REDUCING ROAD TRAUMA IN MURRINDINDI SHIRE

ROAD SAFETY STRATEGY 2023-2030

Murrindindi Shire Council

ROAD SOLUTIONS

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1 BACKGROUND

1.1 INTRODUCTION

Murrindindi Shire is a rural shire council in Victoria, home to around 15,000 people. In developing the shire's strategic development direction, the "Shaping Our Future" community engagement project identified that one of the strong desires of the community is for the council to focus on a healthy and connected community. This focus lies at the heart of this new strategy.

Mobility is one of the most basic needs of humans. Unfortunately, road trauma can happen as people travel and often leaves a deep scar in the community. Murrindindi Shire, which has a large high-speed road network, variable road conditions, and high traffic volumes during peak season, is not an exception. In fact, Murrindindi has the highest crash rate per 1,000 residents among the rural shires in Victoria (Figure 4). However, road trauma is preventable. Recognising this, the Murrindindi Road Safety Strategy 2023-2030 has been developed to guide the creation of a safe travel environment for all people by mitigating fatal and serious injury crash risks on Murrindindi roads, through understanding the past, present, and future road safety challenges in Murrindindi Shire up to 2030.

In order to develop this new Strategy, all related strategies, plans, and information on basic characteristics of the Murrindindi Shire were collected and investigated to provide an understanding of the background on key issues. Next, a clear vision and principles were set for the strategy to align with the National and State road safety vision and Safe System principles. This strategy was further guided by the analysis of current safety issues on Murrindindi roads based on the recorded crash data as well as community and stakeholders' feedback. Following the findings of this analysis, seven safety improvement goals have been identified, together with the required actions to achieve the goals as well as safety performance indicators to measure the success of the plan.

1.2 ABOUT MURRINDINDI SHIRE

Murrindindi is a rural shire council, located north-east of the Melbourne Metropolitan Area (Figure 1). The total population in Murrindindi is around 15,000 people based on 2021 data (Census of Population and Housing, 2021). The shire spreads across an area of 3,879 square kilometres with a majority of the land being agricultural and national parks. Some of the major rural townships in Murrindindi are Alexandra, Buxton, Eildon, Kinglake, Marysville, Molesworth, Narbethong, Taggerty, Thornton, Toolangi, Yarck, and Yea.

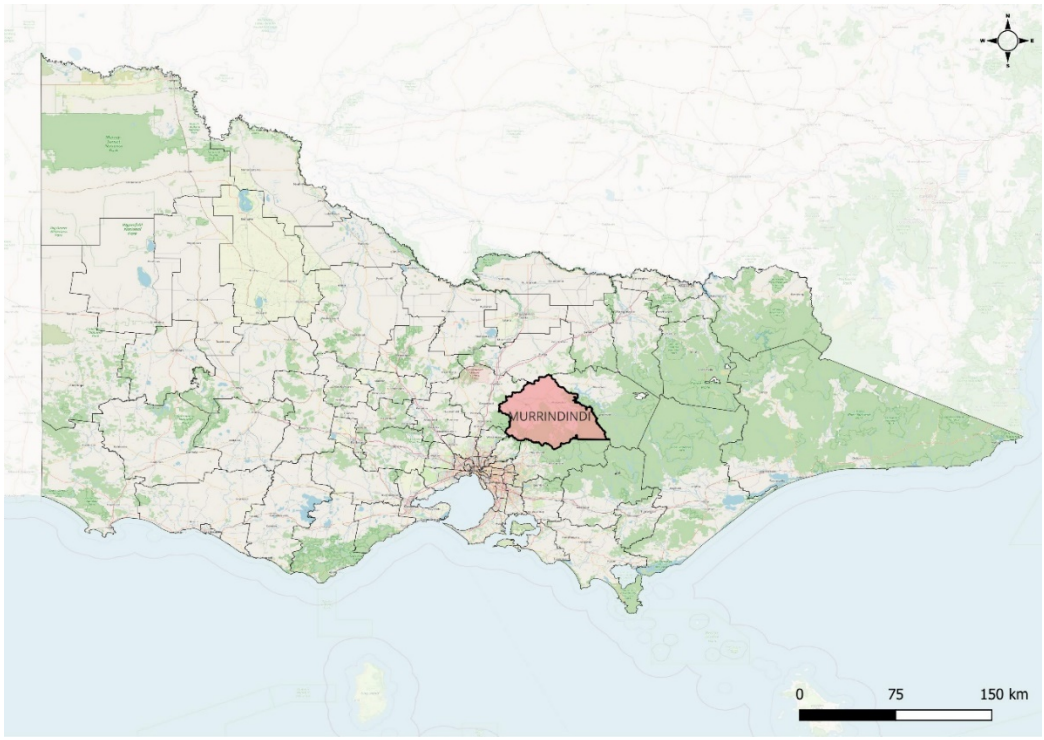

Figure 1: Murrindindi Shire location

Murrindindi's road network consists of major arterial networks under Rural Roads Victoria management, local roads under Council management, and other roads such as the national park's roads and tracks (Figure 2) managed by the Department of Environment Energy and Climate Action (DEECA). The total length of the Department of Transport and Planning (DTP) road network is around 490km and the Council managed network is around 1,293km. The total network length is around 6,722km, with the remaining network comprising mainly of national park's roads and tracks.

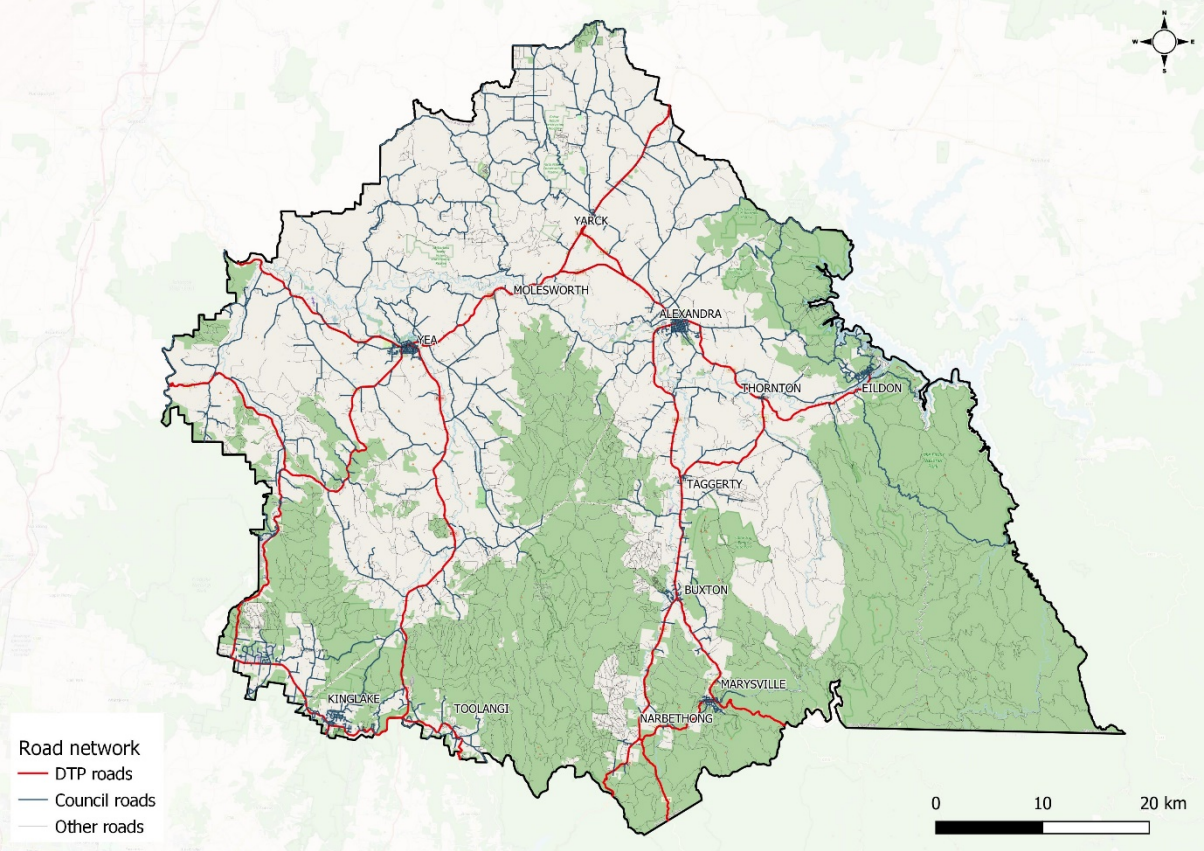

Figure 2: Murrindindi Shire road network

The arterial road network in Murrindindi consists of 11 major roads:

- Whittlesea-Yea Road
- Broadford-Flowerdale Road
- Melba Highway
- Maroondah Highway
- Acheron Way
- Marysville Road
- Marysville-Woods Point Road
- Buxton-Marysville Road
- Goulburn Valley Highway
- Maroondah Link Highway
- Taggerty-Thornton Road

The majority of Murrindindi residents are around the late middle age and the retirement age group (from 45 to 74 years old) (Figure 3). There is an older population in Murrindindi compared to the whole of Victoria.

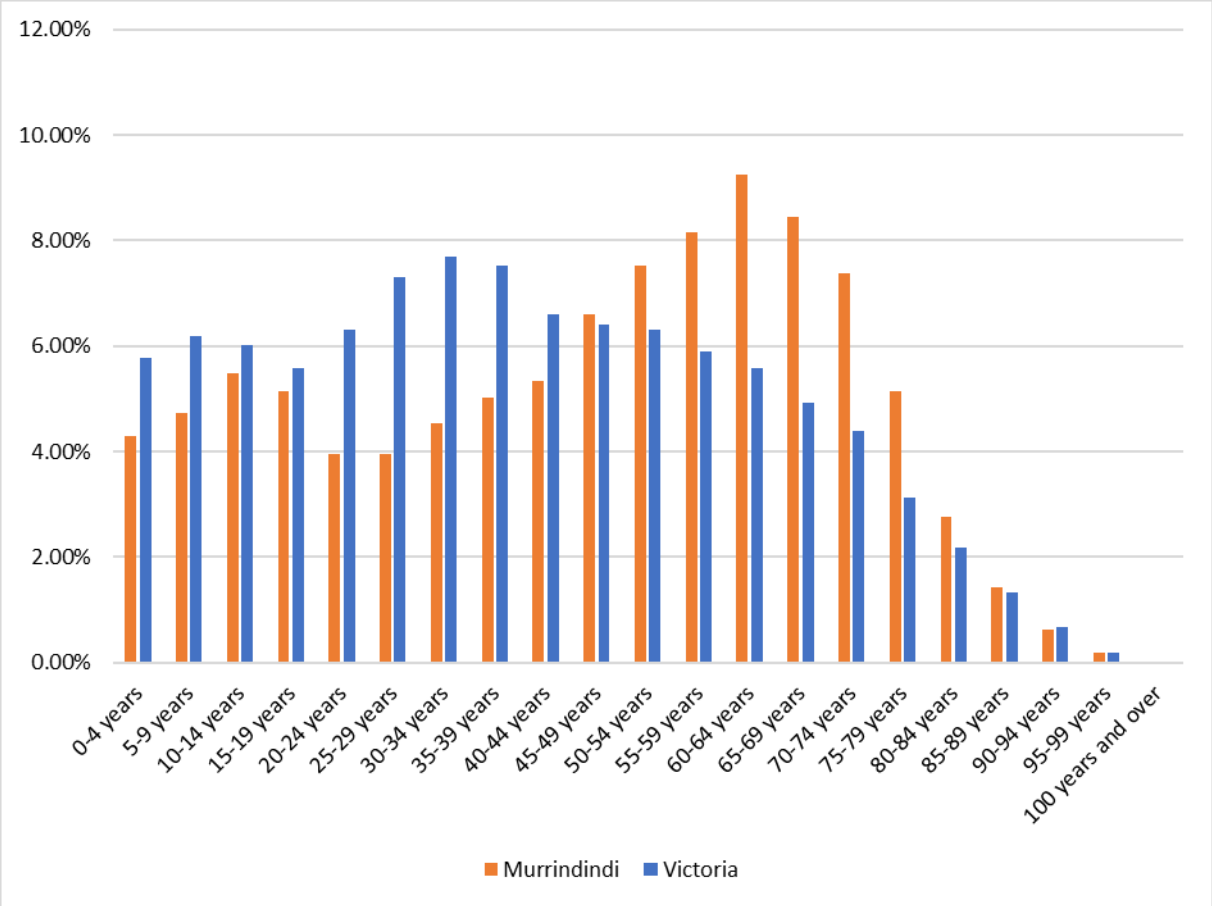

Figure 3: Murrindindi age distribution (2021 census)

The main mode of travel to work is as a car driver which accounts for around 84% of the total commute trips (2021 census). The majority of dwellings in Murrindindi have at least one motor vehicle.

Murrindindi Shire is a popular destination for tourists in Victoria. According to the Tourism and Events Strategy, there were more than one million visitors to the Shire in 2018, a number that is set to grow in future. This growth necessitates the development of adequate facilities and the assurance of a safe and enjoyable visitor experience, including accommodation for walkers and cyclists. However, the Council Asset Plan indicates that financial constraints may hinder the fulfilment of these aspirations.

1.3 STRATEGIC CONTEXT

1.3.1 National and State Strategies and Plans

The Murrindindi Shire Road Safety Strategy has been produced to align with the National and State road safety strategies but to also take full account of local conditions. Underlying these strategies is the 'Safe System' approach, outlined in Section 6.1 and the Movement and Place analysis in Section 6.2. Details are provided below on both the national and state road safety strategies, highlighting particular areas of relevance for Murrindindi Shire.

National Road Safety Strategy 2021–2030 and Action Plan 2023-2025: There is a national strategy for road safety in Australia, as well as action plans outlining activities and targets over a shorter duration. The targets set out in the strategy are for a 50% reduction in fatalities, and a 30% reduction in serious injuries by 2030. The strategy outlines a variety of priority issues and actions, including for regional roads and local government. These include the need to develop network safety plans; prioritise road safety treatments that will have the most impact; implement staged Safe System treatments for roads with moderate to high traffic volumes (e.g. audio-tactile line markings or "rumble strips", median treatments, targeted stretches of barrier treatment, shoulder widening and sealing, intersection treatments, and protection on curves and from roadside hazards); and reduce speed limits for some roads, particularly undivided roads and where infrastructure improvements may not reach the whole network within the life of the Strategy.

The most recent Action Plan highlights that around 55% of fatalities occur on regional roads and that much higher rates of death occur outside metropolitan areas, especially on high speed, undivided roads with poor surface conditions and design. The plan highlights that an initial enabling action is needed for each local council to undertake a road safety risk assessment – such as a road network safety plan. Specific actions for regional roads include the need to undertake risk assessments on high to moderate volume regional roads, identifying key priorities and implementing specific road safety infrastructure improvements to reduce run-off-road and head-on crashes within a 10-year investment program.

Victorian Road Safety Strategy 2021–2030 and Action Plan 2021-23: The State strategy also aims to halve all road deaths and significantly reduce injuries by 2030 and sets Victoria on the path towards zero deaths by 2050. The goals to be achieved are based upon the Safe System principles and include addressing key risks by supporting and enforcing safer driver behaviour; removing unsafe vehicles from the roads; improving safety for vulnerable and unprotected road users; improving safety on high speed roads and at intersections and reducing the underlying risk; increasing safety for those using the road for work or at work; and recognising the importance of post-crash care. These same focus areas are reflected in the 2021-23 State Action Plan. Performance targets were included that assess progress against key measures, including the 'quality' of road network safety, compliance with speed limits, safety features present in vehicles, driver impairment and seatbelt use.

Victorian Cycling Strategy: The Victorian government has committed to increasing the number, frequency and diversity of Victorians cycling for transport by investing in a safer, lower-stress, better-connected network, prioritising strategic cycling corridors and making cycling a more inclusive

experience. The 2018-2028 plan also includes support for recreational cycling including cycling tourism, indicating that “We will continue to develop trails to improve the attractiveness of cycling tourism across Victoria, including rail trails. These usually follow disused rail corridors and provide a comfortable, enjoyable environment for people to cycle for leisure.” (p36).

1.3.2 Council Documents and Plans

Murrindindi Shire's Road Safety Strategy aligns with the Murrindindi Shire 2021-2025 Council Plan to promote a healthy and connected community. The feedback gathered during the 'Shaping Our Future' project emphasized the community's desire for enhanced safety, which forms the core of this strategy. Additionally, the Municipal Public Health and Wellbeing Plan identifies challenges related to transport, including limited public transport options and reliance on private vehicles, which necessitate careful consideration for road safety measures. Furthermore, the plan highlights the need to encourage active living and reduce injuries, further emphasizing the importance of integrating safety into the transport system.

The Murrindindi Shire Council Road Management Plan underscores the need for programmed road safety inspections and maintenance, ensuring timely responses to identified issues within existing resources. Similarly, the Murrindindi Shire Council Asset Plan emphasizes the integration of road safety into decision-making processes across the road network, including both roads and roadsides.

Road safety also intersects with other Shire activities, such as tourism promotion. The Tourism and Events Strategy indicates that over one million visitors visited the Shire in 2018, a number expected to grow in the future. These visitors utilize Murrindindi's roads and are increasingly drawn to events and nature-based activities, including access to tracks and trails. For instance, the Murrindindi Shire section of the Great Victorian Rail Trail welcomed around 16,000 locals and visitors in 2018, a figure that may also increase. However, this growth depends on providing adequate facilities and ensuring a safe and enjoyable environment for walkers and cyclists.

