



Highway Assessment: Victor Harbor Road

Report: May 2021

Motor | Home | Travel

RAA at a glance



South Australia's
largest
membership organisation



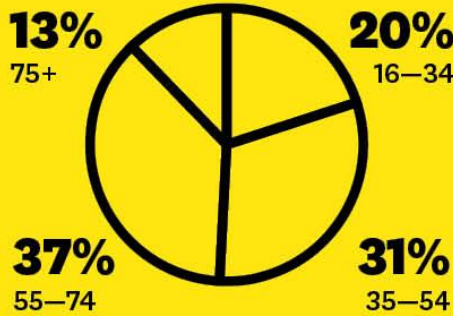
Advocating for South
Australians for over
115 years



770k+
current members
(55% of SA adults)



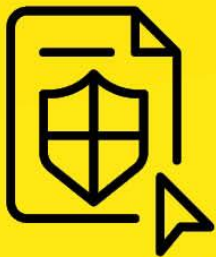
150k+
RAA members are
also cyclists



Our members span
all adult age groups



1000+
staff employed
across SA



Largest
personal lines
insurer in SA



340k+
roadside callouts
per year



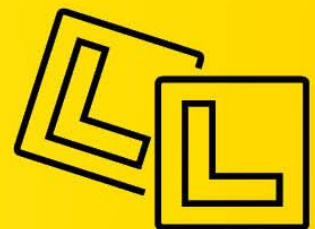
530+
tourism providers
promoted on Experience SA



450+
businesses accredited
through RAA's Approved
Repairer network




29k+
people educated on
road, bike and child
safety each year



23k+
free lessons delivered
to keep SA learner
drivers safe

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Executive Summary

RAA is South Australia's largest member organisation, representing more than 770,000 South Australians – about half the state's population. Our diverse motor, home and travel expertise means that we can help translate public policy into opportunity for South Australians and advocate for the things that matter. RAA's advocacy efforts support the economic prosperity of South Australia, including its regions – recognising our role as an employer of more than 1,000 people across our state.

Our advocacy is evidence-based: we consult and engage with industry, government and our members; and we use open-source data, research and technical field work to develop our recommendations.

RAA has been a trusted advocate in transport and mobility developed over the last 118 years. We have also provided South Australians with travel services, ranging from holiday planning and bookings to travel insurance and international driving permits, for over 60 years. This means we have an expert understanding to provide unique insights into services and public policy settings to encourage improved transport, mobility planning and services and tourism infrastructure to help support and benefit our members and the broader South Australian community.

RAA aligns its advocacy with the following three themes:

- **Safe** – A safe system that not only achieves, but outperforms, national and international safety benchmarks. It encompasses safe people, using safe vehicles, on safe roads, at safe speeds.
- **Accessible** – To have a cost efficient, convenient and reliable network that is accessible and inclusive, as an essential part of personal mobility.
- **Sustainable** - Encompasses the needs of current and future generations, and considers financial, societal and environmental factors.

Through member and broader community feedback received as part of our Fleurieu Peninsula regional road assessment, Victor Harbor Road has been identified as the most concerning piece of transport infrastructure in the Fleurieu Peninsula Region. Victor Harbor Road is critical to movement through the Fleurieu Peninsula and is highly important to both freight and tourism in addition to its thousands of daily users.

The methodology used to produce this report involved surveying residents of the Fleurieu Peninsula and analysing their feedback prior to undertaking several days of field work to assess and review the issues raised. RAA also consulted with local councils to discuss issues raised throughout the community survey, including Victor Harbor Road. The findings and subsequent recommendations from this field work are presented throughout this report along with a review of open-source crash and traffic volume data.

RAA has outlined a series of recommendations aimed at improving safety on Victor Harbor Road now, and into the future.

RAA's key recommendations for Victor Harbor Road



Victor Harbor Road, Hindmarsh Valley (Cut Hill).

Sealed shoulder widening

1. Widen the shoulder seal north of Mount Compass to at least 2m for sections where this shoulder width is not achieved.

Overtaking lanes

2. Ensure that planned overtaking lanes south of Mount Compass are of sufficient length and include wire rope median barriers. (High priority recommendation)

To be included in the proposed Victor Harbor Road duplication project

- 3a. Construct a grade-separated interchange at the intersection with Seaview Road and Budgens Road.
- 3b. Install a wire rope central median barrier along the length of the project.

Between McLaren Vale and Mount Compass

4. Undertake additional pavement rehabilitation works between McLaren Vale and Willunga to improve the section of the road not currently included in the \$3m works already announced.
5. Plan and prepare for the future duplication to Mount Compass.



Fatigue cracking and rutting between McLaren Vale and Willunga.

South of Mount Compass

6. Widen the road to achieve a 2m shoulder seal, 3.5m lanes and a 2m-wide centre line with a wire rope central barrier. (High priority recommendation)
7. Review and update outdated intersection warning signs.
- 8a. Ensure motorcycle underrun protection is incorporated into all new barrier installations and retrofitted to existing barriers, prioritising curved sections.
- 8b. Continue rollout of safety barriers incorporating motorcycle underrun protection to ensure that all fixed roadside hazards are protected.

The intersection with Nangkita Road

- 9a. Refresh line marking.
- 9b. Replace old damaged crash barriers.
- 9c. Consider upgrade or realignment to facilitate safer freight movement.

The intersection with Goolwa Road

10. Install a roundabout. (High priority recommendation)



Goolwa Road intersection, looking north.

RAA's key recommendations for Victor Harbor Road (continued)

The intersection with Crows Nest Road

- 11a. Install a channelised right-turn lane on Victor Harbor Road.
- 11b. Clear vegetation to improve sight distance.
- 11c. Update intersection warning signs.

The intersection with Hindmarsh Tiers Road

- 12a. Install a roundabout.
- 12b. Update intersection warning signs.

AusRAP star ratings

- 13. Ensure safety upgrades achieve a minimum three-star AusRAP star rating for the entire corridor. (High priority recommendation)

Speed limits

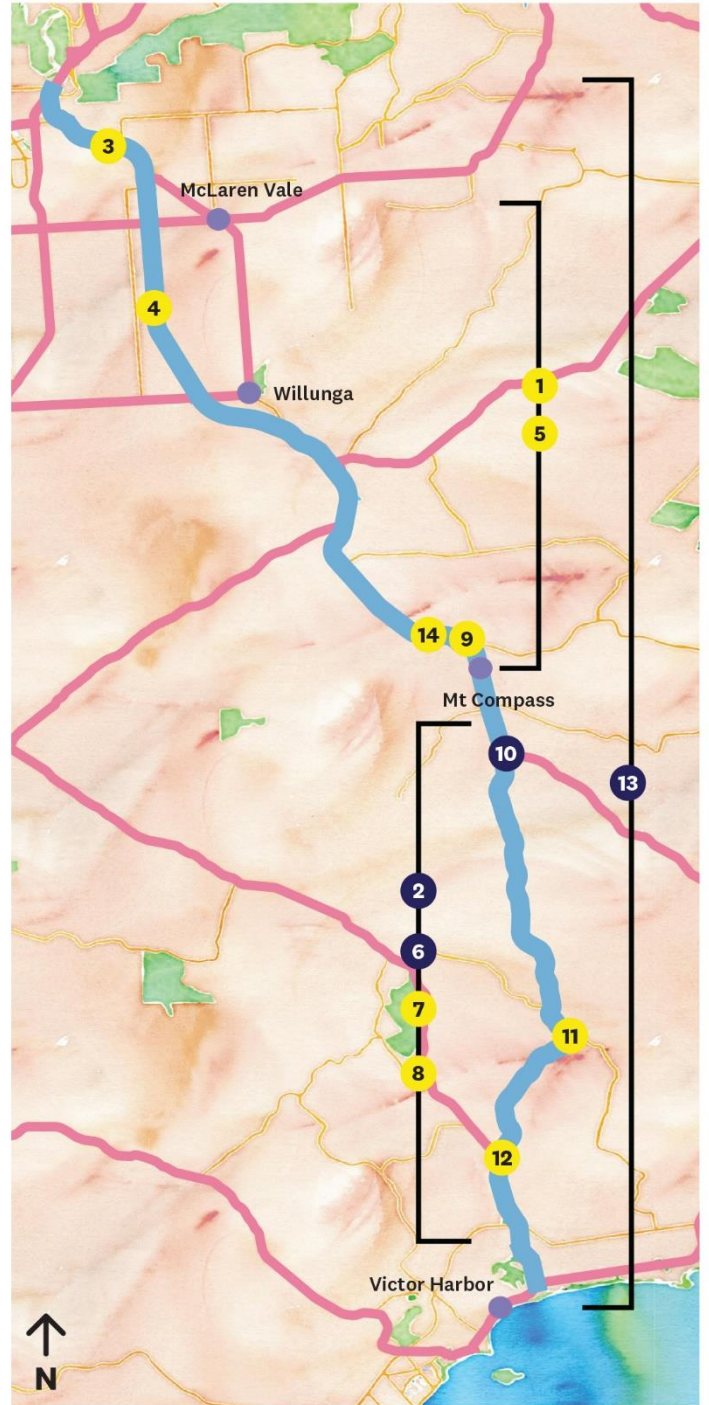
- 14a. Extend the northern 80km/h zone in Mount Compass to improve safety at the intersection with Sand Mine Road and at the exit from Roadman's Reserve.
- 14b. Extend the Mount Compass 60km/h speed zone by 100m to the north to improve safety at the intersection with Tay Road.



60km/h speed limit in Mount Compass.

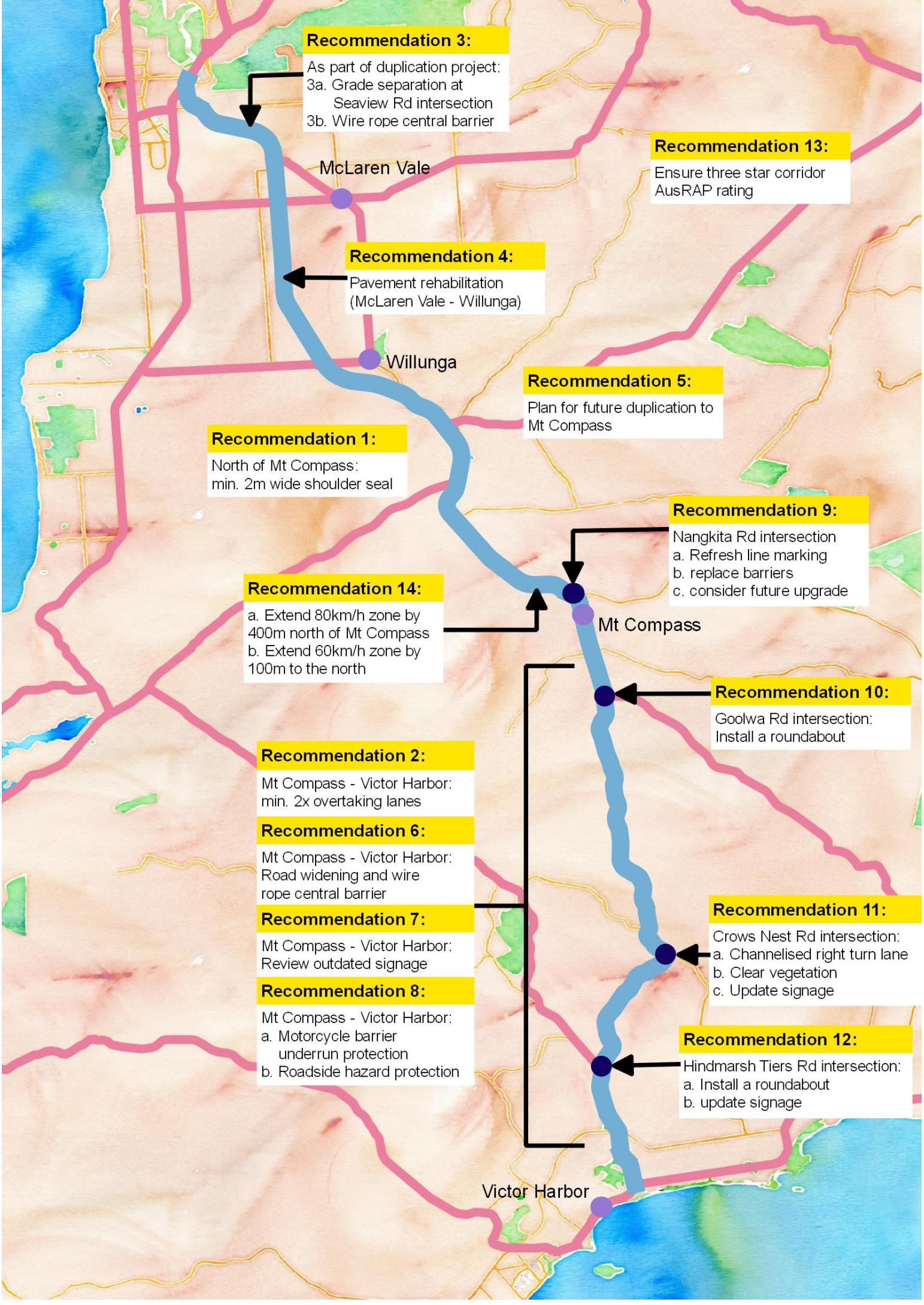
High priority recommendation

This issue is of very high importance to the local community, 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.



Location of recommendations for Victor Harbor Road.





