



# Road Management Plan

## Nelson Road

March 2024



**Government of South Australia**  
Department for Infrastructure  
and Transport

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We acknowledge the Traditional Custodians of the Country throughout South Australia and recognise their continuing connection to land and waters. We pay our respects to the diversity of cultures, significance of contributions and to Elders past, present and emerging.



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# Executive Summary

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As part of the South Australian Government's election commitments a Road Management Plan (RMP) has been delivered for Nelson Road, spanning from Wright Road to McIntyre Road.

In collaboration with community and stakeholders, the RMP was developed to provide an in-depth analysis of existing safety and operational concerns along Nelson Road while identifying cost-effective alternatives for possible improvement opportunities that can reduce traffic congestion and enhance road safety for all road users. The Department for Infrastructure and Transport (the Department) has sought input from City of Salisbury prior to the report being finalised.

A preliminary community consultation took place to help identify any potential issues and areas for improvement related to road management and safety.

Management of this length of Nelson Road is split between the City of Salisbury and the Department. The section of Nelson Road between McIntyre Road and Montague Road is under the care, control, and management of the City of Salisbury, while the section between Montague Road and Wright Road is under the care, control, and management the Department. Part of Nelson Road between Wright Road and Grand Junction is not included in the RMP.

The RMP identifies existing traffic management issues and seeks to identify short to medium term improvements that have the potential to enhance road safety and alleviate congestion along Nelson Road. Some long-term road enhancements have been identified but the focus is to identify potential future measures that could make significant contributions to the current traffic situation.

The process of identifying existing traffic management issues included:

- research of historical transport investigation records
- site auditing and assessments
- analysis of recorded crash data and traffic flow statistics
- consultation with the community
- discussion with key stakeholders including the Department and City of Salisbury, Public Transport and Cycling and Walking, Asset Management representatives.

By following this comprehensive process, the aim was to ensure all aspects of road management were addressed effectively.

The following factors have been considered for both the Department and Council sections of Nelson Road:

- broader transport objectives
- role and function of the road
- the needs of all modes of transport including, freight and cars, buses, bicycles, and pedestrians
- community and stakeholder need and expectations
- consistency of treatments with known longer-term plans for the road or area
- application of appropriate standards and guidelines to ensure safety, consistency, and effectiveness of any proposed treatments.

Suggested improvements identified as a part of this RMP are presently unfunded and the recommendations require prioritisation against other statewide priorities over future financial years. This strategic approach guarantees that the limited funds available each year are wisely allocated to projects that can provide maximum benefits to the community.

# Existing road environment

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## General Description

Nelson Road is north south oriented, with a length of approximately 5 km between Grand Junction Road and McIntyre Road. The scope of the RMP specifically covers a shorter length of 3.8 km between Wright Road and McIntyre Road.

The road comprises a single lane in each direction with varying cross-sections, including painted centrelines or medians, solid medians, bike lanes and right turn lanes. Additionally, Nelson Road includes part-time peak period bike lanes in both directions between McIntyre Road and Montague Road, which operate from Monday to Friday between 7am and 9.30am as well as 3pm to 6pm. There are no bike lanes marked between Montague Road and Wright Road.

Nelson Road features footpaths along the length of the road, a single Pedestrian Actuated Crossing, and a pedestrian walkthrough for convenient access to the Para Vista Shopping Centre. Similar crossings can also be found at other key intersections.

The land use along the roadside is predominantly residential with scattered public facilities such as schools, churches, shops, and reserves. In regard to the RMP sections of the road, there are various intersection configurations including T-junctions, as well as single and dual lane roundabouts.

### Nelson Road

- Sections managed by both the Department and the City of Salisbury.
- Sub Arterial Road Function.
- Public Transport Corridor Including a Go Zone Bus Route.
- Average Annual Daily Traffic Volume (AADT) ranging between 7,800 and 13,000 vehicles.
- 60km/h posted speed limit.
- General Access Vehicle Route.
- A straight road with undulating sections that follow the natural vertical alignment of the surrounding landscape.

# Road Sections

The length of Nelson Road within the RMP has been divided in to 4 main sections:

- Section 1: McIntyre Road to Kesters Road
- Section 2: Kesters Road to Warren Road
- Section 3: Warren Road to Montague Road
- Section 4: Montague Road to Wright Road

Road management and development play a significant role in the area, with majority of road networks dedicated to residential use. Most properties along Nelson Road have access via service roads or lane ways. A few residential properties have direct crossover access to Nelson Road.

Nelson Road also serves as a crucial route for accessing the wider local road network and other commercial and residential developments including:

- Para Hills Tennis Club
- Liberman Kindergarten
- Para Hills Uniting Church
- Reserves
- Para Hills School and Preschool
- North Ingle School and Preschool
- Good Shepherd Lutheran School
- Early Steps Childcare Centre
- Para Vista Primary School
- Modbury West School
- Prescott Primary Northern
- Valley View Secondary School
- Ingle Farm East Primary School

Intersections and the vertical road alignment vary along the length of the road. Each section has been described further below.



Figure 1 - Sections along Nelson Road

## Section 1 – McIntyre Road to Kesters Road

This section of Nelson Road has a single lane in each direction, with peak period bike lanes, bus stops and sheltered right turn lanes for side roads (except at service road accesses). It is 1.3 km long and includes seven intersections. The undulating vertical road alignment contributes to some intersections having poor sight distance.



Figure 2 - McIntyre Road to Kesters Road

## Section 2 – Kesters Road to Warren Road

This section has a single lane in each direction, solid median, peak-period bike lanes, as well as a short section of parking lane on the western side only. The bike lane alongside the indented parking is marked full time. This section is 880 m long and includes six intersections. The undulating vertical road alignment contributes to some intersections having poor sight distance.



Figure 3 - Kesters Road and Warren Road

### Section 3 – Warren Road to Montague Road

This section has a single lane in each direction, painted centreline and peak-period bike lanes. It is 1 km long and includes seven intersections. The undulating vertical road alignment contributes to some intersections having poor sight distance.



Figure 4 - Warren Road to Montague Road

### Section 4 – Montague Road to Wright Road

This section has a single lane in each direction and a painted centreline. It is 600 m long and includes three intersections. The section is straight and flat.



Figure 5 - Montague Road to Wright Road

# Parking

Effective road management is crucial to ensure safe and regulated parking in this area. Within the City of Salisbury sections of Nelson Road (1, 2 and 3), on-street parking is restricted in accordance with the Australian Road Rules (ARR 208), as traffic lane widths limit the space available for passing parked vehicles. In the wider sections of the road, where drivers could pass a parked vehicle, continuous part-time bike lanes restrict on-street parking during the bike lane operational times.

On the western side of Nelson Road between the Milne Road Roundabout and Miller Avenue, there is a section of indented parking which has unrestricted parking control times. Site observations indicate the section is used occasionally and is considered underutilised.



Figure 6 - Parking along Nelson Road

Within the City of Salisbury sections, off street parking generators include, Para Vista Shopping Centre and Para Hills Tennis Club and ovals, and all have parking provisions onsite. Site observations indicate there was no overflow parking or obvious parking demand transfer to Nelson Road. In general, there was no on street parking observed on these sections of Nelson Road apart from within the formal indented parking bay.

Section 4 has a range of parking restrictions in place. These are clearly marked with yellow line markings and are typically found at specific features such as bus stops, the Pedestrian Actuated Crossing, intersections, and on the eastern side of Nelson Road between Heather Drive and the Wright Road roundabout near Prescott Primary Northern School. While on-street parking is possible between Malu Street and Heather Drive, the lane width is limited to 5 m. This means that larger vehicles, such as buses, may need to encroach into the opposing lane to pass a parked vehicle.

Several off-street parking generators were identified, including churches which have underutilised onsite parking spaces. Another area identified was the internal carpark and kiss-and-drop drive-through at Prescott Primary Northern School, just north of Wright Road. As drivers illegally park along the eastern side of Nelson Road on the approach to the school, this causes some queuing and interrupts traffic flow. While this only occurs briefly during school pickup and drop off, opportunities for improvement have been discussed as part of the midblock assessment to address parking concerns in the area.

# Public Transport

Nelson Road is a key corridor for public transport, with numerous services operating along the road and surrounding council roads. As shown in the image below, buses continually travel along Nelson Road. There are six primary services that operate via Nelson Road, including the 203, 225, 229, 506 and 546. Additionally, there are 22 existing bus stops located along both Council and the Department lengths. For school services, such as routes 475 and 479, there are dedicated school bus stops available. With efficient road management practices in place, Nelson Road remains an essential route for public transport in the area.

Nelson Road forms part of the Para Hills Go Zone via the 506 Bus route service and some routes form part of the O-Bahn Bus service connections. Stops 49 and 52 are time points for bus services. Site observations identified that on occasion buses were double stacking at these locations, momentarily limiting traffic flow along Nelson Road.



Figure 7 - Bus route network map along Nelson Road

Bus stops vary in their facilities, such as indents or shelters and accessibility in accordance with the *Disability Discrimination Act* (DDA). The City of Salisbury is responsible for the bus stops and manages an annual Bus Stop & Bus Shelter Renewal & Upgrade Program to target improvements. Of the stops along Nelson Road, the following has been identified from the program:

Table 1- Bus stops and status along Nelson Road

Stop Number	Side of Road	Stop Status
<b>Section 1</b>		
41E	West Side	In lane, not DDA compliant
41E	East Side	In lane, not DDA compliant
41D	West Side	Not DDA compliant
41D	East Side	Not DDA compliant
41C	West Side	DDA compliant Bus Pad installed, no new Bus shelter
41C	East Side	DDA compliant Bus Pad installed - no new Bus shelter
<b>Section 2</b>		
52	West Side	Not DDA compliant
52	East Side	Not DDA compliant
<b>Section 3</b>		
46	West Side	Not DDA compliant
46	East Side	Upgraded to DDA compliant
47A	West Side	Not DDA compliant
47A	East Side	Upgraded to DDA compliant
48	West Side	Not DDA compliant
48	East Side	Not DDA compliant
49	West Side	Not DDA compliant; programmed for 2024-2025 Financial Year
49	East Side	Not DDA compliant; programmed for 2025-2026 Financial Year
<b>Section 4</b>		
36	West Side	Not DDA compliant
36	East Side	Not DDA compliant
44	West Side	Not DDA compliant; programmed for 2026-2027 Financial Year
44	East Side	Upgraded to DDA compliant
45	West Side	Not DDA compliant
45	East Side	Upgraded to DDA compliant

The stops along Nelson Road are a combination of in lane or indented stops, with spacing between stops varying based on suitable locations within the road environment. Bus stops are located on or prior to road crests and spaced less than 400 m apart to maintain connectivity with the surrounding development.

Bus services on Nelson Road are operating adequately within scheduled timetables based on input from the Department's Public Transport. The 506 route experiences some delays during peak times when accessing Nelson Road.

Based on average peak period patronage data recorded, Bus Stops 49 East, 52 West, 47A East, 45 East, 44 East are most used and could be considered for adjusted prioritisation.

Nelson Road does not form part of any existing project currently undertaken by the Department and has not been identified for changes in past Bus Stop Management Plans.

