



Limestone Coast

Regional Road Assessment September 2019



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RAA

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V1.0	16/08/19	MV/AC/JL	CM/MV/AC/JL	Draft for comment.
V1.1	10/9/19	MV/AC/JL	CM	Final draft for approval.
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Executive Summary

RAA's Road Safety Team periodically evaluates the South Australian regional road network. This assessment of the Limestone Coast region reviews the road network within seven Limestone Coast councils, namely City of Mt Gambier, DC of Grant, DC of Robe, Kingston DC, Naracoorte Lucindale Council, Tatiara DC and Wattle Range Council. The selection of roads and locations to investigate is largely guided by the foremost concerns of RAA members and regional stakeholders; however, it also considers the concerns of traffic volumes and an analysis of crash data.

RAA consulted the community through an extensive survey of Limestone Coast members that was also open for public comment. The Road Safety Team met with key stakeholders across the region whilst undertaking on-site investigations of the road network. This included meetings with representatives from five of the seven councils, the Limestone Coast Local Government Association (LCLGA), Primary Industries and Regions SA (PIRSA) and Regional Development Australia (RDA). The main topics of discussion in these meetings centred around the primary concerns raised in the community survey, as well as other transport and mobility funding issues RAA were aware of.

During community consultation, the key mobility issues identified included:

- Concerns regarding the safety of interactions with **large freight vehicles** on narrow regional highways.

- A demand for **shared paths** to provide safer cycling and walking between townships
- A lack of **general maintenance** on state maintained roads throughout the region

The Road Safety team undertook seven days of traffic and road assessments covering a distance of approximately three and a half thousand kilometres. These traffic and road assessments took place late in March 2019.

As a result of our investigations and community feedback, the RAA Road Safety Team have identified some key areas of improvement and further investigation that are required in the Limestone Coast Region including:

- Staged duplication of **the Dukes Highway** between Tailem Bend and the Victorian border.
- Upgrades to **Riddoch Highway** including additional overtaking lanes, hazard removal and intersection upgrades whilst recognising this vital piece of infrastructure should be part of the National Highway Network.
- Greater investment into **shoulder sealing** programs across the region.
- A need for investment into **roadside hazard removal** or protection across the region.
- Safety upgrades to four roads that had speed limits reduced to 100 km/h in 2017, with a subsequent **speed limit review**.
- Substantial investment into the **Princess Highway** corridor to improve safety and efficiency.

Notes

Crash Data

Unless otherwise specified, all crash data discussed in this report refers to casualty crash data sourced from DPTI between the years 2013 and 2017 inclusive. For the purposes of this report, a casualty crash is defined as any crash that results in minor injuries, serious injuries or fatality. Crashes resulting in only property damage have been omitted from the broader analysis, however they may be reviewed in local areas when required for the purposes of individual investigations.

Not all crashes within the crash database are geocoded. Crash information shown on maps will only show geocoded crash data. Therefore, crashes without location data will not be included in the visual analysis. Non-geocoded crashes only make up a very small portion of all crashes.

Traffic Volumes

Current estimated traffic volumes (AADT) quoted on state maintained roads in this report have been sourced through Data SA and these values generally refer to DPTI surveys conducted between 2014 and 2017. The 2007 AADT values quoted throughout this report refer to DPTI rural traffic volume estimate maps released in 2007.

List of Abbreviations

AADT

Average Annual Daily Traffic

ATLM

Audio Tactile Line Marking

CAM

Chevron Alignment Marker

CMG

City of Mt Gambier Council

DCG

District Council of Grant

DCR

District Council of Robe

DIRDC

Department of Infrastructure, Regional Development and Cities

DPTI

Department of Planning Transport and Infrastructure

KDC

Kingston District Council

PBS

Performance Based Standards

NLC

Naracoorte Lucindale Council

RRPM

Retroreflective Raised Pavement Marker

TDC

Tatiara District Council

WRC

Wattle Range Council

Contents

Executive Summary	ii
Notes	iii
Contents	iv
Background.....	1
Recommendations	3
Full list of recommendations	4
Discussion and Survey Analysis	10
Member Sampling Frame	10
The Region.....	10
Mobility Profile	11
Road Maintenance	13
Unsealed Roads.....	15
Local vs Tourist Crashes	16
Freight.....	16
Road Safety	17
Speed Zones.....	21
Tourism	22
Cycling	23
Walking / Pedestrians.....	25
Community Transport.....	26
Taxi / app-based ride-sharing	28
Crash Statistics.....	29
2013-2017 Casualty Crash Analysis.....	29
Local vs Visitor Involvement in Crashes	33
Site Investigation Details and Recommendations.....	35
General and Common Issues	35
Narrow Bridges	35
Speed Limit Reductions from 110 km/h to 100 km/h	35
Hazardous roadside vegetation.....	36
Dukes Highway	37
Riddoch Highway	43
Princes Highway.....	57
Southern Ports Highway	75
Naracoorte Road	81
Frances Road.....	85
Clay Wells Road.....	92
Ngarkat Highway	96

Carpenter Rocks Road	100
Glenelg River Road	104
Lucindale Road	107
Mount Burr Road	110
Glenelg Highway	114
Kangaroo Flat Road	117
Avenue Range Road	120
Other Roads Assessed.....	122
Rowney Road (Bordertown – Desert Camp)	122
Four Mile Road	122
Wimmera Highway	122
Casterton Road.....	123
Nangwarry Road	125
Tantanoola Road	126
Tillers Road.....	126
Eight Mile Creek Road	127
Callendale Road	127
Wattle Range Road.....	128
Maaoupe Road	129
Moyhall Road.....	129
Bog Lane	130
Nora Creina Road	131
Sandy Lane (Robe).....	131

Background

The RAA Road Safety team periodically evaluates the South Australian regional road network based on the concerns of regional RAA members. During this assessment of the Limestone Coast region, the team covered approximately 3,500 kilometres of the road network, encompassing more than 30 roads and intersections over seven days in March 2019. RAA's previous assessments in the region occurred in 2013 and 2014 focussing on the Riddoch Highway, Dukes Highway and Princes Highway.

In the lead up to the 2019 federal election, RAA ran an extensive campaign, which included advocating for improvements to the Dukes Highway and the Riddoch Highway. In order to obtain enough background information for this assessment, these highways were reviewed separately in November 2018. These highways were traversed again over the course of our March 2019 assessments to identify any differences since November 2018.

RAA consulted with local road authorities and regional stakeholders, along with distributing a detailed survey to 8,100 RAA members residing in the Limestone Coast region, of which 669 responses were received. Information was sought regarding locations that were deemed unsafe or inefficient, challenges for freight operations, and issues with other forms of mobility such as active and community transport experienced throughout the region.

The area assessed is shown in the map over page and is defined by the combined boundaries of the seven Limestone Coast Councils, namely:

- City of Mt Gambier
- District Council of Grant
- District Council of Robe
- Kingston District Council
- Naracoorte Lucindale Council
- Tatiara District Council
- Wattle Range Council






Further to these council regions, RAA drove the full length of Princes Highway, Dukes Highway and Ngarkat Highway in order to complete the assessment of each of these roads within the single regional assessment.



Recommendations

Recommendations throughout this report are ranked using a priority colour scale as depicted below. The primary factors considered when prioritising recommendations are the **importance to RAA members, road safety, traffic volumes and importance to tourism and industry in the region**, however, not all of these factors may contribute to a given priority.

Timeframes mentioned below are a general guide only, and may not be applicable to every recommendation within this report.

Recommendation Colour Scale	
	▪ <u>High priority recommendation</u> . This issue is of very high importance to RAA Members, has significant implications to road safety, is located on a busy road corridor and is important to tourism and industry in the region. These recommendations should be committed to within 12 months.
	▪ <u>Mid-high priority recommendation</u> . This issue is of high importance to RAA Members, has implications to road safety, is generally located on a busy road corridor and can be important to tourism and industry in the region. These recommendations should be committed to within 3 years.
	▪ <u>Mid priority recommendation</u> . This issue is moderately important to RAA Members, has some road safety implications and may be important to tourism and industry in the region. These recommendations should be committed to within 5 years.
	▪ <u>Mid-low priority recommendation</u> . This issue has been raised by RAA Members, may have some road safety implications or be important to tourism and industry in the region. These recommendations should be implemented as part of routine maintenance, or are part of a longer-term vision.
	▪ <u>Low priority recommendation</u> . This issue may have road safety implications, or has some level of importance to tourism and industry in the region. These recommendations should be implemented as part of routine maintenance, rolled out gradually or are part of a longer-term vision.

Full list of recommendations

The below list of recommendations is displayed in the order they appear throughout this report.

Key Recommendations		Authority
<ul style="list-style-type: none"> A cycling and shared path strategy be investigated with consideration given to utilising disused rail corridors which will provide better cycling and active transport corridors across the region and reduce the number of cyclists using hazardous road corridors. 		All
<ul style="list-style-type: none"> Widen narrow bridges on key freight routes and high traffic routes to provide safety benefits to all road users and additional efficiencies to freight and industry in the region. 		All
<ul style="list-style-type: none"> Review suitability of 110 km/h speed limits on Riddoch Highway (Bay Road), Carpenter Rocks Road, Ngarkat Highway and Clay Wells Road following implementation of safety upgrades. 		DPTI
<ul style="list-style-type: none"> Widen and expand clear zones on state highways to a preferable five metres (minimum three metres). Councils should also aim to achieve these targets on major council maintained corridors. Where these limits are not possible, safety barriers should be further utilised to protect these hazards. 		All
Dukes Highway		
<ul style="list-style-type: none"> Progressively duplicate Dukes Highway between Taillem Bend and the Victorian border. 		DPTI/ DIRDC
<ul style="list-style-type: none"> Install wire rope barrier to separate opposing traffic flows and reduce the number of head on crashes occurring. 		DPTI/ DIRDC
Riddoch Highway		
<ul style="list-style-type: none"> Recognise Riddoch Highway on the National Highway Network. 		DPTI / DIRDC
<ul style="list-style-type: none"> Road and shoulder widening to achieve minimum dimensions (3.5m lanes, 1.0m sealed shoulder), set out in <i>Austroads Guide to Road Design</i>. 		DPTI
<ul style="list-style-type: none"> Complete ATLM installation on remaining sections along the corridor. 		DPTI
Keith to Naracoorte		
<ul style="list-style-type: none"> Install minimum of four overtaking lanes. 		DPTI
<ul style="list-style-type: none"> Removal or protection of all fixed hazards within 5m of the highway. 		DPTI
<ul style="list-style-type: none"> Extend turn lanes and modify lane designation with the intersections with Rowney Road and Rowney Road West. 		DPTI
<ul style="list-style-type: none"> Further intersection upgrades along the corridor to facilitate safer turning movements. 		DPTI
<ul style="list-style-type: none"> Further investigation into a freight bypass of Naracoorte. 		DPTI
Naracoorte to Penola		
<ul style="list-style-type: none"> Extend the two existing overtaking lanes by 500m to facilitate safer overtaking of road trains. 		DPTI
<ul style="list-style-type: none"> Install two new overtaking lanes (one in each direction). 		DPTI
<ul style="list-style-type: none"> Removal or protection of all fixed hazards within 5m of the highway. 		DPTI
<ul style="list-style-type: none"> Review Speed limit in the Coonawarra wine region between Edenhope Road and Penola. 		DPTI
<ul style="list-style-type: none"> Install right and left turn lanes to facilitate safer access to cellar doors and side roads in the Coonawarra wine region. 		DPTI
Penola to Mount Gambier		
<ul style="list-style-type: none"> Extend four overtaking lanes to facilitate safer overtaking of road trains and log trucks. 		DPTI
<ul style="list-style-type: none"> Surface remediation works to extend pavement life. 		DPTI
<ul style="list-style-type: none"> Additional barrier protection around curves and dense vegetation between Penola and Tarpeena. 		DPTI

Mount Gambier to Port MacDonnell

▪ Reseal between Orchard Road and Loudon Hill Road.	DPTI
▪ Intersection upgrades with all sealed roads to accommodate left and right turning lanes.	DPTI
▪ 10m apron sealing at all unsealed road intersections.	DPTI
▪ Ensure consistent 3.5m lane geometry and minimum 1.0m sealed shoulder width.	DPTI
▪ Minimum 2.0m shoulder seal at property access points.	DPTI
▪ Remove or protect all hazards within at least 5m of the highway.	DPTI
▪ Install two overtaking lanes (one in each direction) between Mount Gambier and Allendale East.	DPTI
▪ Following safety upgrades, review 100 km/h speed limit between Mount Gambier and Port MacDonnell.	DPTI

Princes Highway

Tailem Bend to Meningie

▪ Pavement reconstruction and reseal at the Narrung turnoff (Poltalloch Road) for 200m north and 200m south of the intersection.	DPTI
▪ Refresh ATLM.	DPTI
▪ Clear zone widening and protection of roadside hazards.	DPTI
▪ Safety upgrades, including possible construction of freeway type interchange at the intersection with Dukes Highway.	DPTI

Meningie to Kingston

▪ Review Coorong speed limit between Meningie and Kingston.	DPTI
▪ Pavement rehabilitation for the length, with priority given to the 30km south of Salt Creek.	DPTI
▪ Refresh ATLM south of Meningie.	DPTI
▪ Widen the Blackford Drain Bridge, just north of Kingston.	DPTI
▪ Install two overtaking lanes between Salt Creek and Kingston.	DPTI
▪ Clear zone widening and hazard protection as required.	DPTI
▪ Construct at least one rest stop on the north eastern side of the road that can safely accommodate heavy vehicles.	

Kingston to Millicent

▪ Seal shoulders on sections with no current shoulder seal between Clay Wells and Millicent.	DPTI
▪ Widen shoulder seal on sections with narrow shoulder seal between Kingston and Clay Wells.	DPTI
▪ Widen lanes to minimum 3.3m between Kingston and Clay Wells.	DPTI
▪ Widen lanes to 3.5m between Clay Wells and Millicent.	DPTI
▪ Install ATLM along the entire length between Kingston and Millicent.	DPTI
▪ Surface rehabilitation works as required, particularly near the Clay Wells Road intersection.	DPTI
▪ Upgrade rest stops to better cater for heavy vehicles.	DPTI
▪ Widening of four bridges between Kingston and Millicent: <ul style="list-style-type: none"> - Drain L bridge (Drain K) - Wilmot Drain bridge (Reedy Creek Wilmot Drain) - Anderson Scheme Drain M bridge (Drain M) - Reedy Creek Mount Hope Drain bridge 	DPTI
▪ Clear zone widening and hazard protection as required.	DPTI
▪ Reseal and road widening through the Clay Wells Road intersection.	
▪ <u>Intersection with Clay Wells Road</u> <ul style="list-style-type: none"> - Further passive safety upgrades in the shorter term - Consideration and further exploration of constructing a roundabout in the longer term 	DPTI DPTI

Millicent to Mount Gambier

▪ Extend overtaking lanes to meet minimum length of 1.6km.	DPTI
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▪ Future duplication.	DPTI
▪ Surface rehabilitation as required.	DPTI
▪ Removal or protection of hazards within 5m.	DPTI
▪ Install ATLM between Millicent and Mount Gambier.	
▪ Widen Snuggery Drain 56 Bridge between Millicent and Tantanoola.	DPTI
▪ Remove 'Rail X' line marking and disused rail tracks between Glens Lane and Tantanoola Road.	DPTI
Jubilee Highway (Mount Gambier)	
▪ <u>Intersection with Riddoch Highway</u> - Install additional exit lane on the south side of the roundabout	DPTI
▪ <u>Intersection with Pick Avenue</u> - Extend right turn lane into Pick Avenue - Explore alternate alignment options	DPTI DPTI
▪ Construct U-turn facilities between Riddoch Highway and Pick Avenue.	DPTI
Mt Gambier to SA/Victoria border	
▪ Protection of roadside hazards.	DPTI
▪ Install ATLM between Mount Gambier and Victoria.	DPTI
Southern Ports Highway	
▪ Seal shoulders to 1.0 metre wide where there is no current shoulder seal between Robe and Clay Wells Road, and between Beachport and Southend.	DPTI
▪ Widen Shoulder seal between Clay Wells Road and Beachport.	DPTI
▪ Roll out ATLM treatment to cover the entire length of the highway.	DPTI
▪ Widen the Butcher Gap Drain Bridge 10km south of Kingston – reseal required as a minimum.	DPTI
▪ Widen the Drain L Bridge on the outskirts of Robe.	DPTI
▪ Reseal and reconstruct 15km of narrow undulating carriageway between Robe and Clay Wells Road.	DPTI
▪ <u>Intersection with Clay Wells Road</u> - Extend left turn lane for traffic continuing north on Southern Ports Highway. - Extend left turn lane for traffic turning left from Clay Wells Road onto Southern Ports Highway. - Delineation improvements including line marking and RRPM's	DPTI DPTI DPTI
▪ <u>Intersection with Southend Access Road</u> Adopt Recommendations of RAA Road Safety Audit, which include: - Installation of a sheltered left turn lane from Southern Ports Highway onto Southend Access Road. - Modification of line marking to direct southeast bound vehicles into the left lane and create a dedicated right turn lane from Southern Ports Highway onto Southend Access Road. - Install R1-2 'give way' signs on Southend Access Road. - Monitor vegetation and consider removal to ensure sight distance is maintained.	DPTI DPTI DPTI WRC
Naracoorte Road	
▪ Road widening and shoulder sealing for the remaining 47 kilometres of Naracoorte Road.	DPTI
▪ Widen clear zones to a minimum of three metres and provide barrier protection to all fixed hazards within five metres of the road.	DPTI/NLC/ TDC
▪ Reseal for 12 kilometres, immediately south of Rowney Road.	DPTI
▪ Reseal the apron at the intersection with Meatworks Road, and refresh all line marking.	DPTI/TDC

Frances Road		
	▪ Monitor heavy vehicle traffic volumes to ensure any additional increase in freight due to the Bordertown Intermodal facility is captured.	DPTI
	▪ Seal shoulders to 1.0m wide between Frances and Bordertown.	DPTI
	▪ Widen the bridge over Nalang Creek, just south of Custon Road.	DPTI
	▪ Remove all vegetation within 2 metres of the road, and protect or remove all vegetation between 2 and 5 metres of the road.	DPTI/NLC/ TDC
	▪ Widen the Mullinger Bridge, north of Kybybolite.	DPTI
	▪ <u>Intersection with Stott Road (Pooginagoric)</u>	
	- Explore the feasibility of re-aligning Stott Road and installing left turn lanes at the three offset T-intersections.	DPTI
	- Widen shoulders to 2.0m between Pooginagoric Road and Hutchings Road.	DPTI
	- Install W5-22 'trucks (crossing or entering)' warning signs on Frances Road.	DPTI
	- Trim or remove vegetation on the inside of the curve to improve sight distance from Stott Road.	TDC
	▪ <u>Intersection with Angus Street and Mill Road (Kybybolite)</u>	
	- Change give way priorities and associated line marking.	DPTI
	- If priorities are not to be changed, upgrade line marking and delineation at the two intersections.	DPTI
Clay Wells Road		
	▪ Seal shoulders to 1.0m wide along the entire length	DPTI
	▪ Widen lanes to 3.3m	DPTI
	▪ Remove or protect all fixed hazards within 3m, and protect all hazards within 5m of the road	DPTI/WR C/ DCR
	▪ Should the 110 km/h speed limit be reinstated, consider installation of two overtaking lanes between Penola and Clay Wells	DPTI
	▪ Following aforementioned safety upgrades, review 100 km/h speed limit between Bray and Wattle Range.	DPTI
Ngarkat Highway		
	▪ Seal shoulders to 1.0m wide between West McCallum Road and Dukes Highway.	DPTI
	▪ Widen shoulder seal to 1.0m on remaining sections of Ngarkat Highway.	DPTI
	▪ Reseal eight kilometres immediately south of Mallee Highway.	DPTI
	▪ Increase routine maintenance levels to address pavement defects in a timely manner.	DPTI
	▪ Survey rut depths along the corridor so that targeted remediation works can be undertaken.	DPTI
	▪ Improve delineation at rest stop entry points, widen shoulders on approach to rest stops and consider installing sheltered left turn lanes.	DPTI
	▪ Create an additional rest stop on the west side of the highway.	DPTI
	▪ Install advisory signage before the rest stop just south of West McCallum Road.	DPTI
	▪ Following aforementioned safety upgrades, review 100 km/h speed limit on Ngarkat Highway.	DPTI
Carpenter Rocks Road		
	▪ Seal shoulders to 1.5 metres between Burrungule Road and Mount Gambier.	DPTI
	▪ Seal shoulders to 1.0 metre wide between Carpenter Rocks and Burrungule Road.	DCG
	▪ Further hazard removal and protection.	DPTI/DCG

Glenelg River Road		
	▪ Install two overtaking lanes (one in each direction) between Mount Gambier and the Victorian border.	DPTI
	▪ Widen shoulder seal to 1.0m.	DPTI
	▪ Investigate rutting and undertake remedial action where depth exceeds 20mm.	DPTI
Lucindale Road		
	▪ Seal shoulders to 1.0m.	DPTI
	▪ Widen lanes to 3.3m.	DPTI
	▪ Reseal and localised pavement reconstruction as required to address undulating sections.	DPTI
	▪ Widen the Mosquito Creek Watercourse Bridge and Bakers Range Drain Bridge.	DPTI
Mount Burr Road		
	▪ Seal shoulders between Wattle Range and Penola.	DPTI
	▪ Widen shoulder seal between Millicent and Mount Burr (for remaining sections).	DPTI
	▪ Widen shoulder seal between Mount Burr and Wattle Range.	DPTI
	▪ Localised rut filling in problem areas.	DPTI
	▪ Clear zone widening and barrier protection.	DPTI/WR C
Glenelg Highway		
	▪ Widen shoulder seal to 1.0m	DPTI
	▪ Replace white edge line RRPMS with red RRPMS when routine maintenance/replacement is required.	DPTI
	▪ Install an overtaking lane in each direction, near the Victorian border.	DPTI
Kangaroo Flat Road		
	▪ Widen road and seal shoulders between Princes Highway and Wandilo Forest Road. A temporary speed limit reduction should be strongly considered until these works can be undertaken.	DPTI
	▪ Widen road and seal shoulders between Wandilo Forest Road and Kalangadoo.	DPTI
	▪ Full road reconstruction between Princes Highway and Wandilo Forest Road.	DPTI
	▪ Widen the Drain A Bridge just south of Darrymore Road	DPTI
Avenue Range Road		
	▪ Minimum 0.5 metre shoulder seal.	DPTI
	▪ Widen narrow bridges.	DPTI
	▪ Additional barrier protection, particularly around curves.	DPTI
	▪ Remove trees within three metres of the carriageway.	DPTI/NLC/ KDC
Rowney Road		
	▪ Seal shoulders between Mundulla and Desert Camp.	DPTI
Four Mile Road		
	▪ Reseal in full and seal shoulders to minimum 0.5 metres.	DPTI
Wimmera Highway		
	▪ Install ATLM between Hynam and the Victorian border.	DPTI
	▪ Consider vegetation removal or additional barrier protection between Hynam and the Victorian border.	DPTI/NLC
Casterton Road		
	▪ Localised rut filling and undulation remediation.	DPTI
	▪ Seal shoulders to 0.5m between Penola and the Victorian border (unsealed shoulder remediation could be a viable short term alternative)	DPTI

▪ Clear zone widening and additional barrier protection	DPTI/ WRC
Nangwarry Road	
▪ Install intersection warning signage prior to the intersection with Riddoch Highway.	DPTI
Tantanoola Road	
▪ Removal or protection of roadside hazards	DPTI/DCG
▪ Seal shoulders to minimum 0.5 metres	DPTI
Tillers Road	
▪ Repair crumbling edges and build up/grade the unsealed shoulder.	DPTI
▪ Seal shoulders.	DPTI
Eight Mile Creek Road	
▪ Seal shoulders.	DPTI
Callendale Road	
▪ Road widening, particularly on the northern half of the road.	DPTI
▪ Routine maintenance to address deteriorating surface in local areas.	DPTI
▪ Review speed limit should the road not be widened.	DPTI
Wattle Range Road	
▪ Consider installation of safety barriers or removal of large trees in close proximity to the road. As a minimum, these trees should be delineated using D4-3 'width markers'	DPTI/WR C
▪ Additional vegetation maintenance to avoid obscuring existing guide posts.	WRC
Maaoupe Road	
▪ Review guide posts and reinstall at the appropriate spacing where necessary.	WRC
▪ Refresh centre line marking.	WRC
▪ Extend the sealed surface beyond the curve and intersection with Penola-Lucindale Road. As a minimum, W5-19 'gravel road' signage should be installed to warn of the upcoming surface transition.	WRC
Moyhall Road	
▪ Install guide posts at the appropriate spacing where necessary.	NLC
Bog Lane	
▪ Consider the use of alternative pavement materials to provide better longevity and resistance to damage in localised areas subject to regular surface deformation.	DCG
▪ Review guide post placement, particularly around curves.	DCG
Nora Creina Road	
▪ Manage roadside vegetation and review guide posts and delineation.	DCR
▪ Remove crossroads warning sign at the intersection with Bog Lane and Powells Road, and replace give way sign.	DCR

Discussion and Survey Analysis

Member Sampling Frame

A total of 8,116 RAA Members were invited by email to participate in the online survey, along with the survey link forwarded to regional stakeholders for distribution.

A total of 669 responses were received, 510 directly from Member engagement and a further 159 through external engagement opportunities. The majority of respondents were aged between 55 and 74 years (50.9%) and have resided in the region for 20+ years (64%).

Respondents were from the following council districts:

- Wattle Range Council – 26%
- City of Mt Gambier – 23%
- Naracoorte Lucindale Council – 16%
- Tatiara District Council – 15%
- District Council of Grant – 9%
- Kingston District Council – 5%
- District Council of Robe – 5%
- Other – <1%

Based on the number of responses received the confidence interval is within the acceptable range of less than $\pm 5\%$.

Confidence interval of survey responses

<i>Limestone Coast Population</i>	Sample Size (Members and Non Members)	Confidence Interval	Confidence Level
64,788	669 responses	± 3.77	95%

*The **confidence level** – accuracy at one point in time will provide how often the percentage of the population would choose a particular answer. When the confidence level is combined with the **confidence interval**, you can say that you are 95% sure that the true percentage of the population is between $\pm 3.77\%$. In addition the larger the sample size, the more you can be sure that the answers truly reflect the population.*

The Region

In 2016 the Australian Bureau of Statistics reported a population for the region of 64,794 residents. These correspond to:

- City of Mt Gambier – 26,276
- District Council of Grant – 8,203
- District Council of Robe – 1,378
- Kingston District Council – 2,349
- Naracoorte Lucindale Council – 8,291
- Tatiara District Council – 6,620
- Wattle Range Council – 11,677

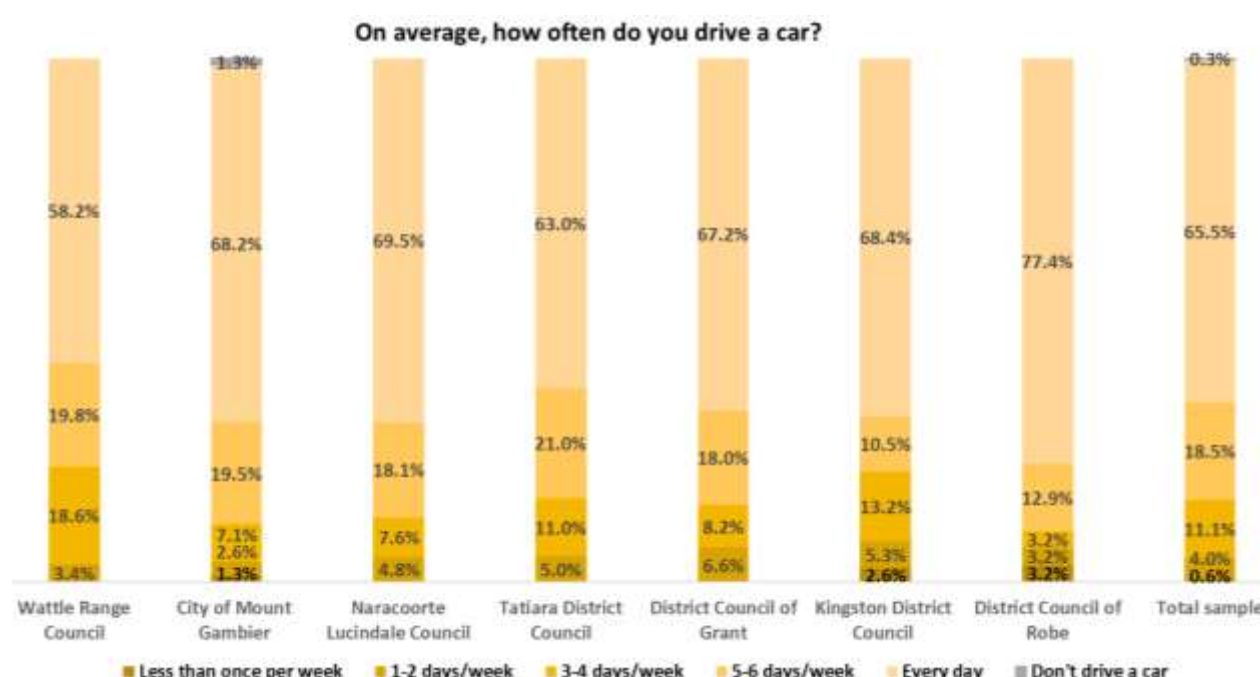
The Limestone Coast region has a combined area of 21,558 square kilometres, and the seven councils are responsible for the maintenance of over 2,300 kilometres of sealed roads and 6,900 kilometres of unsealed roads. In addition, there are over 1,400 kilometres of sealed roads maintained by DPTI in the region, who also manages less than 20 kilometres of unsealed road network. Just over 70 kilometres of the Dukes Highway also passes through the region, which forms part of the national highway network.

According to the Australian Bureau of Statistics¹, key industries across the area include agriculture, forestry and fishing; rental, hiring and real-estate services; construction; financial and insurance services; and retail trade.

Industry	Percentage of total
Agriculture, forestry and fishing	39%
Construction	10%
Rental, hiring and real estate services	10%
Financial and insurance services	6%
Retail trade	6%

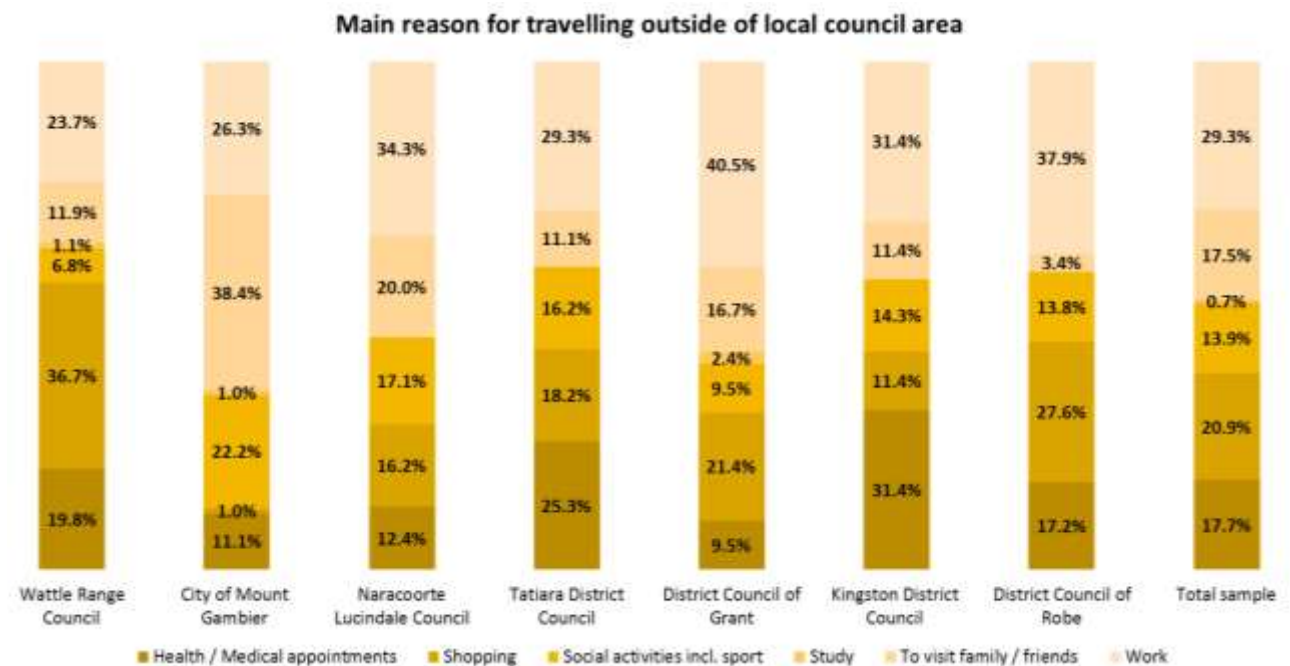
Mobility Profile

Cars and mobility are very important to our Members. When asked about their driving habits, the majority of respondents indicated they drive everyday (65.5%) or 5-6 days per week (18.5%).