Recommendation 3:

As part of duplication project:
3a. Grade separation at Seaview Rd intersection
3b. Wire rope central barrier

McLaren Vale

Recommendation 4:

Pavement rehabilitation (McLaren Vale - Willunga)

Willunga

Recommendation 1:

North of Mt Compass:
min. 2m wide shoulder seal

Recommendation 14:

a. Extend 80km/h zone by 400m north of Mt Compass
b. Extend 60km/h zone by 100m to the north

Recommendation 2:

Mt Compass - Victor Harbor:
min. 2x overtaking lanes

Recommendation 6:

Mt Compass - Victor Harbor:
Road widening and wire rope central barrier

Recommendation 7:

Mt Compass - Victor Harbor:
Review outdated signage

Recommendation 8:

Mt Compass - Victor Harbor:
a. Motorcycle barrier
underrun protection
b. Roadside hazard protection

Recommendation 13:

Ensure three star corridor AusRAP rating

Recommendation 5:

Plan for future duplication to Mt Compass

Recommendation 9:

Nangkita Rd intersection
a. Refresh line marking
b. replace barriers
c. consider future upgrade

Mt Compass

Recommendation 10:

Goolwa Rd intersection:
Install a roundabout

Recommendation 11:

Crows Nest Rd intersection:
a. Channelised right turn lane
b. Clear vegetation
c. Update signage

Recommendation 12:

Hindmarsh Tiers Rd intersection:
a. Install a roundabout
b. update signage

Victor Harbor

Notes

Notes on crash data

Unless otherwise specified, crash data quoted within this report is sourced from the Road Crash Data dataset uploaded by the Department of Infrastructure and Transport on the Data SA website. Crash data is for the five year period between 2015 and 2019 (unless otherwise specified) because it is the most recent data available at the time of publishing this report.

Casualty crashes are defined as a crash where at least one person is injured or killed as a result of the crash. Property damage only crashes are not considered in crash data analysis within this report unless explicitly specified.

Units within the road crash database include animals and objects, but for the purpose of analysing the units involved in crashes, only human controlled units are considered unless otherwise specified.

Casualty crashes per 100 million vehicle kilometres travelled (vkt) have been calculated for various roads and road sections throughout this report for comparative purposes. The calculation for vehicle kilometres travelled is $vkt = AADT \times \text{length of road}$ and can be considered the approximate number of kilometres travelled by vehicles on that particular section of road. Crashes per 100m vkt allows for a comparison of historic crash risk across different road sections.

Notes on star ratings

Throughout this regional road assessment, AusRAP star ratings are provided for sections of Victor Harbor Road. The AusRAP star rating system, a subsidiary of the International Road Assessment Program (iRAP), assesses several key criteria to establish the safety rating of a road from one to five stars with the latter representing the safest. Star ratings have been provided for discrete sites on Victor Harbor Road that are typical of the overall road or to highlight certain deficiencies. These ratings have been calculated using the iRAP 'ViDA' demonstrator tool. AusRAP star ratings are based on the international iRAP model which estimates an average 40% reduction in fatal and serious crashes for each incremental increase in star rating¹.

Table 1: Estimated reduction in fatalities and serious injuries with increases in AusRAP star rating (iRAP, 2020).

Star rating	Relative proportion of fatalities and serious injuries
1	1
2	0.6
3	0.36
4	0.216
5	0.1296

RAA advocates for all regional highways to be rated a minimum of three stars to reduce the number of lives lost and serious injuries on South Australian roads. Our recent submission to the state road safety strategy to 2031 recommends firstly that these ratings are released publicly, and secondly, they are used as a tool to identify and justify safety upgrades across South Australia's regional road network to achieve a three star rating or better on all state highways.

¹ iRAP, 2020, *The Business Case for Safer Roads*, <<https://www.vaccinesforroads.org/business-case-for-safer-roads/>>.

Notes on recommendation colour scales

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 survey respondents, road safety, traffic volumes and importance to tourism and industry in the region. However, not all these factors may contribute to a given priority.

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

High priority recommendation

This issue is of very high importance to the local community, 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.

Mid-high priority recommendation

This issue is of high importance to the local community, 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 or as part of routine maintenance.

Mid priority recommendation

This issue is moderately important to the local community, 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 or as part of routine maintenance.

Mid-low priority recommendation

This issue has been raised by the local community, 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 as part of a longer-term vision.

Low priority recommendation

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 as part of a longer-term vision.

Background

RAA’s Safety and Infrastructure team systematically evaluates the state’s regional road network through our Regional Road Assessment Program. As part of the current Fleurieu Peninsula regional road assessment, an online survey containing questions about the Fleurieu Peninsula road network was emailed to over 12,000 RAA members living within the Fleurieu Peninsula region and also promoted through media and social media channels to residents of the region. The survey received 1,080 responses (694 from members emailed the survey and 386 from other sources) between 23 November 2020 and 16 December 2020 and took an average of 30 minutes to complete.

The responses identified dozens of issues under the broad headings of road maintenance, road design, congestion, speed limits and enforcement, driver behaviour, freight, cycling and motorcycling. It was evident that, of all the roads nominated by survey respondents, Victor Harbor Road was identified as the road in the region with the greatest number of issues. For this reason, the decision was made to release a separate, detailed report on Victor Harbor Road prior to completion of our 2021 Fleurieu Peninsula regional road assessment, which will now be released later in 2021.

Between February and April 2021 RAA’s Safety and Infrastructure undertook several days of site investigations on Victor Harbor Road to review infrastructure along the corridor including many of the issues raised in the community survey.

For the purposes of this assessment, the Fleurieu Peninsula region was defined by the combined boundaries of Alexandrina Council, Victor Harbor City Council, Yankalilla District Council and the McLaren Vale portion of the City of Onkaparinga Council. This boundary is shown in Figure 1 below. Victor Harbor Road passes through three of these four council areas and was reviewed in full despite the northernmost section falling outside of the survey area.



Figure 1: Map of the Fleurieu Peninsula and McLaren Vale region being assessed by RAA

Victor Harbor Road has been a high priority for RAA for many years and, whilst works undertaken to date on sections of the road have been welcomed, the crash history of the corridor shows that more needs to be done to provide a safe route that can meet current needs and account for future growth.

In 2018, RAA lobbied for the first stage of duplication to increase awareness and attain funding commitments in the lead up to the 2018 state election. In 2019, Victor Harbor Road was nominated the third riskiest regional road in South Australia in RAA's third iteration of the 'Risky Roads' survey. In 2020, RAA called for upgrades to the section between Mount Compass and Victor Harbor, which has since received \$12m in funding from the federal government.

This report seeks to detail the improvements required on Victor Harbor Road to ensure safe journeys for decades to come.

Discussion and survey analysis

Respondents to the Fleurieu Peninsula regional community survey raised Victor Harbor Road more times than any other road in the Fleurieu Peninsula region. Victor Harbor Road was the most frequently raised road under several categories including ‘top issue in region’, ‘maintenance’, ‘road design’, ‘congestion’, ‘speed enforcement’ and ‘driver behaviour’, and was raised highly for other categories.

Table 2: Total number of survey responses raising Victor Harbor Road

	Top issue in region	Maintenance	Road design	Congestion	Speed limit	Speed enforcement	Driver behaviour	Freight	Motorcycling	Cycling	Combined
Number of survey responses	113	136	64	65	104	57	174	107	17	23	816
Overall rank	1	2	1	1	2	1	1	2	2	3	1

Survey respondents were very vocal about specific issues along Victor Harbor Road. Examples of the written feedback received is included under the sub-headings below.

Road maintenance

Maintenance concerns were raised along all sections of Victor Harbor Road, but most notably between McLaren Vale and Willunga, where an undulating and deteriorating road surface was raised.

“Needs resurfacing near McLaren Vale. Also roundabouts are needed”.

“Large potholes, undulations and poor bitumen repairs with raised edges and poor attention to joining new bitumen with old bitumen”.

“From the Goolwa Rd through to Old Noarlunga there are a large amount of potholes and road breaking up, especially in areas where they have added extra lanes”.

Road design

Road design concerns were raised at many intersections along Victor Harbor Road, with high traffic volumes and sight distance issues causing dangerous situations. The top three intersections raised along Victor Harbor Road were at Seaview Road, Robinson Road and Goolwa Road. Many respondents also suggested that the road required additional overtaking lanes or a full duplication.

“Although recently ‘upgraded’ the flow of traffic wanting to turn from Goolwa into traffic from Victor Harbor has not been addressed. Would a roundabout be a better solution?”.

“Quarry trucks consistently enter from Seaview onto Victor Harbor Rd whilst traffic is approaching in both directions incredibly dangerous and intimidating”.

“Single carriageway isn't suitable for the traffic load. Especially during peak times like holidays”.

“Certain areas of road aren't wide enough and can be a concern when needing to move across closer to outside of land. Little area to move without potentially ending up in gravel”.

Congestion

Congestion was most raised between McLaren Vale and Main South Road, and heading north out of Victor Harbor, with several respondents also commenting that slow vehicles (e.g. caravans or trucks) regularly hold up traffic. Congestion was raised particularly highly by respondents who were raising issues at the intersection with Seaview Road and Budgens Road in McLaren Vale.

“Traffic often congests at the end of Victor Harbor Road going onto Main South Road, especially at peak hour”.

“Lack of passing opportunities equals impatience and risks taken on a regular basis.”.

“The Roundabout (Ring road/Waterport Rd) is excellent - works extremely well and should have been there years ago! But driving north only one overtaking lane just before Cut Hill - frequently a line up of cars in this section and held up by slow moving trucks or caravans - some of this road is quite winding with limited visibility for overtaking and many private and roads access on/off this section too.”

Speed limits

Most survey respondents commented that speed limits were too high along sections of Victor Harbor Road with challenging curvilinear geometry and that a lower speed limit would be appropriate. There were a small number of comments suggesting that the speed limit was too low, and several comments raising issues with the speed limit approaching Mount Compass and blocked/obscured signage.

“Too many changes that are not well sign posted”.

“In winding sections of the road, the speed limit is still at 100km/h. This should be decreased for that section.”

“This is a windy road, yet 100km/h, some people go crazy on this road and tail gate putting pressure on the driver and making it very dangerous.

“Speed limit to low in some cases. Not enough passing lanes”

Speed enforcement

The majority of survey respondents raising speed enforcement issues on Victor Harbor Road discussed witnessing speeding vehicles on a regular basis, with several comments also related to drivers travelling too slowly. Comments were also received about a lack of visible police enforcement.

“Abundant examples of over speeding every time I travel this road”.

“It’s not a bad road but there are too many people that push the limit”.

“Even though the speed limit is mostly 100, there are regular drivers who insist on driving at around 110. I very rarely see police on this road.”

“People driving 40+km/h under the posted limit on clear sunny days is a regular occurrence. Victor Harbor road overall is in very good condition and this is particularly dangerous when you are going around a corner where somebody could easily come up behind you at the full speed limit.”

Driver behaviour

Driver behaviour on Victor Harbor Road was raised by survey respondents as one of the key issues to be addressed. While comments related to several issues, speeding, tailgating and dangerous overtaking were by far the most common.

“Regularly see drivers using mobile phones (both calls and texting) causing the usual veering from side to side as they drive”.

“Speeding up on passing lanes then slowing back to original speed sometimes 20 km less than sign posted”.

“Overtaking on double white lines. I try not to be on this road between 1530 and 1730”.

“People driving too close and obviously wanting to pass when I am already doing the speed limit”.

“Speeding, tailgating, overtaking at inappropriate areas, unsafe cornering - crossing double lines”.

Freight

Freight issues were also commonly raised along Victor Harbor Road, with the Seaview Road intersection in McLaren Vale attracting far more nominations than any intersection in the region, particularly in relation to trucks turning right from Seaview Road. Concerns regarding difficulties in safely overtaking trucks were also frequently raised.

“Heavy vehicle traffic decimates the surface of this road (particularly around the Seaview Rd intersection). It also causes congestion on the downhill into Old Noarlunga and must cause the truck drivers frustration and stress pulling out of Seaview Rd”.

“Quarry trucks having to wait a long time to cross the road to head north. Often come to the centre of the road while cars driving north, then cross over to the left side of the road. Most truck drivers are careful, but it is a challenging intersection because of the volume of traffic on the Victor Harbor Road”.

“Some drivers overtake on double white lines because trucks have to slow down on this windy section of road”.

Cycling

Cycling was raised by some survey respondents citing that the road was not currently safe for cycling, noting that it was difficult to safely pass cyclists and that ideally a dedicated off-road path was needed for this corridor.

“Without a dedicated section and double white central lines, the opportunity to pass safely or within the law does not exist along the majority of the road”.

“Construction of a Dedicated Bike Path the same as the Amy Gillett Bikeway in the Adelaide Hills”.

“For many bike trips, this road is unavoidable. To cycle regularly, I and many others need a safer alternative”.

Motorcycling

Motorcycle safety was an issue raised mostly by non-motorcyclists in relation to Victor Harbor Road. There were several comments relating to unsafe behaviour by motorcyclists, particularly when overtaking, as well as the poor surface of the road leading to a higher risk of motorcycle crashes.

“Have seen many motorbike riders driving unsafely on these roads. Going too fast and swerving”.

“Used as a racetrack for motorcycles late pm to early am”.

“Windy road, with risk for accidents”.

“Pot holes. Loose gravel”.

Additional Victor Harbor Road survey questions

The final section of the survey asked specifically about respondents’ experiences using Victor Harbor Road. Two in ten (19%) travel on Victor Harbor Road on most days, four in ten (43%) weekly, three quarters (74%) monthly and 98% ever.

How often do you travel on Victor Harbor Road?

