



The Rural City of
**MURRAY
BRIDGE**

Bridge to Opportunity



Rural City of Murray Bridge

Walking and Cycling Masterplan and Concept Design

Final Report with Cost Estimates

Author: GTA Consultants

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Contents

Executive Summary	i
Glossary of Terms and Abbreviations	iv
1. Introduction	1
1.1. Background	1
1.2. Scope of work and project objectives.....	1
1.3. Report structure.....	2
2. Planning Context	3
2.1. Previous relevant planning.....	3
2.2. Strategic planning	3
2.3. Concept planning.....	6
3. Existing Walking and Cycling Network	13
3.1. Walking.....	13
3.1.1. Footpath network.....	13
3.1.2. Trail network.....	20
3.1.3. Heritage walks.....	22
3.2. Cycling	23
3.3. Road safety	26
3.4. Issues identified from the key stakeholders.....	27
3.5. Network gap and needs assessment	27
4. Proposed Walking and Cycling Network Plan	29
4.1. Network principles	29
4.1.1. Route characteristics	29
4.1.2. Network planning	30
4.2. New walk connections	31
4.2.1. Local footpaths.....	31
4.2.2. Walking trail networks	32
4.3. New cycling connections	33
4.3.1. Murray Bridge bicycle network	33
4.3.2. Cycling Trails.....	39



Bridge to Opportunity

The Rural City of
**MURRAY
BRIDGE**

4.3.3. End-of-trip cycling facilities	40
4.4. Safe crossings	41
4.5. Future opportunities.....	42
5. Concept Designs and Cost Estimates	45
5.1. Concept designs	45
5.2. Cost estimates	46
5.3. Supporting promotional programs.....	49
6. Action and Implementation Plan.....	50
6.1. Staged implementation	50
6.2. Maintenance plan.....	51
6.2.1. Footpaths.....	51
6.2.2. On-road Bicycle Markings (Sharrow and Line markings)	52
6.2.3. Shared Path Maintenance	52
7. References	54
Relevant South Australian Planning	54
Relevant Studies for the Rural City of Murray Bridge	54
Other Research Documents	55
Appendix A Landscape Concept Plans for the Walking and Cycling Infrastructure	56
Appendix B Concept Design Drawings for the Walking and Cycling Infrastructure	57
Appendix C Cost Estimates for the Walking and Cycling Infrastructure	58

List of Tables

Table E-1	Staged Walking and Cycling Infrastructure Implementation Plan...	ii
Table 3-1	Types of Footpaths in Murray Bridge	15
Table 3-2	Types of Cycling Treatments in Murray Bridge	23
Table 4-1	Pedestrian and Bicycle Network Characteristics	29
Table 4-2	Bicycle Network Features.....	30
Table 4-3	Bicycle Network Hierarchy	33
Table 5-1	Total Cost Estimates for the Walking and Cycling Infrastructure ...	48

Table 6-1 Staged Walking and Cycling Infrastructure Implementation Plan 50

List of Figures

Figure E-1	Proposed Murray Bridge Bicycle Network Plan	i
Figure E-2	Proposed Murray Bridge Bicycle Infrastructure Treatments.....	ii
Figure 1-1	Murray Bridge Walking and Cycling Masterplan Study Area.....	1
Figure 2-1	Sturt Reserve Precincts in the Riverfront Strategy	5
Figure 2-2	Sturt Reserve Heritage Tourism Precinct.....	6
Figure 2-3	Sturt Reserve Recreation Precinct	7
Figure 2-4	Sturt Reserve Play Precinct.....	8
Figure 2-5	Sturt Reserve Accommodation and Events Precinct	9
Figure 2-6	Proposed Murray Bridge Bicycle Plan Draft for Consultation in 2012	10
Figure 2-7:	Adelaide Road Linear Open Space Concept Plan	12
Figure 3-1	Existing Footpaths and Bicycle Routes in Murray Bridge	13
Figure 3-2	Existing Footpaths and Bicycle Routes in Murray Bridge City Centre	14
Figure 3-3	Types of Footpath Treatments in Murray Bridge	15
Figure 3-4	Existing Footpath Infrastructure in Murray Bridge	16
Figure 3-5	Swanport Road Pedestrian-Actuated Crossing.....	18
Figure 3-6	Bridge Street Median Crossing	19
Figure 3-7	South Terrace Zebra Crossing.....	19
Figure 3-8	Murray Bridge Trail Network	20
Figure 3-9	Murray Coorong Trail Route in Murray Bridge	21
Figure 3-10	Murray Bridge Discovery Trail.....	22
Figure 3-11	Existing Types of Bicycle Infrastructure in Murray Bridge	24
Figure 3-12	Types of Existing Bicycle Infrastructure in Murray Bridge	25
Figure 3-13	Reported Pedestrian and Cyclist Crashes 2012-2016	26
Figure 4-1	Trail Network Vision through Murray Bridge	32
Figure 4-2	Proposed Bicycle Route Network	34
Figure 4-3	Examples of Sharrow Road Markings	36
Figure 4-4	Proposed Bicycle Network Infrastructure.....	37
Figure 4-5	Types of Proposed Bicycle Infrastructure for Murray Bridge	38



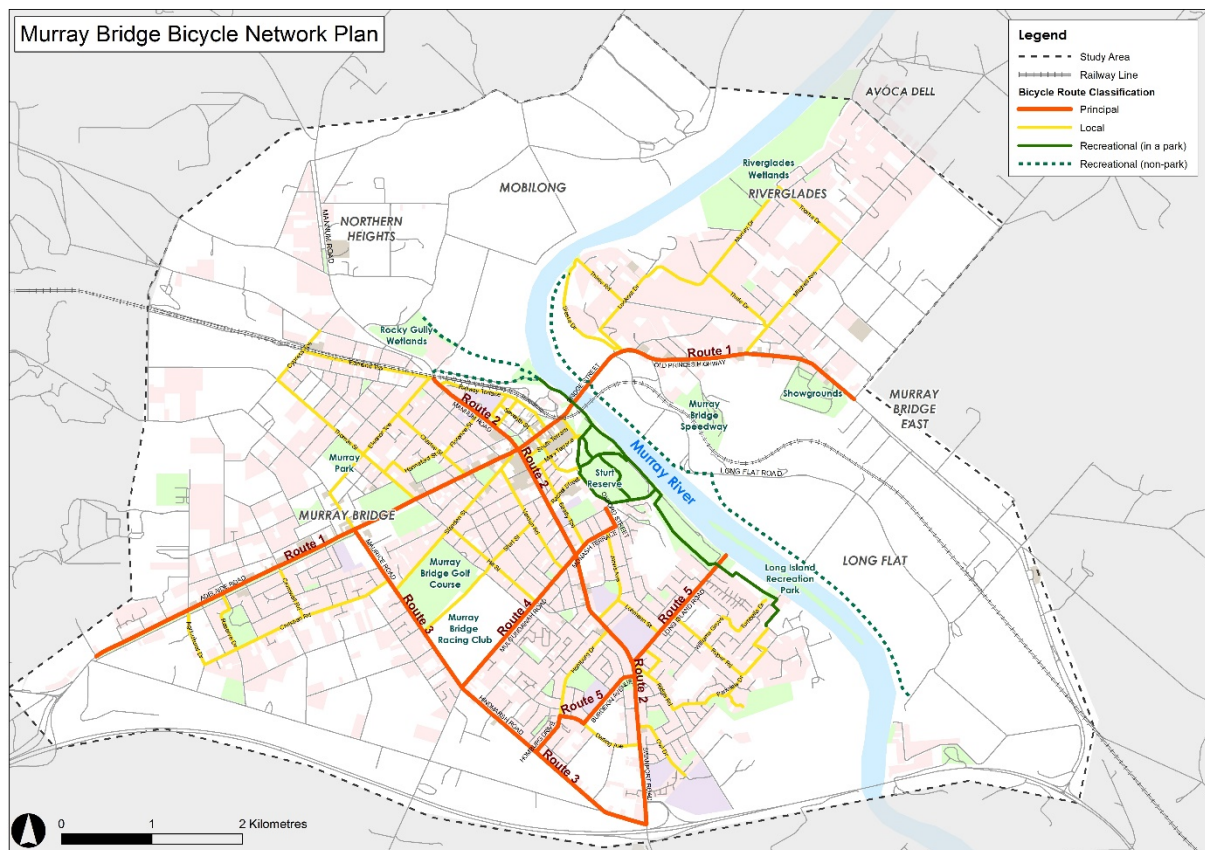
Figure 4-6	Example of a Pedestrian and Cyclist Signalised Crossing.....	42
Figure 4-7	Golf Course Residential Estate at the Murray Bridge Racecourse Development	43
Figure 4-8	Monarto Zoo Masterplan	44
Figure 5-1	Proposed Walking and Cycling Wayfinding Signage for Murray Bridge	45
Figure 5-2	Walking and Cycling Map in Belmont, Western Australia	49

Executive Summary

A walking and cycling masterplan was prepared for the Rural City of Murray Bridge to improve the walking and cycling access and amenity for residents, visitors and tourists between the Murray Bridge town site and the Murray River and linking to the key attractors in Murray Bridge.

The proposed bicycle network plan, identifying the principal, local and recreational and trail routes is shown in Figure E-1.

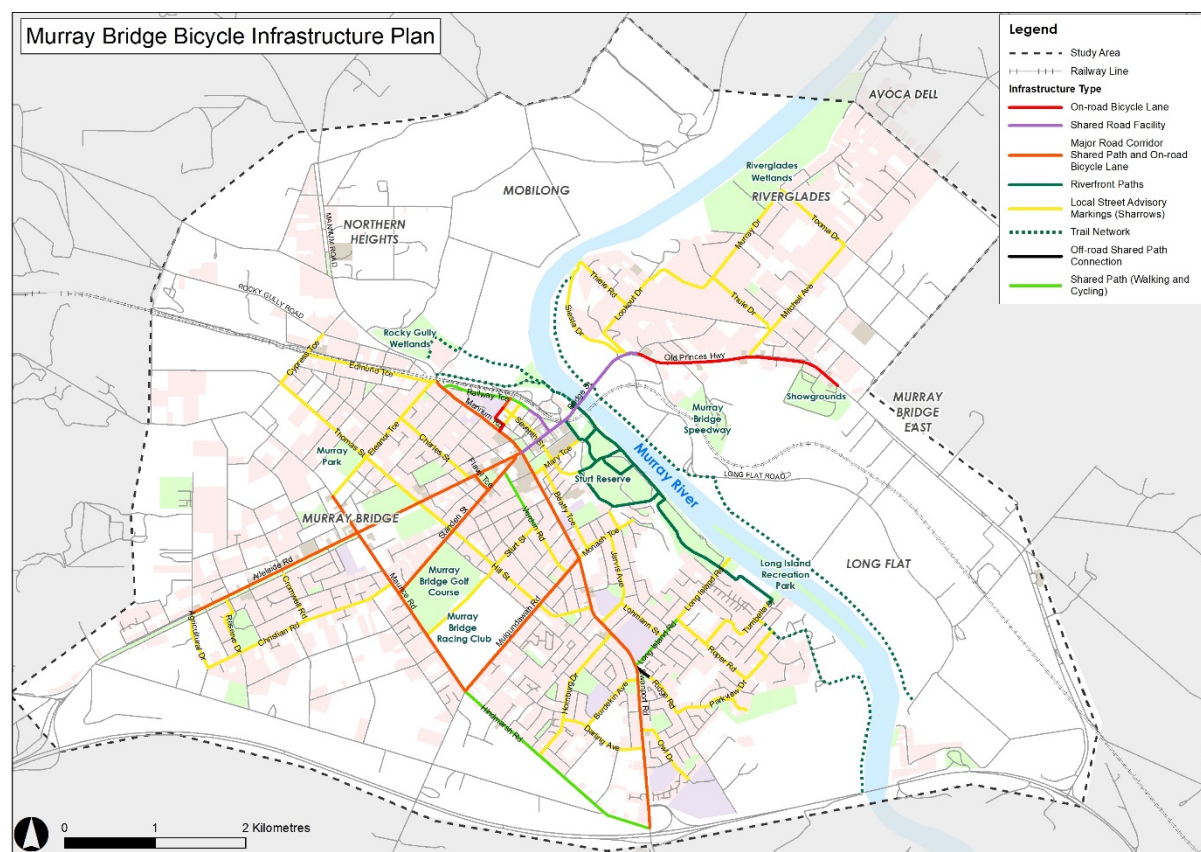
Figure E-1 Proposed Murray Bridge Bicycle Network Plan



The proposed bicycle infrastructure treatments to support the bicycle network plan is shown in Figure E-2. These treatments include on-road bicycle lanes, shared road facilities, shared paths for walking and cycling, local street advisory markings with shared lane markings known as sharrows, recreational paths that are sealed and trails that are unsealed.