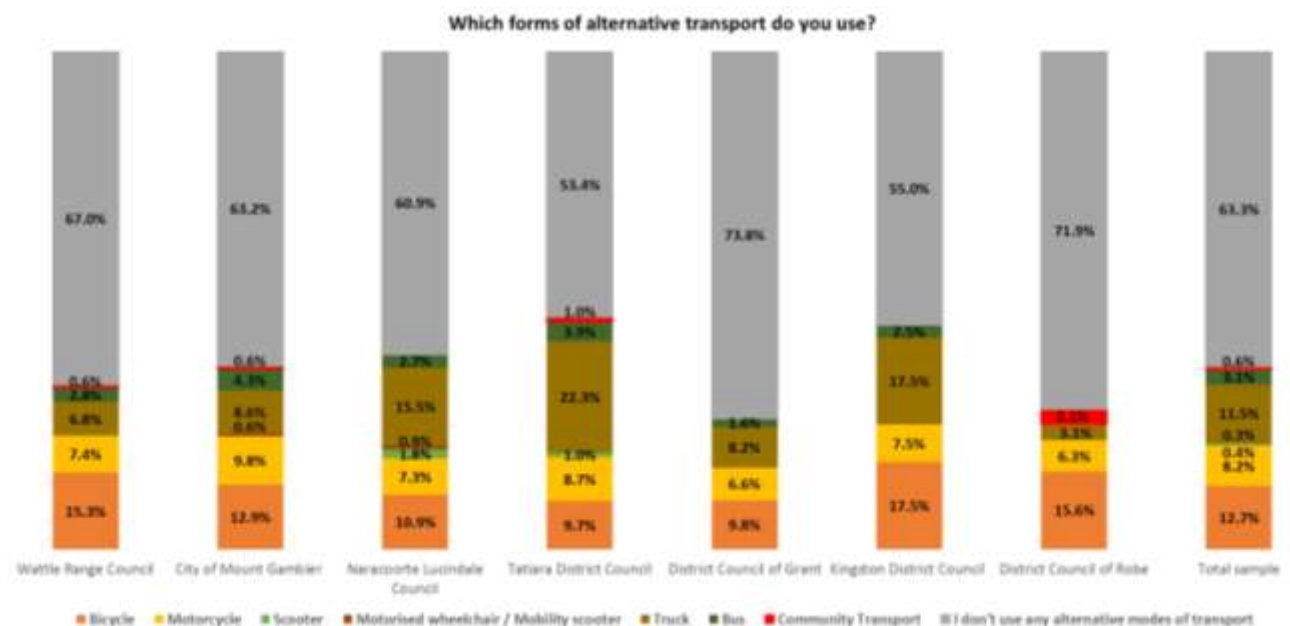


The majority of respondents travel outside of their council area less than once per week (41.9%), with the most common reasons for doing so being 'work' (29%), 'shopping' (21%), to 'visit family/friends' (17%), and 'health/medical appointments' (17%). Residents of the City of Mount Gambier were most likely to travel outside their council district 'to visit family/friends' (38%), while for Wattle Range Council residents it was most likely for 'shopping' (37%).

¹ Australian Bureau of Statistics, 2018, *Limestone Coast Region Data Summary*.

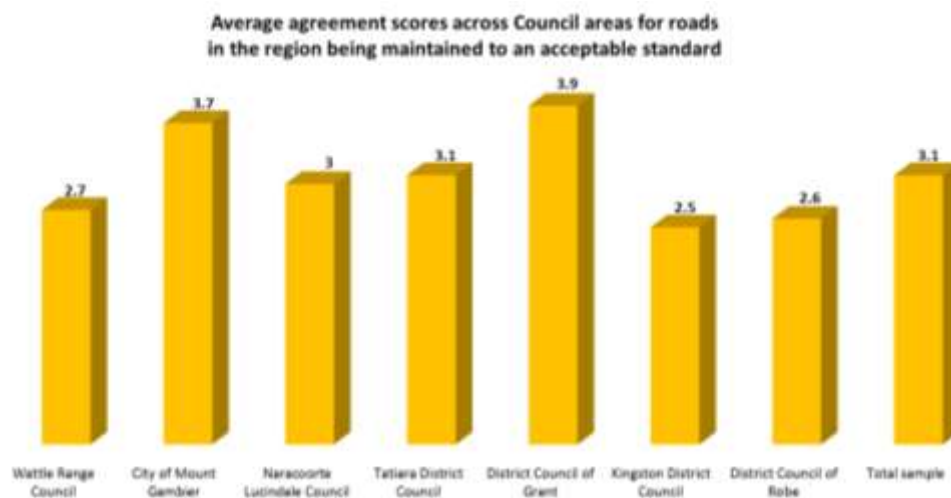


Of those who reported using alternative forms of transport (37%), the majority use their alternative transport infrequently, (42% use it less than once per week, 25% use it 1-2 days/week). The most common forms of alternative transport used by Limestone Coast residents are bicycle (35%), truck (31%) and motorcycle (22%).



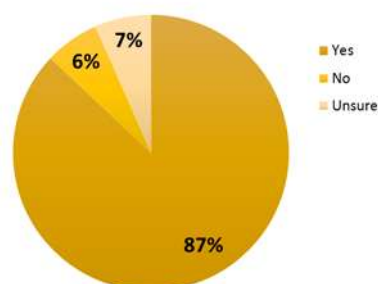
Road Maintenance

In response to whether roads in the region are maintained to an acceptable standard, 60% of respondents disagreed, while 23% of respondents considered the regions roads maintained at an acceptable level. The average agreement rating across all respondents was 3.1 out of 7 (where 7 = strongly agree that roads are maintained to an acceptable standard). There were slight differences in the average agreement scores were across council regions (average scores ranged from 2.5-3.9 out of 7), with residents from the District Council of Grant and City of Mount Gambier more likely to feel the roads are maintained to an acceptable standard than other council areas. Furthermore, 87% of all respondents feel that major improvements are needed within the region to improve the road/transport conditions.

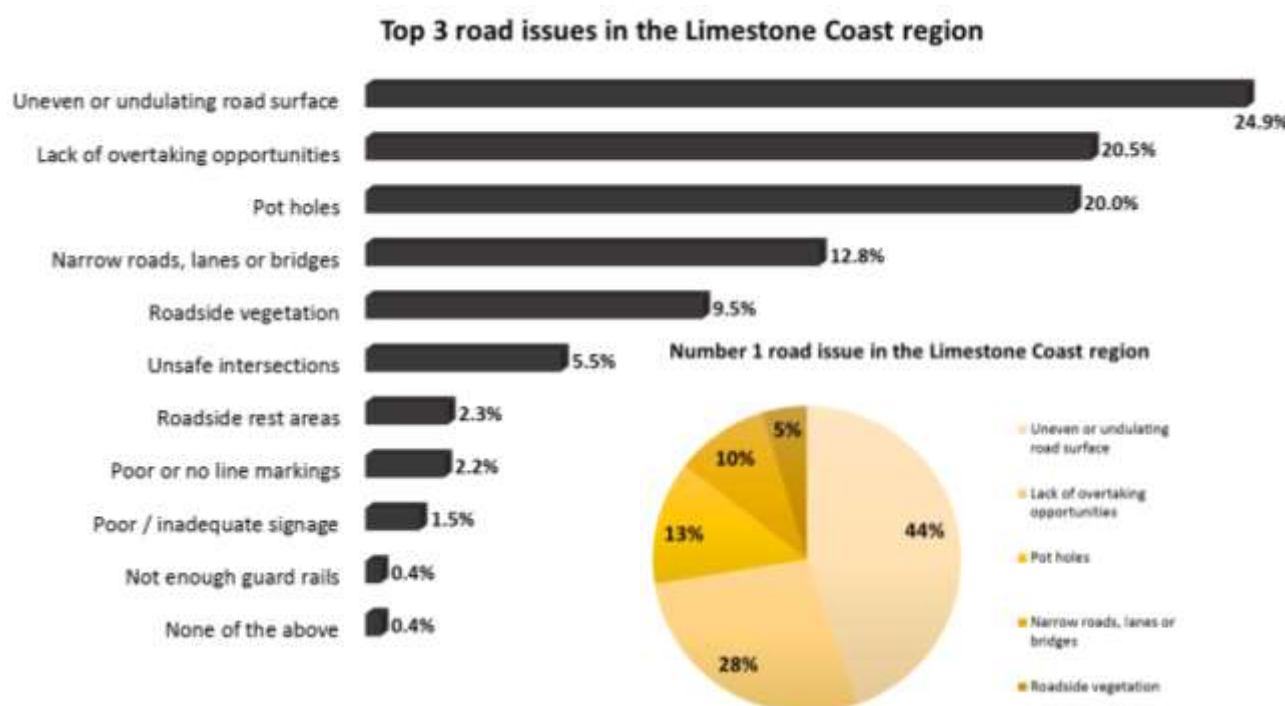


**Values shown are the average rating out of 7 (where 1 = Strongly disagree and 7 = Strongly agree)*

Are major road or transport improvements needed within the Limestone Coast region?



When asked to select the top three most concerning road issues in the region, 25% of respondents selected 'uneven or undulating road surface', 20.5% selected 'lack of overtaking opportunities' and 20% selected 'pot holes'. Respondents were then asked to select (from the same list) the number 1 road issue in the region, to which 44% selected 'uneven or undulating road surface'. This was followed by 28% of respondents that selected 'lack of overtaking opportunities'.



Those who indicated a need for road improvements in the region were asked to provide more information. Some common themes emerged, particularly in regards to maintaining roadside vegetation, sharing the road with cyclists, undulating road surfaces and lack of overtaking opportunities. Specific roads which received a high number of mentions included Clay Wells Road, Southern Ports Highway, Riddoch Highway and Princes Highway. An example of some of the survey comments received is shown below.

“The Princes Highway between Salt Creek and Meningie does not have enough overtaking lanes or areas where a caravan can safely pull off to the side to allow a vehicle behind to overtake. The section of highway between Kingston SE and Salt Creek has noticeable undulations.”

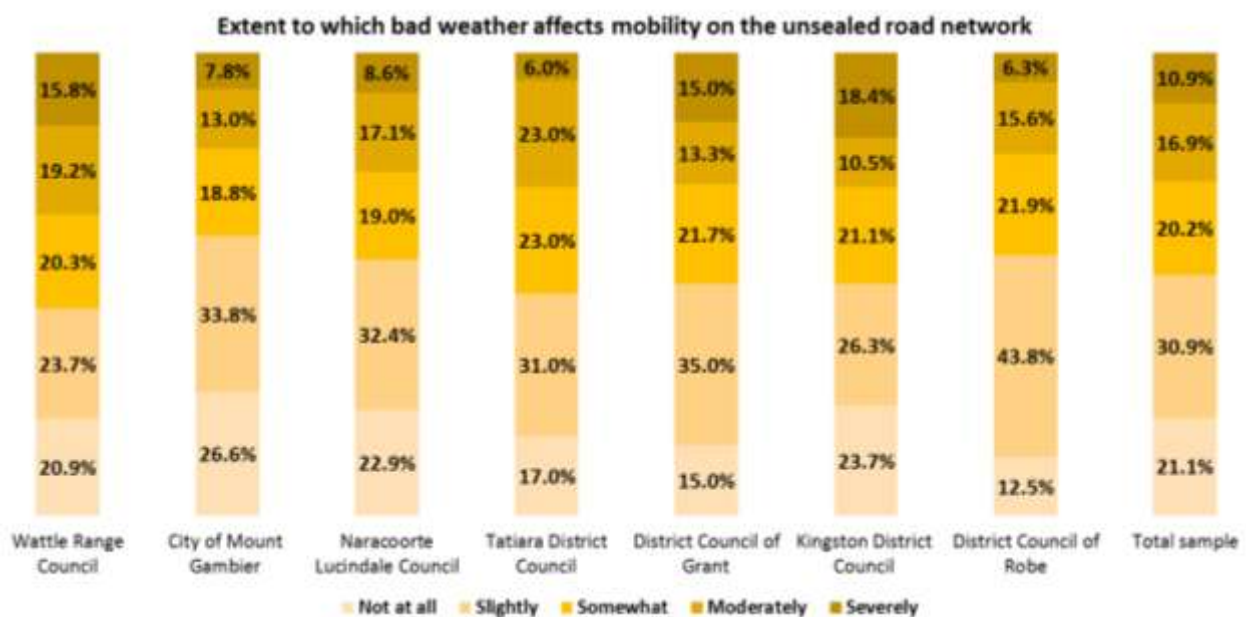
“The Riddoch Highway needs a lot of vegetation removed from both sides of the road. There are a lot of overhanging tree branches along this highway that are very dangerous. We make a conscious decision to avoid this highway when we travel to Adelaide because of this.”

“Southern Ports Highway Millicent to Beachport - rough surfaces, pot holes, narrow, dangerous to overtake. Needs repair and resurfacing.”

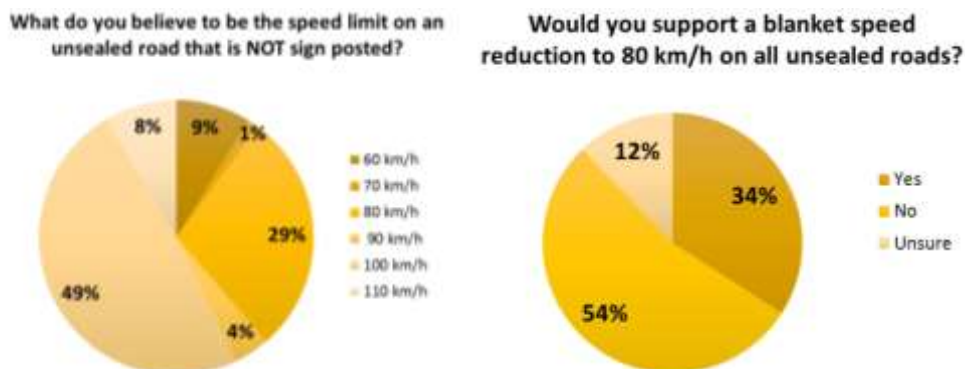
Unsealed Roads

There are over 6,900 kilometres of council maintained unsealed roads across the Limestone Coast region which form a vital part of the road network, with many of these subject to a relatively high volume of seasonal traffic. Motorists driving these roads also have varying degrees of experience when driving in unpredictable road conditions.

When asked about the impact of bad weather on their mobility across unsealed roads in the region, 28% of respondents reported being moderately to severely affected, 51% were slightly to somewhat affected, while 21% reported not being affected at all. Slight differences were seen across each of the council areas, with 18% of Kingston District Council residents indicating they are severely affected, and more than a third (35%) of Wattle Range Council respondents being moderately to severely affected. Conversely, residents of the City of Mount Gambier were the least likely to be affected by bad weather on unsealed roads (27% not affected at all).

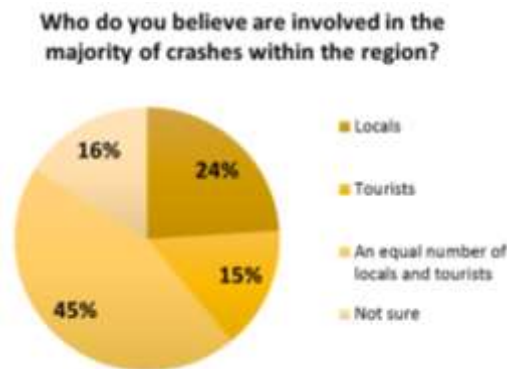


Unsealed roads are subject to a default speed limit of 100 km/h; however, 51% of respondents were not aware of this, with 8% citing a higher speed (i.e. 110 km/h) and 39% citing at least 20 km/h below the speed limit. A subsequent question was asked to gauge support for a blanket speed reduction to 80 km/h on unsealed roads. Responses were weighted more towards those who were against decreasing the speed limit, with 54% opposed to a speed reduction. More than a third (34%) would be supportive of a blanket speed reduction on unsealed roads in the region.



Local vs Tourist Crashes

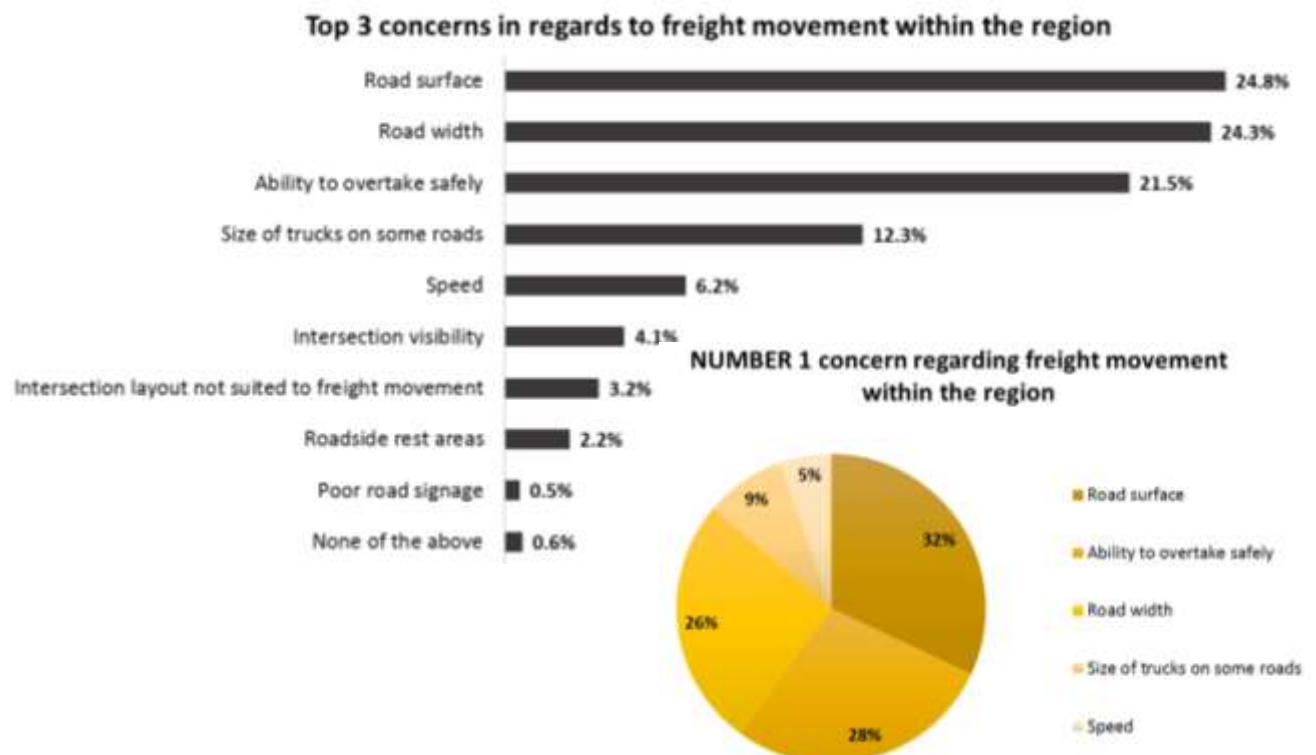
Residents were asked whether they thought locals and/or tourists would be involved in the majority of crashes in the region, to which 45% believed an equal number of tourists and locals contributed to road crashes. This was followed by 24% who feel locals are more likely to be involved in crashes. This highlights a general perception within the region of the higher crash risk for locals. RAA have reviewed the occurrence of local and visitor driver crashes in the crash data analysis section of this report.



Freight

When asked to select their top 3 concerns regarding freight movement within the region, respondents were most likely to select 'road surface' (24.8%), followed by 'road width' (24.3%) and 'ability to overtake safely' (21.5%). This was followed by a question in which respondents selected their biggest concern regarding freight movement, to which 32% selected 'road surface', followed by 'ability to overtake safely' (28%) and 'road width' (26%). To a lesser extent residents were concerned about 'the size of trucks on some roads' and the 'speed' at which trucks travel in the region.

Further insight was sought regarding the current b-triple freight route, with 59% of respondents indicating they support the current route. Approximately a quarter of respondents (23%) indicated that they did not support the current route, with a further 18% unsure.



The following survey responses are indicative of the overall comments received:

“Volumes of freight of this magnitude should be confined to rail.”

“There are not enough places to overtake such long vehicles.”

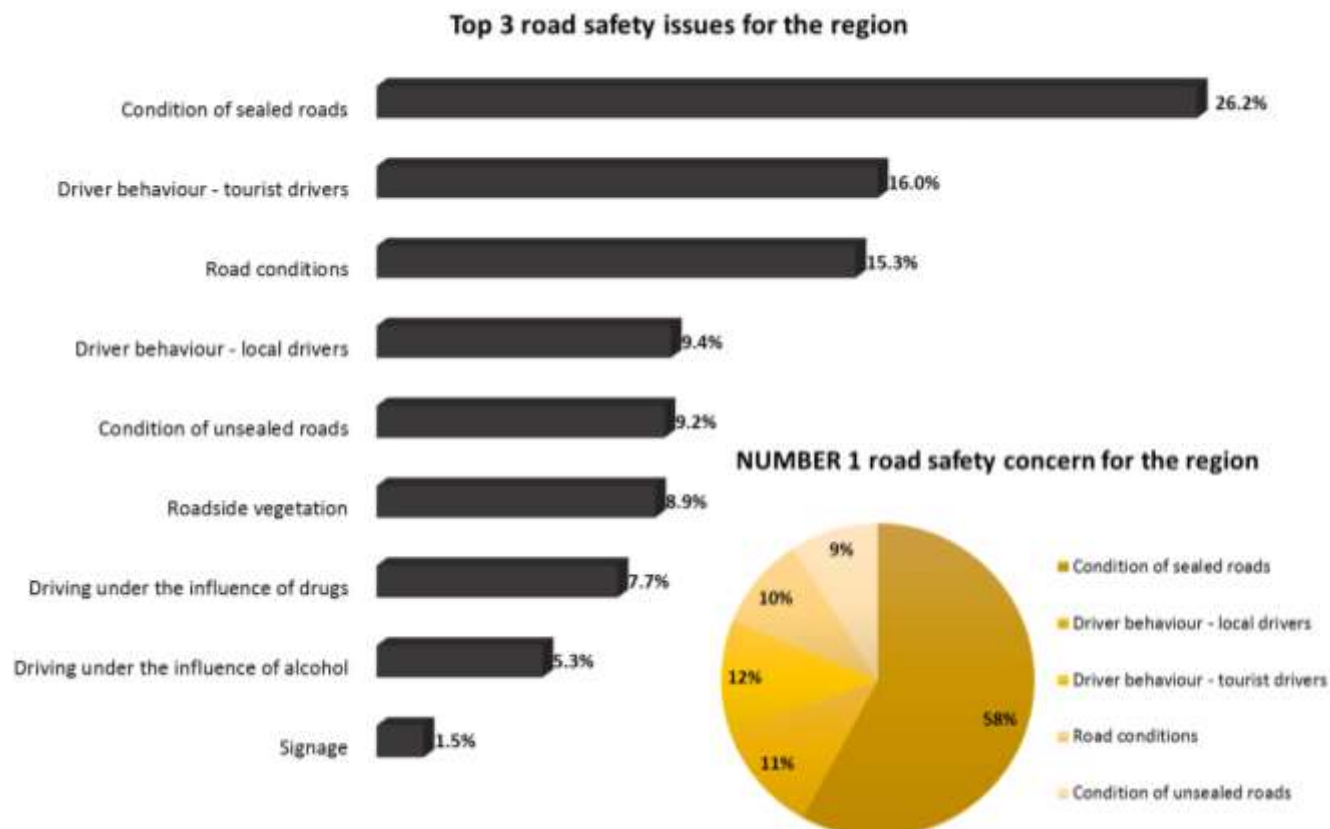
“Logging trucks often have to drive off the edge of the bitumen when coming past oncoming traffic – road width is an issue.”

“The main roundabout in the CBD of Naracoorte is a bit of a struggle for b-doubles.”

“I would like to see more monitoring of heavy vehicles during harvest time. We regularly have trucks this size driving down side streets in our town.”

Road Safety

Road safety is everyone’s responsibility, and it incorporates a number of factors such as the prevailing road conditions and maintenance, vehicle design, travel speeds, and human involvement. Within the Limestone Coast, the ‘condition of sealed roads’, ‘driver behaviour – tourist drivers’ and ‘road conditions’ were ranked amongst the top 3 road safety concerns. When respondents were asked to select their biggest concern, more than half of all respondents (58%) selected ‘condition of sealed roads’ as their primary concern.



When asked generally about the roads and intersections in the region where crashes or near misses have occurred, many comments were in relation to sharing the road with cyclists. A selection of the comments received is included below:

“Cyclists are often on the Coorong Road early in the morning and later in the afternoon when shadows cast by the roadside vegetation make them hard to see if they do not wear high-vis clothing.”

“Along the Coorong and Southern Ports Highway from Kingston to Robe. The cyclists ride on the road, as there is nowhere else for them to go. There are no shoulders and many blind corners, they cannot see or hear you coming and sometimes they are riding two abreast.”

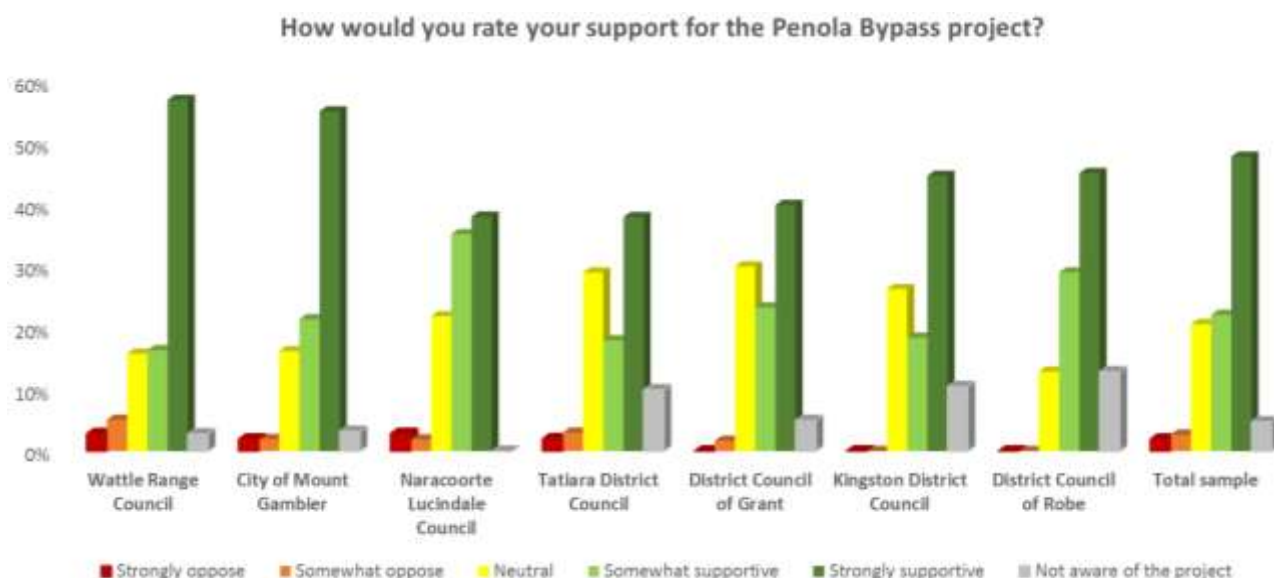
“Large trucks should not turn right at the roundabout where Penola Road and Jubilee Highway cross – very dangerous.”

Respondents were asked about topical issues within the region, specifically:

- Penola bypass
- Naracoorte bypass
- RAA 2019 Federal Government priorities:
 - Dukes Highway duplication between Taillem Bend and the Victorian border
 - Add Riddoch Highway to the National Highway network, facilitating upgrades between Keith and Mount Gambier

When asked about their level of support for the Penola bypass project, the majority of respondents indicated they supported the project (70% supportive).

Responses across each of the council areas showed a higher number of people from Wattle Range Council (74%) and City of Mount Gambier (77%) supporting the bypass. Tatiara District Council, District Council of Grant and Kingston District Council showed a greater percentage of respondents that were neither for nor against the bypass (26-30%).



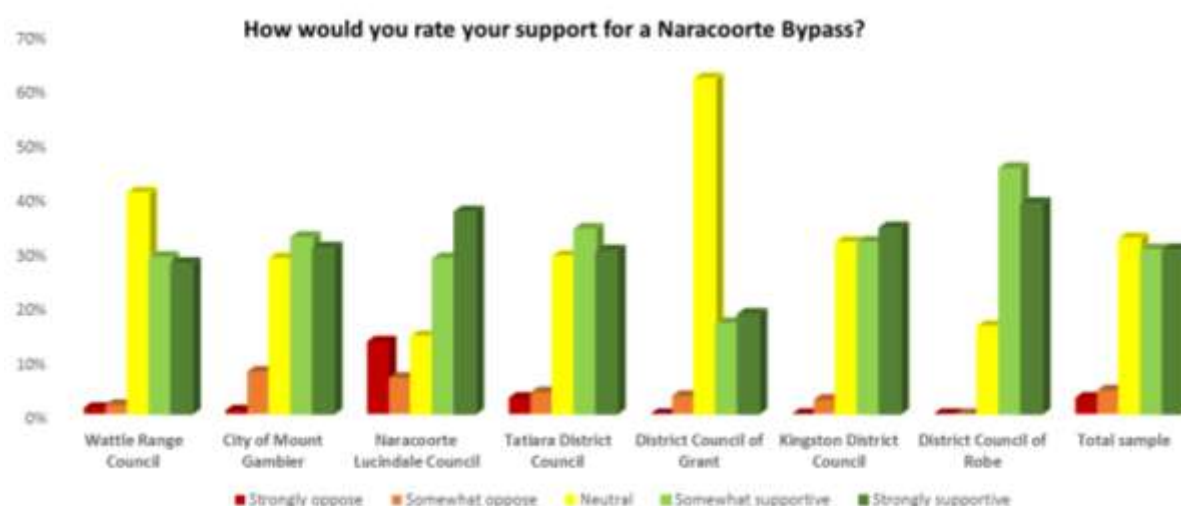
Those who indicated that they were 'strongly opposed' (2%) or 'strongly supportive' (48%) towards the Penola bypass were provided with an opportunity for further comment. Many of the comments reflected the positive outcomes for pedestrian safety and reduced traffic through town provided by the project. Negative comments were in relation to the design of the bypass, the impact of reduced traffic on local business prosperity and trucks not using the bypass route.

"Penola relies on tourists as well as local viticulture and agriculture. The bypass allows for safer movement of smaller vehicles within the town centre and is unlikely to affect local trade."

"I think the town is struggling and if passing traffic is taken away it is only a matter of time until it becomes like all the towns along the Hume Highway."

"As a former heavy vehicle driver I believe any towns which can be bypassed, should be bypassed, especially those with narrow streets such as Penola."

When asked about their support for a similar bypass project at Naracoorte, 60% of respondents would support this project going forward and only around 7% would be opposed. Looking at the support shown across each of the council regions, residents of the District Council of Robe (84%) were most supportive, while the most opposition was shown by residents of Naracoorte Lucindale Council (20%). Respondents who indicated they were strongly opposed (3%) or strongly supportive (30%) were given the opportunity to provide more detailed comment on the project.



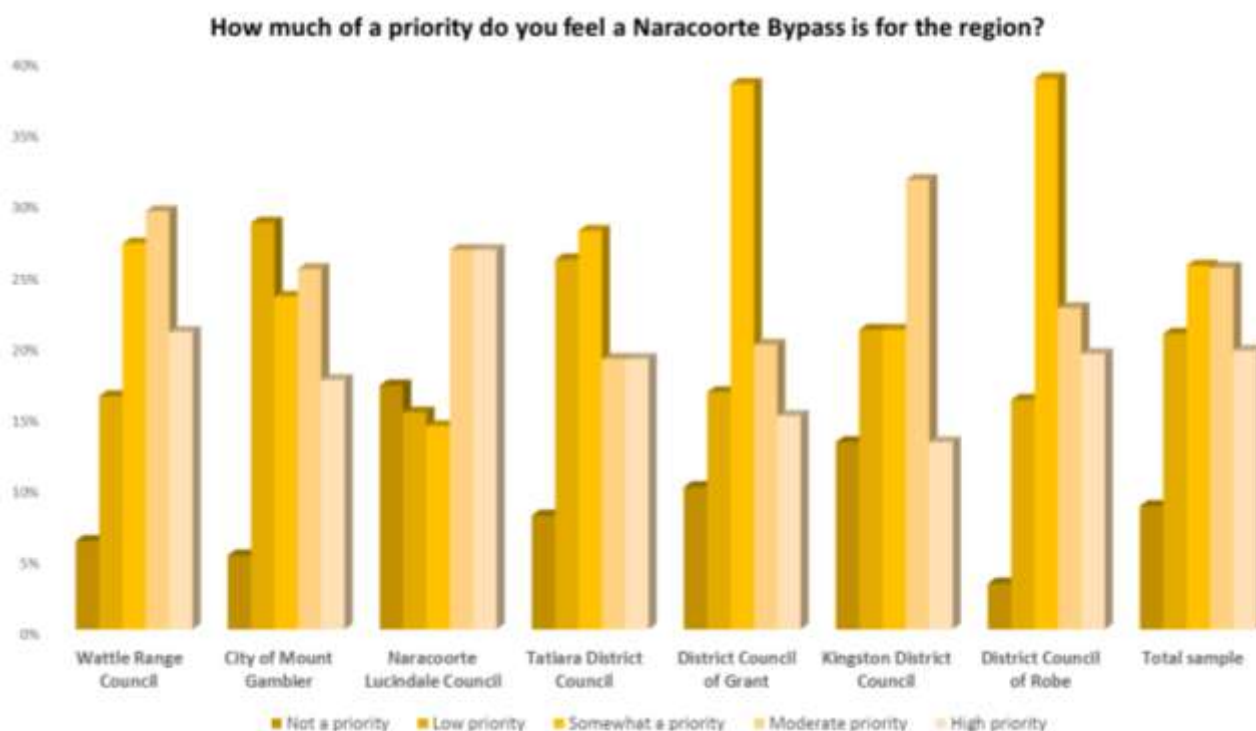
Many comments in support of a bypass at Naracoorte related to roundabouts on the current route being difficult for trucks to navigate, often resulting in spilled animal effluent. Those who were less supportive mentioned the impact of reduced business in the township and the need for public consultation on the project.

“Trucks clearly have difficulty negotiating the roundabouts in the centre of town, as well as depositing cattle manure on the road, particularly at intersections.”

“It can be difficult to negotiate Naracoorte town centre when carting livestock from west to east, towards the Hynam meatworks or saleyards.”

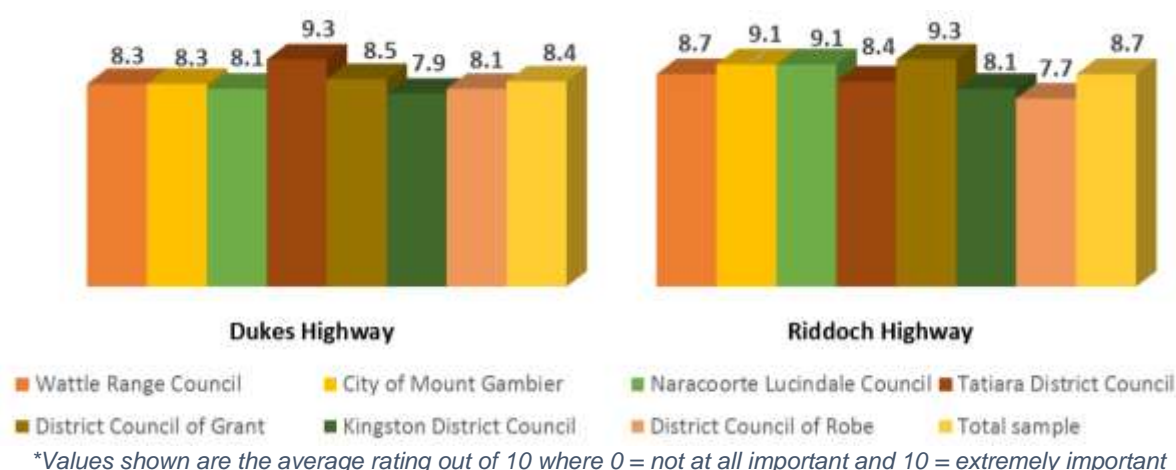
“Bypasses for trucks and other large vehicles will be used by tourists trying to save time. This will divert tourists away from the town, which Naracoorte cannot afford to lose.”