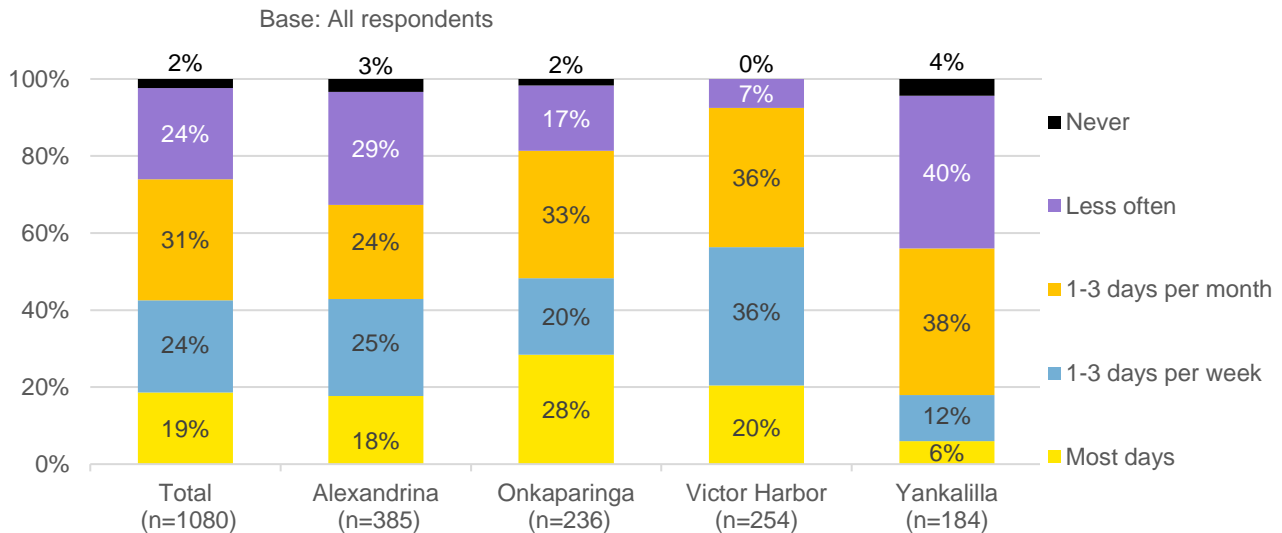


Figure 2: How often community survey respondents travel on Victor Harbor Road

There is variation in usage of Victor Harbor Road by council area, reflecting that the road runs from the Onkaparinga council area in the north, through the western part of the Alexandrina council area to Victor Harbor at its southern end:

- Road usage is relatively high in the Victor Harbor council area, where two in ten (20%) use it most days, a majority (56%) use it weekly and over nine in ten (93%) use it monthly – usage is particularly high for the section from Mount Compass to Victor Harbor, but is high for all sections of the road;
- Road usage is also relatively high in the Onkaparinga council area, where three in ten (28%) use it most days, half (48%) use it weekly and eight in ten (81%) use it monthly – usage is high for the section from Old Noarlunga to McLaren Vale, dropping progressively for sections further south;
- Road usage is close to average in the Alexandrina council area, where two in ten (18%) use it most days, four in ten (43%) use it weekly and two thirds (67%) use it monthly – usage is fairly even for each section of the road, although a little lower for the section from Old Noarlunga to McLaren Vale; and
- Road usage is relatively low in the Yankalilla council area, where one in twenty (6%) use it most days, two in ten (18%) use it weekly and just over half (56%) use it monthly – usage is mostly limited to the section from Mount Compass to Victor Harbor.

Daily usage was higher among working age people than older people, with 32% of 16-44 year olds and 22% of 45-64 year olds using it most days compared with 10% of those aged 65 and over. At six

in ten (58%), weekly usage is also higher than average among those who have driven a truck in the region in the past six months.

Respondents were next presented with a list of potential issues with Victor Harbor Road and asked to select which were concerns for them and then which was their biggest concern.

Which, if any, of the following is a concern for you/your biggest concern with Victor Harbor Road?

Base: All respondents (n=1080)

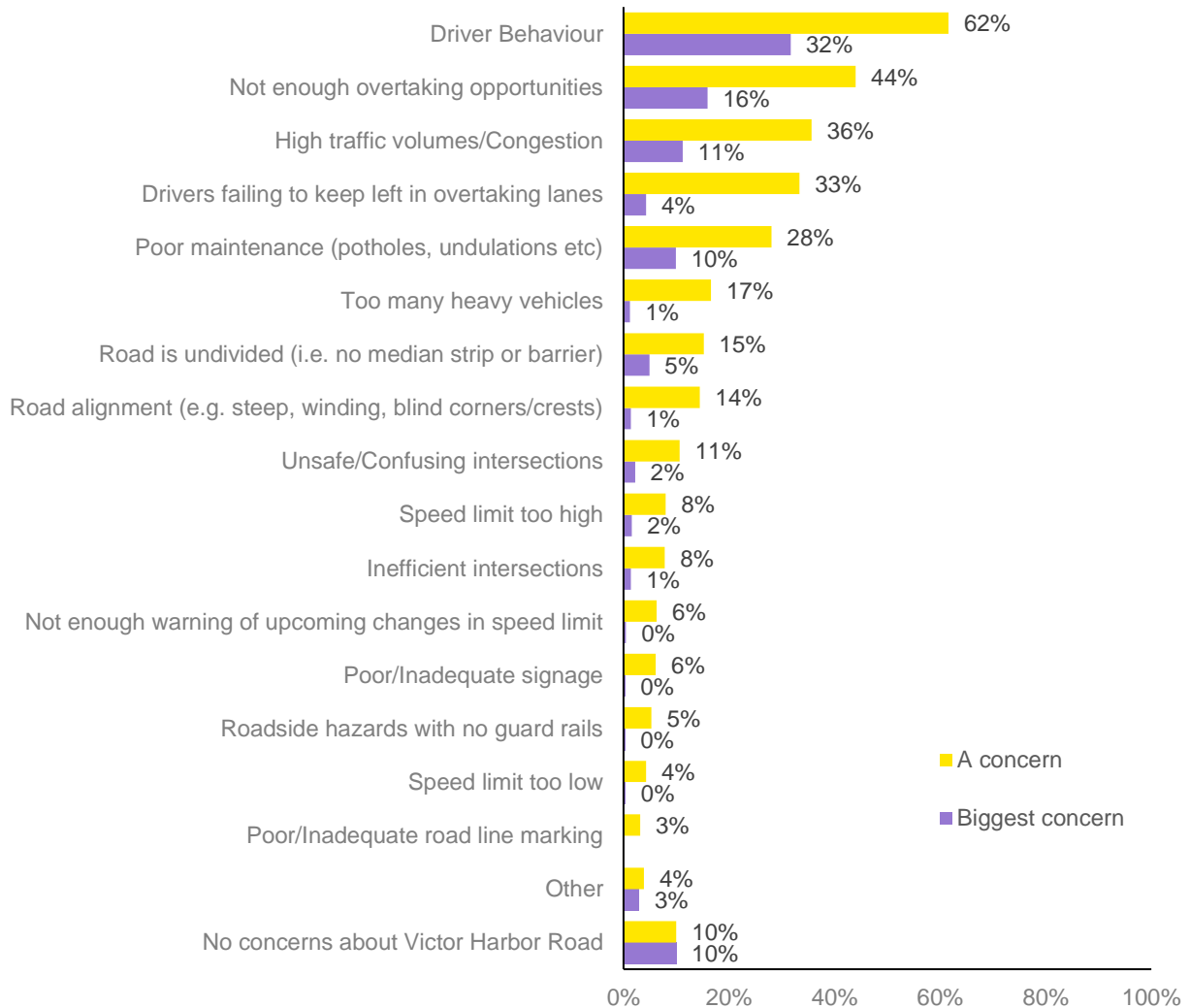


Figure 3: Concerns with Victor Harbor Road

Six in ten respondents (62%) were concerned about driver behaviour (e.g. inattention, speeding, driving too slowly, tailgating) and one in three (32%) selected it as their biggest concern, making it the top issue relating to Victor Harbor Road. Over four in ten (44%) were concerned about there not being enough overtaking opportunities, with 16% selecting it as their biggest concern, making this the second most prominent issue on Victor Harbor Road among survey respondents. The third most prominent issue was high traffic volumes/congestion, with over a third (36%) concerned about this and one in ten (11%) nominating it as their biggest concern.

Other prominent respondent concerns included: driver failing to keep left in overtaking lanes (a concern for 33%, biggest concern for 4%); poor road maintenance (a concern for 28%, biggest concern for 10%); and the road being undivided (only a concern for 15% but the biggest concern for 5%). The most common ‘other’ concerns not provided as response options were calls for the whole road to be two lanes in each direction and concerns about slow drivers speeding up at overtaking lanes. One in ten respondents (10%) had no concerns about Victor Harbor Road.

There was a correlation between how often respondents use Victor Harbor Road and how many issues they were concerned about, meaning that those living in council areas where use of the road is high (Victor Harbor and Onkaparinga) typically had most concerns. However, the nature of respondents’ concerns also varied by council area, partly reflecting the different sections of the road they regularly travel on:

- Victor Harbor residents were more likely than average to be concerned about driver behaviour (76%), not enough overtaking opportunities (58% - with 24% nominating it as their biggest concern), the road being undivided (22%), road alignment (27%), the speed limit being too high (14%) and roadside hazards with no guard rails (10%) – only 3% had no concerns about Victor Harbor Road;
- Onkaparinga residents were more likely than average to be concerned about high traffic volumes/congestion (45%), unsafe/confusing intersections (19%), inefficient intersections (17%) and the speed limit being too low (8%);
- Alexandrina residents were more likely than average to be concerned about not enough overtaking opportunities (51%); whereas
- Two in ten Yankalilla residents (22%) had no concerns about Victor Harbor Road.

Truck drivers were particularly likely to be concerned about the speed limit being too low (13%). Those travelling on Victor Harbor Road on most days were more likely than average to nominate poor maintenance (18%), unsafe/confusing intersections (5%) and inefficient intersections (4%) as their biggest concern.

Demographics

1,080 people completed RAA's Fleurieu Peninsula regional assessment survey, with 980 (91%) living in a postcode defined by RAA as part of the region for the purpose of this assessment and most of the remainder living elsewhere within the City of Onkaparinga. All four Fleurieu council areas were well represented among respondents, ranging from 184 responses from Yankalilla residents to 385 responses from Alexandrina residents, enabling the results to be analysed by council area. With regard to the age of respondents, 55-74 year olds comprised about half (52%) of respondents but all age groups were represented, meaning that survey results have been analysed by three broad age groups: 16-44 year olds; 45-64 year olds; and those aged 65 or over. Survey responses were evenly split between males and females (50% in each case).

Table 3: Survey respondent demographics

Subgroup	No. of responses	% of total
Council Area		
Alexandrina Council	385	36%
City of Victor Harbor	254	24%
City of Onkaparinga	236	22%
District Council of Yankalilla	184	17%
District Council of Mt Barker	9	1%
Other	12	1%
Gender		
Female	535	50%
Male	540	50%
Other	5	0%
Age		
16-24	21	2%
25-34	63	6%
35-44	126	12%
45-54	140	13%
55-64	241	22%
65-74	316	29%
75+	173	16%
Total	1080	100%

When analysing results by council area, it should be noted that Onkaparinga residents were more likely than average to be aged 16-44, female and sourced from media and social media promotional activity whereas Alexandrina and Victor Harbor residents were more likely than average to be aged 65 or older and to have been sourced from an email to RAA members located in the region. When analysing results by age, it should be noted that those aged under 65 were more likely than average to be female and sourced from promotional activity whereas those aged over 65 were more likely than average to be male and sourced from an email to RAA members located in the region.

2015-2019 casualty crash statistics

Victor Harbor Road has tragically been the scene of far too many tragic road crashes over the years. Between 2015 and 2019 alone, 111 casualty crashes occurred, with six resulting in at least one fatality and a further 21 resulting in serious injuries. Whilst detailed crash data for 2020 is not yet available, it is believed that a further four people lost their lives in crashes in 2020. The locations and types of crashes occurring on Victor Harbor Road is displayed in Figure 4 below.



Figure 4: Locations of casualty crashes occurring on Victor Harbor Road (2015-2019)

Rear end crashes are the most commonly occurring crash type, which is uncommon for a regional road. Factors that frequently influence the occurrence of rear end crashes include congestion, inattentive driving and following too closely. Upon further review, 56% of these rear end crashes occurred between Main South Road and McLaren Vale, and in particular on the approach to the Main South Road signalised intersection.

Crashes involving a collision with a fixed object were the next most common crash type, and most often involve a single vehicle leaving the carriageway colliding with a tree. There is a trend with these crashes occurring south of Mount Compass (56% of all hit fixed object crashes). In particular, a 6km section between Isaacson Road (Mt Jagged) and Mount Rosa Road (Hindmarsh Valley) has the highest rate of hit fixed object crashes.

Right angle crashes occur at intersections, with both the Goolwa Road and Hindmarsh Tiers Road intersections recording the highest number of right angle crashes (3 at each).

Head on crashes, whilst less frequent, are far more likely to result in serious injury or death. Five of twelve head on crashes occurring on Victor Harbor Road between 2015 and 2019 occurred on the 6.5km section in Mount Jagged north of Crows Nest Road. A wire rope centre median treatment would significantly reduce the likelihood of head on crashes occurring on this section and would also have a positive impact on run off road and serious hit fixed object crashes. The effectiveness of this has been seen on the Willunga Hill section of Victor Harbor Road, where no head on crashes occurred between 2015 and 2019.

Wire rope centre median barriers should be considered between Mount Compass and Victor Harbor to help address this high crash rate. Generally, horizontal curve radii of less than 200m are not appropriate for wire rope barrier applications, however, most curves on Victor Harbor Road have a radius greater than 200m. RAA understands that road widening, and clearance of roadside hazards will also be required as part of the application of this treatment.