Key national, state and local plans and documents that are most relevant to this strategy are outlined in the table below.

Table 1: Summary of National, state and council documents and plans relevant to the new Murrindindi Road Safety Strategy:

National and State Strategies and Plans
National Road Safety Strategy 2021–2030
National Road Safety Action Plan 2023-2025
Victorian Road Safety Strategy 2021–2030
Movement and Place in Victoria
Victoria's 30-Year Infrastructure Strategy 2016
Victorian Cycling Strategy 2018–2028
Relevant Council Documents and Plans
Murrindindi Shire 2021-2025 Council Plan
Murrindindi Shire Council Road Management Plan 2021
Murrindindi Shire 2021-2025 Municipal Public Health and Wellbeing Plan
Murrindindi Shire Council Asset Plan 2022-2032
Murrindindi Shire Council Rural Roadside Management Guidelines and Plan
Murrindindi Shire Tourism and Events Strategy 2019-2025

2 VISION AND PRINCIPLES

2.1 VISION

This strategy adopts the National and State Vision Zero[1] at its core, which is to eliminate all road deaths by 2050. Toward this direction, the immediate aim of this strategy is to reduce half of the road fatalities by 2030 compared to the average yearly fatality during the FY2015-2019 period and reduce the number of serious injury crashes on the Murrindindi road network.

2.2 PRINCIPLES

To achieve the above vision, the Safe System approach[1] has been applied to be consistent with the National and State Road Safety Strategies. This approach acknowledges that people will at times make mistakes that can lead to crashes. Therefore, all components of the road system must be considered and strengthened so that positive road safety outcomes are maximised and to ensure that road users are adequately protected even if one component fails. There are five Safe System components: safer road users, safer roads, safer speeds, safer vehicles, and post-crash care.

Considering the Safe System approach, the Murrindindi Road Safety Strategy 2023-2030 identified the following key principles which underpin the direction and actions to be undertaken as part of the Strategy:

1. Equity: Ensure that all road users in Murrindindi Shire benefit from safety improvements, regardless of their travel modes, purposes, age, gender, accessibility, ethnicity, or residential status.
2. Infrastructure Safety: Mitigate or eliminate road hazards that can lead to fatal or serious injuries.
3. Safe System Impact Speeds: Adopt safe system travel speeds as the principle for selecting speed limits.
4. Future Mobility: Consider the council's current vehicle composition and mode share, as well as the future development toward safe and sustainable mobilities.
5. Shared Responsibility: Recognize the need for effective coordination and shared responsibility between road authorities, road safety partners, other bodies beyond the transport sector (e.g., enforcement, education, tourism, and public health), as well as all road users for the improvement of road safety.
6. Evidence-Based Approach: Ensure that all recommendations are supported by a strong evidence base, such as risk identification, historical data, and community/stakeholders' consultations.
7. Continuous Improvement: Be open to learning and development of emerging technologies and opportunities to address any road safety issues.

By adhering to these principles, the Murrindindi Road Safety Strategy 2023-2030 is well-positioned to achieve its ambitious goal of reducing road fatalities and serious injuries by 50% by 2030.

[1] Refer to Section 6.1 for more details on Safe System approach and Vision Zero

3 THE SAFETY PROBLEM IN THE MURRINDINDI SHIRE

3.1 CRASH ANALYSIS

3.1.1 Crash descriptive

3.1.1.1 Overview of crashes in Murrindindi (the whole road network)

Murrindindi is in the top ten shires with the highest number of crashes among the total of 38 regional shires in Victoria. The total number of casualty crashes in Murrindindi Shire from FY2015 to FY2019 is 512 crashes (approximately two casualty crashes per week).

When considering the population, Murrindindi has the highest crash rate among all shires in Victoria in the FY2015-2019 period (Figure 4). In terms of the Fatal and Serious Injury (FSI) rate, Murrindindi takes second place after Towong in this period.

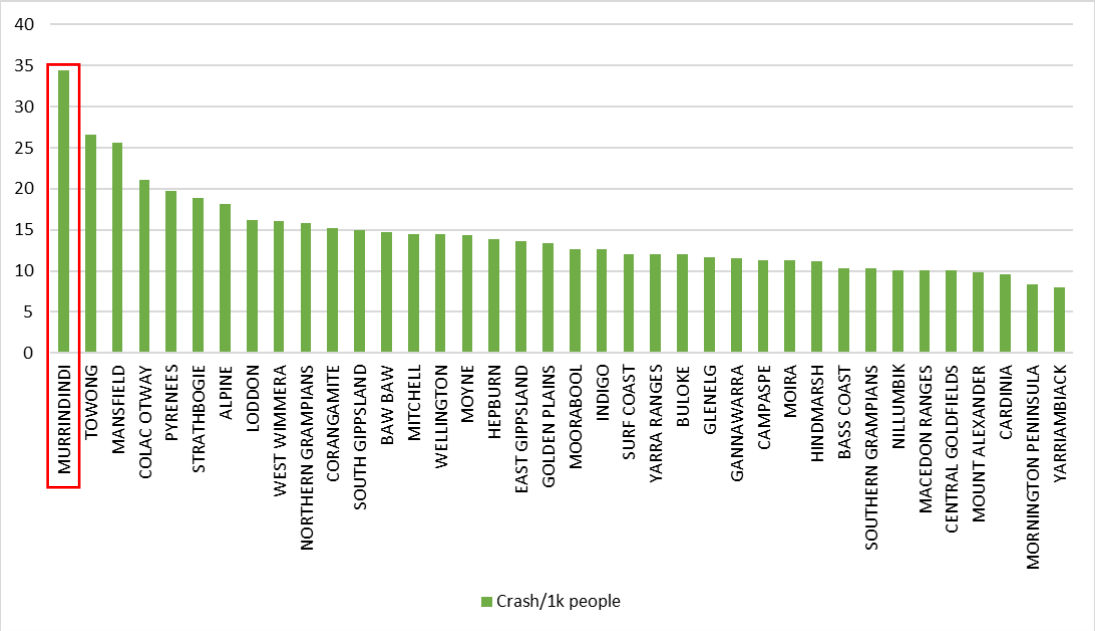

Figure 4: Crash rate per 1,000 people in all rural shires in Victoria (FY2015-2019)

The total number of casualty crashes tends to increase from FY2010 to FY2014 and then decrease after FY2014 (Figure 5). Interestingly, the data shows a dip in total crashes in FY2017[2]. The total number of casualties tends to have the same trend in this period. It is noted that most crashes and FSI crashes in Murrindindi Shire were off-path crash types (e.g., running off the road on a bend or a straight path).

[2] Strong enforcement program during this period is expected to be one of the contributions.

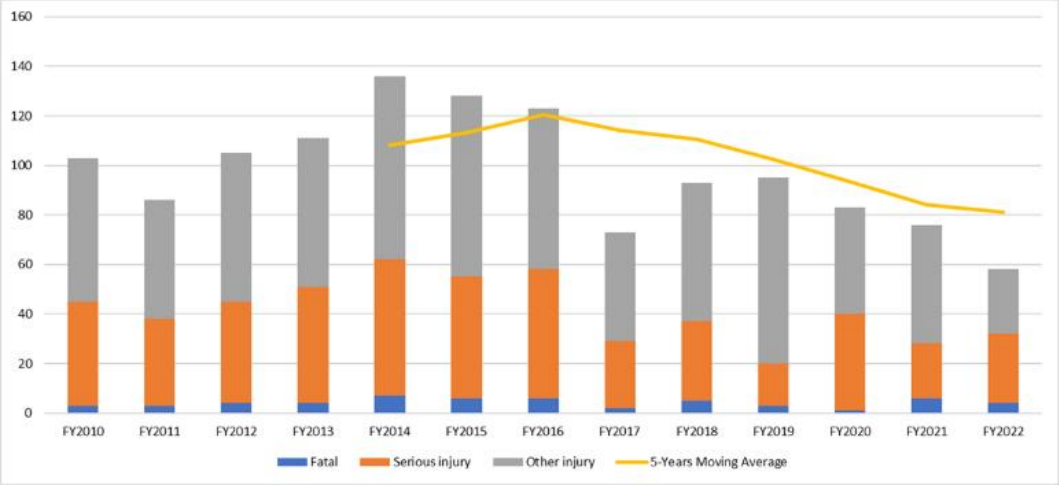

Figure 5: Number of crashes in Murrindindi

When considering all casualties, Murrindindi ranks third among all rural shires in terms of the proportion of motorcyclist casualties. In addition, Murrindindi has the second highest share of motorcyclist FSI casualties compared to other rural shires, presenting a much higher figure than the state total. (Figure 6).

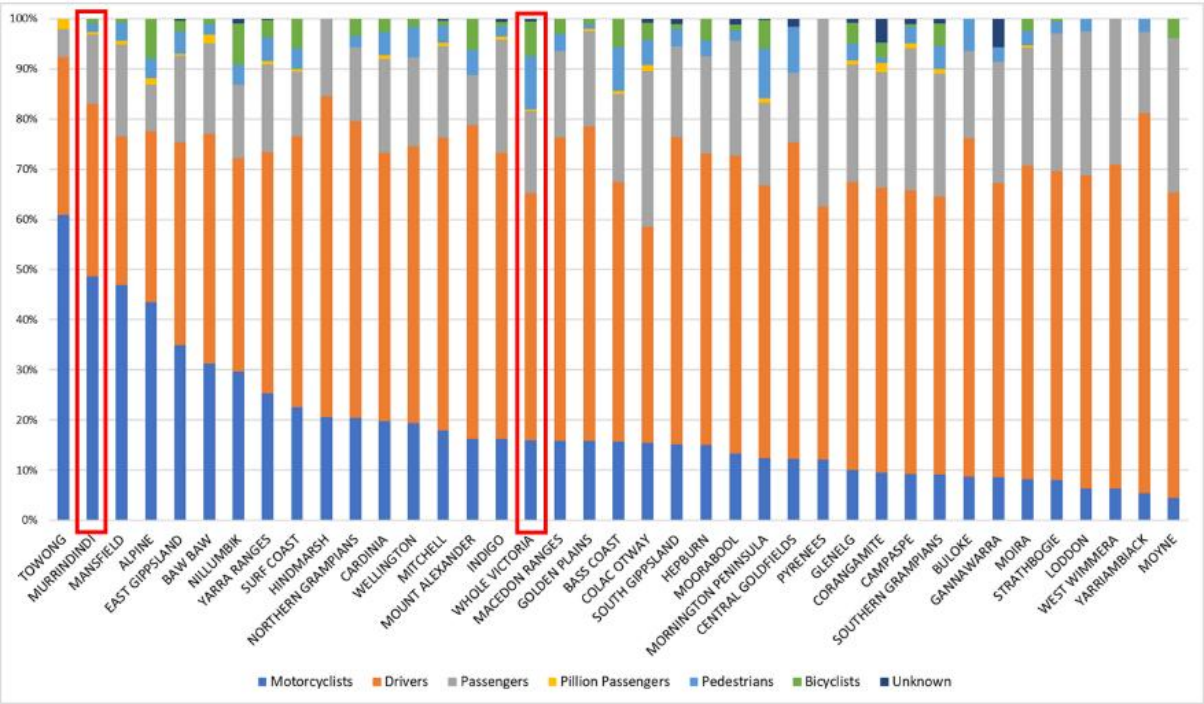

Figure 6: Proportion of FSI casualties on rural shires and the whole of Victoria by road user types (FY2015-2019) – sorted by proportion of motorcyclist FSI casualties.

Although most Murrindindi residents fall in the late middle-age to retirement age category (Figure 3, the highest number of casualty crashes occurs within the younger age groups of 20 to 29 (Figure 7).

Figure 3Figure 7

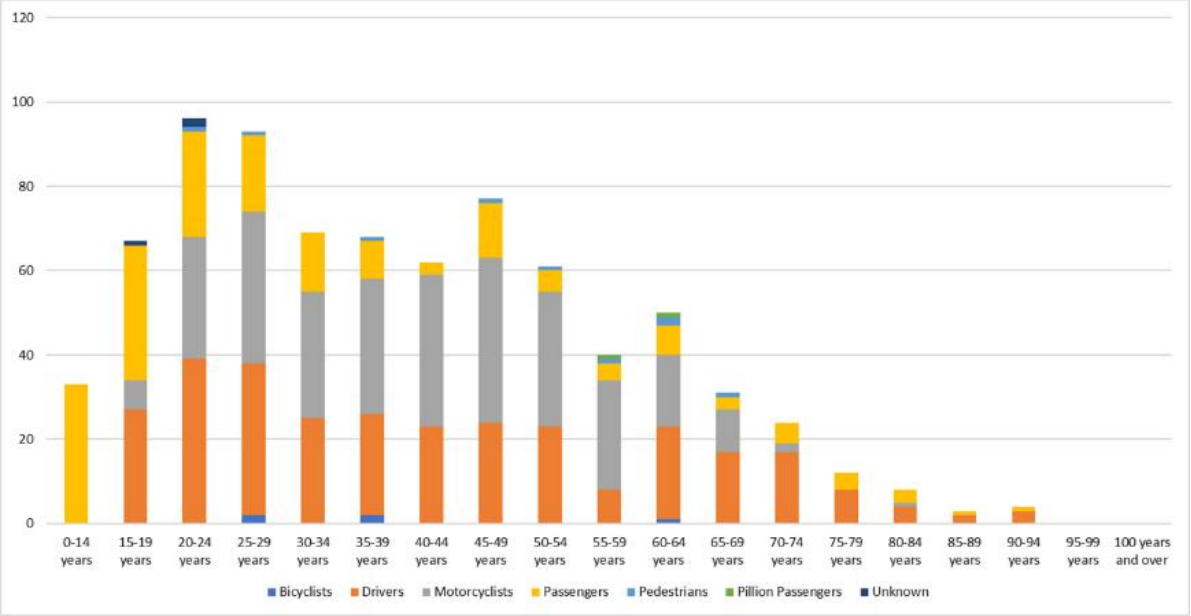

Figure 7: Number of casualties in Murrindindi by road user types and age groups (FY2015-2019)

Based on crash locations and road asset management data, crashes have been separated by road management agencies (Figure 8). 'Other' Roads refers to roads in the State Forests and Parks managed by DEECA. The highest number of casualty crashes and FSI crashes happened on DTP roads. 'Other' roads have the second highest number of total crashes, followed by Council roads. However, there were no fatal crashes on 'other' roads, and the number of FSI on Council roads is higher than on other roads.

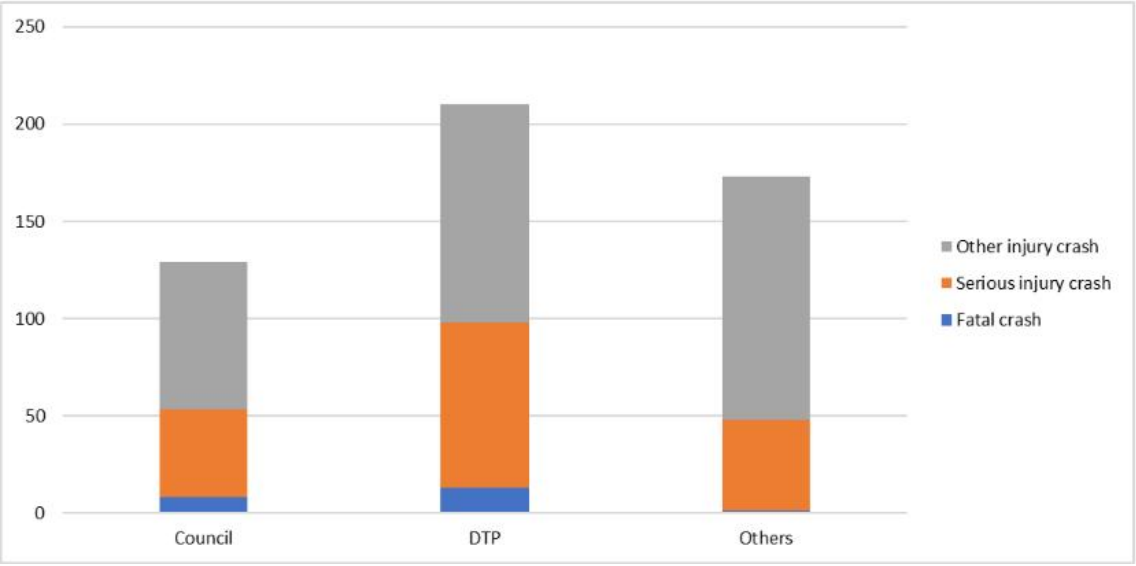

Figure 8: Number of crashes by road management agencies (FY2015-2019)

3.1.1.2 Overview of crashes on Murrindindi Council roads

Crashes by time

The total number of casualty crashes tends to increase from FY2010 to FY2016 and then decrease after FY2016, similar to the crash trend in Figure 5. From FY2016, the number of serious injury crashes sharply reduced but there were more fatal crashes. The trend of casualty numbers is similar to crash numbers.