Figure E-2 Proposed Murray Bridge Bicycle Infrastructure Treatments



A staged implementation of the proposed walking and cycling infrastructure is proposed over ten years from 2018/2019 to 2027/2028 with an allocation of the capital cost estimates provided in Table E-1.

Table E-1 Staged Walking and Cycling Infrastructure Implementation Plan

Infrastructure Item	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023
East Terrace Pedestrian Refuges	\$87,380	-	-	-	-
Bridge Street / East Terrace Channelised Right Turn	-	-	\$30,000	-	-
Shared Paths (Major Road Corridor)	\$375,503	\$234,098	\$202,846	\$360,510	\$692,112
Riverfront Paths	\$157,940	\$440,467	\$440,467	\$258,512	-
Local Road Advisory Markings (Sharrows)	-	-	\$44,840	\$44,840	\$44,840
Cycle Lane Sign / Line Upgrades	-	-	\$15,400	\$15,400	\$15,400
Footpaths (Non-Reserve)	\$63,840	-	-	-	-
Total exclusive of GST	\$684,663	\$674,565	\$733,553	\$679,262	\$752,352
Total inclusive of GST	\$753,129	\$742,022	\$806,909	\$747,189	\$827,587



Infrastructure Item	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Shared Paths (Major Road Corridor)	\$687,591	\$568,827	\$314,612	\$513,439	-
Riverfront Paths	-	\$78,105	\$333,872	-	\$688,115
Local Road Advisory Markings (Sharrows)	\$44,840	\$44,840	-	-	-
Total exclusive of GST	\$732,431	\$691,772	\$648,484	\$513,439	\$688,115
Total inclusive of GST	\$805,675	\$760,949	\$713,333	\$564,783	\$756,926



Glossary of Terms and Abbreviations

Term or Abbreviation	Description
CHR	Channelised Right Turn
DPTI	Department of Planning, Transport and Infrastructure
RCMB	Rural City of Murray Bridge
SAPOL	South Australian Police
Sharrow	Shared lane bicycle pavement marking with a combined bicycle logo and arrow symbol
180SLS	One Eighty Sports and Leisure Solutions



1. Introduction

1.1. Background

The Rural City of Murray Bridge is developing a walking and cycling masterplan to improve the walking and cycling access and amenity for residents, visitors and tourists between the Murray Bridge town site and the Murray River and linking to the key attractors in Murray Bridge.

1.2. Scope of work and project objectives

This study was focused on the issues with walking and cycling access as shown in Figure 1-1. The study area comprises the urban development in Murray Bridge north of the South Eastern Freeway and includes the suburbs of Riverglades, Murray Bridge East and Long Flat on the eastern side of the river and the Murray Bridge city centre, Mobilong, Northern Heights and Murray Bridge on the southwestern side of the river.

Figure 1-1 Murray Bridge Walking and Cycling Masterplan Study Area





The walking and cycling masterplan was focused on the following locations in the wider study area:

- Along the Murray River between the Swanport Reserve and Toora Reserve.
- Between riverfront spaces linking the Hume Reserve to Toora Reserve, Avoca Dell Reserve and Thiele Reserve, Thiele Reserve to Swanport Wetlands and Swanport Reserve to the Murray River Resort.
- Connections between the Council assets with safe and convenient walking and cycling paths.

The walking and cycling masterplan was developed to address the following key issues:

- Lack of legible and direct walking and cyclist connections between the town centre and the riverfront
- Poor access to significant indigenous sites
- Poor connectivity with the major trails passing through the Council jurisdiction, such as the Lavender Federation, Kidman and Mawson trails
- Poor linkages to key tourist attractions

1.3. Report structure

The Walking and Cycling Masterplan and Concept Design report is structured as follows:

- **Section 2 Planning Context** is a summary of the most recent State Government and Council planning policies that are relevant to walking and cycling in Murray Bridge.
- **Section 3 Existing Walking and Cycling Network** is a description of the existing walking and cycling network in Murray Bridge, a list of issues and opportunities provided from the stakeholders and a network gap and needs assessment.
- **Section 4 Proposed Walking and Cycling Network Plan** is a description of the proposed walking and cycling network plan based on a hierarchy approach of walking and cycling routes with the identified key infrastructure requirements to complete the networks.
- **Section 5 Concept Designs and Cost Estimates** is a description of the infrastructure projects recommended for the walking and cycling network with the cost estimates for the infrastructure projects.
- **Section 6 Action and Implementation Plan** is an action plan with a staged implementation with the proposed cost estimates for the infrastructure projects over the next ten years and a proposed maintenance plan.
- **Section 8 References** provides the documents and internet sources used in the preparation of this walking and cycling masterplan.
- **Appendix A** Landscape Concept Plans for the Walking and Cycling Infrastructure
- **Appendix B** Concept Design Drawings for the Walking and Cycling Infrastructure
- **Appendix C** Cost Estimates for the Walking and Cycling Infrastructure



2. Planning Context

The planning context for the walking and cycling masterplan is based on a review of the previous planning strategies and studies since 2012, with a summary of the key relevant policy documents.

2.1. Previous relevant planning

The information contained in the following plans and strategies was reviewed and considered in the preparation of the Walking and Cycling Masterplan.

- Murray River, Lakes and Coorong Strategic Tourism Plan 2017–2020 prepared by the Murray River, Lakes and Coorong Tourism Alliance
- Murray Bridge Council Development Plan, Consolidated 2 May 2017
- Parsons Brinckerhoff, Review of the Rural City of Murray Bridge Bicycle Plan, 2016
- RCMB Annual Business Plan 2017-2018
- RCMB Community Plan, 2016-2032
- RCMB Economic Development Strategy 2015-2030
- RCMB, Murray Bridge Public Realm Style Manual, February 2012
- RCMB, Sport, Recreation and Open Space Strategy, Volume II, Sport and Recreation Strategy, Treadwell with Aspect Studios, October 2013
- RCMB Riverfront Strategy, May 2016
- RCMB Tourism Development Plan, 2016-2020
- InfraPlan and WAX, Adelaide Road Linear Open Space Concept Plan Report, August 2017
- 180SLS, Playspace Strategy, Planning for Play in the RCMB 2017-2027, May 2017
- RCMB Sturt Reserve Master Plan, October 2017
- RCMB, A Public Toilet Strategy for the RCMB 2017-2022, November 2017
- RCMB, Footpath Network Strategy 2017, June 2017

2.2. Strategic planning

A summary of the strategic planning documents to support the development of the walking and cycling masterplan is provided as follows.

RCMB Strategic Plan, 2016 – 2020

This is a four-year commitment focussing on ensuring a Valued Environment, Great People and Lifestyle, a Dynamic Economy and Connected Communities, providing a blueprint for the Rural City of Murray Bridge to 2020. It identified the need for a network of accessible, safe and convenient recreational walking and cycling trails that would activate and support river-based tourism opportunities,

RCMB Economic Development Strategy, 2015 – 2030

This strategy recognises the contribution that recreational trails can have on economic development through tourism opportunities. The strategy states that the Murray Bridge region is striving to own the brand for active river-based recreation for the entire Murray River.



RCMB Sport Recreation and Open Space Strategy, October 2013

This strategy provides a framework to ensure that the current and future population of the RCMB is catered to in terms of sport, recreation and open space opportunities. The strategy identifies the need for the establishment of an integrated, sustainable and accessible trails network that provides recreational opportunities for walkers, cyclists and horse riders. Trail-related actions are recommended at Gifford Hill, Adelaide Road Plantation, Carey's Park, Murray Park, Long Island Reserve, Thiele Reserve, Vanderzon Reserve, Monarto Oval, Narooma Wetland and Riverglades Wetland.

Murray River, Lakes and Coorong Strategic Tourism Plan 2017-2020, Murray River, Lakes and Coorong Tourism Alliance, August 2017

This tourism strategy recommends improvements to the walking and cycling access to the Murray River with clear wayfinding to attract more tourists.

Murraylands River Trail Feasibility Study, 180 Sports and Leisure Solutions, March 2015

This study provides a vision for a 450-km walking and bike riding trail along the Murray River, linking Cadell in the Murraylands to Salt Creek in the Coorong. Stage one of this project in the Rural City of Murray Bridge area involves consulting with land owners to determine the exact alignment of the 5km section planned between Toora and Hume Reserves.

The guiding principles of the Murraylands River Trail are:

- Be in close proximity to water and utilise both sides of the river
- Be in proximity to townships and population centres
- Not to disturb areas of significant cultural heritage, Aboriginal or European Australian
- Provide linkages to bordering trails, particularly national and/or regional level trails
- Link to railways and roads providing access to the trail
- Link to existing facilities that may promote and support use of the trail, such as car parks, toilets, picnic facilities, camping sites, tourist information centres and cafes

In February 2017, a Trail Strategy was prepared by Treadwell for Council to investigate, audit and provide a framework for the future strategic direction of trails across the council area. This Strategy focused on the identification, provision, development and management of trails throughout the Council area, including along the riverfront.

RCMB Riverfront Strategy, GHD, May 2016

In May 2016 the Council endorsed the Riverfront Strategy in which a Walking and Cycling Masterplan for Murray Bridge would focus on access to the riverfront. The Riverfront Strategy developed sub-area plans for walking and cycling trails. The guiding principles in the Riverfront Strategy are:

- Improve access and build connectivity along the riverfront
- The focal point for the riverfront is Sturt Reserve. It is the hub for community activities, tourism, and promotion of Indigenous and European heritage.
- Activate the Swanport Bridge area to create a gateway to Murray Bridge

- Site specific recommendations were given for the following reserves:

- In particular, a plan for the Sturt Reserve which is situated directly between the Murray Bridge CBD and the Murray River was developed for four themed precincts in the Riverfront Strategy as shown in Figure 2-1 for tourism history, recreation, play and accommodation and events.

Figure 2-1 Sturt Reserve Precincts in the Riverfront Strategy



Source: Riverfront Strategy, GHD, Jensen, 2016.

2.3. Concept planning

The most recent reserve and road corridor concept planning studies are summarised as follows.

RCMB Sturt Reserve Masterplan, GHD, October 2017

The Sturt Reserve Masterplan was adopted by Council in November 2017 that included concepts for the four themed precincts as described in the following sections.

Tourism and History Precinct Concept Plan

The concept plan for the Tourism and History precinct includes several new footpaths between the city centre and the riverfront and along the river as shown in Figure 2-2.

Figure 2-2 Sturt Reserve Heritage Tourism Precinct



Source: Sturt Reserve Masterplan, GHD, 2017.

Key elements related to walking and cycling access in the Heritage Tourism precinct are to:

- Upgrade the existing path to the Roundhouse.
- Simplify the road system to remove permanent vehicle access to the river edge
- Maintain the parking area to the south of the precinct.

- Creation of a Heritage rail boulevard following the route of the disused rail corridor and celebrating this heritage through use of existing carriages, public art and signage.
- Construct a Tourist or Visitor Information Centre, incorporating a café, discovery centre and/or function space.
- Improve the linkage with the shopping centre through road markings and creation of pathways / landscaped boulevard along East Terrace.

