z=10&pco=1&pcl=1&sco=1&scl=1&nd=0&v=0&lat=-35.54598222970726&lon=148.10264718005592&id=95506

**RES2405.42.168 NSW RURAL FIRE SERVICE WILLIGOBUNG BRIGADE STATION**

| | |
|---|---|
| **Location** | Approx. 200m south of the intersection between Batlow Road and Lower Bago Road |
| **Start Date** | Thursday, 31 October 2019 |
| **Duration** | 2 Weeks |

| | | %HV | | | |
|---|---|---|---|---|---|
| **ADT** | | **CL3-5** | **CL6-9** | **CL10-12** | **TOT** |
| Week 1 | 1187 | 12.00% | 3.84% | 4.32% | 20.17% |
| Week 2 | 1188 | 11.90% | 3.87% | 4.07% | 19.83% |

| | Thu 31/10/19 | Fri 1/11/19 | Sat 2/11/19 | Sun 3/11/19 | Mon 4/11/19 | Tue 5/11/19 | Wed 6/11/19 | Average Weekday | Average 7-day |
|---|---|---|---|---|---|---|---|---|---|
| **0000-0100** | 6 | 3 | 5 | 4 | 7 | 16 | 1 | 7 | 6 |
| **0100-0200** | 5 | 4 | 7 | 3 | 2 | 6 | 3 | 4 | 4 |
| **0200-0300** | 3 | 1 | 4 | 1 | 8 | 12 | 11 | 7 | 6 |
| **0300-0400** | 8 | 4 | 3 | 0 | 6 | 9 | 6 | 7 | 5 |
| **0400-0500** | 16 | 11 | 5 | 2 | 17 | 22 | 10 | 15 | 12 |
| **0500-0600** | 25 | 16 | 13 | 4 | 31 | 32 | 33 | 27 | 22 |
| **0600-0700** | 51 | 45 | 16 | 7 | 45 | 52 | 59 | 50 | 39 |
| **0700-0800** | 78 | 76 | 22 | 13 | 74 | 69 | 82 | 76 | 59 |
| **0800-0900** | 122 | 99 | 65 | 40 | 103 | 94 | 104 | 104 | 90 |
| **0900-1000** | 110 | 100 | 123 | 65 | 98 | 87 | 89 | 97 | 96 |
| **1000-1100** | 97 | 90 | 104 | 68 | 93 | 81 | 94 | 91 | 90 |
| **1100-1200** | 79 | 81 | 101 | 74 | 77 | 73 | 90 | 80 | 82 |
| **1200-1300** | 93 | 93 | 83 | 75 | 82 | 81 | 88 | 87 | 85 |
| **1300-1400** | 85 | 103 | 85 | 56 | 83 | 89 | 115 | 95 | 88 |
| **1400-1500** | 89 | 103 | 90 | 56 | 93 | 84 | 96 | 93 | 87 |
| **1500-1600** | 112 | 98 | 69 | 67 | 89 | 79 | 96 | 95 | 87 |
| **1600-1700** | 124 | 119 | 65 | 88 | 132 | 94 | 128 | 119 | 107 |
| **1700-1800** | 83 | 87 | 55 | 46 | 96 | 88 | 100 | 91 | 79 |
| **1800-1900** | 57 | 65 | 46 | 27 | 61 | 49 | 63 | 59 | 53 |
| **1900-2000** | 41 | 45 | 29 | 20 | 47 | 30 | 37 | 40 | 36 |
| **2000-2100** | 28 | 27 | 12 | 16 | 16 | 11 | 27 | 22 | 20 |
| **2100-2200** | 20 | 17 | 16 | 18 | 11 | 12 | 31 | 18 | 18 |
| **2200-2300** | 7 | 13 | 10 | 11 | 10 | 13 | 16 | 12 | 11 |
| **2300-2400** | 2 | 9 | 3 | 6 | 8 | 6 | 4 | 6 | 5 |
| **Totals** | | | | | | | | | |
| **0000-0000** | **1,341** | **1,309** | **1,031** | **767** | **1,289** | **1,189** | **1,383** | **1,302** | **1,187** |
| **0700-0900** | 200 | 175 | 87 | 53 | 177 | 163 | 186 | 180 | 149 |
| **1600-1800** | 207 | 206 | 120 | 134 | 228 | 182 | 228 | 210 | 186 |
| **Off-Peak** | 934 | 928 | 824 | 580 | 884 | 844 | 969 | 912 | 852 |

## 2.3. Audit Scope

The Road Safety Audit was conducted in accordance with relevant Austroads Guides to Road Safety, inclusive but not limited to *Austroads Guide to Road Safety Part 6: Road Safety Audits 2022* including the application and consideration of Safe System principles.

The Rigore Road Safety Audit team has undertaken the audit by embedding Safe Systems principles. This is achieved by applying our knowledge, experience and understanding of the Safe Systems Framework to document findings in a manner that describes the road user exposure, crash likelihood and severity.


The identification and removal or treatment of road elements that may contribute to crash occurrence or crash severity is a key component of the safe system approach to road safety. A safe system acknowledges that human error within the transport system is inevitable and that when it does occur the system makes allowance for these errors to minimise the risk of serious injury or death. In a safe system, therefore, roads (and vehicles) should be designed to reduce the incidence and severity of crashes when they inevitably occur.

Four key principles form the basis of the Safe System philosophy, as outlined in *Guide to Road Safety Part 1: Introduction & The Safe System*:

- People make mistakes that can lead to road crashes
- The human body has a limited physical ability to tolerate crash forces before harm occurs
- A shared responsibility exists amongst those who plan, design, build, manage and use roads and vehicles and those providing post-crash care to prevent crashes resulting in serious injury or death
- All parts of the system must be strengthened to multiply their effects; so that if one part fails, road users are still protected.

Safer road user behaviour, safer speeds, safer roads and safer vehicles are the four key elements that make up a safe system. In relation to speed, the *Guide to Road Safety Part 3: Safe Speed*, using Wramborg curves, outlines the relationships between a motorized vehicle collision speed and the probability of a fatality for different crash configurations:

Often refer to as the Safe System speeds, the following aspirational operating speeds are as follows:

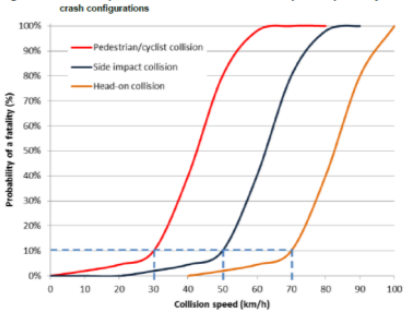
**30km/h** where there is the possibility of a collision between a vulnerable road user and a passenger vehicle or where there is the possibility of a side impact with a fixed object such as a tree or pole

**50km/h** where there is the possibility of a right-angle collision between passenger vehicles

**70km/h** where there is the possibility of a head-on collision between passenger vehicles

**≥100 km/h** where there is no possibility of side or frontal impact between vehicles or impacts with vulnerable road user impacts.

Figure 2.6: Relationships between a motorised vehicle collision speed and probability of a fatality for different crash configurations




Source: Jurewicz et al. (2015a) and based on Wramborg (2005)

**NOTE:** presently there is only limited evidence on cyclist and motorcyclist injury thresholds and an assumption is often made that their injury potential is the same as the pedestrian curve. The curves only represent passenger car interactions and do not account for young and elderly people and heavy vehicles. The curves are also limited in that they only provide the probability of fatality and not serious injury and there is little published evidence demonstrating the origins of the curves.

## 2.4. Primary Considerations

Complimentary to the Safe Systems Approach, the following primary factors are evident for consideration on this project. The report herein has been undertaken based on the below primary considerations:

### 2.4.1. Relationship between vehicle speed and the likelihood of Severe Injury

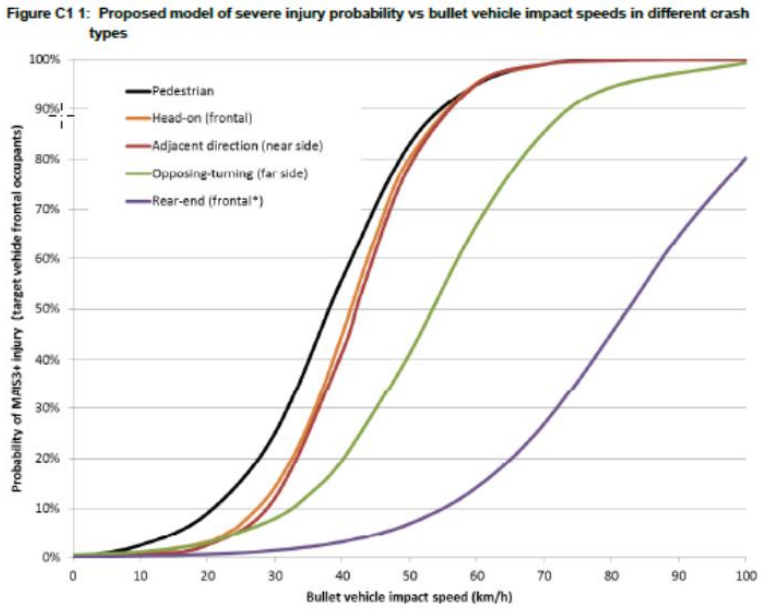
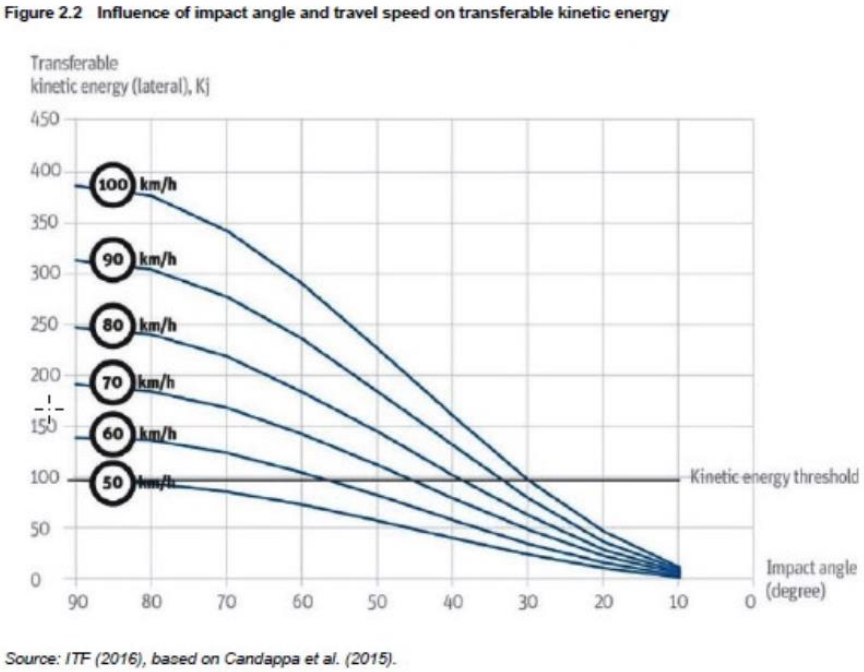



*Figure 2-3 – Reference: Extract Austroads Guide to Traffic Management Part 6- 2020*

### 2.4.2. Influence of impact angle and travel speed on transferable kinetic energy




Source: ITF (2016), based on Candappa et al. (2015).