The highest number of crashes is from January to April (Figure 9)

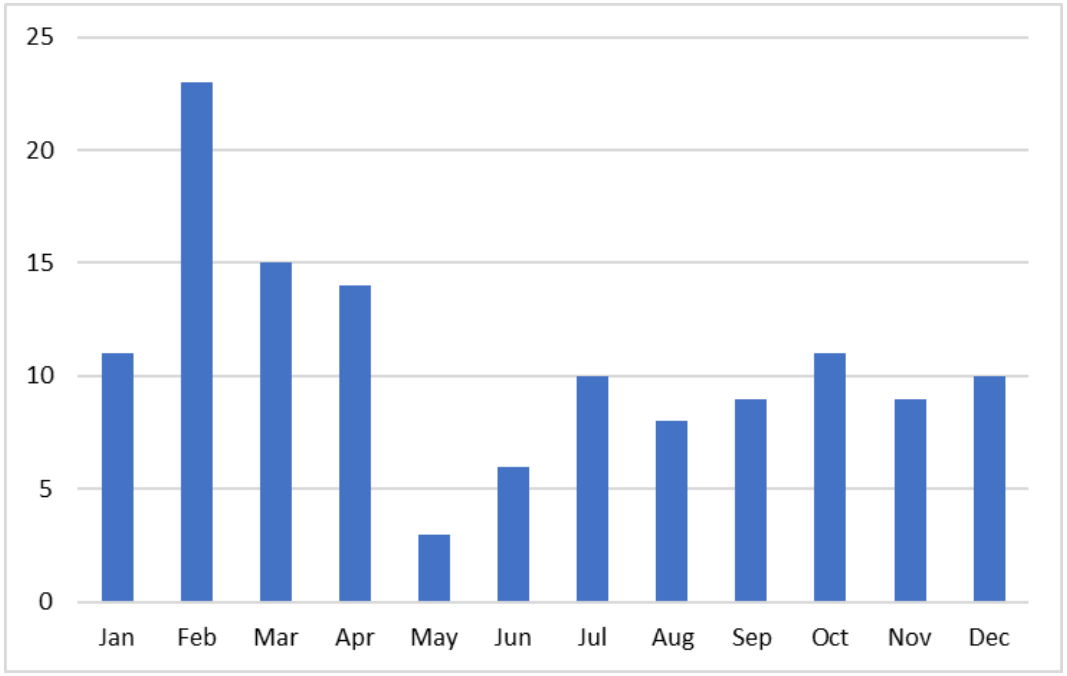

Figure 9: Number of crashes on council roads by month of the year (FY2015-2019)

Crash tends to occur more frequently at the weekend (Figure 10)

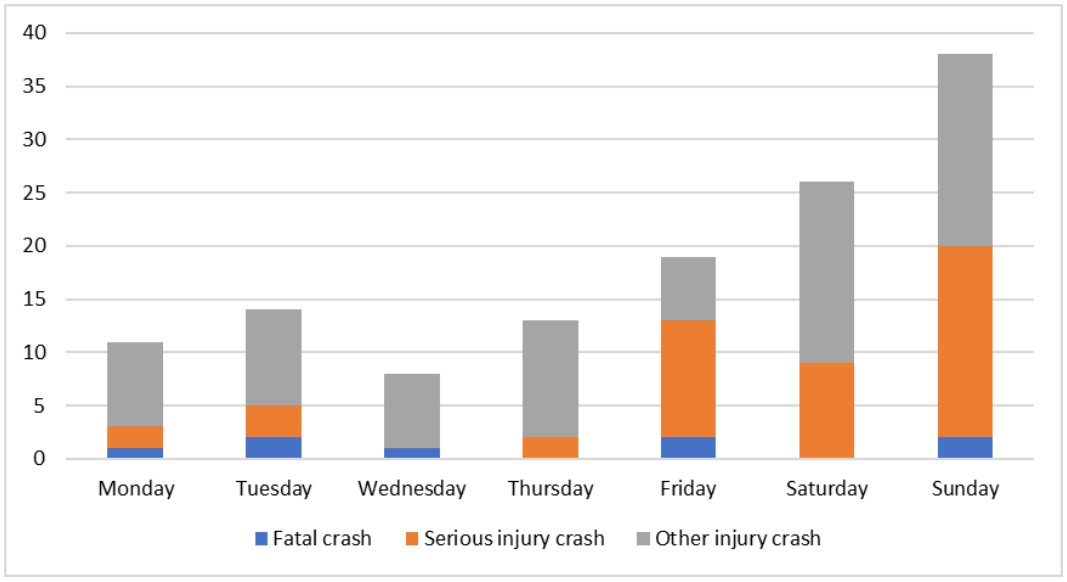

Figure 10: Number of crashes on council roads by day of the week (FY2015-2019)

The highest number of crashes is during mid-day (11h-16h) (Figure 11). Crashes mainly occurred at midday during the weekend.

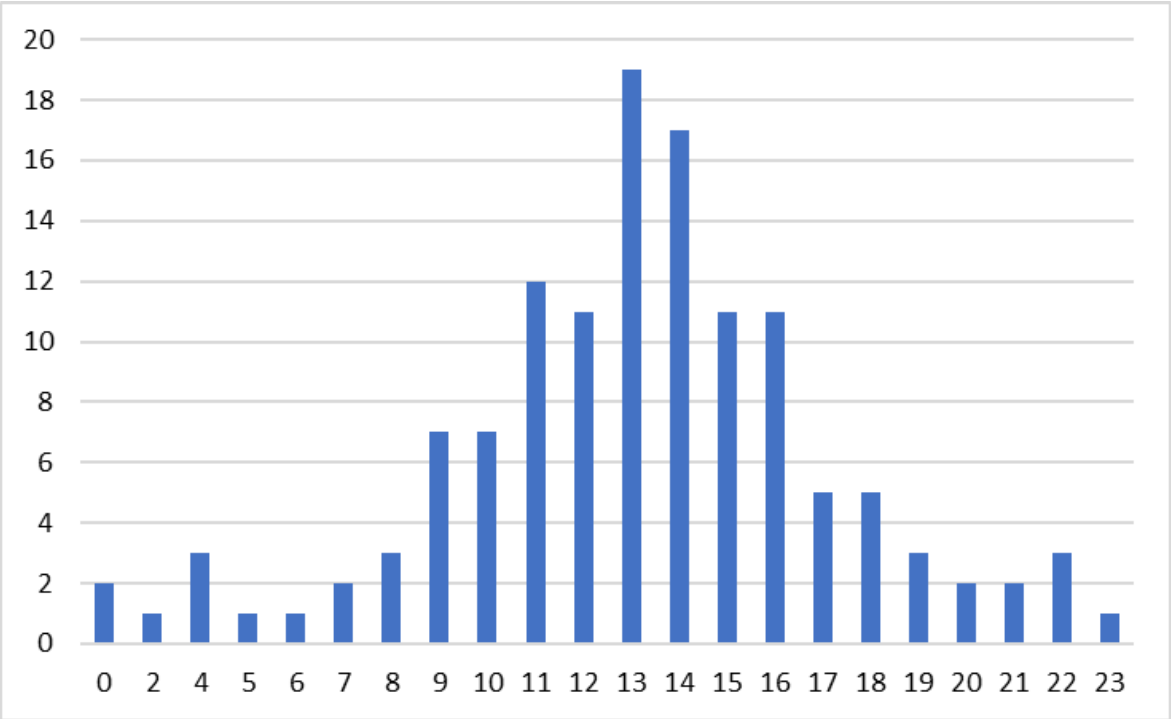

Figure 11: Number of crashes on council roads by the time of the day (FY2015-2019)

Crashes by crash types

The cause of higher severity level crashes seems to be associated with collisions with object(s), followed by vehicle overturned and collisions with other vehicle(s) (Figure 12). It is noted that hitting a fixed object is usually preceded by running off road at a midblock location.

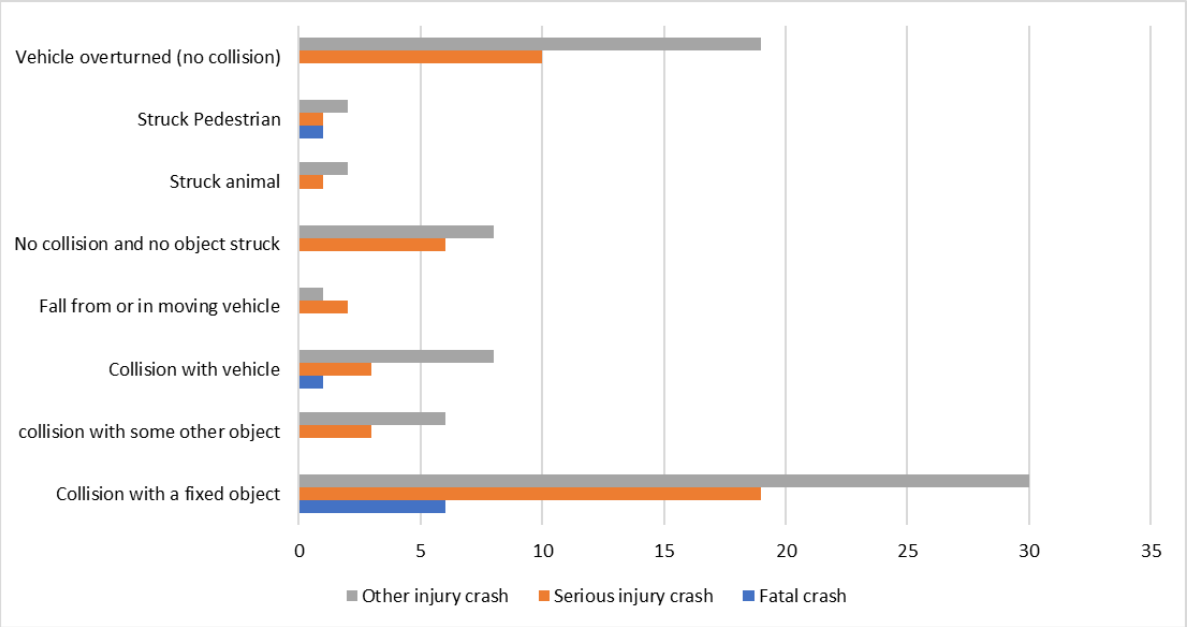

Figure 12: Number of crashes on council roads by crash type (FY2015-2019)

Crashes by speed

Most of the casualty crashes happened on high-speed (70-100km/h) midblock sections (Figure 13).

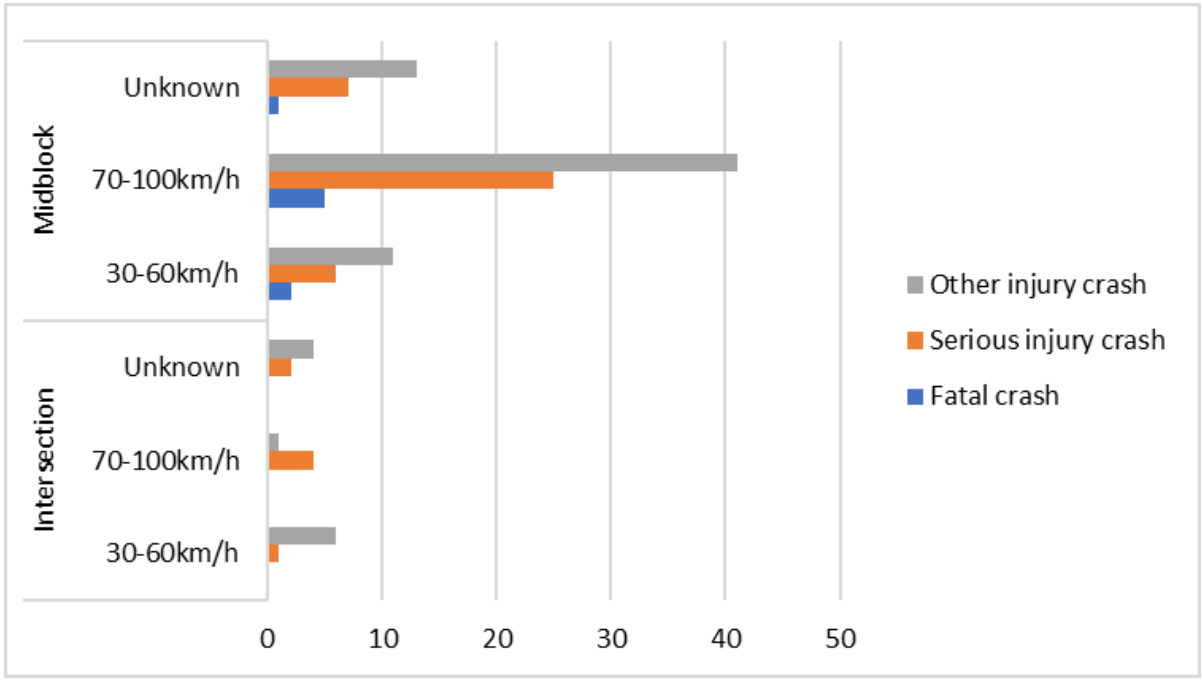

Figure 13: Number of crashes on Council roads by speed zone and road midblock and intersection (FY2015-2019)

Most FSI crashes on 100km/h speed limit Council roads are off-path on curve, off-path on straight, and vehicles from opposing directions (Figure 14).

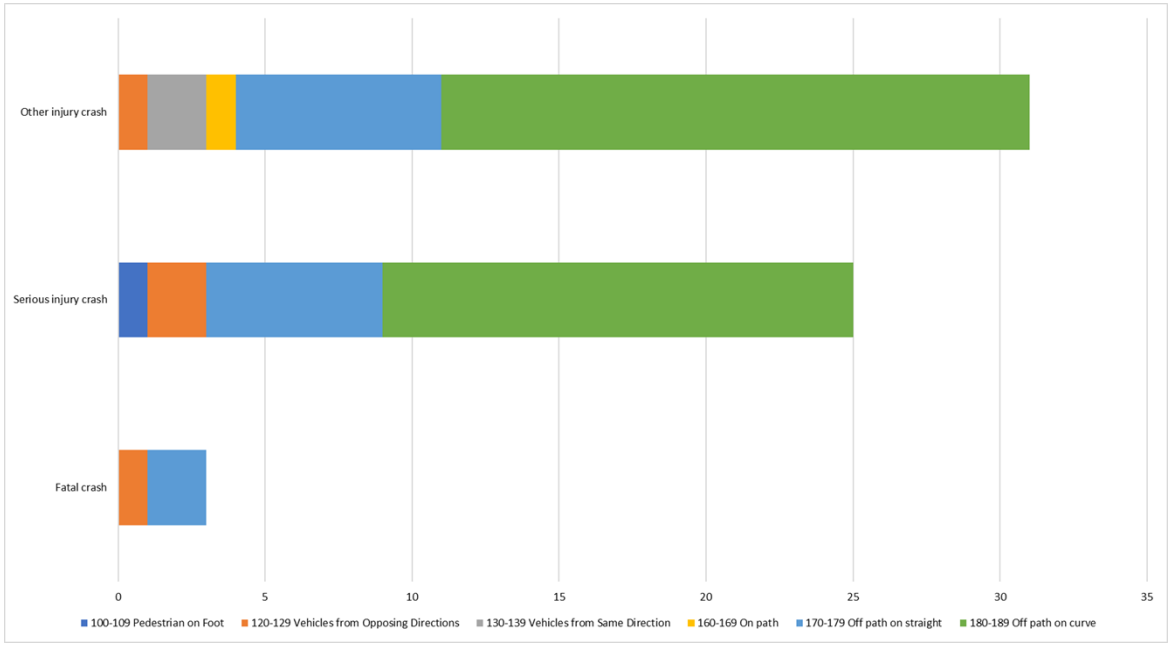

Figure 14: Number of crashes on 100km/h speed limit Council roads by DCA groups and severity level (FY2015-2019)

Crashes by road user types

Motorcyclists accounted for nearly half of all FSI casualties, followed by drivers at around one-third of all FSI casualties (Figure 15). When considering the passengers, the casualties from motorcycle and car crashes are roughly similar.

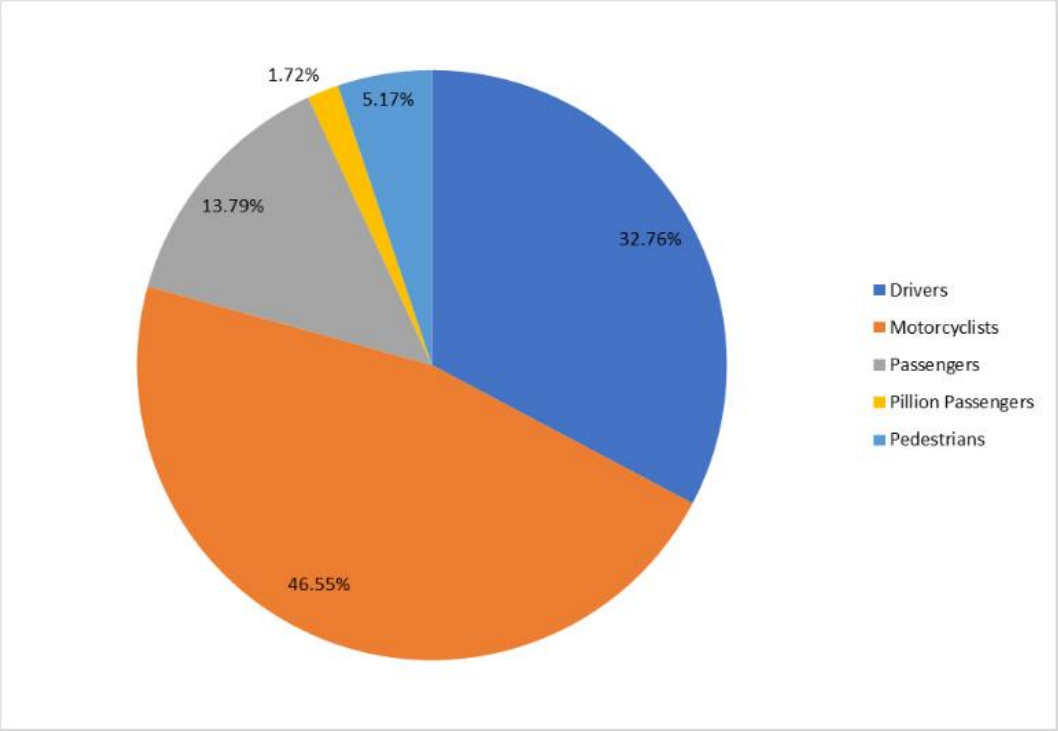

Figure 15: Proportion of FSI casualties on council roads by road user types (FY2015-2019)

Figure 16 shows that while the casualties of car drivers are similar between residents and visitors, most of the motorcyclist casualties are visitors of the Shire.