Table 4: Victor Harbor Road casualty crash types

Crash type	Number of casualty crashes	Crash severity		
		Minor	Serious	Fatal
Rear End	34	28	6	0
Hit Fixed Object	25	20	4	1
Right Angle	17	15	2	0
Head On	12	5	5	2
Roll Over	6	3	2	1
Side Swipe	6	5	1	0
Hit Animal	3	3	0	0
Hit Pedestrian	2	1	0	1
Right Turn	2	1	0	1
Hit Parked Vehicle	2	1	0	0
Other	1	1	0	0
Left Road – Out of Control	1	1	0	0
Total	111	84	21	6

Cars are the predominant unit involved in crashes on Victor Harbor Road, making up 88% of all units involved in crashes. Truck involvement in crashes is about 4%, with most of these occurring north of Willunga Hill, including three on the south east bound carriageway of Willunga Hill ascent and three between Seaview Road and Quarry Road, which included two fatal head on crashes.

Table 5: Vehicles involved in crashes on Victor Harbor Road

Unit type	Approximate number of units
Car	180 (88%)
Truck	8 (4%)
Other/Unknown	5 (2%)
Motorcycle	5 (2%)
Bicycle	4 (<2%)
Pedestrian	2 (<2%)
Bus	1 (<2%)

Between 2015 and 2019, the average casualty crash rate per 100 million vehicle kilometres travelled (vkt) for the corridor is 11. However, there are three distinct sections of Victor Harbor Road, which were reviewed independently. These sections were Main South Road – McLaren Vale, McLaren Vale – Mount Compass, and Mount Compass – Victor Harbor.

Following this review, the casualty crash rate per 100 million vkt is highest between Main South Road and McLaren Vale, with 17.2 casualty crashes occurring per 100 million vkt (total 34 crashes). Ranked second is the section between Mount Compass and Victor Harbor, with 16.6 casualty crashes per 100 million vkt (total 50 crashes). The McLaren Vale to Mount Compass section recorded an average of 5.8 casualty crashes per 100 million vkt (total 27 crashes). This emphasises the need to prioritise safety improvements between Mount Compass and Victor Harbor, recognising that duplication between Main South Road and McLaren Vale will result in a substantial improvement to safety if undertaken in alignment with safe system principles.

Infrastructure review

Victor Harbor Road is a major rural arterial corridor under the care and control of the Department for Infrastructure and Transport. Victor Harbor Road extends for 47km between Main South Road in Old Noarlunga and Port Elliot Road in Hayborough (including Adelaide Road) and is the primary route between Adelaide and Victor Harbor. While the road bypasses McLaren Vale and Willunga, both with grade separated interchanges, it continues through the regional township of Mount Compass.

Average traffic volumes between Main South Road and McLaren Vale exceed 25,000 vehicles per day. Between McLaren Vale and Goolwa Road (Mount Compass), volumes average more than 12,000 vehicles per day, and south of Goolwa Road they sit at around 6,500 vehicles per day.

Several upgrades to Victor Harbor Road have been completed in recent years, with other major upgrades on the horizon, including:

- (2013) \$18m McLaren Vale overpass
- (2016) \$4.3m roundabout at the intersection with Welch Road/Waterport Road
- (2016) \$2.0m for wide centreline between Old Willunga Hill Road and Yundi Road, and safety improvements at the intersection with Pages Flat Road
- (2019) \$0.6m upgrade at the intersection with Arthur Road in Mt Compass
- (2020) \$0.6m upgrade at the intersection with Goolwa Road, south of Mt Compass
- (2021) \$3m for 3.5km resurfacing works between Willunga and Mount Compass
- (2021/22) overtaking lane between Crows Nest Road and Victor Harbor
- (2021/22) \$92m duplication between Old Noarlunga and McLaren Vale
- (2021/22) \$12m safety upgrades between Mount Compass and Victor Harbor including overtaking lanes (2020 Federal budget)

Road widths

Due to high traffic volumes and poor curvilinear alignment, it was only possible to safely take two cross-sectional measurements of Victor Harbor Road. It is acknowledged that these are not necessarily representative of the entire corridor.

Whilst geometry north of Goolwa Road is generally acceptable, improvements to lane and shoulder widths should be made south of Goolwa Road to improve safety on this section with a high crash rate.

Table 6: Sealed width of Victor Harbor Road

Location	Lane width	Sealed shoulder width	Total seal width
Rest stop N of Aldinga Rd	3.6m/3.8m	2.2m	11.8m
S of Hindmarsh Tiers Rd	3.2m	1.7m/1.8m	9.9m

RAA recommends that shoulders be sealed to a minimum width of 2.0m for the length of Victor Harbor Road to provide additional opportunities for errant vehicle recovery, additional area for broken down and service vehicles and provide additional clearance to fixed roadside objects. This is simpler to achieve north of Mount Compass where there are fewer geographical constraints, however should also be a target south of Mount Compass.

Recommendation 1

Widen shoulder seal to at least 2.0m wide north of Mount Compass, where this width has not already been attained.

This should be undertaken in conjunction with the widening required to facilitate a wide centreline treatment with wire rope barrier.

Overtaking lanes

There are fifteen overtaking lanes along the length of Victor Harbor Road, with 8 for northbound traffic, and 7 for southbound traffic. The locations of current overtaking lanes are displayed on the map in Figure 5.

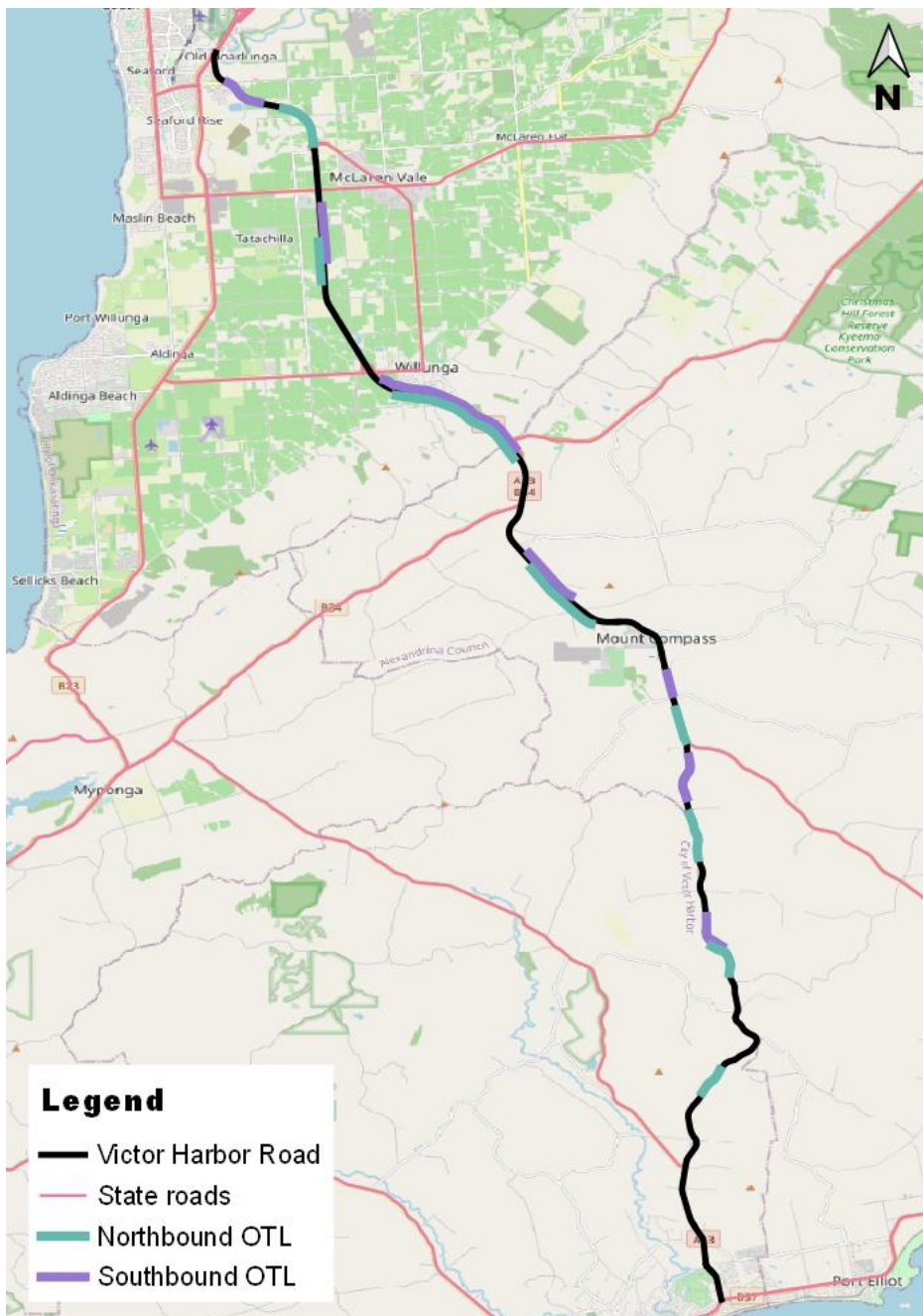


Figure 5: Locations of overtaking lanes on Victor Harbor Road

The length of these lanes varies, with the shortest being just over 600m long (southbound, between Mount Compass and Goolwa Road), and the longest being at Willunga Hill, which RAA considers to be a high standard four lane highway for approximately 4km. Other lanes are typically between 1.1km and 1.7km long. A 1km long overtaking lane is sufficient to overtake a vehicle with a 10km/h speed differential. However, it can be challenging to overtake multiple vehicles, or for multiple vehicles to overtake a single vehicle without exceeding the speed limit, whilst keeping safe following distances.

Prior to the \$12m 2021/22 federal budget announcement for overtaking lanes on Victor Harbor Road, the state government announced separate funding for a new overtaking lane between Crows Nest Road and Hindmarsh Tiers Road, which is expected to be constructed in the 2021/22 financial year. The additional \$12m federal funding will go a long way to funding at least one more overtaking lane and substantial road upgrades between Mount Compass and Victor Harbor, however, the finer details of what will be upgraded have not yet been released.

Recommendation 2

Ensure that current funding provided for overtaking lanes on Victor Harbor Road contributes to providing at least two more overtaking lanes of substantial length between Mount Compass and Victor Harbor, with wire rope median barriers dividing opposing traffic.

Other observations

Old Noarlunga – McLaren Vale

The section of Victor Harbor Road between Old Noarlunga and McLaren Vale carries more than 25,000 vehicles every day, of which 1,600 are heavy vehicles. This traffic volume exceeds the serviceable capacity for a single lane road, and therefore the duplication of this section of Victor Harbor Road (which is funded with major works expected to commence in the 2021/22 financial year) is timely. This duplication project has received \$92m in funding to date, with the federal government contributing 80%.

Whilst our preliminary investigations indicate that duplication of midblock sections should not pose too many technical challenges, intersections along the corridor already pose a significant safety risk which will be exacerbated should they remain in their current configuration following the duplication. This is confirmed by significant feedback received, regarding both the Seaview Road intersection and Robinson Road intersection. The Seaview Road intersection received more mentions in the community survey than any other intersection across the Fleurieu Peninsula and has been highlighted previously in our 2019/20 Risky Roads survey, where it was nominated as the fifth riskiest intersection across South Australia.

RAA's key safety priorities for this duplication project are to ensure that all at-grade right turns are removed along the duplicated section of Victor Harbor Road, and that opposing traffic flows are physically separated. Removing at-grade right turns will significantly reduce the likelihood of high-severity right angle crashes occurring, whilst physical separation of opposing traffic flows will significantly reduce the likelihood of high-severity head-on crashes occurring. Both of these priorities align highly with safe system principles, and facilitate higher AusRAP star ratings.

The crossroad intersection with Seaview Road and Budgens Road provides a significant challenge due to the high volume of right turn movements (including many heavy vehicles) from Seaview Road onto Victor Harbor Road. High traffic volumes make selecting a safe gap difficult, then a gradual

incline of about 4% is faced for right turning vehicles to accelerate to speed, which results in slow acceleration for a loaded heavy vehicle.

RAA considers it highly unsafe for this to remain as an at-grade four-way intersection and proposes that this intersection be grade separated to eliminate conflict between vehicles turning right from Seaview Road and Victor Harbor road traffic. The landscape appears to be more conducive of Seaview Road/Budgens Road passing under Victor Harbor Road, but detailed site and geotechnical investigations will be required to suitably determine a preferred option.

The concept sketch below indicates a potential interchange layout, respective of adjacent land use and maintaining full access at the junction.