*Figure 2-4 – Reference: Extract Austroads Guide to Traffic Management Part 6- 2020*

## 2.4.3. Roadside Hazards:



**Figure 1.3: Calculation of an effective lateral distance to a hazard**

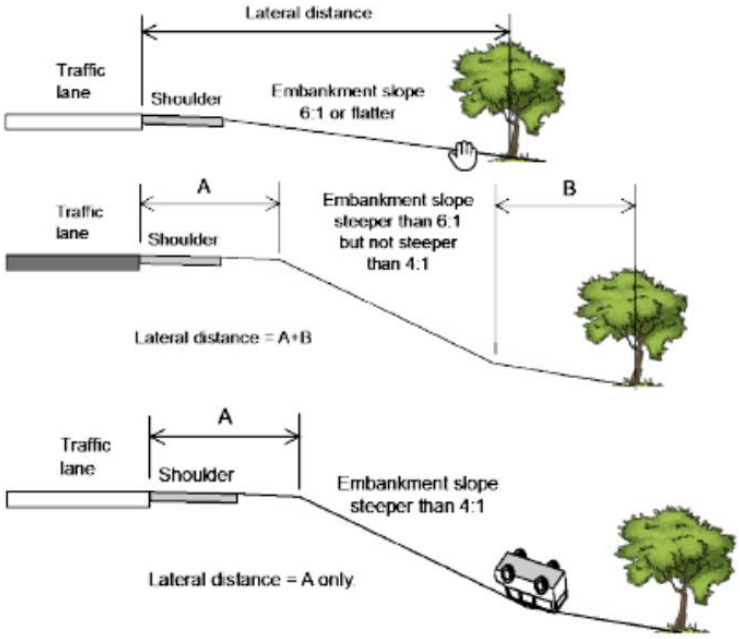
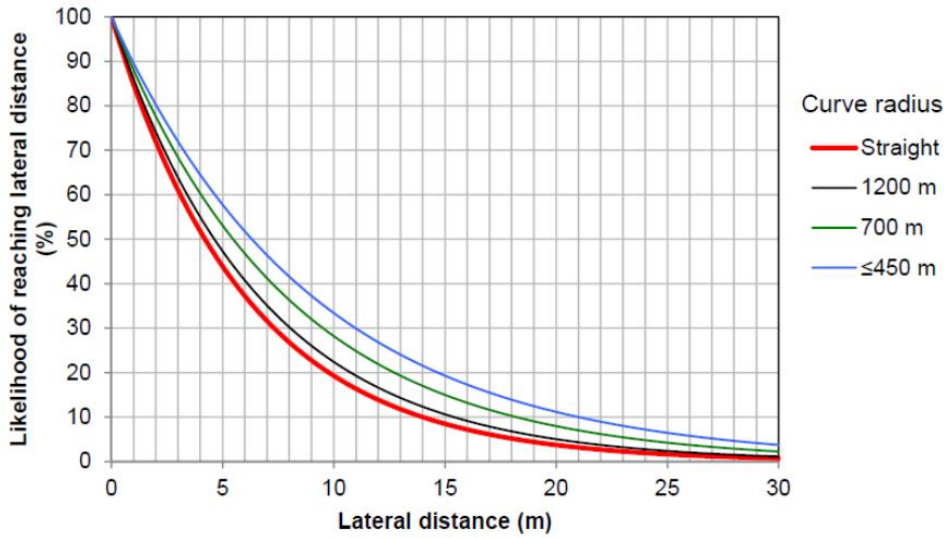



*Figure 2-5 – Reference: Extract Austroads Guide to Road Design Part 6- 2021*

## 2.4.4. Likelihood of Reaching a Lateral Distance

**Figure B.6: Likelihood of reaching a lateral distance for a road with an operating speed of 110 km/h and with curves of different radii**




*Source: Adapted from Austroads (2020e).*

*Figure 2-6 – Reference: Extract Austroads Guide to Road Design Part 6- 2021*

### 2.4.5. Safe Intersection Sight Distance (SISD)

It is fundamental to the safety of intersections that drivers approaching in all traffic streams are able to:

- recognise the presence of an intersection in time to slow down or stop in a controlled and comfortable manner.
- see vehicles approaching in conflicting traffic streams and give way where required by law or avoid a crash in the event of a potential conflict.

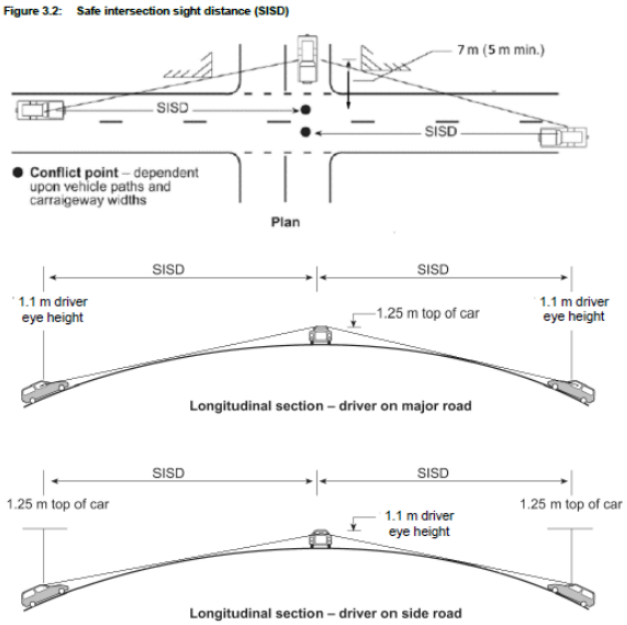



*Figure 2-7 – Extract Austroads Guide to Road Design Part 4A – 2021*

### 2.4.6. Stopping Sight Distance (SSD)

Stopping Sight Distance (SSD) is the distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead.

- It is generally measured between the driver's eye (1.1 m) and a 0.2 m high, stationary object on the road. The object height of 0.2 m represents a hazard that cannot be driven over and hence requires the vehicle to stop to avoid a collision.
- Car stopping sight distance shall be available along all traffic lanes on all roads. This distance is considered to be the minimum sight distance that should be available to a driver at all times.

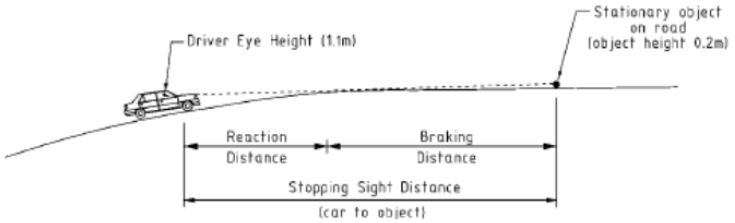



*Figure 2-8 – Extract Austroads Guide to Road Design Part 3 – 2021*

### 2.4.7. References

The following list of references provided background information during the audit process:

- TNSW Guidelines for Road Safety Audit Practices (2011)
- Austroads: Guide to Road Safety Part 6: Road Safety Audit (2022)
- Austroads: Guide to Road Design, Road Safety, Traffic Management and RMS Supplements
- Australian Standards AS1742 – Manual of Uniform Traffic Control Devices and RMS Supplements
- TfNSW Speed Zoning Guideline
- NSW Road Rules Legislation

### 2.4.8. Exclusions

A road safety audit:

- is **not** a way of assessing or rating a project as good or poor
- is **not** a means of ranking or justifying one project against others in a works program
- is **not** a way of rating one option against another
- is **not** a check of compliance with standards
- is **not** a substitute for design checks
- is **not** a crash investigation
- is **not** a redesign of a project
- is **not** to be applied only to high-cost projects or only to projects involving safety problems
- is **not** the name used to describe informal checks, inspections or consultation.

### 2.4.9. Audit Team

In accordance with the *Austroads Guide to Road Safety Part 6: Road Safety Audits* minimum audit team requirements, Rigore has provided two (2) Level 3 Lead Road Safety Auditors and one (1) Level 2 Road Auditor to form the independent audit team.

**James Gorrie**

| | |
|---|---|
| Position: | Managing Director \| Lead Road Safety Auditor |
| Experience: | 17+ years |
| Education: | Master of Engineering \| Bachelor of Engineering Tech |
| Qualifications: | MIEAust CPEng NER APEC Engineer |
| Accreditations: | Level 3 Lead Road Safety Auditor NSW (RSA-02-0732) |

**Zach Walgers**

| | |
|---|---|
| Position: | Lead Civil Design Engineer \| Road Safety Auditor |
| Experience: | 8+ years |
| Education: | Master of Engineering / Bachelor of Technology \| Current Associate Degree of Engineering (Civil) |
| Qualifications: | MIEAust |
| Accreditations: | Level 3 Lead Road Safety Auditor NSW (RSA-02-1502) |

### 2.4.10. Site Inspections

The day and night site inspections were undertaken by James Gorrie (Lead Road Safety Auditor) and Zach Walgers (Road Safety Auditor) on Wednesday 10th June 2024 between 3:30pm and 6:00pm, the weather was cold, overcast with light intermittent rain for the duration of the inspection. An additional day time site inspection was undertaken on Friday 2nd August 2024 between 2:30pm and 3:00pm, the weather was cold with clear skies for the duration of the inspection.