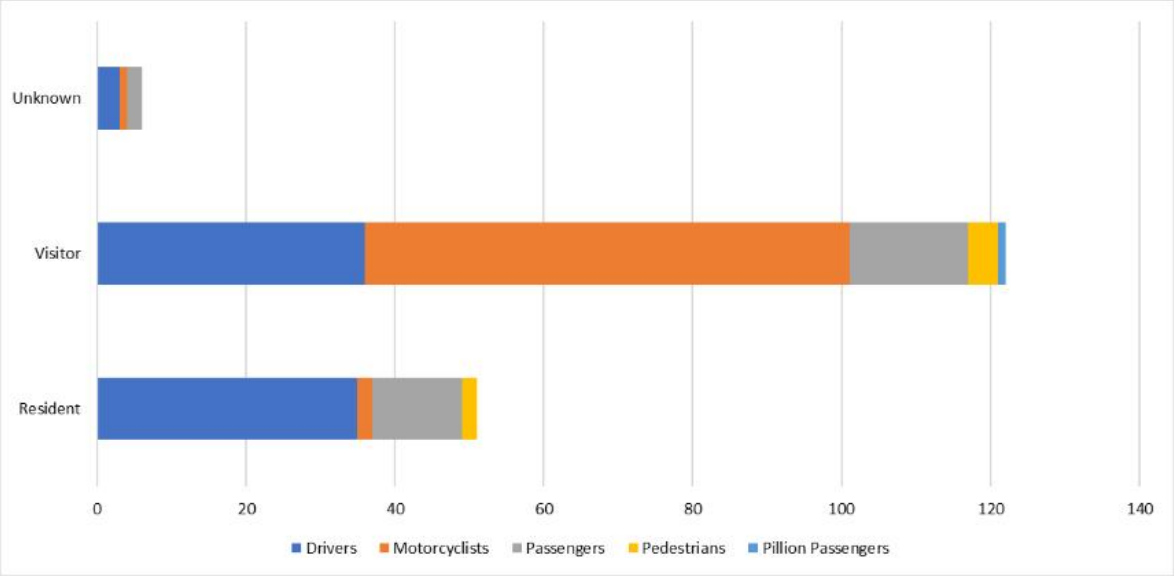

Figure 16: Number of casualties on council roads by road user types and resident status (FY2015-2019)

Most of the motorcyclist casualties and FSI casualties occurred at midblock, followed by car drivers (Figure 17).

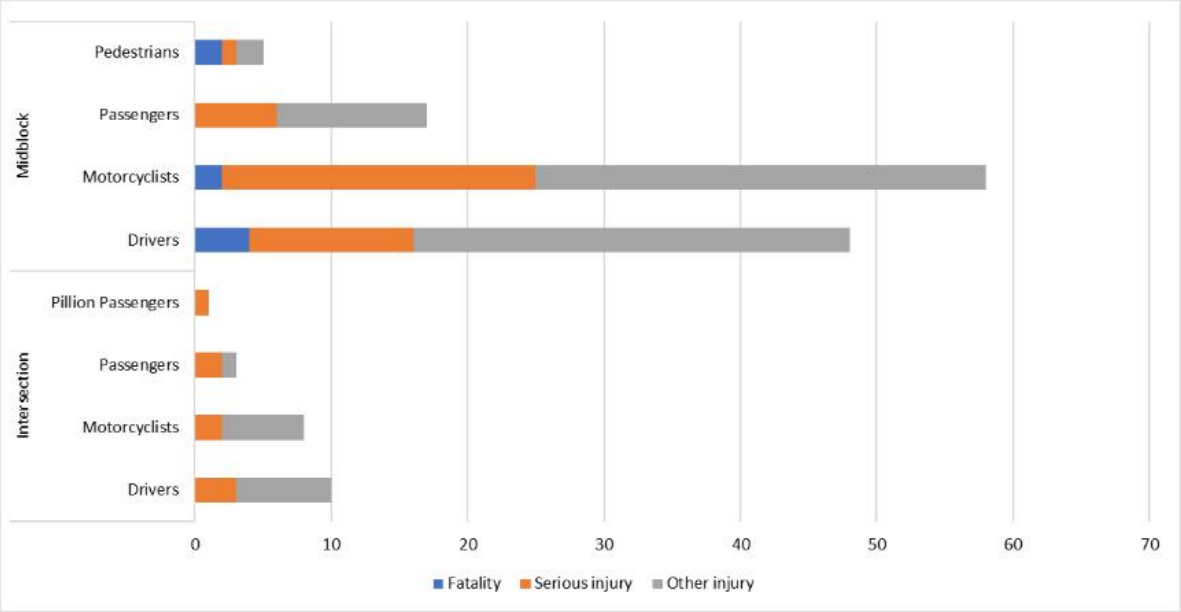

Figure 17: Number of casualties on council roads by road user types and road geometry (FY2015-2019)

Crashes by age groups

Although most Murrindindi residents fall in the late middle-age to retirement age category (Figure 3, the highest number of casualty crashes on Murrindindi Council roads occurs within the younger age groups of 20 to 29 (Figure 18).

Figure 3Figure 18

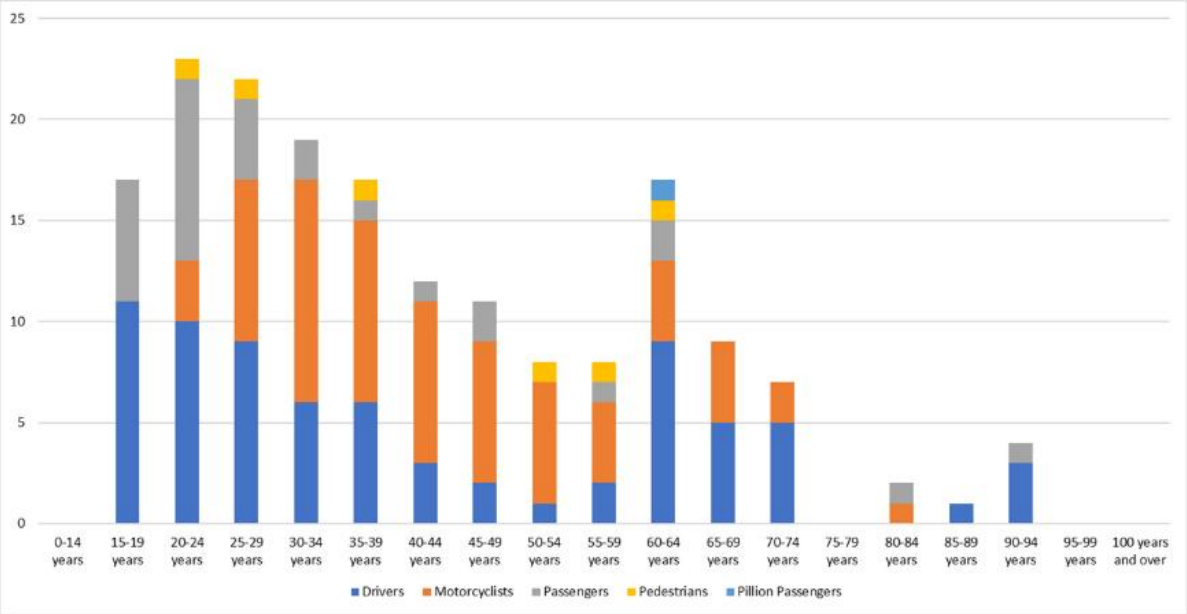

Figure 18: Number of casualties on council roads by road user types and age groups (FY2015-2019)

When considering only resident casualties, young age groups (15 to 29) and senior residents (70-74) seem to have a higher risk of car-related crashes (Figure 19).

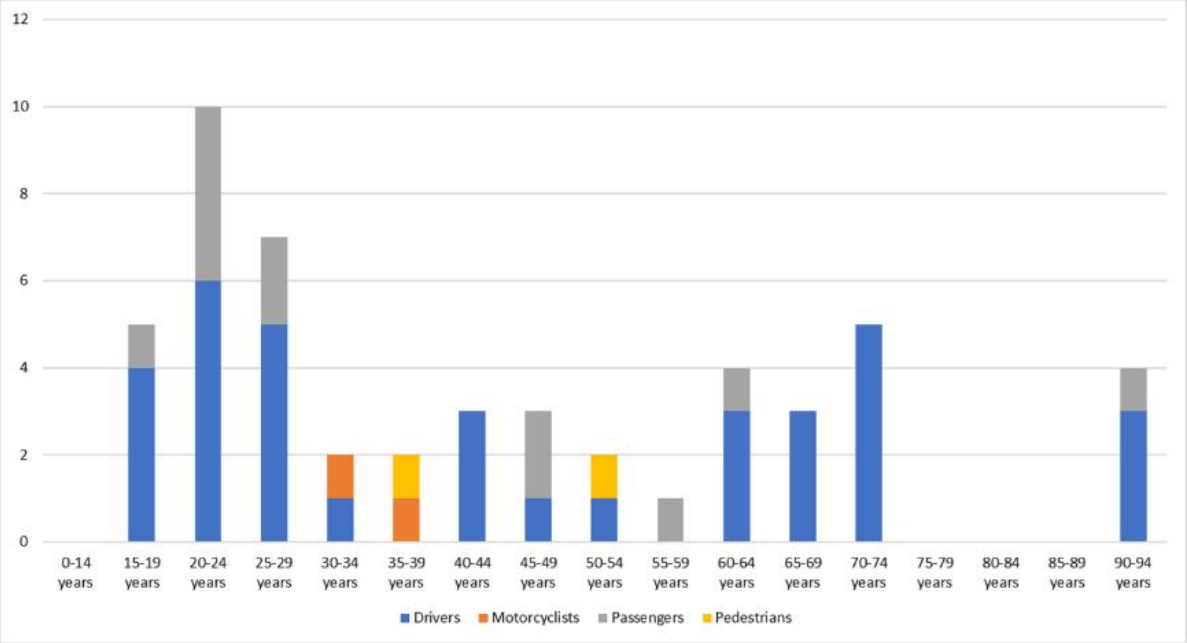

Figure 19: Number of resident casualties on council roads by road user types and age groups (FY2015-2019)

Younger age groups (from 15 to 29) have a much higher rate of casualties on Council roads compared to other age groups (Figure 20).

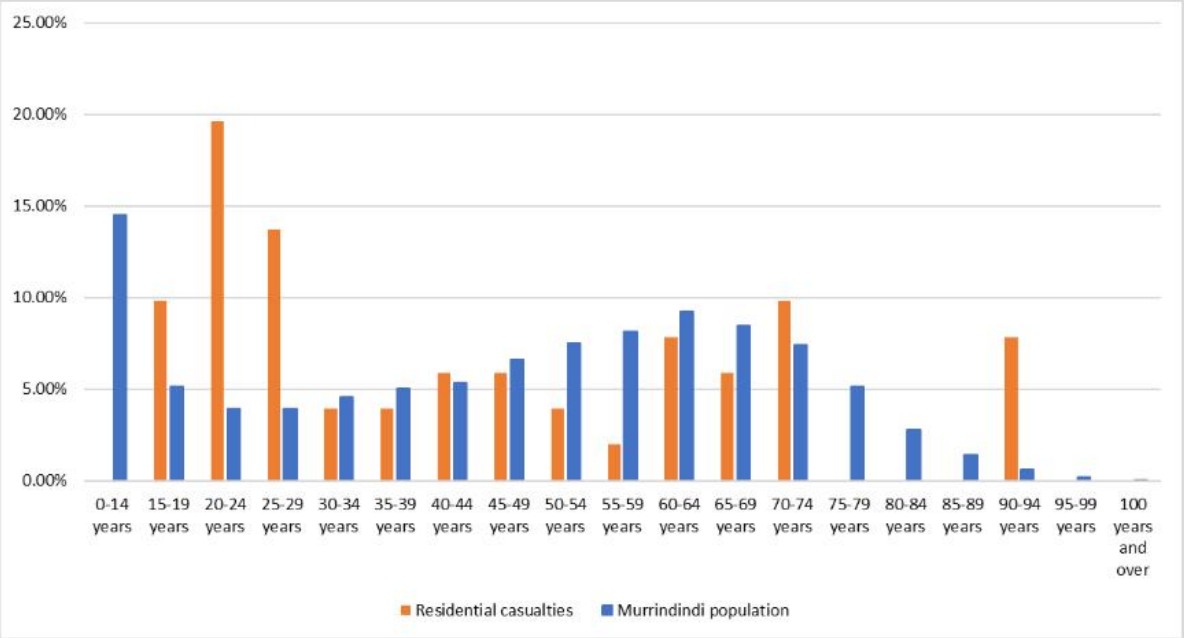

Figure 20: Number of resident casualties on council roads by age groups (FY2015-2019) compared with Murrindindi age profile in the 2021 census

Age groups with the highest risk of casualties for visitors are ages 25-39, and 60-64 (Figure 21)

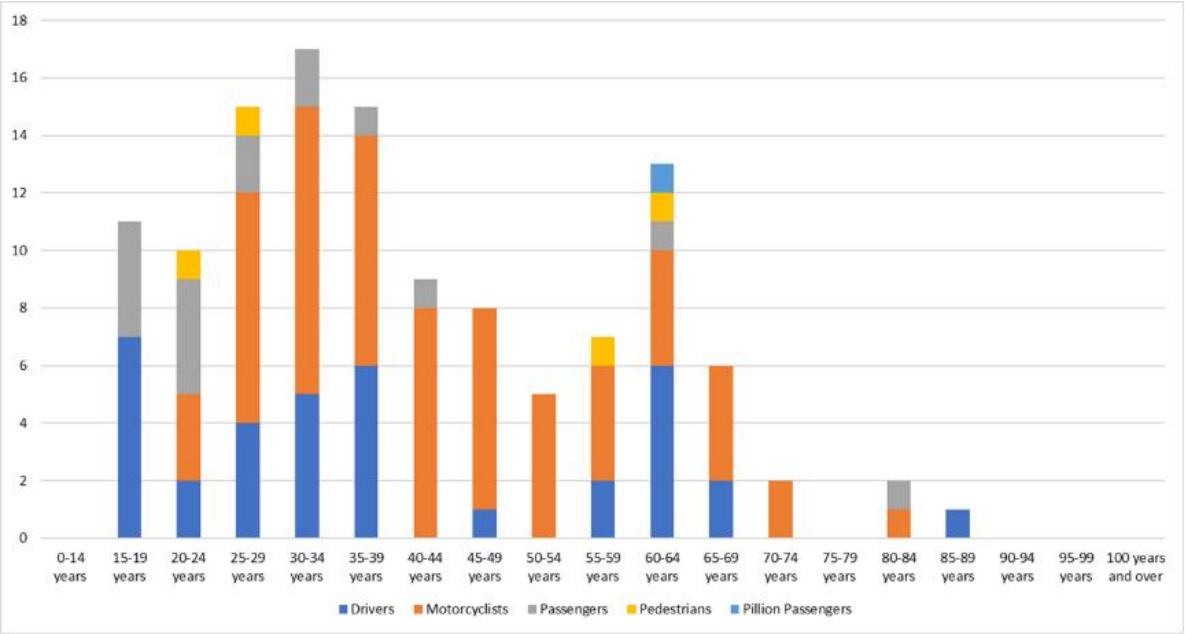

Figure 21: Number of visitor casualties on council roads by road user types and age groups (FY2015-2019)

Motorcycle crashes

'Other roads' network has the highest number of motorcycle casualty crashes, accounting for more than 50% of the total figure (Figure 22). However, there is not a big difference in terms of motorcycle FSI crashes between Council, DTP, and other roads (Forest Roads managed by DEECA).