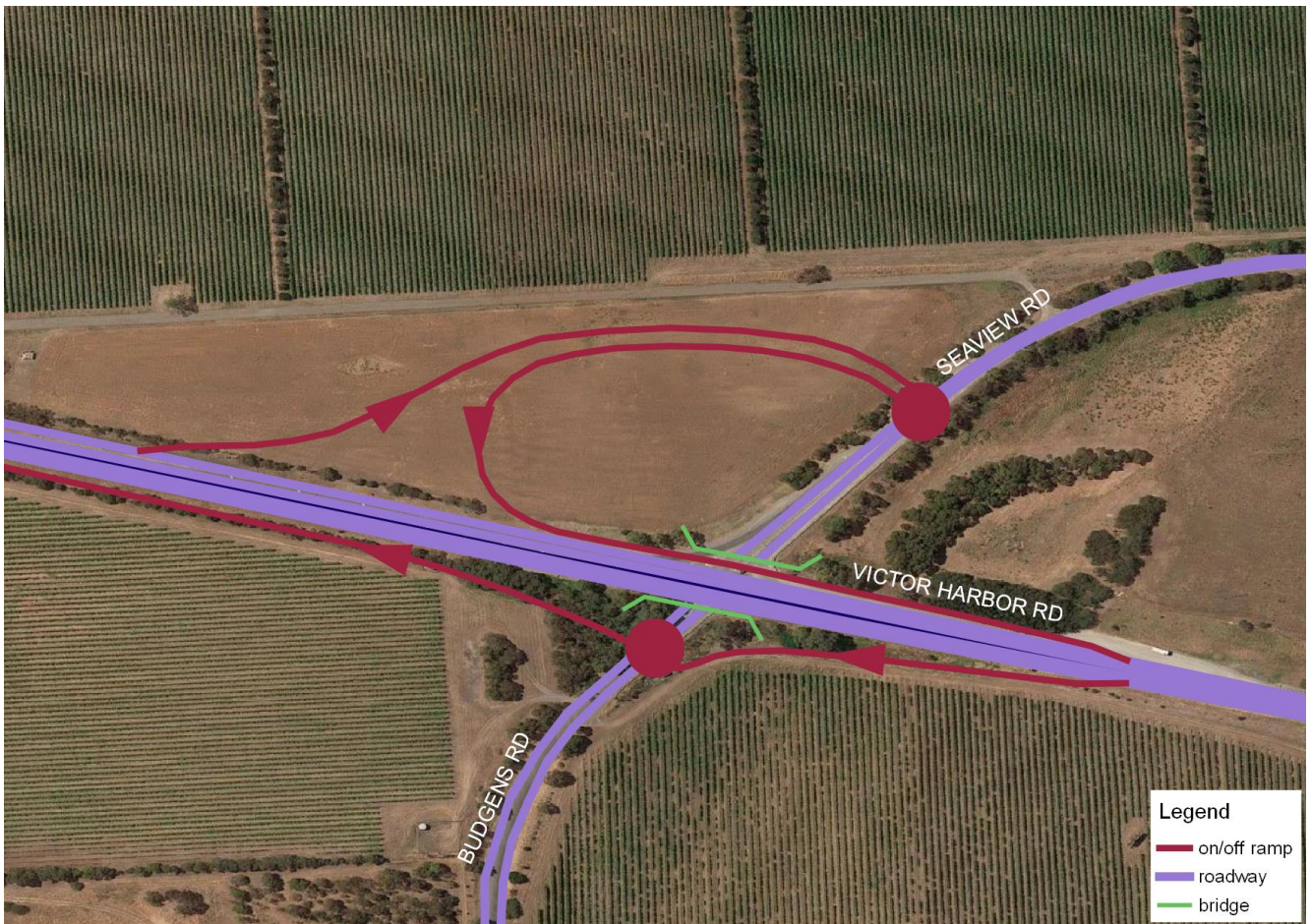


Figure 6: Potential layout of a grade separated Seaview Road/Victor Harbor Road intersection

Should this upgrade occur, there is potential to introduce right turn restrictions at the intersection with Robinson Road, and RAA recommends that Robinson Road be restricted to a 'left in, left out' only treatment, whilst Quarry Road be partially closed with 'left in' the only permitted movement. 'Left out' movements may be feasible with improved intersection alignment. This would reduce rat-running along the unsealed Quarry Road, and encourage vehicles to utilise a safer, upgraded interchange at Seaview Road.

Given that right turns into Robinson Road would be removed, access to some northern parts of the Seaford Heights estate from the north would therefore switch to Main South Road.

The availability of a right turn option onto Victor Harbor Road from Seaford Heights must be considered, as prohibiting right turns from Robinson Road would make it cumbersome for local residents to access Victor Harbor Road in a southbound direction. Should an interchange be constructed at Seaview Road, it would be preferable to utilise this as a safe access point.

The Seaford Heights Development Plan² identifies a link to Victor Harbor Road from the future Seaford Heights development along Ostrich Farm Road. This intersection is already hazardous due to poor curvilinear geometry and RAA considers encouraging additional traffic to use this intersection in its current layout unsafe. Instead, RAA recommends creating a new 400m long road link between Bakewell Drive and Wheaton Road, which will allow residents of Seaford Heights to access Budgens Road and the recommended Seaview Road interchange. This would facilitate the option to remove all at-grade right turns to, and from, Victor Harbor Road for the extent of this duplication project.

Recommendation 3A

As part of the Victor Harbor Road duplication project, construct a grade separated interchange at the intersection with Victor Harbor Road, Seaview Road and Budgens Road. This should be undertaken in conjunction with other improvements suggested in this report including a new link road between Bakewell Drive and Wheaton Road and right turn restrictions at the Robinson Road and Quarry Road intersection.

On 29 March 2021, the Department for Infrastructure and Transport unveiled concept plans for the duplication of Victor Harbor Road for public comment. In addition to duplication, these concept plans detailed several improvements, including:

- A sheltered right turn lane into Noarlunga Avenue, whilst still allowing right turns from Noarlunga Avenue
- Constructing a service road for residential properties currently abutting Victor Harbor Road in Old Noarlunga
- A large, dual lane roundabout at the intersection of Victor Harbor Road, Robinson Road and Quarry Road
- Realignment of Quarry Road and sealing through to Seaview Road
- Modifications to the Victor Harbor Road, Seaview Road and Budgens Road intersection which include changing Seaview Road to left in/left out access, whilst maintaining full access to and from Budgens Road by way of a Seagull island
- Modifications to on and off ramps at the McLaren Vale interchange
- Extending duplication through to the Tatachilla Road overpass.

Notwithstanding, RAA's preference for the Victor Harbor Road duplication project is to construct a grade separated interchange at Seaview Road/Budgens Road and restrict turn movements from Robinson Road and Quarry Road as well as other intersections. RAA considers this to be the safer option as it facilitates the option to remove all at-grade right turn movements from this section of

²Government of South Australia, 2011, Onkaparinga (City) Development Plan, Seaford Heights, Approval Development Plan Amendment, accessed at <https://www.sa.gov.au/_data/assets/pdf_file/0015/21291/Seaford-Heights-DPA-approval.pdf>.

Victor Harbor Road, whilst also providing less restricted traffic flow between Old Noarlunga and McLaren Vale. As discussed previously, a local road link from the Seaford Heights development between Bakewell Drive and Wheaton Road would need to be created, which would provide local southbound access to Victor Harbor Road at the proposed Seaview Road/Budgens Road interchange instead of at Robinson Road. This should be fully funded by the duplication project. A summary of RAA’s proposed traffic arrangements is outlined in Figure 7 below.

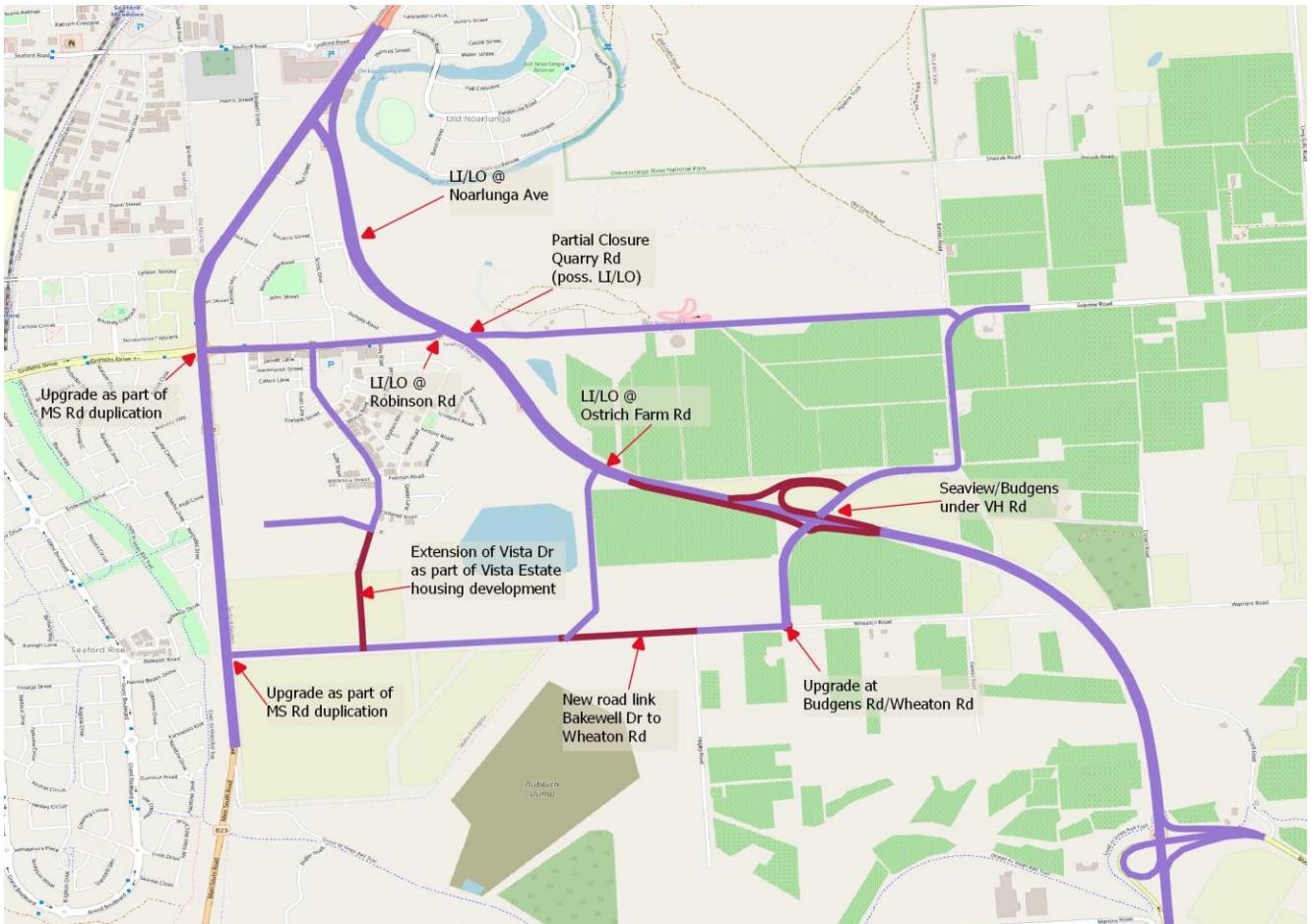


Figure 7: RAA’s traffic management proposal for the Victor Harbor Road duplication project

RAA recognises that our proposal is likely to be higher in overall cost but considers the additional safety and traffic flow benefits would be justified in the longer term.

Table 7 summarises the advantages and disadvantages of both RAA’s and DIT’s proposals for the Robinson Rd/Quarry Rd intersection and Seaview Rd/Budgens Rd intersection.

Table 7: Advantages and disadvantages of Victor Harbor Rd intersection proposals

Criteria	RAA proposal		DIT proposal	
	Advantages	Disadvantages	Advantages	Disadvantages
Efficiency	<ul style="list-style-type: none"> Unimpeded traffic flow on VH Rd through Robinson Rd Unimpeded traffic flow on VH Rd through Seaview Rd/Budgens Rd Optimised travel times between Old Noarlunga and McLaren Vale 		<ul style="list-style-type: none"> Unimpeded traffic flow on VH Rd through Seaview Rd/Budgens Rd 	<ul style="list-style-type: none"> Some impact on VH Rd traffic flow due to roundabout at Robinson Rd/Quarry Rd
Access	<ul style="list-style-type: none"> Full access at Seaview Road/Budgens Road Better access to Victor Harbor Road for future residents of Seaford Heights Vista estate 	<ul style="list-style-type: none"> Restricted (LI/LO) access at Robinson Rd/Quarry Rd Existing Quarry Rd traffic redirected to Seaview Rd (longer route) 	<ul style="list-style-type: none"> Full access at Robinson Rd/Quarry Rd Full access to/from Budgens Rd Quarry Road is a more direct route between Victor Harbor Rd and the eastern section of Seaview Rd 	<ul style="list-style-type: none"> Restricted (LI/LO) access at Seaview Rd Potential future need for upgrade at Ostrich Farm Rd or Budgens Rd to provide access from southern parts of Seaford Heights estate Quarry Road is a less direct route between Victor Harbor Rd and the western section of Seaview Rd
Safety	<ul style="list-style-type: none"> Grade separated movements at Seaview Rd/Budgens Rd Hazardous at-grade right turns eliminated at Robinson Rd/Quarry Rd 		<ul style="list-style-type: none"> Hazardous at grade right turns eliminated at Robinson Rd/Quarry Rd 	<ul style="list-style-type: none"> Confusing and hazardous intersection layout at Seaview Rd/Budgens Rd Hazardous at-grade right turns allowed to/from Budgens Rd
Cost	<ul style="list-style-type: none"> Lower construction cost at Robinson Rd/Quarry Rd 	<ul style="list-style-type: none"> Higher construction cost at Seaview Rd/Budgens Rd interchange Potentially higher overall cost 	<ul style="list-style-type: none"> Higher construction cost at Robinson Rd/Quarry Rd Potentially lower overall cost 	<ul style="list-style-type: none"> Lower construction cost at Seaview Rd/Budgens Rd
Land acquisition	<ul style="list-style-type: none"> Minimal/not required at Robinson Rd/Quarry Rd 	<ul style="list-style-type: none"> Required at Seaview Rd/Budgens Rd 	<ul style="list-style-type: none"> Minimal/not required at Seaview Rd/Budgens Rd 	<ul style="list-style-type: none"> Required at Robinson Rd/Quarry Rd for roundabout and Quarry Rd realignment
Traffic disruption during construction*	<ul style="list-style-type: none"> Minimal at Robinson Rd/Quarry Rd 	<ul style="list-style-type: none"> Moderate/High at Seaview Rd/Budgens Rd 	<ul style="list-style-type: none"> Low/Moderate at Seaview Rd/Budgens Rd 	<ul style="list-style-type: none"> Moderate at Robinson Rd/Quarry Rd

*In addition to delays caused by the overall duplication project. May vary significantly depending on construction methods used.