## Road Assets

Both Council and the Department are responsible for road assets within their respective road sections, including pavements, electrical assets, pavement marking and delineation.

### Pavement

Council Sections 1 to 3 are managed via an annual program for repairs and maintenance. Based on visual inspections, the existing pavement is in good condition with some isolated defects. In some locations, there are minor pavement undulations and crocodile cracking (an area cracked in a pattern resembling the hide of a crocodile) in the wheel paths. Large-scale pavement surface works or rehabilitation are not planned for the short to medium term.

The Department's Section 4 is managed by its Road and Marine Section (Zone 1) through a maintenance contractor who undertakes cyclic inspections and repairs in accordance with the maintenance contract specification.

Existing pavement condition of these sections is good, with some isolated defects including crocodile cracking in wheel path sections and minor rutting. Large scale pavement surface works or rehabilitation are not prioritised in the short to medium term.

### Electrical Assets

Lighting mounted on Stobie poles is owned by SA Power Networks (SAPN), with the Department and City of Salisbury paying a tariff to ensure the lighting is maintained. Section 1 and 2 have a combination of lighting on SAPN Stobie poles and council tubular light poles. Section 3 lighting is Stobie pole mounted and located along the eastern side of the road. Council's Infrastructure Guidelines specify a minimum public lighting category of P3.

In Section 4, road lighting is Stobie pole mounted and located along the eastern side of the road. This section is currently not prioritised for upgrade to LED Luminaires. Luminaires in all sections are combinations of 150 and 250 High Pressure Sodium (HPS) and are replaced upon failure by SAPN or City of Salisbury with an equivalent LED luminaire. A night audit identified that road lighting and line marking is adequate, however lighting upgrades for changeover of HPS luminaires to LED should be prioritised.



Figure 8 – Views along Nelson Road at night

The Pedestrian Actuated Crossing within Section 4 is the only other electrical asset within the scope of the RMP. It has LED lanterns and links with the Para Vista Primary School. The crossing is in good condition and there are no works programmed in the short to medium term. The crossing is more than 20 years old and does not meet current Department standards in terms of signal pole separations, positions and fencing.

Crosswalk ramp grades are suitable, however improvements in terms of their compliance with DDA Standards could be undertaken.

## Role and Function of the Road

As per the 30 Year Greater Adelaide Plan, Nelson Road has been identified as a Transit Corridor. The Council's section of Nelson Road is classified as a collector road and functions as a high-frequency public transport corridor. The Department section serves as a sub arterial road and forms part of the same public transport corridor.

Although the 2022-2032 Cycling Strategy for South Australia does not specifically designate the Nelson Road sections within RMP as part of a specific cycling route outlined by the Department or City of Salisbury, it is important to incorporate the vision and objectives of this strategy into Nelson Road's planning. The RMP must consider key principles from the Cycling Strategy to ensure that Nelson Road's infrastructure is optimised for cyclists.

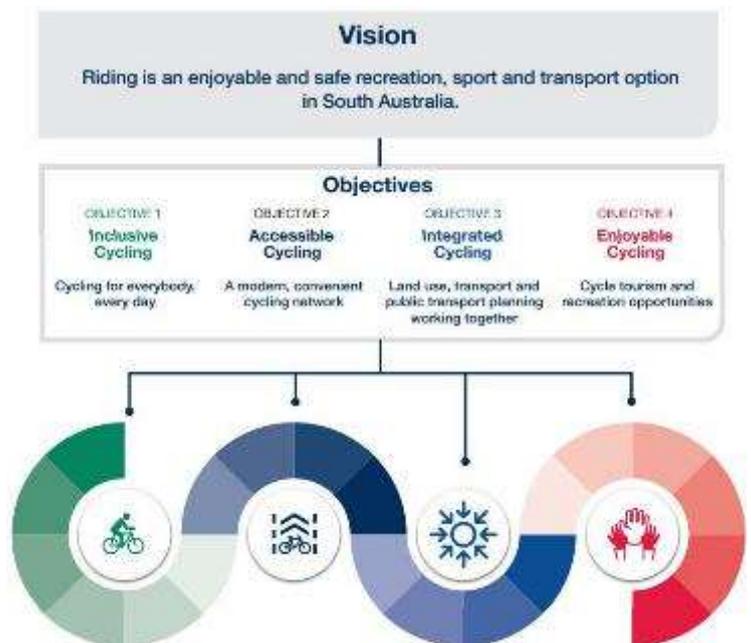


Figure 9 - 2022-2023 Cycling Strategy Vision and Objectives



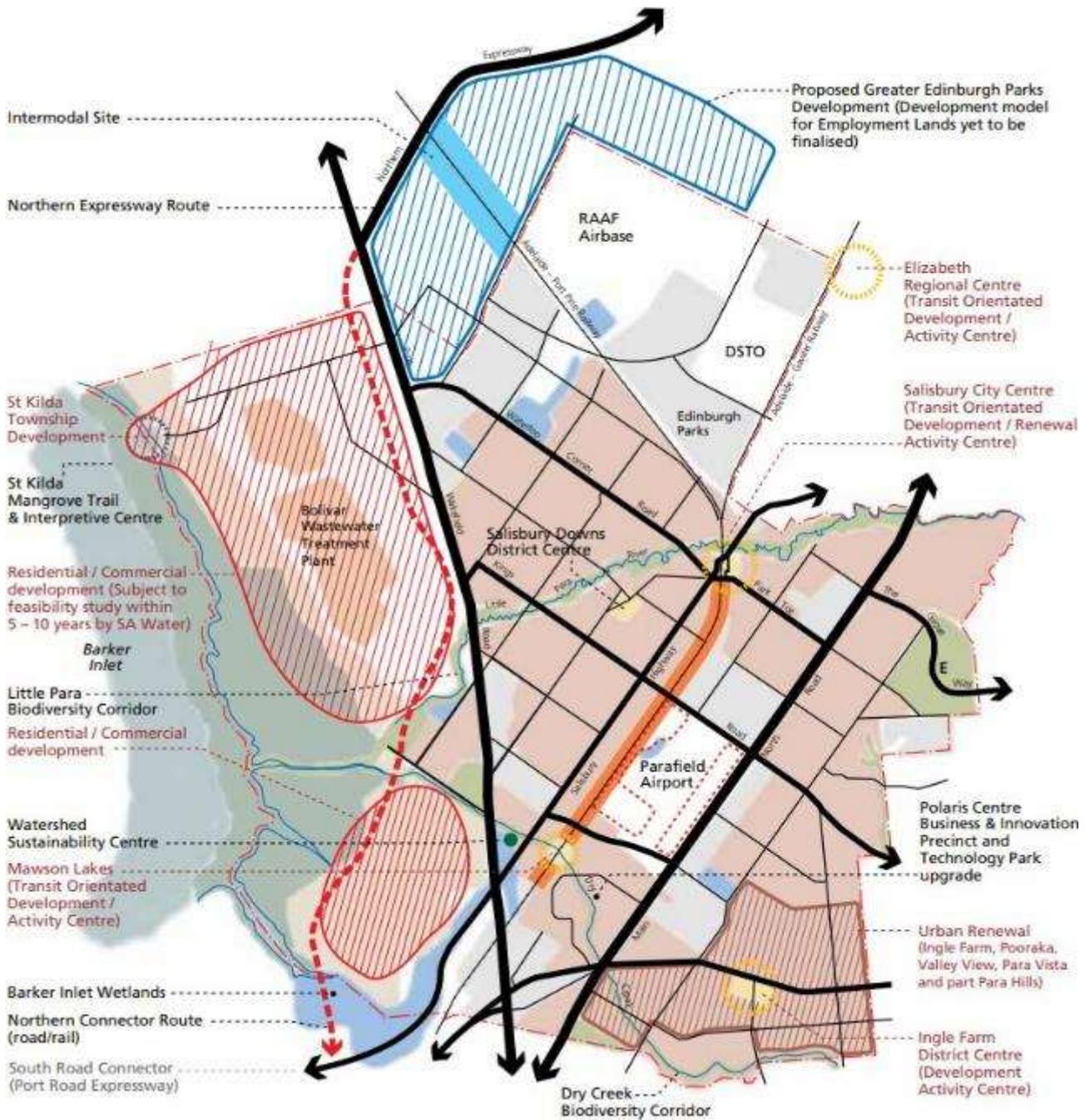


Figure 10B – Future Development of the City of Development (Salisbury City Plan 2020)

# Road Capacity

Traffic volumes vary along Nelson Road. Annual Average Daily Traffic (AADT) volumes range between 7400 and 13200 vehicles per day (two way) as shown in the image to the right.

Volumes are consistent between Wright Road and Montague Road, increasing between Montague Road and Milne Road and then reducing through to McIntyre Road.

Key East West traffic routes exist across Nelson Road, including between Kesters Road and Billabong Road and between Milne Road East and West.

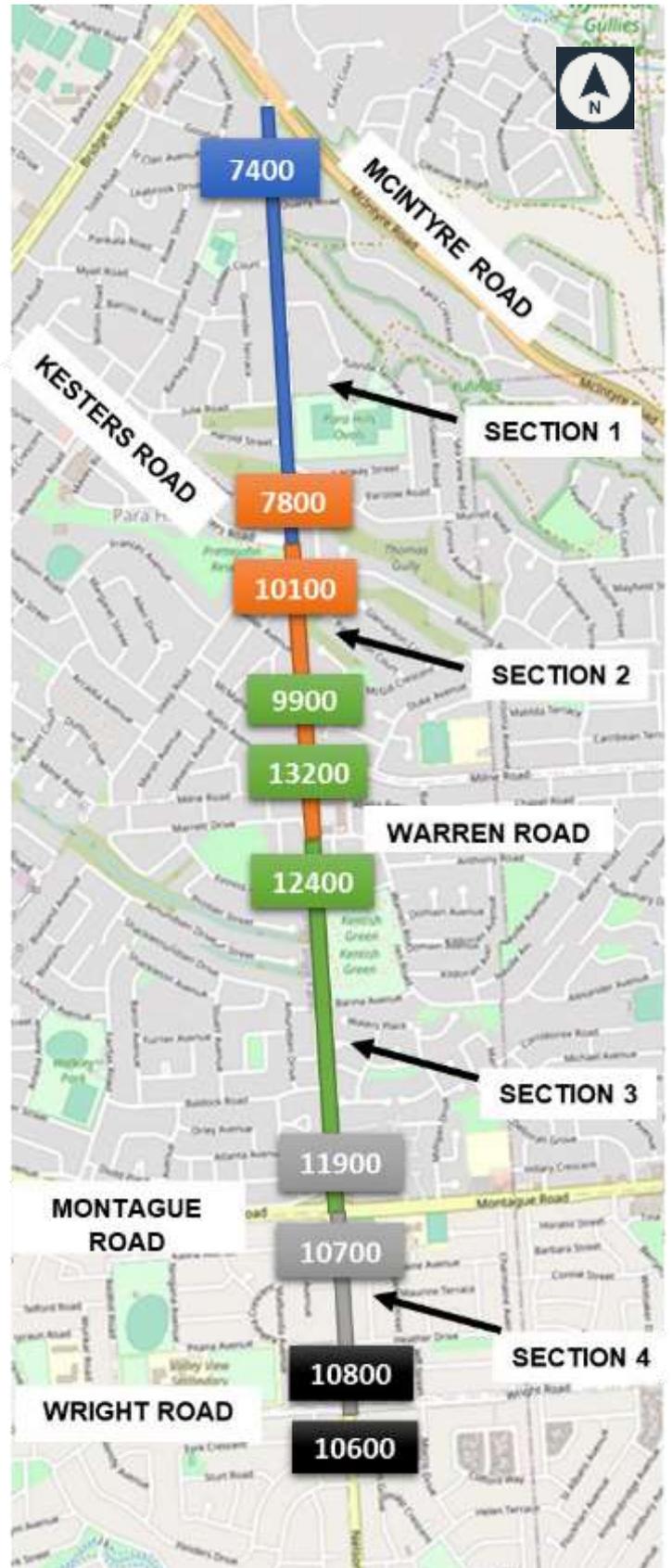


Figure 11 - AADT Values along Nelson Road (April 2022)

**Existing one-way peak period traffic volumes are shown in the adjacent image, with volumes varying along the different sections of Nelson Road.**

A single clear lane of traffic has the capacity to cater for 1200 vehicles per hour (Austroads Guide to Traffic Management), depending on the number and frequency of side roads and other factors which influence traffic flow.