A follow-up question was asked in relation to the prioritisation of this project for the region, to which most respondents (45%) indicated that a bypass should be a moderate to high priority. Only 9% of respondents feel this project is not a priority, and a further 21% feel it is a low priority.



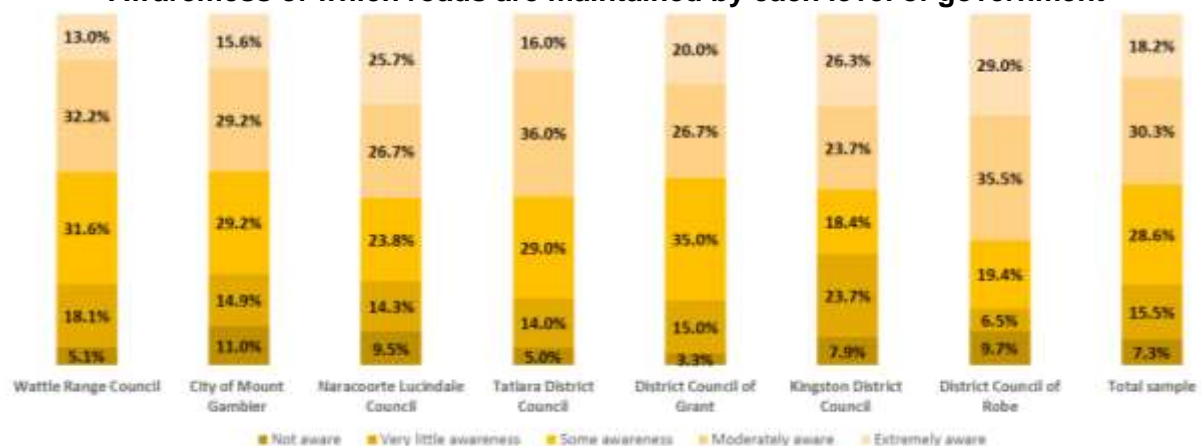
Two of RAA's 2019 federal election priorities were involved roads in the Limestone Coast region, namely the duplication of Dukes Highway between Taillem Bend and the Victorian border, and an upgrade of the Riddoch Highway between Keith and Mount Gambier. As such, the survey was used to gauge the level of support for these projects by the local community. The average score overall for the importance of the Dukes Highway duplication was 8.4 out of 10, and for the Riddoch Highway upgrade, it was 8.7 out of 10.

Importance of federal election road priorities to the region



The survey included a question to assess the public awareness of council maintained, state maintained and federally maintained roads in the region. In response, the majority indicated they had some to moderate awareness of the level of government responsible for each road in the region (59%). Around 7% of respondents indicated they had no awareness, and a further 16% had very little awareness of which roads fall under the jurisdiction of each level of government. Approximately 18% reported being extremely aware of the government responsibilities for specific roads in the region.

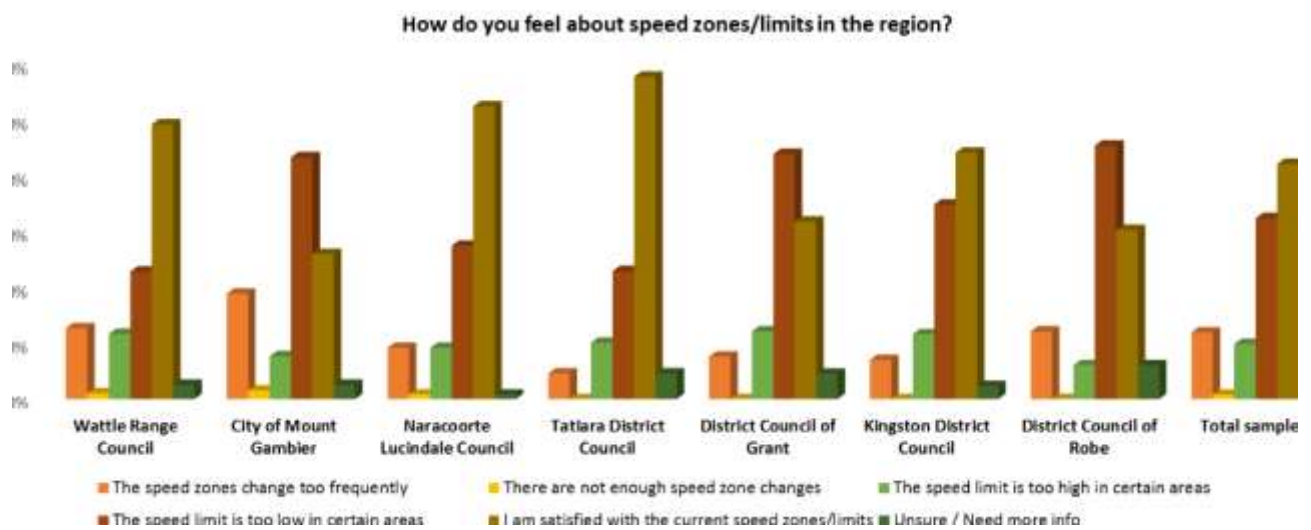
Awareness of which roads are maintained by each level of government



Speed Zones

Changing speed zones can cause confusion for drivers, especially if there are multiple changes in what appears to be similar driving conditions over short stretches of road. More than a third of survey respondents feel that speed limits are too low in certain areas (32.4%), however a larger percentage of respondents indicated they are satisfied with the current speed zones/limits in the region (42.2%).

Responses from Wattle Range Council, Naracoorte Lucindale Council, Tatiara District Council and Kingston District Council residents followed a similar trend to the total sample, with the majority of respondents from these districts being satisfied with the current speed zones/limits. The council areas of City of Mount Gambier, District Council of Grant and District Council of Robe had a larger percentage of respondents that indicated the speed limit is too low in certain areas. Around 19% of survey respondents from the City of Mount Gambier feel the speed zones change too frequently in the region.



Respondents were asked to provide further details of specific locations where the speed zones/limits should be reviewed. The majority of responses related to increasing the speed limit on a number of highways from 100 km/h to 110 km/h, particularly on those roads that were recently reduced.

“Bay Road to Port MacDonnell should go back to 110 km/h.”

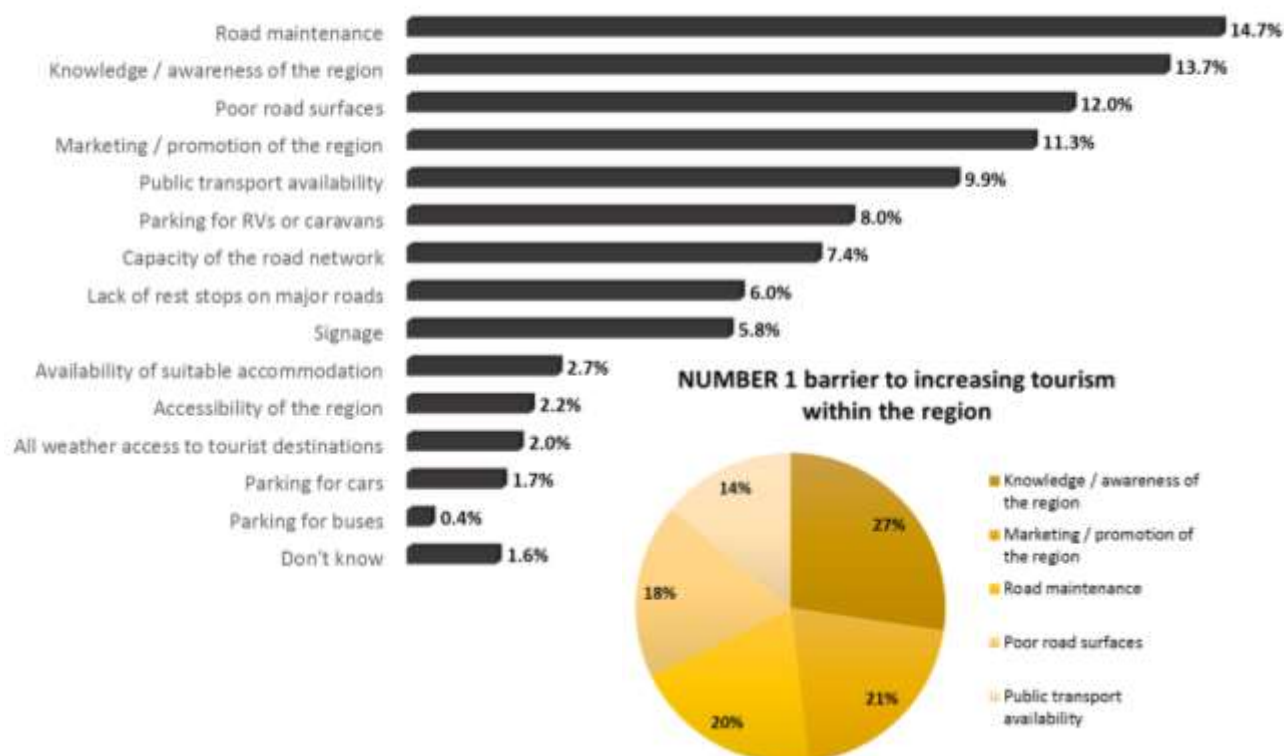
“In Mt Gambier too many main roads are 50 km/h. It's at times difficult to know if you are in a 60 km/h or 50 km/h zone. Some that are 50 km/h seem no different to others that are 60 km/h.”

Tourism

The South Australian Tourism Commission has valued tourism in the Limestone Coast region at a potential of \$457 million by 2020 (currently \$321 million). In 2017, tourism in the region contributed approximately \$249 million to the Limestone Coast economy, and directly employed around 1,900 people. The region is most popular with domestic visitors who make up 92% of those travelling to the region (59% of whom are from South Australia and 41% from interstate). Around one third of international tourists are from the United Kingdom or Germany.

Despite the region's popularity with domestic tourists, around 58% of survey respondents believe the current road network is not suitable for the number of visitors to the region. Only 25% of respondents feel the road system is adequate. When asked the biggest barrier to increasing tourism within the region, 27% felt that 'knowledge/awareness of region' was a significant issue, followed by 'marketing/promotion of the region' (21%) and 'road maintenance' (20%). To a lesser degree respondents indicated 'poor road surfaces' (18%) and 'public transport availability' (14%) as barriers to increasing tourism in the region.

Top 3 barriers to increasing tourism within the region



Suggestions for improvements that may enhance visitor experiences in the region were primarily in regards to improving advertising and awareness of the region, better signage at tourist areas and improving the facilities provided for caravans and RV's, such as increased parking close to town and overnight campsites. Other comments included:

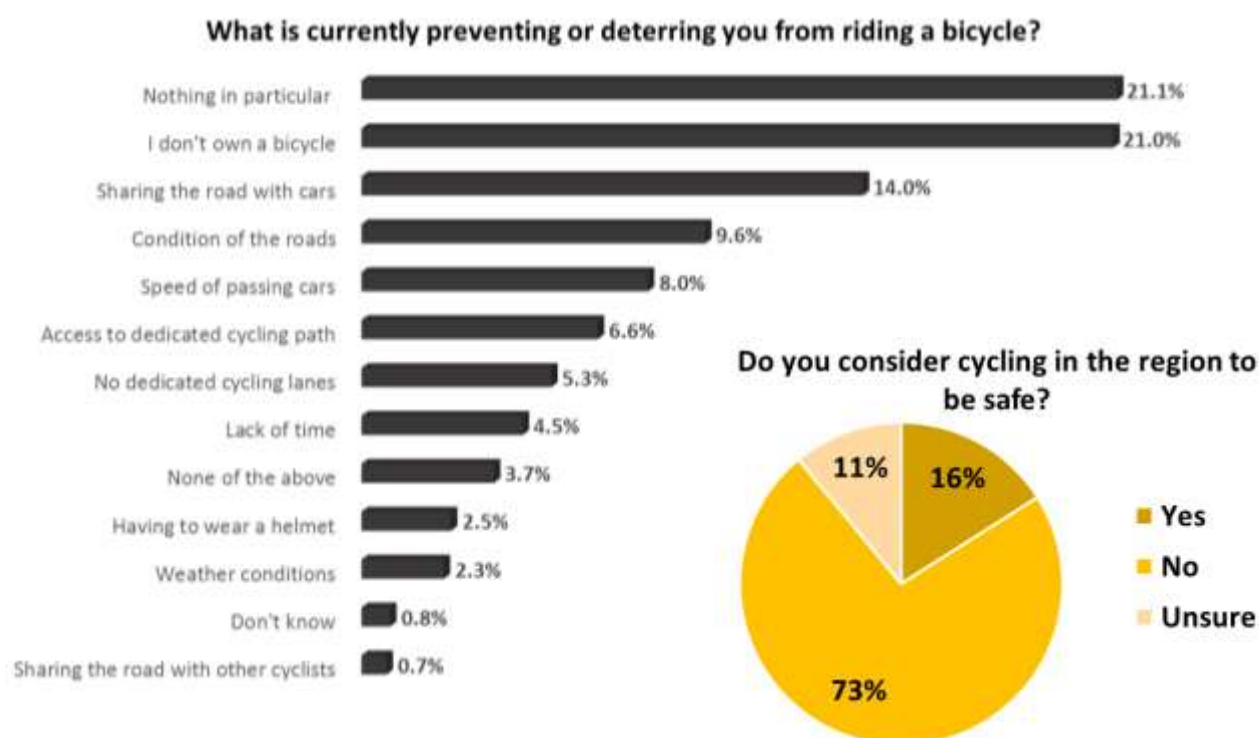
"Coordinated tourism signage between council regions."

"More parking for caravans close to the city centre."

"Signage reminding people that they are in a rural area and hazards to look out for."

Cycling

More than a quarter of respondents (26.3%) indicated they had ridden a bicycle in the past 6 months, with most of those who haven't indicating it was due to not owning a bicycle (21%) or having no reason to ride a bicycle (21%). The majority of respondents feel that the current road network within the region does not encourage cycling (63%) and don't consider cycling in the region to be safe (73%). It is worth noting that 5 days prior to the survey being distributed, the death of a cyclist occurred after a hit and run involving a truck on the Princes Highway. This may have contributed to the negative response regarding cyclist safety in the region.



Comments relating to increasing the uptake of cycling within the region highlighted the importance of having dedicated bike lanes and the danger of cyclists sharing roads with trucks. A number of residents mentioned the idea of turning old railway tracks into dedicated cycle routes, as has been done in Mount Gambier and other regions e.g. the very popular 'Riesling Trail' in the Clare Valley.

"Cycling lanes following the rail corridor through to Coonawarra."

"The road shoulders need to be improved to allow bike riders to be off the edge of the road."

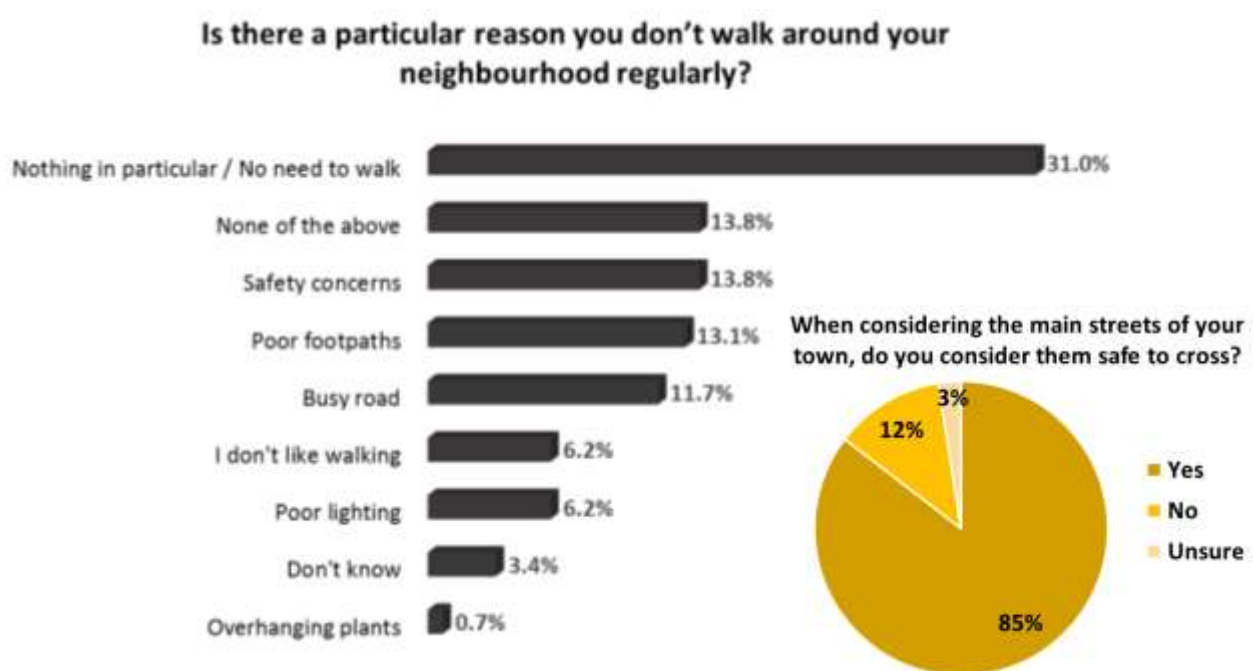
"Cyclists need to wear fluorescent vests or tops – this should be mandatory. I support cyclists but they need to take responsibility for their safety by being seen."

Key Recommendation	Authority
<ul style="list-style-type: none"> A cycling and shared path strategy be investigated with consideration given to utilising disused rail corridors which will provide better cycling and active transport corridors across the region and reduce the number of cyclists using hazardous road corridors. 	All

Walking / Pedestrians

Motorists traditionally walk at some point in their journey, so encouraging active mobility and improving people's choices provides an opportunity to look at the walking journey and how this can be enhanced.

Neighbourhood walking received a positive response from residents of the Limestone Coast, with 81% indicating they take regular walks. The reasons given by those indicating they do not regularly walk around their neighbourhood included: 'no reason/no need to walk' (31%), 'safety concerns' (14%) and 'poor footpaths' (13%). The majority (85%) consider it safe to cross the road in the main streets of their town.



When asked for suggestions that would improve the walking experience in local areas, comments were primarily in relation to the condition of existing footpaths, a need for water stations and seating along walking paths, maintaining vegetation along pathways, and the construction of flat footpaths which are sealed to better cater for the elderly, mobility scooters and prams. Other suggestions included:

"Maintaining the existing footpaths in towns would be nice and if the railways really aren't going to be used again (which is very disappointing); turning the old line into a bike/footpath would be wonderful."

Respondents provided suggestions for improvements that could be made to increase pedestrian safety on their local streets. Among the main items mentioned were the inclusion of pedestrian crossings on Jubilee Highway in Mount Gambier, Smith Street in Naracoorte, and Woolshed Street in Bordertown.

“Smith Street in Naracoorte needs a traffic light activated pedestrian crossing in the CBD.”

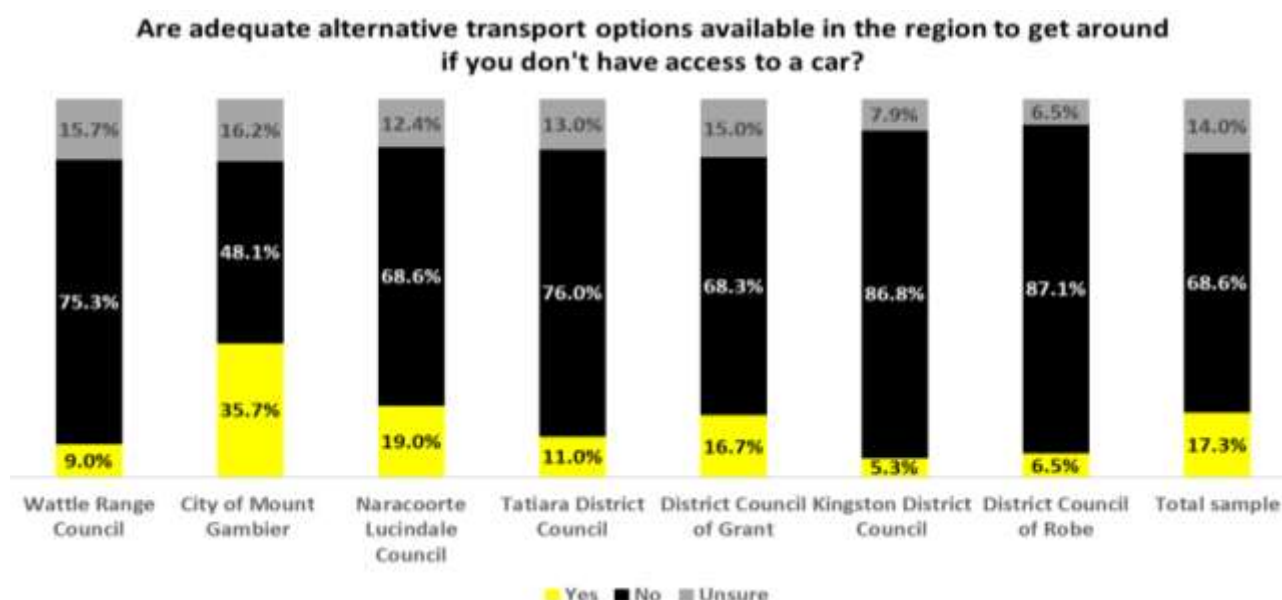
“A pedestrian refuge in the middle of Woolshed Street Bordertown would make it safer for the elderly to cross.”

“Crossing the Dukes Highway in Keith on foot to get to the facilities on the other side is quite unsafe (i.e. the showgrounds which draw crowds of up to 10,000 people for some events).”

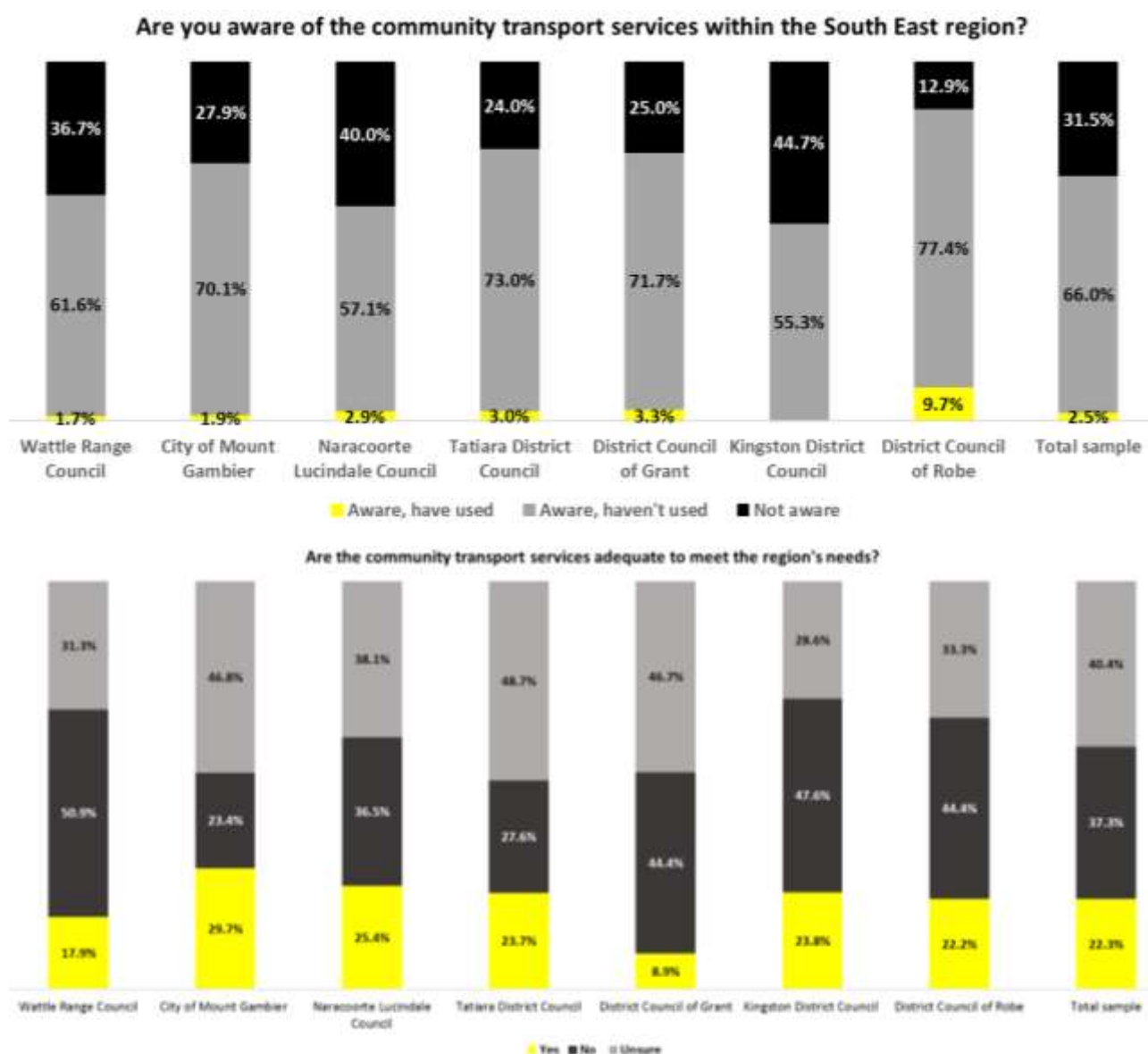
“Crossing Jubilee Highway is a nightmare. Kids walking home from school are playing Russian roulette crossing here.”

Community Transport

The majority of respondents (69%) do not feel that adequate alternative transport options are provided across the region to meet the needs of residents who are without access to a car.



Awareness of community transport options was good overall (66%), however, only around 3% of respondents had actually used a community transport service over the past 6 months. Residents from the District Council of Robe showed the greatest awareness and uptake of community transport services (87%). For the other six council districts, awareness amongst the community ranged from 55% (Kingston District Council) to 76% (Tatiara District Council). Lower awareness and uptake of these services highlights the potential to improve the visibility of community transport services within the area.



Comments regarding community transport across the region highlighted issues with the current services, such as a lack of or infrequent services, restrictive access to services and lack of awareness.

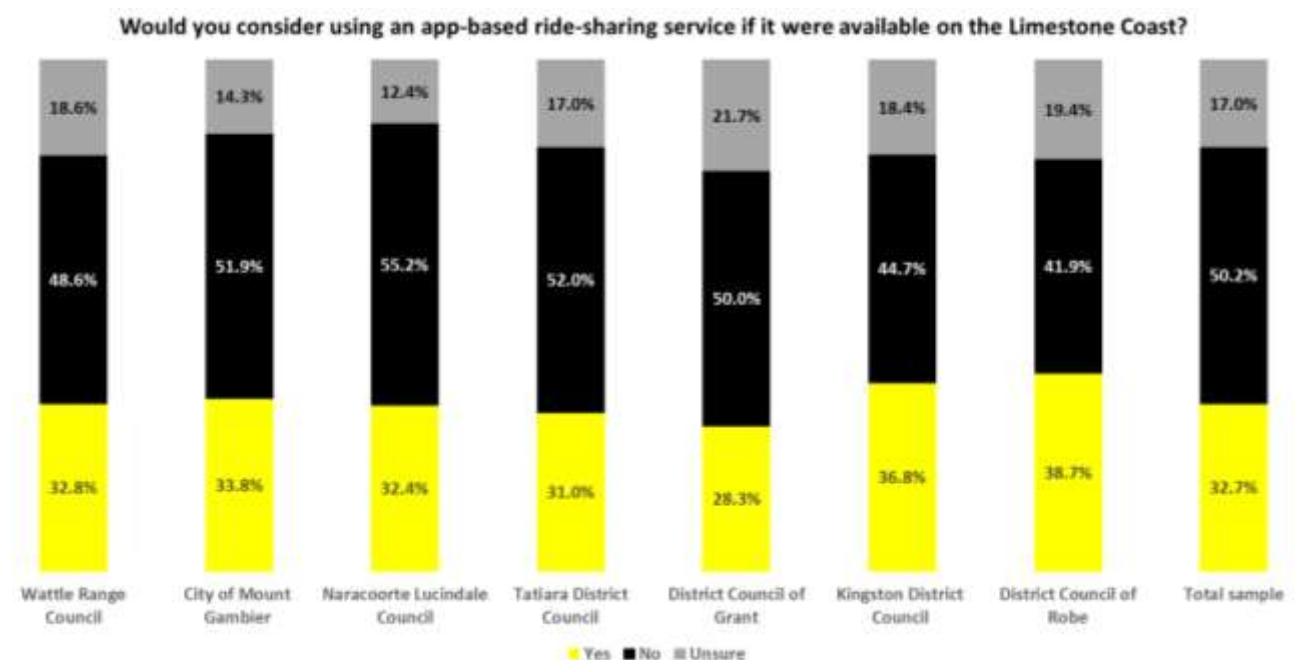
When asked whether they had used any of the public coach and rail services in the region over the past 6 months (i.e. Premier Stateliner, VLine coach/rail, Mount Gambier City Bus Service (Buslink SA), and The Overland), 76% of respondents had not used any of these services. Around 12% of respondents had used Premier Stateliner, and 7% had used VLine coach/rail. The other services were used by less than 2% of respondents.

Taxi / app-based ride-sharing

Taxi and chauffeur cars have long operated in a market with limited disruption. The recent introduction of app-based ride-sharing services (e.g. Uber) has changed the face of fare based services, and led to increased mobility options for many. Regional towns often have limited alternative transport options, with little or no regular public transport, thus ride-sharing may offer a practical and convenient localised solution.

The use of taxi services in the Limestone Coast is low, with only 14% of survey respondents having used a taxi service in their local area in the past six months.

Approximately one third of respondents (31%) had utilised a ride-sharing service in the past six months, with the majority of these instances being in metropolitan Adelaide (16%) or interstate (12%). With a lack of transport options available within the region, 33% of respondents indicated they would consider using a ride-share service if it were available, with a further 17% needing more information before making a decision. Half of all respondents (51%) indicated that they would not consider using an app-based ride-sharing service if it were available to them in the area.



Crash Statistics

2013-2017 Casualty Crash Analysis

Casualty crash data contained within this section refers to the Limestone Coast boundary defined by the seven Limestone Coast Councils. As such, the Dukes and Princes Highways are only partly represented in the data set. The section of Dukes Highway included spans from Keith to the Victorian border, and the section of Princes Highway included covers from Tilley Swamp north of Kingston to the Victorian Border. Full crash data for each of these highways is included within their relevant sections of this report.

Between 2013 and 2017, 719 casualty crashes occurred in the Limestone Coast Region, with 205 of these resulting in serious injuries and 33 resulting in fatalities. The breakdown of casualty crashes by council region is tabulated below.

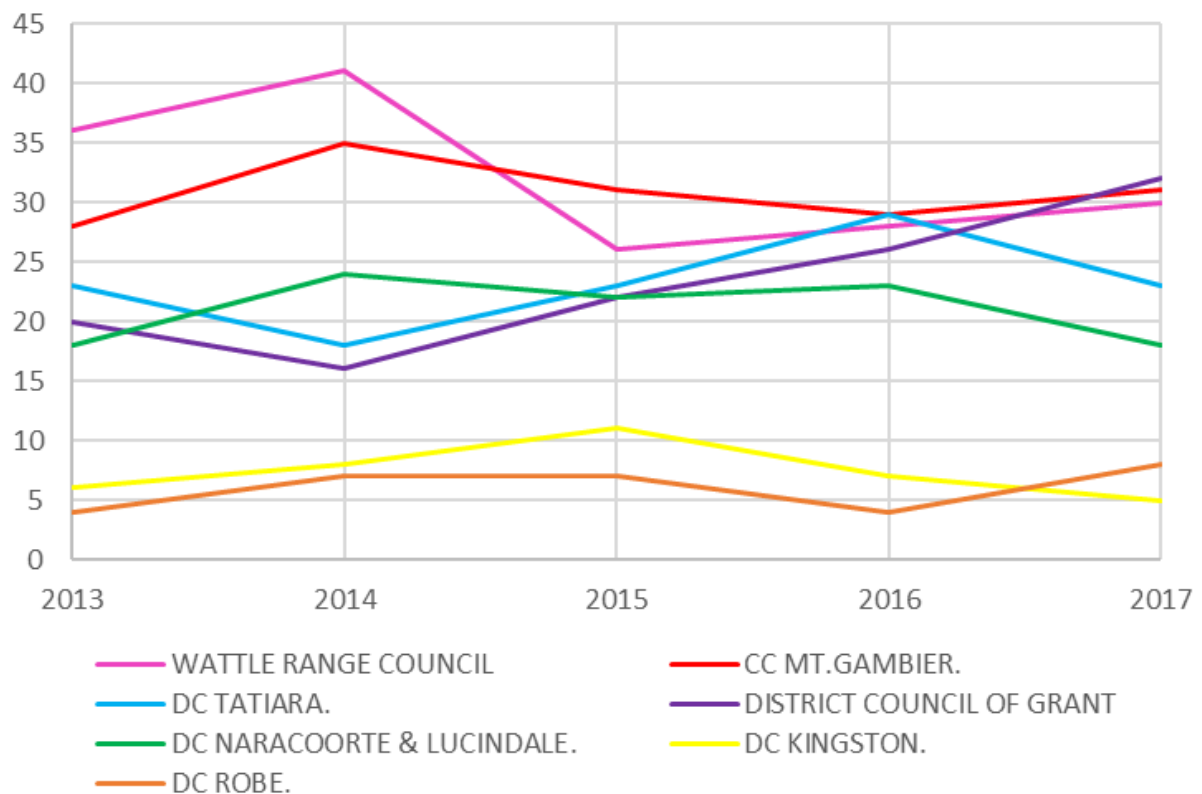
Council Region	Total Casualty Crashes	Total Casualties*	Total Serious Injuries	Total Fatalities
Wattle Range Council	161	223	59	16
City of Mount Gambier	154	183	30	1
Tatiara District Council	116	157	54	6
District Council of Grant	116	150	37	5
Naracoorte Lucindale Council	105	135	31	6
Kingston District Council	37	44	11	4
District Council of Robe	30	48	10	2
Total	719	940	232	40

*Includes total serious injuries and total fatalities

These 719 casualty crashes resulted in 40 people being tragically killed, and a further 232 people being seriously injured.