### 2.4.11. Commencement Meeting

The Commencement Meeting was held via telephone call on Monday 8th July 2024 between 12:15pm and 12:30pm. In attendance were James Gorrie (Lead Road Safety Auditor) and Jon Gregory (NSW RFS representative). The Commencement Meeting provided the opportunity to define the extent and purpose of the audit. The audit team provided Jon with an overview of the proposed approach and an indicative timeframe for completion. Jon provided insight into the local operations, the perceived safety concerns (including recently reported near misses) and recent minor works undertaken at the site.

### 2.4.12. Completion Meeting

The Completion Meeting was held via MS Team Meeting on Monday 12th August 2024 between 2:30pm and 3:30pm. In attendance were James Gorrie (Lead Road Safety Auditor), Zach Walgers (Road Safety Auditor) Scott Southwell and Peter Jones (NSW RFS representatives). The draft report was discussed in detail with RFS representatives accepting the audit findings as well as providing verbal comments on the findings for consideration and incorporation in the final audit report.

# 3. Risk Assessment Framework

The Austroads system of risk assessment has been applied to issues identified in the audit with the relative characteristics as follows:

**Table 3.1: How often is the problem likely to lead to a crash?**

| Likelihood | Description |
|---|---|
| Almost certain | Occurrence once per quarter |
| Likely | Occurrence once per quarter to once per year |
| Possible | Occurrence once per year to once every three years |
| Unlikely | Occurrence once every three years to once every seven years |
| Rare | Occurrence less than once every seven years. |

**Table 3.2: What is the likely severity of the resulting crash type?**

| Severity | Description | Examples |
|---|---|---|
| Insignificant | Property damage | Some low speed collisions<br>Pedestrian walks into object (no head injury)<br>Car reverses into post |
| Minor | Minor first aid | Low speed collisions<br>Pedestrian walks into object (minor head injury)<br>Cyclists fall from bicycle at low speed |
| Moderate | Major first aid and/or presents to hospital (not admitted) | Some low to medium -speed collisions<br>Cyclists fall from bicycle at moderate speed<br>Left-turn rear-end crash in a slip lane |
| Serious | Admitted to hospital | High or medium -speed vehicle / vehicle collision<br>High or medium -speed single vehicle collision with fixed road side object<br>Pedestrian struck at high speed |
| Fatal | At scene or within 30 days of the crash. | High speed multi vehicle crash on Freeway.<br>Car runs into crowded bus stop.<br>Bus and petrol tanker collide<br>Collapse of bridge or tunnel |

**Table 3.3: The resulting level of risk**

| | | | Severity* | | | | |
|---|---|---|---|---|---|---|---|
| | | | Insignificant<br>Property Damage | Minor<br>Minor first aid | Moderate<br>Major first aid and/or presents to hospital (not admitted) | Serious<br>Admitted to hospital | Fatal<br>Death within 30 days of the crash |
| Likelihood (includes exposure) | Almost Certain | One Per Quarter | Medium | High | High | Extreme (FSI) | Extreme (FSI) |
| | Likely | Quarter to 1-year | Medium | Medium | High | Extreme (FSI) | Extreme (FSI) |
| | Possible | 1 to 3 years | Low | Medium | High | High (FSI) | Extreme (FSI) |
| | Unlikely | 3 to 7 years | Negligible | Low | Medium | High (FSI) | Extreme (FSI) |
| | Rare | 7 years + | Negligible | Negligible | Low | Medium (FSI) | High (FSI) |

Safe System Crash Outcome Threshold

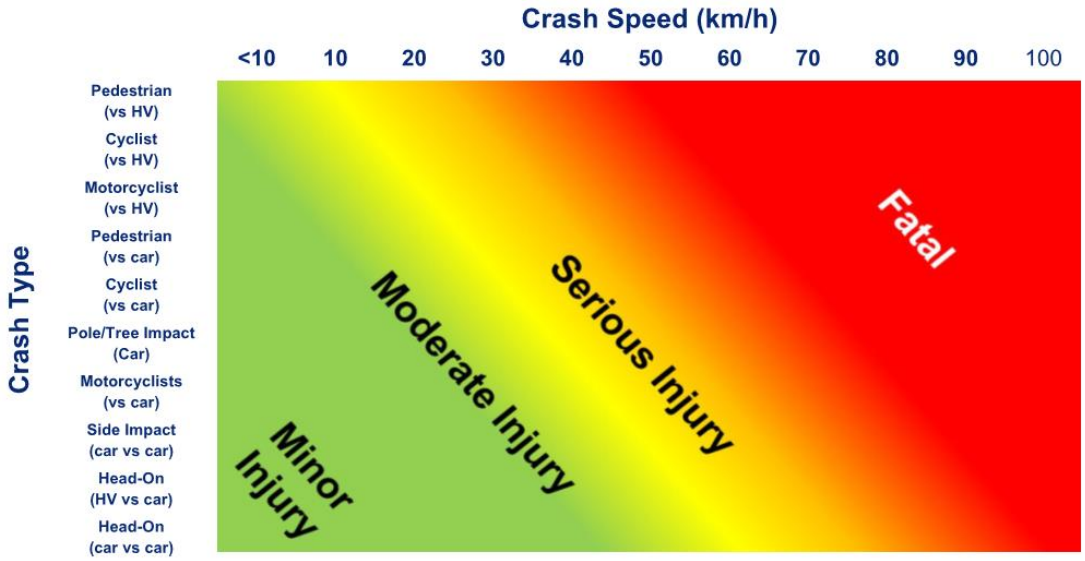
The treatment that Austroads recommend for the above levels of risk is shown in Table 3.4.

**Table 3.4: Treatment approach**

| Risk | Treatment |
|---|---|
| Extreme | Must be corrected regardless of cost |
| 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 even if the treatment cost is moderate, but not high |
| Low | Should be corrected or the risk significantly reduced if the treatment cost is low |
| Negligible | No action required |

The risk matrix above shown in *Table 3.3*, is aligned to Safe System principles and has been designed to be used with consideration of a severity guidance sheet which was developed by the Project Working Group. The PWG comprising of representatives from state and local road agencies was established with the primary objective of consolidating and updating the previously issued Parts 6 and 6A (Austroads 2019).

**Table 3.5: The severity guidance sheet – to be used with the risk matrix**



# 4. Audit Results

The results of the audit observations and findings have been reported in two categories:

4.1 General Observations
4.2 Identified Risks

The audit findings are provided in Table 4.1 to Table 4.2, together with their risk ranking, as determined using the risk assessment tables in Section 3.

This audit has provided the insights of an independent team to highlight potential road safety deficiencies that should be formally considered by the client representative. The responsibility of responding to the findings of a road safety audit rests with the client, not with the Auditor. The client is under no obligation to accept the audit findings. It is also noted that it is not the role of the Auditor to agree to or approve the client's responses to the audit.

## 4.1 General Observations

| ID | General Observations | Photos / Reference |
|---|---|---|
| GO-1 | The recently installed advanced warning signage arrangement includes a *W5-36 "Fire Station"* sign paired with a *W5-55-1n "Concealed Driveway",* which may be difficult for a road user to observe, comprehend and react (if required) when travelling at high speeds. Road users must divide their attention between the road alignment, traffic (both oncoming and trailing vehicles that may be seeking to overtake), as well as other signage, delineation devices, and other environmental factors.<br><br>At high speeds, this division becomes more critical as the consequences of not paying full attention to the road alignment are more severe. This can lead to prioritising road monitoring over reading signs, resulting in missed or misunderstood information. Road users may fail to fully receive the intended warning message and/or ultimately understand the possibility of vehicles entering Batlow Road from a concealed location. This issue may be further exacerbated when the site is subject to inclement weather.<br><br>NOTE: Warning signage that relies solely on words without graphics can pose significant challenges. These signs can be difficult to read quickly due to language barriers, increased cognitive load, and slower processing times. They are also less visible from a distance and harder to comprehend in poor weather conditions. Additionally, variations in literacy levels further complicate comprehension and issues with readability. In emergencies, the quick and clear communication provided by symbols is crucial for safety. Therefore, using a combination of text and graphics on warning signs is often used to enhance recognition and understanding for a diverse range of drivers. |  <br>*Looking north along Batlow Road towards Willigobung Road intersection and Brigade Station access.*<br><br>  <br>*W5-36 "Fire Station"*<br><br>  <br>*W5-55-1n "Concealed Driveway"*<br><br>*Example of text and graphic combination:*<br>  <br>*W2-207 Series* |

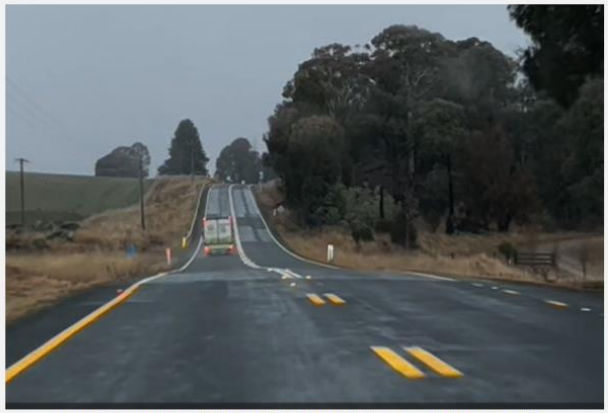
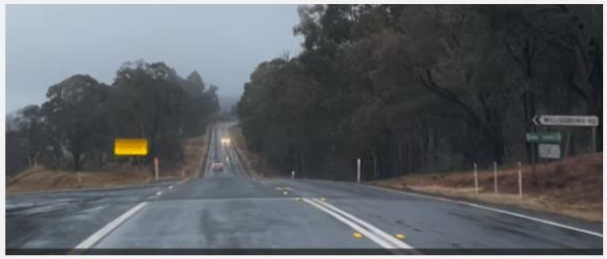
| ID | General Observations | Photos / Reference |
|---|---|---|
| GO-2 | The transition of yellow to white linemarking occurs approximately 10m south of the Willigobung Road intersection. The linemarking colour transition indicates a likely area for snow and ice. The transition location has not been changed as part of the recent works. Further consideration may be given to relocating the transition to the higher elevation further up the hill, approximately 350m south of the intersection.<br><br>NOTE: The change of linemarking colour may be difficult to implement until there is a need for a reseal. |  <br>*Looking south along Batlow Road from the Willigobung Road intersection and Brigade Station access.* |
| GO-3 | At the time of inspection, it was noted that recent roadside vegetation removal had been undertaken to improve visibility along Batlow Road from the Brigade Station access.<br><br>NOTE: This vegetation removal assists in addressing findings contained within the road safety audit RES2305.42.117. Regular maintenance may be required to ensure unrestricted sight lines are retained in the future. |  <br>*Looking north along Batlow Road from the Brigade Station Access* |
| GO-4 | At the time of inspection, it was noted that a sign had been installed to alert those leaving the Brigade Station access to "THINK SAFETY DRIVE TO THE CONDITIONS"<br><br>NOTE: This sign provides a clear message that caution must be taken when entering Batlow Road and assists in addressing findings contained within the road safety audit RES2305.42.117. |  <br>*Looking west at Batlow Road from the Brigade Station Access* |