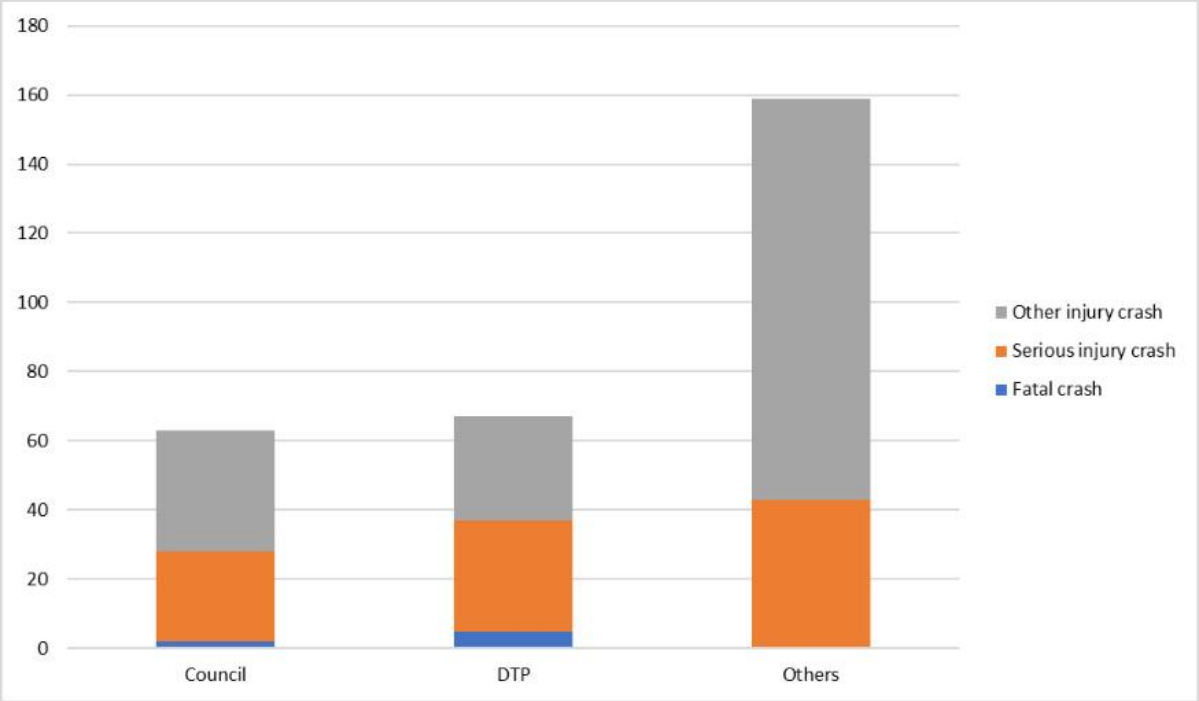

Figure 22: Number of motorcycle crashes by road management agencies (FY2015-2019)

The majority of the motorcycle crashes on council roads are related to off-path on curve, or off-path on straight crash types (Figure 23).

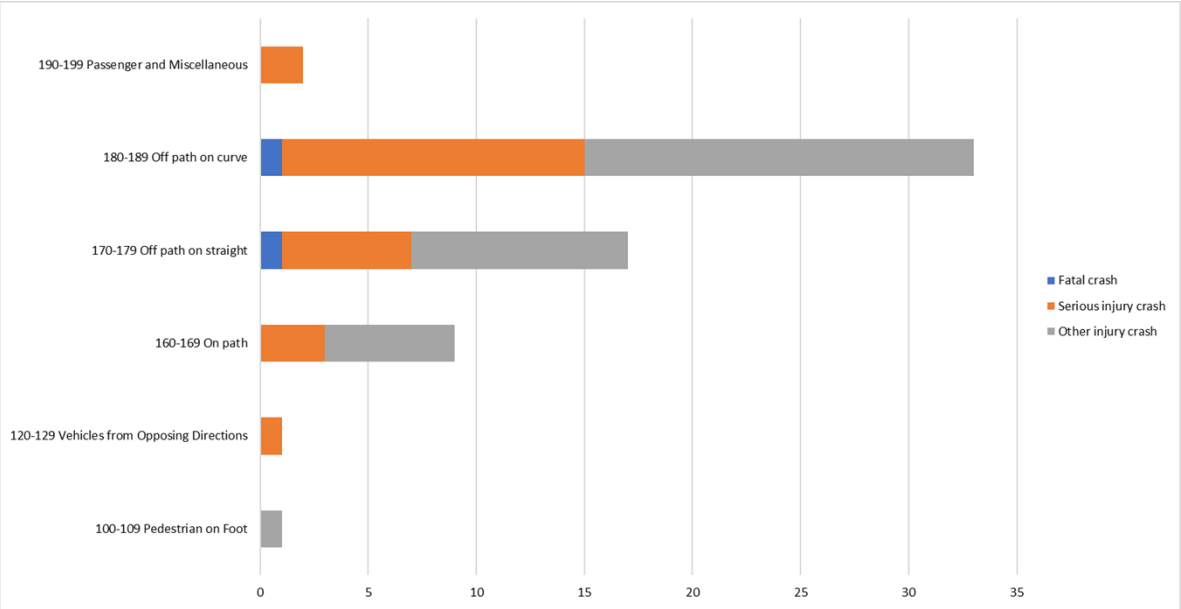

Figure 23: Number of motorcycle crashes on council roads by DCA groups (FY2015-2019)

3.1.2 Spatial Analysis

Based on the analysis of crash locations (Figure 24), crash hotspots are preset on the following Council roads:

- Grant Street / Nihil Street intersection, Alexandra
- Eildon – Jamieson Road, between Barnewall Plains Road and Eildon – Warburton Road, Eildon
- Skyline Road near UT Creek Road intersection, Devils River
- Whanregarwen Road, near Goulburn Valley Highway, Whanregarwen
- King Parrot Creek Road, south of Fairview Road, Kerrisdale
- Yarck Road, within Gobur G102 Bushland Reserve, Gobur
- Extons Road, Kinglake Central
- Myers Creek Road, between Healesville – Kinglake Road and Philips Road, Toolangi

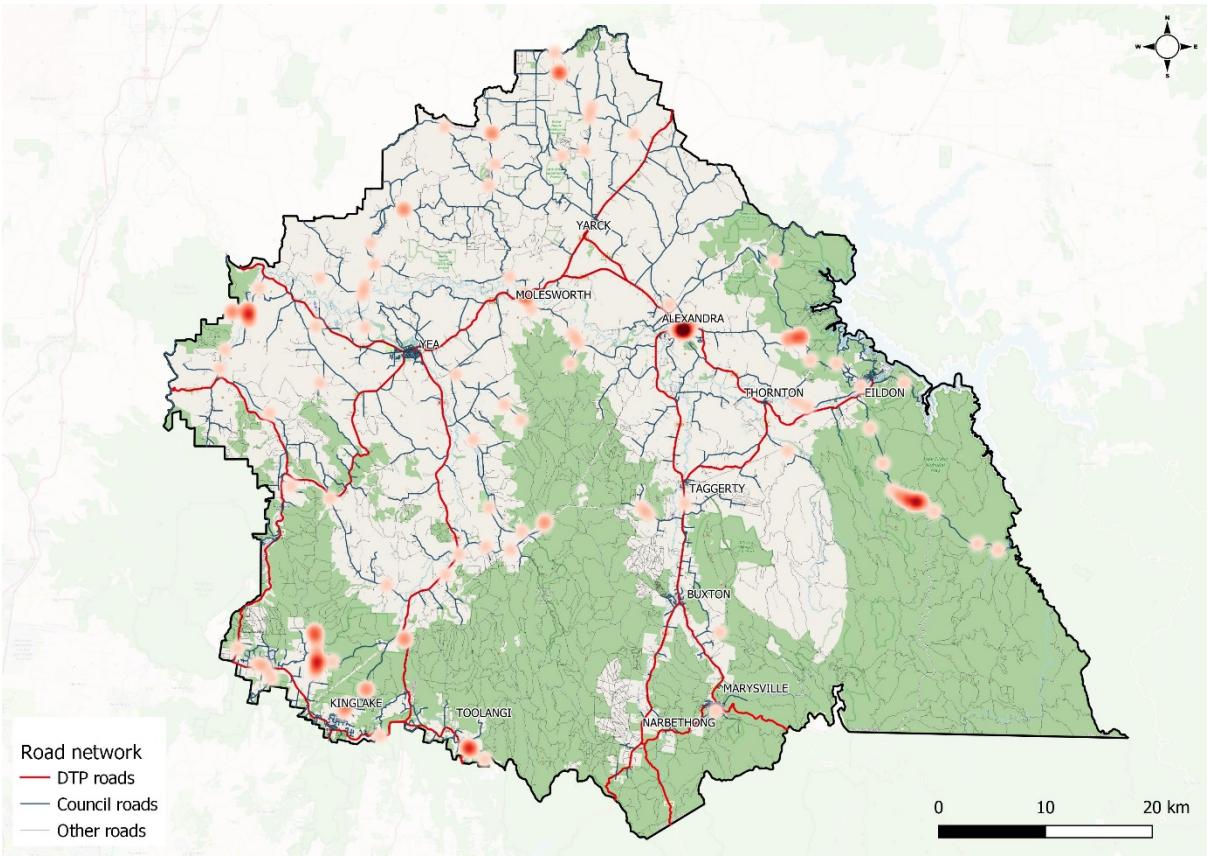

Figure 24: Crashes on Council roads heatmap FY2015-2019

In addition, some locations of midblock crash hotspots on Council roads between FY2015 and FY2019 were f such as:

- Eildon – Jamieson Road (between S Corduroy Creek Road and Eildon-Warburton Road, Eildon
- King Parrot Creek Road (south of Fairview Road), Devils River
- Myers Creek Road (between Phillips Road and Healesville-Kinglake Road), Toolangi
- Extons Road (between Powers Road and Captains Creek Road), Kinglake Central

Based on Figure 25, motorcycle crash hotspots occurred on the following Council roads:

- Eildon – Jamieson Road, between Barnewall Plains Road and Eildon – Warburton Road, Eildon
- Skyline Road near UT Creek Road intersection, Devils River
- Whanregarwen Road, near Goulburn Valley Highway, Whanregarwen
- Extons Road, Kinglake Central

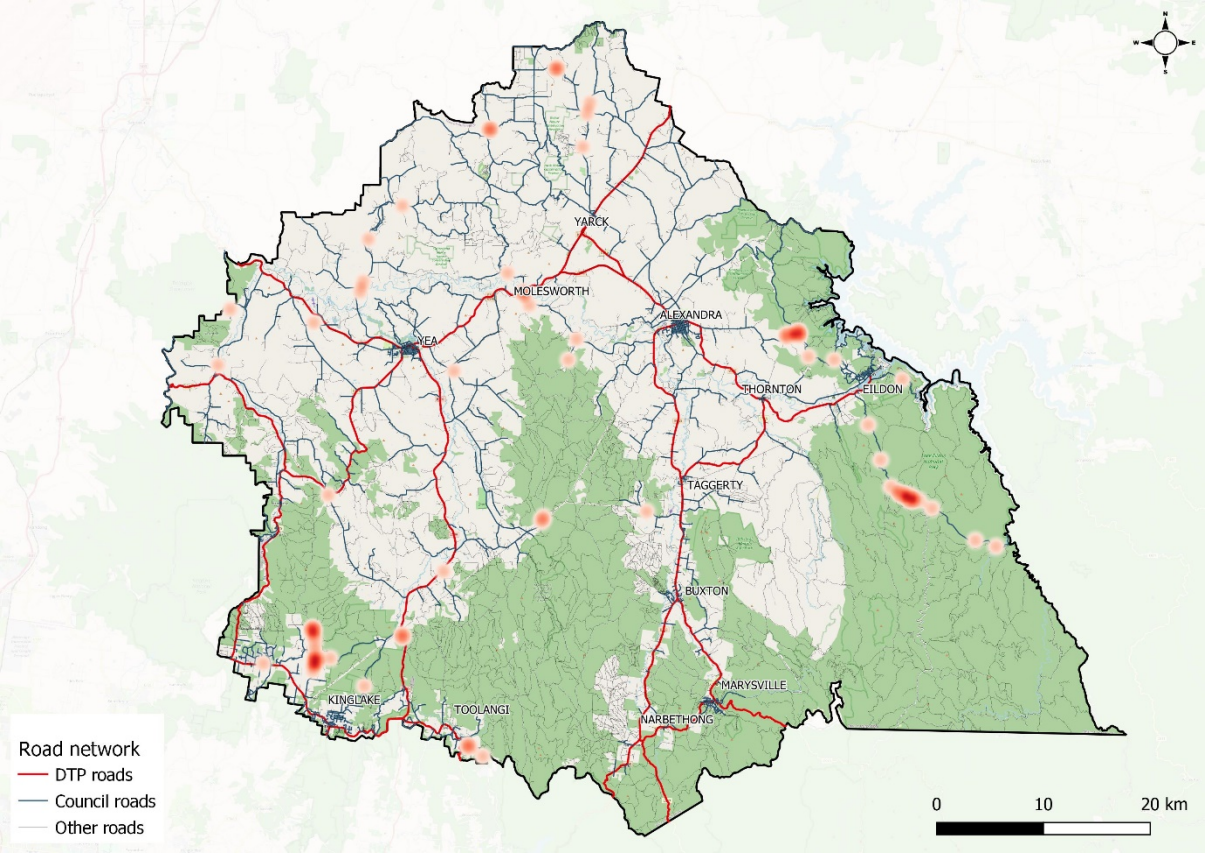

Figure 25: Motorcycle crashes on Council roads heatmap FY2015-2019

On the 'Other roads' network, motorcycle crash hotspots occurred at the following locations:

- Along Marginal Road, Toolangi State Forest, Glenburn
- Along Mount Robertson Road, from near the Arthurs Road intersection, Kinglake Central
- Along Big River Road, Eildon
- Lots of the motorcycle crashes happened on tracks and bush areas

3.1.3 Highlights of Crash Trends and Issues

Based on the analysis of crash data, the following key trends and issues were observed:

- There are high crash rates and FSI rates in Murrindindi compared to other shires in Victoria
- 'Other' injuries and serious injuries have a decreased trend, however, the trend for fatalities has remained stagnant (between FY2015 and FY2019)
- There is a higher proportion of FSI crashes in the last three years (FY2020-FY2022) compared to the previous period
- The highest number of crashes occurs between January to April
- Crashes tend to occur more frequently on the weekend
- The highest number of crashes is during midday (11h-16h), especially on weekends
- Run-off road crashes resulted in the highest number of FSI crashes, many involving collision with an object
- There are high numbers of crashes on high-speed roads at midblock locations
- Motorcycle crashes comprise almost half of council FSIs, with the vast majority on 'other' roads - both involving mostly visitors
- 9% of all casualties on council roads are pedestrians, but there were no cyclist injuries
- There is high risk for younger (ages 15-29) and older (ages 60-64) age groups
- The number of visitor casualties is more than double the figure for residents
- The time-of-day crash pattern suggests that travel to work may not be the main factor contributing to crashes in this period in Murrindindi
- The pattern in Figure 18 may be due to higher trips generated and a large volume of visitors (mostly motorcyclists) in the younger age group compared to other age groups

More details on the data processing, data limitation, and additional analysis on the share of crashes and casualties by various categories on different road networks are presented in Section 6.3.

3.2 COMMUNITY AND STAKEHOLDER CONSULTATION

3.2.1 Stage 1: Community consultation

An online community survey has been conducted from 25 August 2023 to 08 October 2023. A total of 42 respondents participated in answering 22 questions. More than 84% of the respondents are living in Murrindindi Shire. Detailed survey questions and results are provided in a separate document.

Survey results

Around half of the respondents feel unsafe in Murrindindi Shire as car drivers (Figure 26). In addition to car drivers, more than half of cyclists and motorcyclists are feeling unsafe on Murrindindi Shire. Moreover, cycling is the activity that has the highest number of respondents feeling very unsafe.

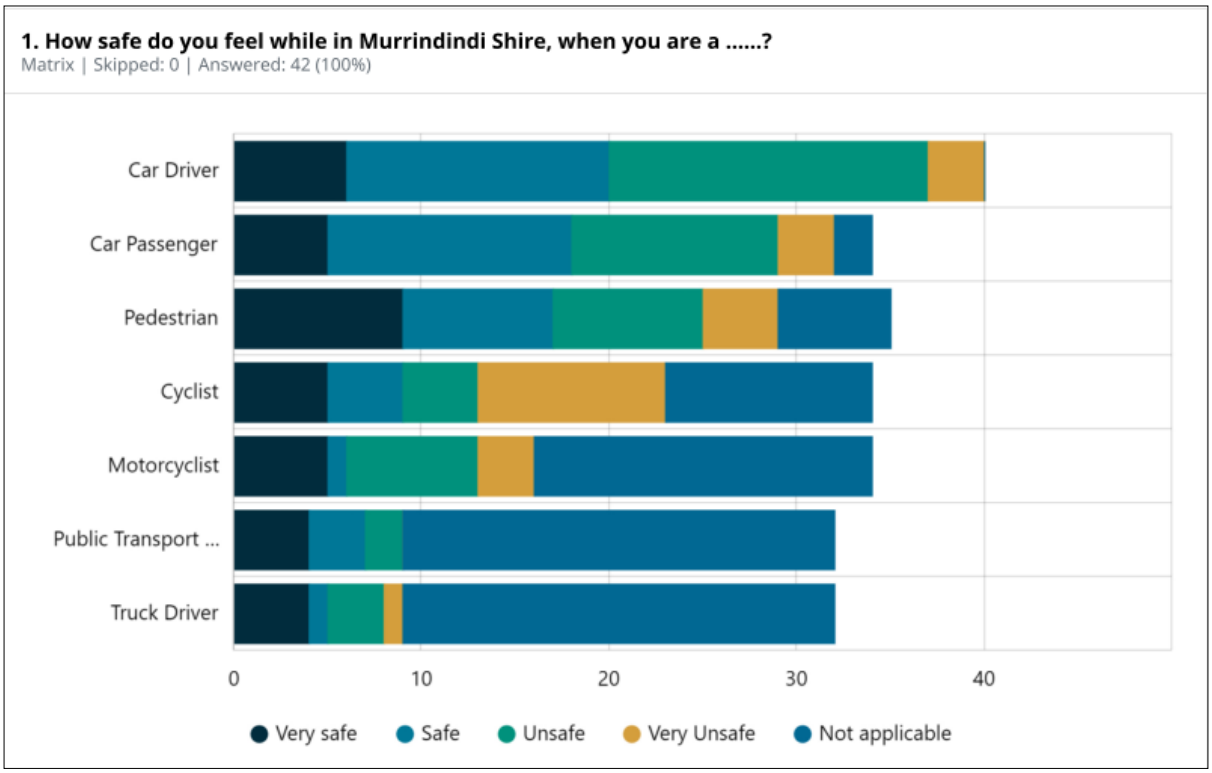

Figure 26: Community survey - Question 1 results

Many car users, bicyclists, and motorcyclists feel it is less safe in Murrindindi Shire compared to other places (Figure 27). This finding is in line with the high crash rate in Murrindindi Shire compared to other rural shires in Victoria.