Recreation Precinct Concept Plan

The concept plan for the Recreation precinct includes new footpaths along Olympic Drive and Sturt Reserve Road and to and along the riverfront as shown in Figure 2-3.

Figure 2-3 Sturt Reserve Recreation Precinct



Source: Sturt Reserve Masterplan, GHD, 2017.

Key elements related to walking and cycling access in the Recreation precinct are to:

- Maintain the existing tennis facilities and enhance the rowing club access with upgraded footpaths
- Upgrade the existing path to a 3m wide dual use path and construct new paths to provide formalised linkages to the riverfront, tennis facilities, toilets and car parking.

- As recommended by the Murray Bridge Public Toilet Strategy, upgrade or replace the existing public toilet.

Play Precinct Concept Plan

The concept plan for the Play precinct includes new footpaths to and along the riverfront as shown in Figure 2-4.

Figure 2-4 Sturt Reserve Play Precinct



Source: Sturt Reserve Masterplan, GHD, 2017.

Key elements related to walking and cycling access in the Play precinct concept plan are:

- Upgrade the existing path to a 3m wide dual use path and continue path to end of precinct to facilitate access to future development to the south of the reserve.
- Close a portion of the existing one-way riverfront road to permanent traffic and convert adjacent areas to two-way roads with parking and turn around facilities.
- Install removable bollards at each end of the closed road so that the road can be reopened as part of the Pedal Prix circuit or for special events so that access is provided for food trucks and vehicles for set-up.
- Treat area of restricted access road to match theming of play space but ensure that the surface remains suitable for the Pedal Prix competition.

Accommodation and Events Precinct Concept Plan

The concept plan for the Accommodation and Events precinct includes new footpaths around the periphery of the open space as shown in Figure 2-5.

Figure 2-5 Sturt Reserve Accommodation and Events Precinct



Source: Sturt Reserve Masterplan, GHD, 2017.

Review of the Rural City of Murray Bridge Bicycle Plan, Draft Report for Consultation, Parsons Brinckerhoff, March 2012

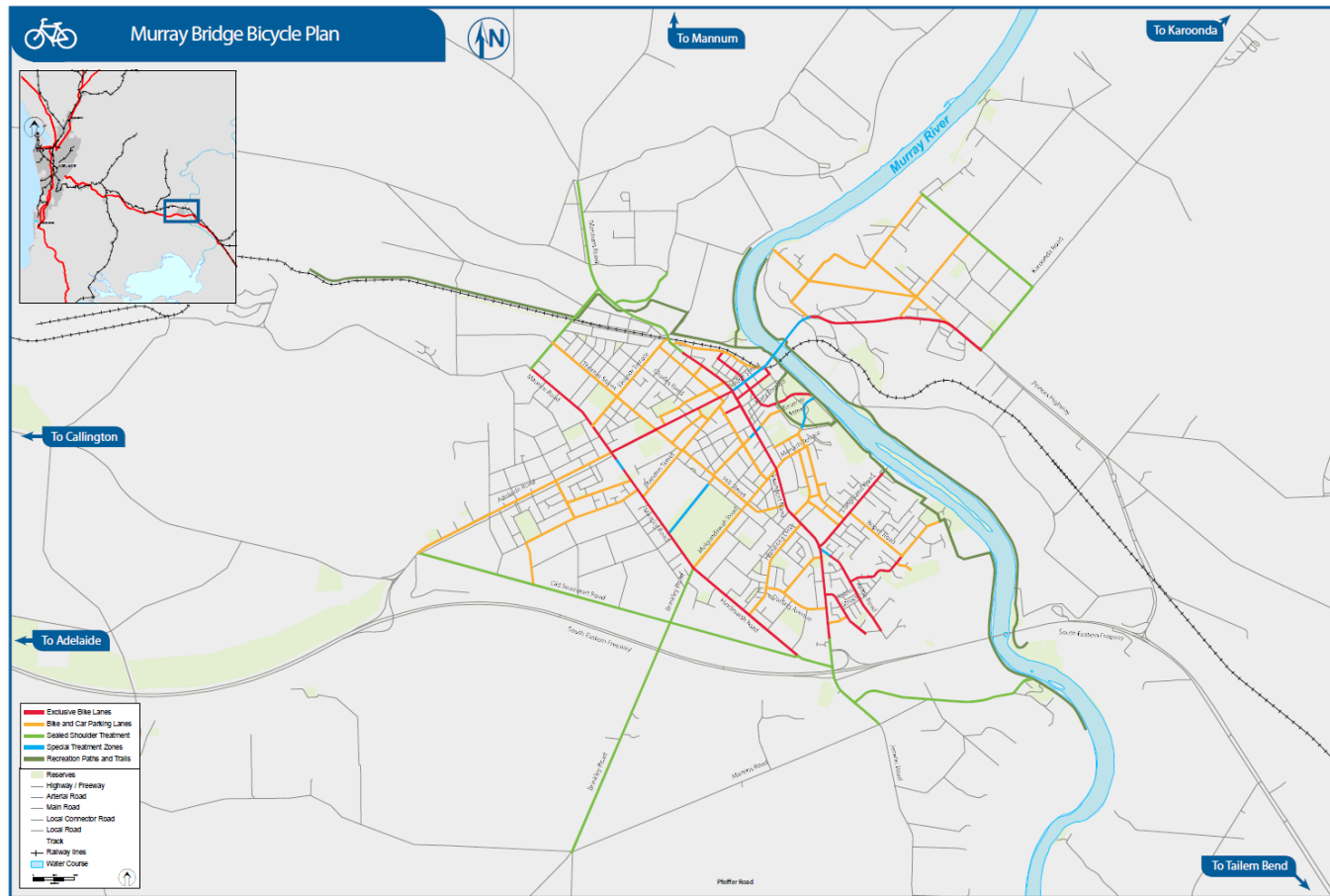
Parsons Brinckerhoff prepared a draft report for consultation for the Murray Bridge Bicycle Plan in March 2012 that reviewed the previous 2001 bicycle plan in the context of the road hierarchy and a vision to encourage more bicycling in the city with safer and more direct bicycle routes and infrastructure. The proposed bicycle plan shown in Figure 2-6 identified routes with exclusive bicycle lanes, bicycle and car parking lanes, sealed shoulder treatments, special treatment zones and recreational and trail paths. This bicycle plan was not adopted for implementation by the RCMB. The report provided the planning background and rationale for improving bicycle infrastructure in the city with a discussion of the benefits for bicycling.



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Figure 2-6 Proposed Murray Bridge Bicycle Plan Draft for Consultation in 2012



Source: Review of the Rural City of Murray Bridge Bicycle Plan, PB, March 2012.



RCMB Adelaide Road Linear Open Space Concept Plan Report, InfraPlan and WAX, August 2017

Adelaide Road is an important bicycle connection leading from the south-west part of the city directly into the city centre and Bridge Street, Swanport Road and the riverfront. The intersection of Maurice and Adelaide Roads has cycling infrastructure for safe crossing movements. The sections of Adelaide Road between Bremer Road and Maurice Road, connect a variety of bicycle and pedestrian trip attractors including the industrial precincts along Adelaide Road (employment), the city centre (retail), surrounding open space (recreation), school (education) and residential growth areas. These attract visitors for a range of activities at different times of the day, all of the visitors to these places will have different requirements and expectations from cycle and pedestrian facilities.

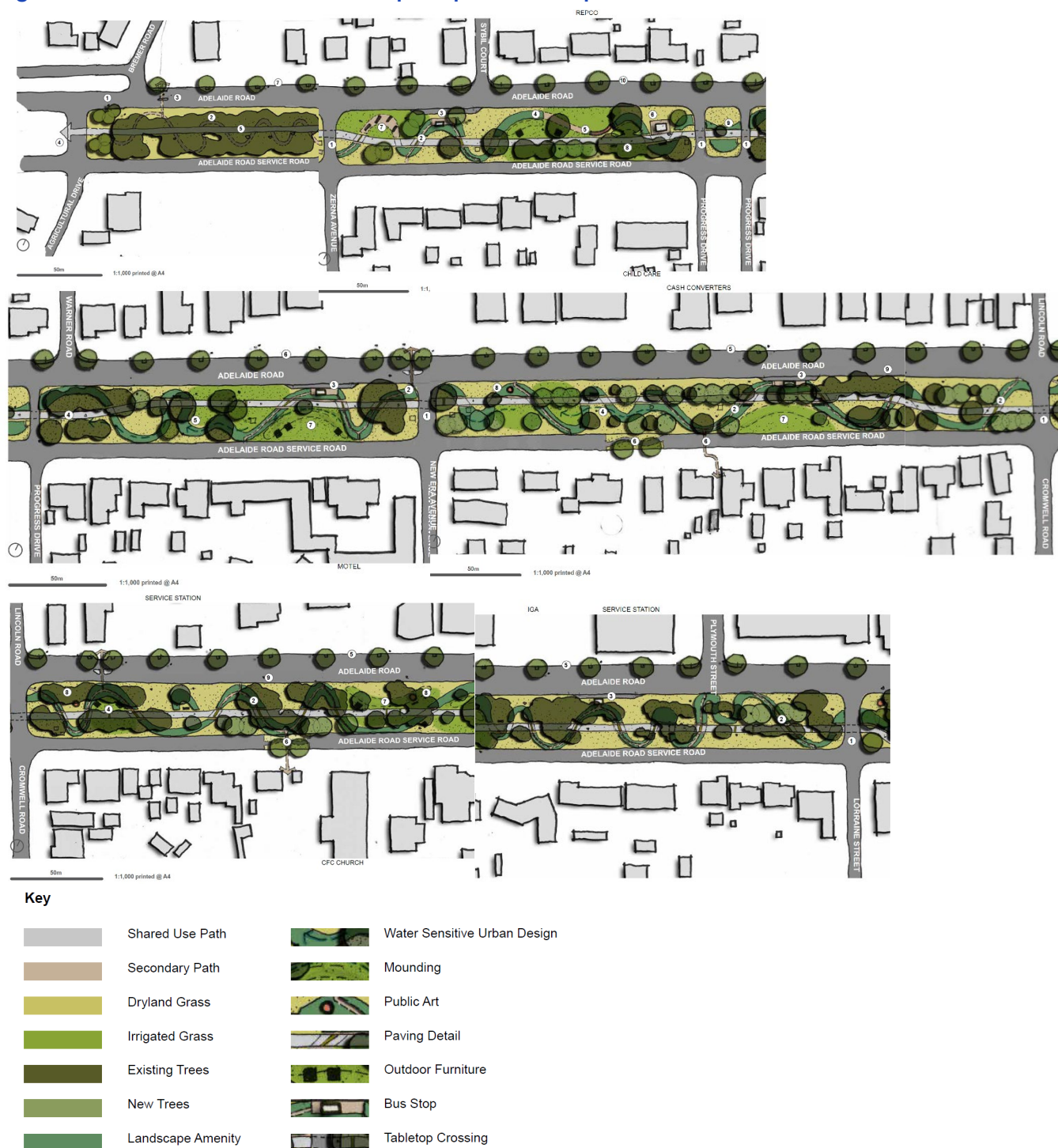
The Concept Plan for Adelaide Road Linear Park will guide Rural City of Murray Bridge in the future development of the reserve that proposes a streetscape upgrade of Adelaide Road and Adelaide Road Service Road. The project is developed to manage vehicular movements and parking within the site and provide increased cycle and pedestrian connectivity. The project seeks to establish the Adelaide Road Linear Open Space as a recreation and open space destination through providing a shared use path, improved landscape amenity, cultural narrative and storytelling through way finding, interpretation and public art.

The existing conditions for walking and cycling are poor and do not provide a continuous accessible path of travel. This low level of amenity is increased by the noise, pollution and safety issues associated with high volume of traffic along Adelaide Road. The lack of sealed pathways reduces the usability of the reserve as a linear pathway connection especially within the wet months due to the stormwater management on site.