## 4.2. Identified Risks

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|
| ID-1 | Northbound warning signage arrangement (~300m south of the intersection) |  <br>*Looking north along Batlow Road towards Willigobung Road intersection and Brigade Station access.*<br>  <br>*W5-36 "Fire Station"*<br>  <br>*W5-55-1n "Concealed Driveway"* | The recent works involved the installation of W5-36 "Fire Station" paired with W5-55-1n "Concealed Driveway" warning signs. The advanced warning signage arrangement has been installed on the inside of a horizontal curve on the crest approximately 300m south of the intersection with Willigobung Road/Brigade Station access.<br><br>However, should a northbound road user fail to observe, comprehend and react when required (refer to GO-1 above), it may result in high-speed intersection crash types involving road users travelling northbound on Batlow Road and those entering/exiting the Willigobung Brigade Station access. The likely travel speeds and impact angles may result in a high energy transfer at impact causing serious harm to occupants.<br><br>Should a road user's attention be taken away from the roadway at a critical time on the approach to a substandard horizontal curve and vertical crest curve, this may cause drivers to stray outside the dedicated travel lane into oncoming traffic, resulting in head-on type collision at high speeds.<br><br>NOTES: This hazard will be exacerbated during adverse weather and at nighttime when visibility is reduced. | Rare | Serious | Medium (FSI) |

RES2405.42.168 NSW RURAL FIRE SERVICE WILLIGOBUNG BRIGADE STATION

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|
| ID-2 | Central barrier linemarking for the intersection/access |  *Looking south on Batlow Rd at the Willigobung Rd Intersection*  *Looking north on Batlow Rd at the Willigobung Rd Intersection* | The recent works involved the extension of central double barrier linemarking from the crest south of the Willigobung Road intersection to the transition between white and yellow linemarking about 10m south of the intersection with Willigobung Road/Brigade Station access. This will assist in preventing northbound overtaking through the intersection. However, there is no leading central barrier linemarking (tail) on the southbound approach to the Willigobung Road intersection restricting overtaking manoeuvres in the opposing southbound direction. Additionally, Approach Sight Distance (ASD) is not achieved at the commencement of the double barrier line for southbound road users on approach.<br><br>Should southbound road users commence overtaking before the intersection they may not complete the manoeuvre before the intersection, exposing road users turning left from Willigobung Road (having only checked to their right) to an oncoming overtaking vehicle travelling in the southbound lane.<br><br>This may result in a high-speed head-on/intersection-type crash. The likely travel speeds and impact angles may result in a high energy transfer at impact causing serious harm to occupants. | Rare | Serious | Medium (FSI) |

# Concluding Statement

The recent works undertaken at the Willigobung Brigade Station access have been assessed against the findings outlined within the preceding road safety audit undertaken on the existing conditions (RES2305.42.117 Willigobung Brigade Station Access - Road Safety Audit FINAL.pdf).

The audit team have concluded that the overall risk level associated with the site has been reduced and is now considered to be of a 'Medium' risk level which is inherent of an access adjoining a rural high-speed road with the traffic volumes and road user make-up outlined within section 2.2.2. Although the risk outlined herein could be further mitigated by additional signage and linemarking, the described risks would ultimately remain as a rare occurrence with the likely severity being severe should they occur.

# Attachment A – Cat 1 Appliance Specifications

NSW GOVERNMENT

NSW RURAL FIRE SERVICE

# CATEGORY 1

## HEAVY TANKER - ISUZU CHASSIS DUAL CAB

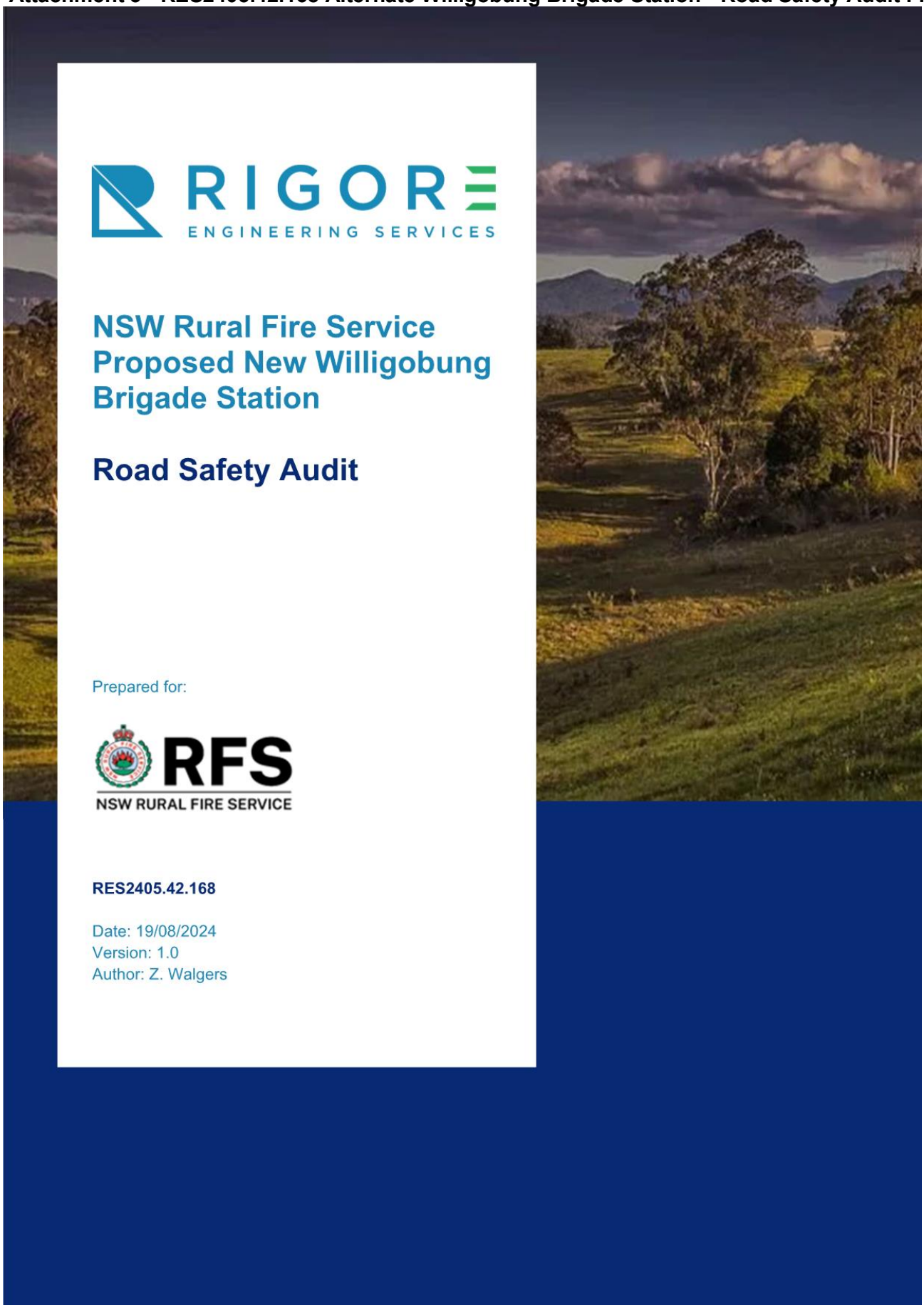
May 2018 | Fact sheet 1

## CATEGORY 1 HEAVY TANKER - ISUZU CHASSIS DUAL CAB

| | |
|---|---|
| CAB CHASSIS: | Isuzu FTS 139-260 |
| GVM: | 13,700kg |
| DIMENSIONS: | › Length: 8,000mm<br>› Width: 2,400mm (excluding external mirrors)<br>› Height: 3,300mm (excluding aerials) |
| WHEEL BASE: | 4,250mm |
| SEATING CAPACITY: | 6 |
| AXLE LOADING: | › Front: 5,200kg<br>› Rear: 9,000kg |
| ENGINE: | 6 cylinder OHC turbo diesel, displacement 7,790cc |
| NETT POWER: | 176kW @ 2,400rpm |
| NETT TORQUE: | 706Nm @ 1,450rpm |
| FUEL TANK: | 200L |
| TRANSMISSION: | Gearbox – Alison LCT2500 6 speed automatic<br>Ratios: › 1st: 3.51 › 2nd: 1.90 › 3rd: 1.44 › 4th: 1.00 › 5th: 0.74 › 6th: 0.64 › Reverse: 5.09 |
| TRANSFER CASE: | 2 speed<br>Ratios: › High: 1.00:1 › Low: 1.913:1<br>Full time AWD, central diff lock.<br>Rear axle No-Spin differential |
| DRIVE CONFIGURATION: | Four wheel drive (4x4) |
| MAIN PUMP: | RFS Class 4, two stage centrifugal pump coupled to three-cylinder diesel engine (36kW).<br>› Closed pump pressure: 1,500kPa<br>› 1,400 litres/min @ 700kPa › 1,200 litres/min @ 1,000kPa<br>› 1,000 litres/min @ 1,200kPa › 800 litres/min @ 1,300kPa<br>› 600 litres/min @ 1,400kPa › 400 litres/min @ 1,500kPa<br>*All above figures are nominal* |
| PRIMER PUMP: | Electric rotary vane primer |
| AUX PUMP: | RFS Class 7, single stage centrifugal pump coupled to single cylinder petrol engine. |
| GENERATOR (OPTIONAL): | 3.3kva 240 volt single phase generator, coupled to single cylinder petrol engine. |
| AUX PUMP 2 (OPTIONAL): | RFS Class 8, single stage centrifugal pump high flow coupled to single cylinder petrol engine. |
| FOAM SYSTEM: | Around the pump foam induction proportioner with 40 litre foam concentrate storage. |
| SUCTION: | 75mm Storz with ball valve control. |
| DELIVERY: | 2 x 38mm Storz and 1 x 65mm Storz with ball valve control. |
| HOSE REEL: | 2 x electric hose reel, galvanised steel, with 60M x 19mm ID hose & rotary head nozzle on each. |
| WATER TANK: | Galvanised steel with a capacity of 3,500 litres. |
| BODY: | Modular design, steel tray frame with aluminium chequer plate. |
| SUCTION HOSE: | 4 x 2 metre 75mm and 3 x 2 metre 38mm wired reinforced hose with Storz coupling. |
| EQUIPMENT BOX: | 2 |
| LOCKERS: | › Village x5 › Multi-purpose x4 |
| HOLDERS: | › 2 x 20L jerry can › 1 x folding ladder › 2 x standpipes › 1 x esky mount<br>› 2 x rakehoe › 2 x knapsack › 2 x drip torch › 1 x axe<br>› 1 x brushook › 1 x traffic cone holder |
| CREW PROTECTION: | Cabin ring main with one spray per side window, two for front windscreen, one rear window spray.<br>One-wheel spray per wheel including spare wheel.<br>Radiant heat curtains fitted to the inside of cabin windows. |
| MIN. LIC. CLASS.: | MR |