Side road interactions, turning traffic and bus movements are all potential influencers. Based on current numbers, the peak volumes are within capacity for the current lane configuration.

There are limited opportunities for additional urban infill in the vicinity. It is however noted that further subdivision of allotments could occur but given the existing access arrangements and the predominant residential land use, significant changes are not expected.

The existing road cross-section is appropriate for both current and potential future traffic volumes and capacity, as future traffic volumes are not expected to grow significantly.



Figure 11 - One Way Peak Period Traffic Volumes

Figure 12 - AADT Values along Nelson Road (April 2022)

# Intersection Performance

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Significant intersections have been analysed using traffic modelling software SIDRA to assess overall intersection performance based on existing conditions.

Road management relies heavily on the performance of traffic flow, measured by the Level of Service (LOS) indicator which ranges from LOS A (best case) to LOS F (worst case). The LOS indicates how well the road is operating from a user perspective and its level of delay. Assessing the Degree of Saturation (DOS) at an intersection is crucial in determining its capacity to operate and cater for existing and future traffic.

To analyse intersection operations, the Department 's SIDRA Modelling Guidelines set targets and thresholds for different types of intersections, which are crucial in considering the need for upgrades or changes in road management. These assessments are undertaken against the peak traffic periods, representing the times when intersections are most used.

The following two locations have been modelled in the software to provide an indication of the intersections operating LOS (delay) and capacity based on existing traffic volumes and intersection layouts. The McIntyre Road and Nelson Road Intersection has been discussed separately further in the report.

Table 2 – Existing Intersection Performance

Intersection	Traffic Data	LOS AM Peak	LOS PM Peak	Degree of Saturation AM	Degree of Saturation PM
<b>Milne Road Roundabout</b>	31/08/2022	A	A	0.489	0.615
<b>Wright Road Roundabout</b>	07/04/2022	A	A	0.651	0.581

Based on the traffic modelling assessment, both the Milne Road Roundabout and Wright Road Roundabout are operating satisfactorily during peak periods in terms of intersection delay and capacity.

Given the above, opportunities for improvements have been discussed further below in the RMP.

# Community and stakeholder feedback

The project team conducted consultation with the community during a six-week consultation period in late 2022. Along with meetings with key stakeholders, members of the community were encouraged to complete an online survey and digitally 'pin' comments to relevant points along the corridor or intersection and categorise their feedback according to the nature of their comment.

The 34 survey responses identified their main mode of transport along Nelson Road as: 61% car, 15% public transport, 13% walking, 8% bicycle, 4% commercial vehicle and 2% mobility aid. Respondents were asked to categorise the opportunities for improvement. The chart below shows the frequency of improvement opportunities raised by survey respondents. Local insights outlined there are opportunities to improve:

- motorist safety
- congestion
- pedestrian safety.

## Congestion

Respondents broadly felt that the existing roundabouts along Nelson Road work well and are preferred over traffic lights.

Cars parked on Nelson Road were identified as contributing to congestions, particularly near schools. It was suggested that traffic congestion is particularly evident at the Wright Road and Nelson Road roundabout due to its location between two schools. Another cause of congestion identified was waiting behind turning vehicles.

Potential opportunities identified by the community to improve congestion included improvements to the turning movements at the junction of McIntyre Road and Nelson Road.

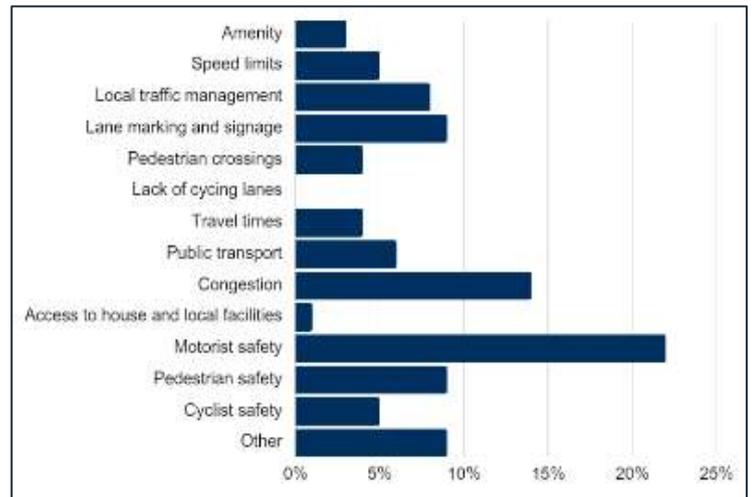


Figure 13 - Frequency of improvement opportunities raised by survey respondents.

## Motorist and pedestrian safety

Driver behaviour around schools and unsafe parking at school peaks times were referred to in the feedback.

Potential opportunities identified by the community to improve safety included:

- improvements to turning movements at Nelson Road onto McIntyre Road due to the change of speed on McIntyre Road
- improvements to sightlines for turning vehicles
- providing pedestrian crossings via pedestrian refuges in centre medians
- repositioning bus stops away from side streets
- installing "no parking zones" on Nelson Road
- Improving the condition of the road surface.

Initial consultation comments have been tabulated and comment responses provided in Appendix 3.

# Road Safety and Intersection Operation

Each of the intersections and midblock sections have been investigated below and analysed in terms of their operation, considering crash statistics recorded between 2018 and 2022.

Intersections and road lengths are commonly compared with each other in terms of crash history. A common funding source for upgrading these locations is the annual Black Spot Program. Road crashes are a major cost to Australians every year. The Black Spot program targets those road locations where crashes are occurring or are at risk of occurring.

Black Spot funding consideration for intersections, mid-block or short road sections requires a history of a minimum of three casualty crashes over a five-year period. Funding consideration for lengths of road requires an average of 0.2 casualty crash per kilometre per annum over five years.

## Intersections

The following table provides a summary of all locations. Those with no crash history or identified opportunity for improvement are not discussed in further detail. Sites with crash history and opportunities are documented further in the following table.

It should be noted that some locations have reduced sight distance due to the vertical road alignment along Nelson Road. However, crash analysis at those locations suggests these sight distance limits are not resulting in negative impacts to road safety. Improvements to sightlines, such as changes to the vertical alignments or property boundaries on Nelson Road are currently unjustified. These impacts are discussed in more detail as part of intersection summaries.

Table 3 - Summary of Intersection Crash History

Location	Crash History	Comment
<b>Nelson Road and McIntyre Road</b>	Discussed further below	
<b>Nelson Road Service Roads</b>	No Crashes Recorded	Local Traffic Only
<b>Nelson Road and Goodall Road</b>	Discussed further below	
<b>Nelson Road and Quarry Road</b>	No Crashes Recorded	A dead-end road
<b>Nelson Road and Goodwin Court</b>	Discussed further below	
<b>Nelson Road and Para Hills Tennis Club access</b>	No Crashes Recorded	Has a sheltered right turn lane
<b>Nelson Road and Yulinda Terrace</b>	No Crashes Recorded	Has a sheltered right turn lane
<b>Nelson Road and Julie Road</b>	Discussed further below	
<b>Nelson Road and Murrell Road</b>	Discussed further below	
<b>Nelson Road and Kesters Road</b>	No Crashes recorded since roundabout upgrade	Recently upgraded

<b>Nelson Road and Billabong Road</b>	Discussed further below	
<b>Nelson Road and Miller Avenue</b>	Discussed further below	
<b>Nelson Road and McGill Crescent</b>	No Crashes Recorded	Discussed in further detail below
<b>Nelson Road and Milne Road East and West</b>	Discussed further below	
<b>Para Vista Shopping Centre Access</b>	No Crashes Recorded	Has a sheltered right turn lane
<b>Nelson Road and Warren Road</b>	Discussed further below	
<b>Nelson Road and Finniss Avenue</b>	No Crashes Recorded	Discussed in further detail below
<b>Nelson Road and Barina Avenue</b>	Discussed further below	
<b>Nelson Road and Milligan Drive and Baldock Road</b>	Discussed further below	
<b>Nelson Road and Atlanta Avenue</b>	Discussed further below	
<b>Nelson Road and David Road</b>	No Crashes Recorded	A dead-end road
<b>Nelson Road and Montague Road</b>	Discussed further below	
<b>Nelson Road and Lorraine Avenue, Malu Street &amp; Heather Drive</b>	Discussed further below	
<b>Nelson Road and Wright Road</b>	Discussed further below	

# Nelson Road and McIntyre Road

## Operation summary

Nelson Road curves towards McIntyre Road to intersect at 90 degrees. The curve is treated with curve warning and advisory speed signage as well as Chevron Alignment Markers (CAM's)

During the morning peak, most of the traffic on McIntyre Road is heading north-west past the intersection. In the afternoon peak, traffic volumes are more balanced but slightly higher for the south-east bound direction on McIntyre Road.

Right turn volumes from McIntyre Road into Nelson Road are slightly higher in the PM peak compared with the AM. During the morning peak period, queuing occurs due to the right turn movements from McIntyre Road to Nelson Road. Occasionally, the right turn lane overflows into the McIntyre Road southbound through lane.

Majority of traffic turns left from Nelson Road onto McIntyre Road. The volume of drivers turning right onto McIntyre Road is very low. The latest turning movement survey (31/08/2022) identified a total of 14 vehicles turning right from Nelson Road onto McIntyre Road, during the AM and PM peak periods combined. Over the 11- hour survey, a total of 167 vehicles made a right turn. This maneuver can be challenging during peak times due to the volume of traffic on McIntyre Road. Off peak, there are reasonable gaps in traffic along McIntyre Road, created by the Bridge Road traffic signals to the west. Traffic from the east is easily identified coming down the hill along McIntyre Road, with regular gaps in traffic flow. There are no sight distance issues at the intersection. However, during peak periods queued traffic can temporarily obstruct the view for drivers turning.