The Adelaide Road / Maurice Road intersection forms a key cycle connection into the city centre. Pedestrian connections to the south across Adelaide Road Service Road is good due to the low traffic volume along this road. A sealed footpath exists on the north side of Adelaide Road, but is crossed by numerous wide driveways. There is not a sealed footpath on either side of the Service Road.

The concept plan for the linear open space with the pedestrian and cyclist infrastructure is shown in Figure 2-7.

Figure 2-7: Adelaide Road Linear Open Space Concept Plan



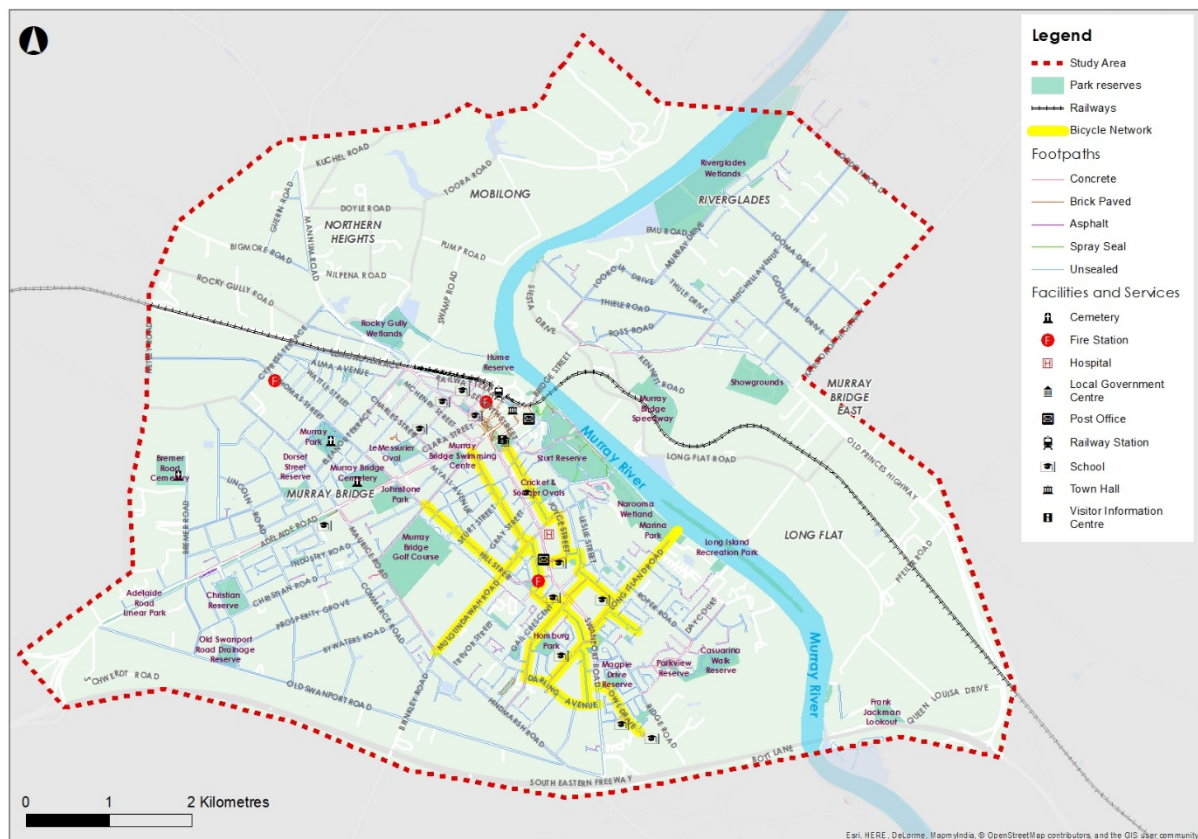
Source: Adelaide Road Linear Open Space Concept Plan, InfraPlan and WAX, 2017.



3. Existing Walking and Cycling Network

The Rural City of Murray Bridge has a range of walking and cycling infrastructure in the study area as shown in Figure 3-1.

Figure 3-1 Existing Footpaths and Bicycle Routes in Murray Bridge



3.1. Walking

3.1.1. Footpath network

Within the city centre and immediately surrounding areas, the streets primarily comprise sealed footpaths, with brick paving on the main streets (e.g. Bridge Street, Seventh Street) and concrete in the nearby streets. Within the Riverfront areas, sections of the footpaths are asphalt based. Conversely, even within the city centre there are sections where the footpaths are unsealed with gravel or rubble surfaces.

The types of footpath construction in the central area of Murray Bridge are shown in Figure 3-2.



Figure 3-2 Existing Footpaths and Bicycle Routes in Murray Bridge City Centre





The Rural City of Murray Bridge pedestrian footpath network incorporates approximately 230 km of footpaths, valued at approximately \$16.5M. The footpaths are located throughout the urban areas of the city, along roads, river corridors and through reserves.

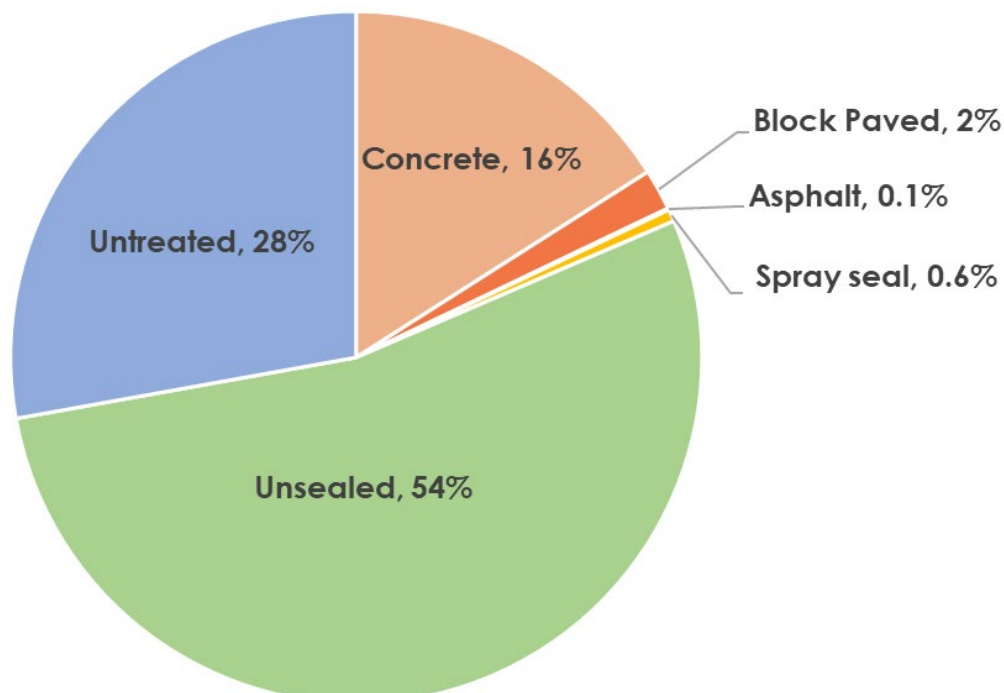
The sealed footpath network is constructed from concrete, block paving and bitumen. However, 76 percent of the footpath network consists of unsealed surfaces (scalp, rubble, landscape or no surface). Council has recognised that significant work is required to lift the standard of its footpaths and provide all weather pedestrian access throughout the city and has commenced a five-year footpath strategy. The lengths of the types of footpath construction within Murray Bridge, as identified from the Council GIS data and reflecting the initial stages of the footpath strategy, are provided in Table 3-1.

Table 3-1 Types of Footpaths in Murray Bridge

Footpath Material	Length (m)	Percentage of Network
Concrete paths	50,231	16%
Block paved paths	6,038	2%
Asphalt paths	259	0.1%
Spray seal paths	1,762	0.6%
Unsealed (scalp/landscape with kerb)	168,502	54%
Untreated (no kerb)	87,441	28%
Total	314,233	100%

The percentage of the types of footpaths in Murray Bridge are shown in Figure 3-3.

Figure 3-3 Types of Footpath Treatments in Murray Bridge



Examples of the various footpaths within the Rural City of Murray Bridge are shown in Figure 3-4 and they include the city centre block paved footpaths on Bridge Street, concrete footpaths in the Sturt Reserve, concrete footpaths in local streets and unsealed footpaths,

Figure 3-4 Existing Footpath Infrastructure in Murray Bridge

	<p>Block paved footpaths on Bridge Street in the city centre.</p> <p>These footpaths are the full width of the verge between the building and roadside kerb and include the street furniture and signage poles.</p>
	<p>Concrete paths in the Sturt Reserve</p> <p>These footpaths are not wide enough for groups or for use by cyclists.</p>
	<p>Concrete footpath along Swanport Road</p> <p>This section of footpath along Swanport Road has a typical width of 1.2 m, which is the minimum footpath width. It is adjacent to the fence line, despite the wide verge, leaving insufficient sight distance between emerging vehicles and pedestrians/cyclists on the footpath. It does not provide sufficient clearance to the fence for cyclists (recommended 1 m, absolute minimum 0.5 m).</p>



	<p>Unsealed footpath</p> <p>This footpath located along Long Island Road at Edinburgh Street only has kerbing and a gravel finish.</p>
	<p>Untreated footpath</p> <p>This grave; footpath located along Hindmarsh Road has no kerbing or separation between the road shoulder and footpath area.</p>

In addition to the provision of footpaths, the development of a connected walking network requires suitable crossing facilities of the road network, particularly on the busier roads.

Controlled traffic signals with pedestrian phases exist at the Adelaide Road/Bridge Street and Adelaide Road/Maurice Road intersections. Signalised pedestrian-actuated crossings (PAC) are located along Swanport Road (three crossings in total) and one crossing on Mannum Road and two school crossings in Joyce Street for the Murray Bridge South Primary School and on Florence Street for St Josephs School. The Swanport Road pedestrian crossing south of Homburg Avenue near Murray Bridge High School is shown in Figure 3-5.

Figure 3-5 Swanport Road Pedestrian-Actuated Crossing



Source: Google maps, 2017.

Within the city centre, crossings are primarily in the form of median refuge crossings that enable pedestrians to cross each direction of traffic separately and are predominantly on Bridge Street, Adelaide Road and Swanport Road. The recent upgrade of Sixth Street has also introduced a raised table on South Terrace incorporating two zebra crossings providing pedestrian access to the Murray Bridge Marketplace shopping centre. There is also a raised zebra crossing (wombat crossing) on River View Road between the two sections of Murray Bridge Green shopping centre.

The median crossings of the Bridge Street and the zebra crossing of South Terrace at the Murray Bridge Marketplace are shown in Figure 3-6 and Figure 3-7 respectively.