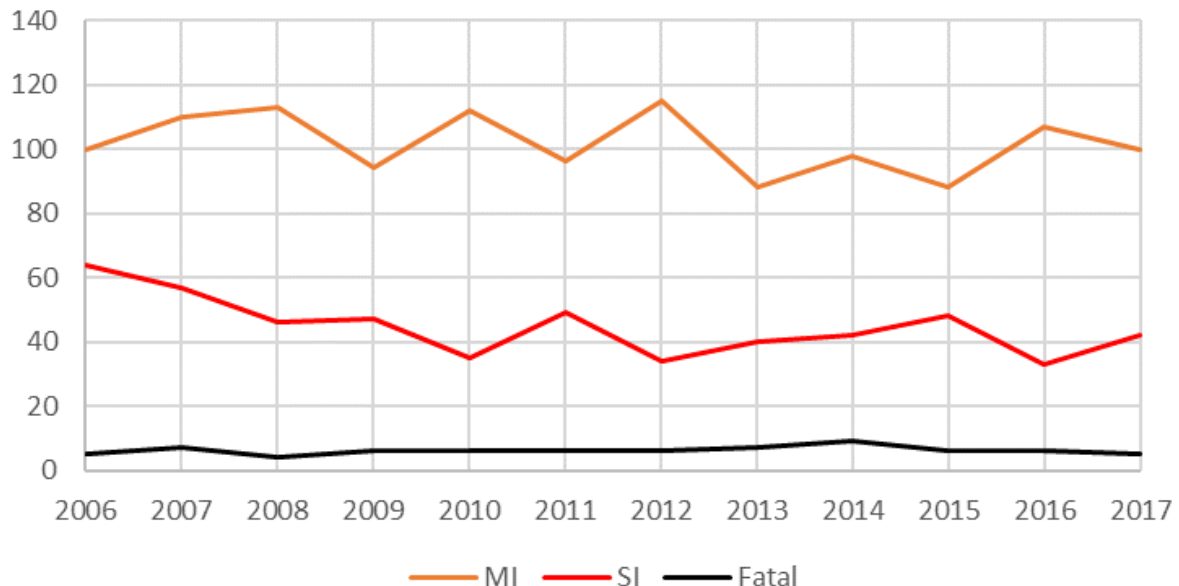
The District Council of Grant has seen a steady increase in the number of casualty crashes occurring since 2014 when 16 casualty crashes were reported. By contrast, 32 casualty crashes were reported in this council region in 2017. The number of crashes occurring annually in the remaining six councils has remained relatively steady, with minor yearly fluctuations but no noticeable trend.

Casualty crashes by council region

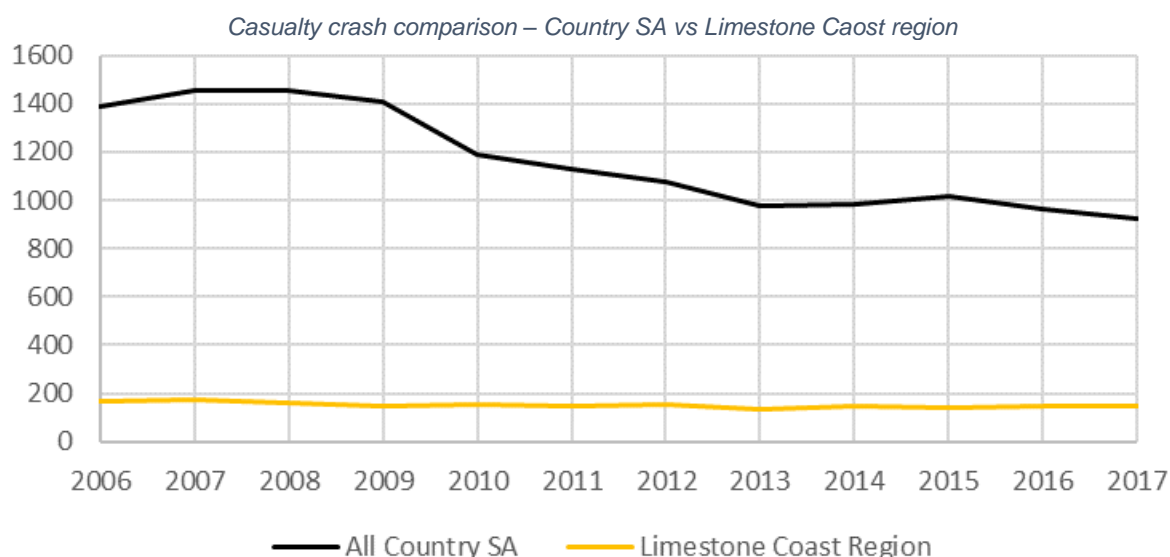


Since 2006, there have been no observable trends in casualty crashes in the Limestone Coast Region, with figures fluctuating around average values of six fatal crashes, 45 serious injury crashes, and 102 minor injury crashes every year.

Limestone Coast casualty crashes between 2006 and 2017



The Limestone Coast region has not seen the same drop in casualty crash figures compared to regional South Australia as a whole. When comparing 2006-2008 averages to 2015-2017 averages, the Limestone Coast region has seen a 10% reduction in casualty crashes, whilst regional South Australia as a whole has seen a 33% reduction in casualty crashes.



'Hit fixed object' crashes are the most common type within the region, accounting for 34% of all casualty crashes followed by vehicle roll over crashes making up 19% of all casualty crashes. These two crash types are the most common casualty crashes on South Australia's regional road network, often involving a single vehicle and mainly attributed to inattention. As a whole, 53% of casualty crashes are attributed to inattention, followed by failing to give way (9%), driving under the influence of alcohol or drugs (D.U.I) (6%).

Crash Types	No. of Crashes	Apparent Error
Hit Fixed Object	246 (34%)	Inattention (76%), D.U.I (10%), died sick or asleep at wheel (9%), other (5%)
Roll Over	134 (19%)	Inattention (80%), D.U.I (7%), vehicle fault (4%), died sick or asleep at wheel (4%), other (5%)
Right Angle	118 (16%)	Fail to give way (42%), disobey – give way sign (36%), disobey – stop sign (10%), incorrect turn (3%), other (9%)
Rear End	55 (8%)	Inattention (58%), follow too closely (35%), D.U.I (4%), other (3%)
Right Turn	29 (4%)	Fail to stand (100%)
Hit Pedestrian	28 (4%)	Inattention (57%), fail to give way (21%), vehicle fault (7%), reverse without due care (7%), other (8%)
Head On	23 (3%)	Fail to keep left (78%), D.U.I (13%), inattention (4%), disobey traffic lights (4%)
Hit Animal	22 (3%)	No error (91%), D.U.I (5%), inattention (5%)
Hit Parked Vehicle	21 (3%)	Inattention (62%), opening or closing door (19%), D.U.I (14%), died sick or asleep at wheel (5%)
Side Swipe	20 (3%)	Overtake without due care (45%), fail to give way (40%), change lanes to endanger (10%), follow too closely (5%)
Left Road – Out of Control	13 (2%)	Inattention (92%), not specified (8%)
Other	6 (<1%)	Inattention (83%), D.U.I (17%)
Hit Object on Road	4 (<1%)	Inattention (100%)
All Crashes	719	Inattention (53%), fail to give way (9%), D.U.I (6%), disobey – give way sign (6%), died sick or asleep at wheel (4%), fail to stand (4%), no error (4%), follow too closely (3%), fail to keep left (3%), overtake without due care (2%), disobey – stop sign (1%), vehicle fault (1%), reverse without due care (1%), other (<2%)

Locations

The roads with eight or more casualty crashes in the region are tabulated below. It is important to note that only sections of the road within the seven Limestone Coast councils are included for the purpose of this analysis. Full crash details for the Princes Highway, Dukes Highway and Ngarkat Highway are located in their respective sections of this report.

Road	No. of Casualty Crashes
Riddoch Highway (Keith - Port Macdonnell)	120
Princes Highway (Tilley Swamp - SA/Vic border)	104
Glenelg River Road (Mt Gambier - SA/Vic border)	28
Southern Ports Highway (Kingston - Millicent via coast)	23
Dukes Highway (Keith - SA/Vic Border)	22
Commercial Street (Mt Gambier)	22
Frances Road (Bordertown - Hynam)	16
Carpenter Rocks Road (Mt Gambier - Carpenter Rocks)	16
Naracoorte Road (Bordertown - Naracoorte)	14
Mount Burr Road (Millicent - Penola)	11
Crouch Street South (Mt Gambier)	11
Clay Wells Road (Penola - Bray)	8
Wimmera Highway (Naracoorte - SA/Vic border)	8
Ngarkat Highway (Bordertown - Ngarkat)	8

The nine intersections with three or more casualty crashes are tabulated below. With the exception of the Clay Wells Road and Princes Highway intersection, these are all located in built up areas.

Intersection	No. of Casualty Crashes
Pick Ave/Princes Highway (Mount Gambier)	11
Wireless Road East/Riddoch Highway (Mount Gambier)	4
Jenkins Terrace/Butler Terrace (Naracoorte)	4
Riddoch Highway/Princes Highway (Mount Gambier)	4
Commercial Street/Crouch Street South (Mount Gambier)	3
Clay Wells Road/Princes Highway (Clay Wells)	3
Victoria Street /Squires Drive (Robe)	3
Williams Road/Ridge Terrace (Millicent)	3
Wehl Street North/Princes Highway (Mount Gambier)	3

Local vs Visitor Involvement in Crashes

The member survey asked respondents who they thought were involved in the majority of crashes, and an analysis of crash data was undertaken to determine how this perception compared to reality.

For the purpose of this analysis, and due to the limitations of driver information in the available crash data, drivers involved in crashes were split into two groups:

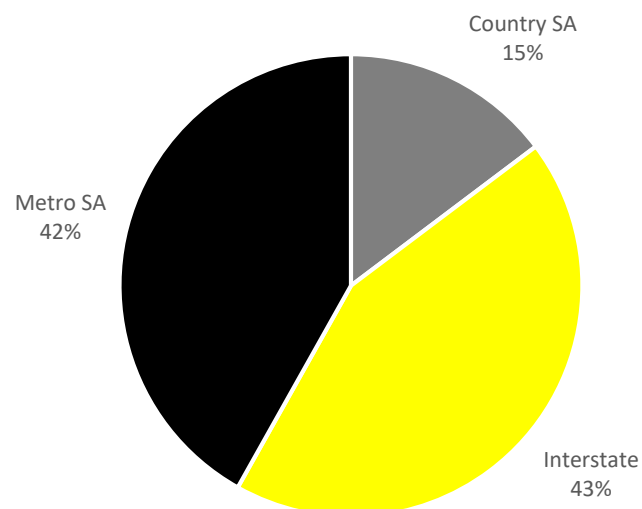
- **Locals**, with a residential postcode within the boundary defined for this assessment, and
- **Visitors**, with a residential postcode outside the boundary defined in this assessment.

The analysis of the data took into account which party in the crash made an error, and then compared this to the residential postcode of the driver.

Only casualty crashes where a postcode is attributed to the driver deemed to have made the error leading to the crash were reviewed. In total, 658 casualty crashes (91.5% of all casualty crashes in the region) included the driver's residential postcode and were included in the analysis, with the remaining crashes excluded.

The analysis revealed that 80% of casualty crashes within the Limestone Coast region were attributed to drivers residing in the region. Of the visitors to the region, most of these were from interstate or metropolitan South Australia, with a smaller percentage residing in other South Australian regions. The chart below breaks down the residential locations of the 20% of casualty crashes caused by visitor drivers.

Residential postcodes of visitor drivers involved in crashes in the Limestone Coast Region



Further analysis of crash data revealed that the ten most common apparent errors among local and visitor drivers constituted about 95% of the total crashes. The table below compares the proportions of apparent error for both local and visitor drivers.

	No. of crashes for user type		% of crashes for user type	
	Local	Visitor	Local	Visitor
Apparent Error				
Inattention	274	85	51.8%	65.9%
Fail to Give Way	56	3	10.6%	2.3%
D.U.I.	38	5	7.2%	3.9%
Disobey - Give Way Sign	31	8	5.9%	6.2%
Died Sick or Asleep At Wheel	22	6	4.2%	4.7%
Fail to Stand	24	4	4.5%	3.1%
Follow Too Closely	18	2	3.4%	1.6%
Fail to Keep Left	10	8	1.9%	6.2%
Overtake Without Due Care	11	3	2.1%	2.3%
Disobey - Stop Sign	11	0	2.1%	0%

This data indicates that crashes caused by local drivers are more likely to be as a result of following too closely, driving under the influence of alcohol or drugs, or failing to give way, when compared to visitor drivers to the region. Crashes caused by visitors are more likely to be due to failing to keep left or inattention, when compared to local drivers.

It is worth noting that all 11 crashes caused by drivers disobeying stop signs are attributed to local drivers. This could be due to the difficulties experienced by local drivers when accessing major arterial roads from local access roads controlled by stop signs, and the fact that visitor drivers are less likely to use these type of intersections.

A similar analysis was undertaken which considered the proportions of different crash types between local and visitor drivers.

	No. of crashes for user type		% of crashes for user type	
	Local	Visitor	Local	Visitor
Crash Type				
Hit Fixed Object	192	44	36.3%	34.1%
Roll Over	85	42	16.1%	32.6%
Right Angle	100	9	18.9%	7.0%
Rear End	47	5	8.9%	3.9%
Right Turn	24	4	4.5%	3.1%
Head On	12	11	2.3%	8.5%
Hit Pedestrian	20	1	3.8%	0.8%
Side Swipe	17	3	3.2%	2.3%
Hit Parked Vehicle	17	1	3.2%	0.8%

When considering the common crash types, crash data shows that local drivers are more likely to be involved in hit pedestrian, hit parked vehicle, right angle and rear end crashes. These crash types generally occur more frequently in built up environments and townships. On the other hand, visitor drivers are more likely to be involved in head on and roll over crashes, most of which occur on the highways between townships.

Site Investigation Details and Recommendations

General and Common Issues

Narrow Bridges

The Limestone Coast region has a vast drainage network comprising more than 2,500 kilometres of drains and floodways², which inevitably intersect with the road network on a regular basis. Narrow bridges create a hazard by introducing tight interactions with opposing vehicles, and pose a crash risk with fixed barriers or culverts close to road edges.

Furthermore, narrow bridges can reduce the efficiency of freight, and can make certain routes unsuitable for particular heavy vehicle combinations.

Within this report, narrow bridges are identified with recommendations made for future widening. These should be considered in conjunction with other factors such as (in no particular order):

- Age and physical condition of the bridge,
- Load bearing capacity of the bridge,
- Kerb to kerb width of the bridge,
- Total traffic volumes traversing the bridge, and
- Freight volumes traversing the bridge.

Key Recommendation	Authority
<ul style="list-style-type: none">▪ Widen narrow bridges on key freight routes and high traffic routes to provide safety benefits to all road users and additional efficiencies to freight and industry in the region.	All

Speed Limit Reductions from 110 km/h to 100 km/h

In late 2017, the former Labor Government reduced the speed limit from 110 km/h to 100 km/h on eight regional roads across the state, of which four are within the Limestone Coast region:

- 22 kilometres of Riddoch Highway (Bay Road) between Mount Gambier and Port MacDonnell
- 16 kilometres of Carpenter Rocks Road between Mount Gambier and Burrungule
- 55 kilometres of Clay Wells Road between Bray and Wattle Range
- 115 kilometres of Ngarkat Highway between Bordertown and Pinnaroo

Riddoch Highway and Carpenter Rocks Road both have reasonably high levels of regional roadside development, as well as high traffic volumes.

Clay Wells Road and Ngarkat Highway both have much lower traffic volumes, and both traverse more isolated areas, through agricultural and conservation areas with less development along the corridor.

DPTI's *Speed Limit Guideline*³ states the following for a 110 km/h speed limit –

“Rural arterial road or expressway. Maximum allowable speed limit in SA. Typically these roads will be of the highest standard in non-built-up areas and feature full access control, have divided carriageways, sealed shoulders and be a major traffic and primary freight route.”

² PIRSA, 2013, *History of the South East Drainage System – Summary*, <https://www.pir.sa.gov.au/aghistory/natural_resources/water_resources_ag_dev/history_of_the_south_east_drainage_system_-_summary/history_of_the_south_east_drainage_system_-_summary>.

³ DPTI, 2017, *Speed Limit Guideline for South Australia*, pp8.

Australian Standard 1742.4 *Speed Controls*⁴ states that 110 km/h is an appropriate speed limit on an undeveloped rural arterial road or expressway, classifying an undeveloped area as –

“No development on either side of the road except for isolated houses set well back from the road, less than 5 access points per kilometre.”

All four of the above listed roads will require substantial investment to meet these guidelines.. Recommendations are made throughout this report relating to the improvements that should be made to each of these four roads prior to a review of the speed limit.

RAA understand that within the 2019/20 state budget, funding is allocated to upgrade these road upgrades including overtaking lanes and shoulder sealing.

RAA recommends that the suitability of 110 km/h speed limits be reviewed on these four roads following upgrades, but consider that sections of these roads may still not be suitable for a 110 km/h speed limit.

Key Recommendation	Authority
<ul style="list-style-type: none">Review suitability of 110 km/h speed limits on Riddoch Highway (Bay Road), Carpenter Rocks Road, Ngarkat Highway and Clay Wells Road following implementation of safety upgrades.	DPTI

Hazardous roadside vegetation

Roadside vegetation is a substantial issue within the Limestone Coast region, with more than one third of the casualty crashes occurring between 2013 and 2017 involving a vehicle hitting a fixed object. In more than 60% of these crashes, the fixed object was a tree. Recent work on Dukes Highway involved widening the clear zone, with a before and after analysis of casualty crashes showing a substantial reduction of ‘hit fixed object’ crashes. It is important to note that other upgrades on the Dukes Highway also occurred during this period including installation of barriers, road widening and a wide centre line treatment.

Between 2006 and 2013, an average of more than eight ‘hit fixed object’ crashes occurred on Dukes Highway annually. Between 2014 and 2017, an average of less than four occurred each year.

In light of the apparent effectiveness that clear zone widening has had in reducing casualty crashes on the Dukes Highway, RAA recommends that clear zone widening be undertaken on a larger scale on all state highways with any fixed objects within a preferable five metres (minimum three metres) of the road to be removed or protected by suitable barriers. Councils should also aim to achieve this target on major council maintained corridors.

Key Recommendation	Authority
<ul style="list-style-type: none">Widen and expand clear zones on state highways to a preferable five metres (minimum three metres). Councils should also aim to achieve these targets on major council maintained corridors. Where these limits are not possible, safety barriers should be further utilised to protect these hazards.	All

⁴ Standards Australia, 2008, AS1742.4–2008 *Manual of uniform traffic control devices Part 4: Speed controls*, pp26.

Dukes Highway

Dukes Highway is a federally maintained national highway extending approximately 190 kilometres between Princes Highway in Tailm Bend and the Victorian border near Bordertown. Duplication is cited as a long-term (15+ years) project in the *Integrated Transport and Land Use Plan* (ITLUP). Dukes Highway Traverses a number of towns including Coomandook, Yumali, Ki Ki, Coonalpyn, Culburra, Tintinara, Keith and Bordertown with the largest of these being Bordertown and Keith, followed by Coonalpyn and Tintinara.

Whilst only a portion of Dukes Highway lies within the Limestone Coast region being assessed, RAA assessed the full length due to its significance to the limestone coast region.

Dukes Highway was raised by multiple survey respondents when asked which major transport improvements were needed in the region, with typical responses seen below.

“Resurfacing of sections of Dukes Highway, and additional wide centre line.”

“Dukes Highway duplication, Riddoch and Princes Highway overtaking lanes and shoulder sealing.”



Dukes Highway is vital to our states tourism and freight industries

Dukes Highway has seen a significant number of safety upgrades in recent years, including:

- 2008-2013 – Funding over six years as part of Australian Governments Nation Building Program (\$100M at an 80/20 Federal/State government split), which included:
 - Construction of seven new rest areas and upgrading nine rest areas
 - Installing six new overtaking lanes and extending five
 - 2012 – Implementation of 5-6m clear zone by removing/relocating all non-frangible hazards and installing barriers at high risk locations
 - 2012 – Wide Centreline treatment stage 1
 - 2013 – Wide Centreline treatment stage 2
 - 2013 – 86 km of safety barrier installation
- 2017 – 3.5 km of reseal east of Keith (\$340,000)

Crash History

Between 2013 and 2017, 64 casualty crashes occurred on Dukes Highway or at intersections with Dukes Highway. Nine of these crashes resulted in fatalities, 21 resulted in serious injuries and a further 34 resulted in minor injuries.

Dukes Highway Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	22	Inattention (15), died sick or asleep at wheel (5), D.U.I (2)
Head On	15	Fail to keep left (11), D.U.I (1), died sick or asleep at wheel (1), O/T without due care (1), vehicle fault (1)
Roll Over	10	Inattention (6), vehicle fault (4)
Right Angle	5	Disobey give way sign (3), fail to give way (2)
Right Turn	5	Fail to stand (5)
Rear End	4	Follow too closely (1), inattention (1), died sick or asleep at wheel (1), D.U.I (1)
Hit Animal	1	N/A (1)
Left Road – Out of Control	1	Inattention (1)
Other	1	Inattention (1)
All Crash Types	64	Inattention (24), died sick or asleep at wheel (7), fail to keep left (11), vehicle fault (5), fail to stand (5), D.U.I (4), disobey give way sign (3), fail to give way (2), O/T without due care (1), follow too closely (1), N/A (1)

Following significant investment occurring on the corridor between 2008 and 2014, crashes were assessed before and after this investment, and a decrease in casualty crashes has occurred since the upgrades. One of the most significant reductions in crashes has come from hit 'fixed object' type crashes, which can directly be attributed to road widening, and especially the expansion of the clear zone. Between 2006 and 2013, an average of more than eight of these crashes occurred each year. Between 2014 and 2017, an average of less than four occurred each year.

Comparison: Before and After Upgrades

Crash Type	Average casualty crashes per year	
	2006-2013	2014-2017
Head on	2.63	2.75
Hit Fixed Object	8.13	3.5
Left Road out of control	1.4	0
Roll Over	3	2.25
Side Swipe	1.6	0
All casualty crash types	19.63	11.25
All FSI crash types	9.13	5.5

No 'left road out of control' type crashes occurred between 2014 and 2017, however, the sample size is quite small. This could be attributed to the significant amount of barrier protection that has been installed along the corridor. Similarly no 'side swipe' type crashes

occurred from 2014 to 2017. The majority of these crashes (56%) between 2006 and 2013 were due to overtaking without due care, so the installation of overtaking lanes and a wide centre line may have helped reduce these crashes.

In light of the apparent effectiveness that clear zone widening has had in reducing casualty crashes on the Dukes Highway, RAA recommends that clear zone widening be a priority on all major state highways with any fixed objects within a preferable five metres of the road to be removed or protected by suitable barriers. Councils should also aim to achieve this on major council maintained corridors.



Safety upgrades have reduced road trauma on Dukes Highway

Of concern is the fact that the number of 'head on' casualty crashes has slightly increased. Although this could be due to the volatility of a small data set, there is no noticeable reduction even though this is one of the primary crash types targeted by the wide centre line treatment.

Whilst it is positive that we have seen a reduction in almost 40% of fatal and serious injury crashes over these periods, the crash history on Dukes Highway remains a concern.

There has been at least one fatal crash on Dukes Highway every year since 2006, and most years over this period have seen more than one fatal crash.

Traffic Volumes

Traffic volumes on Dukes Highway have increased by approximately 15% on average since 2007, however, the total number of commercial vehicles is relatively unchanged. This does not imply that the freight task has remained steady, as commercial vehicles have increased in size and load capacity over this time as well with b-triple trucks first allowed to regularly use South Australian roads in 2012 increasing the efficiency of long distance freight operations.

Dukes Highway Traffic Volumes

Segment	Length (km)	AADT	C.Vs	2007 AADT	2007 C.Vs
Princes Hwy – Mallee Hwy (Taillem Bend)	3.0	5900	1800	4800	1600
Mallee Hwy – Coonalpyn	58.5	4300	1100	3600	1200
Coonalpyn – Keith	64.0	4000	1200	3600	1200
Keith – Ngarkat Hwy	36.0	2800	1100	2600	1000
Ngarkat Hwy – Bordertown (Ramsay Tce)	9.5	3200	1000	2800	1100
Ramsay Tce – North Tce (W)	1.0	3300	1200	2800	1000
North Tce (W) – North Tce (E)	1.0	2000	750	2200	800
North Tce (E) – Creecoona Tce	1.0	3300	1200	2900	1100
Bordertown – SA/Victoria Border	17.0	2700	1000	2300	850

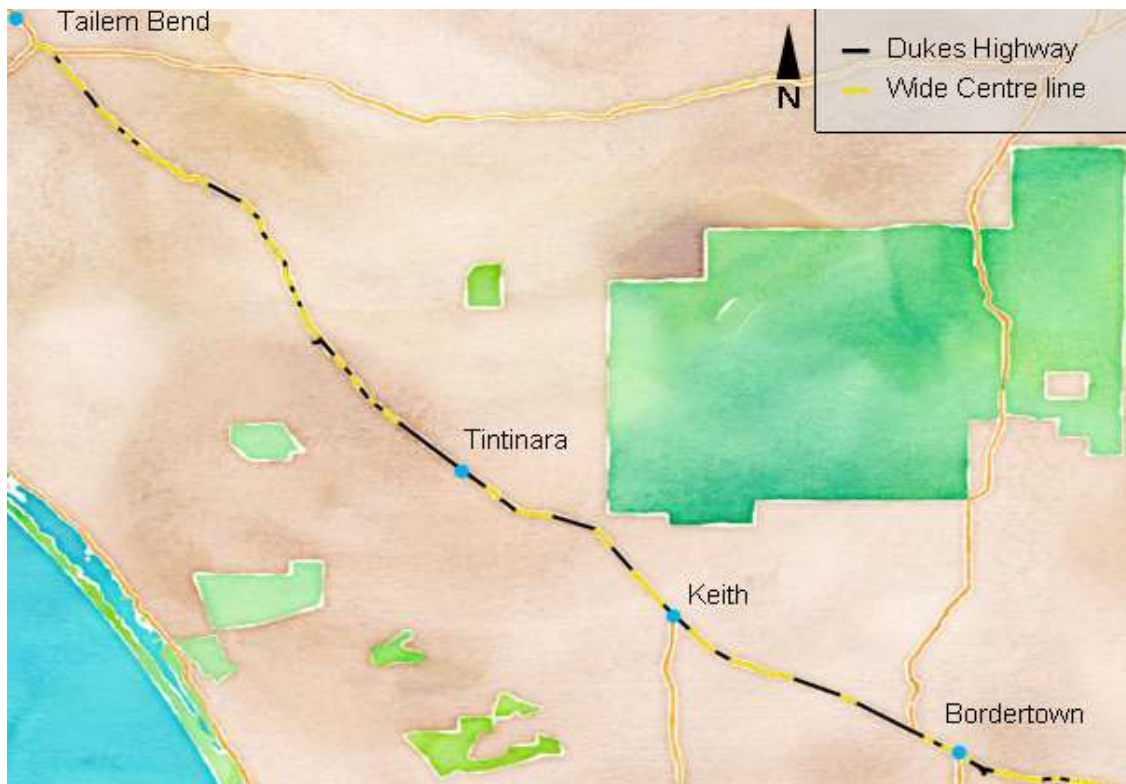
Road Widths

Dukes Highway is well constructed with wide geometry to cater for large freight combinations.

Dukes Highway Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
Cooke Plains	3.5m	1.8m-1.9m	11.9m
Culburra	3.5m	1.4m-2.0m	11.6m
Brimbago	3.5m	1.8m-2.0m	12.0m
Serviceton (Victoria)	3.5m-3.7m	2.1m	11.4m

Lane and shoulder widths are consistent with a 1.2m wide centreline treatment in place for much of the corridor.



Locations of wide centre line treatment along Dukes Highway

Speed Limits

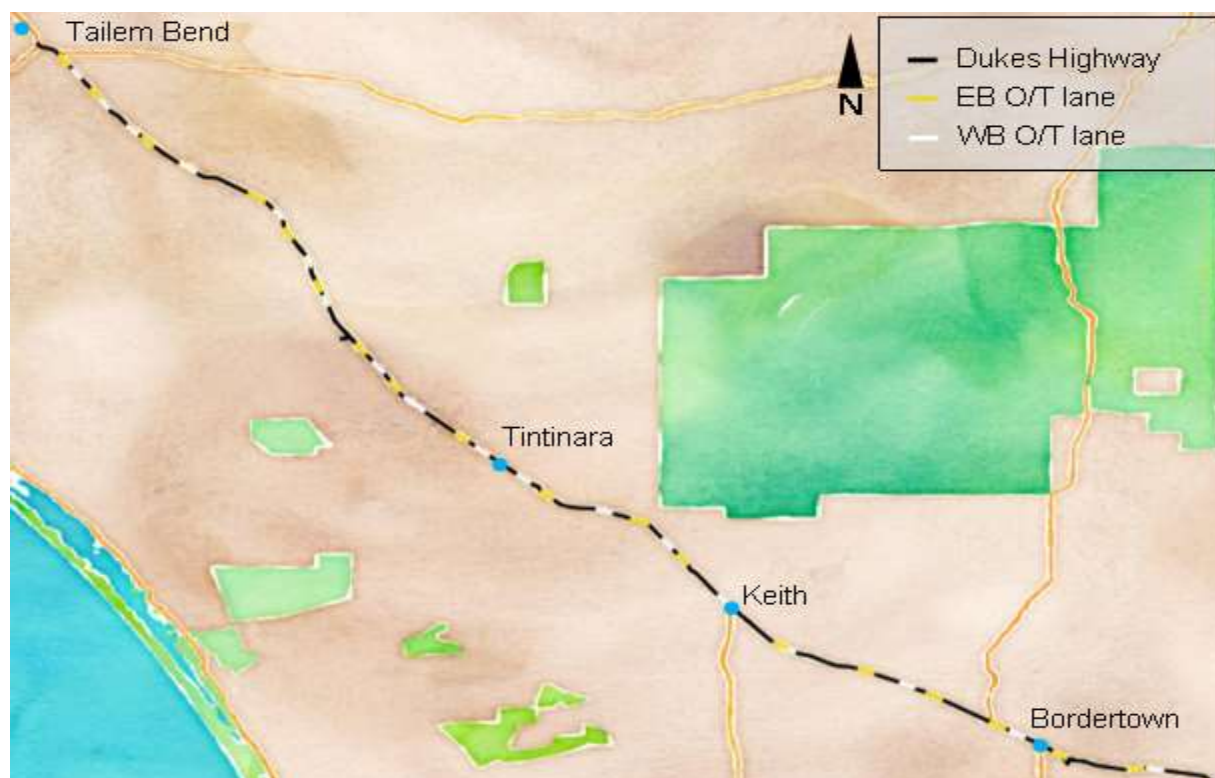
The speed limit on Dukes Highway is 110 km/h, with reductions to 80 km/h and 60 km/h through townships. It was noted that during the time of our assessment, some speed limit buffer zones were being replaced with 'speed limit ahead' signs.

Dukes Highway Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Tailem Bend – Coomandook	31.5	110
Coomandook	2.5	80
Coomandook – Ki Ki	13.0	110
Ki Ki	0.5	80
Ki Ki – Coonalpyn	14.0	110
Coonalpyn	2.0	80/60
Coonalpyn – Culburra	17.5	110
Culburra	0.5	80
Culburra - Tintinara	10	110
Tintinara	2.5	80/60/80
Tintinara – Keith	35.5	110
Keith	3.5	80/60/80
Keith – Bordertown	40.5	110
Bordertown	6.0	80
Bordertown – SA/Victoria Border	17	110

Observations

In general, the surface condition of Dukes Highway is quite good. The clear zone is well established, and barrier protection is regularly provided to protect against fixed roadside hazards. There are 36 overtaking lanes between Tailem Bend and the Victorian border which provide regular opportunities for overtaking.



Location of overtaking lanes on Dukes Highway

Traffic volumes are high with a mix of traffic including b-triples and double road trains, tourists towing caravans, and regular commuters. The larger and slower vehicles present challenges for overtaking with almost two kilometres of clear road required to overtake a b-double travelling at 100 km/h without exceeding the posted 110 km/h speed limit.

Traffic volumes indicate that, on average, a driver will encounter a vehicle in the opposing direction once every kilometre. Traffic engineering theory in regards to platooning of vehicles means that longer platoons of vehicles will be encountered, with spaces larger than this in between. On observation when traversing the highway multiple times in each direction, overtaking opportunities outside of the designated overtaking lanes are infrequent and risky. RAA recommends that Dukes Highway be progressively duplicated between Taillem Bend and the Victorian border in multiple stages that will eventually join a duplicated Western Highway in Victoria. RAA recognise the significant cost of this project, and the need to secure federal funding; however, consider the project vital for safety and productivity along this corridor into the future.

In the shorter term, RAA recommends that wire rope barrier be installed to separate opposing traffic flows and further address the ongoing issue of catastrophic head on crashes occurring on Dukes Highway.

Key Recommendations

Dukes Highway – Key Recommendations		Authority
	▪ Progressively duplicate Dukes Highway between Taillem Bend and the Victorian border.	DPTI/DIRDC
	▪ Install wire rope barrier to separate opposing traffic flows and reduce the number of head on crashes occurring.	DPTI/DIRDC

Riddoch Highway

Riddoch Highway is a state maintained highway extending for 240 kilometres between Keith and Port MacDonnell. The highway passes through a number of townships with the largest being Mt Gambier, Penola and Naracoorte. The highway is vital for the tourism and primary production industries in the region with freight, tourists and local commuters all sharing the highway.