The Nelson Road and McIntyre Road intersection provides a traffic connection to access the northern suburbs via Bridge Road, McIntyre Road and Main North Road. On Nelson Road, some northbound drivers take a right turn at McIntyre Road to head up the hill towards Gulfview Heights and other north-eastern suburbs via The Golden Way. Several drivers use the Milne Road Roundabout to access McIntyre Road, as part of a Milne Road East West link across Nelson Road.

Intersection modelling indicates that based on existing conditions, the overall intersection does not meet the operational performance targets in accordance with the Department's Traffic Modelling Guidelines.

## Crash statistics

Table 4 - Recorded Crash History at Nelson Road and McIntyre Road

Crash Type	Property Damage Only	Casualty	Total
Rear End	3	4	7
Right Turn	4	2	6
Right Angle	3	0	3
Hit Fixed Object (HFO)	2	0	2
<b>Total</b>	<b>12</b>	<b>6</b>	<b>18</b>

Most rear-end crashes occurred on the McIntyre Road approach, heading north-east. The right-angle crashes involved two drivers turning right onto McIntyre Road and another due to a left turn onto McIntyre Road. The HFO crashes involved inattentive drivers under the influence of alcohol. The right-turn crashes involved drivers turning right turn from McIntyre Road into Nelson Road.

## Opportunity for Improvement

The assessment has reviewed some options for improvement including:

- Applying a peak period right-turn restriction from Nelson Road onto McIntyre Road
- Installing a left-turn acceleration lane
- Installing traffic signals
- Installing a roundabout

Each of these options has different benefits and disbenefits, as well as varying complexities in terms of constructability.

The implementation of a restricted right turn during peak periods could be a smart movement design solution to alleviate traffic congestion at the Cornwall Drive intersection. By diverting drivers to use the U-turn maneuver, this aligns with existing driver behaviour and formalises the relocation of the right turn out movement. However, it is important to note that this may not solve all issues. Drivers turning right into Nelson Road continue to face challenges, indicating a need for further movement design improvements.

Designing safe roadways requires a thorough understanding of traffic movement patterns and potential hazards. While solutions such as Keep Clear pavement markings appear to be an easy fix for intersections like Nelson Road, it's important to consider the unintended consequences. As highlighted by the crash history, improving visibility for left turns may inadvertently increase risk for those turning right. A comprehensive approach to roadway design is necessary to ensure the safety of all drivers and pedestrians.

The design of roadways and intersections plays a crucial role in ensuring a safe and efficient movement of vehicles. This is particularly true for busy intersections such as Nelson Road and McIntyre Road. Given the high proportion of left-turning vehicles at this intersection, a left-turn acceleration lane onto McIntyre Road has been considered as part of the road design. The *Austrroads Guide to Road Design Part 4A – Unsignalised and Signalised Intersections* provides guidance on minimum lane length for such intersections. However, the constrained verge area and footpath on the western side of McIntyre Road would present challenges during construction. Despite these challenges, a well-designed left turn acceleration lane could improve the movement of traffic at this intersection.

Another effective tool to improve safety at intersections is the installation of traffic signals. As highlighted in the *Austrroads Guide to Traffic Management Part 6 - Intersections, Interchanges and Crossings Management*, traffic signals provide increased control over all movements at intersections, reducing the likelihood of collisions. Additionally, following the Department's Code of Technical Requirements ensures that traffic signals are designed to meet the highest safety standards. Prioritising safety in intersection design through the use of traffic signals can create safer and more efficient roadways for all users.

Based on traffic turning surveys and crash history at this location, the intersection does not currently meet the requirements for consideration of traffic signals. Nonetheless, traffic signals are an opportunity for improvement in terms of road safety and could be considered over the longer term. Traffic signals may impact access to Cornwall Drive and this would require further consideration as part of future planning and design.

Adopting a minimum traffic signal treatment as a scenario in SIDRA, the analysis suggests that if right-turn movements are fully controlled, right-turn queues would continue to overflow into McIntyre through lanes (lane extension limited by Cornwall Drive). However, the operation of McIntyre Road in the AM and PM

peaks could operate within LOS and Degree of Saturation (DoS) thresholds with current volumes.

The option to install a dual lane roundabout at the intersection of Nelson Road and McIntyre Road would require a large footprint to ensure that the traffic volume and vehicle types accessing McIntyre Road are adequately accommodated. Further consideration of the operation and length of the right turn from McIntyre Road to Nelson Road will also be required.

SIDRA analysis further reinforces that a large roundabout would be required, and the McIntyre Road approach would need re-alignment. Based on current traffic volumes at the intersection, a roundabout cannot operate within LOS and DOS thresholds. The roundabout would require significant roadwork, services impacts, and potential land acquisition, attracting a high cost for implementation.

Given the right turn demand during peak periods, the introduction of right-turn restriction could be considered over the short term. Further analysis of a future traffic volume scenario is required to gain a better understanding of the potential impact of traffic signals at the intersection over the longer term.

# Nelson Road and Goodall Road

## Operation summary

Goodall Road forms a connection between Bridge Road and Nelson Road. It provides for buses, access to residential development and rear access to the Somerset Hotel and the Bridge Road Market shopping area. Sightlines for drivers at the intersection are adequate.

## Crash Statistics

Crash statistics indicate the intersection is satisfactory from a road safety perspective.

Table 5 - Recorded Crash History at Nelson Road and Goodall Road

Crash Type	Property Damage Only	Casualty	Total
Hit Fixed Object (HFO)	0	1	1
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>

The HFO crash involved a driver crashing into a Stobie pole due to inattention while heading north on Nelson Road.

## Opportunity for improvement

The intersection currently facilitates concurrent movements of a bus and a passenger car. However, if two buses access the intersection at the same time potential conflict could occur. In the event that bus timetables change or frequency of services increase, the widening of intersection could be considered to better accommodate concurrent bus turning movements.

# Nelson Road and Goodwin Court

## Operation summary

Goodwin Court provides residential access and has an existing sheltered right-turn lane. The intersection is located just north of a road crest, limiting sight distance for drivers entering and exiting the intersection.

## Crash statistics

Crash statistics indicate the intersection is satisfactory from a road safety perspective.

Table 6 - Recorded crash History at Nelson Road and Goodwin Court

Crash Type	Property Damage Only	Casualty	Total
Right Angle	0	1	1
Rear End	0	1	1
<b>Total</b>	<b>0</b>	<b>2</b>	<b>2</b>

The right-angle crash involved a driver making the left turn towards to east, failing to give way to the vehicle going straight ahead to the north. The rear end crash involved a driver going straight ahead to the south, following too closely, with the front vehicle making a U turn.

## Opportunity for improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. The intersection layout provides for all movements and there are no opportunities for improvement identified in the short to medium term.

# Nelson Road and Julie Road

## Operation summary

Julie Road provides access between Nelson Road and Liberman Road and has a sheltered right-turn lane. It is located just south of a road crest, limiting sight distance for drivers entering and exiting the intersection.

## Crash Statistics

Table 7 - Recorded Crash History at Nelson Road and Julie Road

Crash Type	Property Damage Only	Casualty	Total
Hit Fixed Object (HFO)	0	1	1
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>

## Opportunity for improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. The intersection layout provides for all movements and there are no opportunities for improvement identified in the short to medium term.

# Nelson Road and Murrell Road

## Operation summary

Murrell Road provides access to the Para Hills oval and soccer club, as well as a significant amount of residential development to the east of Nelson Road. It connects through to Kelly Road, which is parallel to Nelson Road and links to Montague Road.

Murrell Road also provides access for buses and has a sheltered right-turn lane, as well as a pedestrian walkthrough across both Murrell Road and Nelson Road. The intersection is located on a road crest and there is a subtle curve through the intersection which is treated with Chevron Alignment Markers on the northbound approach for improved delineation. There are Stobie poles on each of the approaches, as well as in the centre median just north of the intersection. The central Stobie pole is treated with a crash cushion for northbound traffic.

Sight distance for drivers exiting Murrell Road is limited to the south due to a residential property fence boundary. When positioned at the give way hold line, available sight distance to the south is approximately 81m. Site observations note that drivers tend to shift forward and encroach into the bike lane to improve their view.



Figure 14 – Limited sightlines from Murrell Road, looking south.

### Crash statistics

Table 8 – Recorded Crash History at Nelson Road and Murrell Road

Crash Type	Property Damage Only	Casualty	Total
Hit Fixed Object (HFO)	1	0	1
<b>Total</b>	<b>1</b>	<b>0</b>	<b>1</b>

The HFO crash involved a driver crashing due to inattention while turning right out of Murrell Road.

### Opportunity for improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. The intersection layout provides for all movements and there are no opportunities for improvement identified in the short to medium term.

# Nelson Road and Billabong Road

## Operation summary

Billabong Road provides residential access and connects through to Kelly Road. Compared with other residential side roads to the north, this location does not have a sheltered right turn lane. The solid median area provides storage for a single vehicle to wait before turning into Billabong Road. Sightlines for drivers at the intersection are adequate.

## Crash statistics

Table 9 - Recorded Crash History at Nelson Road and Billabong Road

Crash Type	Property Damage Only	Casualty	Total
Hit Pedestrian	0	1	1
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>

The pedestrian crash involved a driver making a right turn from Billabong Road onto Nelson Road and crashing with a pedestrian crossing Nelson Road. It is noted that the new Kesters Road roundabout upgrade now provides a pedestrian walkthrough near this intersection.

## Opportunity for improvement

A sheltered right turn lane could provide improved storage capacity and space for drivers when turning into Billabong Road, while reducing the impact on northbound through traffic.

# Nelson Road and Miller Avenue

## Operation Summary

Miller Avenue provides residential access and bus access to the local road network west of Nelson Road. Like Billabong Road, this location does not have a sheltered right turn lane. The solid median area provides storage for a single vehicle to wait before turning into Miller Avenue. The intersection is located just north of a road crest, limiting sight distance for drivers entering and exiting the intersection. Buses turn right into Miller Avenue and impact southbound through traffic if waiting to turn into Miller Avenue.

## Crash Statistics

Table 10 - Recorded Crash History at Nelson Road and Miller Avenue

Crash Type	Property Damage Only	Casualty	Total
Side Swipe	0	1	1
Right Angle	1	0	1
<b>Total</b>	<b>1</b>	<b>1</b>	<b>2</b>

The right-angle crash involved a driver making a right turn from Miller Avenue crashing with a northbound driver on Nelson Road. The side swipe crash involved a driver attempting a U-turn at the intersection.

## Opportunity for Improvement

A sheltered right turn lane could provide improved storage capacity and space for drivers and buses turning into Miller Avenue, while reducing the impact on southbound through traffic.

## **Nelson Road and McGill Crescent**

### **Operation summary**

McGill Crescent provides residential access to a small residential catchment. The intersection is located just north of a road crest, limiting sight distance for drivers exiting the intersection.

### **Crash statistics**

There are no crashes recorded at this location.

### **Opportunity for improvement**

A sheltered right turn lane could provide improved storage capacity and space for drivers when turning into McGill Crescent, while reducing the impact on northbound through traffic.