**For further information regarding this document, please contact the NSW RFS Engineering Services Section email engineering@rfs.nsw.gov.au or www.rfs.nsw.gov.au**

**Attachment 3 - RES2405.42.168 Alternate Willigobung Brigade Station - Road Safety Audit FINAL**



# Document Quality Information

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| Date | Version | Author | Change Reference |
|---|---|---|---|
| 05/08/2024 | 0.1 | Z. Walgers | Draft release for submission to NSW Rural Fire Service |
| 19/08/2024 | 1.0 | Z. Walgers | Final release for submission to NSW Rural Fire Service |

# Contents

# 1. Audit Statement

| | |
|---|---|
| **Project Name:** | Proposed New Willigobung Brigade Station Road Safety Audit |
| **Client:** | NSW Rural Fire Service |
| **Client Representative:** | Jon Gregory – District Manager, Riverina Highlands |
| **Contact Details:** | Phone: 0419 460 880<br>Email: jon.gregory@rfs.nsw.gov.au |
| **Auditors:** | James Gorrie (RSA-02-0732 - Level 3) – Lead Road Safety Auditor<br>Zach Walgers (RSA-02-1502 - Level 3) – Lead Road Safety Auditor |
| **Audit Type** | Strategic Design (Existing Road) |
| **Commencement Meeting:** | Monday 8th July 2024 |
| **Audit Date:** | Wednesday 10th July 2024 & Friday 2nd August 2024 |
| **Completion Meeting:** | Monday 12th August 2024 |
| **Previous Audits:** | Nil |

We, the undersigned, declare that we have reviewed the material and data listed in this report and identified the risks to road safety listed in Section 4. The reasons are given to explain why an identified item is considered a risk to road safety. The auditors listed are independent to the project.

It should be noted that while every effort has been made to identify potential safety problems, no guarantee can be made that every problem or deficiency has been identified.

It is recommended that identified risks to road safety be investigated and corrective actions implemented as soon as practicable.

James Gorrie
Lead Road Safety Auditor (RSA-02-0732 - Level 3) Date: 19/08/2024

Zach Walgers
Road Safety Auditor (RSA-02-1502-Level 3) Date: 19/08/2024

# 2. Introduction

Rigore Engineering Services has been engaged by NSW Rural Fire Service representative Jon Gregory, District Manager – Riverina Highlands, to undertake a Road Safety Audit on the existing conditions of the proposed location of the New Willigobung Brigade Station on Willigobung Road.

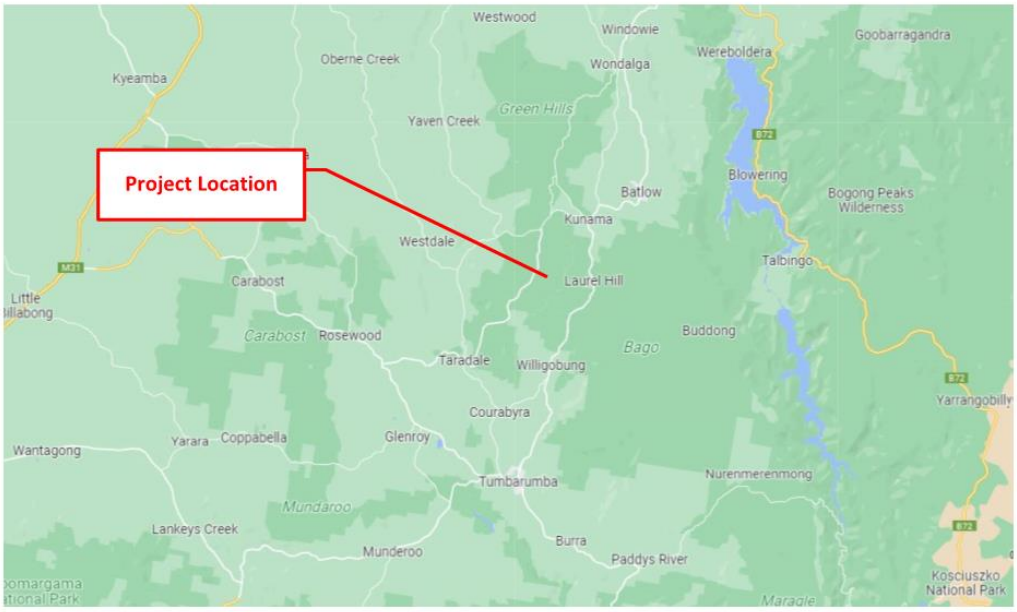



*Figure 2-1 – Locality Plan*

## 2.1. Project Description

NSW Rural Fire Service representative Jon Gregory, District Manager – Riverina Highlands has requested a road safety audit to be conducted on the proposed location of the New Willigobung Brigade Station to Lot 171 DP757233 near the junction between Willigobung Road and Willigobung South Spure Road, currently a default 100km/h speed zone.


*Figure 2-2 – Proposed relocation site for the Willigobung Brigade Station*

## 2.2. Supporting Information

The following background data and reference material were provided by NSW Rural Fire Service representative Jon Gregory | District Manager, Riverina Highlands to assist with the audit:

- Vehicle Fleet | Category 1 Appliance Specifications
- Traffic Data | Traffic Volume Viewer / Ad-hoc Traffic Data

### 2.2.1. Vehicle Fleet | Category 1 Appliance Specifications

It has been identified by Jon Gregory, the Willigobung fire brigade station has been upgraded to accommodate a Category 1 fleet vehicle. The increased vehicle size was considered during the audit process.



Refer to Attachment A – Cat 1 Appliance Specifications

### 2.2.2. Traffic Data

There has been no traffic data provided by the client to inform this road safety audit, however, site observations indicate that Willigobung Road and Willigobung South Spur Road attract very low usage and would largely consist of locals familiar with the existing road environment. This has been factored herein when considering the likelihood of an incident occurring.

## 2.3. Audit Scope

The Road Safety Audit was conducted in accordance with relevant Austroads Guides to Road Safety, inclusive but not limited to *Austroads Guide to Road Safety Part 6: Road Safety Audits 2022* including the application and consideration of Safe System principles.

The Rigore Road Safety Audit team has undertaken the audit by embedding Safe Systems principles. This is achieved by applying our knowledge, experience and understanding of the Safe Systems Framework to document findings in a manner that describes the road user exposure, crash likelihood and severity.


The identification and removal or treatment of road elements that may contribute to crash occurrence or crash severity is a key component of the safe system approach to road safety. A safe system acknowledges that human error within the transport system is inevitable and that when it does occur the system makes allowance for these errors to minimise the risk of serious injury or death. In a safe system, therefore, roads (and vehicles) should be designed to reduce the incidence and severity of crashes when they inevitably occur.

Four key principles form the basis of the Safe System philosophy, as outlined in *Guide to Road Safety Part 1: Introduction & The Safe System*:

- People make mistakes that can lead to road crashes
- The human body has a limited physical ability to tolerate crash forces before harm occurs
- A shared responsibility exists amongst those who plan, design, build, manage and use roads and vehicles and those providing post-crash care to prevent crashes resulting in serious injury or death
- All parts of the system must be strengthened to multiply their effects; so that if one part fails, road users are still protected.

Safer road user behaviour, safer speeds, safer roads and safer vehicles are the four key elements that make up a safe system. In relation to speed, the *Guide to Road Safety Part 3: Safe Speed*, using Wramborg curves, outlines the relationships between a motorized vehicle collision speed and the probability of a fatality for different crash configurations:

Often refer to as the Safe System speeds, the following aspirational operating speeds are as follows:

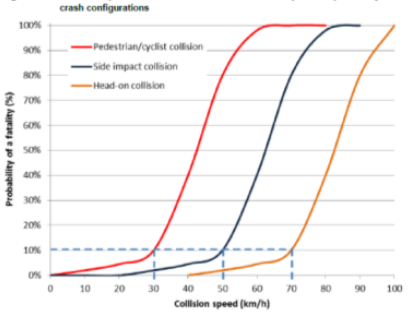
**30km/h** where there is the possibility of a collision between a vulnerable road user and a passenger vehicle or where there is the possibility of a side impact with a fixed object such as a tree or pole

**50km/h** where there is the possibility of a right-angle collision between passenger vehicles

**70km/h** where there is the possibility of a head-on collision between passenger vehicles

**≥100 km/h** where there is no possibility of side or frontal impact between vehicles or impacts with vulnerable road user impacts.