Due to the high importance of the Riddoch Highway to the Limestone Coast region, greater South Australia and Victoria, RAA have been campaigning to have the Riddoch Highway included as part of the National Highway network. This would open up additional federal funding to make the highway safer and more efficient for the thousands of motorists using the corridor every day.



Freight, tourists and local commuters all share the Riddoch Highway

Riddoch Highway is the most significant corridor for the timber industry in South Australia, with the section between Penola and Mount Gambier predicted to carry up to 20M tonnes of timber product between 2015 and 2024⁵ according to the *Green Triangle Freight Action Plan Update (2016)*. This report also highlights the section between Naracoorte and Penola that is predicted to carry up to 2.5M tonnes of timber product over the same period.

Furthermore, Riddoch Highway is the primary road train and over dimensional load route to and from the Limestone Coast region, and is PBS level 3A approved.

The highway was one of the most raised roads in the Limestone Coast regional member survey. When asked which major road or transport improvements are needed in the region, the lack of overtaking lanes on the northern section of Riddoch Highway was very evidently one of the most significant concerns. Concerns about speed limits being too high or too low were also raised in a number of locations.

⁵ Victorian and South Australian Governments, 2016, *Green Triangle Region Freight Action Plan Update*, pp12-13.

Some typical survey responses are included below.

“Definitely need more overtaking lanes on the Riddoch Highway as there are none between Naracoorte and Keith and only one between Naracoorte and Penola. Improved safety measures such as islands or lighting at intersections with the Riddoch Highway.”

“Between Padthaway and Naracoorte after building shoulders on road, the shoulders are higher than the centre of the road leading to deep puddles forming within the lanes after rain. There are numerous places where these puddles do not drain and are an aquaplane hazard.”

“Truck traffic on the Riddoch Hwy has increased. The road needs to be improved to accommodate this traffic.”

A number of recent improvements to the Riddoch Highway include:

- 2015 – Penola southern bypass (\$13M)
- 2017 – 12km of resealing works in five locations between Naracoorte and Mt Gambier
- 2017 – 3km of ATLM between Penola and Nangwarry
- 2018 – Shoulder sealing between Padthaway and Naracoorte (\$750,000)
- 2018 – Intersection upgrade – Wandilo Forest Road to include dedicated right and left turn lanes and pavement improvements for b-double access
- 2018 – Intersection upgrade – Kilsby Road
- 2019 – 1.6km of surfacing works 17km south of Tarpeena.

Crash History

Between 2013 and 2017, 86 casualty crashes occurred on Riddoch Highway or at intersections with Riddoch Highway. This consisted of 5 fatal crashes, 23 crashes resulting in serious injuries, and a further 58 resulting in minor injuries.

The primary crash types are ‘hit fixed object’ and ‘roll over’ – largely attributed to inattention with fatigue the second highest cause of these two crash types. Of all crashes, inattention is the largest contributing factor, with 44 crashes due to inattention. Failure to give way (7), and failure to keep left (6) were the second highest apparent errors leading to casualty crashes.

Due to the high frequency of single vehicle crashes attributed to inattention and fatigue, RAA recommends ATLM edge lines be installed for the entire length of Riddoch Highway. ATLM is currently only installed in sections between Keith and Desert Camp and between Penola and Mount Gambier.

Riddoch Highway Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	30	Inattention (23), died sick or asleep at wheel (4), dangerous driving (1), O/T without due care (1), other (1)
Roll Over	14	Inattention (13), vehicle fault (1)
Rear End	10	Follow too closely (5), inattention (4), died sick or asleep at wheel (1)
Right Angle	8	Disobey give way sign (4), fail to give way (3), disobey stop sign (1)
Side Swipe	7	O/T without due care (4), fail to give way (3)
Head On	7	Fail to keep left (6), D.U.I (1)
Right Turn	5	Fail to stand (5)
Hit Parked Vehicle	2	Inattention (2)
Hit Pedestrian	2	Inattention (1)
Hit Object on Road	1	Inattention (1)
All Crash Types	86	Inattention (44), fail to give way (7), fail to keep left (6), O/T without due care (5), follow too closely (5), fail to stand (5), died sick or asleep at wheel (5), disobey give way sign (4), disobey stop sign (1) D.U.I (1), vehicle fault (1), dangerous driving (1), other (1)

Traffic Volumes

Traffic volumes on the Riddoch Highway vary considerably depending on the location. Between Keith and Naracoorte, the highway typically sees 2,000 vehicles per day, whereas the section south of Penola can see in excess of 4,000. Traffic volumes between Keith and Naracoorte have increased by more than 20% overall since 2007, with the volume on the 43 kilometres between Keith and Desert Camp increasing by more than 50% in this time.

The section between Penola and Mount Gambier has also seen a large increase in traffic, with growth in the range of 10% to 20% since 2007.

Riddoch Highway Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Keith – Desert Camp	43	1700	23.0	1100
Desert Camp	1.5	1700	17.5	1200
Desert Camp – Padthaway	18.0	1500	18.0	1200
Padthaway – Naracoorte Rd	21.0	1800	17.0	1500
Naracoorte Rd – Naracoorte	23.5	2200	18.0	1800
Naracoorte	4.0	2700-4100	12.0 – 14.0	2000 – 4100
Naracoorte – Edenhope Road	29.5	2000	18.0	1900
Edenhope Road – Coonawarra	8.5	2300	18.5	2000
Coonawarra – Penola	8.5	3100	14.0	3300
Penola	2.0	2600-4300	16.5	2600 – 4500
Penola – Nangwarry	17.5	3000	23.5	2200

Nangwarry – Tarpeena	8.5	3400	20.5	2900
Tarpeena – Wandilo Forest Rd (Wandilo)	6.5	3800	16.0	3400
Wandilo Forest Rd (Wandilo) –Suttontown	5.5	4100	20.5	3400
Suttontown – Mil-Lel	2.5	4900	16.5	3700
Mil-Lel –Mt Gambier	1.0	5700	14.0	4200
Mt Gambier	4.0	4700 - 13800	2.0 – 11.0	4500 – 12700
Mt Gambier –Moorak	2.5	3900	5.0	3100
Moorak –Mount Schank	11.5	2500	8.0	2300
Mount Schank – Allendale East	7.0	1900	7.0	1800
Allendale East – Port MacDonnell	5.5	1500	6.5	1600
Port MacDonnell	0.5	1200	6.5	650

Road Widths

Austrroads Guide to Road Design⁶ specifies that 3.5m lanes and 1.0m sealed shoulders should be the minimum dimensions for a single carriageway rural road carrying between 1,000 and 3,000 vehicles per day. Riddoch Highway falls just short of these dimensions, and RAA recommends road widening to meet these minimum dimensions over time, however, as a lower priority than other required upgrades on Riddoch Highway.

Riddoch Highway Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
Keith	3.3-3.5m	0.9-1.0m	8.7m
N of Chain Pump Road (Willalooka)	3.3m	0.8m	8.2m
S of McBride Road (Padthaway)	3.4-3.5m	1.6m	10.1m
S of Caves Road (Naracoorte)	3.4m	0.7-1.0m	8.5m
N of Millers Lane (Penola)	3.5-3.6m	1.6m	10.3m
S of Wandilo Forest Road (Wandilo)	3.3-3.5m	1.1-1.2m	9.1m
S of Tarrant Road (Moorak)	3.3-3.5m	1.1-1.5m	9.4m
S of Post Office Road (Mt Schank)	3.3-3.4m	0.7-0.9m	8.3m
S of Lithgows Road (Port MacDonnell)	3.0-3.1m	1.2-1.3m	8.6m



Safety would be improved with wider lanes and shoulders

⁶ Austrroads 2016, *Guide to Road Design Part 3: Geometric Design*, pp46-47.

Speed Limits

Between Keith and Mount Gambier the speed limit on open sections of the highway is 110 km/h. Between Mount Gambier and Port MacDonnell, the speed limit was recently reduced from 110 km/h to 100 km/h. Buffer zones are used to reduce speed limits through built up areas as required.

Riddoch Highway Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Keith	3.0	80
Keith – Padthaway	59.0	110
Padthaway	1.5	80
Padthaway – Naracoorte	43.5	110
Naracoorte	5.5	80/60/80
Naracoorte – Penola	45.5	110
Penola	3.0	80/60/50/80
Penola – Nangwarry	16.5	110
Nangwarry	2.0	80/60/80
Nangwarry - Tarpeena	6.5	110
Tarpeena	3.0	80/60/80
Tarpeena – Mount Gambier	18.0	110
Mount Gambier	9.0	80/60/50/40/60/80
Mount Gambier – Allendale East	16.5	100
Allendale East	2.0	80/50/80
Allendale East - Port MacDonnell	3.5	100
Port MacDonnell	1.0	80/50

When analysing survey responses, two areas along the Riddoch Highway were raised by respondents that had concerns with the speed limits. These were the section through the Coonawarra wine region, and the section between Mount Gambier and Port MacDonnell, with some typical survey responses below.

“Riddoch Highway (Bay Rd) – Mt Gambier to Port MacDonnell – speed limit should be reinstated to 110 km/h.”

“The Riddoch highway between Penola and Coonawarra, where all the Cellar doors are, should be 80 km/h.”

RAA have reviewed these locations in the *Observations* section below.

Observations

Keith to Naracoorte

The 110 kilometre long section of Riddoch Highway between Keith and Naracoorte was one of the most raised sections of road by respondents to the Limestone Coast survey. The biggest concern with this section of Riddoch Highway is the lack of overtaking lanes. For a corridor of such importance to tourism, freight, and local road users it is vital that overtaking lanes are installed to provide some safe opportunities for overtaking. RAA recommends a minimum of four overtaking lanes be installed (two in each direction) distributed evenly at approximately 20 kilometre intervals.

The road surface is generally in serviceable condition with localised defects including corrugations, ruts and minor undulations. There are sections with wide clear zones, and barrier protection has been used in some locations to protect fixed hazards. Numerous locations exist where large trees are unprotected within 5m of the road, and RAA recommends that all fixed hazards within five metres of the highway be removed or protected by barriers. Consideration should also be given to providing barrier protection to other fixed hazards within 10 metres of the road that cannot be addressed by other means.



Trees line the highway south of Padthaway

At both intersections with Rowney Road, a number of safety upgrades were identified, including:

- Extending short left turn lanes
- Modifying lane designation at each intersection to create a through lane, and a dedicated right turn lane rather than a through lane and a right/through lane.

Other intersections significant along this section of Riddoch Highway with poor or no turning lanes were identified including Carew Road/Mount Monster Road, Beeamma-Parsons Road and Lochaber Lane and it is recommended that intersections be upgraded to facilitate safer turning movements.

As discussed in the survey results section of this report, a bypass of Naracoorte is supported by 60% of respondents in the region, with 45% of all respondents rating it a moderate to high priority in the Limestone Coast region as a whole.

The 2019/20 federal budget allocated \$6.4M to upgrading the two Smith Street roundabouts in Naracoorte to accommodate heavy vehicles. At the time of writing there had been no formal contribution to this project by the state government, however it is anticipated that \$1.6M will be contributed by the state government to make the project an 80/20 federal to state funding split.

RAA expect larger heavy vehicle combinations including b-triples and double road trains to be considered as part of the design and eventually permitted on Smith Street. This will reduce the number of freight movements needed for the same freight task and improve efficiency and sustainability for local business.

Constructing a full freight bypass of Naracoorte is a significant challenge due the layout of the existing road network and major commercial destinations west of the Naracoorte CBD. RAA recommends and supports further investigation including a feasibility study into a freight bypass of Naracoorte that will facilitate safe freight movements and further reduce the number of heavy vehicles traversing the Naracoorte township.

Naracoorte to Penola

Survey respondents raised the section of Riddoch Highway between Naracoorte and Penola as a concern due to a lack of overtaking lanes. There are currently two overtaking lanes, with one in each direction between Edenhope Road and Bool Lagoon Road as pictured below.



Current overtaking lane locations between Naracoorte and Penola

These overtaking lanes are only 1.1 kilometres long, which is far below the minimum desired length of 1.6 kilometres on a road train route. RAA recommends that these two overtaking

lanes be extended to at least 1.6 kilometres long. RAA also recommends that an additional overtaking lane be installed in each direction to increase the number of safe overtaking opportunities between Naracoorte and Penola.

Fixed hazards are located within five metres of the road along most of this section and include trees and stobie poles, particularly in the Coonawarra region where a row of stobie poles is adjacent to the east side of the corridor for 10 kilometres between McLean Road in Coonawarra and the northern entry to Penola. Barriers protect some hazards on the outside of curves, however, RAA recommends that additional hazard removal and protection works be undertaken to further improve safety on this busy highway.

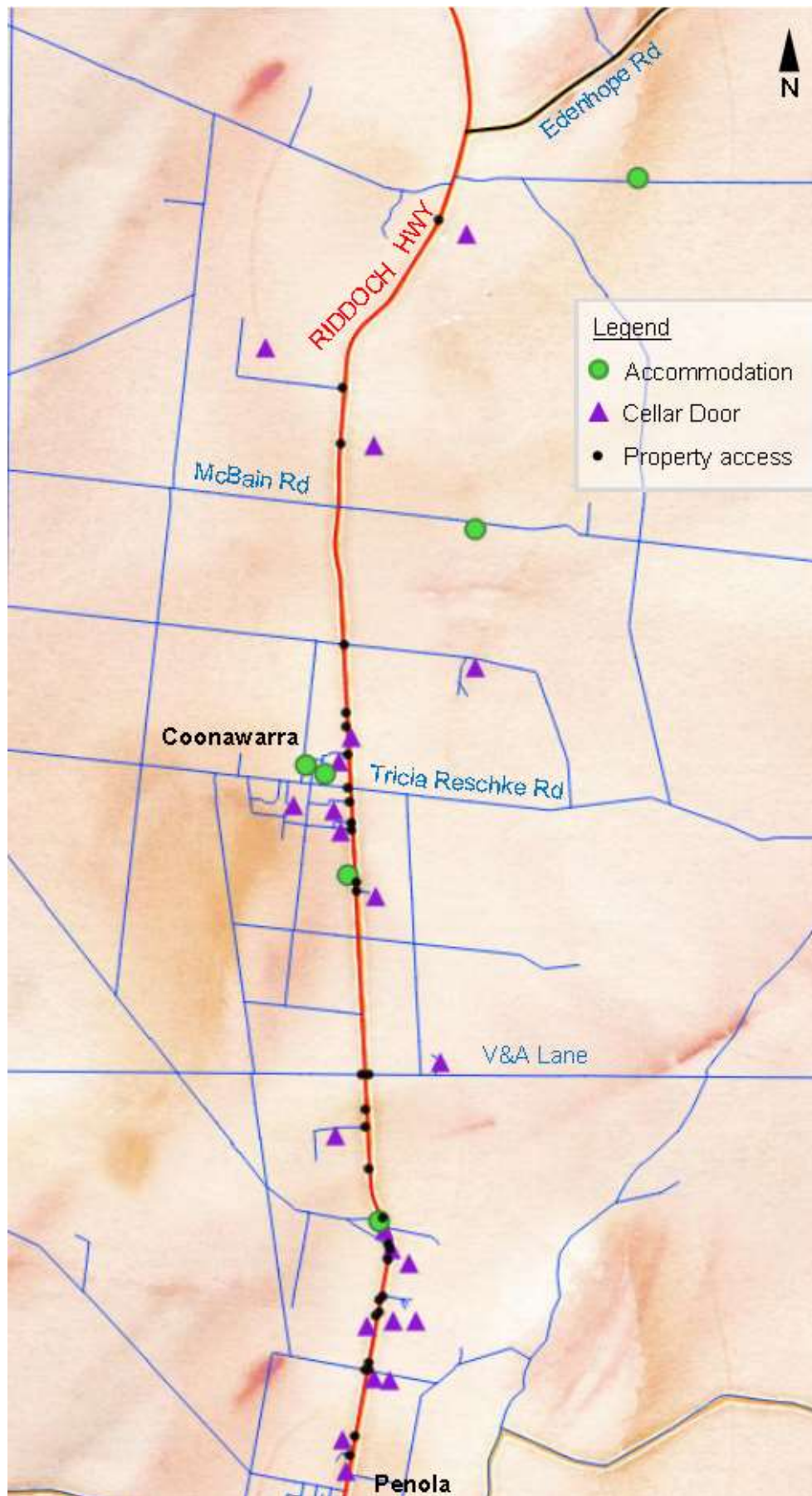


Stobie poles and trees consistently within 5m of the highway in the Coonawarra region

RAA has assessed intersections and property access points in the Coonawarra wine region, with the key issue being the high number of destinations and a lack of dedicated left and right turn lanes for vehicles to turn off the highway. With many popular tourist destinations, as well as grape processing facilities along this section of the highway, vehicles are frequently turning off for both agriculture and tourism purposes. The map over page shows popular wineries and tourist accommodation in the region and property access points off the highway between Penola and Edenhope Road.

Intersections and wineries along this section of Riddoch Highway, with the exception of Memorial Drive/Tricia Reschke Road, do not have turning lanes to facilitate safer access, however, shoulders are usually wide enough to allow a vehicle to partially leave the through lane when making a left turn. This does not protect vehicles that need to stop in the middle of the road to make a right turn, and this is an incredibly dangerous position to be in on a 110 km/h road carrying more than 3,000 vehicles per day.

Between 2013 and 2017 there were six casualty crashes on the Riddoch Highway in the Coonawarra wine region. Five of these resulted in minor injuries, and one tragically resulted in a fatality. A further 17 crashes occurred that resulted in a vehicle being towed away, or in property damage greater than \$5,000.



Locations of accommodation and cellar doors in the Coonawarra wine region

RAA recommends that speed limits be reviewed for the 17 kilometres of Riddoch Highway between Penola and Edenhope Road. RAA also recommends that left and right turn lanes be provided from the highway to key cellar door access points and at side road intersections in this region.

Penola Bypass

The 2018/19 state budget includes a funding allocation of \$14.6M to complete the northern section of the Penola bypass project with completion scheduled for June 2020. Community support for this project is very high, with 70% of survey respondents indicating support for the project. The need for this projects completion is obvious observing the volume of heavy vehicle traffic travelling through the centre of town. Upon completion, the bypass project will significantly improve safety and amenity within Penola and RAA are supportive of the timely completion of the long-awaited and worthwhile project.



Artist impression of the Penola Northern Bypass project (Source, DPTI)

Penola to Mt Gambier

The 47 kilometre section of Riddoch Highway between Penola and Mount Gambier is the busiest with AADT between 3,000 to 5,000 vehicles every day. Overtaking lanes are more frequent with four for southbound traffic and additional three for northbound traffic. Four of these overtaking lanes fell below the desirable 1.6 kilometre length and RAA recommends that these four overtaking lanes be extended.



Current overtaking lane locations between Penola and Mount Gambier

The surface of the road is markedly worse between Penola and Mount Gambier, likely correlating with the high volumes of freight. Ruts were evident along most sections of the road, causing water to pond on the road surface in the wheel paths.



Rutting and cracking in the wheel paths in Mingbool



Ruts causing ponding in Nangwarry

RAA recommends surface remediation works be undertaken between Penola and Mount Gambier to extend the serviceable life of the pavement before cracks develop further.

Barrier protection is used to a greater extent, especially south of Tarpeena. Fixed hazards consisting of large trees and stobie poles are still prevalent, with the latter generally set back up to 10m from the road. RAA recommends that additional barrier protection be installed around curves and areas of dense vegetation between Penola and Tarpeena.

Mt Gambier to Port MacDonnell

In late 2017, the former Labor Government reduced the speed limit from 110 km/h to 100 km/h on eight regional roads across the state. Riddoch Highway (Bay Road) between Mount Gambier and Port MacDonnell was one of these. The incoming Liberal government promised to reinstate these 110 km/h speed limits.

Along the corridor, shoulders are widened marginally at most property access points and side road intersections, and lane geometry varies with the section south of Post Office Road being narrower than the northern section. Roadside hazards in the form of trees and stobie poles are present along the route, and ATLM has not been applied on edge lines.

Side road intersections have widened shoulders but do not have dedicated turning lanes, with the intersection with Old Boundary Road of particular concern. This intersection is located on a curve beyond a crest on a moderate incline.

The crash history is poor with 10 casualty crashes occurring in the previous 110 km/h zone between 2013 and 2017 with five of these resulting in serious injuries. Eight of the crashes were single vehicle crashes, primarily due to inattention, and these crash types involved vehicles hitting fixed objects (4), leaving the road out of control (2), rolling over (1) or hitting animals (1).



Locations of 10 casualty crashes between Mt Gambier and Port MacDonnell

For the 2.5 kilometre section between Orchard Road and Loudon Hill Road there are at least 23 rural address access points and six side road intersections (including Orchard Road and Loudon Hill Road). The road is generally wide with ruts up to 30mm deep in the wheel paths and cracks forming in the pavement. The surface is also exhibiting binder bleeding in the wheel paths. RAA recommends that Riddoch Highway be resealed to address the pavement defects between Orchard Road and Loudon Hill Road. Roadside development on this section of the highway is prohibitive of a higher speed limit, even if defects are repaired.

South of Loudon Hill Road, the level of roadside development is lower, and following implementation of a number of safety upgrades, RAA recommends a review of the 100 km/h speed limit be undertaken with consideration given to reinstating the 110km/h speed limit.

RAA recommends the following safety upgrades between Mount Gambier and Port MacDonnell which may facilitate the re-introduction of a 110 km/h speed limit south of Loudon Hill Road.

- Intersection upgrades with all sealed roads to accommodate left and right turning lanes
- 10m apron sealing at all unsealed road intersections
- Ensure consistent 3.5m lane geometry and minimum 1.0m sealed shoulder width
- Minimum 2.0m shoulder seal at property access points
- Remove or protect all hazards within at least 5m of the highway
- Install two overtaking lanes (one in each direction) between Mount Gambier and Allendale East

Once these upgrades are completed, the road will meet most criteria for a 110 km/h speed limit outlined in DPTI's *Speed Limit Guideline for South Australia*⁷, with the exception of divided carriageways.

Key Recommendations

Riddoch Highway – Key Recommendations		Authority
▪ Recognise Riddoch Highway on the National Highway Network.		DPTI / DIRDC
▪ Road and shoulder widening to achieve minimum dimensions (3.5m lanes, 1.0m sealed shoulder), set out in <i>Austroads Guide to Road Design</i> .		DPTI
▪ Complete ATLM installation on remaining sections along the corridor.		DPTI
Keith to Naracoorte		
▪ Install minimum of four overtaking lanes.		DPTI
▪ Removal or protection of all fixed hazards within 5m of the highway.		DPTI
▪ Extend turn lanes and modify lane designation with the intersections with Rowney Road and Rowney Road West.		DPTI
▪ Further intersection upgrades along the corridor to facilitate safer turning movements.		DPTI
▪ Further investigation into a freight bypass of Naracoorte.		DPTI
Naracoorte to Penola		
▪ Extend the two existing overtaking lanes by 500m to facilitate safer overtaking of road trains.		DPTI
▪ Install two new overtaking lanes (one in each direction).		DPTI
▪ Removal or protection of all fixed hazards within 5m of the highway.		DPTI
▪ Review Speed limit in the Coonawarra wine region between Edenhope Road and Penola.		DPTI
▪ Install right and left turn lanes to facilitate safer access to cellar doors and side roads in the Coonawarra wine region.		DPTI
Penola to Mount Gambier		
▪ Extend four overtaking lanes to facilitate safer overtaking of road trains and log trucks.		DPTI
▪ Surface remediation works to extend pavement life.		DPTI
▪ Additional barrier protection around curves and dense vegetation between Penola and Tarpeena.		DPTI
Mount Gambier to Port MacDonnell		
▪ Reseal between Orchard Road and Loudon Hill Road.		DPTI
▪ Intersection upgrades with all sealed roads to accommodate left and right turning lanes.		DPTI
▪ 10m apron sealing at all unsealed road intersections.		DPTI
▪ Ensure consistent 3.5m lane geometry and minimum 1.0m sealed shoulder width.		DPTI
▪ Minimum 2.0m shoulder seal at property access points.		DPTI
▪ Remove or protect all hazards within at least 5m of the highway.		DPTI
▪ Install two overtaking lanes (one in each direction) between Mount Gambier and Allendale East.		DPTI
▪ Following safety upgrades, review 100 km/h speed limit between Mount Gambier and Port MacDonnell.		DPTI

⁷ DPTI, 2017, *Speed Limit Guideline for South Australia*, pp20.

Princes Highway

Princes Highway is a state maintained highway extending for approximately 370 kilometres between Dukes Highway in Tailem Bend and the Victorian border near Mount Gambier. Princes Highway travels adjacent the Coorong via Meningie and Salt Creek until reaching Kingston where it makes its way inland through Millicent and Mount Gambier.

More than 70 survey respondents mentioned Princes Highway when asked which major road or transport improvements were needed in the region. The majority of these comments were in relation to the section between Kingston and Millicent and the section along the Coorong between Kingston and Meningie. A selection of typical survey responses are included below.

“Specifically along the Coorong, there need to be more overtaking opportunities due to slow travellers with caravans.”

“In relation to the Princes Highway between Biscuit Flat and Millicent the road has no overtaking lanes, it is narrow, bumpy and does not have edge line marking – all of which makes it difficult to overtake trucks.”

“Narrow road at Clay Wells Road and Princes Highway intersection.”

“The Princes Highway from Kingston SE to Meningie has low areas where water lays after rain. This causes a vehicle to aquaplane and the spray from a truck or slow vehicle reduces visibility in passing. This road also has many corners and undulations with little area to pass cyclists.”

Princes Highway is also a vital corridor for freight and the logging industry. According to the *Green Triangle Region Freight Action Plan Update* (2016)⁸, the Kingston to Millicent section is predicted to carry up to 2.5M tonnes of timber product and the Millicent to Victoria section up to 10M tonnes of timber product in the ten years to 2025.



Princes Highway is a vital piece of road infrastructure in the Limestone Coast region

⁸ Victorian and South Australian Governments, 2016, *Green Triangle Region Freight Action Plan Update*, pp12-13.

RAA previously assessed Princes Highway in 2014 where a number of improvements were identified and recommended. These included road widening, surface rehabilitation works, hazard protection and shoulder sealing, with some of these upgrades being implemented in varying degrees over recent years.

In 2015, the *Integrated Transport and Land Use Plan (ITLUP)*, produced by the Government of South Australia stated that road widening and shoulder sealing had a 5-15 year implementation timeframe in the Limestone Coast region.

Upgrades to the highway in recent years include:

- 2014 – 4.3 km of shoulder seal at junction with Southern Ports Highway (Kingston) including safety barriers, street lighting and rumble strips (\$590,000)
- 2015 – 2.7 km of resurfacing north of Millicent
- 2015 – Intersection upgrade at Main Road 300 (Hatherleigh), improving layout and removing hazards along with improved signage and installation of rumble strips (\$145,000)
- 2016 – Reduction of speed from 110 km/h to 80 km/h for 2.1 km through Hatherleigh
- 2017 – Intersection upgrade at Clay Wells Road including shoulder sealing, drainage upgrades, improved delineation and installation of solar flashing warning signs on approaches (\$470,000)
- 2018 – Shoulder seal for sections between Kingston and Millicent (\$3.3M)
- 2019 – Total of 6.5 km of surfacing works at various locations east of Mt Gambier

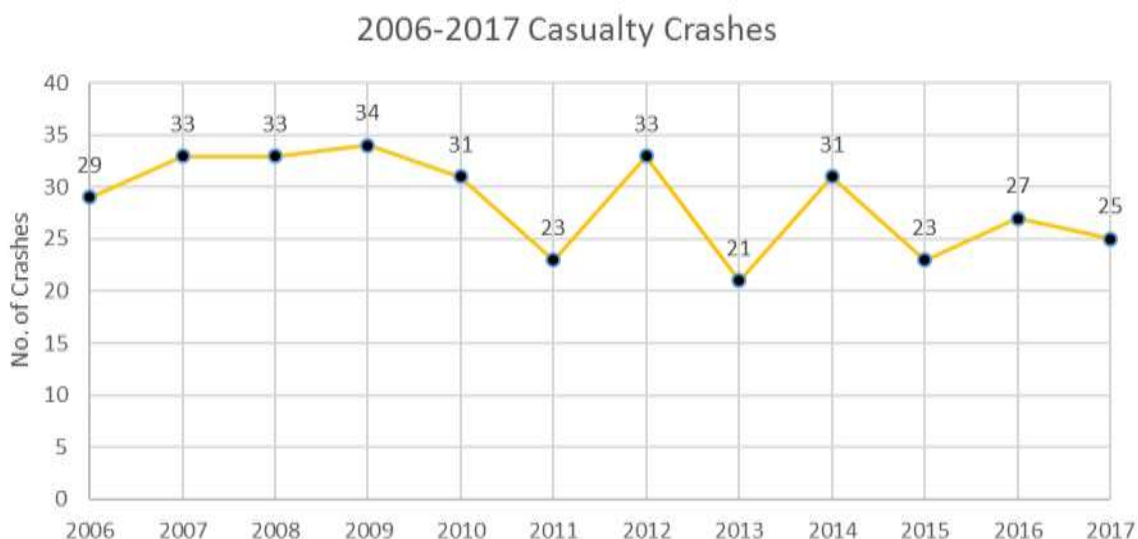
Furthermore, the 2019 federal budget announcement on 2 April 2019 included \$1B towards the Princes Highway corridor between Sydney and Port Augusta, with \$200M to be spent in South Australia. This funding will become available over a period of up to 10 years from 2021 through the *Infrastructure Investment Program – Princes Highway*. Further detail on where this funding will be allocated is not yet available. RAA has made a submission to the Princes Highway corridor study being conducted by GHD on behalf of the Federal Government, which highlights key issues with the corridor that are also raised within this report.

Crash History

Between 2013 and 2017, 127 casualty crashes occurred on Princes Highway or at intersections with Princes Highway. This consisted of four fatal crashes, 37 crashes resulting in serious injury and a further 86 resulting in minor injury.

As a result of these 127 crashes, 7 people were killed, 42 people were seriously injured and 172 people suffered minor injuries. The most serious crash during this period was a quadruple fatality at the intersection with Main Road 300 in Hatherleigh.

The number of casualty crashes occurring annually on Princes Highway has decreased (on average) in the past decade, however, this number is still very high with an average of more than 25 casualty crashes occurring annually on the highway for the 2013 – 2017 period.



The primary crash type is ‘hit fixed object’, with these crashes mostly attributed to inattention. ‘right angle’ and ‘roll over’ crashes the next most common. Inattention is, by far, the most common apparent error leading to crashes, with 54 crashes likely due to inattention. Failure to stand (14), and failure to give way (13) are the next highest apparent errors leading to casualty crashes on the Princes Highway.

Princes Highway Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	35	Inattention (25), D.U.I (5), sick or asleep (4), vehicle fault (1)
Right Angle	16	Fail to give way (9), disobey give way sign (5), disobey stop sign (1), disobey traffic lights (1)
Roll Over	15	Inattention (10), sick or asleep (3), D.U.I (2)
Rear End	15	Inattention (9), follow too closely (6)
Right Turn	14	Fail to stand (14)
Side Swipe	9	O/T without due care (4), fail to give way (4), follow too closely (1)
Hit Animal	6	N/A (6)
Hit Pedestrian	5	Inattention (4), drunken pedestrian (1)
Left Road – Out of Control	5	Inattention (3), sick or asleep (1), N/A (1)
Head On	3	Fail to keep left (1), D.U.I (1), inattention (1)
Hit Parked Vehicle	3	Opening or closing door (2), inattention (1)
Other	1	Inattention (1)
All Crash Types	127	Inattention (54), fail to stand (14), fail to give way (13), D.U.I (8), sick or asleep (8), follow too closely (7), N/A (7), disobey give way sign (5), O/T without due care (4), opening or closing door (2), disobey stop sign (1), disobey traffic lights (1), vehicle fault (1), drunken pedestrian (1), fail to keep left (1)

Traffic Volumes

Traffic volumes along the route are highly variable, however, are highest on the section between Millicent and Mount Gambier, which is traversed by more than 3,000 vehicles daily.

Since 2007, traffic volumes on most sections of Princes Highway have increased by more than 10% between Taillem Bend and the SA/Victoria border. The section with the most substantial increase in traffic is between Millicent and Mount Gambier, with an increase of more than 20% since 2007.

Princes Highway Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Taillem Bend – Ferry Rd	8.0	2000	13.5	1700
Ferry Rd - Meningie	42.0	1500	12.5	1400
Meningie	1.5	2500 - 3000	13.5	2600 - 2800
Meningie – Salt Creek	60.5	1000	14.0	900
Salt Creek - Kingston	83.0	1100	14.5	1000
Kingston	3.5	1000	17.0	900
Kingston – Avenue Range Rd	15.5	800	16.5	700
Avenue Range Rd – Konetta Rd	38.5	600	26.5	470
Konetta Rd – Clay Wells Rd	10.5	650	26.0	N/A
Clay Wells Rd - Hatherleigh	23.5	900	21.0	800
Hatherleigh – Furner Rd	7.0	1100	18.0	1000
Furner Rd - Millicent	7.0	1300	19.0	1300
Millicent	7.0	1600 - 5300	6.0 - 19.0	1600 - 7300
Millicent – Tantanoola Rd (N)	5.5	3000	9.0	2700
Tantanoola Rd (N) – Tantanoola Rd (S)	10.5	2700	15.0	2200
Tantanoola Rd – The Springs Rd	7.5	2800	14.5	2100
The Springs Rd – Kangaroo Flat Rd	8.0	3500	14.5	2900
Kangaroo Flat Rd – Mt Gambier	9.0	3900	13.0	N/A
Mt Gambier	10.5	1450 – 16000	8.0 – 24.0	1500 - 14700
Mt Gambier – Vorwerk Rd	3.0	1500	23.5	1500
Vorwerk Rd – SA/Victoria border	8.0	1300	31.0	1200

Road Widths

Road widths north of Kingston and south of Millicent are largely adequate for the function of the road; however, for the 105 kilometres between Kingston and Millicent, the road geometry varies widely. Lane widths are generally less than 3.2 metres, and sealed shoulders are mostly very narrow or non-existent. The map below highlights sections of the corridor with inadequate, or no shoulder sealing and edge lines.