If this is not considered feasible due to budget or geotechnical restraints, RAA offers the following comments and recommendations on the concept design:

- Consider a right turn ban from Noarlunga Ave, restricting traffic to a left turn only and provide a separate dedicated U-turn facility for any vehicles intending to turn right. Alternatively, drivers could turn right onto Victor Harbor Road via the proposed Robinson Road roundabout.
- Reconsider the design at the intersection with Seaview Road/Budgens Road as the current concept design is likely to cause confusion amongst unfamiliar drivers and does not provide a sufficient level of safety at the current 80km/h speed limit. Whilst heavy vehicle right turn movements from Seaview Road will be removed, RAA holds concerns about the safety of right turn movements from Budgens Road, however, acknowledges the need to provide this movement as Budgens Road is the sole access point to properties in McLaren Vale, west of Victor Harbor Road. A roundabout would potentially provide a safer option and could still be designed to prohibit right turns from Seaview Road if desired.

RAA also considers it critical that a wire rope barrier is installed along the central median of Victor Harbor Road for the length of the duplication project, which will significantly reduce the likelihood of high-severity head on crashes.

Recommendation 3B

Ensure wire rope central median barrier is installed for the length of the Victor Harbor Road duplication project.

McLaren Vale – Mount Compass

On 9 March 2021, DIT announced \$3m of road resurfacing works taking place between Willunga Hill and Mount Compass which are expected to be complete by mid-2021. Whilst these works address several priority sections identified during RAA's February 2021 assessment, there are significant pavement failures including undulations, rutting, fatigue cracking and minor potholes between McLaren Vale and Willunga, particularly in both directions between Tatchilla Road and Malpas Road. RAA recommends further pavement rehabilitation works be undertaken between McLaren Vale and Willunga to address these failures.

Recommendation 4

Undertake additional pavement rehabilitation between McLaren Vale and Willunga to address the poor pavement not being addressed under the current \$3m resurfacing works on Victor Harbor Road.

At the start of 2016, A wide centreline treatment was installed between Old Willunga Hill Road and Yundi Road, incorporating a 1.2m wide centreline with central audio tactile line marking, aimed at reducing the likelihood of head on crashes occurring.

Crash data for the four years prior to installation of the wide centreline (2012-2015) shows seven casualty crashes occurring on this section, with one resulting in fatality, two resulting in serious injury and four resulting in minor injury. Two of these (both minor injury) occurred at the intersection with Pages Flat Road, and the remaining five crashes were head on crashes.

Crash data for the four years following installation of the wide centreline (2016-2019) shows four casualty crashes occurring on this section, each resulting in minor injury. Two of these were

intersection crashes, one at Black Billy Road and one at Pages Flat Road, one involved a collision with an animal, and one involved a collision between a car and a guard rail.

Given this data, RAA considers this treatment to be a resounding success, highlighting the demonstrable safety benefits that can be achieved by installation of wide centre line treatments in challenging curvilinear geometry environments.



Figure 8: Wide centre line between Old Willunga Hill Road and Yundi Road has been effective at reducing head on crashes

In the mid to long term, duplication of Victor Harbor Road between McLaren Vale and Mount Compass will be required. While current traffic volumes and crash data currently make this a lower priority than other road safety upgrades and duplication projects across South Australia, provision should nonetheless be made for this in terms of a suitable design to meet future growth and demand.

The 7km McLaren Vale to Willunga section will be a relatively straightforward duplication project, with the most significant challenge duplication of the Willunga interchange at Aldinga Road. Current average daily traffic volumes of 13,200 vehicles per day indicate that sufficient overtaking lanes should provide an adequate level of service. Between 2011 and 2019, daily traffic volumes increased annually by an average of 4.9% (9,500 to 13,200). Should this rate of growth continue, RAA would expect duplication to be required between 2031 and 2035.

Between Willunga and Mount Compass, an overtaking lane is present for 49% of the journey travelled in each direction, with long overtaking lanes present in both directions at Willunga Hill and just south of Yundi Road. Current average daily traffic volumes are 12,500 between Aldinga Road and Old Willunga Hill Road and 11,600 south of Old Willunga Hill Road. Duplication of 3.5km between Old Willunga Hill Road and Yundi Road would result in a four-lane road between Willunga and just north of Mount Compass, with intersection upgrades and the topography providing challenges to duplicating this section. Between 2011 and 2019, daily traffic volumes increased annually by an average of 4% (8,800 to 11,600). Should this rate of growth continue, RAA would expect duplication to be required between 2035 and 2039.

Recommendation 5

Plan and prepare for future duplication of Victor Harbor Road to Mount Compass.

Mount Compass – Victor Harbor

The section of Victor Harbor Road between Mount Compass and Victor Harbor is about 20km long and differs to the remainder of Victor Harbor Road due to its challenging curvilinear geometry, which is less prevalent north of Mount Compass.

Along the 15km section between Goolwa Road and Hindmarsh Tiers Road, Victor Harbor Road consists of moderate curvature, typically with minimum radii of around 400m, which can usually be traversed between 70km/h and 90km/h. Some tighter curves have radii closer to 200m, which can require speeds lower than 70km/h to traverse safely, especially for heavy vehicles. RAA considers that curves on Victor Harbor Road are appropriately signposted with curve warning signs and advisory speed limits.

Between 2015 and 2019, 38 casualty crashes occurred on this 15km section, of which 10 resulted in at least one fatality or serious injury (FSI), giving this stretch a rate of 5.1 FSI crashes per 100 million vkt over the past five years.

Austrroads 2020 guide, *Network Design for Road Safety (Stereotypes for Cross-sections and Intersections User Guide)*³ details typical FSI crash rates for cross-sectional road stereotypes. In this guide, the predicted number of FSI crashes per 100 million vkt for a high-volume rural highway (road stereotype no. 3), moderate curvature, 3.5m lanes and 1.0m shoulders without wide centreline treatments or audio tactile edge lines is 3.29. The current rate of 5.1 significantly exceeds the expected value for a road like Victor Harbor Road.

Whilst the current sealed width is generally between 8 and 9 metres, a consistent 10m sealed width could accommodate 3.5m wide lanes with a 1.0m wide centre line and 1.0m wide sealed shoulders, which gives an expected FSI rate of 2.05 FSI crashes per 100m vkt. Not accounting for future growth in traffic volumes, this could result in at least 22 fewer FSI crashes over the next 20 years, or an economic benefit of \$29m. This figure is obtained when using a willingness-to-pay FSI crash cost of \$1.3m as highlighted in Table C.2 of the Austrroads report converted to 2020 dollar values.

Recommendation 6

Widen Victor Harbor Road south of Mount Compass to achieve a minimum 13.0m seal width incorporating 2.0m wide shoulders, 3.5m lanes and 2.0m wide centre line with wire rope central barrier. If this cannot be justified economically, as an absolute minimum, a sealed width of 10.0m incorporating 3.5m wide lanes, 1.0m wide sealed shoulders and a 1.0m wide centre line (with wire rope barrier) must be achieved to ensure safer travel on this section of Victor Harbor Road.

Intersection warning signage, particularly W2-1 (crossroad) and W2-4 (side road intersection) is consistently outdated between Mount Compass and Victor Harbor. RAA recommends that this be reviewed and updated as necessary to current standards outlined in AS1742.2. The current warning signs incorporating an arrowhead are much clearer regarding priority movements at intersections.

³ Austrroads, 2020, *Network Design for Road Safety (Stereotypes for Cross-sections and Intersections): User Guide*, pp37, accessed at < <https://austrroads.com.au/publications/road-design/ap-r619-20>>.

Recommendation 7

Review and update as necessary all W series intersection warning signs between Mount Compass and Victor Harbor to align with current Australian Standard AS1742.2.

W-beam roadside crash barriers were being installed at strategic locations in Mount Jagged at the time of our assessment. Whilst RAA welcomes these installations to reduce crash severity, it is critical that care be given to their placement to ensure the barriers do not restrict sight distance or inhibit access from side roads and property access points, as has been the case in some installations. It was observed that the majority of these barriers do not incorporate motorcycle underrun protection, which should be included on all new installations and retrofitted to existing installations.

Recommendation 8A

Ensure motorcycle underrun protection is incorporated into all new barrier installations and retrofitted to existing barriers, prioritising curved sections.

Furthermore, RAA recommends continued rollout of safety barriers incorporating motorcycle underrun protection on Victor Harbor Road to ensure that all drivers and riders are protected from all fixed roadside hazards.

Recommendation 8B

Continued rollout of safety barriers incorporating motorcycle underrun protection to ensure that drivers and riders are protected from all fixed roadside hazards where removal of the hazard is not possible or desirable.

Nangkita Road intersection

RAA reviewed the intersection with Nangkita Road in Mount Compass. Line marking was faded to the point where it is scarcely visible, and RAA recommends that line marking be refreshed to reduce confusion, improve delineation and emphasise safe holding points at the intersection.



Figure 9: Faded line marking at the Intersection with Nangkita Road in Mount Compass

Recommendation 9A

Refresh line marking at the intersection with Nangkita Road in Mount Compass.

It was also observed that the w-beam crash barrier on the south eastern corner of the intersection was sitting too low to be effective in the event of a crash and RAA recommends that this be replaced and installed at an appropriate height (approx. 1.2m) above the road surface.

Recommendation 9B

Replace w-beam crash barrier on the southeastern corner of the intersection with Nangkita Road in Mount Compass.

Further improvements to this intersection may also need to be made to facilitate safer freight movements as Nangkita Road is a key freight corridor in the Fleurieu Peninsula Region and gazetted for b-double use. The current intersection location is poor due to road geometry and topographic issues, and intersection realignment or a partial freight bypass of Mount Compass are considerations to improve heavy vehicle safety and efficiency in Mount Compass.

Recommendation 9C

Monitor freight movements at the intersection with Nangkita Road and consider an upgrade or realignment of the intersection to facilitate safer freight movement through Mount Compass.

Goolwa Road intersection

The intersection with Goolwa Road was raised several times throughout the community survey, and by members of the public whilst undertaking site inspections, despite the intersection receiving an upgrade in late 2020 prior to when the community survey was undertaken. Typical responses mostly related to restricted sight distance due to the crest just north of the intersection, with some examples of feedback received included below.

“This intersection has just been 'upgraded' which meant the installation of lights. This new design has resulted in the (heading south) VH Road dipping down and veering around. This appears to the people waiting at Goolwa Rd to turn right (North) onto the VH road that the vehicles are turning when they are in fact going straight ahead. We have had people pull out in front of us more times that I can count, including in the semi - there was a lot of rubber left on the road and how that didn't eventuate in a fatality to this day we do not know.”

“When turning right (north) from Goolwa road it is hard to see oncoming traffic because there is a rise that does not allow a clear view of oncoming vehicles. Note that it's fine if you travel in an SUV, which I don't!”

“Tourists coming to Mt Compass from Goolwa don't realise you can turn right into a slip lane. Sometimes 6 cars waiting for both lanes to clear before turning right.”

“The recently upgraded intersection has made very little improvement. Cars still turn right from Goolwa road towards Mt Compass without due care, directly in front of cars passing straight through to Victor Harbor.”

Between 2015 and 2019, there were three casualty crashes at the intersection with Goolwa Road. In each case, the crash involved a westbound vehicle on Goolwa Road failing to give way to a southbound vehicle on Victor Harbor Road. The intersection was upgraded at the end of 2020 to provide LED street lighting and an improved left turn slip lane from Victor Harbor Road onto Goolwa Road whilst also clearing some vegetation. This change in slip lane layout improves safety by ensuring that vehicles in the slip lane do not conceal southbound vehicles continuing straight through the intersection on Victor Harbor Road. The images below show the intersection before and after the upgrade.



Figure 10: Goolwa Road intersection looking North, before the 2020 upgrade (Image Google Maps: 2014)



Figure 11: Goolwa Road intersection looking north, after the 2020 upgrade (Image: RAA, 2021)

Whilst this upgrade is welcome, it did not address sight distance issues posed by the crest directly north of the intersection or deficiencies with a seagull intersection in a high-speed rural setting. As seen in Figure 11, which was taken from a typical driver's eye height 1.2m above the road surface, the crest obscures the presence of southbound vehicles travelling through the intersection. Whilst minimum sight distance requirements are still met in the revised layout, rural seagull intersections tend to have a higher than expected crash rate involving vehicles turning right from the side road into the path of through vehicles on the nearside.

Two examples of this layout providing very poor safety performance in South Australia are the Sturt Highway/Old Sturt Highway intersection in Barmera, and the Augusta Highway/Copper Coast Highway intersection in Port Wakefield, with the latter currently having an overpass constructed, and the former flagged for major upgrade (likely to be a roundabout) as part of a package of works along the length of Sturt Highway.

RAA recommends a large roundabout be installed at this intersection, which would further improve safety by reducing travel speeds in the immediate vicinity of the intersection whilst improving impact angles. A speed limit of 80km/h between Mount Compass and the intersection would need to be applied to ensure travel speeds around the roundabout were appropriate, sight distance to the roundabout is adequate and to allow for a smaller roundabout footprint. Similar examples of roundabouts in a rural setting include the Victor Harbor Road/Waterport Road roundabout in Victor Harbor, the Copper Coast Highway/Yorke Highway roundabout on the Yorke Peninsula or the Onkaparinga Valley Road/Woodside Road roundabout in the Adelaide Hills, which have all significantly improved safety at their respective locations.