Figure 3-6 Bridge Street Median Crossing



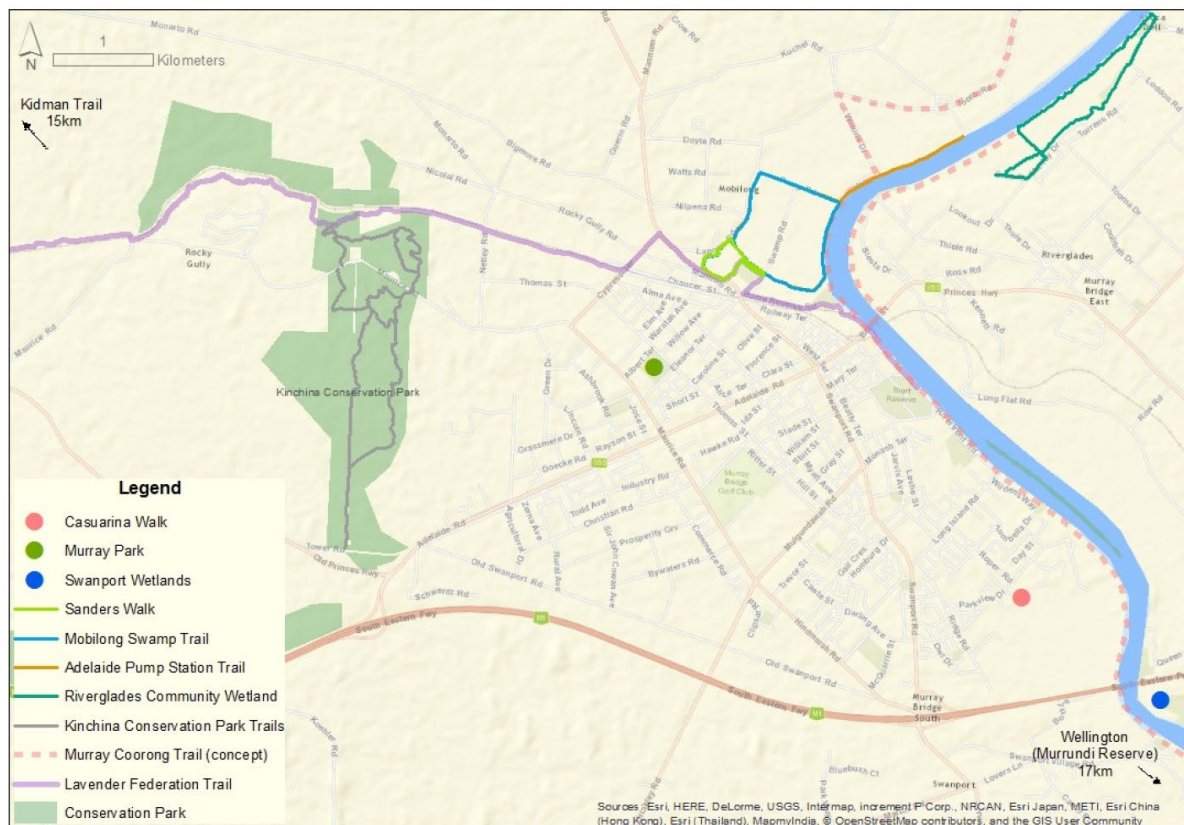
Figure 3-7 South Terrace Zebra Crossing



3.1.2. Trail network

Beyond the footpath network on the local streets, there is an existing network of trails within Murray Bridge. These range from short trails within the local reserves through to long distance trails, including the start of the Lavender Federation Trail which runs from Murray Bridge to Clare. The walking trail routes within the Murray Bridge area are shown Figure 3-8.

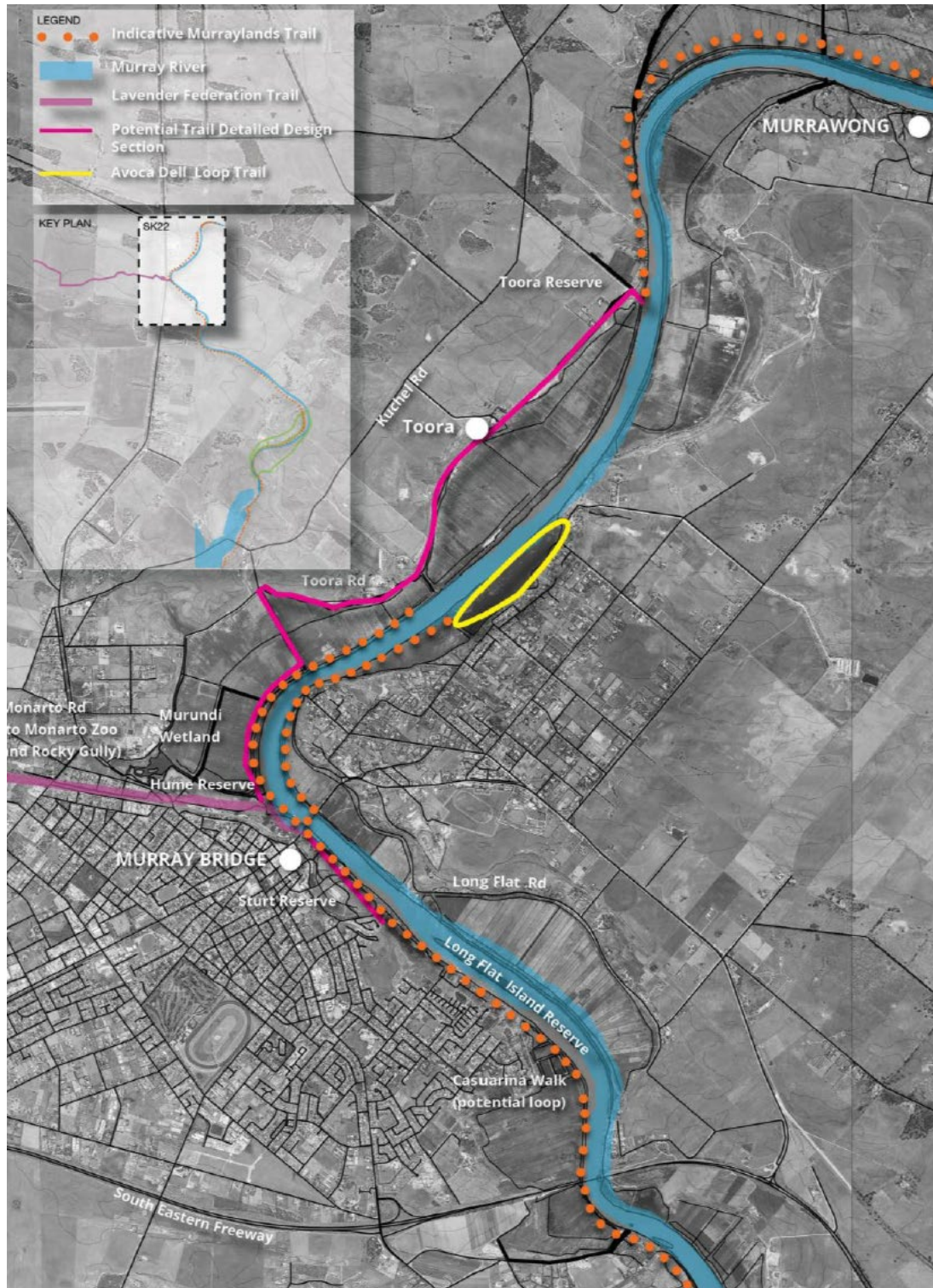
Figure 3-8 Murray Bridge Trail Network



Source: RCMB Trail Strategy, February 2017.

The proposed Murray Coorong trail is a joint project between Murray Bridge, Mid Murray and Coorong District Councils. The section from the Hume Reserve to the Toora Reserve has been identified as the first section to be developed to detail design stage within Murray Bridge. The section of the trail to be established initially and the connections with the other trails and the wider Murray Coorong trail is shown in Figure 3-9.

Figure 3-9 Murray Coorong Trail Route in Murray Bridge



Source: Murraylands Trail Strategy, 2016.

The existing trail network generally provides unsealed surfaces, which is considered appropriate for a trail network. The Murray Coorong trail is however intended to provide sealed routes within the urban area of the various townships through which it passes.

3.1.3. Heritage walks

Within the urban area of Murray Bridge, there are also a series of heritage trails. Two Murray Bridge Rail and River Heritage Walks were developed in the early 2000s providing routes that start and finish at the Visitor Information Centre and are shown on one map brochure.

In 2017, the Council implemented the Discovery Trail as a loop walking route providing interpretive and historic information at nine locations in the city centre, the Wharf and Historic Transport precincts via the riverfront. The route for the Discovery Trail is shown in Figure 3-10.

Figure 3-10 Murray Bridge Discovery Trail



Source: Murray Bridge Discovery Trail map, 2017.



3.2. Cycling

Murray Bridge only has a limited provision of cycling infrastructure. On-road bicycle lanes exist along sections of Adelaide Road and Swanport Road, providing a mixture of timed and exclusive bicycle lanes. However, some of the Adelaide Road signage is not compliant to the relevant standards and the Swanport Road timed sections of the bicycle lane is only in effect from 8 am to 9 am and 3 pm to 4 pm, which does not support any PM peak period commuter cycling. This does not encourage school students of any age group, including high school, to use the on-road bicycle lanes along Swanport Road.

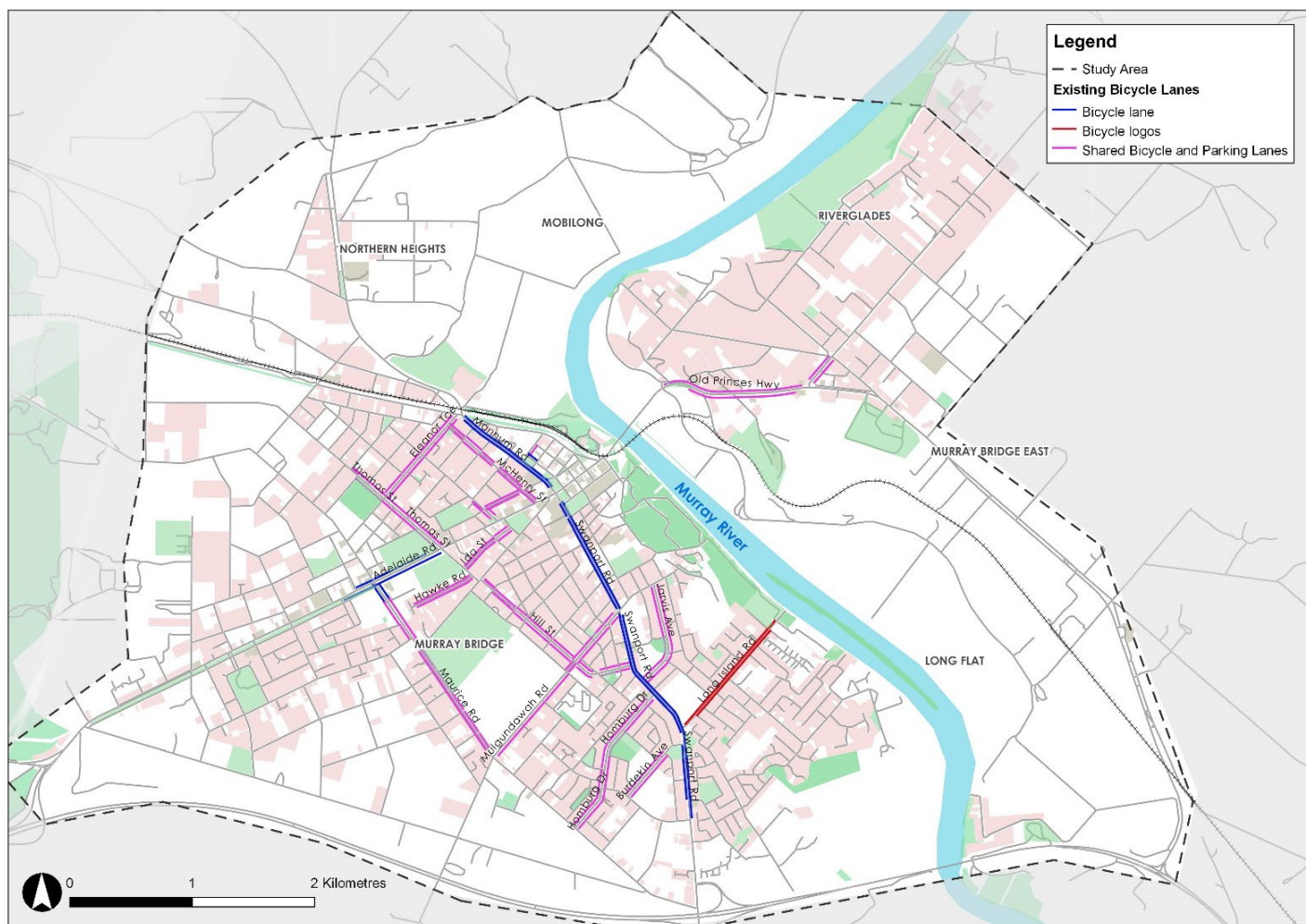
Within the local streets identified as part of the bicycle network in Figure 3-1, bicycle logo markings, either kerbside, part of a shared bicycle and parking lane or as a bicycle lane exist. In all cases, cyclists need to navigate around parked cars, with the shared bicycle and parking lanes typically too narrow to enable a cyclist to safely pass a parked vehicle and remain within the lane. Where the width of the lane is effectively only sufficient as a bicycle lane, no regulatory signage exists making the bicycle lane unenforceable.