Princes Highway shoulder seal map

RAA recommends that shoulders be sealed to a minimum of 1.0m for the entire corridor, with the section between Clay Wells and Millicent highlighted in the above map prioritised. RAA also recommends that lane widths be widened to 3.5m between Clay Wells and Millicent, and a minimum of 3.3m between Kingston and Clay Wells, based on the higher volumes of logging freight between Clay Wells and Millicent.



Narrow lanes and lack of shoulder seal south of Clay Wells

Princes Highway Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
N of Ferry Rd (Taillem Bend)	3.5m	1.0m	9.0m
S of Nine Mile Rd (Ashville)	3.3-3.4m	1.0-1.1m	8.8m
S of Salt Creek	3.1-3.3m	1.2m	8.8m
N of Cantara Rd (Tilley Swamp)	3.2m	1.0-1.3m	8.7m
E of Rowney Rd W (Kingston)	3.5m	0.1-0.3m	7.4m
S of Avenue Range Rd (Reedy Creek)	3.1-3.2m	0.2-0.3m	6.6m
S of Cockys Ln (Conmurra)	3.2-3.3m	0.2m	6.9m
N of Konetta Rd (Greenways)	3.0-3.2m	1.5m	9.2m
N of Clay Wells Rd (Clay Wells)	3.1-3.2m	0.3-0.4m	7.0m
S of Clay Wells Rd (Clay Wells)	3.0-3.1m	N/A	6.1m
E of Agricultural Bureau Dr (Millicent)	3.4m	0.9-1.6m	9.3m
W of Kromelite Rd (Glenburnie)	3.2-3.4m	0.9-1.1m	8.4m
W of SA/Vic Border (Victoria)	3.3-3.5m	1.0-1.4m	9.2m

Speed Limits

Speed limits are generally 110 km/h on the open road, with the exception of a 60 kilometre section between Meningie and Salt Creek. This section of highway is very similar in geometry and condition to the section between Salt Creek and Kingston, where a 110 km/h speed limit applies. When asked where speed limits should be reviewed in the region, many survey respondents raised the section between Meningie and Salt Creek. RAA recommends that speed limits be reviewed along the Coorong and a consistent speed limit apply between Meningie and Kingston.

Princes Highway Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Tailem Bend - Meningie	49.00	110
Meningie	2.5	80/60/50/100
Meningie – Salt Creek	59.5	100
Salt Creek - Kingston	82.0	110
Kingston	1.5	80/60/80
Kingston - Hatherleigh	88.5	110
Hatherleigh	2.0	80
Hatherleigh - Millicent	13.5	110
Millicent	5.5	80/60/50/60/80
Millicent – Mt Gambier	41.5	110
Mt Gambier (Jubilee Hwy)	9.0	80/60/80
Mt Gambier - Glenburnie	3.0	100
Glenburnie – SA/Victoria border	11.0	110

Observations

Tailem Bend to Meningie

The quality of the road surface is generally adequate between Tailem Bend and Meningie. The exception to this is at the Narrung turnoff (Poltalloch Road) where undulations were present through the intersection and for about 200 metres each side of the intersection. RAA recommends that pavement rehabilitation works be undertaken to address these undulations.

Aprons with unsealed roads are mostly sealed, reducing the transfer of loose gravel to the sealed carriageway, and improving cornering and acceleration capabilities for vehicles approaching and turning at these intersections.

Existing QATLM edge lines are very worn and limited in their effectiveness, and RAA recommends that this be refreshed. All six casualty crashes between Tailem Bend and Meningie were single vehicle crashes consisting of three rollovers, two cases where a vehicle collided with a fixed object and one where a vehicle left the carriageway out of control, with ATLM an effective countermeasure for these crash types.

Roadside hazards are generally kept to a minimum, however, there are sections where clear zones should be widened or hazard protection installed.

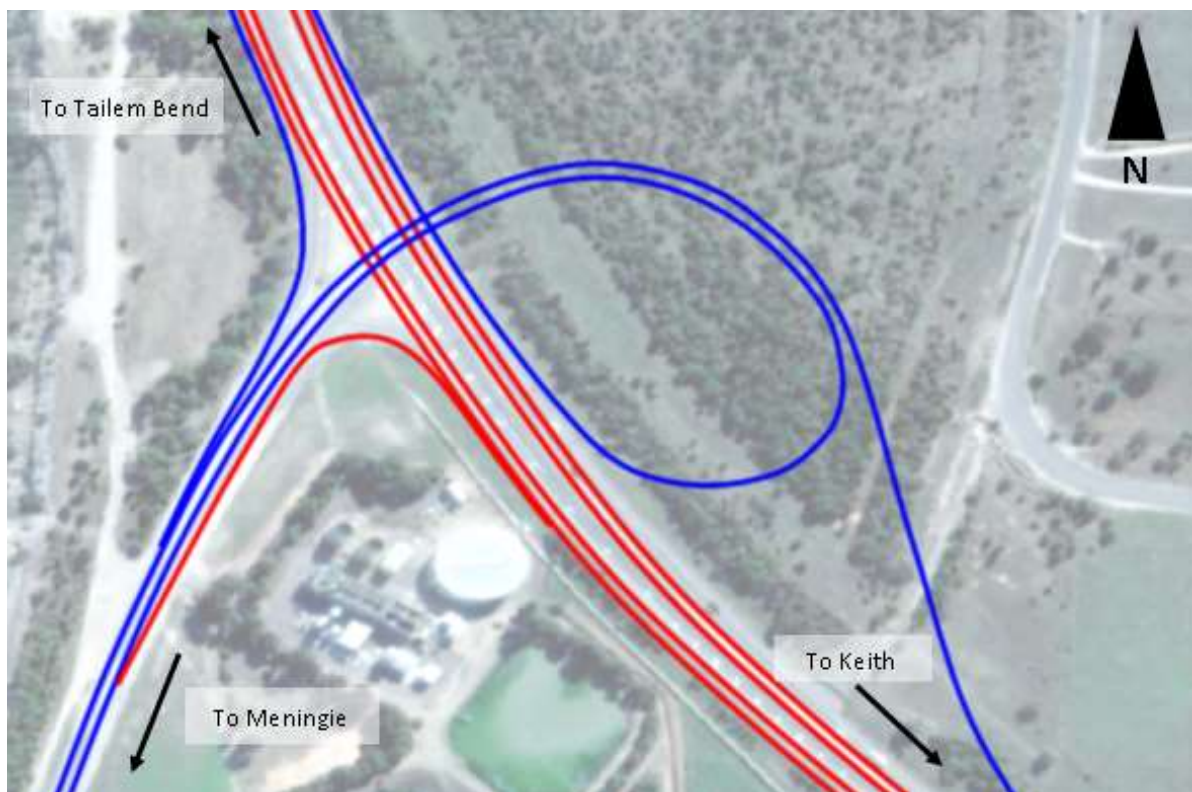


ATLM edge lines have completely worn away for most of Princes Highway between Tailem Bend and Meningie

Intersection with Dukes Highway

Between 2013 and 2017, there were four casualty crashes at the intersection with Princes and Dukes Highway. Three of these involved southeast bound vehicles turning right onto Princes Highway towards Meningie failing to give way to a northwest bound vehicle continuing along Dukes Highway towards Taillem Bend. Our observations on site indicated that sight distance to the southeast when turning right onto Princes Highway is good but the curvature of Dukes Highway may cause drivers to look in the wrong location for approaching traffic.

The intersection layout is good for a low traffic rural T-junction with long, separated turning lanes, a divided median, clear delineation and signage and ample street lighting. RAA are calling for duplication of Dukes Highway, which will result in a significant change at this intersection and a number of treatments such as a full interchange should be considered as there is sufficient adjacent land to remove dangerous at-grade right turns. The sketch below depicts a Princes Highway overpass of a four lane Dukes Highway, which would be a vastly safer treatment at this intersection when Dukes Highway duplication eventuates.



Concept sketch of a Princes Highway overpass and duplicated Dukes Highway in Taillem Bend

Meningie to Kingston

The Meningie to Kingston section of Princes Highway through the Coorong has good lane and shoulder geometry, however, the pavement is showing its age in some sections with failures including cracks, ruts, potholes, scouring, polishing and minor to moderate undulations present along most of the corridor. One of the poorer sections extended for approximately 30 kilometres south of Salt Creek, surface rehabilitation works should occur on this section as a priority.

ATLM was deteriorated and ineffective south of Meningie and RAA recommends that this be refreshed.

Delineation is good along this section of the corridor with guideposts, CAMs and RRPMS all used to good effect. Curve warning signs are used where needed and appropriate advisory speeds included as necessary.

Survey respondents were frustrated by a lack of overtaking lanes between Kingston and Meningie. Whilst traffic volumes along the corridor do not suggest a fundamental demand for additional overtaking lanes, RAA recommends that at least one additional overtaking lane be constructed in each direction between Kingston and Salt Creek due to:

- Long sections of road between townships
- Limited opportunities to pull off the road safely
- High percentage of freight and caravan traffic
- Three serious crashes caused by overtaking without due care between 2013 and 2017

The Blackford Drain Bridge just north of Kingston is narrow and RAA recommends that this be widened to safely accommodate interactions with heavy vehicle combinations in both directions. AADT estimates indicate that an average of 1,200 vehicles traverse the bridge every day, including 180 commercial vehicles.



The Blackford Drain Bridge north of Kingston

A three metre clear zone is generally maintained, and exceeded in some locations. RAA recommends widening of this clear zone where appropriate with barrier protection for hazards including embankments, trees and stobie poles considered in strategic locations due to the high frequency of crashes involving vehicles hitting fixed objects.

Whilst there are a number of rest areas along the corridor, the majority of these are located on the south western side of the road, making access dangerous for southbound vehicles. Entry points are not clearly delineated due to roadside vegetation and the majority of these are also signed as 'no trucks'. RAA recommends that at least one rest stop is constructed on the north eastern side of the road that can safely accommodate heavy vehicles.

Kingston to Millicent

The 105 kilometre section of Princes Highway between Kingston and Millicent is one of the poorest sections of the Princes Highway corridor. As specified above, lane and shoulder widths are inadequate for the function of the road and must be widened as a high priority.

With no major towns along the 105 kilometre corridor, the risk of fatigue and inattention related crashes is high and RAA recommends audio tactile line marking be installed between Kingston and Millicent to reduce the risk of these crash types occurring. Ten crashes occurred on this section due to inattention or fatigue, with two resulting in fatalities, three in serious injuries and five in minor injuries.

Whilst the surface condition is generally satisfactory, there are sections that are failing and require attention, which should be addressed as part of routine maintenance, particularly near the intersection with Clay Wells Road. Edge breakup and drop off is also present along narrow sections of the corridor south of Clay Wells, however, this can be addressed by sealing shoulders and widening lanes.



Poor surface condition north of Clay Wells Road

There are a number of rest stops located on each side of the highway; however, they generally do not cater for heavy vehicles effectively. RAA recommends that rest stops along Princes Highway be upgraded to provide safer heavy vehicle access and encourage their use.

Clear zones are generally maintained to three metres along the corridor and there are sections where roadside hazards are minimal. There are also areas where substantial roadside hazards exist, usually in the form of vegetation. RAA recommends that clear zones be widened and barrier protection used to protect roadside hazards where this is not possible.

Five major drain bridges exist between Kingston and Millicent, with only one of these (Hatherleigh Drain 20B) sufficiently wide. RAA recommends widening of the four other bridges, namely:

- Drain L bridge (Drain K)
- Wilmot Drain bridge (Reedy Creek Wilmot Drain)
- Anderson Scheme Drain M bridge (Drain M)
- Reedy Creek Mount Hope Drain bridge

By removing these narrow choke points, both safety and productivity will be improved for all road users.



Narrow Bridges on Princes Highway

Intersection with Clay Wells Road

The intersection with Clay Wells Road has a poor crash history with three casualty crashes occurring between 2013 and 2017, with one of these being fatal. At a cost of \$470,000, the intersection was upgraded in 2017 to improve geometry, delineation and drainage. This upgrade also included the installation of solar flashing warning signs on both approaches to the Princes Highway. Whilst this upgrade is welcome, additional improvements are still needed at this busy intersection. This was confirmed during stakeholder and member engagement, with commentary indicating that the solar powered lights were not effective on sunny days due to contrast and that battery backup is insufficient, with lights generally not being operational at night. These comments were confirmed during RAA's assessment of the intersection.

Particularly when approaching from the east, the curvilinear alignment of Clay Wells Road is consistently straight, and the intersection is located some distance from Penola, which increases the likelihood of inattention related crashes. The eastern and western approaches to the intersection have had a high number of passive safety treatments installed, including:

- Duplicated reduce speed warning signs with flashing LEDs
- Duplicated W2-14 't-intersection beyond curve' signs with 400m and 200m plates
- Rumble strips
- Hazard boards
- Shoulder widening and edge line marking at intersection



Multiple warning signs currently indicate the approaching intersection

RAA recommends the following treatments be considered to improve safety and further delineate the intersection in the shorter term:

- Shoulder sealing and widening on Clay Wells Road
- Edge continuity line along Princes Highway through the intersections
- Installation of RRPMS
- Installation of turning lanes
- Installation of street lighting
- Increase size and install additional hazard markers opposite the terminating legs (Clay Wells Road) of the intersection
- Installation of R1-2 'give way' signs and associated holding lines

RAA notes that these are mostly passive treatments, and that their overall effectiveness may be somewhat limited when inattention is a contributing factor to crashes. Often, a roundabout is an effective safety measure at intersections such as this. A roundabout designed to safe system principles would improve impact angles, reduce impact speeds, reduce the number of conflict points and increase visibility of the approaching intersection. However, a roundabout may require local speed reductions on approaching roads, would come at a significant financial cost, and have the potential to increase the number of crashes resulting in minor injury or property damage. RAA recommends a roundabout be considered in this location; however, detrimental impacts to productivity and safety must be carefully assessed.

A grade separated interchange, whilst able to provide the largest safety benefit, cannot currently be justified due to the low traffic volumes and high cost of design and construction.

The road surface of Princes Highway between the Clay Wells Road intersections was also very poor, with potholes and rutting prevalent. RAA recommends a reseal and road widening be undertaken through this intersection as a priority, and preferably in conjunction with additional safety upgrades as specified above.



Princes Highway is in a very poor state of repair between the two Clay Wells Road intersections

Millicent to Mount Gambier

The section of Princes Highway between Millicent and Mount Gambier is constructed to a higher standard as it is the busiest section of the corridor in the Limestone Coast region.

There are seven overtaking lanes (three westbound, four eastbound) between Millicent and Mount Gambier, which provide numerous opportunities to overtake on this busy section with vertical and horizontal alignment also restricting opportunities to overtake. Only two of these overtaking lanes meet the minimum requirement of 1600 metres⁹ in length for a road train route, and RAA recommends that five of these overtaking lanes be extended to allow additional safe overtaking opportunities.

⁹ Austroads, 2016, *Austroads Guide to Road Design Part 3: Geometric Design*, publication no. AGRD03-16, pp 225 – 236.



Locations and lengths of overtaking lanes between Millicent and Mt Gambier

In the longer term, increasing traffic volumes between Millicent and Mount Gambier may warrant duplication of this section of Princes Highway.

The surface is generally in satisfactory condition between Millicent and Mount Gambier, however minor maintenance and rehabilitation work is required in local areas. Hazard protection is also more substantial than on other sections of Princes Highway, however there are still occasional fixed hazards such as trees or stobie poles within five metres of the road edges. RAA recommends that all hazards within five metres of the road be removed or protected by barriers.

Seven casualty crashes occurred due to drivers hitting fixed objects between Millicent and Mount Gambier, with six of these attributed to inattention. RAA recommends that ATLM be installed to further reduce the risk of these crash types occurring.

The Snuggery Drain 56 Bridge near Jennings Road is narrow, and with an average of 3,000 vehicles including 270 commercial vehicles traversing the bridge per day, widening of this bridge should be seen as a high priority.

RAA also recommends the removal of 'Rail X' line marking and disused rail tracks from the former Mount Gambier to Millicent line between Glens Lane and Tantanoola Road.

Jubilee Highway (Mount Gambier)

Jubilee Highway is the name given to Princes Highway through Mount Gambier and is a four lane divided road with high traffic volumes. A full assessment of this road was not undertaken due to time limitations. RAA assessed two intersections and made a number of observations when traversing the road.

Line marking was faded, particularly on approach to, and through, roundabouts and RAA recommends this be refreshed.

East of Riddoch Highway, most side road intersections are left-in left-out only, which provides greater safety at intersections by eliminating right turns. There are a number of breaks in the

median for vehicles to perform U-turns, and these are utilised regularly. As the breaks in the median offer storage space for only one vehicle, often these overflow with multiple vehicles performing U-turns.



Vehicle queueing to make a U-turn frequently block the right lane of Jubilee Highway

Some of these median breaks are in particularly dangerous locations on curves, increasing the risk of a crash when these overflow. RAA recommends that a sheltered U-turn lane scheme be developed to provide a number of sheltered U-turn lanes at strategic locations between Riddoch Highway and Pick Avenue. Where they don't serve a purpose for right turns, remaining breaks in the median should be closed to encourage motorists to use the sheltered facilities.

Intersection with Riddoch Highway (Bay Road)

The primary issue identified at this roundabout is due to the lack of dual exit lanes on the southern side of the roundabout. There is only one exit lane in order to facilitate a sheltered right turn for accessing the McDonalds car park. This lane configuration has been in place for many years, and a review of crash data from 2006 onwards indicates that no casualty crashes have occurred as a result of this lane layout.

Notwithstanding, RAA recommends that a second exit lane be created on the south side of this roundabout, whilst maintaining the right turn lane into the McDonalds car park for safety reasons. This may require the relocation of underground power and telco services, as well as street lighting and footpath realignment. Whilst RAA recognise this issue, at present, road funding may be more effectively allocated to other projects in the region that will make a more significant improvement to road safety.

Intersection with Pick Avenue (Glenelg River Road)

The primary concern raised on Jubilee Highway during member engagement was the signalised intersection with Pick Avenue, and this was one of the most frequently raised intersections in the region. This intersection was signalised in late 2011 due to high traffic volumes and a poor crash history.

“The intersection of Jubilee Highway East and Pick Avenue in Mt Gambier – particularly since the traffic light sequence changed. This has led to a backlog of traffic that is unable to clear the intersection within one cycle of the lights. This problem normally occurs in the morning from approx. 7:45-9:00am and in the afternoon from 2:30-5:30pm”

RAA had identified the intersection due to a poor crash history, with 11 casualty crashes occurring between 2013 and 2017. There was a trend in the types of crashes occurring, with six involving vehicles turning right onto Pick Avenue colliding with northwest bound vehicles on Jubilee Highway. Five of these six crashes were a result of the driver failing to stand, and the sixth was due to a vehicle disobeying traffic lights. This is a strong indication that filter turns, which were allowed when these crashes occurred, were a major safety issue in this location.

Following our site investigation, it was noted that filter turns are no longer allowed and a follow up with the traffic management centre confirmed that this was changed in 2018 along with extending the green phase for right turns. The right turn lane measures approximately 60 metres in length, and overflows frequently, increasing the risk of rear end and side swipe crashes, increasing congestion, and reducing safety at the intersection with Jubilee Highway and Kennedy Avenue.

A median closure at the intersection with Kennedy Avenue may be required to facilitate an extension of the right turn lane into Pick Avenue. Kennedy Avenue is a collector road and intersects Jubilee Highway about 100 metres northwest of the Pick Avenue intersection. Kennedy Avenue is important to the local road network and as such, closures in the median in order to extend the Jubilee Highway right turn lane could have detrimental impacts on the function of Kennedy Avenue and the surrounding road network. A proper U-turn facility constructed in the median to the west may alleviate some of the issues associated with closing the median at Kennedy Avenue to extend the right turn lane on Jubilee Highway.

A far more costly option that would retain all turn movements would be to realign Pick Avenue and Kennedy Avenue to form a single signalised intersection, as pictured below. This would help reduce congestion and improve safety whilst also providing an opportunity for safety improvements at the Pick Avenue/Commercial Street East intersection.



Realignment of Pick Avenue and Kennedy Avenue at the intersection with Jubilee Highway

RAA recommends that the right turn lane from Jubilee Highway onto Pick Avenue be extended. Alternative options such as realignment of Pick Avenue and Kennedy Avenue should be considered, however, may not be economically feasible.

Mount Gambier to SA/Victoria Border

The section of Princes Highway between Mount Gambier and the Victorian border is generally in good condition with rehabilitation works undertaken in the weeks prior to our assessment. As a key interstate corridor, RAA recommends that ATLM be installed between Mount Gambier and Victoria to reduce the risk of inattention and fatigue related crashes.

Key Recommendations

Princes Highway – Key Recommendations		Authority
Tailem Bend to Meningie		
▪ Pavement reconstruction and reseal at the Narrung turnoff (Poltalloch Road) for 200m north and 200m south of the intersection.		DPTI
▪ Refresh ATLM.		DPTI
▪ Clear zone widening and protection of roadside hazards.		DPTI
▪ Safety upgrades, including possible construction of freeway type interchange at the intersection with Dukes Highway.		DPTI

Meningie to Kingston

	▪ Review Coorong speed limit between Meningie and Kingston.	DPTI
	▪ Pavement rehabilitation for the length, with priority given to the 30km south of Salt Creek.	DPTI
	▪ Refresh ATLM south of Meningie.	DPTI
	▪ Widen the Blackford Drain Bridge, just north of Kingston.	DPTI
	▪ Install two overtaking lanes between Salt Creek and Kingston.	DPTI
	▪ Clear zone widening and hazard protection as required.	DPTI
	▪ Construct at least one rest stop on the north eastern side of the road that can safely accommodate heavy vehicles.	
Kingston to Millicent		
	▪ Seal shoulders on sections with no current shoulder seal between Clay Wells and Millicent.	DPTI
	▪ Widen shoulder seal on sections with narrow shoulder seal between Kingston and Clay Wells.	DPTI
	▪ Widen lanes to minimum 3.3m between Kingston and Clay Wells.	DPTI
	▪ Widen lanes to 3.5m between Clay Wells and Millicent.	DPTI
	▪ Install ATLM along the entire length between Kingston and Millicent.	DPTI
	▪ Surface rehabilitation works as required, particularly near the Clay Wells Road intersection.	DPTI
	▪ Upgrade rest stops to better cater for heavy vehicles.	DPTI
	▪ Widening of four bridges between Kingston and Millicent: <ul style="list-style-type: none"> - Drain L bridge (Drain K) - Wilmot Drain bridge (Reedy Creek Wilmot Drain) - Anderson Scheme Drain M bridge (Drain M) - Reedy Creek Mount Hope Drain bridge 	DPTI
	▪ Clear zone widening and hazard protection as required.	DPTI
	▪ Reseal and road widening through the Clay Wells Road intersection.	
	▪ <u>Intersection with Clay Wells Road</u> <ul style="list-style-type: none"> - Further passive safety upgrades in the shorter term - Consideration and further exploration of constructing a roundabout in the longer term 	DPTI DPTI
Millicent to Mount Gambier		
	▪ Extend overtaking lanes to meet minimum length of 1.6km.	DPTI
	▪ Future duplication.	DPTI
	▪ Surface rehabilitation as required.	DPTI
	▪ Removal or protection of hazards within 5m.	DPTI
	▪ Install ATLM between Millicent and Mount Gambier.	
	▪ Widen Snuggery Drain 56 Bridge between Millicent and Tantanoola.	DPTI
	▪ Remove 'Rail X' line marking and disused rail tracks between Glens Lane and Tantanoola Road.	DPTI
Jubilee Highway (Mount Gambier)		
	▪ <u>Intersection with Riddoch Highway</u> <ul style="list-style-type: none"> - Install additional exit lane on the south side of the roundabout 	DPTI
	▪ <u>Intersection with Pick Avenue</u> <ul style="list-style-type: none"> - Extend right turn lane into Pick Avenue - Explore alternate alignment options 	DPTI DPTI
	▪ Construct U-turn facilities between Riddoch Highway and Pick Avenue.	DPTI
Mt Gambier to SA/Victoria border		
	▪ Protection of roadside hazards.	DPTI
	▪ Install ATLM between Mount Gambier and Victoria.	DPTI

Southern Ports Highway

Southern Ports Highway is a state maintained highway extending for approximately 120 kilometres between Kingston and Millicent along the coast. The highway is the primary route to access popular tourist destinations in Robe and Beachport, however bypasses their town centres.

The condition of Southern Ports Highway was a significant issue to survey respondents who raised it due to the undulating and rough surface, narrow lanes and lack of overtaking opportunities.

Some typical survey responses are below.

"The Southern Ports Highway is atrocious for cyclists and trucks to be on together! A car, let alone a truck takes up the whole lane due to eroded verges that when you come to a corner at 100 km/h to be confronted by a cyclist and another vehicle in the opposing direction, you have to slam the brakes on hoping you stop to a crawl in time or may have to go bush!"

"The road between Robe, Beachport and Millicent – Southern Ports Highway is very rough."

The Southern Ports Highway has not been assessed by RAA in recent years, however, has been a high priority since featuring in the top ten riskiest roads in South Australia (RAA 2017 Risky Roads survey).

Recent works include 26 kilometres of shoulder re-sheeting and sealing between Kingston and Robe at a cost of \$2.1M in 2017. Shoulder sealing and barrier upgrades between Beachport and Millicent were undertaken under the 2014/15 state black spot program.

Crash History

Between 2013 and 2017, 22 casualty crashes occurred on the Southern Ports Highway. Four of these resulted in fatalities, seven in serious injuries and a further eleven in minor injuries.

Southern Ports Highway Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	6	Inattention (3), D.U.I (2), N/A (1)
Roll Over	6	Inattention (4), Died Sick or Asleep At Wheel (1), Overtake Without Due Care (1)
Right Angle	3	Disobey - Give Way Sign (2), Fail to Give Way (1)
Hit Animal	2	N/A (2)
Head On	1	D.U.I (1)
Hit Pedestrian	1	Inattention (1)
Rear End	1	Follow Too Closely (1)
Right Turn	1	Fail to Stand (1)
Side Swipe	1	Overtake Without Due Care (1)
All Crash Types	22	Inattention (8), D.U.I (3), N/A (3), Disobey - Give Way Sign (2), Overtake Without Due Care (2), Died Sick or Asleep At Wheel (1), Fail to Give Way (1), Fail to Stand (1), Follow Too Closely (1)

Traffic Volumes

Traffic volumes on Southern Ports Highway are generally quite low with most sections between townships carrying less than 1,000 vehicles per day and around 10% freight. Traffic volumes have not increased substantially since 2007, with most sections seeing an increase of less than 10%. The section between Beachport and Millicent carries the most traffic on average, compared with other sections of the highway.

Southern Ports Highway Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Kingston	2.0	1000 - 1900	13.0 - 15.5	1300 - 1900
Kingston – Sandy Grove	6.5	1000	11.0	950
Sandy Grove - Robe	33.0	800	15.0	800
Robe – Clay Wells Rd (Bray)	15.5	850	13.0	750
Clay Wells Rd (Bray) – Bog Lane	13.0	400	9.0	390
Bog Lane - Beachport	14.0	450	9.5	490
Beachport	3.5	600	11.0	650
Beachport (Millicent Rd)	2.5	1500	10.5	1400
Beachport - Southend	12.5	1200	10.0	900
Southend - Rendelsham	7.0	1300	11.5	1200
Rendelsham - Millicent	10.50	2000	10.0	2200
Millicent	2.5	900 - 1700	6.5 – 9.5	1200 - 1800

Road Widths

The road geometry between Kingston and Robe meets Austroads minimum criteria for a 100km/h undivided rural road given the current traffic volumes – with a total seal of 8.6 metres including 3.3 metre wide lanes. South of Robe, lane widths measure 3.1m or less, and a narrow shoulder seal exists on some sections of the highway, with other sections lacking shoulder seal altogether.

Southern Ports Highway Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
S of Saltwell Road (Cape Jaffa)	3.3m	1.0m	8.6m
W of Sandy Lane (Robe)	2.9-3.1m	N/A	6.0m
N of Beachport – Penola Road (Bray)	3.0-3.1m	0.4m	6.9m
N of Southend	3.1m	N/A	6.2m
S of Southend	3.1m	0.8m	7.8m

RAA recommends that sections with no shoulder seal be prioritised along the corridor for 1.0m shoulder sealing, with other sections of narrow shoulder seal to be widened further.



Southern Ports Highway shoulder seal map

Speed Limits

The speed limit of Southern Ports Highway is 110 km/h, with reductions to 60 km/h through townships, with the exception of Rendelsham where the speed limit is 80 km/h. This speed limit is considered higher than what is currently considered on a road of this type, and is a legacy of outdated speed limit strategies and standards. If current standards and safe system principles were applied, a 100km/h or lower speed limit would be considered more appropriate in some sections.

Southern Ports Highway Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Kingston	2.5	60/80
Kingston - Robe	38.0	110
Robe	2.5	80/60/80
Robe – Bog Lane	14.0	110
Bog Lane - Beachport	30.0	110
Beachport	3.0	80
Beachport - Rendelsham	19.0	110
Rendelsham	0.5	80
Rendelsham - Millicent	9.0	110
Millicent	3.0	80/60

Observations

At the time of assessment, ATLM was being installed between Kingston and Robe, with this addition welcome on Southern Ports Highway. RAA recommends that this be rolled out along the length of Southern Ports Highway as shoulders are sealed to further reduce the risk of fatigue and inattention related crashes.

The Butcher Gap Drain Bridge, located ten kilometres south of Kingston is narrow and RAA recommends this be widened. The pavement over this bridge is also deteriorated, and as a minimum, should be resealed. The Drain L Bridge in the outskirts of Robe is also narrow with significant pavement defects, with widening and resealing required. Due to the higher freight volume (particularly timber) between Robe and Clay Wells Road, the Drain L Bridge should be considered the higher priority of these two bridges.

Clear zone widths vary along the length of Southern Ports Highway, with some sections wide and relatively hazard-free, and others with dense vegetation on both sides of the road. It was clear that local government regularly maintain vegetation overgrowth to approximately three metres, particularly between Robe and Beachport.



Widening of the clear zone on Southern Ports Highway would be a welcome improvement

The surface between Robe and Clay Wells Road is in very poor condition, with significant undulations experienced on this narrow section of carriageway, beginning at the start of the 80 km/h buffer zone in Robe. RAA recommends that this 15 kilometre section be resealed, with significantly undulating sections being reconstructed to prevent reoccurrence.

The Y-intersection with Clay Wells Road is very wide, with less than ideal sight lines and geometry as a result of road construction techniques when the roads were first built. Whilst re-alignment of the intersection may provide a substantial safety improvement, the intersection appears to perform well from a safety perspective, with no casualty crashes occurring here between 2013 and 2017. As such, the extensive cost of such a project would not be justified when taking into account current volumes. Consideration should be given to extending the left turn acceleration lane for traffic continuing north on Southern Ports Highway, and extending the left turn lane for vehicles turning left from Clay Wells Road onto Southern Ports Highway. Improvements to delineation such of improved line marking and painted islands, and installation of RRPM's should also be considered.



The narrow and undulating surface between Robe and Clay Wells Road



Intersection with Southend Access Road (Southend Turnoff)

The Road Safety team conducted a formal road safety audit at the Southend Turnoff due to concerns raised by survey respondents and clear deficiencies with the intersection following a site inspection. The full audit report is available on the RAA website, or by contacting a member of the RAA Road Safety team at roadsafety@raa.com.au. The key recommendations outlined in this report include:

- Installation of a sheltered left turn lane from Southern Ports Highway onto Southend Access Road
- Modification of line marking to direct southeast bound vehicles into the left lane and create a dedicated right turn lane from Southern Ports Highway onto Southend Access Road
- Install R1-2 'give way' signs on Southend Access Road
- Monitor vegetation and consider removal to ensure sight distance is not compromised.

Key Recommendations

Southern Ports Highway – Key Recommendations		Authority
▪ Seal shoulders to 1.0 metre wide where there is no current shoulder seal between Robe and Clay Wells Road, and between Beachport and Southend.		DPTI
▪ Widen Shoulder seal between Clay Wells Road and Beachport.		DPTI
▪ Roll out ATLM treatment to cover the entire length of the highway.		DPTI
▪ Widen the Butcher Gap Drain Bridge 10km south of Kingston – reseal required as a minimum.		DPTI
▪ Widen the Drain L Bridge on the outskirts of Robe.		DPTI
▪ Reseal and reconstruct 15km of narrow undulating carriageway between Robe and Clay Wells Road.		DPTI

<ul style="list-style-type: none"> ▪ <u>Intersection with Clay Wells Road</u> 		
	<ul style="list-style-type: none"> - Extend left turn lane for traffic continuing north on Southern Ports Highway. 	DPTI
	<ul style="list-style-type: none"> - Extend left turn lane for traffic turning left from Clay Wells Road onto Southern Ports Highway. 	DPTI
	<ul style="list-style-type: none"> - Delineation improvements including line marking and RRPM's 	DPTI
<ul style="list-style-type: none"> ▪ <u>Intersection with Southend Access Road</u> 		
	Adopt Recommendations of RAA Road Safety Audit, which include:	
	<ul style="list-style-type: none"> - Installation of a sheltered left turn lane from Southern Ports Highway onto Southend Access Road. 	DPTI
	<ul style="list-style-type: none"> - Modification of line marking to direct southeast bound vehicles into the left lane and create a dedicated right turn lane from Southern Ports Highway onto Southend Access Road. 	DPTI
	<ul style="list-style-type: none"> - Install R1-2 'give way' signs on Southend Access Road. 	DPTI
	<ul style="list-style-type: none"> - Monitor vegetation and consider removal to ensure sight distance is maintained. 	WRC

Naracoorte Road

Naracoorte Road is a state maintained road extending 55 kilometres between Bordertown and Naracoorte. The road is a key connector between Bordertown and the Limestone Coast Region, linking to the Riddoch Highway 23 kilometres north of Naracoorte and provides the shortest route from Bordertown to most destinations in the region. Survey respondents were concerned about the narrow width and roadside hazards located along Naracoorte Road.

Some typical survey responses are included below.

“Bordertown to Naracoorte road is uneven and too narrow. This is the main road to hospital and Service SA for Bordertown residents. It is too narrow for trucks/caravans and has virtually no place to overtake.”