Figure 12: RAA concept sketch of a roundabout at the Victor Harbor Road/Goolwa Road intersection (22m central island radius used)

Realignment of Goolwa Road and Saleyard Road to create a four-way roundabout should be explored as part of this process, to provide safer access and egress to Saleyard Road and the Mount Compass Saleyards.

As an indication of potential cost, the Woodside roundabout cost \$3.3m in 2016, whilst the Victor Harbor Roundabout was almost \$4.5m in the same year. The Yorke Peninsula roundabout cost \$4m in 2017. RAA considers a roundabout at the Goolwa Road intersection would come in at around \$4m, pending final design.

Recommendation 10

Install a roundabout at the intersection with Goolwa Road.

Crows Nest Road intersection

The intersection with Crows Nest Road is located on the outside of one of the tighter curves along Victor Harbor Road, which creates sight distance issues when turning onto Victor Harbor Road or turning right onto Crows Nest Road, compounded by a crest to the north. Sight distance for northbound traffic to the rear of a vehicle waiting to turn right onto Crows Nest Road is also poor. Although the western shoulder of Victor Harbor Road has been widened to allow northbound vehicles to pass a stationary vehicle turning right, safety would be improved further by installing a channelised right turn lane onto Crows Nest Road.

Recommendation 11A

Install a channelised right turn lane for traffic turning right from Victor Harbor Road onto Crows Nest Road.

To improve poor sight distance from Crows Nest Road, vegetation on the western side of Victor Harbor Road should also be cleared to ensure maximum possible sight lines to approaching traffic.

Recommendation 11B

Clear vegetation on Victor Harbor Road to improve sight distance when turning from Crows Nest Road.

It was also noted that W2-9 (side road intersection on a curve) signage on approach to the intersection was outdated and required updating to the current standard as outlined in AS1742.2.

Recommendation 11C

Update W2-9 (side road intersection on a curve) intersection warning signs approaching Crows Nest Road to align with current Australian Standard AS1742.2.

Hindmarsh Tiers Road intersection

The intersection with Victor Harbor Road, Hindmarsh Tiers Road and Virgin Road in Hindmarsh Valley is a typical regional four-way intersection. Virgin Road is a minor local access road, whilst Hindmarsh Tiers Road is a key arterial route between Victor Harbor and Myponga on the western Fleurieu Peninsula.

Between 2015 and 2019, three injury crashes occurred at this intersection, with each involving a vehicle turning from Hindmarsh Tiers Road failing to give way to northbound traffic on Victor Harbor Road. Tragically, on 8 April 2021, a fatal crash occurred at this intersection involving a vehicle entering Victor Harbor Road from Hindmarsh Tiers Road and a northbound vehicle on Victor Harbor Road.

A channelised left turn lane from Victor Harbor Road onto Hindmarsh Tiers Road was installed in 2014, with the remainder of turn movements required to be made from the through lanes.

Whilst sight distance from Hindmarsh Tiers Road meets minimum requirements, crests north and south of the intersection impede clear sight distance and can obscure vehicles on Victor Harbor Road approaching the intersection. RAA considers a roundabout to be an appropriate safety treatment at this intersection, similar in design to the roundabout located 2km south, at the intersection with Welch and Waterport Roads. This would require an extension of the 80km/h speed limit from Welch Road to Hindmarsh Tiers Road.

Recommendation 12A

Install a roundabout at the intersection with Hindmarsh Tiers Road.

It was also noted that W2-1 crossroad intersection warning signs on Victor Harbor Road were outdated and require updating to the current standard as outlined in AS1742.2.

Recommendation 12B

Update W2-1 crossroad intersection warning signs approaching Hindmarsh Tiers Road to align with current Australian Standard AS1742.2.

AusRAP star ratings

Dividing Victor Harbor Road into north and south, either side of Mount Compass, the star rating of the corridor varies dramatically. North of Mount Compass, Victor Harbor Road would generally be rated three stars, with isolated four and five star sections. South of Mount Compass, the road is typically only rated one or two stars. On the southern section, straights with some level of roadside hazard protection are rated two stars, whilst curves, or sections with exposed roadside hazards are typical one star sections of road. Key factors influencing this star rating the most are the presence of curves and crests, the proximity and frequency of roadside hazards, and the 100km/h speed limit.

The figures below highlight the various influencing factors and varying road conditions along the length of Victor Harbor Road, with examples of various star ratings between one and five stars present along the length of the corridor. Having such varying conditions along the corridor can make it more challenging for drivers to judge the road environment and drive to the prevailing conditions. This is a particular issue on low star rated sections, where drivers may expect a safer road environment based on their experiences several kilometres earlier



Figure 13: Example of a one star AusRAP star rating on Victor Harbor Road in Mount Jagged



Figure 14: Example of a two star AusRAP star rating on Victor Harbor Road in Hindmarsh Valley

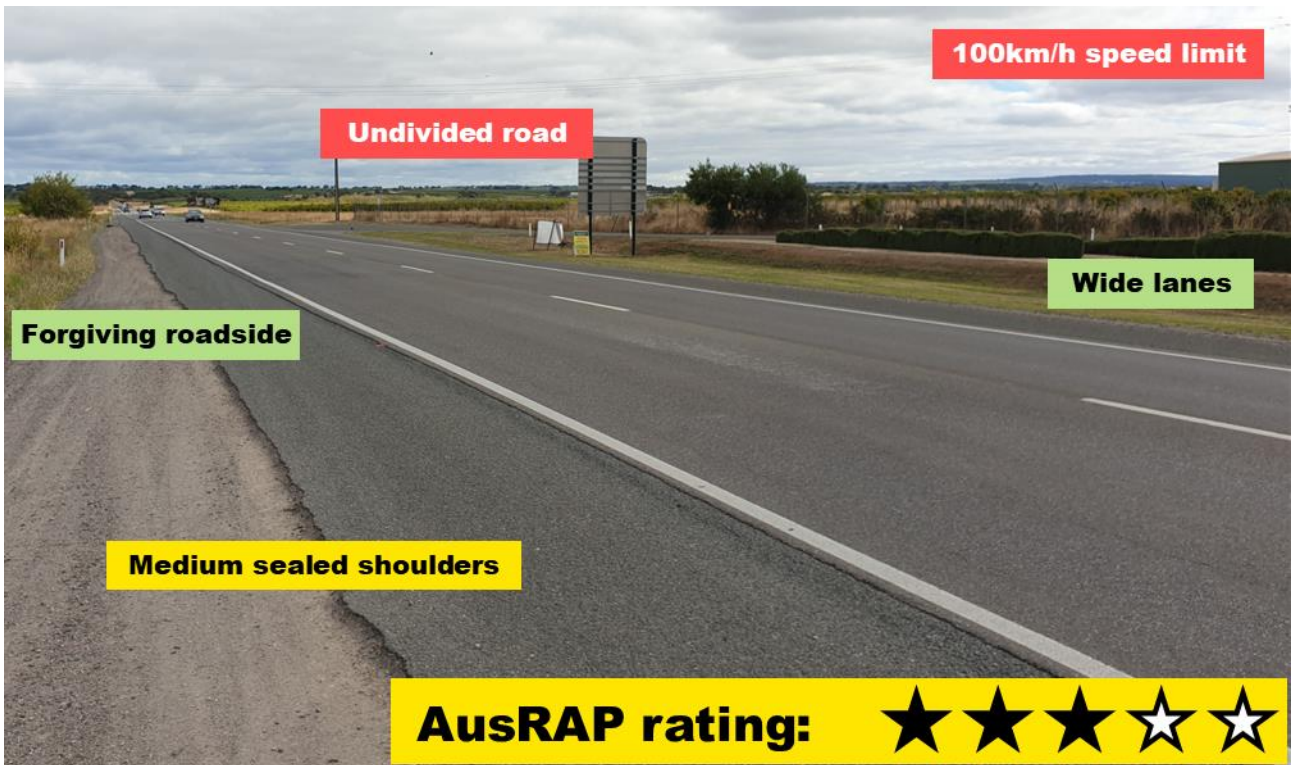


Figure 15: Example of a three star AusRAP star rating on Victor Harbor Road in Willunga

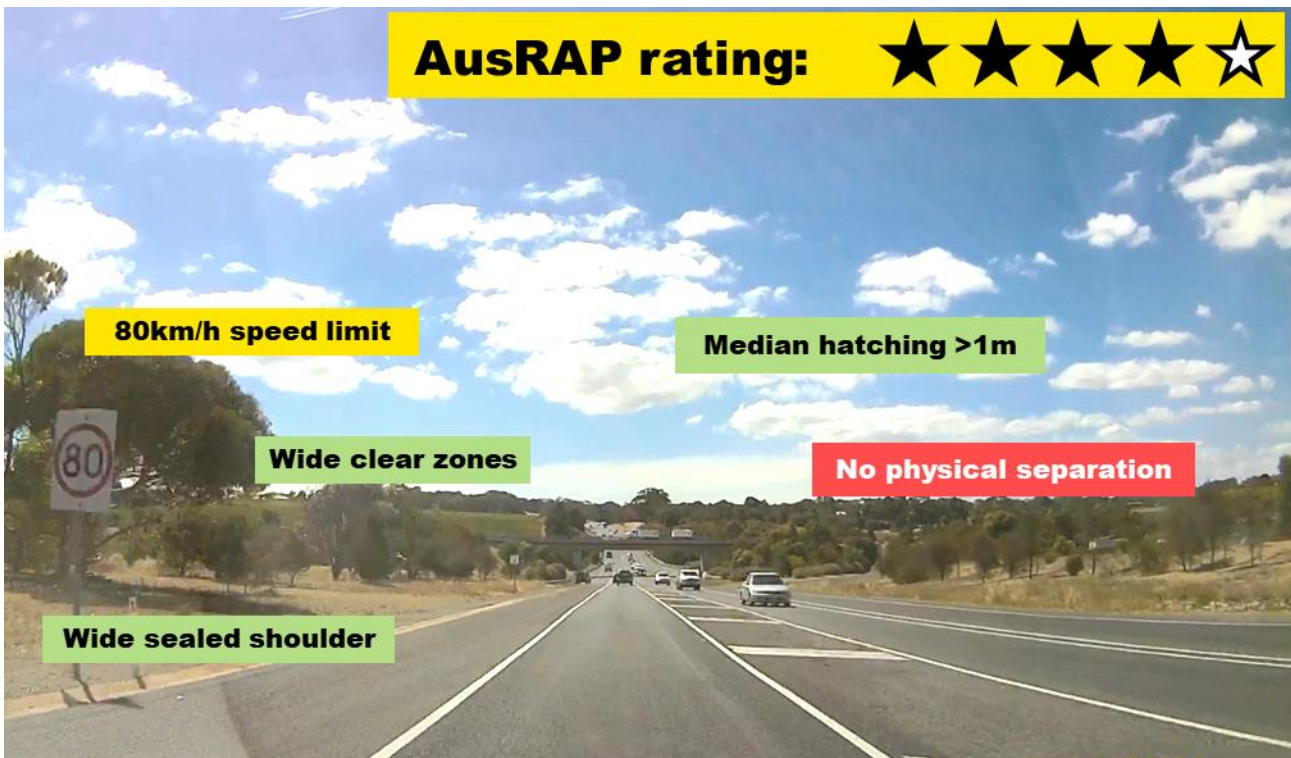


Figure 16: Example of a four star AusRAP star rating on Victor Harbor Road in McLaren Vale

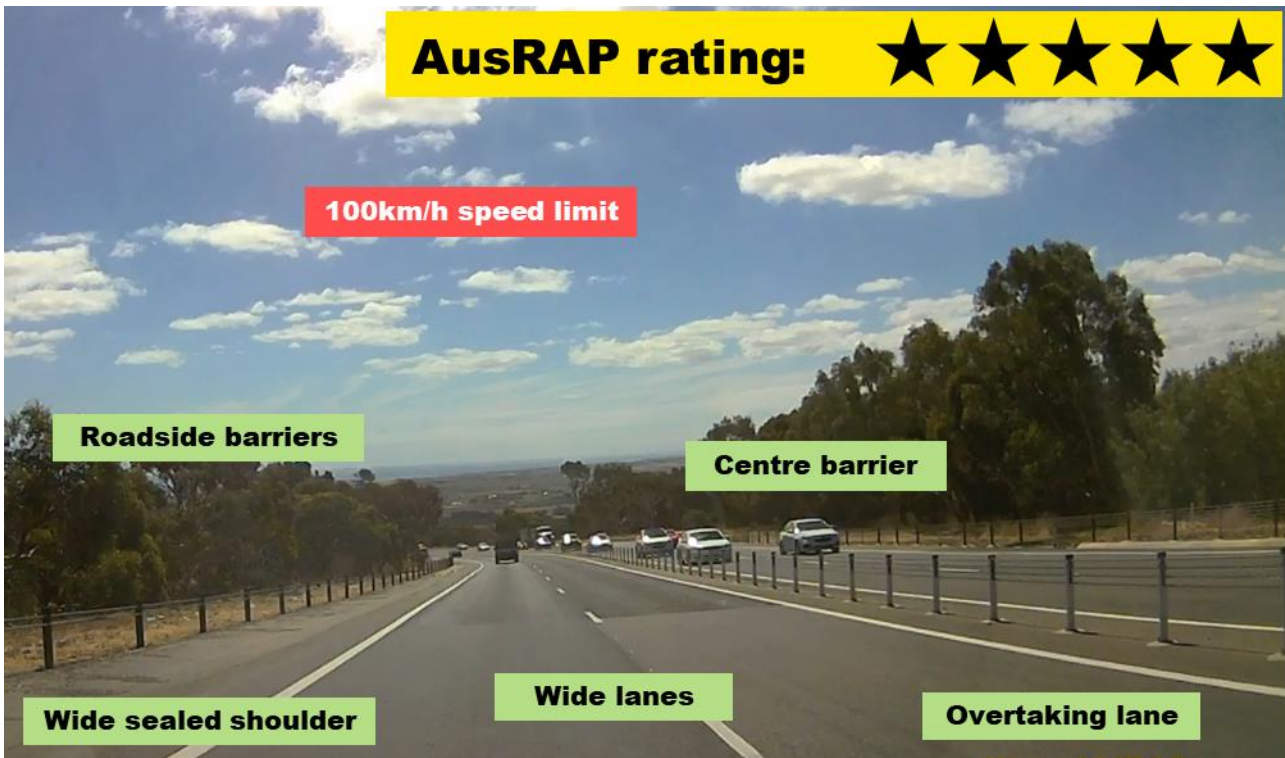


Figure 17: Example of a five star AusRAP star rating on Victor Harbor Road at Willunga Hill

Adopting infrastructure recommendations made throughout this report would ensure a minimum three star rating (four stars on straights) is achieved for Victor Harbor Road, with the key influencing factors being the introduction of a wire rope centre barrier and additional roadside barriers in conjunction with road widening.