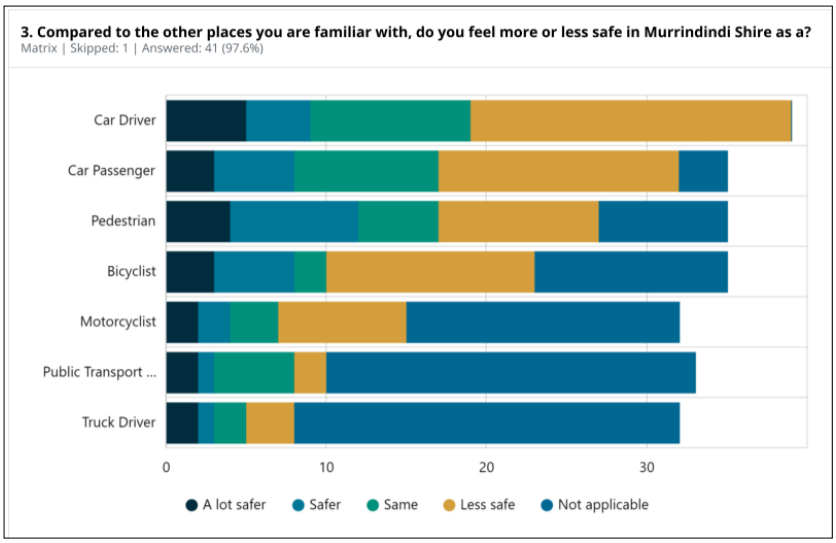

Figure 27: Community survey – Question 3 results

The issues that received the greatest community concern are speed and speeding, road infrastructure, rural roads, and cyclists' safety/infrastructure (Figure 28).

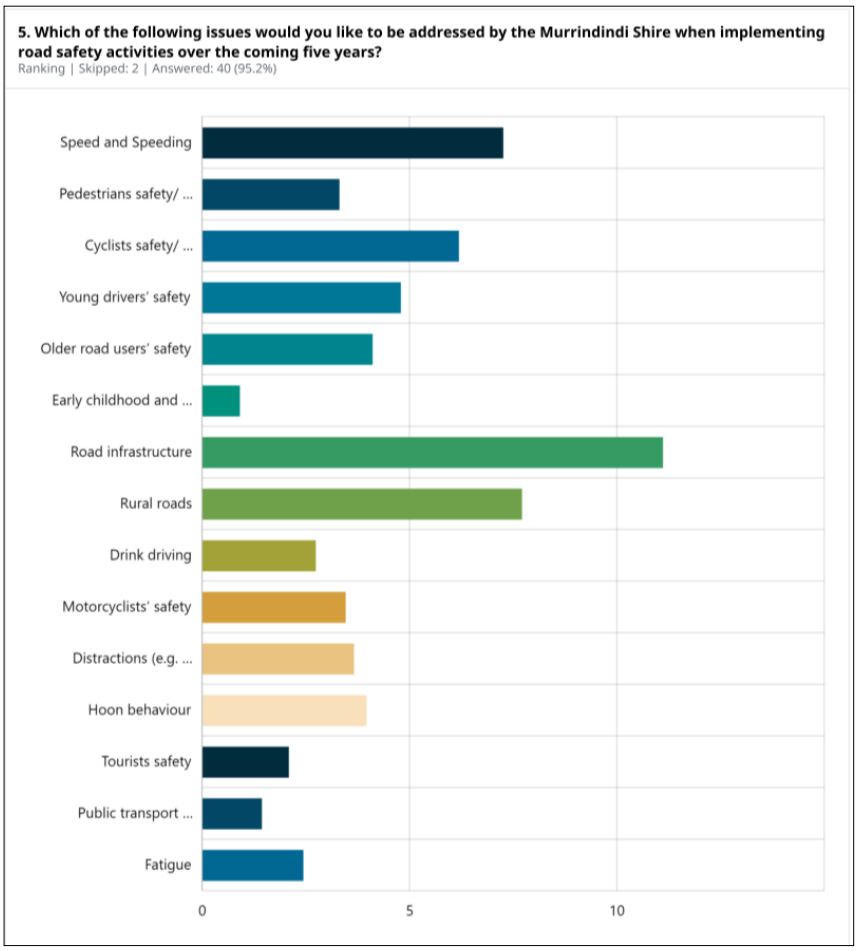

Figure 28: Community survey – Question 5 results

Among the suggested programs, education for young drivers and riders, road safety education programs for primary and secondary school students, and information sessions on road rules received the most interest (Figure 29).

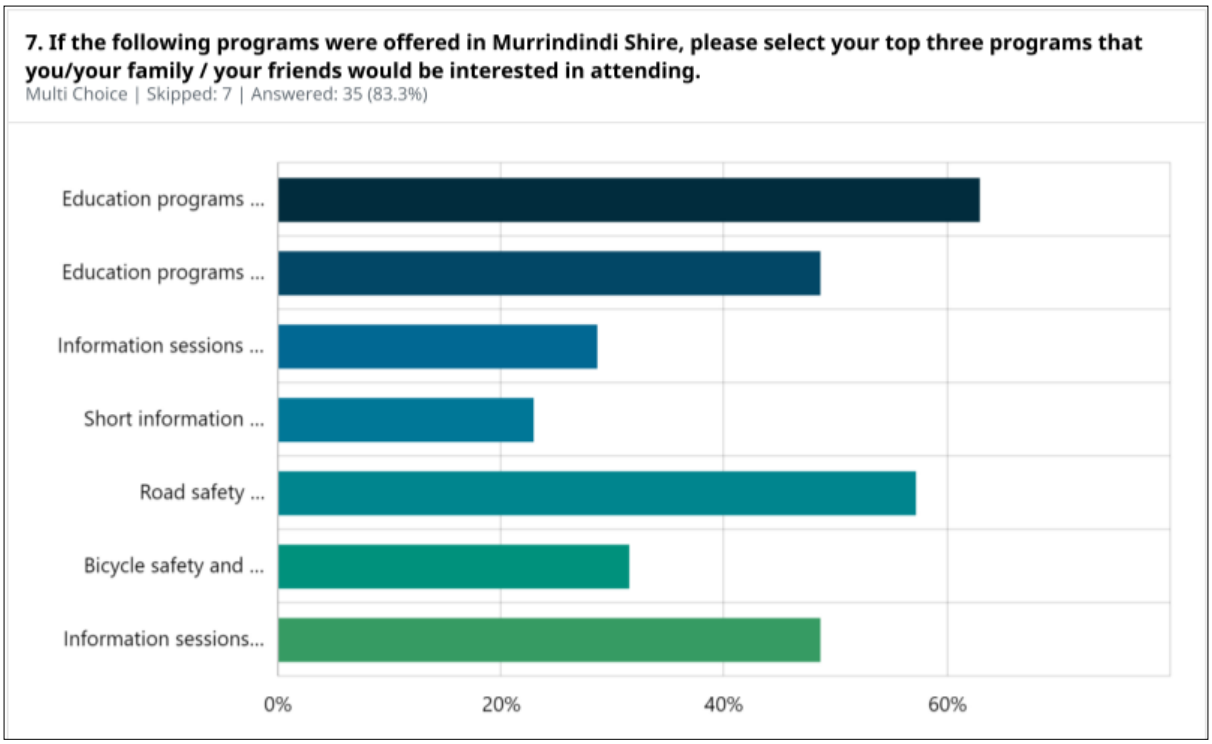

Figure 29: Community survey – Question 7 results

Summary of road safety issues raised in respondents' comments in the Community Survey

- Maintenance issues have been highlighted in many comments. The lack of proper maintenance has led to the deterioration of road conditions resulting in outcomes such as a high number of potholes, loose gravel on the road, faded line marking; and vegetation over the roads, at the roundabout, or on the roadside. There is an increased risk due to vehicles losing control when in contact with, or trying to avoid potholes, gravel, or trees. Sight distance is also limited due to vegetation.
- Presence of narrow high-speed roads on the network. The risk is significantly higher for cyclists on these roads.
- Lack of safe facilities for pedestrians and cyclists.
- Presence on unsealed roads and unsealed shoulders.
- Visitors are unfamiliar with Murrindindi roads.
- Speeding and overtaking issues, especially by large vehicles.
- Poorly lit roads.

3.2.2 Stage 2: Stakeholder consultation

A stakeholder consultation was organised on 29 November 2023 with representatives from Murrindindi Council, DTP, Victoria Police, and TAC, as well as the bicycle and motorcycle community. A draft of the Murrindindi Road Safety Strategy was presented to the groups. The meeting then focused on the discussion of seven strategic goals. The questions for discussion include:

- Do you agree this should be our Goals; why/why not
- What can you and your organisation do to support this area?
- What are the limitations of Council, in collaboration with your organisation?

Consultation results

In general, stakeholders were very engaged with the subject matter by showing agreement with the Goals and providing supportive and constructive comments on the potential action plans. A summary of comments on each goal is presented in a separate document.

3.2.3 Consultation Conclusions

In addition to the crash analysis, the results of the Community Survey and Stakeholder consultation successfully brought more insights into the safety issues in Murrindindi including the perception of risks by the community and the professional perspective of stakeholders. Safety issues such as missing crash data, changes in road conditions, poor road maintenance, high-speed limits, presence of animals, and driver fatigue have been highlighted and considered in the Action Planning (Section 5).

4 GOALS

In line with the key principles (Section 2.2) and the findings from crash analysis as well as community/stakeholder consultation, seven goals were set for the future of Murrindindi's road safety.

1. Reduce the number of fatal and serious injuries related to motorcycle crashes.
2. Ensure a self-explaining road network that helps to reduce the number of fatal and serious injuries of shire's visitors who are unfamiliar with the shire's road network.
3. Support the selection of suitable speed limits to improve survivability, especially on high speed roads, and improve compliance.
4. Improve safety on high-speed rural road mid-block.
5. Maintain good road conditions to ensure safe outcomes.
6. Support innovative solutions to prepare for future development as well as an integrated network with e-mobility and automation of vehicles.
7. Provide safe connections between and within communities (including townships and commercial areas) to increase accessibility and safety, in particular for the young and aging population, and tourists.

These goals will form the basis of the strategy actions, as outlined in the following sections.

5 ACTION PLANNING

A list of recommended actions to achieve the goals is presented in Table 2 below.

Table 2: Murrindindi Road Safety Strategy – Action Plans

No	Goal/ Objective	Action	Authority/ Teams	Specific objective	Outcome	Performance measure	Safety Performance Indicators	Time frame	Tools	Resources
1	1. Reduce the number of fatal and serious injuries related to motorcycle crashes by half	Identify all high-risk locations for motorcyclists	Engineering Services team	Create a project to identify high-risk locations for motorcyclists across the council road network with the consideration of under-reporting of crashes on forest roads	A list of high-risk sites with related treatments	Network coverage	All high-risk locations for motorcyclists across the whole council network are assessed		Spatial analysis; Site survey; Risk assessments	Motorcycle program
2		Implement treatments for at least 50% of the identified high-risk motorcycle sites (see action number 1)	Engineering Services / Project Delivery team	Create projects to implement the treatments Some identified hotspots for motorcycle crashes are: - Eildon – Jamieson Road, between Barnewall Plains Road and Eildon – Warburton Road, Eildon - Skyline Road near UT Creek Road intersection, Devils River - Whanregarwen Road, near Goulburn Valley Highway, Whanregarwen - Extons Road, Kinglake Central	Treatments are implemented at high-risk sites such as improving road surfaces with high friction surface treatment, installing rubrail barriers, improving emergency response, etc.	Number of treated sites Speed change Road user perception Perceived risks	Road safety improvements are implemented in 50% of the high-risk locations for motorcyclists		Speed survey; Community survey; Road Safety Audit	Federal Blackspot Programmes; TAC funding; Local council funding Safe Local Roads and Streets Program, Motorcycle Safety Levy funding
3		Education campaigns on motorcycle risks for residents and visitors	Communication team	Implement education campaigns on motorcycle safety	Ads and educational materials are provided	Number of people reached	100% of residents and 80% of visitors are aware of the associated risks of motorcycle crashes on the council network		Social media; Website; Road signs at tourism sites	TAC support
4		Propose safe routes for off-road recreational riders to utilise	Engineering Services Team	Provide safe travel routes and promote off-road recreational riders to utilise these recommended routes	Reduce exposure on high-risk routes	Number of recommended routes Traffic volume Road user perception Perceived risks	Promote 2 safe routes for off-road recreational riders		Community survey Traffic count	

No	Goal/ Objective	Action	Authority/ Teams	Specific objective	Outcome	Performance measure	Safety Performance Indicators	Time frame	Tools	Resources
5		Lobby DTP and State Government to improve crash data collection	Communication team	Lobby DTP and State Government to include crash data from various sources (e.g., hospital, unlicensed) and address the underreported data	Raise the attention of DTP and State Government on addressing the missing data issue	Communication record with DTP and State Government	Crash data is cross-checked by different sources to accurately measure the safety outcome		Emails Meetings	
6		Lobby the State and Federal Governments to introduce a motorcycle safety strategy	Communication team	Lobby the State and Federal Government to introduce a motorcycle safety strategy	Raise the need for a motorcycle safety strategy	Communication record with the State and Federal Government			Emails Meetings	
7	2. Ensure a self-explaining road network that helps to reduce the number of fatal and serious injuries of shire's visitors who are unfamiliar with the shire's road network	Implement projects to modify the road environment based on speed limit and road functionality	Engineering Services Team / Project Delivery team	Ensure all high-risk road environments match their speed limit and functionality to address the speeding issue. Some identified hotspots include: - Grant Street / Nihil Street intersection, Alexandra - Eildon – Jamieson Road, between Barnewall Plains Road and Eildon – Warburton Road, Eildon - Skyline Road near UT Creek Road intersection, Devils River - Whanregarwen Road, near Goulburn Valley Highway, Whanregarwen - King Parrot Creek Road, south of Fairview Road, Kerrisdale - Yarck Road, within Gobur G102 Bushland Reserve, Gobur - Extons Road, Kinglake Central - Myers Creek Road, between Healesville – Kinglake Road and Philips Road, Toolangi	All high-risk roads become 'self-explaining' e.g. including through enhanced signage and line markings	Number of treated roads Speed change Road user perception Perceived risks	All high-risk road environments match their speed limit and functionality with clear and consistent signs		Speed survey Community survey RSA	Federal Blackspot Programmes; TAC LGA grant funding; Local council funding; Safe Local Roads and Streets Program

No	Goal/ Objective	Action	Authority/ Teams	Specific objective	Outcome	Performance measure	Safety Performance Indicators	Time frame	Tools	Resources
8		Provide warnings at break stops and townships about the risks associated with the road conditions ahead	Engineering Services Team / Project Delivery team	Educate road users about the risks associated with the road conditions in advance. Road conditions may include nighttime animals, weather conditions, road geometry, etc.	Raise road users' awareness of risks associated with road conditions in advance	Number of information signs	Information is provided in advance of all high-risk routes		Signages Posters, banners	
9	3. Support the selection of suitable speed limits to improve survivability, especially on high speed roads	Develop projects to reduce the speed limit on all high-risk high-speed roads	Engineering Services Team / Project Delivery team	Reduce speed on high-risk high-speed roads to 80km/h or below	Speed limit reduction	Number of treated roads Speed change	Reduce speed limit on all high-risk roads where speed is a leading cause of FSI crashes		Speed survey Signages	Safe Local Roads and Streets Program
10		Implement at least 3 speed enforcement operations with Police		Implement speed enforcement operations to raise the compliance level on high-risk roads and roads which have new speed limits	Implementation of enforcement operations	Number of enforcement operations Number of infringements	Implement at least 3 speed enforcement operations with Police		Speed gun Speed camera	Police / TAC Enhanced Enforcement funds
11		Conduct a post-intervention speed study across the network	Engineering Services team	Conduct a post-intervention speed study across the network to evaluate the effectiveness of the treatments Suggest further solutions if needed	Confirm if 85th speed percentiles on all council roads are within the posted speed limit	85th speed percentiles	85th speed percentiles on all council roads are within the posted speed limit		Speed survey	Federal or TAC LGA grant funding
12	4. Improve safety on high-speed rural road mid-block	Develop Road Network Safety Plans for the whole network and Road Safety Audits on 100% of the high-	Engineering Services team	Understand the risks on the whole network and potential treatments to reduce run-off road likelihood and severity. The risks related to high-speed roads may include narrow road	Network Safety Plans report. A summary of risks on high-speed rural roads with related treatments	Network coverage	Develop Road Network Safety Plans for the whole network and Road Safety Audits on 100% of the high-		Risk assessments RSA Network safety plans[3]	Council fund Federal Blackspot Programmes