“I feel this road is too narrow for the number and size of vehicles that travel on it each day. It is the usual route for trucks between Naracoorte and Bordertown. I feel the road needs widening and overtaking opportunities implemented for the safety and comfort of all motorists.”

Crash History

Between 2013 and 2017, 14 casualty crashes occurred on Naracoorte Road, with four resulting in serious injuries and the remaining 10 in minor injuries. There is a significant trend with crashes on Naracoorte Road, with more than 70% of crashes involving a vehicle hitting a fixed roadside object due to inattention. Two head on crashes also occurred in this five year period. Considering the moderately low traffic volumes, this crash rate is cause for concern

Tragically, in January 2019, a collision between a caravan and truck resulted in a single fatality on Naracoorte Road.

Naracoorte Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	10	Inattention (10)
Head On	2	Fail to Keep Left (2)
Left Road - Out of Control	1	Inattention (1)
Roll Over	1	Inattention (1)
All Crash Types	14	Inattention (12), Fail to Keep Left (2)

Traffic Volumes

Naracoorte Road is important to industry in the northern Limestone Coast region. With the new Bordertown Intermodal facility taking shape, RAA expects that the volume of road freight to Bordertown will increase, and therefore upgrades of the corridor particularly aimed at improving safety for heavy vehicles should be considered.

Although traffic volumes are generally quite low and well below the minimum criteria for the installation of overtaking lanes, the route carries up to 20% commercial traffic, highlighting a possible need for overtaking lanes to provide a safe opportunity for overtaking heavy vehicles between Naracoorte and Bordertown.

Naracoorte Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Bordertown	2.0	1700 - 2100	11.0 - 11.5	1100 - 2700
Bordertown - Rowney Rd	3.5	1200	11.0	950
Rowney Road – Riddoch Hwy (Naracoorte)	50.0	420	20.0	480

Road Widths

When travelling north on Naracoorte Road, the four kilometres immediately north of Riddoch Highway has good lane and shoulder geometry, with road widening works on this section of the road appearing to be relatively recent. The lanes and shoulders then narrow for the next 3.5 kilometres before another four-kilometre section with wide lanes and shoulder seal begins just south of The Gap Road. The 38 kilometres through to the intersection with Rowney Road has no shoulder seal, with edge lines provided along the 3.5 kilometres between Rowney Road and Bordertown providing no additional seal width. In total, less than 15% of Naracoorte Road has a suitable geometry for its current PBS Level 2A (b-double) classification. As such, RAA recommends that shoulders on the remaining sections of Naracoorte Road be sealed to provide minimum 3.3m lanes and 1.0m sealed shoulders.



The sections of Naracoorte Road with wider lanes and sealed shoulders are significantly safer

Naracoorte Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
N of Riddoch Hwy	3.3-3.4m	1.0-1.2m	8.9m
N of Beeamma-Parsons Rd	3.1m	N/A	6.2m
E of Rowney Road	3.0m	0.1m	6.2m

Speed Limits

Naracoorte Road is subject to a 110 km/h speed limit, with a reduction to 50 km/h on the approach to Bordertown.

Naracoorte Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Bordertown	2.5	50/60/80
Bordertown – Riddoch Hwy (Naracoorte)	53.0	110

Observations

Other than the narrow carriageway previously discussed, vegetation on both sides of Naracoorte Road presented a significant hazard as highlighted by the high number of casualty crashes involving vehicles hitting fixed objects. Large red gums are frequently situated in close proximity to the road. Some of these are delineated with hazard boards as shown in the below image, however, this does not provide any protection in the event of a crash. RAA recommends widening clear zones to three metres as a minimum, and providing barrier protection to other fixed hazards within five metres of the road.



Unprotected vegetation presents a major hazard on Naracoorte Road

The road surface itself is in poor condition for approximately 12 kilometres south of the intersection with Rowney Road, with undulations and rutting particularly prominent in this area. RAA recommends that this section be resealed concurrently with road and shoulder widening.

At the staggered intersection with Meatworks Road and Rowney Road, line marking was unsatisfactory and the apron on Meatworks Road was exhibiting extensive signs of failure.

RAA recommends that this intersection be resealed, and line marking be refreshed across the entire intersection.



Cracking at the intersection of Meatworks Road and Naracoorte Road

Key Recommendations

Naracoorte Road – Key Recommendations		Authority
<ul style="list-style-type: none"> ▪ Road widening and shoulder sealing for the remaining 47 kilometres of Naracoorte Road. ▪ Widen clear zones to a minimum of three metres and provide barrier protection to all fixed hazards within five metres of the road. ▪ Reseal for 12 kilometres, immediately south of Rowney Road. ▪ Reseal the apron at the intersection with Meatworks Road, and refresh all line marking. 		DPTI
		DPTI/NLC/TDC
		DPTI
		DPTI/TDC

Frances Road

Frances Road is a state maintained road extending for 77 kilometres between Bordertown and Hynam, bypassing the townships of Frances and Kybybolite. Survey respondents were particularly concerned about the narrow road and unsealed shoulders, with a number of respondents also raising concerns about the intersection with Pooginagoric Road, where three side roads meet Frances Road on a curve.

Some typical survey responses are below.

“Frances Roads needs to be widened. The road is too narrow and the drop off from the bitumen to gravel is dangerous.”

“The intersection of Frances Road, Stott road, Watson Road, Pooginagoric road and Hutchings road – all together and on a bend.”

In March 2019, three kilometres of surfacing works were undertaken south of Frances in two sections. These works were almost complete at the time of our assessment.

The 2019-20 Black Spot program also allocated \$780,000 towards safety improvements on Frances Road to undertake shoulder sealing, delineation improvements and hazard removal along a four-kilometre stretch. This funding is welcomed by RAA and will improve safety on the road, however, needs to be sustained along the entire length of the road.

Frances Road is a b-double approved freight route between Frances and Bordertown, and the section between Frances and Hynam is only approved for single articulated vehicles up to 20 metres in length (PBS level 1A).

Crash History

Fifteen casualty crashes occurred on Frances Road between 2013 and 2017. Tragically, one of these was fatal, with three resulting in serious injuries and a further eleven in minor injuries. Considering the low traffic volumes, this high crash rate is a significant cause for concern.

As with Naracoorte Road, crashes involving vehicles hitting fixed roadside objects due to inattention are the most common making up 60% of casualty crashes on the road. Also of concern are more than 25% of crashes that were attributed drivers with alcohol or drugs in their system. Whilst RAA considers this driver behaviour to be very irresponsible and dangerous, a safe system should still accommodate for this.

Frances Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	10	Inattention (9), D.U.I (1)
Roll Over	3	D.U.I (2), Inattention (1)
Hit Parked Vehicle	1	D.U.I. (1)
Right Turn	1	Fail to Stand (1)
All Crash Types	15	Inattention (10), D.U.I. (4), Fail to Stand (1)

Traffic Volumes

Traffic volumes on Frances Road are moderate to low, and there has been no significant change since 2007. The Bordertown intermodal facility may increase the volume of freight travelling between western Victoria and Bordertown along the route, and heavy vehicle traffic volumes should be monitored to ensure heavy vehicle productivity upgrades can be targeted along the route if necessary.

Frances Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Bordertown	1.5	310	13.0	370
Bordertown - Pooginagoric	12.5	260	12.5	310
Pooginagoric - Frances	34.0	180	17.0	200
Frances - Kybybolite	19.5	200	31.0	230
Kybybolite - Hynam	10.0	340	11.0	370

Road Widths

The lane geometry of Frances Road is consistent, measuring approximately 3.1m in each direction. South of Frances, shoulders are sealed for 0.5m, providing an additional metre of sealed width. RAA recommends that shoulders be sealed to 1.0 metre wide between Frances and Bordertown, particularly as this section of Frances Road is a b-double approved route.

Frances Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
S of Custon Road	3.1m	N/A	6.2m
S of Frances	3.1m	0.5-0.6m	7.3m

Speed Limits

The speed limit of Frances Road is 100 km/h, with a reduction to 80 km/h in the vicinity of Kybybolite, and on the approach to the major intersections with Naracoorte Road and Wimmera Highway at each end.

Frances Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Bordertown	0.5	80
Bordertown - Kybybolite	66.0	100
Kybybolite	1.0	80
Kybybolite - Hynam	9.0	100
Hynam	1.0	80

Observations

Frances Road is generally in serviceable condition with minor undulations present, but not causing any immediate concern. Due to the narrow carriageway, edge breakup is occurring with a drop off of approximately 10 millimetres in sections between Bordertown and Frances. For seven kilometres north of Frances, the surface is quite undulating and RAA recommends surface remediation works for this section, similar to what has been undertaken south of Frances.

The presence of many large red gums in close proximity to the road between Frances and Hynam is significant hazard. RAA recommends that all vegetation within two metres of the road be removed, with large gums between two and five metres from the road to be either removed or protected by appropriate barriers.

The bridge over Nalang Creek, just south of Custon Road is very narrow and RAA recommends this be widened, particularly considering that this is a b-double route. RAA also recommends the widening of the narrow Mullinger Bridge just north of Kybybolite.



The narrow Nalang Creek Bridge

Intersection with Pooginagoric Road, Stott Road and Hutchings Road.

A number of survey respondents raised the section of Frances Road between Pooginagoric Road and Hutchings Road as an issue. There are three T-intersections on a gradual curve of this 100 metre section of Frances Road in Pooginagoric as pictured below.



Survey respondents raised Frances Road between Pooginagoric Road and Hutchings Road

Farm machinery and heavy vehicles frequently drive across Frances Road from Stott Road to Hutchings Road and vice versa. These vehicles turning right from Stott Road travel very slowly due to their size and handling characteristics before making a left turn onto Hutchings Road. Sight distance of southbound vehicles is compromised by the road geometry

Common practice for heavy vehicle drivers travelling from Stott Road to Hutchings Road is to turn left onto Frances Road and utilise open space at the Pooginagoric Road intersection to turn around, before turning left onto Frances Road to access Hutchings Road. This allows drivers sufficient sight distance to be confident that they will not pull out in front of traffic.



Sight distance to the north from Stott Road is poor

Realignment of Stott Road may be the best option in this location; however, cost may be prohibitive of such an upgrade. Installation of left turn lanes is also desirable; however, cost once again may be a barrier to an upgrade of this scale. RAA recommends that these options be considered and explored, considering the safety and productivity benefits that may be generated.

As a minimum treatment for this location, RAA recommends that shoulders be sealed to two metres wide between Pooginagoric Road and Hutchings Road, and W5-22 'Trucks (crossing or entering)' warning signs be installed on Frances Road on both the northern and southern approaches. Vegetation on the inside of the curve should also be trimmed or removed to provide additional sight distance.

Intersection with Angus Street and Mill Road (Kybybolite)

Signage indicates that traffic on Frances Road is required to give way to traffic on Angus Street and Mill Road at this intersection, which somewhat contradicts the centre line marking that suggests Frances Road is the priority road through the staggered intersections. As Frances Road is the primary route through these two intersections, RAA recommends that give way priorities be switched at the Angus Street and Mill Road intersections to give priority to traffic on Frances Road.

If the current give way conditions are to remain unchanged, RAA recommends that line marking and signage be reviewed and updated to delineate the priorities through the intersection.

The diagrams over the page highlight the current lack of delineation at the intersection, and show the changes suggested by RAA.



Key Recommendations

Frances Road – Key Recommendations		Authority
	<ul style="list-style-type: none"> ▪ Monitor heavy vehicle traffic volumes to ensure any additional increase in freight due to the Bordertown Intermodal facility is captured. 	DPTI
	<ul style="list-style-type: none"> ▪ Seal shoulders to 1.0m wide between Frances and Bordertown. 	DPTI
	<ul style="list-style-type: none"> ▪ Widen the bridge over Nalang Creek, just south of Custon Road. 	DPTI
	<ul style="list-style-type: none"> ▪ Remove all vegetation within 2 metres of the road, and protect or remove all vegetation between 2 and 5 metres of the road. 	DPTI/NLC/ TDC
	<ul style="list-style-type: none"> ▪ Widen the Mullinger Bridge, north of Kybybolite. 	DPTI
	<ul style="list-style-type: none"> ▪ <u>Intersection with Stott Road (Pooginagoric)</u> <ul style="list-style-type: none"> - Explore the feasibility of re-aligning Stott Road and installing left turn lanes at the three offset T-intersections. - Widen shoulders to 2.0m between Pooginagoric Road and Hutchings Road. - Install W5-22 'trucks (crossing or entering)' warning signs on Frances Road. - Trim or remove vegetation on the inside of the curve to improve sight distance from Stott Road. 	DPTI DPTI DPTI TDC
	<ul style="list-style-type: none"> ▪ <u>Intersection with Angus Street and Mill Road (Kybybolite)</u> <ul style="list-style-type: none"> - Change give way priorities and associated line marking. - If priorities are not to be changed, upgrade line marking and delineation at the two intersections. 	DPTI DPTI

Clay Wells Road

Clay Wells Road (sometimes referred to as Robe Road) is a significant east-west connecting route between Robe and Penola used by freight, local road users and tourists alike. Clay Wells Road forms one of the most significant corridors to the timber industry with some of the largest hardwood plantations in the region located between Lucindale and Penola. The section between Wattle Range East and Penola is expected to carry between 10 million and 20 million tonnes of timber between 2015 and 2024 according to the *Green Triangle Region Freight Action Plan Update* (2016)¹⁰.

Clay Wells Road was raised by survey respondents due to its narrow geometry and the recently lowered speed limit. Under the former Labor Government, 55 kilometres of Clay Wells Road from the western end had the speed limit reduced to 100 km/h from 110 km/h.

“Clay Wells Road is a major route for log trucks and Victorian tourists travelling to Robe. Trucks have damaged the road, as it probably wasn’t built for their weight. The fact that tourists use it and there are no turn outs, no overtaking lanes and no shoulders makes it dangerous.”

There have been no significant safety improvements made on Clay Wells Road in recent years, with the intersection with Princes Highway (discussed in the Princes Highway part of this report) the only section to receive any notable upgrade.

Crash History

Between 2013 and 2017, eight casualty crashes occurred on Clay Wells Road. Two crashes resulted in serious injury, and a further five in minor injuries. Three of the eight crashes were at the intersection with Princes Highway with one tragically resulting in a fatality. Single vehicle crashes make up almost 90% of crashes on Clay Wells Road, with these mostly due to vehicles hitting fixed objects or rolling over. Inattention was attributed to more than 60% of crashes on the road.

Clay Wells Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	3	Inattention (3)
Roll Over	3	Died Sick or Asleep At Wheel (1), Inattention (1), Vehicle Fault (1)
Side Swipe	1	Overtake Without Due Care (1)
Left Road - Out of Control	1	Inattention (1)
All Crash Types	8	Inattention (5), Died Sick or Asleep At Wheel (1), Vehicle Fault (1), Overtake Without Due Care (1)

¹⁰ Victorian and South Australian Governments, 2016, *Green Triangle Region Freight Action Plan Update*, pp12-13.

Traffic Volumes

Clay Wells Road has moderate traffic volumes, with the eastern end of the road carrying a high percentage of heavy vehicle traffic.

Clay Wells Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Southern Ports Hwy (Bray) – Konetta Rd	13.5	400	20.0	370
Konetta Rd – Princes Hwy (Clay Wells)	10.0	310	19.5	290
Princes Hwy (Clay Wells) – Callendale Rd (Wattle Range)	31.5	190	26.0	150
Callendale Rd (Wattle Range) – Wattle Range East	12.0	430	35.0	240
Wattle Range East - Penola	17.0	950	43.0	260
Penola	1.0	1300 - 2100	15.0 - 17.0	550 - 1100

Road Widths

Clay Wells Road is very narrow, and current geometry is not suited to its current classification as a b-double route. RAA recommends that shoulders be sealed to 1.0 metre for the entire length of Clay Wells Road to improve safety for all road users. Widening of lanes to at least 3.3 metres should also be strongly considered. A lane width of 3.5m would be considered more appropriate should the speed limit be returned to 110 km/h.

There is no shoulder seal on the 100 km/h section between Bray and Callendale Road,. West of Callendale Road, the sealed shoulder width varies from 0.2 metres to 0.5 metres.

Clay Wells Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
W of Southern Ports Highway	3.1-3.2m	N/A	6.3m
W of Princes Highway	3.0-3.1m	N/A	6.1m
W of Callendale Road	3.1m	0.4m	7.0m

Speed Limits

The speed limit along 55 kilometres of Clay Wells Road was reduced from 110 km/h to 100 km/h in 2017 under the former state Labor government. West of Wattle Range, the speed limit remains at 110 km/h through to Penola.

This reduction results in a travel time loss of up to three minutes over a 55 kilometre journey. Travel times for heavy vehicles limited to 100 km/h are not impacted by this reduction.

The current Liberal Government promised to return the speed limit to 110 km/h, and this report highlights some of the necessary safety improvements needed to facilitate this.

Clay Wells Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Bray – Kangaroo Inn	32.0	100
Kangaroo Inn	0.5	100/80/100
Kangaroo Inn – Callendale Road	23.0	100
Callendale Road - Penola	29.0	110
Penola	1.0	80/60

Observations

The section of Clay Wells Road between the Southern Ports and Princes Highways is in poor condition, with cracks, ruts, potholes and undulations all contributing to the poor condition of the road. Potholes forming near the centre of the road were common, indicating that inadequate drainage may be a factor in the condition of Clay Wells Road.

Due to the narrowness of the road, the sealed edges were breaking up and a drop off from 10 to 20 millimetres was observed. In addition to the shoulder sealing previously recommended, RAA recommends a full reseal including reconstruction of the crown if necessary to provide suitable drainage between the Southern Ports and Princes Highways.

Three metre clear zones were well maintained along this section of Clay Wells Road, however, widening of the road would likely require some additional vegetation removal to maintain a satisfactory clear zone.



Edge drop off and breakup between the Southern Ports and Princes Highways.

When travelling west of Princes Highway, pavement issues are far less prominent than they are on the eastern section.

Other than the narrowness of the road, the most significant hazards between Princes Highway and Penola are due to the proximity of significant roadside vegetation, and a number of narrow drain bridges.

The density and proximity of vegetation to the road means there is often very little margin for error when driving on Clay Wells Road, and even a minor driver error could have tragic consequences. Following appropriate road and sealed shoulder widening, RAA recommends removing all fixed hazards within three metres, and protecting all other fixed hazards with within five metres with barriers. Where hazards in close proximity to the road cannot be removed, they should be protected by barriers.



Trees in close proximity to Clay Wells Road

When driving Clay Wells Road in full, there are no substantial townships or rest areas for drivers to pull over or take a break. RAA recommends that at least one rest stop be provided between Penola and Clay Wells to provide a safe location along the route for drivers to take break.

Traffic volumes are currently below the minimum requirement to usually warrant installation of overtaking lanes. Due to the disparity in speed between freight limited to 100 km/h and other commuters travelling at 110 km/h, if the speed limit is to be returned to 110 km/h, RAA recommends that two new overtaking lanes be considered between Clay Wells and Penola to provide a safe overtaking opportunity along this route

Following the implementation of safety upgrades listed within this report, RAA recommends that the 100 km/h speed limit be reviewed with consideration given to reinstating a 110 km/h speed limit.

Key Recommendations

Clay Wells Road – Key Recommendations		Authority
▪ Seal shoulders to 1.0m wide along the entire length		DPTI
▪ Widen lanes to 3.3m		DPTI
▪ Remove or protect all fixed hazards within 3m, and protect all hazards within 5m of the road		DPTI/WRC/ DCR
▪ Should the 110 km/h speed limit be reinstated, consider installation of two overtaking lanes between Penola and Clay Wells		DPTI
▪ Following aforementioned safety upgrades, review 100 km/h speed limit between Bray and Wattle Range.		DPTI

Ngarkat Highway

Ngarkat Highway is a state maintained highway forming part of an important link between the Limestone Coast and Riverland regions. Ngarkat Highway spans 115 kilometres between Bordertown and Pinnaroo, with the Browns Well Highway continuing for a further 100 kilometres to Loxton to establish inter-region connectivity. The Browns Well Highway was assessed as part of RAA's Riverland Regional Road Assessment in 2018.

Ngarkat Highway is a b-triple approved route, with low to moderate traffic volumes. Survey respondents were concerned about the recent reduction in speed limit from 110 km/h to 100 km/h in lieu of road maintenance.

Crash History

Eight casualty crashes occurred on the Ngarkat Highway between 2013 and 2017, with two resulting in serious injuries and six in minor injuries. All of these crashes involved only a single vehicle and were primarily a result of driver inattention.

Ngarkat Highway Crash Types

Crash Types	No. of Crashes	Apparent Errors
Roll Over	4	D.U.I. (1), Died Sick or Asleep At Wheel (1), Inattention (1), Vehicle Fault (1)
Hit Fixed Object	3	Inattention (3)
Hit Animal	1	N/A
All Crash Types	8	Inattention (4), D.U.I. (1), Died Sick or Asleep At Wheel (1), Vehicle Fault (1), Hit Animal (1)

Traffic Volumes

Traffic volumes are low to moderate, with less than 300 vehicles travelling the highway between Pinnaroo and Bordertown each day. Commercial traffic makes up almost 40% of all traffic and there has been a slight increase in traffic over the past decade.

Ngarkat Highway Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Pinnaroo – Bordertown	115.0	280	39.5	220

Road Widths

Ngarkat Highway is generally narrow with inconsistent geometry along the length of the highway. The northern section has some level of shoulder seal, however, this is often crumbling, in poor condition and of a narrow width that offers little safety benefit. The 33 kilometre section between Dukes Highway and West McCallum Road has no shoulder seal, and RAA recommends this section should be prioritised for 1.0 metre shoulder sealing along the route. Only 12 of the remaining 82 kilometres of Ngarkat Highway is considered by RAA to be acceptable geometrically for the current function as an inter-regional b-triple route. RAA recommends that widening of the existing narrow shoulder seal to 1.0m be undertaken on the remaining sections of Ngarkat Highway.



Ngarkat Highway shoulder seal map

Ngarkat Highway Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
N of Dukes Highway	3.1m	N/A	6.2m
S of West McCallum Road	3.1m	N/A	6.2m
N of West McCallum Road	2.8-2.9m	0.1-0.3m	6.1m
N of East Shaugh Road	3.2-3.3m	0.3-0.7m	7.5m
Ngarkat	3.4m	0.1-0.3m	7.2m
S of Oaks Road	3.2m	0.5m	7.4m

Speed Limits

Ngarkat Highway is subject to a 100 km/h speed limit following a reduction from 110 km/h in 2017. This caused journey times to increase by approximately 6 minutes, however, has no impact on journey times for freight combinations limited to 100 km/h or 90 km/h.

The current Liberal Government promised to return the speed limit to 110 km/h, and the observations section of this report highlights some of the necessary safety improvements needed to facilitate this.

Ngarkat Highway Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Pinnaroo – Bordertown	115.0	100
Bordertown	0.5	80

Observations

The pavement condition on Ngarkat Highway is generally poor, with ruts prevalent along the length of the highway. Light rainfall was experienced at the time of our assessment which caused water to pond in the wheel paths.



Rutting is prevalent on Ngarkat Highway

Other pavement defects identified included cracking, potholes, edge breakup and drop off, and moderate undulations. The section extending for approximately eight kilometres south of the Mallee Highway was in particularly poor condition and RAA recommends this be resealed. Routine maintenance levels must increase to address local pavement defects that are present along the corridor in a timely manner. RAA also recommends that a survey of rut depths along the corridor be undertaken so that surface remediation works can target the worst areas as a priority.

Five rest stops are provided along the route and can be difficult to access from the highway with poorly delineated entry points. RAA recommends that entry points to rest stops be clearly delineated by using guide posts, and that shoulders and aprons be widened at each rest stop to provide safer access from the highway, with consideration given to providing sheltered left turn lanes into the rest stop. It was noted that four of the five rest stops are located on the east of the highway, and RAA recommends that one additional rest stop be created on the west side of the highway to provide safer access for northbound vehicles. The rest stop south of West McCallum Road does not have any advisory signage and RAA recommends this be installed.



Breaking edges and associated edge drop-off persistent along Ngarkat Highway

Following the implementation of safety upgrades listed within this report, RAA recommends that the 100 km/h speed limit be reviewed with consideration given to reinstating a 110 km/h speed limit.

Key Recommendations

Ngarkat Highway – Key Recommendations		Authority
■ Seal shoulders to 1.0m wide between West McCallum Road and Dukes Highway.		DPTI
■ Widen shoulder seal to 1.0m on remaining sections of Ngarkat Highway.		DPTI
■ Reseal eight kilometres immediately south of Mallee Highway.		DPTI
■ Increase routine maintenance levels to address pavement defects in a timely manner.		DPTI
■ Survey rut depths along the corridor so that targeted remediation works can be undertaken.		DPTI
■ Improve delineation at rest stop entry points, widen shoulders on approach to rest stops and consider installing sheltered left turn lanes.		DPTI
■ Create an additional rest stop on the west side of the highway.		DPTI
■ Install advisory signage before the rest stop just south of West McCallum Road.		DPTI
■ Following aforementioned safety upgrades, review 100 km/h speed limit on Ngarkat Highway.		DPTI

Carpenter Rocks Road

Carpenter Rocks Road is under the care and control of the state government for 16 kilometres between Mount Gambier and Burrungule Road. The remaining 18 kilometre section between Burrungule Road and Carpenter Rocks is under the care and control of the District Council of Grant.

Survey respondents were concerned with the recent speed limit reduction from 110 km/h to 100 km/h on the 16 kilometre state maintained section of the road. Although most comments were in favour of a speed limit increase, there was some concern regarding the safety of a 110 km/h speed limit along the council maintained section of road.

Some typical survey responses are below.

“The Carpenter Rocks Road 100 km/h zone should be increased to 110 km/h”

“Carpenter Rocks Road, to and from Mount Gambier should be 100 km/h all the way, with the threat of kangaroo collision highly probable!”

In May 2019 as part of the 2019/20 Black Spot program, \$680,000 was committed to shoulder sealing, delineation improvements and hazard removal in Compton, however, the full extent of this treatment is not yet known. RAA expects that this work will be completed in the 2019/20 financial year.

Crash History

Between 2013 and 2017, 16 casualty crashes occurred on Carpenter Rocks Road, with thirteen of them occurring on the section under state government control. Sadly, one of these was fatal. Four crashes resulted in serious injuries, and the remaining 10 in minor injuries.

Crashes involving a vehicle hitting a fixed object due to inattention were the most common, followed by right angle crashes where a vehicle disobeyed a give way sign when entering the road.

Carpenter Rocks Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	7	Inattention (7)
Right Angle	5	Disobey - Give Way Sign (5)
Rear End	2	Inattention (2)
Head On	1	Fail to Keep Left (1)
Hit Animal	1	N/A (1)
All Crash Types	16	Inattention (9), Disobey - Give Way Sign (5), Fail to Keep Left (1), N/A (1)

Traffic Volumes

Traffic volumes on the state maintained section of road are high, with 1,400 vehicles using the road each day. Data is not available for the council maintained section of the road.

Carpenter Rocks Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Carpenter Rocks - Burrungule	18.0	N/A	N/A	N/A
Burrungule – Mt Gambier	16.5	1400	10.0	1100

Road Widths

The geometry of Carpenter Rocks Road is not consistent along the length of the road. The section under council control has 3.0 metre wide lanes and no sealed shoulder for the entire 18 kilometre length. The section under DPTI control has lane widths varying between 3.0 and 3.3 metres with varying levels of sealed shoulder widths. A 900 metre section east of Megaws Road is well constructed with wide shoulders and barrier protection.

RAA recommends that shoulders be sealed to minimum 1.0 metre for the length of Carpenter Rocks Road, with consideration given to a 1.5 metre shoulder seal between Burrungule Road and Mount Gambier due to the high traffic volumes and number of property access points.



Varying geometry of Carpenter Rocks Road

Carpenter Rocks Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
W of Old Rocks Road	3.0m	N/A	6.0m
E of Burrungule Rd	3.0m	N/A	6.0m
E of Megaws Rd	3.2-3.3m	1.3-1.5m	9.3m
W of Megaws Rd	3.1-3.2m	0.3-0.4m	7.0m

Speed Limits

Further to the image shown in the 'road widths' section, only the top of the three cross sections pictured is subject to a 110 km/h speed limit. The other two images, occurring east of Burrungule Road are within the 100 km/h zone, creating a visual discrepancy with the speed limits. In its current condition, a 100 km/h speed limit is appropriate for the entire length of Carpenter Rocks Road. If changes were made based on the recommendations in this report, a 110 km/h zone may be appropriate between Carpenter Rocks and Burrungule Road, however, RAA would hold safety concerns should a 110 km/h zone be reinstated east of Burrungule Road due to the traffic volumes, number of property access points, crash history and curvilinear geometry.

It should be noted that the state maintained section of the road has more than twice as many property access points, more side road intersections, and a poor crash history, all of which are important considerations when setting a speed limit.

Carpenter Rocks Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Carpenter Rocks – Burrungule Road	18.0	110
Burrungule Road – Mt Gambier	16.5	100
Mt Gambier (White Ave, Sutton Ave)	3.0	80/60/50

Observations

The road surface is generally in serviceable condition, with the primary failure identified being edge break-up on the narrow sections, which can be addressed by shoulder sealing as identified above.

Roadside hazards are primarily due to vegetation with a row of stobie poles adjacent to the north side of the road between Pelican Point Road and Old Rocks Road in Carpenter Rocks. A three metre clear zone is usually well maintained, and there has been some use of w-beam barrier protection along the state maintained section of road. Consideration must be given to providing additional barrier protection, particularly due to the high proportion of crashes occurring involving vehicles hitting fixed objects.



Roadside hazards on Carpenter Rocks Road include trees and stobie poles

Key Recommendations

Carpenter Rocks Road – Key Recommendations		Authority
■ Seal shoulders to 1.5 metres between Burrungule Road and Mount Gambier.		DPTI
■ Seal shoulders to 1.0 metre wide between Carpenter Rocks and Burrungule Road.		DCG
■ Further hazard removal and protection.		DPTI/DCG

Glenelg River Road

Glenelg River Road is a key state maintained interstate corridor utilised by the timber industry, delivering product by road to export facilities in Portland. According to the *Green Triangle Region Freight Action Plan update*¹¹, Glenelg River Road is expected to carry between 20M and 30M tonnes of timber product between 2015 and 2024, making it one of the most important corridors to the timber industry in South Australia, and the Green Triangle Region as a whole, which includes south-western Victoria.

Crash History

Between 2013 and 2017, 28 casualty crashes occurred between Jubilee Highway in Mount Gambier and the Victorian border, with the majority of these occurring within Mount Gambier including 11 at the intersection with Jubilee Highway which is discussed in the Princess Highway section of this report.

Glenelg River Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	7	Inattention (5), D.U.I (1), Overtake Without Due Care (1)
Rear End	5	Inattention (3), Follow Too Closely (2)
Right Turn	5	Fail to Stand (5)
Roll Over	5	Inattention (4), D.U.I (1)
Right Angle	3	Disobey - Give Way Sign (1), Disobey - Traffic Lights (1), Fail to Give Way (1)
Hit Pedestrian	2	Fail to Give Way (1), Inattention (1)
Hit Animal	1	N/A (1)
All Crash Types	28	Inattention (13), Fail to Stand (5), D.U.I. (2), Fail to Give Way (2), Follow Too Closely (2), Disobey - Give Way Sign (1), Disobey - Traffic Lights (1), Overtake Without Due Care (1), N/A (1)

Traffic Volumes

Traffic volumes on Glenelg River Road are high and thousands of commuters use the road daily, with freight making up a substantial portion of this. Due to the high traffic volumes and heavy vehicle movements, RAA recommends that two overtaking lanes (one in each direction) be installed on Glenelg River Road between Mount Gambier and the Victorian border.

Glenelg River Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
<i>Mt Gambier</i>	2.0	7300 - 13000	6.5 – 7.5	5800 - 9900
<i>Mt Gambier – Ob Flat</i>	1.5	3000	10.5	2500
<i>Ob Flat - Caveton</i>	9.5	2200	20.5	1900
<i>Caveton - Wye</i>	4.5	1200	26.5	1000
<i>Wye – SA/Victoria border</i>	14.0	1000	40.0	950

¹¹ Victorian and South Australian Governments, 2016, *Green Triangle Region Freight Action Plan Update*, pp12-13.

Road Widths

Cross sectional measurements taken on Glenelg River Road indicate a 3.3 metre lane width and 0.4m shoulder width, providing an overall seal width of 7.5 metres. RAA recommends that shoulder seal be widened to 1.0 metre due to the high traffic volumes and significance of the corridor, however, other high traffic roads lacking any form of sealed shoulder should be treated as a higher priority.

Glenelg River Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
N of Yahl Hall Road	3.3-3.4m	0.4m	7.5



Typical Glenelg River Road geometry

Speed Limits

Glenelg River Road is controlled by a 110 km/h speed limit on the South Australian side of the border. Upon crossing into Victoria, the speed limit is reduced to 100 km/h.

Glenelg River Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
<i>Mt Gambier</i>	3.5	60/80
<i>Mt Gambier – SA/Victoria border</i>	27.5	110
<i>East of SA/Victoria border</i>	N/A	100

Observations

Glenelg River Road is generally in serviceable condition, with the most notable pavement defects being 20 millimetre deep rutting present in the southbound wheel paths. RAA recommends that this be investigated further and remedial action be undertaken as rutting of this magnitude appears to cover more than 10% of the highway, which is the investigatory level specified within Austroads guidelines¹².



Rut depths measured on Glenelg River Road at Ob Flat

Clear zones are generally well maintained and in excess of five metres, with barrier protection provided in a number of locations around curves.

Key Recommendations

Glenelg River Road– Key Recommendations		Authority
▪ Install two overtaking lanes (one in each direction) between Mount Gambier and the Victorian border.		DPTI
▪ Widen shoulder seal to 1.0m.		DPTI
▪ Investigate rutting and undertake remedial action where depth exceeds 20mm.		DPTI

¹² Austroads, 2011, *Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design*, pp20-22.

Lucindale Road

Lucindale Road is a state maintained road extending 35 kilometres between Lucindale and Naracoorte. The road also forms part of a link between Naracoorte and the coast, that connects with the Princes Highway and Southern Ports Highway via Konetta Road.

Numerous survey respondents mentioned undulations on Lucindale Road as a major transport issue that needed to be addressed in the region.

“Lucindale to Naracoorte Road – surface and road edges need repair or total overhaul.”