# Nelson Road and Milne Road (East)

## Operation summary

The roundabout at this location caters to all traffic movements, but the limited pedestrian crossing access raises safety concerns. Although there is a cyclist bypass and improved cyclist access on the western side of the roundabout, pedestrians are limited to a narrow walkthrough on Milne Road East and Nelson Road South approach. The design of the intersection seems to prioritise drivers' sightlines, while safety measures for pedestrians and cyclists appear to be inadequate. A redesign that prioritises safety could make this intersection more accessible for all modes of transportation.

## Crash statistics

Table 11 - Recorded Crash History at Nelson Road and Milne Road (east)

Crash Type	Property Damage Only	Casualty	Total
Hit Fixed Object (HFO)	1	1	2
<b>Total</b>	<b>1</b>	<b>1</b>	<b>2</b>

The HFO crashes involved inattentive drivers, one southbound and one northbound crashing into roadside objects.

## Opportunity for improvement

Vegetation on the roundabout is overgrown, limiting driver sightlines, and should be managed to ensure drivers can identify oncoming or circulating traffic.

Improving pedestrian access at the roundabout could provide accessibility benefits, especially on the northern and eastern approaches. A pedestrian walkthrough could be installed on the northern approach and linked with adjacent footpaths using existing median widths, noting there is also nearby lighting to support the installation in the short to medium term.

Based on the recorded crash history, the roundabout is currently operating satisfactorily. Opportunities for improvement have been identified, including improving the pedestrian and cycling walkthrough across Milne Road East by modifying the Milne Road approach, and widening and adjusting the roundabout splitter island. There are several constraints on this approach, including stormwater, lighting, an embankment and level difference, requiring a substantial investment compared with the northern approach opportunity.

Furthermore, there is an opportunity to alter the roundabout approaches to radial design rather than the existing tangential design. The radial design would encourage lower vehicle approaching speed through roundabouts, which can improve safety for all road users.

# Nelson Road and Milne Road (West)

## Operation summary

The design of Milne Road West considers the safety of both pedestrians and drivers. The separated left and right turn spaces, central median with pedestrian walkthrough, and sheltered right turn lane all contribute to a safer road environment. However, during peak times there is some queueing which may result in minor delays for buses turning onto Nelson Road. To address this issue, it may be necessary to review the road's design and make some changes to improve traffic flow without compromising safety. Overall, Milne Road West is a well-designed local collector road that prioritises safety while providing efficient bus access.

## Crash statistics

Table 12 - Recorded Crash History at Nelson Road and Milne Road (west)

Crash Type	Property Damage Only	Casualty	Total
Rear End	0	1	1
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>

The rear end crash involved a driver making a left turn from Milne Road West into Nelson Road, crashing with another vehicle stopped on carriageway.

## Opportunity for improvement

The intersection may not be eligible for Blackspot funding; however safety should remain a high priority. While there is no apparent crash trend, the design of the intersection should be analysed for potential improvements. No opportunities for improvement were identified for the short to medium term. Longer-term opportunities for improved access from Milne Road may require more significant upgrades such as traffic signals or a roundabout. However, any improvements would need to consider the nearby Milne Road East roundabout and potential impacts to Nelson Road traffic flow. Prioritising safety and thoughtful design is crucial for maintaining a safe and efficient traffic flow in the area.

# Nelson Road and Warren Road

## Operation Summary

Warren Road links with Kelly Road and has a sheltered right-turn lane. There is a road crest just south of the intersection, limiting sightlines. There is a bus stop and indent located to the north of the intersection. The bus stops are considered suitably located. Both have been indented and provide direct links via a pedestrian walkthrough to the Para Vista Shopping Centre.

## Crash statistics

Table 13 - Recorded Crash History at Nelson Road and Warren Road

Crash Type	Property Damage Only	Casualty	Total
Right Angle	1	0	1
<b>Total</b>	<b>1</b>	<b>0</b>	<b>1</b>

The right-angle crash involved a driver turning right from Warren Road and crashing into a southbound driver on Nelson Road.

## Opportunity for improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. The intersection layout provides for all movements. There are no opportunities for improvement identified in the short to medium term.

# Nelson Road and Finniss Avenue

## Operation summary

Finniss Avenue provides access to a small residential catchment. At this location, Nelson Road begins to narrow as the median and carriageway widths reduce. There is a road crest to the south of the intersection, limiting sight distance for drivers entering and exiting Finniss Avenue.

## Crash statistics

There are no crashes recorded at this location.

## Opportunity for improvement

A sheltered right turn lane could provide improved storage capacity and space for drivers when turning into Finniss Avenue, while reducing the impact on northbound through traffic.

# Nelson Road and Barina Avenue

## Operation summary

Barina Avenue links to Warren Road, bordering a scout hall on its northern side and residential development on the southern side. Bus stop 48 is immediately north of the intersection and there is a road crest south of the intersection, reducing sight distance for drivers exiting Barina Avenue. The crest also limits forward sight distance for northbound drivers on Nelson Road.

## Crash statistics

Table 14 - Recorded Crash History at Nelson Road and Barina Avenue

Crash Type	Property Damage Only	Casualty	Total
Right Angle	0	1	1
Rear End	3	0	3
<b>Total</b>	<b>3</b>	<b>1</b>	<b>4</b>

The right-angle crash involved a driver heading south attempting to overtake a driver turning left out of Barina Avenue. The rear end crashes involved drivers crashing into other drivers on Nelson Road heading north, waiting to turn right into Barina Avenue.

## Opportunity for Improvement

The proposed improvement opportunity of a sheltered right-turn lane for Barina Avenue access could enhance the safety of drivers. By creating a designated lane, drivers can easily shift out of the through lane, reducing the risk of crashes. However, the road crest sight distance restriction remains a concern for drivers turning right onto Nelson Road. The design should consider this potential hazard and prioritise the safety of all drivers. While this treatment may require road widening and impact to nearby services and structures such as Stobie poles and bus indent areas, prioritising safety in design should always be an important consideration.

To ensure safety on the roads, it is imperative to consider appropriate design measures. In this regard, limiting traffic movements into and out of an intersection could be a viable option. This opportunity would not only reduce conflicting movements but also improve road safety for both Barina Avenue and Nelson Road. Moreover, it could enhance traffic flow on Nelson Road, which is a critical aspect of urban planning. Therefore, it becomes pertinent to undertake such design interventions for the short to medium term.

Drivers that currently turn right in and right out would be redirected to the Warren Road intersection, which provides a sheltered right-turn lane for local traffic. These turning movements are expected to be a low volume overall and could be accommodated at the Warren Road intersection.

# Nelson Road and Milligan Drive

## Operation summary

Milligan Drive provides access to a small residential catchment which connects through to Montague Road. There is a road crest and an indented bus stop just north of the intersection, limiting sight distance. The Nelson Road cross section reduces at this location and there is no median or sheltered right turn lane.

## Crash statistics

Table 15 - Recorded Crash History at Nelson Road and Milligan Drive

Crash Type	Property Damage Only	Casualty	Total
Right Angle	1	0	1
Rear End	2	0	2
Other-Vehicle Fault	0	1	1
<b>Total</b>	<b>3</b>	<b>1</b>	<b>4</b>

The right-angle crash involved a driver turning right out from Milligan Drive crashing into a southbound driver. The rear end crash was due to drivers following too closely.

## Opportunity for improvement

A sheltered right turn lane could provide improved storage capacity and space for drivers when turning into Milligan Drive, while reducing the impact on northbound through traffic. Due to the proximity of Baldock Road to the south, a back-to-back right turn lane scheme could be provided.

# Nelson Road and Baldock Road

## Operation Summary

Compared with Milligan Drive, Baldock Road provides for a larger residential catchment, as well as for buses. Minimum sightlines for drivers at the intersection are met, noting the road crest north of Milligan Drive is a limiting factor.

## Crash statistics

Table 16 - Recorded Crash History at Nelson Road and Baldock Road

Crash Type	Property Damage Only	Casualty	Total
Right Angle	1	0	1
Rear End	3	1	4
<b>Total</b>	<b>4</b>	<b>1</b>	<b>5</b>

The rear-end crashes involved a driver heading south who crashed into a driver stopped to make a right turn. The right-angle crash involved a driver turning right out of Baldock Road crashing into a driver heading north on Nelson Road.

## Opportunity for improvement

As identified for Milligan Drive, a sheltered right-turn lane could provide improved storage capacity and space for drivers and buses when turning into Baldock Road, while reducing the impact on northbound through traffic. Due to the proximity of Milligan Drive, a back-to-back right-turn lane scheme could be provided. The scheme could also support the council's 2022-2023 Financial Year.

# Nelson Road and Atlanta Avenue

## Operation summary

Atlanta Avenue is parallel to Baldock Road and provides residential access. Sightlines for drivers at the intersection are adequate. There is an indented bus bay immediately north of the intersection and an upgraded in-lane bus stop directly opposite the intersection.

## Crash statistics

Table 17 - Recorded Crash History at Nelson Road and Atlanta Avenue

Crash Type	Property Damage Only	Casualty	Total
Rear End	0	1	1
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>

The rear-end crash involved a driver travelling south and crashing into another vehicle that was stopped on the carriageway.

## Opportunity for improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. There are no opportunities for improvement identified in the short to medium term.

Over the longer term, the intersection could be improved by providing a sheltered right-turn lane. However, this section of Nelson Road is constrained, and a right-turn lane would require road widening, with potential impacts to Stobie poles, the bus indent and bus stops. It is therefore likely to attract high construction costs and is regarded as a longer-term consideration.

# Nelson Road and Montague Road

## Operation summary

The design of the Nelson Road and Montague Road dual-lane roundabout prioritises safety for both pedestrians and drivers. As the largest roundabout within the RMP scope, it includes dual lanes on all approaches and pedestrian walkthroughs on three of four approach legs. To further enhance safety measures, each roundabout approach includes large, green Advance Direction Signs and painted arrows in the lanes to advise drivers of the lane arrangement.

There are some delays and queuing during peak times, but from a traffic performance perspective, the roundabout is operating satisfactorily. Site observations identified that due to the roundabout size and its dual lanes, drivers can carry speed on the approaches through the roundabout if there are no oncoming vehicles.

The lighting at the roundabout has been reviewed and the existing lighting layout and illuminance is adequate and compliant to *Australian Standard 1158* (category V5).

## Crash statistics

Table 18 - Recorded Crash History at Nelson Road and Montague Road

Crash Type	Property Damage Only	Casualty	Total
Rear End	1	2	3
Side Swipe	10	0	10
Right Angle	5	1	6
Hit Fixed Object (HFO)	2	0	2
Left Road Out of Control	1	0	1
<b>Total</b>	<b>19</b>	<b>3</b>	<b>22</b>

This location has the highest record of crashes at an intersection within the RMP scope. Approximately half of the recorded crashes are side swipe crashes, with the majority involving drivers entering the roundabout and heading southbound. The recorded right-angle crashes occurred across all approaches.