[3] Refer to National Road Safety Strategy 2021-30 pg.14 (https://www.roadsafety.gov.au/sites/default/files/documents/National-Road-Safety-Strategy-2021-30.pdf)

No	Goal/ Objective	Action	Authority/ Teams	Specific objective	Outcome	Performance measure	Safety Performance Indicators	Time frame	Tools	Resources
		speed rural road network to prioritise road safety treatments		width, no shoulders, sightlines blocked by vegetation, climate conditions (snow/fog), poor maintenance, animal access, lack of safety barriers, etc.			speed rural road network to prioritise road safety treatments			
13		Improve 2 to 3 targeted high-risk high-speed sites per year	Engineering Services team / Project Delivery team	Implement the treatments on 2-3 highest risk sites every year Aim for treatments that have the potential to reduce FSI crashes by 50%	Implement the treatments	Number of treated sites	Improve 2 to 3 targeted sites per year			Federal Blackspot Programmes
14		Conduct a post-intervention crash analysis across the network	Engineering Services team	Conduct a post-intervention crash analysis across the network to evaluate the effectiveness of the treatments Suggest further solutions if needed	Confirm if 50% of FSI crashes on high-speed midblock is reduced	Number of FSI crashes	Reduce 50% of FSI crashes on high-speed midblock		Crash data	Federal or TAC LGA grant funding
15	5. Maintain a good road and roadside condition	Perform routine and periodic road inspections	Roads and Parks team	Identify and repair the road defects (e.g., signs, line markings, road surface, and vegetation) in time to reduce the risks for road users including that of motorcyclists	Maintain good operating road conditions	The percentage of roads have good condition	The percentage of council roads that meet intervention level in compliance with the maintenance contract			
16	6. Support innovative solutions to prepare for sustainable future development as well as an integrated network with e-mobility and automation of vehicles	Provide at least 2 facilities for electric vehicles by 2030	Environment Programs team / Project Delivery team	Support the development of e-vehicle fleet	At least 2 facilities for e-vehicles are provided	Number of facilities for e-vehicles	Provide at least two facilities for electric vehicles by 2030			
17		Assess and improve road line-marking and signage on all council roads	Engineering Services team / Project Delivery team / Roads and Parks Team	Provide up-to-standard road line marking and signage on all council roads e.g. ensuring quality of markings and signage to ensure compatibility with vehicle safety features such as lane keep assist and speed limit support systems	All council roads meet the standard for road line markings and signage	Network coverage	All council roads meet the standard for road line markings and signage		Site survey	

No	Goal/ Objective	Action	Authority/ Teams	Specific objective	Outcome	Performance measure	Safety Performance Indicators	Time frame	Tools	Resources
18		Build a comprehensive GIS database for road management and risk assessment	Engineering Services team	Collect and build a comprehensive GIS database of road assets and recorded risks	GIS database	Network coverage Number of criteria	Build a comprehensive database for road asset management		Data collection GIS tools	
19	7. Provide safe connections between and within communities (including townships and commercial areas) to increase accessibility and safety, in particular for the young and aging population, and tourists.	Conduct network connectivity gap assessment for safe access to shopping precincts, schools, and tourism sites.	Engineering Services team	Identify the network connectivity gaps, considering safe access for the young and aging population, and tourists.	A list of network gaps	Number of assessed shopping precincts, schools, and tourism sites Number of network gaps	Conduct network road safety gap assessment for shopping precincts, schools, and tourism sites connections		Site survey Community survey Risk assessment RSA	
20		Provide at least one new project to improve accessibility where the demand is high	Engineering Services team / Project Deliver team	Provide new safe connection(s) to address the network gap Bring the focus on sustainable transport modes such as walking and cycling	New or improved connections	Number of new or improved connections	Provide at least one new project to improve accessibility where the demand is high			
21		Cooperate with RRV, DEECA, and other road authorities to raise the safety level at the network level across Murrindindi Shire	Engineering Services team	Cooperate with RRV, DEECA, and other road authorities such as: - Provide findings on safety issues - Provide community feedback - Cooperate on the maintenance process - Develop new projects	Related information is openly shared between road authorities	Number of communications Number of shared project	Improve coordination between different road authorities		Emails Workshops, seminal Data sharing platforms Murrindindi Shire Traffic Liaisons Meeting	
22		Develop promotion plans to encourage drivers to use in-town facilities for resting	Communication team	Reduce the likelihood of drivers' fatigue on roads by providing information and improving available resting facilities.	Provide appropriate services Installation of information signage	The number of routes are covered	Ensure all long connection corridors (more than 2 hours drive) are provided appropriate resting facilities and guidance signages		Stakeholder engagement Signage Advertisement campaign	

6 APPENDICES

6.1 SAFE SYSTEM AND VISION ZERO

Built on Vision Zero the Safe System is an internationally recognised framework to reduce road trauma, based on Sweden's success in achieving a 40% reduction in fatal and serious injuries, over 10 years. The Safe System approach is seen as the most effective way to produce road safety improvements. The core vision of this approach is that death and serious injury are not acceptable by-products of road transport, and we should be striving to eliminate such events, much as we have done in aviation, and workplace health and safety. The approach aims to provide a road system that recognises that road users do make mistakes, but through a systematic, long-term approach, works to reduce and ultimately eliminate the chance of these mistakes leading to serious injury outcomes. This goal is ambitious, especially since it will not be reached overnight, and not within the duration of this new strategy. However, this is the vision we ultimately aim to achieve.

The foundation of the System lays on four underlying principles:

1. ***The only acceptable fatality or serious injury toll on our roads is zero – zero tolerance***
   Everyone is susceptible to being injured, no one is exempt from being missed. Road safety needs to be focused towards reducing fatal and serious injuries.
2. ***People are vulnerable***
   If vehicles crash at high speed, then our bodies are subject to forces they cannot withstand. The approximate tolerances for the human body under different crash conditions are:
   - Head on crash with another car: 70 km/h
   - Side impact crash with another vehicle: 50 km/h
   - Side impact crash with a tree: 30 km/h
   - Pedestrian crash: 30 km/h.

   While our natural tolerance to physical forces is outside of our control, there is a lot we can do to reduce or avoid physical impact greater than our body's tolerance level.
3. ***People make mistakes***
   Human error is inevitable, and on our roads, human error can result in crashes and trauma. However, crashes need not (and should not) result in death or serious injury. The Safe System recognises the unavoidable nature of human error, and rather than placing the blame solely on the road user, recommends a shared responsibility approach, amongst those designing, maintaining and using the road space.
4. ***Shared responsibility***
   Creating a safe road network is everyone's responsibility. Businesses, organisations, communities, individuals, and road authorities all have a role to play in moving Towards Zero.

The Safe System approach uses five interacting elements (pillars) to address all factors contributing to crashes and severity:

1. ***Safer Roads***
   Road infrastructure plays a vital role in helping reduce crashes and minimise the severity of injuries, should a crash occur. Our roads should be designed and maintained to remove or minimise risk for road users and reduce the severity of crashes. Our roads should be forgiving of errors by road users and providing the safest possible outcome in adverse circumstances.

2. ***Safer Speeds***
   When a crash occurs, the weight and speed of the vehicle at the time of impact determine how much force is transferred to the people involved. For our fragile bodies, even a small difference in speed can mean the difference between life and death. The 'Safe Speeds' element aims to ensure that speed limits are appropriate and that road users travel at speeds safe for the conditions.
3. ***Safer People***
   Crashes often involve an element of human error. We should all take care and pay attention to the way we use the roads. This also means being aware of the road rules and other road users - for all modes of transport.
4. ***Safer Vehicles***
   Better safety features are continually being introduced to vehicles. These features can assist in preventing crashes by automatically detecting dangerous situations and reacting appropriately, or by reducing the impact forces on those involved in a crash. Increasingly safe vehicles play an important role in improving personal safety and reducing road trauma.
5. ***Post-Crash Care***
   The aim of post-crash care is to avoid preventable death and disability, limit the severity of the injury and the suffering caused by it, and ensure the crash survivor's best possible recovery and reintegration into society. The way in which persons injured in road traffic crashes are dealt with following a crash determines their chances and the quality of survival.

Figure 30: Safe System Pillars

Source: https://blog.altaplanning.com/elements-of-robust-data-in-the-safe-systems-approach-5034bd52a21f

Figure 31: Safe System and Traditional road safety

The Safe System approach introduces the tolerant impact speeds, which are speeds below it have a low chance of resulting in a fatal or serious injury crash. Figure 32 is a guide to Safe System impact speeds for common crash types. The human body is vulnerable and not built to withstand impact forces greater than 30km/h, above which the risk of death greatly increases. It should be noted that the angle of impact of a collision is also a factor that affects the severity of a crash. As far as is practically possible, infrastructure should be designed, and travel speeds managed so that the impact speeds when a crash occurs are below the thresholds.

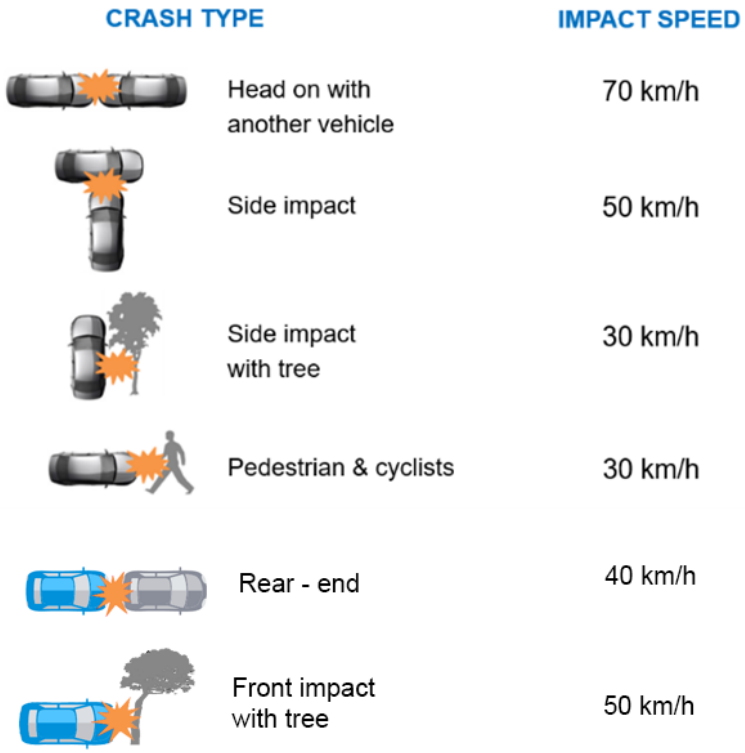

Figure 32: Safe System Impact Speeds

6.2 Movement and Place

Movement and Place classification have been provided for a large part of the Victorian network (Figure 33). The Movement ranges from M1 to M5 with the lower number indicating a more significant movement link. Similarly, the Place is categorised from P1 (a significant place that attracts a lot of activities) to P5 (a local place).

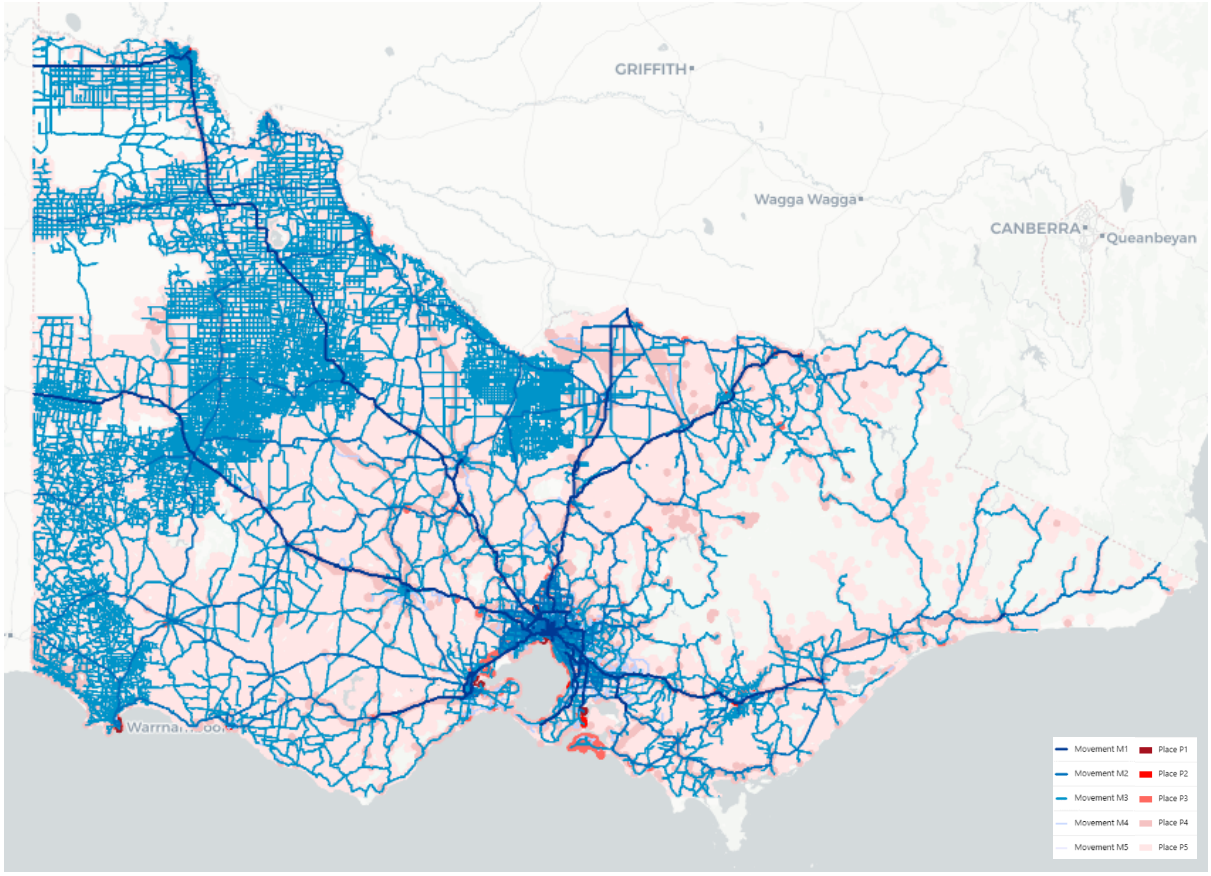

Figure 33: Movement and Place Classification in Victoria

Figure 34 demonstrates the classification of Movement and Place in Murrindindi Shire. While the Movement classification was applied mainly on arterial road networks with M3 to M4, the Place classification covered a broader road network, including some Council roads. Place classification in Murrindindi Shire is mostly P5 with the exception of some towns where it goes up to P4 or P3.

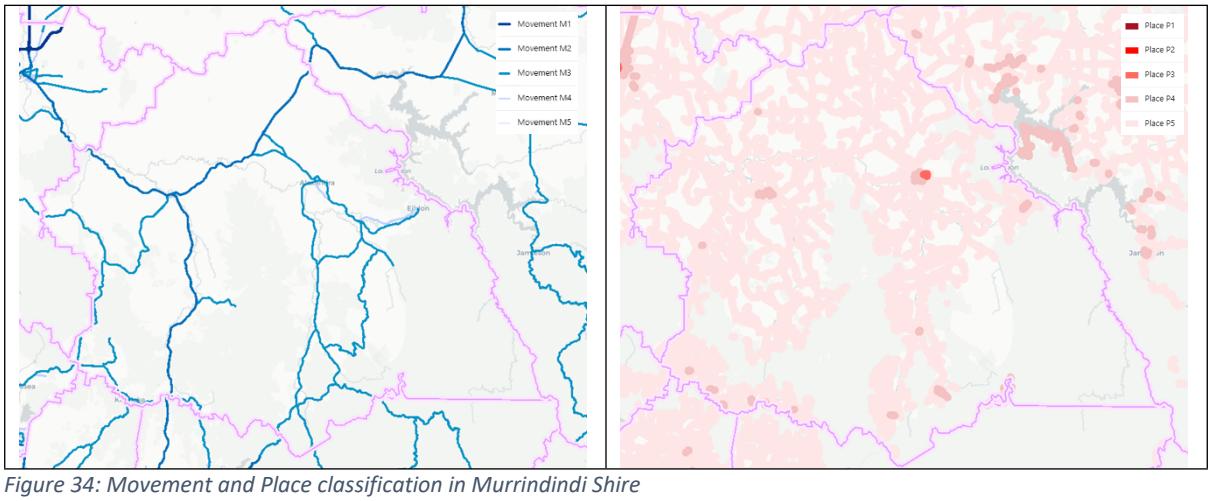

Figure 34: Movement and Place classification in Murrindindi Shire

6.3 CRASH ANALYSIS

6.3.1 Crash Data Description

6.3.1.1 Dataset

Crash data for the 10-year period of FY2010 to FY2019 were extracted from the VicRoads CrashStats database, and downloaded from the Data Vic platform. This data contains detailed individual crash information recorded by Victoria Police including time, location, crash type, road type, number of casualties, severity level, road user info, vehicle info, and other related factors. The analysis captures the general crash trend of the 10-year period, then focuses on analysing the crash characteristics of the more recent 5-year period between FY2015 and FY2019.