Typical Lucindale Road geometry

Crash History

Between 2013 and 2017, four casualty crashes occurred on Lucindale Road, with each resulting in minor injuries. There are no trends in the types of crashes occurring, with each of the four crashes being a different type with a range of attributable errors.

Tragically, two people were killed in a crash on the road near Lucindale in March of this year.

Lucindale Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Head On	1	Fail to Keep Left (1)
Hit Animal	1	N/A (1)
Hit Fixed Object	1	Inattention (1)
Right Angle	1	Fail to Give Way (1)
All Crash Types	4	Fail to Give Way (1), Fail to Keep Left (1), Inattention (1), N/A (1)

Traffic Volumes

Traffic volumes on Lucindale Road are substantial, with an average of 700 vehicles making the journey between Lucindale and Naracoorte each day.

Lucindale Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Lucindale - Naracoorte	34.5	700	10.5	600

Road Widths

Lucindale Road is generally quite narrow with more than 50% of the road lacking sealed shoulders. There are currently two sections along the road with 1.0 metre shoulder sealing, as highlighted in the map below. The geometry of this road is not suitable for a route carrying this volume of traffic, and RAA strongly recommends that 1.0 metre wide shoulder sealing be undertaken for the remaining 19 kilometres without shoulder sealing and lanes be widened to 3.3 metres.



Map of current shoulder sealing along Lucindale Road

Lucindale Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
W of Old Kingston Road	3.0-3.1m	N/A	6.1m
W of Fogartys Road	3.4m	1.1m	9.0m
W of Spence-Coles Road	3.0m	N/A	6.0m

Speed Limits

Lucindale Road is subject to a 110 km/h speed limit, which is considered high based on the prevailing condition and construction of the road. Should all recommendations in this report be adopted, the 110 km/h speed limit should be deemed appropriate.

Lucindale Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Lucindale - Naracoorte	34.0	110
Naracoorte	0.5	60




Observations

Undulations commence shortly after beginning the 110 km/h speed limit zone departing Naracoorte, with some of these able to send substantial force through a vehicle when traversed at the speed limit. These undulations continue in varying degrees and frequencies for some distance, and develop more consistently through the widened section through to the Lake Ormerod rest stop. RAA recommends a reseal and localised reconstruction of the base course to address undulations on Lucindale Road.

There are a number of narrow bridges along the corridor, and RAA recommends that the Mosquito Creek Watercourse Bridge and the Bakers Range Drain Bridge be widened to improve safety at these choke points.

Delineation is generally good, with guide posts and centre line RRPMS provided along the corridor and line marking clear. A three metre wide clear zone is maintained along the corridor, with the exception of the narrow bridges.

Key Recommendations

Lucindale Road – Key Recommendations		Authority
	▪ Seal shoulders to 1.0m.	DPTI
	▪ Widen lanes to 3.3m.	DPTI
	▪ Reseal and localised pavement reconstruction as required to address undulating sections.	DPTI
	▪ Widen the Mosquito Creek Watercourse Bridge and Bakers Range Drain Bridge.	DPTI

Mount Burr Road

Mount Burr Road is a major state maintained arterial road connecting Millicent and Penola via Mount Burr. The road is approved for b-double use and is of significance to the timber industry with a high density of timber plantations in Mount Burr.

Survey respondents were concerned about the narrowness of the road, and tight interactions with heavy vehicles, as highlighted by the comments received below.

“Mount Burr Road between Penola and Millicent – the road is regularly patched but it doesn’t last long and returns to poor quality, very undulating, big potholes, lots of water pooling on the road in wet weather causing aquaplaning. A lot of truck/farm equipment movements along the road, no proper shoulder and edges of road boggy in wet weather.”

“Mount Burr road between Penola and Millicent, logging trucks and other trucks often have to go off edge of bitumen when coming past oncoming traffic – road width is an issue.”

Recent upgrades include \$426,000 on shoulder sealing and delineation improvements between west of Mount Burr under the 2017/18 *Black Spot Program* with this work completed in the 2018/19 financial year.

Crash History

Eleven casualty crashes occurred on Mount Burr Road between 2013 and 2017, with four resulting in serious injuries and another seven in minor injuries.

Crashes involving vehicles hitting fixed objects or rolling over are most prevalent, with these mostly attributed to inattention. These crash types are reflective of a typical regional road with narrow lanes and an unforgiving roadside environment.

Mount Burr Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	5	Inattention (3), D.U.I. (2)
Roll Over	3	Inattention (3)
Head On	1	Fail to Keep Left (1)
Hit Animal	1	N/A (1)
Rear End	1	D.U.I. (1)
All Crash Types	11	Inattention (6), D.U.I. (2), Fail to Keep Left (1), Follow Too Closely (1), N/A (1)

Traffic Volumes

Traffic volumes on Mount Burr Road are generally high, particularly between Millicent and Mount Burr.

Mount Burr Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Millicent	0.5	2400	9.0	1500
Millicent – Rocky Camp	1.5	1500	9.5	N/A
Rocky Camp – Mount Burr	10.5	1400	10.0	N/A
Mount Burr – Mount McIntyre	2.5	600-750	17.0	550-650
Mount McIntyre - Monbulla	29.5	400	17.5	320
Monbulla - Penola	5.5	600	7.5	600
Penola	1.0	600 - 850	15.0	650 - 1200

Road Widths

For 26 kilometres west of Penola through to Wattle Range, the road is narrow with no sealed shoulder, and RAA recommends shoulder sealing be undertaken for this a priority. With the exception of the short section west of Mount Burr that received recent black spot funding, the next 24 kilometres between Wattle Range and Millicent has a narrow 0.3 metre wide sealed shoulder which should ideally be widened to 1.0 metre. RAA recommends that this be undertaken between Millicent and Mount Burr first due to the higher volumes of traffic and higher crash frequency on this segment of the road.

Mount Burr Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
E of Old Kalangadoo-Penola Rd	3.1-3.2m	N/A	6.3m
E of Woolstons Rd	3.2-3.3m	0.3m	7.1m
W of Gold Course Rd	3.4-3.5m	1.2-1.3m	9.4m
E of Delaneys Rd	3.2m	0.2-0.3m	6.9m

Speed Limits

Mount Burr Road is subject to a 110 km/h speed limit with reductions through built up areas of Millicent, Mount Burr and Penola.

Mount Burr Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
<i>Millicent</i>	1.0	60/80
<i>Millicent – Mount Burr</i>	8.5	110
<i>Mount Burr</i>	2.5	80/60/80
<i>Mount Burr - Penola</i>	37.5	110
<i>Penola</i>	1.5	80/50

Observations

The pavement of Mount Burr Road is mostly in serviceable condition, with some sections exhibiting localised failures including rutting, cracking, edge drop off and breakup – particularly between Penola and Wattle Range. Sealing the shoulders on this section as previously recommended in this report will address the issues regarding edge break up and drop off, whilst reducing the amount of unsealed shoulder maintenance work required.



Broken edges and drop-offs on the narrow section between Penola and Wattle Range

Ruts as deep as 20mm were measured, however, not consistently along the corridor, and RAA recommends that localised rut filling be undertaken to address the problem sections.

Roadside hazards in the form of trees were particularly prevalent between Penola and Mount Burr, and RAA recommends that any vegetation within three metres of the road be removed or protected by barriers as part of a wider scheme across the region targeting roadside hazards.



Trees growing in close proximity to the road edges pose a substantial risk in run off road crashes.

Key Recommendations

Mount Burr Road – Key Recommendations		Authority
■ Seal shoulders between Wattle Range and Penola.		DPTI
■ Widen shoulder seal between Millicent and Mount Burr (for remaining sections).		DPTI
■ Widen shoulder seal between Mount Burr and Wattle Range.		DPTI
■ Localised rut filling in problem areas.		DPTI
■ Clear zone widening and barrier protection.		DPTI/WRC

Glenelg Highway

Glenelg Highway is a state government maintained highway extending for 15 kilometres between Glenburnie and the Victorian border. The highway continues through to Casterton and Hamilton in Victoria.

Survey respondents did not raise the highway as a major transport issue in the region, however, being a significant interstate route RAA assessed the corridor between Glenburnie and Casterton in Victoria to compare the South Australian and Victorian segments of the highway.

Crash History

Between 2013 and 2017, four casualty crashes occurred on Glenelg Highway between Glenburnie and the Victorian border. Three of these occurred within one kilometre of the Victorian border and shoulders have recently been widened substantially for this short section of the road to improve safety.

Glenelg Highway Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	2	Inattention (2)
Right Angle	1	Disobey – Give Way Sign (1)
Rollover	1	N/A (1)
All Crash Types	4	Inattention (2), Disobey – Give Way Sign (1), N/A (1)

Traffic Volumes

Traffic volumes on Glenelg Highway are moderate to high with 700 vehicles using the road per day, of which a high percentage is for commercial purposes.

Glenelg Highway Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
<i>Mount Gambier - SA/Victoria border</i>	15.44	700	17.0	800

Road Widths

Glenelg Highway has adequate lane width with narrow sealed shoulders, and this geometry is consistent along the length of the South Australian government maintained section of road. Shortly after crossing the Victorian border, lane widths become quite narrow, however, a narrow sealed shoulder is maintained which provides a seal width of just over 6.1 metres. This treatment is not common in South Australian roads this narrow, and generally roads with a seal width around 6 metres do not have any edge lines, allowing vehicles to utilise the full width of their lane at the expense of improved delineation.



Typical geometry on the South Australian section of Glenelg Highway

RAA recommends that shoulders be widened to 1.0m due to the high significance of this corridor; however, this should occur as a lower priority to other roads in the region without any level of shoulder seal.

Glenelg Highway Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
W of Rennick Rd (SA)	3.3-3.4m	0.3m	7.3m
E of Smiths Rd (Vic)	2.7-2.8m	0.3m	6.1m

Speed Limits

Glenelg Highway is controlled by a 100 km/h speed limit, consistent with the Victorian section of the highway. There is a short 80 km/h section of road immediately north of Princes Highway where additional hazards are present including stobie poles, vegetation and property access points.

Glenelg Highway Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Mount Gambier	0.5	80
Mount Gambier – SA/Victoria border	15.0	100

Observations

The pavement of Glenelg Highway is generally in good condition with adequate delineation of the carriageway. It was noted that white RRPM's had been used to delineate edge lines, rather than the usual red and, as such RAA recommends that red RRPM's be used for consistency when these are next replaced during maintenance or when replacement is required.

It was noted that shoulders were widened around some curves which improves safety and tracking of heavy vehicles, and CAM's are used to delineate substandard curves.

Due to the topography, there are many slight crests in the road which make overtaking opportunities infrequent or dangerous. The road is constructed to minimise the severity of crests with a cut-out just north of Kromelite Road. Traffic volumes do not warrant an overtaking lane at this stage, however, installation of an overtaking lane in each direction near the Victorian border may be considered a long-term recommendation to improve safety on the highway, should AADT increase.

The clear zone is generally quite good and very wide, with occasional trees located within five metres of the carriageway. There are a number of unprotected stobie poles in the 80 km/h zone north of Princes Highway.

Key Recommendations

Glenelg Highway – Key Recommendations		Authority
▪ Widen shoulder seal to 1.0m		DPTI
▪ Replace white edge line RRPMS with red RRPMS when routine maintenance/replacement is required.		DPTI
▪ Install an overtaking lane in each direction, near the Victorian border.		DPTI

Kangaroo Flat Road

Kangaroo Flat Road is a state maintained road providing access from Glencoe and Kalangadoo through to the Princes Highway and Mount Gambier. The southern-most 3.5 kilometres of the road is a designated b-double route providing access from Glencoe pine plantations to the Princes Highway and the timber processing facility in Wandilo.

Survey respondents raised the narrow width and undulations on Kangaroo Flat Road as primary issues on the road.

“Log trucks coming from Princes Highway onto Kangaroo Flat Road to access the saw mill are usually b-doubles and road width is not wide enough so vehicles have to move off the road.”

“Kangaroo Flat Road should only be 80 km/h until undulations can be fixed.”

Crash History

Three casualty crashes occurred on Kangaroo Flat Road between 2013 and 2017, with one of these resulting in serious injuries in Kalangadoo.

Kangaroo Flat Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Parked Vehicle	1	Inattention (1)
Right Turn	1	Fail to Stand (1)
Roll Over	1	Inattention (1)
All Crash Types	3	Inattention (2), Fail to Stand (1)

Traffic Volumes

Traffic volumes on Kangaroo Flat Road are generally low to moderate, with commercial vehicles making up a high percentage of all traffic due to significant timber facilities accessible by the road.

Kangaroo Flat Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
Kalangadoo	2.0	600 - 1000	16.5 - 19.0	650 - 900
Kalangadoo - Glencoe	15.5	350	17.0	360
Glencoe - Wandilo	8.5	140	8.5	270
Wandilo	2.0	190	17.5	N/A

Road Widths

Kangaroo Flat Road is extremely narrow and as such, RAA considers it particularly unsafe and inappropriate for a freight route, notwithstanding, it is important to the timber industry in the local area. RAA recommends that Kangaroo Flat Road be widened to 3.3 metres and

shoulders be sealed to a minimum of 0.5 metres for the 7.5 kilometres between Princes Highway and Wandilo Forest Road as a matter of urgency, providing a vital safety improvement for all road users.

The below photograph highlights the narrowness of the road, with wheel paths overlapping and wider than the trafficable lane.



Kangaroo Flat Road is very narrow with a seal width of 5.0m measured

The section between Wandilo Forest Road and Kalangadoo is also narrow, and RAA recommends that consistent geometry be achieved along the corridor in the short to medium term following priority works on the southern-most section of road.

Kangaroo Flat Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
750m N of Princes Hwy	2.4-2.6m	N/A	5.0m
S of Wandilo Forest Road	2.8-2.9m	N/A	5.7m
N of Wandilo Forest Road	3.0-3.1m	N/A	6.1m

Speed Limits

Kangaroo Flat Road is controlled by a 100 km/h speed limit, with a reduction to 50 km/h when entering the Kalangadoo township.

Kangaroo Flat Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Kalangadoo	1.0	50/80
Kalangadoo - Wandilo	26.5	100

Observations

The main safety concern is the narrow width of Kangaroo Flat Road as discussed, which results in heavy vehicles causing significant damage to the edges of the road and the unsealed

shoulder, which exacerbates the risk. An edge drop off up to 100 millimetres is measured in the worst sections, which can cause a vehicle to lose control if traversed at high speed. This, coupled with an unforgiving roadside environment creates an exceedingly dangerous environment for driving, regardless of vehicle type.



Edge break up and drop off on the southern end of Kangaroo Flat Road

Road widening and shoulder sealing as previously recommended will substantially address these issues, and should be undertaken as a matter of urgency. Until these works are carried out, establishment of a temporary speed reduction to 80 km/h or less should be strongly considered between Princes Highway and Wandilo Forest Road to reduce the level of risk.

Further to this, the pavement is exhibiting signs of failure with cracks, ruts and undulations all present on the southern end of Kangaroo Flat Road. In the short term, localised repairs must be undertaken to address these issues, however RAA recommends full road reconstruction between Princes Highway and Wandilo Forest Road.

Clear zones are well established for most of the corridor; however, there are a number of roadside hazards including stobie poles and large trees in close proximity to the road edges. The Drain A Bridge, just south of Darrymore Road in Kalangadoo, is another example of a narrow bridge in the region, and RAA recommends that this be widened – but prioritised against other required bridge widening projects in the region that may be of higher significance.

Key Recommendations

Kangaroo Flat Road – Key Recommendations		Authority
■	Widen road and seal shoulders between Princes Highway and Wandilo Forest Road. A temporary speed limit reduction should be strongly considered until these works can be undertaken.	DPTI
■	Widen road and seal shoulders between Wandilo Forest Road and Kalangadoo.	DPTI
■	Full road reconstruction between Princes Highway and Wandilo Forest Road.	DPTI
■	Widen the Drain A Bridge just south of Darrymore Road	DPTI

Avenue Range Road

Avenue Range Road is a state maintained road extending for 33 kilometres between Lucindale and the Princes Highway, just south of Kingston. Survey respondents raised no significant issues with the road; however, RAA reviewed the road condition en route to other destinations.

Crash History

Between 2013 and 2017, three casualty crashes occurred, with each resulting in minor injuries.

Avenue Range Road Crash Types

Crash Types	No. of Crashes	Apparent Errors
Hit Fixed Object	2	Inattention (2)
Hit Animal	1	N/A (1)
All Crash Types	3	Inattention (2), N/A (1)

Traffic Volumes

Traffic volumes are moderate with almost 400 vehicles travelling the road daily.

Avenue Range Road Traffic Volumes

Segment	Length (km)	AADT	% Commercial Vehicles	2007 Estimated AADT
<i>Kingston – Avenue Range</i>	33.5	390	12.0	370

Road Widths

Avenue Range Road is generally quite narrow with lanes consistently around 3.1 metres wide. There are no sealed shoulders along the length of road, and RAA recommends that consideration be given to providing a minimum 0.5 metre shoulder seal to improve the level of safety.

Avenue Range Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
W of Avenue	2.9-3.2m	N/A	6.1m

Speed Limits

Avenue Range Road is controlled by a 110 km/h speed limit, with a short 80 km/h zone through the Avenue township.

Avenue Range Road Speed Limits

Segment	Length (km)	Speed Limit (km/h)
Kingston – Avenue	20.0	110
Avenue	0.5	80
Avenue – Lucindale	12.0	110

Observations

The pavement is generally in serviceable condition with minor undulations and edge break up observed between Lucindale and Avenue Range.

There are a number of narrow bridges along the route that would benefit from widening, however, this should be seen as a lower priority to other bridge widening projects on significant freight routes.



Typical cross section of Avenue Range Road

The clear zone is generally maintained to approximately three metres, however, moderately dense and hazardous vegetation exists outside of this width for many parts of the corridor. RAA recommends that additional barrier protection be installed to provide further protection, particularly around curves. Removal of trees within three metres of the carriageway should also be considered.

Intersection with Princes Highway

The intersection with Princes Highway is well signposted with direction boards, 400 and 200 metre warning signs, rumble strips, enhanced line marking and guide post delineation as well as left and right turn lanes to access the road from Princes Highway.

Key Recommendations

Avenue Range Road – Key Recommendations		Authority
■	Minimum 0.5 metre shoulder seal.	DPTI
■	Widen narrow bridges.	DPTI
■	Additional barrier protection, particularly around curves.	DPTI
■	Remove trees within three metres of the carriageway.	DPTI/NLC/ KDC

Other Roads Assessed

Rowney Road (Bordertown – Desert Camp)

Rowney Road is a state maintained road connecting Bordertown and Kingston and is subject to a 110 km/h speed limit. Rowney Road was not raised as an issue in the survey, however, RAA reviewed the section between Bordertown and Riddoch Highway en route to other destinations.

Rowney Road is narrow with 3.1 metre lanes and no sealed shoulders. The 5 kilometre section between Naracoorte Road and Mundulla has moderate traffic volumes and is traversed by more than 600 vehicles on a daily basis. The 34 kilometres section between Mundulla and Riddoch Highway experiences much lower traffic volumes, with AADT between 100 and 250 vehicles per day. RAA recommends that shoulders eventually be sealed between Mundulla and Riddoch Highway, however, there are a number of projects in the region that warrant investment as a higher priority.

Rowney Road – Key Recommendation		Authority
▪ Seal shoulders between Mundulla and Desert Camp.		DPTI

Four Mile Road

Four Mile Road is a state maintained road extending for six kilometres between the township of Lucindale and Lucindale Road. The road carries around 550 vehicles daily and is approximately 6m wide, which provides a 3 metre lane in each direction. The surface is quite uneven, with moderate undulations experienced and RAA recommends that a full reseal be undertaken to address the majority of surface issues. It would be economically beneficial to seal shoulders concurrently to a minimum 0.5m wide, which will further improve the level of safety.

Four Mile Road – Key Recommendation		Authority
▪ Reseal in full and seal shoulders to minimum 0.5 metres.		DPTI

Wimmera Highway

Wimmera Highway is a state maintained highway between Naracoorte and the Victorian border, linking through to Marong via Horsham. Only the 20 kilometre South Australian section of the highway was reviewed by RAA.

Survey respondents did not raise Wimmera Highway as a major issue, however, its condition was reviewed whilst in the vicinity of Naracoorte as it forms part of a major interstate route.

In 2018, shoulder sealing between Hynam and the Victorian border was completed at a cost of \$350,000, making a substantial improvement to safety. A further \$1.3M was invested on a five kilometre stretch between Naracoorte and Hynam in 2016, which included shoulder sealing and barrier installation following two tragic fatal crashes on this section of the highway in 2014.



Barrier protection to combat crashes into trees along Wimmera Highway

ATLM is installed along the edge lines between Naracoorte and Hynam, however this is not continued through to the Victorian border. The risk of serious crashes involving trees east of Hynam is high due to the frequency of roadside vegetation, and RAA recommends that ATLM edge lines be extended through to the border as a minimum. Vegetation removal or additional barrier protection should also be considered between Hynam and the border.

Wimmera Highway – Key Recommendations		Authority
<ul style="list-style-type: none"> ▪ Install ATLM between Hynam and the Victorian border. ▪ Consider vegetation removal or additional barrier protection between Hynam and the Victorian border. 		DPTI
		DPTI/NLC

Casterton Road

Casterton Road is a state maintained corridor linking Penola and Casterton, approximately 45 kilometres east of the Victorian border. The South Australian section of the road is 17.5 kilometres long and controlled by a 100 km/h speed limit. There were a number of mentions of the road in the survey, highlighting issues with freight and tourist driver interactions.

“The Penola-Casterton Road is a major route for b-double log trucks and for Victorian tourists going to Robe. The road has been trashed by trucks as it probably wasn’t built for their weight. The fact that it is used by tourists as well, with no turn outs, no overtaking lanes, and no shoulders makes it dangerous.”

The route carries moderate traffic volumes with almost 350 vehicles using it per day between Penola and the Victorian border, of which almost 25% is freight. No casualty crashes occurred within the 2013-2017 period.

A number of measurements were taken along the route, which is generally quite narrow with a 6.1 metre seal width. The 2.6 kilometre section between Tower Road and the Victorian border had shoulders sealed as part of a \$1.33M project funded jointly by the Federal and State governments under the *Heavy Vehicle Safety and Productivity Program*. This funding also facilitated an upgrade of the full length of Tower Road which removed the need for heavy vehicles to travel through Penola, with the benefits of this upgrade to be fully seen upon the completion of the Northern Penola bypass.

Casterton Road Widths

Segment	Lane Width	Sealed Shoulder Width	Total Seal Width
S of Winter Rd	3.0-3.1m	N/A	6.1m
S of Tower Rd	3.1m	1.6-1.9m	9.7m
E of Victorian border	3.0-3.1m	0.2m	6.5m

In the case of Casterton Road, a favourable recent crash history is not an indication that the road is safe. It is apparent that no surface remediation works were undertaken when the shoulders were sealed, with surface failures including cracking, undulations and ruts up to 20 millimetres deep in the southeast bound direction. This is mainly attributable to the weight of loaded timber trucks travelling towards Portland. RAA recommends that localised rut filling and undulation remediation be undertaken between Penola and the Victorian border.

North of Tower Road, the narrow width and recent freight use has caused substantial edge drop off and break up, with undulations still present for much of the route. RAA recommends that 0.5 metre shoulder sealing be undertaken between Tower Road and Penola, however, a short term alternative may be to build up and grade the unsealed shoulders that are currently in poor condition, now that the majority of freight will be diverted away from this section.



Poor condition of road edges and unsealed shoulders on Casterton Road

Dense vegetation lines most of the corridor between Penola and Tower Road, with much of this growing within three metres of the road. To reduce the risk of crashes with trees, RAA

recommends that clear zones be widened to a minimum of three metres, and additional barrier protection be provided to protect against hazards.

Local and state government may wish to consider a swap of ownership between Tower Road and Casterton Road due to the changed priorities for these two roads.

Casterton Road– Key Recommendations		Authority
	▪ Localised rut filling and undulation remediation.	DPTI
	▪ Seal shoulders to 0.5m between Penola and the Victorian border (unsealed shoulder remediation could be a viable short term alternative)	DPTI
	▪ Clear zone widening and additional barrier protection	DPTI/ WRC

Nangwarry Road

Nangwarry Road is a state maintained road extending for eleven kilometres between Kangaroo Flat Road in Kalangadoo and Riddoch Highway in Nangwarry. The road has a 110 km/h speed limit and an AADT of more than 400 vehicles per day, of which 24% is freight.

Only one casualty crash occurred between 2013 and 2017 as a result of a vehicle disobeying a give way sign at the intersection with Slaughterhouse Road, just outside the Kalangadoo township.

The road condition and geometry is good, with 3.5 metre wide lanes and 0.3m sealed shoulders, and is one of the better examples of a minor freight route within the region.



Nangwarry Road has good geometry for its current function

There is a gradual curve before the intersection with Riddoch Highway, and RAA recommends that intersection warning signage be installed prior to this intersection. Large, duplicated 60 km/h signs have been installed 50 metres before the intersection, which is unusual, but does not create confusion. Their presence may serve to clarify the 60 km/h speed limit after turning onto Riddoch Highway – even though these signs do not apply to Riddoch Highway.

Nangwarry Road – Key Recommendation	Authority
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- Install intersection warning signage prior to the intersection with Riddoch Highway.

DPTI

Tantanoola Road

Tantanoola Road is a state maintained road between Millicent and Mount Gambier that diverts from the Princes Highway through the township of Tantanoola, before re-joining the highway. The ten kilometre road is controlled by a 100 km/h speed limit and is traversed by 400 to 600 vehicles per day.

Tantanoola Road is generally in good condition with 3.2 metre lane widths and a wide clear zone. Some localised hazard removal or protection is required with trees and stobie poles present in close proximity to the road. In the longer term, RAA recommends that shoulders be sealed to a minimum width of 0.5 metres to further improve safety.



Typical Tantanoola Road geometry

Tantanoola Road – Key Recommendations		Authority
▪ Removal or protection of roadside hazards		DPTI/DCG
▪ Seal shoulders to minimum 0.5 metres		DPTI

Tillers Road

Survey respondents did not raise issues with Tillers Road; however, the state maintained section (Tillers Road East) was reviewed en route to Port MacDonnell. This section of Tillers Road has a 100 km/h speed limit and AADT is low with an average of 140 vehicles using the road per day. Measurements taken on site found that lanes are consistently 3.0 metres wide.

The road surface is in good condition, but due to its width, edges are breaking up and a drop off up to 20 millimetres was measured. As traffic volumes are low and there is no recent crash history, shoulder sealing is considered a low priority; however, RAA recommends this be considered a longer term goal. In the shorter term, RAA recommends that road edges be repaired and unsealed shoulders built up and graded to provide a seamless transition between road and shoulder.



Broken edges and drop off on Tillers Road

Tillers Road – Key Recommendations		Authority
	▪ Repair crumbling edges and build up/grade the unsealed shoulder.	DPTI
	▪ Seal shoulders.	DPTI

Eight Mile Creek Road

Survey respondents did not raise issues with Eight Mile Creek Road, however, the state maintained section was reviewed en route to Port MacDonnell. Eight Mile Creek Road is travelled by about 350 vehicles per day and is subject to the urban default speed limit, with a short reduction to 80 km/h through Racecourse Bay.

Three casualty crashes occurred on the road between 2013 and 2017, with all of these involving single vehicles leaving the road, with two also involving rollovers. The road is narrow with three metre wide lanes, and as such, RAA recommends that shoulder sealing be undertaken to improve the level of safety by providing a wider overall seal width.

Eight Mile Creek Road – Key Recommendations		Authority
	▪ Seal shoulders.	DPTI

Callendale Road

Callendale Road is a state maintained road extending 39 kilometres between Lucindale Road in Lucindale and Clay Wells Road in Wattle Range. The speed limit is 110 km/h and two casualty crashes occurred between 2013 and 2017. Traffic volumes are low, with approximately 190 vehicles travelling the road per day.

The road is very narrow, particularly on the northern end where RAA measured the total sealed width to be only 5.6m. Considering this is a b-double route, road widening should be treated as the highest priority on Callendale Road, as the current width does not allow two heavy vehicles to safely pass one another. The southern half of Callendale Road is slightly wider, with a 6.2 metre wide seal provided.

The surface is beginning to show its age with ruts and a cracked, crumbling surface requiring routine maintenance to address in local areas.



Callendale Road is in need of maintenance

Should these upgrades not be undertaken, RAA recommends a review of the speed limit due to the safety issues of a 110km/h speed limit on a road of such narrow geometry.

Callendale Road – Key Recommendations		Authority
	▪ Road widening, particularly on the northern half of the road.	DPTI
	▪ Routine maintenance to address deteriorating surface in local areas.	DPTI
	▪ Review speed limit should the road not be widened.	DPTI

Wattle Range Road

Wattle Range Road is a state maintained road between Wattle Range and Mount Burr, with a road length of approximately 24 kilometres. The road is unsealed within Wattle Range and has maximum 80 km/h speed advisory signs displayed due to the condition and alignment of the road, although the enforceable default limit of 100km/h still applies. Wattle Range Road has an AADT of 95 vehicles per day, of which almost 15% of traffic is for commercial purposes.

In terms of the road condition, there is loose gravel, potholes and corrugations consistent along the road. Vegetation and trees are set back less than a metre from the carriageway, increasing the risk of drivers being involved in a casualty crash. A number of trees are wide in diameter, and as such, provision of barriers or removal may be considered. As a minimum, these trees should be delineated using D4-3 'width markers'. It is also noted that additional vegetation maintenance is required to avoid obscuring existing guide posts.



Trees having setback less than a metre on Wattle Range Road

Wattle Range Road – Key Recommendations		Authority
<ul style="list-style-type: none"> Consider installation of safety barriers or removal of large trees in close proximity to the road. As a minimum, these trees should be delineated using D4-3 'width markers' Additional vegetation maintenance to avoid obscuring existing guide posts. 		DPTI/WRC
		WRC

Maaoupe Road

Survey respondents did not raise Maaoupe Road as a significant issue in the region, however, RAA reviewed the road en route to Moyhall Road. The road surface, under the care and control of Wattle Range Council, is in good condition, however it was noted that delineation is poor. Guideposts are old and sparse, and centre line marking is very faded and overdue for refreshing. The transition from a sealed to an unsealed road occurs at an intersection on a minor crest and around a curve, and this transition appeared very suddenly. RAA recommends the following improvements to Maaoupe Road:

Maaoupe Road – Key Recommendations		Authority
<ul style="list-style-type: none"> Review guide posts and reinstall at the appropriate spacing where necessary. Refresh centre line marking. Extend the sealed surface beyond the curve and intersection with Penola-Lucindale Road. As a minimum, W5-19 'gravel road' signage should be installed to warn of the upcoming surface transition. 		WRC
		WRC
		WRC

Moyhall Road

Moyhall Road is under the care and control of Naracoorte Lucindale Council and was raised by several survey respondents when asked about unsealed roads where they had safety concerns. Moyhall Road is generally well constructed and has good clear zones. A number of small potholes were observed during our assessment, however, these were quite typical of a road of this category and would be addressed by routine grading.

Delineation is generally poor, with guide posts not provided along most of the corridor and RAA recommends that guide posts be installed at the appropriate spacing to improve delineation of the carriageway.

At the time of RAA's assessment, a culvert was being replaced and widened under the Federal *Bridges Renewal Program* (round three) at a cost of almost \$700,000 – jointly funded by local and federal governments. Further to this, almost \$300,000 was spent widening two other culverts on the road in round one of the *Bridges Renewal Program* in 2015. Naracoorte Lucindale Council should be praised for the work undertaken to to present a case for the upgrade of these crossings in order to secure federal funding.

Moyhall Road – Key Recommendation	Authority
<ul style="list-style-type: none"> Install guide posts at the appropriate spacing where necessary. 	NLC

Bog Lane

Bog Lane is primarily under the care and control of the District Council of Grant, with approximately 1.5 kilometres of the northern end under the care of the District Council of Robe.

At the time of RAA's assessment, some sections of Bog Lane were in reasonable condition, however, there were a number of areas with substantial corrugations and a very sandy surface that provided minimal traction.



Corrugations and a slippery surface are the primary issues noted on Bog Lane

The curvilinear geometry can be challenging at times, and delineation is generally quite poor. RAA recommends that guide posts be reviewed and installed at the appropriate spacing where necessary, with reduced spacing around curves.

Bog Lane – Key Recommendations	Authority
<ul style="list-style-type: none"> Consider the use of alternative pavement materials to provide better longevity and resistance to damage in localised areas subject to regular surface deformation. 	DCG
<ul style="list-style-type: none"> Review guide post placement, particularly around curves. 	DCG

Nora Creina Road

Nora Creina Road is classified as a local road, which is under the care of the District Council of Robe. The southern section of the road is unsealed, and runs between various lakes, connecting Robe to a number of holiday retreats within Nora Creina.

The condition along the sealed northern section is good with no major issues. Whilst the unsealed sections are generally in acceptable condition, some sections are considered to be corrugated. Dense vegetation is present along Nora Creina Road, which obscured some guide posts along the road and the road could benefit with further delineation to improve night driving. RAA recommends that the crossroads warning sign at the intersection of Bog Lane and Powells Road be removed, as this conflicts with the give way ahead warning sign. The existing give way sign is also in poor condition and RAA recommends it be replaced.



Conflicting 'give way ahead' and intersection warning signs on Nora Creina Road, and faded give way sign (inset)

Nora Creina Road – Key Recommendations		Authority
<ul style="list-style-type: none">Manage roadside vegetation and review guide posts and delineation.Remove crossroads warning sign at the intersection with Bog Lane and Powells Road, and replace give way sign.		DCR
		DCR

Sandy Lane (Robe)

Sandy Lane is an unsealed local road managed by the District Council of Robe and was raised by a number of survey respondents concerned about its use as a 'rat run' for vehicles travelling along Southern Ports Highway. Both ends of Sandy Lane are connected to the Southern Ports Highway and it is occasionally used by traffic to bypass Robe. Whilst this does present additional safety risks at the two intersections not designed for high turn volumes, the only feasible solution would be a partial closure of Sandy Lane, which could present some concerns from locals regarding emergency access and egress.

In general, the road condition of Sandy Lane is adequate. Some sections of the road are slightly corrugated, and the presence of vegetation along the road may pose some risks. This road may benefit from being included in the long-term road-sealing program.



Typical Sandy Lane geometry