Figure 2.6: Relationships between a motorised vehicle collision speed and probability of a fatality for different crash configurations




Source: Jurewicz et al. (2015a) and based on Wramborg (2005)

**NOTE:** presently there is only limited evidence on cyclist and motorcyclist injury thresholds and an assumption is often made that their injury potential is the same as the pedestrian curve. The curves only represent passenger car interactions and do not account for young and elderly people and heavy vehicles. The curves are also limited in that they only provide the probability of fatality and not serious injury and there is little published evidence demonstrating the origins of the curves.

## 2.4. Primary Considerations

Complimentary to the Safe Systems Approach, the following primary factors are evident for consideration on this project. The report herein has been undertaken based on the below primary considerations:

### 2.4.1. Relationship between vehicle speed and the likelihood of Severe Injury

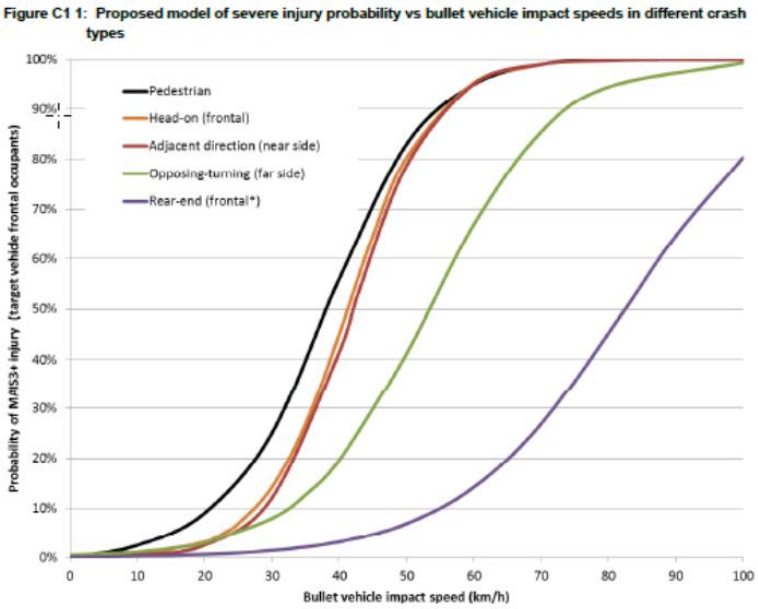



*Figure 2-3 – Reference: Extract Austroads Guide to Traffic Management Part 6- 2020*

### 2.4.2. Influence of impact angle and travel speed on transferable kinetic energy

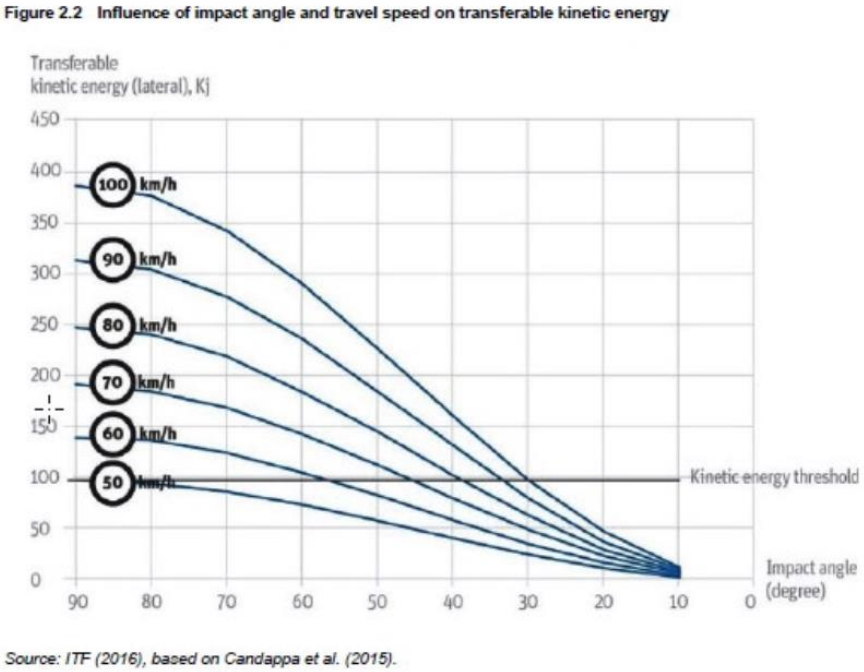



*Figure 2-4 – Reference: Extract Austroads Guide to Traffic Management Part 6- 2020*

## 2.4.3. Roadside Hazards:



**Figure 1.3: Calculation of an effective lateral distance to a hazard**

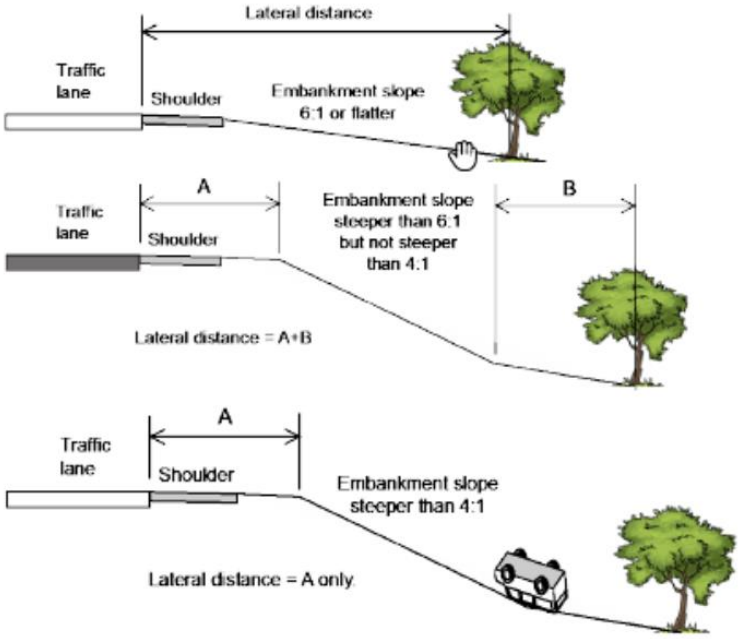
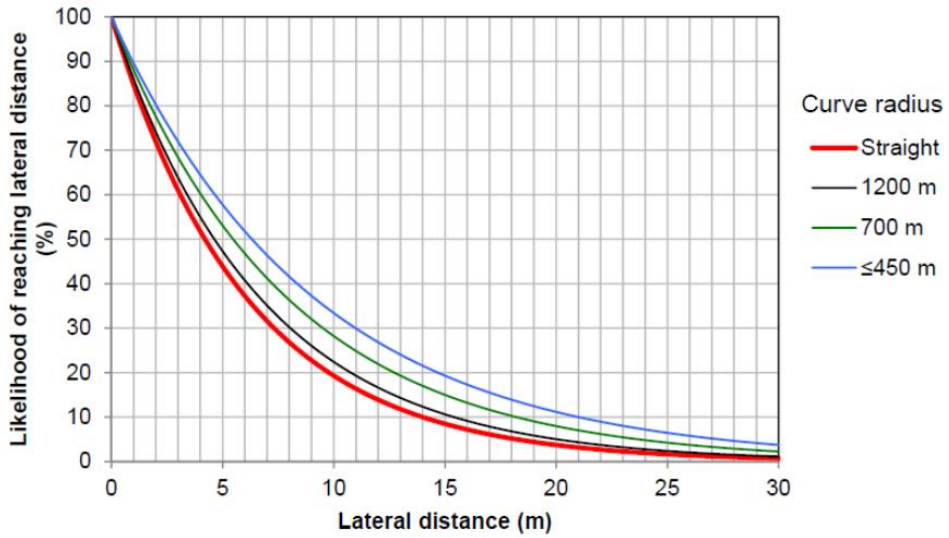



*Figure 2-5 – Reference: Extract Austroads Guide to Road Design Part 6- 2021*

## 2.4.4. Likelihood of Reaching a Lateral Distance

**Figure B.6: Likelihood of reaching a lateral distance for a road with an operating speed of 110 km/h and with curves of different radii**




*Source: Adapted from Austroads (2020e).*

*Figure 2-6 – Reference: Extract Austroads Guide to Road Design Part 6- 2021*

### 2.4.5. Safe Intersection Sight Distance (SISD)

It is fundamental to the safety of intersections that drivers approaching in all traffic streams are able to:

- recognise the presence of an intersection in time to slow down or stop in a controlled and comfortable manner.
- see vehicles approaching in conflicting traffic streams and give way where required by law or avoid a crash in the event of a potential conflict.

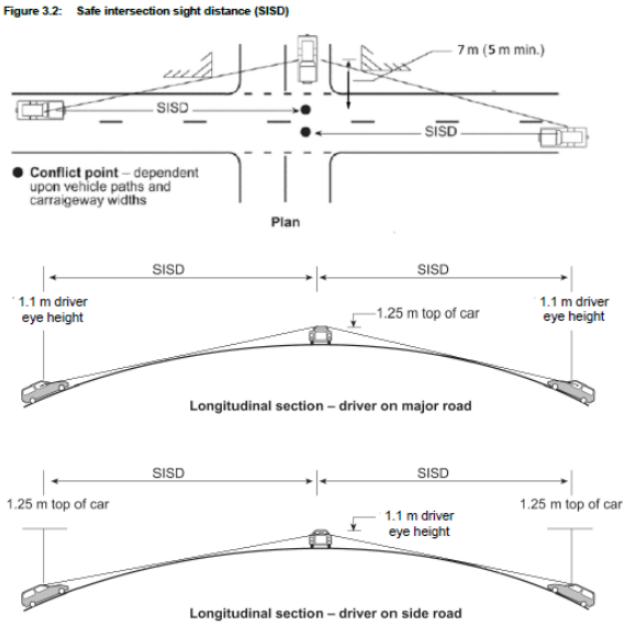



*Figure 2-7 – Extract Austroads Guide to Road Design Part 4A – 2021*

### 2.4.6. Stopping Sight Distance (SSD)

Stopping Sight Distance (SSD) is the distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead.

- It is generally measured between the driver's eye (1.1 m) and a 0.2 m high, stationary object on the road. The object height of 0.2 m represents a hazard that cannot be driven over and hence requires the vehicle to stop to avoid a collision.
- Car stopping sight distance shall be available along all traffic lanes on all roads. This distance is considered to be the minimum sight distance that should be available to a driver at all times.