## Opportunity for improvement

The installation of a pedestrian walkthrough on the western leg of the roundabout, as well as upgrades to each of the other walkthroughs, would be a step towards improved accessibility. This would support potential separated off-road shared paths around the roundabout, creating safer crossing points and alternate options for cyclists in the short to medium term. The intersection's eligibility for Blackspot funding may provide an opportunity to implement these changes and prioritise safety for all road users.

# Nelson Road and Lorraine Avenue

## Operation summary

Lorraine Avenue provides for residential access and sightlines are adequate.

## Crash statistics

Table 19 - Recorded Crash History at Nelson Road and Lorraine Avenue

Crash Type	Property Damage Only	Casualty	Total
Right Angle	1	0	1
<b>Total</b>	<b>1</b>	<b>0</b>	<b>1</b>

The right-angle crash involved a driver turning right out from Lorraine Avenue crashing with a driver travelling on Nelson Road.

## Opportunity for improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. The intersection layout provides for all movements and there are no opportunities for improvement identified in the short to medium term.

# Nelson Road and Heather Drive

## Operation summary

Heather Drive provides for residential access and sightlines are adequate.

## Crash statistics

Table 20 - Recorded Crash History at Nelson Road and Heather Drive

Crash Type	Property Damage Only	Casualty	Total
Right Turn	0	1	1
<b>Total</b>	<b>0</b>	<b>1</b>	<b>1</b>

## Opportunity for Improvement

The intersection is not eligible for Blackspot funding and there is no apparent crash trend. The intersection layout provides for all movements and there are no opportunities for improvement identified in the short to medium term.

# Nelson Road and Wright Road

## Operation Summary

The Wright Road roundabout includes a single lane on all approaches and pedestrian walkthroughs on three of four approach legs. On each roundabout approach there are green Advance Direction Signs (except for Nelson Road southbound approach) and sightlines are adequate.

Based on the existing traffic volumes and the geometry of the intersection, SIDRA traffic modelling and site observations indicate the overall intersection meets operational performance targets and is operating within an appropriate level of service and capacity. The analysis identified queuing and delay on approaches during peak periods, which was also observed on site. However, from a traffic performance perspective, the roundabout is operating satisfactorily.

## Crash Statistics

Table 21 – Recorded Crash History at Nelson Road and Wright Road

Crash Type	Property Damage Only	Casualty	Total
Rear End	4	1	5
Hit Fixed Object (HFO)	1	0	1
Right Angle	0	1	1
Head On	0	1	1
<b>Total</b>	<b>5</b>	<b>3</b>	<b>8</b>

Most recorded crashes are rear end. These occurred on all approaches with no obvious trend, similarly with the other recorded crashes. The recorded right-angle crash involved a cyclist.

## Opportunity for Improvement

The intersection is eligible for Blackspot funding. The roundabout provides limited opportunities for pedestrian and cyclist access. Installing a pedestrian walkthrough on the western leg of the roundabout could improve accessibility and support potential off road cycling ramp connections to footpaths, to provide alternatives to cycling in lane through the roundabout in the short to medium term.

# Midblock Locations

## City of Salisbury

The Council and the Department midblock sections were reviewed and separated. Within the Council Sections 1, 2 and 3 from McIntyre Road to Montague Road there were nine recorded midblock crashes.

### Crash Statistics

Table 22 - Recorded Midblock Crashes along Council's Sections of Nelson Road

Crash Type	Property Damage Only	Casualty	Total
Side Swipe	2	0	2
Hit Fixed Object (HFO)	1	2	3
Hit Parked Vehicle	1	0	1
Right Angle	0	1	1
Rear End	1	1	1
Head on	1	0	1
<b>Total</b>	<b>6</b>	<b>4</b>	<b>10</b>

There are no obvious crash trends or road users overrepresented in the data. One of the side swipe crashes involved a cyclist. Approximately 18% of the midblock crashes occurred at night. A crash that resulted in a fatality in 2018 was investigated and found to be non-road related.

The road verge area adjacent within these sections of road varies in terms of width and the presence of footpath and roadside hazards. There are Stobie poles and trees along the edge of the road, primarily between Montague Road and Milne Road, some within 1.5 m of the kerb. Two of the HFO crashes involved drivers crashing into trees, however there are no recorded impacts with Stobie poles. The likelihood of a crash occurring at the isolated Stobie pole locations is low and, as such, recommendations for further protection or relocation of Stobie poles has not been considered as part of the RMP.

### Opportunity for Improvement

Based on the crash analysis and the initial community feedback, the following midblock opportunities could provide improvements for Nelson Road in the short to medium term, including:

- Installing a pedestrian walkthrough between bus stops 52 east and west on Nelson Road, for improved pedestrian accessibility between stops and to surrounding informal paths.
- Installing a pedestrian walkthrough just south of the Para Hills Tennis Club for improved pedestrian accessibility across Nelson Road to surrounding informal paths and recreation.

- Installing emergency vehicle crossovers using mountable kerb sections between Kesters Road and Murrell Road and additionally between Miller Road and Billabong Road, to provide an option for emergency vehicles to pass stopped traffic in emergencies.
- Changing the existing peak period bike lanes in both directions to full-time bike lanes to create a clearway for traffic flow along Nelson Road. This would have a minor impact on residents as the majority gain access via service roads or local roads.

# Department for Infrastructure and Transport

Within the Department Section 4, from Montague Road to Wright Road, three midblock crashes were recorded. The majority occurred near Heather Drive. There are no obvious crash trends or road users overrepresented in the data.

Table 23 - Recorded Midblock Crashes along Council's Sections of Nelson Road

Crash Type	Property Damage Only	Casualty	Total
Rear End	0	2	2
Head On	0	1	1
<b>Total</b>	<b>0</b>	<b>3</b>	<b>3</b>

As identified earlier in the report, the operation of the Prescott Primary Northern School impacts Nelson Road. Ensuring safety in the design of the Kiss and Drop area at the school is essential. Site observations during peak times revealed that most families parked on Nelson Road or drove into the school. However, a small number of families parked within the church carpark and walked across Nelson Road to access the school. While fewer than five families did so at the time of observation, it is important to consider their safety in any future longer-term design plans. Additionally, students arriving via bus stops 44 crossed Nelson Road without issue.

In terms of safety and design, it is important to carefully consider possible improvements to pedestrian crossings. While it may be difficult to justify the implementation of a Pedestrian Actuated Crossing in certain areas based on current crash history and low crossing demand, it is crucial to prioritise the safety of pedestrians whenever possible.

Given the existing road width and bus stop locations, installation of a pedestrian refuge could also be considered. However, road widening would be required at this section to accommodate travel lanes, bicycle lanes and a pedestrian refuge.

Road widening on the western side of Nelson Road not only aligns with the Department 's preference for roads that are bus routes, but also presents an opportunity for safety and design improvements. With a desired carriageway width of 12 m, there is room for a painted median that incorporates sheltered right-turn lanes for Heather Drive and Lorraine Avenue. Such improvements would not only enhance the safety of all road users but also improve the overall design of this public transport corridor.

The proposal for full-time bike lanes northbound on Nelson Road (with or without road widening) is not only an environmentally conscious solution but also a practical one. By considering road widening as a potential longer-term improvement and enabling through lane widths to be adjusted and made wider on the eastern side, additional space for parking outside of bike lane operation times could be provided. This would improve safety for passing stopped buses, crossing Nelson Road, and accessibility to the nearby school. Incorporating such innovative design solutions is essential in creating a more sustainable and safer environment for all.

## Opportunity for Improvement

Based on the crash analysis and the initial community feedback, the following midblock opportunities could provide improvements for Nelson Road in the short to medium term, including:

- Installing northbound full time bike lanes and southbound part time bike lanes along Nelson Road to provide improved on road parking controls and formally allocate road space for cyclists to improve road safety. Roadside development on the western side of Nelson Road already has off-street parking. On the eastern side, available parking is limited and is already restricted full-time between Heather Drive and Wright Road surrounding the school.
- Southbound peak period bike lanes are proposed to operate during traffic and school peak times, Monday to Friday 7am - 10am and 3pm - 7pm, extending and further highlighting parking controls for drivers.
- Relocate bus stop 44 west further north to increase the offset to stop 44 east side and indent the bus stop.

Traffic volumes along this midblock section of road, as well as at side roads, are low compared with many other Department roads. As such, short to medium-term options, as well as longer term options are a low priority at this time.

# Summary of opportunities

The intersection and midblock opportunities identified have been listed in tables below and separated between Council and the Department.

## City of Salisbury

Table 24 – Summary of Prioritised Opportunities for Council

Location	Opportunity	Priority
<b>Nelson Road and Goodall Road</b>	Intersection widening for bus movements	Low
<b>Between Quarry Road and Goodwin Court</b>	Pedestrian Walkthrough	Low
<b>Between Murrell Road and Kesters Road</b>	Emergency Vehicle Crossover	Low
<b>Nelson Road and Billabong Road</b>	Install a sheltered right lane for traffic entering Billabong Road	Low
<b>Bus Stop 52</b>	Pedestrian Walkthrough	Low
<b>Between Billabong Road and Miller Avenue</b>	Emergency Vehicle Crossover	Low
<b>Nelson Road and Miller Avenue</b>	Install a sheltered right lane for traffic entering Miller Avenue	Low
<b>Nelson Road and McGill Crescent</b>	Install a sheltered right lane for traffic entering McGill Crescent	Low
<b>Nelson Road and Milne Road Roundabout</b>	Install a pedestrian walkthrough and footpath connection on the northern roundabout approach	Low
<b>Nelson Road and Milne Road Roundabout</b>	Modify and upgrade the walkthrough on the eastern approach	Low
<b>Nelson Road and Milne Road Roundabout</b>	Alter the roundabout design from a radial to tangential design	Low
<b>Nelson Road and Finniss Avenue</b>	Install a sheltered right lane for traffic entering Finniss Avenue	Low
<b>Nelson Road and Barina Avenue</b>	Limit access to left in and left out	Medium
<b>Nelson Road and Barina Avenue</b>	Sheltered right-turn lane (longer term option)	Low
<b>Nelson Road and Miller Road</b>	Install a sheltered right lane for traffic entering Miller Road	Low
<b>Nelson / Milligan Road / Baldock Road</b>	Install back-to-back right turn lanes	Medium

Location	Opportunity	Priority
Midblock Between McIntyre Road and Montague Road	Full time bike lanes in each direction	Low

## Department for Infrastructure and Transport

Table 25 - Summary of Prioritised Opportunities for the Department

Location	Opportunity	Priority
Nelson Road and McIntyre Road	Signed peak period right-turn restriction, U-turn at Cornwall Drive	Medium
Nelson Road and McIntyre Road	Install a left-turn acceleration lane from Nelson Road onto McIntyre Road	Medium
Nelson Road and McIntyre Road	Install traffic signals (longer-term option)	Low
Nelson Road and Montague Road roundabout	Install a pedestrian walkthrough and ramps across Montague Road West	Low
Nelson Road and Montague Road roundabout	Provide pedestrian and cyclist ramps and connections as part of shared paths around the roundabout	Low
Bus Stop 44	Relocate and Indent Bus Stop 44 West	Low
Nelson Road and Wright Road roundabout	Install a pedestrian walkthrough and ramps across Wright Road West	Low
Nelson Road and Wright Road roundabout	Provide pedestrian and cyclist ramps and connections to shared paths around roundabout	Low
Nelson Road near Prescott Primary School	Pedestrian crossing	Medium
Midblock Between Montague Road and Wright Road	Full-time northbound bike lane and peak-period bike lanes southbound	Low
Midblock Between Montague Road and Wright Road	Road widening for a painted median scheme (longer-term option)	Low

# Conclusion

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The identified opportunities for Nelson Road present potential for significant safety and design improvements. With road safety and traffic flow being primary concerns, the assigned priorities for each improvement offer a structured approach towards addressing these issues. While the options are currently unfunded, careful consideration by the respective road authority can lead to meaningful changes that benefit the community. Through a detailed analysis of traffic data and stakeholder engagement, these opportunities have been tailored to address the specific needs of Nelson Road.