The types of bicycle treatments are shown in Figure 3-11. The length of the bicycle treatments within Murray Bridge are given in Table 3-2.

Table 3-2 **Types of Cycling Treatments in Murray Bridge**

Bicycle Treatment	Length (m)	Percentage
Bicycle lane (exclusive and timed)	9,677	27%
Shared bicycle and parking lane	23,966	67%
Bicycle logos along the street	2,235	6%
Total	35,878	100%

Figure 3-11 Existing Types of Bicycle Infrastructure in Murray Bridge



The different types of bicycle infrastructure and road markings for cyclists in Murray Bridge, including the bicycle lanes, shared bicycle and parking lanes and bicycle logos, are shown in Figure 3-12.

Figure 3-12 Types of Existing Bicycle Infrastructure in Murray Bridge

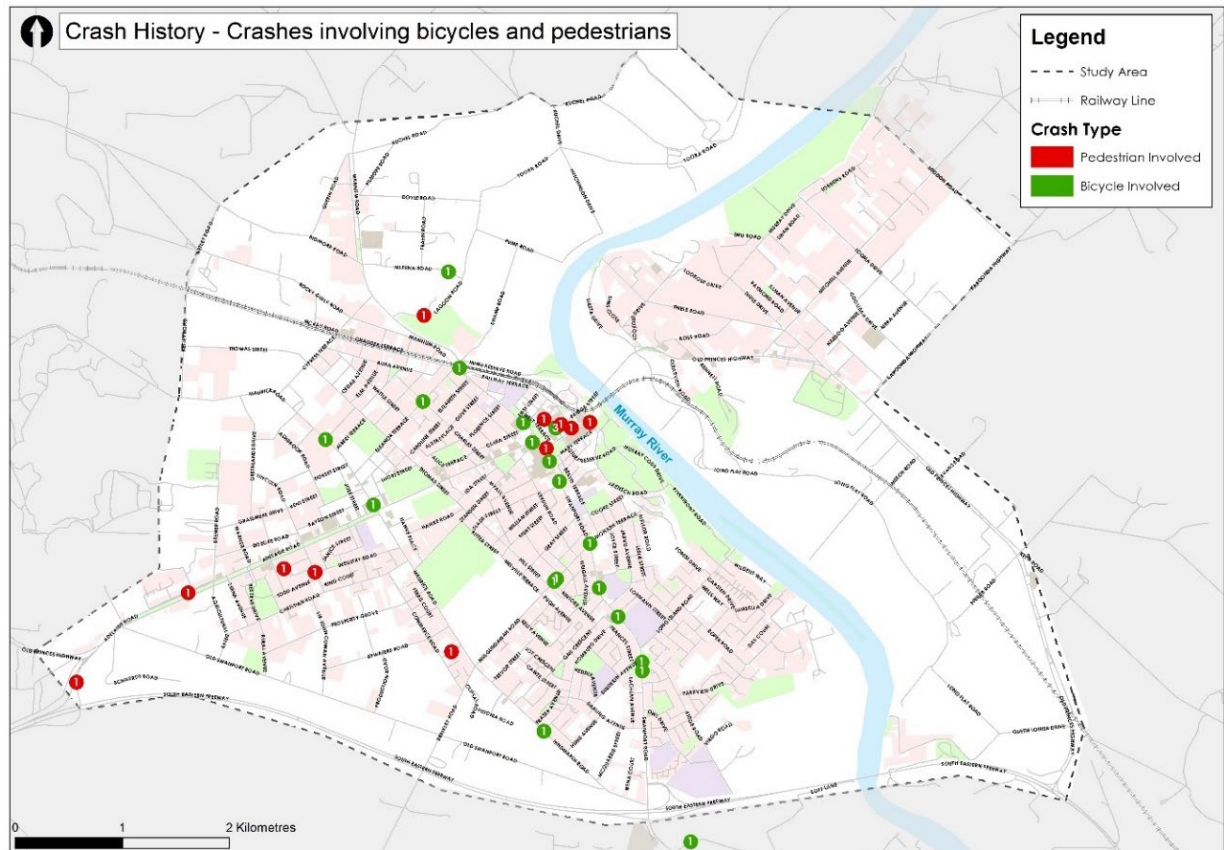
	<p>Section of the Adelaide Road bicycle lane with no signage advising of the status of the bicycle lane or the permitted parking</p>
	<p>Section of the Swanport Road bicycle lane, with signage advising of the hours of operation of the bicycle lane</p>
	<p>Local street shared bicycle and parking lane in Verdun Road</p>



3.3. Road safety

Crash data from the State Government records for the five-year period (2012-2016) were analysed to identify the frequency of crashes involving pedestrians and cyclists. The locations of these pedestrian and cyclist crashes in Murray Bridge are shown in Figure 3-13.

Figure 3-13 Reported Pedestrian and Cyclist Crashes 2012-2016





The crash statistics indicate the following trends:

- A total of 31 crashes were reported of which 12 involved pedestrians and 20 involved cyclists (one involved a pedestrian and a cyclist)
- The crashes resulted in 16 minor injuries, 4 serious injuries and 2 fatalities (although 1 of the fatalities was just outside the study area on Swanport Village Road)
- The Mannum Road-Swanport Road corridor recorded 9 crashes, all involving cyclists, with 7 caused by vehicles failing to give way to cyclists when entering or leaving the major road
- 6 pedestrian crashes were recorded in the city centre, all resulting in an injury (5 minor, 1 serious) of which 4 involved vehicles exiting driveways or car parks.

3.4. Issues identified from the key stakeholders

The stakeholder and community consultation events and the site visits that were conducted in January and February 2018 identified a wide range of issues for walking and cycling in Murray Bridge.

Issues identified for walking included:

- Poor quality footpaths on the Murray River bridge
- Crossing the Adelaide Road and Swanport Road intersection is considered unsafe
- Lack of safe crossing facilities along East Terrace
- Bridge Street is not pedestrian friendly
- Poor pedestrian connections to the swimming pool and other local destinations
- Lack of footpaths on the South Eastern Freeway bridge
- Lack of connectivity to the Swanport Wetlands
- Lack of walking connections to the Kinchina Conservation Park

Issues identified for bicycling included:

- Limited bicycle parking facilities exist in the city centre
- Bridge Street is not bicycle friendly
- Limited space for bicyclists using the footpaths or the road on the Murray River bridge
- Lack of bicycling facilities along Hindmarsh Road

3.5. Network gap and needs assessment

Based on the stakeholder and community feedback and site observations, the following have been identified as the key network gaps and needs to support walking and cycling within Murray Bridge.

- Safe and accessible connections between the city centre and Riverfront across East Terrace
- Pedestrian connections around the Bridge Street/East Terrace intersection



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- Missing and/or poor quality sections of footpath in the city centre along Mary Terrace, South Terrace, Seventh Street and Railway Terrace.
- Lack of clear connections along the full extent of the Riverfront, particularly north of the old bridge and to Long Island Reserve
- Width and format of footpaths within and around Sturt Reserve
- Connectivity to the Round House as a local heritage destination
- Generally poor pedestrian and cycling environment along and across Bridge Street
- Perception of unsafe pedestrian crossing facilities within the traffic signal intersections
- Limited/lack of safe and comfortable pedestrian and bicycle facilities on the river crossings
- Lack of connecting routes and supporting wayfinding signage along and to the various trails, such as in the Kinchina Conservation Park, Swanport Wetlands, Casuarina Walk and wetlands, Hume Reserve, Rocky Gully Wetlands and the Avoca Dell Reserve.
- Limited extent of formal footpaths within the urban area
- Limited and discontinuous bicycle lanes and routes, many of which have no status due to lack of signage
- Lack of bicycle parking provision, particularly in the city centre.



4. Proposed Walking and Cycling Network Plan

4.1. Network principles

A set of network principles were used to guide the development of the Murray Bridge walking and cycling masterplan that comprised of route characteristics and network planning guidelines.

4.1.1. Route characteristics

To encourage the use of the pedestrian and cycling network, consistent principles are applied to all facilities to ensure that pedestrian and cycling networks offer an environment that provides a convenient, safe and pleasant journey with direct routes that minimise the length of travel and travel time to destination. The characteristics for walking and cycling networks as identified in the Austroads Guide are given in Table 4-1.

Table 4-1 Pedestrian and Bicycle Network Characteristics

Route Feature	Considerations
Safety	Good well-maintained surfaces free of tripping hazards and obstructions, clear sight lines and operating space, adequate lighting to ensure that pedestrians feel safe when using paths at night and minimise conflicts between path users.
Connected	Continuous routes and travel paths as short as possible, crossings appropriate for the traffic volume and traffic speed environment at locations that are difficult to cross (e.g. major roads, railways) with short waiting times at signalised crossings. Provide good access to key destinations.
Legible	Easy to follow and provide clear directional signs to destinations, pavement marking information, visible street name and place name signs and be supported with readily available path network information (e.g. local maps and information boards).
Comfortable	Path widths have suitable space for the number of users, including waiting spaces away from through movements, set back from roads to create physical separation from motor traffic, smooth, well maintained surface free from debris.
Convenient	As continuous as practicable, ensuring streets can be crossed easily and safely, minimised delays at road crossings and cyclist and pedestrian facilities at signalised intersections.
Universal	Gradients cater for mobility impaired users where practicable, contrasting coloured surfaces to highlight areas of path, tactile treatments and physical features to aid wayfinding, including for vision impaired persons.
Pleasant	High quality amenity facilities along routes such as resting places, drinking fountains and shade/shelter located clear of the operating space of the path and paths located and designed to be safe and inviting, with diversity of activity and continuous interest at ground floor level.

Source: AGRD06A-17 Austroads Guide to Road Design Part 6A Paths for Walking and Cycling



Features for a good quality bicycle route network from the Austroads Guide to Cycling (AP-G88-17) are provided in Table 4-2.

Table 4-2 Bicycle Network Features

Route Feature	Considerations
Safety	Minimal risk of traffic-related injury, low perceived danger, space to ride, minimum conflict with vehicles
Coherence	Infrastructure needs to form a coherent entity, link major trip origins and destinations, have connectivity, be continuous, signed, consistent in quality, easy to follow, and have route options
Directness	Routes need to be direct, based on desire lines, have low delay through routes for commuting, avoid detours and have efficient operating speeds
Attractiveness	Lighting, personal safety, aesthetics, integration with surrounding area, access to different activities
Comfort	Smooth skid-resistant riding surface, gentle gradients, avoid complicated manoeuvres, reduced need to stop, minimum obstruction from vehicles

Source: AP-G88-17 Cycling Aspects of Austroads Guides, Table 2.2.

4.1.2. Network planning

Within an urban area, local walking access needs to be conveniently and safely available to all, with the footpath provision generally linked to the road network, supplemented by routes within reserves and other local facilities. The availability of a safe and sealed footpath within all local streets is the aspiration for the Rural City of Murray Bridge. The nature of the footpath provision within each street would then reflect the nature of the street and the proximity to local destinations that may generate pedestrian demand.

Lightly-trafficked local residential streets with limited directional and local connectivity may be suitable with one footpath. As the availability of local walking connections and the volume and speed of traffic increases, the need for footpaths on both sides of a street or road increases. Furthermore, pedestrian crossings need to be installed to support key walking desire lines. Near activity centres and destinations, such as schools, local shops and busy tourist attractions, footpaths need to be wider and crossings are required to provide greater priority and safety where a mixture of traffic conditions exist.