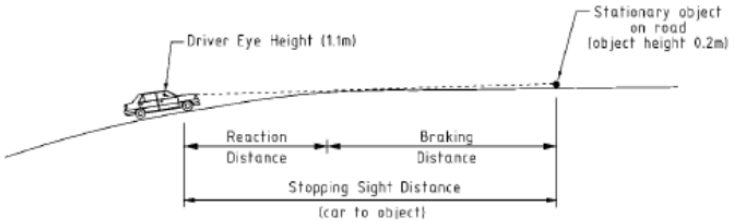



*Figure 2-8 – Extract Austroads Guide to Road Design Part 3 – 2021*

### 2.4.7. References

The following list of references provided background information during the audit process:

- TNSW Guidelines for Road Safety Audit Practices (2011)
- Austroads: Guide to Road Safety Part 6: Road Safety Audit (2022)
- Austroads: Guide to Road Design, Road Safety, Traffic Management and RMS Supplements
- Australian Standards AS1742 – Manual of Uniform Traffic Control Devices and RMS Supplements
- TfNSW Speed Zoning Guideline
- NSW Road Rules Legislation

### 2.4.8. Exclusions

A road safety audit:

- is **not** a way of assessing or rating a project as good or poor
- is **not** a means of ranking or justifying one project against others in a works program
- is **not** a way of rating one option against another
- is **not** a check of compliance with standards
- is **not** a substitute for design checks
- is **not** a crash investigation
- is **not** a redesign of a project
- is **not** to be applied only to high-cost projects or only to projects involving safety problems
- is **not** the name used to describe informal checks, inspections or consultation.

### 2.4.9. Audit Team

In accordance with the *Austroads Guide to Road Safety Part 6: Road Safety Audits* minimum audit team requirements, Rigore has provided two (2) Level 3 Lead Road Safety Auditors and one (1) Level 2 Road Auditor to form the independent audit team.

**James Gorrie**

| | |
|---|---|
| Position: | Managing Director \| Lead Road Safety Auditor |
| Experience: | 17+ years |
| Education: | Master of Engineering \| Bachelor of Engineering Tech |
| Qualifications: | MIEAust CPEng NER APEC Engineer |
| Accreditations: | Level 3 Lead Road Safety Auditor NSW (RSA-02-0732) |

**Zach Walgers**

| | |
|---|---|
| Position: | Lead Civil Design Engineer \| Road Safety Auditor |
| Experience: | 8+ years |
| Education: | Master of Engineering / Bachelor of Technology \| Current Associate Degree of Engineering (Civil) |
| Qualifications: | MIEAust |
| Accreditations: | Level 3 Lead Road Safety Auditor NSW (RSA-02-1502) |

### 2.4.10. Site Inspections

The day and night site inspections were undertaken by James Gorrie (Lead Road Safety Auditor) and Zach Walgers (Road Safety Auditor) on Wednesday 10th June 2024 between 3:30pm and 6:00pm, the weather was cold, overcast with light intermittent rain for the duration of the inspection. An additional day time site inspection was undertaken on Friday 2nd August 2024 between 2:30pm and 3:00pm, the weather was cold with clear skies for the duration of the inspection.

### 2.4.11. Commencement Meeting

The Commencement Meeting was held via telephone call on Monday 8th July 2024 between 12:30pm and 12:45pm. In attendance were James Gorrie (Lead Road Safety Auditor) and Jon Gregory (NSW RFS representative). The Commencement Meeting provided the opportunity to define the extent and purpose of the audit. The audit team provided Jon with an overview of the proposed approach and an indicative timeframe for completion.

### 2.4.12. Completion Meeting

The Completion Meeting was held via MS Team Meeting on Monday 12th August 2024 between 2:30pm and 3:30pm. In attendance were James Gorrie (Lead Road Safety Auditor), Zach Walgers (Road Safety Auditor) Scott Southwell and Peter Jones (NSW RFS representatives). The draft report was discussed in detail with RFS representatives accepting the audit findings as well as providing verbal comments on the findings for consideration and incorporation in the final audit report.

# 3. Risk Assessment Framework

The Austroads system of risk assessment has been applied to issues identified in the audit with the relative characteristics as follows:

**Table 3.1: How often is the problem likely to lead to a crash?**

| Likelihood | Description |
|---|---|
| Almost certain | Occurrence once per quarter |
| Likely | Occurrence once per quarter to once per year |
| Possible | Occurrence once per year to once every three years |
| Unlikely | Occurrence once every three years to once every seven years |
| Rare | Occurrence less than once every seven years. |

**Table 3.2: What is the likely severity of the resulting crash type?**

| Severity | Description | Examples |
|---|---|---|
| Insignificant | Property damage | Some low speed collisions<br>Pedestrian walks into object (no head injury)<br>Car reverses into post |
| Minor | Minor first aid | Low speed collisions<br>Pedestrian walks into object (minor head injury)<br>Cyclists fall from bicycle at low speed |
| Moderate | Major first aid and/or presents to hospital (not admitted) | Some low to medium -speed collisions<br>Cyclists fall from bicycle at moderate speed<br>Left-turn rear-end crash in a slip lane |
| Serious | Admitted to hospital | High or medium -speed vehicle / vehicle collision<br>High or medium -speed single vehicle collision with fixed road side object<br>Pedestrian struck at high speed |
| Fatal | At scene or within 30 days of the crash. | High speed multi vehicle crash on Freeway.<br>Car runs into crowded bus stop.<br>Bus and petrol tanker collide<br>Collapse of bridge or tunnel |

**Table 3.3: The resulting level of risk**

| | | | Severity* | | | | |
|---|---|---|---|---|---|---|---|
| | | | Insignificant | Minor | Moderate | Serious | Fatal |
| | | | Property Damage | Minor first aid | Major first aid and/or presents to hospital (not admitted) | Admitted to hospital | Death within 30 days of the crash |
| Likelihood (includes exposure) | Almost Certain | One Per Quarter | Medium | High | High | Extreme (FSI) | Extreme (FSI) |
| | Likely | Quarter to 1-year | Medium | Medium | High | Extreme (FSI) | Extreme (FSI) |
| | Possible | 1 to 3 years | Low | Medium | High | High (FSI) | Extreme (FSI) |
| | Unlikely | 3 to 7 years | Negligible | Low | Medium | High (FSI) | Extreme (FSI) |
| | Rare | 7 years + | Negligible | Negligible | Low | Medium (FSI) | High (FSI) |

Safe System Crash Outcome Threshold

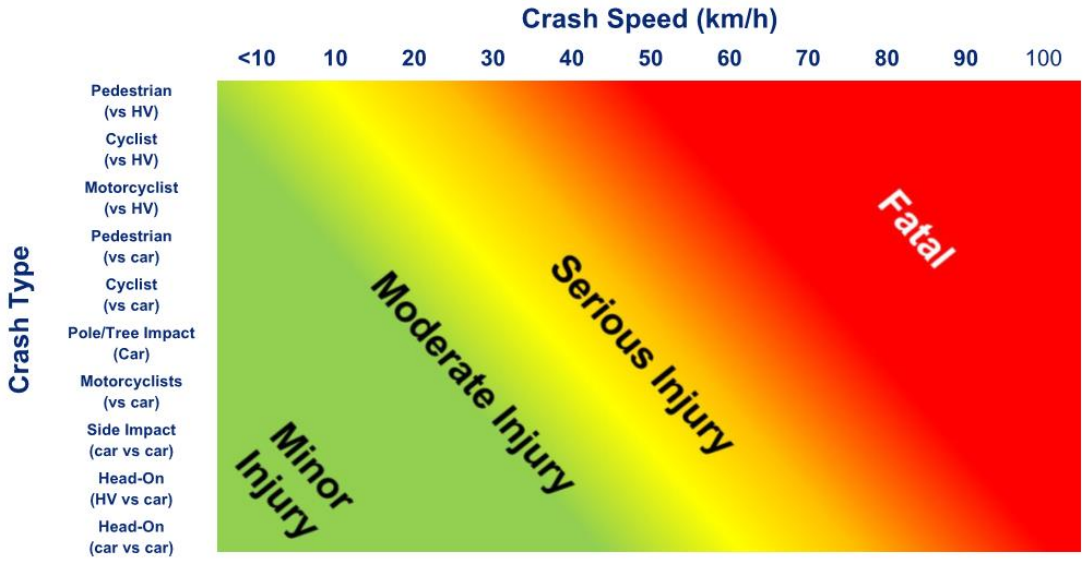
The treatment that Austroads recommend for the above levels of risk is shown in Table 3.4.

**Table 3.4: Treatment approach**

| Risk | Treatment |
|---|---|
| Extreme | Must be corrected regardless of cost |
| 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 even if the treatment cost is moderate, but not high |
| Low | Should be corrected or the risk significantly reduced if the treatment cost is low |
| Negligible | No action required |

The risk matrix above shown in *Table 3.3*, is aligned to Safe System principles and has been designed to be used with consideration of a severity guidance sheet which was developed by the Project Working Group. The PWG comprising of representatives from state and local road agencies was established with the primary objective of consolidating and updating the previously issued Parts 6 and 6A (Austroads 2019).

**Table 3.5: The severity guidance sheet – to be used with the risk matrix**



# 4. Audit Results

The results of the audit observations and findings have been reported in two categories:

4.1 General Observations
4.2 Identified Risks

The audit findings are provided in Table 4.1 to Table 4.2, together with their risk rating, as determined using the risk assessment tables in Section 3.

This audit has provided the insights of an independent team to highlight potential road safety deficiencies that should be formally considered by the client representative. The responsibility of responding to the findings of a road safety audit rests with the client, not with the Auditor. The client is under no obligation to accept the audit findings. It is also noted that it is not the role of the Auditor to agree to or approve the client's responses to the audit.