Each of the highlighted improvements in the Nelson Road, Road Management Plan requires careful planning and design to fully understand their potential costs and benefits. The plan has been developed based on safety, operational, and community-led feedback, and serves as a reference point for road authorities to address identified improvements over the short to medium term. By focusing on safety and thoughtful design, road authorities can effectively manage Nelson Road while improving its overall functionality for the community it serves.

## Appendix 1 – Existing Issues Maps

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# Nelson Road

## Section 1 – McIntyre Road – Kesters Road

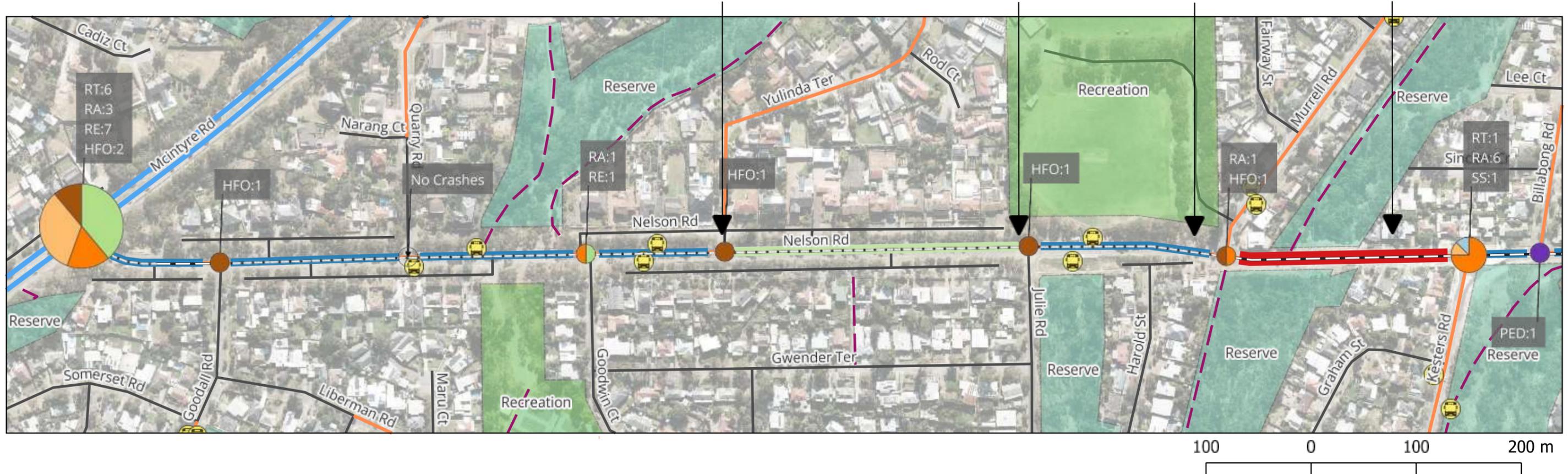


Crest

Crest

Crest

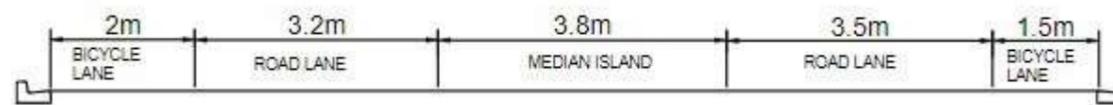
Crest



- Intersection Crashes**
- Rear End (RE)
  - Right Angle (RA)
  - Right Turn (RT)
  - Side Swipe (SS)
  - Head On (HO)
  - Hit Fixed Object (HFO)
  - Left Road (LR)
  - Hit Pedestrian (PED)
  - Cyclist Involved (CYC)

- Midblock Crashes (Total)**
- 0 - 2
  - 2 - 4
  - 4 - 6
  - 6 - 8

Part Time Bike Lane Operation: 7-9:30 AM and 3-6 PM



- Land Use**
- Commercial
  - School
  - Public Facility
  - Recreation
  - Reserve
  - Retail Commercial

- Road Network**
- Arterial
  - Collector
  - Local
  - On Road Bike Lane
  - Off Road Sealed Path
  - Pedestrian Path
- Bus Stop

# Nelson Road

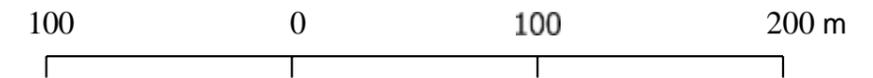
## Section 2 - Kesters Road - Warren Road

Roundabout Installed  
November 2021



Crest

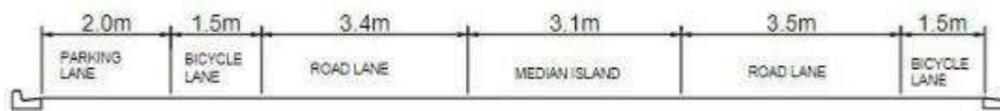
Crest



- Intersection Crashes**
- RE: Rear End (RE)
  - RA: Right Angle (RA)
  - RT: Right Turn (RT)
  - SS: Side Swipe (SS)
  - HO: Head On (HO)
  - HFO: Hit Fixed Object (HFO)
  - LR: Left Road (LR)
  - PED: Hit Pedestrian (PED)
  - CYC: Cyclist Involved (CYC)

- Midblock Crashes (Total)**
- 0 - 2
  - 2 - 4
  - 4 - 6
  - 6 - 8

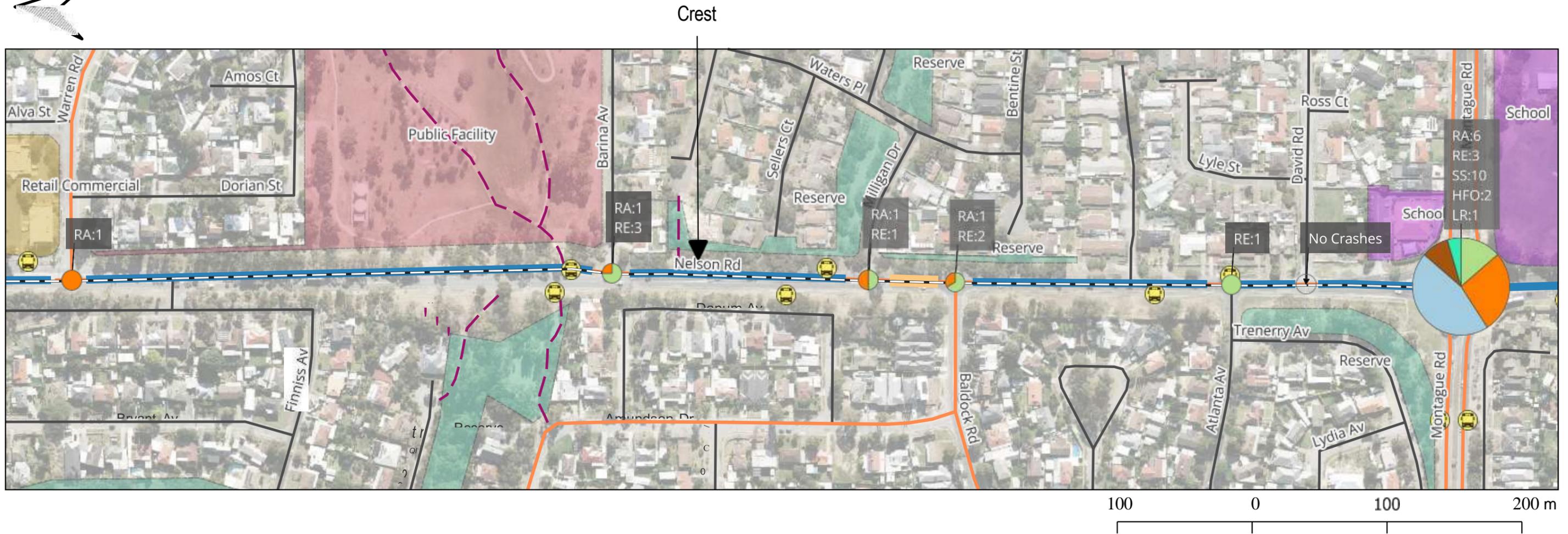
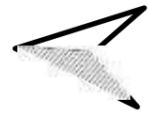
Part Time Bike Lane Operation: 7-9:30 AM and 3-6 PM



- Land Use**
- Commercial
  - School
  - Public Facility
  - Recreation
  - Reserve
  - Retail Commercial
- Road Network**
- Arterial
  - Collector
  - Local
- Cycling**
- On Road Bike Lane
  - Off Road Sealed Path
  - Pedestrian Path
- Bus Stop**

# Nelson Road

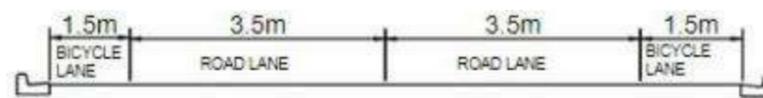
## Section 3 - Warren Road - Montague Road



- Intersection Crashes**
- Rear End (RE)
  - Right Angle (RA)
  - Right Turn (RT)
  - Side Swipe (SS)
  - Head On (HO)
  - Hit Fixed Object (HFO)
  - Left Road (LR)
  - Hit Pedestrian (PED)

- Midblock Crashes (Total)**
- 0 - 2
  - 2 - 4
  - 4 - 6
  - 6 - 8

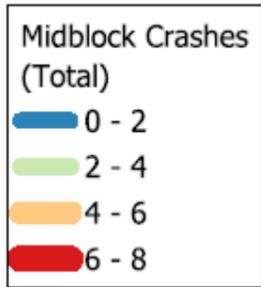
Part Time Bike Lane Operation: 7-9:30 AM and 3-6 PM



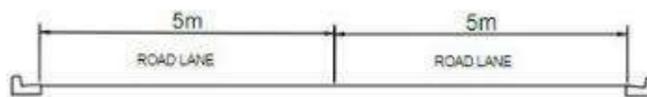
- Land Use**
- Commercial
  - School
  - Public Facility
  - Recreation
  - Reserve
  - Retail Commercial
- Road Network**
- Arterial
  - Collector
  - Local
- Cycling**
- On Road Bike Lane
  - Off Road Sealed Path
  - Pedestrian Path
- Bus Stop**
-