The purpose of a bicycle network is to enable people of a wide range of abilities and skill levels to cycle. The basis of a bicycle network is the road network made up of local and arterial roads. These roads may include designated on-road facilities such as bike lanes, and can be supplemented with dedicated off-road paths, shared paths and footpaths.

The status of the various sections of the bicycle network will reflect the nature of the destinations to be connected and the directness of the route. This will define a hierarchy for the bicycle network, with the primary routes providing direct facilities connecting the major destinations supported by secondary routes providing local connections and overall route connectivity.



4.2. New walk connections

4.2.1. Local footpaths

Most of the walking network in the Murray Bridge study area is provided within wide verges along the road network and through and along the park and reserves. However, the quality of the walking network is generally poor with mostly unsealed paths and where the footpaths are sealed they are generally of the minimum 2 m width. The network connectivity is restricted because of missing sections of connecting footpath, lack of safe crossing facilities and traffic and parking preventing the use of direct walking routes.

Council has already developed a city-wide footpath strategy which recognises the need to provide a much wider network of good quality, sealed footpaths in the local streets connecting to key destinations. This is already improving local accessibility along streets such as Verdun Road between Standen Street and Riverview Road close to Murray Bridge Green Shopping Centre and Murray Bridge Swimming Centre.

Upgrades within the Footpath Strategy of 2017 that will support the recommended priority connections within this Masterplan include new sealed footpaths on sections of Mary Terrace, West Terrace and North Terrace within the city centre.

The key walking connections to be included in this masterplan are:

- The development of a sealed “promenade” walkway along the whole of the Riverfront, initially focusing on the Murray Princess berth just north of the old bridge to Long Island Reserve and subsequently extending to Tumbella Reserve.
- A comprehensive network of footpaths (some of which will be shared paths as discussed in Section 4.4) within Sturt Reserve and along Olympic Drive, Sturt Reserve Road, Murray Cods Drive, Charles Sturt Drive and Jaensch Road, in accordance with the principles of the Sturt Reserve Masterplan.
- Formal pedestrian crossing provision, initially in the form of pedestrian median refuges, across East Terrace between Bridge Street and Mary Terrace.
- Completion of the missing sections of sealed footpath along Mary Terrace, South Terrace, Seventh Street, North Terrace, First Street, Second Street and Railway Terrace within the city centre.
- Completion of a sealed footpath connection along the north side of Bridge Street between Railway Terrace and the footpath on the bridge.
- Continuation of the footpath strategy with a view to providing at least one sealed footpath of 1.5m width on all local and residential streets, increasing this width where additional pedestrian, cyclist and disabled demand is anticipated.
- Review of the pedestrian crossing requirements and provision around the swimming centre and the various schools.
- Improve the pedestrian crossing permeability and safety across Bridge Street between Swanport Road and East Terrace as part of any future upgrade of Bridge Street.

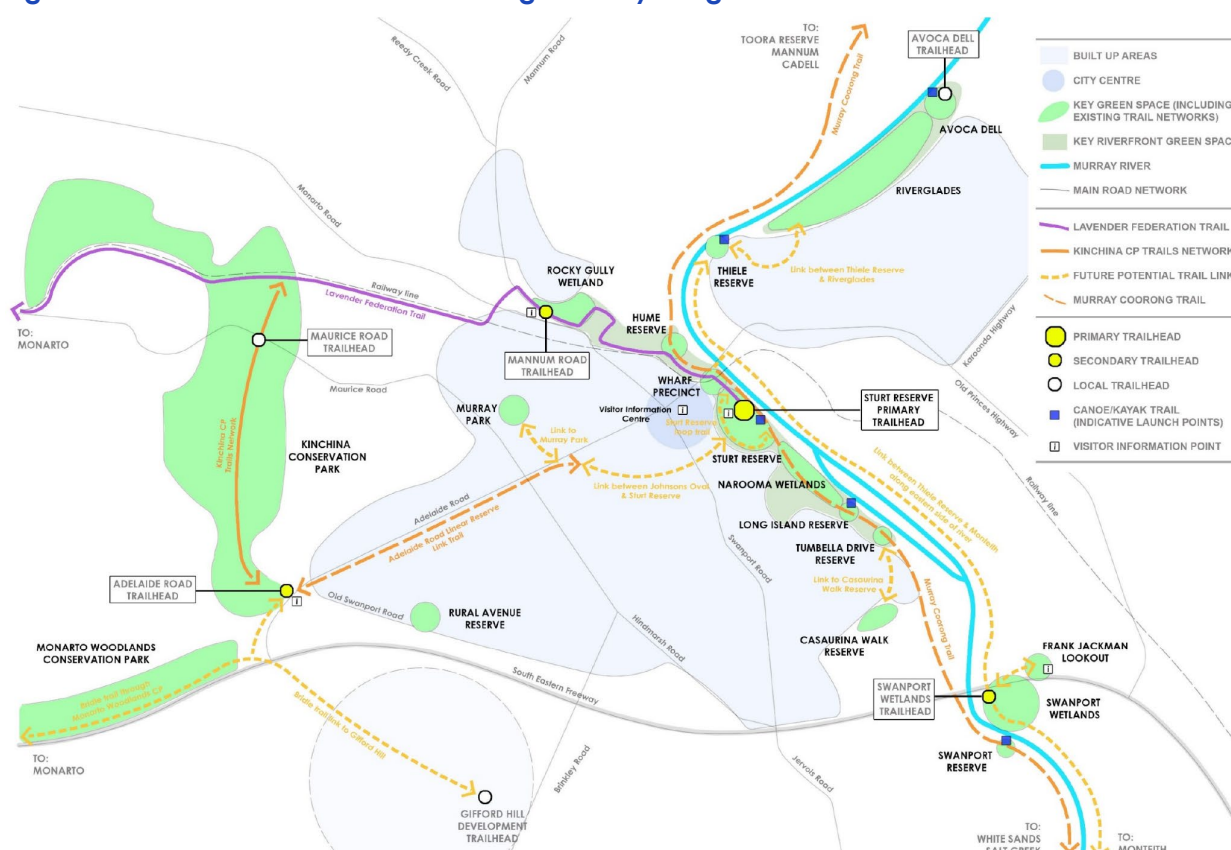
- Investigation of future opportunities to improve the walking connections across the Murray River.

4.2.2. Walking trail networks

Several existing trails connect to Murray Bridge, such as the Lavender Federation Trail. Council previously developed a Trail Strategy to integrate with these routes. For example, the Lavender Federation trail remains a core part of the network with the addition of the proposed Murray-Coorong trail on the western side of the Murray River, local connections to complete a trail network on the eastern side of the river from Avoca Dell to Swanport Wetlands and beyond and improved connections to the Casuarina Reserve, Kinchina Conservation Park and Monarto.

The proposed trail network derived from the Murray Bridge Trail Strategy is shown in Figure 4-1.

Figure 4-1 Trail Network Vision through Murray Bridge



Source: RCMB Trail Strategy, February 2017.

In addition to the proposed trail strategy links, improved connections are identified from the Riverfront to Rocky Gully Wetlands and Hume Reserve.

4.3. New cycling connections

4.3.1. Murray Bridge bicycle network

The development of a bicycle network for Murray Bridge has been based on the following principles:

- Defining a network hierarchy to identify the principle, local and trail bicycle routes, based on the key destinations for cycling trips
- Consideration of the infrastructure requirements for each section of the network based on the traffic conditions, anticipated bicycle users and technical feasibility
- Ensuring that the completion of a connected network is an achievable goal for Council within the likely budget for the bicycle network

A bicycle network hierarchy was developed for Murray Bridge that comprises a principal, local and recreational and trail routes as described in Table 4-3.

Table 4-3 Bicycle Network Hierarchy

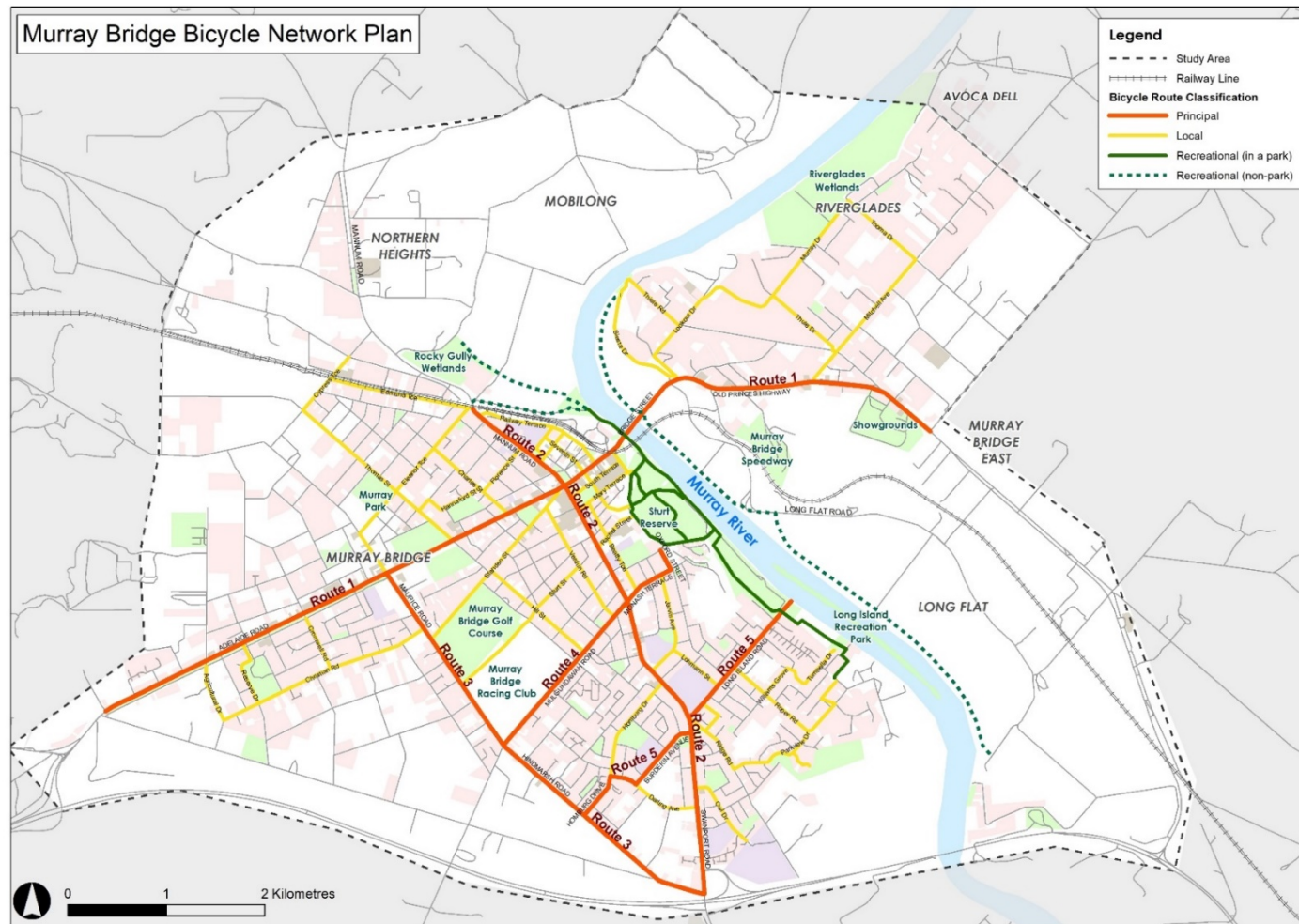
Route Classification	Description
Principal	Bicycle routes on the main roads that provide direct access to the city centre and key destinations with off-road shared paths or on-road bicycle lanes; Each principal route has a route number or name and directional signage along each route
Local	Bicycle routes on local streets with mostly advisory markings that connect to schools and recreational areas
Recreational Paths	High quality, sealed shared paths through reserves and parks, such as along the Riverfront
Recreational Trails	Unsealed paths along off-road routes for recreational cyclists

The principal bicycle routes for Murray Bridge are proposed with the following numbering scheme as:

- **Route 1** Adelaide Road, Bridge Street and Old Princes Highway between the South Eastern Freeway interchange at Old Swanport Road and the Murray Bridge Showgrounds
- **Route 2** Swanport Road and Mannum Road between the South Eastern Freeway interchange at Hindmarsh Road and Railway Terrace
- **Route 3** Maurice Road and Hindmarsh Road between Adelaide Road and Swanport Road
- **Route 4** Mulgundawah Road and Monash Terrace between Maurice Road/Hindmarsh Road and the Sturt Reserve
- **Route 5** Homburg Drive, Darling Drive, Burdekin Avenue to Long Island Road between Hindmarsh Road and the Long Island Reserve

The proposed bicycle network plan, identifying the principal, local and recreational and trail routes is shown in Figure 4-2. This network provides connections to the primary bicycle destinations within Murray Bridge of the city centre, the Riverfront, schools and swimming pool.