South of Mount Compass, a speed limit reduction to 80km/h in isolation would achieve a similar star rating, with sections of two and three stars on curves and up to four stars on straights.

Recommendation 13

Ensure safety upgrades to Victor Harbor Road achieve a minimum three star AusRAP star rating for the entire corridor.

Speed limits

Victor Harbor Road generally operates under the rural default speed limit of 100km/h in non-built-up areas. The section north of McLaren Vale is subject to an 80km/h speed limit, which reduces to 60km/h just south of the intersection with Robinson Road. 80km/h buffer zones are also used north and south of Mount Compass to ease drivers into the 60km/h speed limit through Mount Compass.

Table 8: Speed limits on Victor Harbor Road

Segment	Speed limit (km/h)
Main South Rd – Robinson Rd	60
Robinson Rd – McLaren Vale	80
McLaren Vale – Mt Compass	100
Mt Compass	80 – 60 – 80
Mt Compass – N of Welch Rd (Victor Harbor)	100
Welch Rd – N of Agnes Gillespie Dr	80
Agnes Gillespie Dr – Port Elliot Rd	60

Several issues were identified with the 100km/h speed limit just north of Mount Compass, between a small reserve/rest area situated at the northern end of Peters Terrace and Sand Mine Road.

Firstly, the unsealed exit from the rest area on to Victor Harbor Road is situated immediately south of the 100km/h speed sign and vegetation also restricts sight distance, increasing the risk associated with entering Victor Harbor Road at this point.

Secondly, the Sand Mine Road intersection, which provides access to the Mount Compass trade park and services several businesses including quarries, generates freight movements to and from Victor Harbor Road. Sand Mine Road also provides access to the Mount Compass Golf Course for visitors approaching from the north. The intersection is located on a sweeping curve and sight lines are not ideal. An 80km/h speed limit through this intersection will allow for longer gap acceptance times and improve safety.

Extending the existing 80km/h speed limit from the Peters Terrace reserve to just west of Sand Mine Road would improve safety along this section and at both intersections as well as at several property access points. Consideration should also be given to extending this speed limit an additional 600m to a point north of Lanacoona Road, which provides access to popular tourist destination, 'Harvest the Fleurieu', a quarry, farmland and residential properties.

Recommendation 14A

Extend the north-western 80km/h speed zone in Mount Compass by 400m to the west, to reduce the speed of vehicles to improve safety at the Peters Terrace reserve exit point and Sand Mine Road intersections. Consideration should also be given to extending this an additional 600m north beyond Lanacoona Road to improve safety at this intersection.

RAA also suggests that the 60km/h speed limit signs just east of Tay Road be shifted approximately 100m west to a point north west of Tay Road. This will create safer access and egress to Victor Harbor Road from Tay Road for Mount Compass residents, the majority of whom must use this intersection to access Victor Harbor Road.

Recommendation 14B

Extend the Mount Compass 60km/h speed zone by 100m to the north west to improve safety at the Tay Road intersection by reducing the approach speed of vehicles.

Furthermore, if infrastructure treatments to improve safety identified in this report are not deemed to be economically feasible between Mount Compass and Victor Harbor, a reduction in speed limit must instead be considered for the entire length of Victor Harbor Road between Mount Compass and Victor Harbor to reduce the likelihood and severity of crashes occurring on this dangerous section of road.

RAA have undertaken travel time tests on the 19.4km long 100km/h zone in each direction to determine the impact a speed reduction would have on travel times between Mount Compass and Victor Harbor. From this testing, it was determined that an average passenger vehicle driver driving in clear conditions would travel between 80km/h and 90km/h 14.5% of the time, and greater than 90km/h 84.5% of the time. The survey vehicle travelled lower than 80km/h for only 1% of the overall journey. RAA therefore considers that 80km/h is a realistic approximation for the minimum speed for most curves, and travel time runs were not undertaken at 80km/h as to avoid causing delays to other traffic. Instead, a travel time for 80km/h was calculated assuming an average speed of 79km/h over 19.4km.

The measured and calculated travel times displayed in Table 9 below.

Table 9: Travel time test results – 80km/h vs 100km/h on Victor Harbor Road between Mount Compass and Victor Harbor

Posted speed limit	Travel time	Average speed	Travel time differential
80km/h	14m:43s (calculated)	79.0km/h	2m:18s
100km/h	12m:25s (measured)	93.7km/h	

For the 100km/h test, vehicle speed and associated GPS coordinates were recorded using RAA’s Vericom VC4000DAQ accelerometer on a pass of Victor Harbor Road in each direction with clear headway. The average speed of a test in both the north and south direction was used to provide the ‘measured’ travel time. Figure 18 below shows the recorded travel speeds for the northbound travel time run.

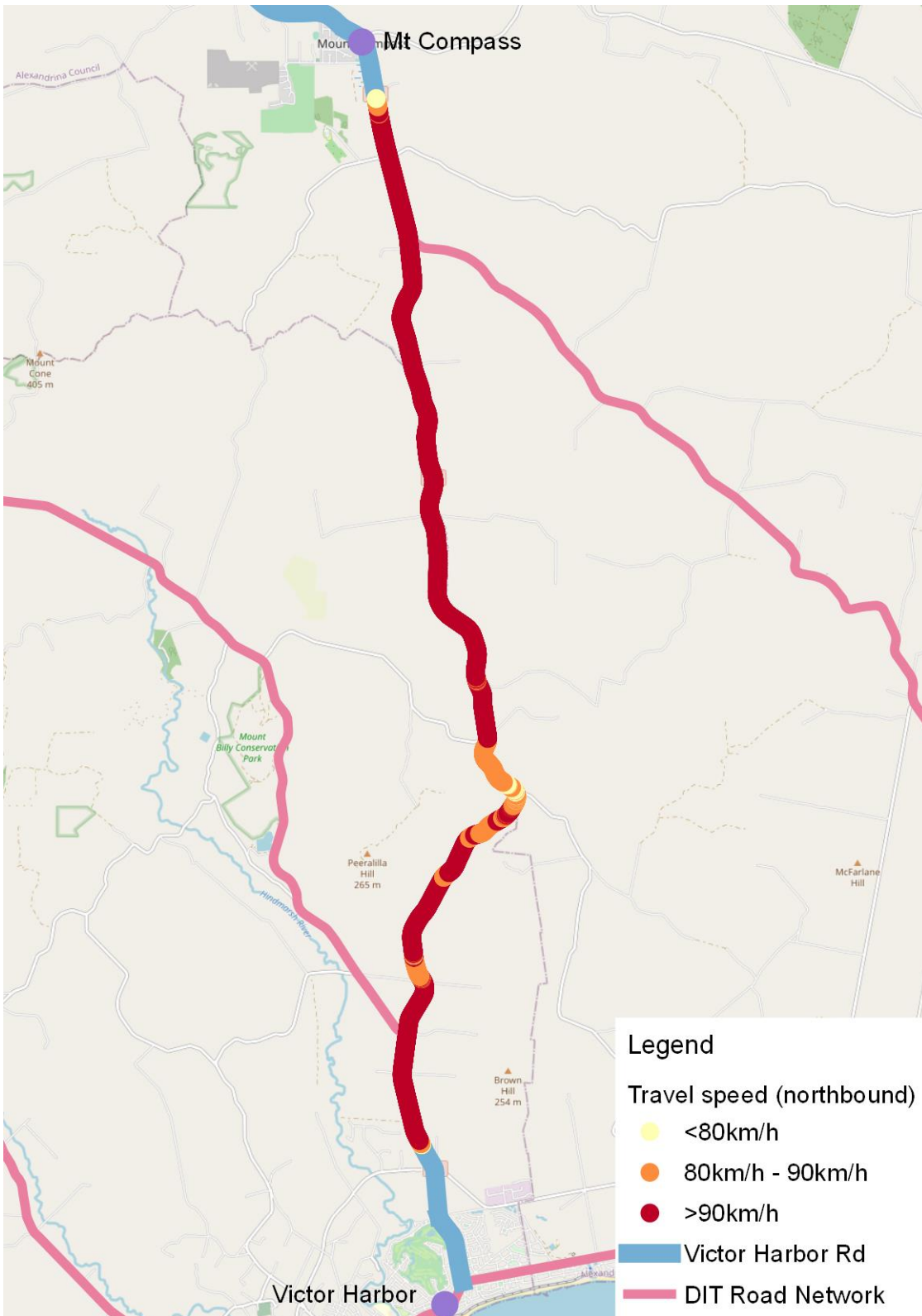


Figure 18: Northbound travel speeds measured on Victor Harbor Road between Victor Harbor and Mount Compass

Summary of recommendations for Victor Harbor Road

Recommendation 1

Widen shoulder seal to at least 2.0m wide north of Mount Compass, where this width has not already been attained.

Recommendation 2

Ensure that current funding provided for overtaking lanes on Victor Harbor Road contributes to providing at least two more overtaking lanes of substantial length between Mount Compass and Victor Harbor, with wire rope median barriers dividing opposing traffic.

Recommendation 3A

As part of the Victor Harbor Road duplication project, construct a grade separated interchange at the intersection with Victor Harbor Road, Seaview Road and Budgens Road. This should be undertaken in conjunction with other improvements suggested in this report including a new link road between Bakewell Drive and Wheaton Road and right turn restrictions at the Robinson Road and Quarry Road intersection.

Recommendation 3B

Ensure wire rope central median barrier is installed for the length of the Victor Harbor Road duplication project.

Recommendation 4

Undertake additional pavement rehabilitation between McLaren Vale and Willunga to address the poor pavement not being addressed under the current \$3m resurfacing works on Victor Harbor Road.

Recommendation 5

Plan and prepare for future duplication of Victor Harbor Road to Mount Compass.

Recommendation 6

Widen Victor Harbor Road south of Mount Compass to achieve a minimum 13.0m seal width incorporating 2.0m wide shoulders, 3.5m lanes and 2.0m wide centre line with wire rope central barrier. If this cannot be justified economically, as an absolute minimum, a sealed width of 10.0m incorporating 3.5m wide lanes, 1.0m wide sealed shoulders and a 1.0m wide centre line (with wire rope barrier) must be achieved to ensure safer travel on this section of Victor Harbor Road.

Recommendation 7

Review and update as necessary all W series intersection warning signs between Mount Compass and Victor Harbor to align with current Australian Standard AS1742.2.

Recommendation 8A

Ensure motorcycle underrun protection is incorporated into all new barrier installations and retrofitted to existing barriers, prioritising curved sections.

Recommendation 8B

Continued rollout of safety barriers incorporating motorcycle underrun protection to ensure that drivers and riders are protected from all fixed roadside hazards where removal of the hazard is not possible or desirable.

Recommendation 9A

Refresh line marking at the intersection with Nangkita Road in Mount Compass.

Recommendation 9B

Replace w-beam crash barrier on the southeastern corner of the intersection with Nangkita Road in Mount Compass.

Recommendation 9C

Monitor freight movements at the intersection with Nangkita Road and consider an upgrade or realignment of the intersection to facilitate safer freight movement through Mount Compass.

Recommendation 10

Install a roundabout at the intersection with Goolwa Road.

Recommendation 11A

Install a channelised right turn lane for traffic turning right from Victor Harbor Road onto Crows Nest Road.

Recommendation 11B

Clear vegetation on Victor Harbor Road to improve sight distance when turning from Crows Nest Road.

Recommendation 12A

Install a roundabout at the intersection with Hindmarsh Tiers Road.

Recommendation 12B

Update W2-1 crossroad intersection warning signs approaching Hindmarsh Tiers Road to align with current Australian Standard AS1742.2.

Recommendation 13

Ensure safety upgrades to Victor Harbor Road achieve a minimum three star AusRAP star rating for the entire corridor.

Recommendation 14A

Extend the north-western 80km/h speed zone in Mount Compass by 400m to the west, to reduce the speed of vehicles to improve safety at the Peters Terrace reserve exit point and Sand Mine Road intersections. Consideration should also be given to extending this an additional 600m north beyond Lanacoona Road to improve safety at this intersection.

Recommendation 14B

Extend the Mount Compass 60km/h speed zone by 100m to the north west to improve safety at the Tay Road intersection by reducing the approach speed of vehicles.