# Nelson Road

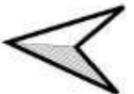
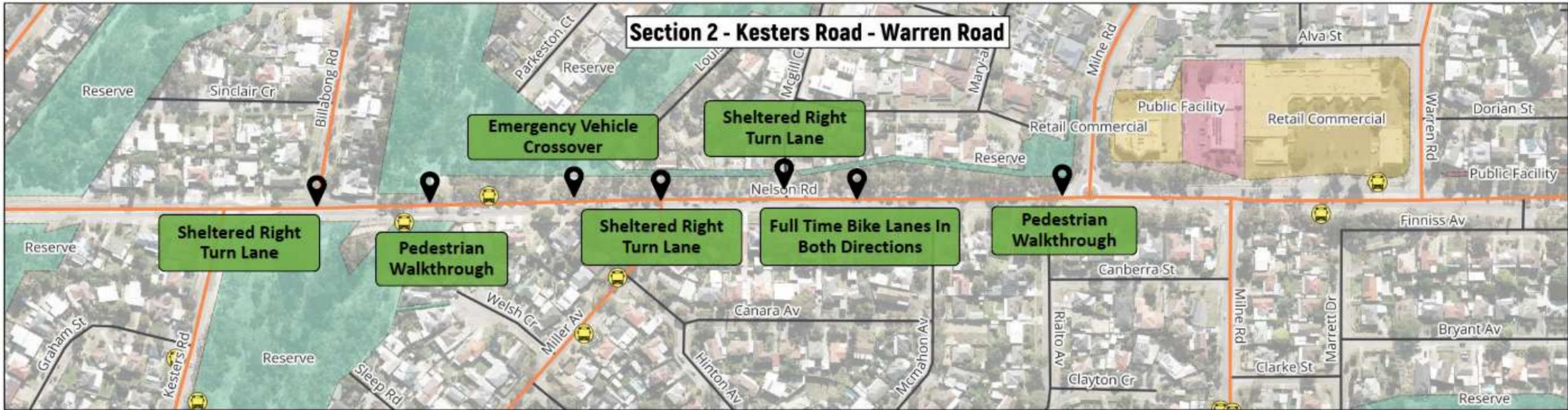
## Section 4 - Montague Road - Wright Road



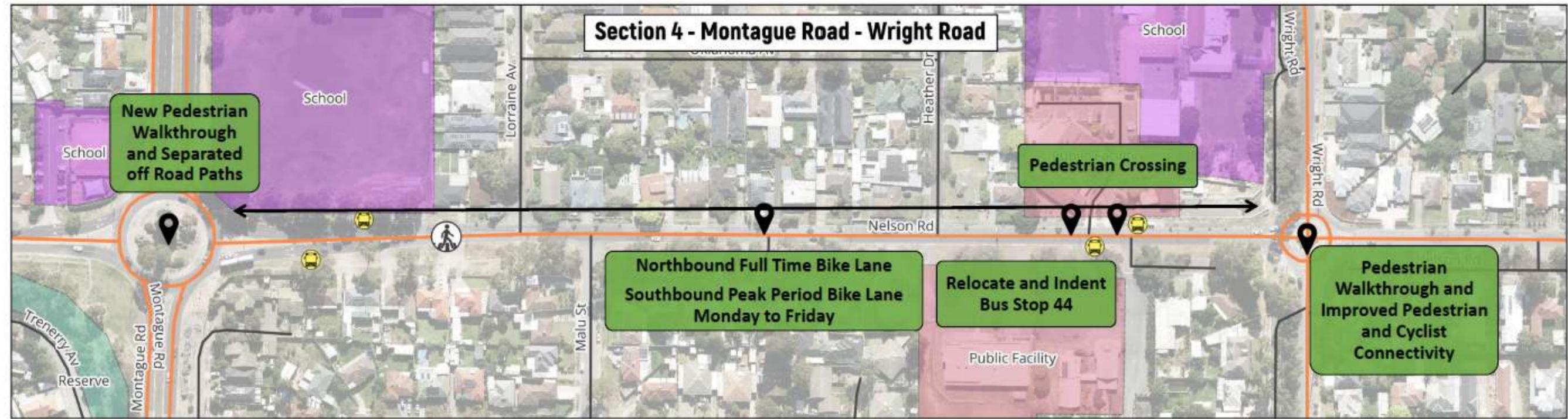
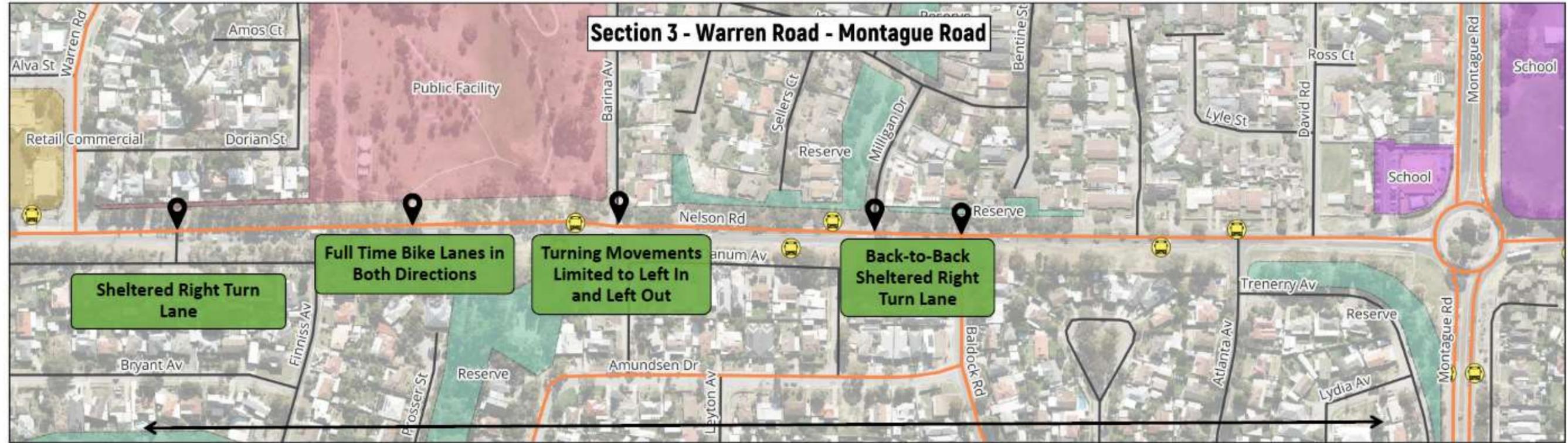
No Bike Lanes



# Appendix 2 – Map of Short to Medium Term Opportunities



- Arterial
- Local
- Bus Stop
- Commercial
- Public Facility
- Reserve
- Collector
- Pedestrian Path
- School
- Recreation
- Retail Commercial



- |           |                 |          |            |                 |                   |
|-----------|-----------------|----------|------------|-----------------|-------------------|
| Arterial  | Local           | Bus Stop | Commercial | Public Facility | Reserve           |
| Collector | Pedestrian Path | PAC      | School     | Recreation      | Retail Commercial |

# Appendix 3 - Initial Community Consultation Response Summary

No	Concerns	Location	Responsibility	Response
1	Complaint about design of road	N/A	Council	As part of the RMP, improvements for Nelson Road have been identified to improve road safety and traffic flow
2	There are potholes along the road	Unknown	Department and Council	Maintenance issues are managed by the road authority. Site observations identified that road pavement is in good condition, with minor isolated defects
3	Unsafe and congested intersection, safety concerns with right turns. Suggest traffic signals	Nelson and McIntyre Road	Department	Opportunities for Improvement have been identified in the RMP
4	Resurfacing pavement is required from Montague to Grand Junction and Nelson Road	Montague Road to Grand Junction Road	Department	There are no current plans for pavement resurfacing works on Nelson Road
5	Lack of turning lanes	Unknown	Department and Council	The RMP has identified locations for turning lanes
6	Buses have to cross travel lanes during peak times		Council	This was observed during site observations impacting traffic momentarily only
7	Hard to enter from Milligan Drive and Baldock Road	Milligan Dr / Baldock Rd	Council	The RMP has identified an opportunity for back-to-back right turn lanes

**OFFICIAL**

<b>8</b>	Suggest a speed camera	Milne Rd to Montague Rd	Council	Mobile camera locations are determined by SA Police (SAPOL). Fixed speed and red light camera locations are determined by the Department in consultation with SAPOL to improve safety at high risk locations. Locations for fixed cameras are prioritised based on sites with a high number of crashes in the last five years, roads with a greater number of lanes in both directions, higher speed zones, high traffic volumes, presence of heavy vehicles and proximity to schools
<b>9</b>	Line marking need to be improved	Unknown	Department and Council	Night site observations identified satisfactory line marking
<b>10</b>	Unsafe driver behaviour concerns and sightline concerns	Kesters Rd and Nelson Rd	Council	The roundabout was observed to be operating satisfactorily and sightlines adequate
<b>11</b>	Parking on Nelson Road safety concerns and traffic congestion	Prescott primary school	Department and Council	Bike lanes are proposed to assist with parking restrictions and encourage sustainable travel modes.
<b>12</b>	Ambulances experience congestion	Billabong and Milne Road	Council	The RMP identifies two opportunities where emergency vehicle crossovers could be provided
<b>13</b>	Nelson Road needs three lanes of traffic		Department and Council	Analysis of traffic capacity identifies the existing road layout for Nelson Road as adequate for existing and future traffic volumes
<b>14</b>	Motorists speeding	Unknown	Department and Council	Speed survey data shows higher speeds tend to occur with changes in road alignment, hills and descents. Speeding can be reported to SAPOL
<b>15</b>	The Wright Road roundabout is difficult to cross as a pedestrian during school times	Wright Road Roundabout	Department	The RMP identifies an opportunity to improve pedestrian access at the roundabout by providing an additional walkthrough area on the western roundabout leg and path connections for cycling

**OFFICIAL**

<b>16</b>	Due to no pedestrian lights at this end, cars will often not allow people to cross, and this is an issue with this road in between a primary and a secondary school	Wright Road and Nelson Road	Department	The RMP identifies an opportunity to improve pedestrian access in the vicinity of primary school by providing an additional pedestrian crossing
<b>17</b>	Traffic lights at the intersection of Montague and Nelson Road is not supported	Montague and Nelson Road	Department	The RMP does not propose changing the Montague Road Roundabout to a traffic signal intersection
<b>18</b>	Difficulty for turning traffic and pedestrians crossing at Nelson Road between Milligan Drive and Baldock Road	Nelson Road from Milligan Drive and Baldock Road	Council	The RMP identifies an opportunity for a back-to-back right turn lane and a pedestrian refuge at this location
<b>19</b>	Traffic merging left from Nelson Road onto McIntyre Road could be improved with a slip lane into McIntyre Road	Nelson Road to McIntyre Road	Department	The RMP identifies this as a potential opportunity for improvement
<b>20</b>	Poor visibility for vehicles turning right from Murrell Road into Nelson Road, due to the surrounding gradients and the fence on the SE corner	Murrell Road into Nelson Road	Council	Site observations confirm that sight lines are limited, however minimum sight distance is achieved. Improvements have not been recommended as part of the RMP