Data was also extracted from this same source for this same period for all other councils and the whole of Victoria. This enabled a comparison of crash types and crash trends in Murrindindi with these other locations.

Furthermore, an additional crash dataset was extracted from the Road Crash Information System (RCIS) for the period between 2000 and 2023. This dataset, however, includes a different set of variables, hence was not combined with the VicRoads CrashStats data. Therefore, an additional analysis was done on this RCIS dataset to capture the more recent crash trends in Murrindindi between FY2020 and FY2022. It is noted that the presence of COVID-19 may affect the travel pattern, hence significantly impacting the crash trends during this period.

Some other data were used in addition to the crash data such as 2021 census data from the Australian Bureau of Statistics (ABS), road networks from Murrindindi council and Open DataVic, and OSM base map.

6.3.1.2 Data assumption and limitations

- **Potential missing data**: The VicRoads CrashStats dataset may be missing some of the crashes for several reasons, such as, not yet being approved by Victoria Police, incorrect and/or missing information, or waiting for amendment. In addition, several crashes might occur but were not reported unless they resulted in a fatal or serious injury.
- **Residential status**: Persons involved in crashes for the shire are analysed as locals or visitors based on the reported postcode of their residency. Those who reported as residing outside the shire are considered as visitors. Local postcodes include 3711, 3712, 3713, 3714, 3717, 3718, 3719, 3763, and 3778.
- **Road owner**: The road management was categorised based on available spatial data, including a Department of Transport and Planning (DTP) declared roads layer, Murrindindi Road asset management layer, and road network layer from Open DataVic. A spatial analysis was performed to classify crashes by the road management agency. Crashes were assigned to the nearest DTP roads or Council roads (within 20m). All other crashes happened outside 20m of DTP roads and Council roads were classified as on other roads (e.g., national park's roads, tracks, or private roads).

6.3.2 Weighted Crashes FY2015-2019

Based on the Victorian Human Capital Costs for Rural Roads as specified in the National Guidelines for Transport System Management in Australian – Road Parameter Values (2015), the analysis team calculated the weighted crash scores by severity levels and DCA code for all crashes on Murrindindi Council roads and DTP roads from FY2015 to FY2019. The factors applied for severity levels were: Other injury, 1; Serious Injury, 24; Fatal, 108. A total weighted severity score for each crash type was derived from the weighted sum of severity types. The weighting places an emphasis on the crash types that are associated with the most frequently severe outcomes. The higher the score of a crash type, the higher the cost associated with that crash type. Four Priority Levels for crash types were defined based on the ranking. The lists of crash types that have the highest risk of severe crashes are presented in Table 3 and Table 4 below.

Table 3: Ranked DCA crash types on Council roads by weighted crashes (FY2015-FY2019)

DCA Cod	DCA Description	Fatal crash	Serious injury cra	Other injury cra	Total casualty crash	Priority (Total crashes)	Weighted (Total crashes)	Priority (Weighed Total crashes)
173	RIGHT OFF CARRIAGEWAY INTO OBJECT/PARKED VEHICLE	4	4	2	10	4	530	1
181	OFF RIGHT BEND INTO OBJECT/PARKED VEHICLE	2	10	11	23	1	467	2
120	HEAD ON (NOT OVERTAKING)	1	1	2	4	8	134	3
174	OUT OF CONTROL ON CARRIAGEWAY (ON STRAIGHT)		5	7	12	2	127	4
184	OUT OF CONTROL ON CARRIAGEWAY (ON BEND)		5	6	11	3	126	5
109	ANY MANOEUVRE INVOLVING PED NOT INCLUDED IN DCAs 100-108.	1		2	3	9	110	6

Table 4: Ranked DCA crash types on DTP roads by weighted crashes (FY2015-FY2019)

DCA Cod	DCA Description	Fatal crash	Serious injury cra	Other injury cra	Total casualty crash	Priority (Total crashes)	Weighted (Total crashes)	Priority (Weighed Total crashes)
181	OFF RIGHT BEND INTO OBJECT/PARKED VEHICLE	5	9	13	27	1	769	1
120	HEAD ON (NOT OVERTAKING)	3	13	10	26	2	646	2
171	LEFT OFF CARRIAGEWAY INTO OBJECT/PARKED VEHICLE	2	6	6	14	5	366	3
183	OFF LEFT BEND INTO OBJECT/PARKED VEHICLE		13	14	27	1	326	4
173	RIGHT OFF CARRIAGEWAY INTO OBJECT/PARKED VEHICLE	1	8	7	16	4	307	5
151	OUT OF CONTROL (OVERTAKING)	1	2		3	10	156	6
167	STRUCK ANIMAL		5	12	17	3	132	7
184	OUT OF CONTROL ON CARRIAGEWAY (ON BEND)		5	8	13	6	128	8

In addition, a similar analysis was conducted for the more recent crashes in FY2020 to FY2022 period. The results are shown in Table 5 and Table 6 below.

Table 5: Ranked DCA crash types on Council roads by weighted crashes (FY2020-FY2022)

DCA Cod	DCA Description	Fatal crash	Serious injury cra	Other injury cra	Total casualty crash	Priority (Total crashes)	Weighted (Total crashes)	Priority (Weighed Total crashes)
181	OFF RIGHT BEND INTO OBJECT/PARKED VEHICLE	2	4	3	9	2	315	1
183	OFF LEFT BEND INTO OBJECT/PARKED VEHICLE		7	3	10	1	171	2
171	LEFT OFF CARRIAGEWAY INTO OBJECT/PARKED VEHICLE	1	1	2	4	3	134	3
120	HEAD ON (NOT OVERTAKING)	1			1	6	108	4

Table 6: Ranked DCA crash types on DTP roads by weighted crashes (FY2020-FY2022)

DCA Cod	DCA Description	Fatal crash	Serious injury cra	Other injury cra	Total casualty crash	Priority (Total crashes)	Weighted (Total crashes)	Priority (Weighed Total crashes)
181	OFF RIGHT BEND INTO OBJECT/PARKED VEHICLE	1	9	8	18	1	332	1
183	OFF LEFT BEND INTO OBJECT/PARKED VEHICLE	1	3	5	9	2	185	2
120	HEAD ON (NOT OVERTAKING)	1	3	3	7	4	183	3
184	OUT OF CONTROL ON CARRIAGEWAY (ON BEND)	1		3	4	7	111	4
174	OUT OF CONTROL ON CARRIAGEWAY (ON STRAIGHT)	1		1	2	9	109	5
167	STRUCK ANIMAL		4	4	8	3	100	6

6.3.3 Additional crash statistics

Table 7: Crash statistics from FY2010 – FY2014

CATEGORY	DESCRIPTION	ALL ROADS										COUNCIL'S ROADS									
		All crashes		FSI crashes		All casualties		Fatality		Serious injury		All crashes		FSI crashes		All casualties		Fatality		Serious injury	
All types	***All types of crashes***	***541***	***100%***	***241***	***100%***	***915***	***100%***	***24***	***100%***	***260***	***100%***	***139***	***100%***	***56***	***100%***	***197***	***100%***	***2***	***100%***	***60***	***100%***
High speed roads	70-110 km/h speed limit	327	60%	178	74%	624	68%	24	100%	194	75%	77	55%	40	71%	113	57%	2	100%	42	70%
30-60 km/h speed limit	30-60 km/h speed limit	76	14%	23	10%	134	15%	0	0%	26	10%	30	22%	10	18%	50	25%	0	0%	12	20%
Intersections	At intersection	85	16%	30	12%	165	18%	3	13%	32	12%	27	19%	12	21%	44	22%	1	50%	11	18%
Midblock	At midblock	452	84%	210	87%	743	81%	21	88%	227	87%	112	81%	44	79%	153	78%	1	50%	49	82%
Young drivers	15-24 years old drivers (car and motorcycle)	121	22%	53	22%	228	25%	4	17%	56	22%	34	24%	14	25%	49	25%	0	0%	14	23%
Older drivers	65+ years old drivers (car and motorcycle)	46	9%	26	11%	86	9%	7	29%	27	10%	12	9%	4	7%	21	11%	0	0%	4	7%
Pedestrians	Involving pedestrians	7	1%	1	0%	16	2%	0	0%	1	0%	4	3%	0	0%	9	5%	0	0%	0	0%
Cyclists	Involving cyclists	4	1%	2	1%	7	1%	0	0%	2	1%	2	1%	1	2%	4	2%	0	0%	1	2%
Motorcyclists	Involving motorcyclists	315	58%	143	59%	407	44%	7	29%	140	54%	83	60%	34	61%	98	50%	1	50%	34	57%
Heavy vehicles	Involving heavy vehicles	12	2%	5	2%	39	4%	3	13%	4	2%	1	1%	1	2%	6	3%	0	0%	2	3%
Visitor	Involving visitors	401	74%	181	75%	655	72%	22	92%	190	73%	99	71%	42	75%	134	68%	2	100%	43	72%
Paved roads	On paved roads	329	61%	167	69%	651	71%	23	96%	184	71%	85	61%	40	71%	128	65%	2	100%	43	72%
Gravel and unpaved roads	On gravel and unpaved roads	197	36%	69	29%	242	26%	1	4%	71	27%	48	35%	14	25%	62	31%	0	0%	15	25%

CATEGORY	DESCRIPTION	DTP'S ROADS										OTHER ROADS									
		All crashes		FSI crashes		All casualties		Fatality		Serious injury		All crashes		FSI crashes		All casualties		Fatality		Serious injury	
All types	***All types of crashes***	***253***	***100%***	***129***	***100%***	***537***	***100%***	***21***	***100%***	***144***	***100%***	***149***	***100%***	***56***	***100%***	***181***	***100%***	***1***	***100%***	***56***	***100%***
High speed roads	70-110 km/h speed limit	207	82%	115	89%	449	84%	21	100%	129	90%	43	29%	23	41%	62	34%	1	100%	23	41%
30-60 km/h speed limit	30-60 km/h speed limit	32	13%	10	8%	65	12%	0	0%	11	8%	14	9%	3	5%	19	10%	0	0%	3	5%
Intersections	At intersection	44	17%	13	10%	106	20%	2	10%	16	11%	14	9%	5	9%	15	8%	0	0%	5	9%
Midblock	At midblock	208	82%	116	90%	427	80%	19	90%	128	89%	132	89%	50	89%	163	90%	1	100%	50	89%
Young drivers	15-24 years old drivers (car and motorcycle)	56	22%	24	19%	128	24%	3	14%	28	19%	31	21%	15	27%	51	28%	1	100%	14	25%
Older drivers	65+ years old drivers (car and motorcycle)	33	13%	21	16%	64	12%	7	33%	22	15%	1	1%	1	2%	1	1%	0	0%	1	2%
Pedestrians	Involving pedestrians	2	1%	1	1%	5	1%	0	0%	1	1%	1	1%	0	0%	2	1%	0	0%	0	0%
Cyclists	Involving cyclists	1	0%	1	1%	2	0%	0	0%	1	1%	1	1%	0	0%	1	1%	0	0%	0	0%
Motorcyclists	Involving motorcyclists	96	38%	57	44%	157	29%	5	24%	55	38%	136	91%	52	93%	152	84%	1	100%	51	91%
Heavy vehicles	Involving heavy vehicles	11	4%	4	3%	33	6%	3	14%	2	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Visitor	Involving visitors	182	72%	92	71%	374	70%	19	90%	100	69%	120	81%	47	84%	147	81%	1	100%	47	84%
Paved roads	On paved roads	236	93%	123	95%	510	95%	21	100%	137	95%	8	5%	4	7%	13	7%	0	0%	4	7%
Gravel and unpaved roads	On gravel and unpaved roads	13	5%	6	5%	17	3%	0	0%	7	5%	136	91%	49	88%	163	90%	1	100%	49	88%

Table 8: Crash statistics from FY2015 – FY2019

CATEGORY	DESCRIPTION	ALL ROADS										COUNCIL'S ROADS									
		All crashes		FSI crashes		All casualties		Fatality		Serious injury		All crashes		FSI crashes		All casualties		Fatality		Serious injury	
All types	***All types of crashes***	***512***	***100%***	***199***	***100%***	***810***	***100%***	***23***	***100%***	***201***	***100%***	***129***	***100%***	***53***	***100%***	***180***	***100%***	***8***	***100%***	***50***	***100%***
High speed roads	70-110 km/h speed limit	295	58%	136	68%	516	64%	19	83%	140	70%	76	59%	34	64%	106	59%	5	63%	34	68%
30-60 km/h speed limit	30-60 km/h speed limit	75	15%	26	13%	134	17%	3	13%	24	12%	26	20%	9	17%	43	24%	2	25%	7	14%
Intersections	At intersection	72	14%	28	14%	140	17%	1	4%	29	14%	18	14%	7	13%	28	16%	0	0%	8	16%
Midblock	At midblock	437	85%	171	86%	667	82%	22	96%	172	86%	111	86%	46	87%	152	84%	8	100%	42	84%
Young drivers	15-24 years old drivers (car and motorcycle)	100	20%	39	20%	184	23%	1	4%	46	23%	23	18%	10	19%	41	23%	1	13%	9	18%
Older drivers	65+ years old drivers (car and motorcycle)	63	12%	29	15%	136	17%	5	22%	31	15%	21	16%	10	19%	33	18%	3	38%	8	16%
Pedestrians	Involving pedestrians	9	2%	4	2%	28	3%	2	9%	2	1%	6	5%	3	6%	16	9%	2	25%	1	2%
Cyclists	Involving cyclists	5	1%	2	1%	8	1%	0	0%	2	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Motorcyclists	Involving motorcyclists	289	56%	108	54%	328	40%	8	35%	102	51%	63	49%	28	53%	70	39%	2	25%	26	52%
Heavy vehicles	Involving heavy vehicles	12	2%	5	3%	21	3%	0	0%	5	2%	2	2%	1	2%	2	1%	0	0%	1	2%
Visitor	Involving visitors	421	82%	169	85%	654	81%	18	78%	173	86%	97	75%	44	83%	135	75%	7	88%	41	82%
Paved roads	On paved roads	301	59%	134	67%	556	69%	20	87%	136	68%	90	70%	38	72%	132	73%	6	75%	37	74%
Gravel and unpaved roads	On gravel and unpaved roads	202	39%	65	33%	240	30%	3	13%	65	32%	39	30%	15	28%	48	27%	2	25%	13	26%

CATEGORY	DESCRIPTION	DTP'S ROADS										OTHER ROADS									
		All crashes		FSI crashes		All casualties		Fatality		Serious injury		All crashes		FSI crashes		All casualties		Fatality		Serious injury	
All types	***All types of crashes***	***210***	***100%***	***98***	***100%***	***423***	***100%***	***14***	***100%***	***102***	***100%***	***173***	***100%***	***48***	***100%***	***207***	***100%***	***1***	***100%***	***49***	***100%***
High speed roads	70-110 km/h speed limit	175	83%	87	89%	345	82%	13	93%	91	89%	44	25%	15	31%	65	31%	1	100%	15	31%
30-60 km/h speed limit	30-60 km/h speed limit	29	14%	10	10%	71	17%	1	7%	10	10%	20	12%	7	15%	20	10%	0	0%	7	14%
Intersections	At intersection	40	19%	14	14%	96	23%	1	7%	14	14%	14	8%	7	15%	16	8%	0	0%	7	14%
Midblock	At midblock	169	80%	84	86%	326	77%	13	93%	88	86%	157	91%	41	85%	189	91%	1	100%	42	86%
Young drivers	15-24 years old drivers (car and motorcycle)	44	21%	19	19%	99	23%	0	0%	26	25%	33	19%	10	21%	44	21%	0	0%	11	22%
Older drivers	65+ years old drivers (car and motorcycle)	39	19%	19	19%	97	23%	2	14%	23	23%	3	2%	0	0%	6	3%	0	0%	0	0%
Pedestrians	Involving pedestrians	2	1%	1	1%	10	2%	0	0%	1	1%	1	1%	0	0%	2	1%	0	0%	0	0%
Cyclists	Involving cyclists	4	2%	1	1%	7	2%	0	0%	1	1%	1	1%	1	2%	1	0%	0	0%	1	2%
Motorcyclists	Involving motorcyclists	67	32%	37	38%	88	21%	6	43%	33	32%	159	92%	43	90%	170	82%	0	0%	43	88%
Heavy vehicles	Involving heavy vehicles	10	5%	4	4%	19	4%	0	0%	4	4%	0	0%	0	0%	0	0%	0	0%	0	0%
Visitor	Involving visitors	164	78%	79	81%	338	80%	10	71%	86	84%	160	92%	46	96%	181	87%	1	100%	46	94%
Paved roads	On paved roads	201	96%	93	95%	410	97%	14	100%	96	94%	10	6%	3	6%	14	7%	0	0%	3	6%
Gravel and unpaved roads	On gravel and unpaved roads	8	4%	5	5%	12	3%	0	0%	6	6%	155	90%	45	94%	180	87%	1	100%	46	94%