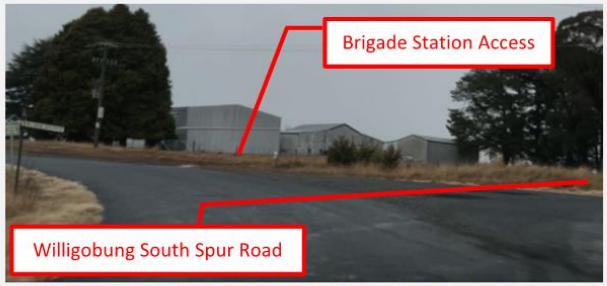
## 4.1 General Observations

| ID | General Observations | Photos / Reference |
|---|---|---|
| GO-1 | It is noted that the default speed zone for Willigobung Road and Willigobung South Spur Road is 100km/h. Considering the substandard horizontal and vertical geometry, narrow formation width and lack of linemarking and delineation on either side of the proposed access, drivers observed were operating at a speed closer to 50-60km/h.<br><br>NOTE: This self-enforcing environment was observed during both site inspections with drivers further reducing their speed during adverse weather and at night time. |  |

## 4.2. Identified Risks

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|
| ID-1 | Sight restriction on Willigobung Road at the Brigade Station access |  Looking east on Willigobung Rd from the proposed access  Looking west on Willigobung Rd from the proposed access | The Safe Intersection Sight Distance (SISD) from the proposed Willigobung Brigade Station access is restricted by a tight crest vertical curve and cut embankment obscuring approaching vehicles from the east (looking right).<br><br>The Safe Intersection Sight Distance (SISD) from the proposed Willigobung Brigade Station access is also obstructed by a vehicle's primary support column due to the horizontal geometry of Willigobund Road, obscuring approaching vehicles from the west (looking left).<br><br>A driver may mistakenly enter Willigobung Road without an adequate gap in through traffic and result in an intersection crash at low to moderate speed. The likely operating speed (50-60km/h) and impact angles may result in a high enough energy transfer at impact to cause a moderate level of harm to occupants.<br><br>NOTE: The degree of harm may increase should a more vulnerable road user be involved in the collision (e.g. motorcyclist). The degree of harm may be reduced during adverse weather when drivers reduce their operating speed. The likelihood will likely reduce when headlights are being used providing further visual cues of approaching vehicles (e.g. nighttime/fog). | Unlikely | Moderate | Medium |

| ID | Location | Photos / Reference | Description of Deficiency & Likely Consequence | Likelihood | Severity | Risk Level |
|---|---|---|---|---|---|---|
| ID-2 | Delineation on Willigobung Road at the Brigade Station access |  Looking east on Willigobung Rd from the proposed access<br>  Looking east on Willigobung Rd from the proposed access | There is a general lack of existing pavement marking and delineation devices along Willigobung Road on both approaches to the proposed brigade station access. Road users were observed to track across the centre of the sealed area when travelling through the horizontal curve on Willigobung Road. This is presumable due to the absence of edge lines and central barrier linemarking to guide lane discipline.<br><br>A driver may enter Willigobung Road from the proposed Willigobung Brigade Station access whilst an approaching vehicle is tracking across the centre of the sealed area. Should this occur, it will result in an intersection type crash at low to moderate speed. The likely operating speed (50-60km/h) and impact angles may result in a high enough energy transfer at impact to cause a moderate level of harm to occupants.<br><br>NOTE: The degree of harm may increase should a more vulnerable road user be involved in the collision (e.g. motorcyclist). The degree of harm may be reduced during adverse weather when drivers reduce their operating speed. The likelihood will likely reduce when headlights are being used providing further visual cues of approaching vehicles (e.g. nighttime/fog). | Rare | Moderate | Low |

# Concluding Statement

The proposed new Willigobung Brigade Station access location has been assessed and the audit team have concluded that the overall risk level associated with the site is considered to be of a 'Low to Medium' risk level which is inherent of an access adjoining a rural moderate to high-speed road with the traffic volumes and road user make-up outlined within section 2.2.2. Although the risk outlined herein could be further mitigated by additional works, the described risks may ultimately remain as a rare/unlikely occurrence with the likely severity being moderate should they occur.

# Attachment A – Cat 1 Appliance Specifications

## Attachment 4 - 20250611 -DRAFT Heads of Agreement - Land Lease

**Draft Heads of Agreement**
**Between: [redacted] – Property Owner at (Part Lot 1 DP 818522) being Part Batlow Road Willigobung Road 2653**
**And: Snowy Valleys Council on behalf of Rural Fire Service (Property NSW)**

| | |
|---|---|
| Lessor | [redacted] |
| Lessor Address | Batlow Road, Willigobung Road, 2653<br>[redacted] |
| Lessee | Snowy Valleys Council<br>76 Capper Street, Tumut, 2720<br>info@svc.nsw.gov.au<br>1300 275 782 |
| Lessee | Rural Fire Service<br>Tumut FCC<br>76 Capper Street, Tumut<br>[redacted]@rfs.nsw.gov.au<br>02 6981 4222 |
| Address of Property | Part Lot 1 DP 818522 being Part Batlow Road, Willigobung Road, 2653 |
| Type of Property | Willigobung RFS Shed |
| Area ($m_2$) | 110 $m^2$ |
| Current | Willigobung Shed currently occupies the parcel identified |
| Annual Rent | |
| Term of Lease | 5 year plus 3 x 5 year options to extend |
| Lease Commencement Date | 1 July 2025 |
| Lease Expiry Date | 30 June 2030 option to extend 5 years<br>30 June 2035 option to extend 5 years<br>30 June 2040 option to extend 5 years |
| Option Term | Three (5 x 5 x 5) year |
| Earliest Date to Exercise Option (3 months before expiry) | 30 March 2030 |
| Latest Date to Exercise Option (1 month before expiry) | 30 May 2030 |
| Rent Commencement | 1 July 2025 |
| Rate of Rent / $00$m^2$ | $00$m^2$ (Total Site Area is 110$m^2$) |
| Annual Rent | $1 (excl. GST) paid Monthly |
| Outgoings (100 %) by the Lessee | Lessee (RFS) is responsible for the following outgoings for land & building<br>a. All Electricity consumed in the property in accordance with a pro rata account<br>b. Water<br>c. Gas<br>d. Cleaning<br>e. Maintenance |

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| | |
|---|---|
| | The Lessor must pay all outgoings for the land or the building of which the property is part when they fall due.<br><br>All above charges to be paid by the Lessee (RFS) on demand.<br><br>Administration Costs $597.15 (GST excl.) p.a.<br>Invoiced yearly.<br><br>Costs calculated on a proportionate basis and adjusted by CPI - March Quarter – All Groups Sydney - annually on Anniversary of lease |
| Permitted use | • Rural Fire Service Shed maintenance,<br>• training area for the Willigobung brigade members, which includes<br>• facilities, water, power and additional firefighting support equipment. |
| Lessor (Landowner) responsibilities | The responsibility for works and maintenance to be carried out on the subject property is to the Lessee.<br>Lessor to provide Lessee access to the property |
| Lessor's rights | The Lessor and its invitees may enter the Property at reasonable time on three days' notice to view the state of repair, carry out repairs, renovations, maintenance, modifications, extensions or alterations.<br>The Lessor can enter the property at any time in an emergency. |
| Demolition of Property | 1. The Lessor (Property owner at Part Lot 1 DP818522) may terminate the Lease if the Lessor wants to undertake capital works.<br>3 months written notice to be provided to Lessee of capital works. |
| Lessor's obligation to provide access | The Lessee and its invitees may access the Property during Access Hours. |
| Maintenance of the Property | The Lessee (Council)is responsible for:<br>• Structural repairs unless required due to act of negligence by the Lessee (RFS).<br>• The replacement of any broken plumbing, electrical/wiring, gas fittings and other apparatus that are situated underground and located outside of the property.<br>• The lessee is responsible for the replacement of any broken plumbing, electrical/wiring, gas fittings and other apparatus that are situated within the property boundary.<br>• The replacement of structural parts of the property including the amenities. |
| Yield up Property | 1. Return of Property to Lessor on Termination of Lease<br>2. Remove the Lessee's property from the Property at the Lessee's cost.<br>3. Peaceably surrender the Property to the Lessor.<br>4. Clean and free from rubbish and return to the Lessor all keys for the Property held by the Lessee.<br>5. The Lessee must make good any damage caused to the property as a result of the Lessee's removal and leave the Property |

| | |
|---|---|
| Payment responsibilities | The Lessee will duly and punctually pay or otherwise discharge all outgoings, claims, debts, liabilities and other obligations arising out of or connected with the carrying on of the business of the Lessee upon the demised premises. |
| Payments to the Landlord (Lessor - Property owner at Part Lot 1 DP818522) | The Lessee will perform and observe all and every of the terms, conditions and payment obligations expressed or implied on the Lease. Rental payments are to be made monthly (1) to the Lessor.<br><br>Should the Lessee fail to pay any moneys payable hereunder on the due dates or within twenty-one (21) days thereafter or if the Lessee or either of them shall be in dealt with in accordance with the draft lease. |
| Prohibited Activities | The Lessee will not use or permit to be used the premises in any noxious noisy, immoral or offensive manner and or permit on the premises anything which in the opinion of the Lessor may be or become a nuisance, disturbance or cause of damage to the Lessor or its tenants or the occupiers of adjoining premises and will not hold or suffer or permit to be held any auction sale on the demised premises. |
| Operational Responsibilities | The Lessee shall not deem or omit any act, matter or thing which might be detrimental to the maintenance of the goodwill of the Council.<br><br>The Lessee shall carry on the business by themselves and their employees in a professional and courteous manner. |
| Compliance relevant laws legislation | For the duration of the lease the Lessee will observe, perform and keep all provisions of all licences, industrial / WHS laws, public health compliance and retail laws and all other Acts, regulations and Ordinances or other laws or requirements of all required authorities relating to affecting the premises and/or the conduct of the business or the employees therein. |
| Work Health and Safety | The tenant must comply with all Work, Health and Safety Legislation during the handover and decommissioning process |

The Common Seal of Snowy Valleys Council was affixed hereto on the …….day of ……2025 in pursuance of resolution No. …… passed on the ..... Day of …….. 2025.

| | | | |
|---|---|---|---|
| Tenant | **Snowy Valleys Council** | | |
| Signed | | Signed | |
| Name | | Name | |
| Position | Acting General Manager | Position | Mayor |
| Date | | Date | |
| | | | |
| Lessor | [redacted] | | |
| Signed | | | |
| Name | | | |
| Position | | | |
| Organisation | | | |
| Date | | | |