Figure 4-2 Proposed Bicycle Route Network





The proposed bicycle network can be implemented using a variety of different infrastructure types, with the primary types identified for Murray Bridge being:

- On-road bicycle lanes, which would be exclusive for bicycles at all times
- On-road advisory treatments using sharrow markings within the traffic lanes (supported by wayfinding signage) which are suitable for low traffic local streets
- Off-road shared paths either within reserves or along the road verge where space permits
- Off road trail paths

On-road bicycle lanes, regardless of any time limits, are generally only attractive to regular and reasonably confident cyclists. In order to widen the appeal of cycling, separated or off-road facilities are recommended to be provided along the main road corridors, with advisory treatments suitable on low volume and low speed local streets.

The existing on-road bike lanes on Adelaide Road, Swanport Road, Mannum Road, Mulgunduwah Road, Maurice Road need to be maintained with all the required regulatory signage installed to ensure that the bike lanes are legally operational and enforceable. Only Swanport Road has the required regulatory signage. Green bicycle lane painting is recommended across intersections to highlight the presence of the bike lane to motorists emerging from minor roads, as this is the major cause of cyclist crashes in Murray Bridge. These bike lanes need to be operational throughout the day, seven days a week.

As a minimum, it is recommended that the hours of operation are extended to 8 am to 9 am and 3 pm to 6 pm to cover both school and commuter peak periods.

On the local street bicycle network, the recommended infrastructure treatment is the approved Shared Lane Marking or "sharrow". The "sharrow" consists of a bicycle logo with a double arrow marking above it.

The use of advisory "sharrow" markings is recommended on designated bicycle routes:

- where traffic volumes are less than 3,000 Average Annual Daily Traffic (AADT) and the speed limit is 50km/h or less; or
- where traffic volumes are between 3,000 and 5,000 AADT and the speed environment is low (typically considered where the 85th percentile speeds are less than 30 km/h; this means that less than 15 per cent of the traffic exceeds 30 km/h).

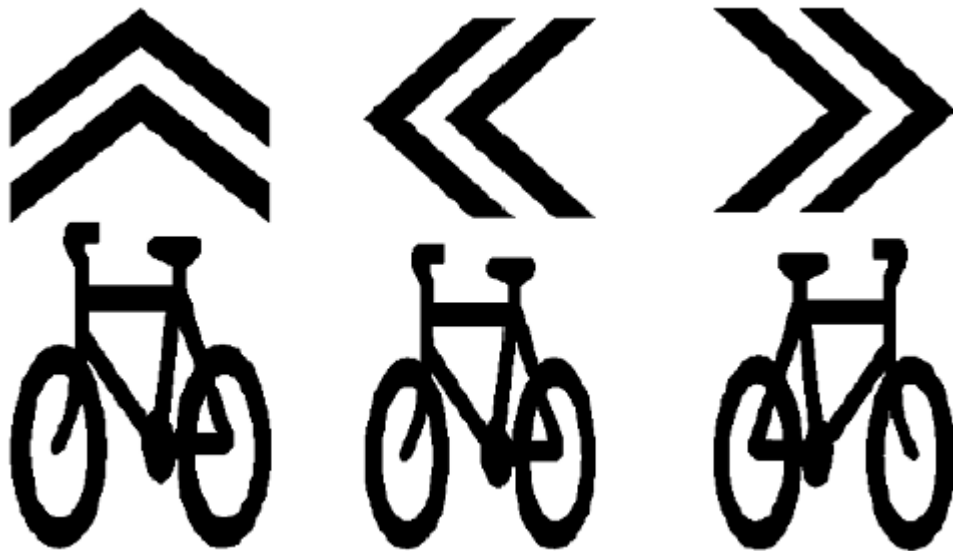
Sharrow markings are recommended for implementation along the local cycling routes to:

- Assist cyclists with lateral positioning on roads with on-street parallel parking in order to reduce the chance of being hit by an opening door of a parked vehicle.
- Assist cyclists with lateral positioning on roads that are too narrow for a motor vehicle and a bicycle to travel side by side in the same direction.
- Assist cyclists with navigating a designated bicycle route.
- Alert road users that they are on a designated bicycle route.
- Alert road users of the lateral location cyclists are likely to occupy within the roadway.

- Encourage safe passing of cyclists by motorists.

To assist cyclists to navigate along a bicycle route, the sharrow markings can be used in three configurations as shown in Figure 4-3.

Figure 4-3 Examples of Sharrow Road Markings

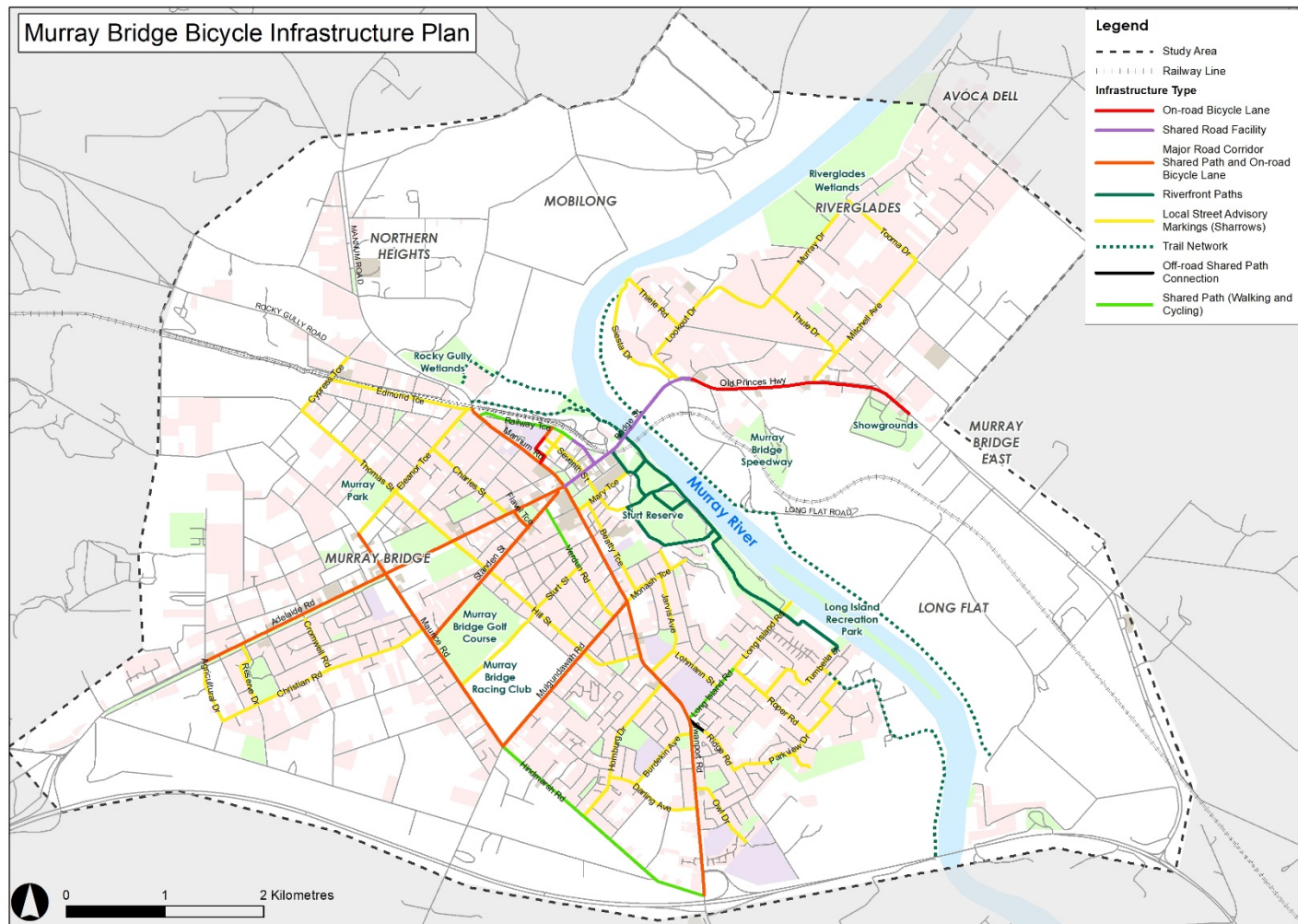


Source: Austroads cycling standards.

On-road advisory treatments, such as sharrows, are recommended for the streets that are classified as local bicycle routes. These streets have speed limits of 50 km/h with less than 3,000 vehicles per day. Verdun Road is proposed for a shared path on the western side at the northern end where the traffic volumes are greater than 4,000 vehicles per day, but has lower volumes at the southern end.

The different types of cycling infrastructure to support the development of the bicycle network plan is shown in Figure 4-4. The existing shared bicycle and parking lanes are recommended to be removed and replaced with either on-street advisory markings, or shared paths.

Figure 4-4 Proposed Bicycle Network Infrastructure



Examples of these different types of bicycle infrastructure, road markings and shared paths are shown in Figure 4-5.

Figure 4-5 **Types of Proposed Bicycle Infrastructure for Murray Bridge**

	<p>Bicycle lane with marking on a low traffic volume, local street</p>
	<p>Sharrow marking on a local street</p>
	<p>Shared path along an arterial road</p>



	<p>Shared path through a park</p>
	<p>Green asphalt pavement treatment at and across a road intersection</p>

4.3.2. Cycling Trails

None of the existing trails within Murray Bridge are formally identified as bicycle trail routes. Many of them would however be suitable as recreational bicycle trails, particularly in conjunction with the proposed walking trail upgrades.

Bicycle trails to be included in the masterplan are:

- Riverfront east trail from Avoca Dell to Swanport Wetlands where the existing route sections along the levees are already suitable for trail cycling.
- Riverfront west trail from the end of the Riverfront Promenade near the Murray Princess berth north of the old bridge through to Hume Reserve following the Lavender Federation Trail.
- Hume Reserve to Rocky Gully Wetlands with an option to extend to the Kinchina Conservation Park and in the longer term to Monarto Zoo.

4.3.3. End-of-trip cycling facilities

To support the proposed bicycle network and increased levels of cycling, the provision of suitable end of trip facilities is essential. In the context of the facilities to be provided by Council, the primary facility required is suitable bicycle parking.

The limited bicycle parking within the city centre comprise of hoops located at South Terrace in front of the library and in front of the Council offices in Seventh Street.

Proposed locations for bicycle parking, to be delivered either by Council or in conjunction with site operators and land owners, and the format of bicycle parking required are summarised in Table 4-3.

Table 4-3 Proposed Bicycle Parking Locations and Format

Location	Format and Use
Various city centre locations close to destinations on Bridge Street, Sixth Street, Seventh Street and South Terrace	Primarily short term for visitors, with small groups of bike hoops, similar to those outside the library
Murray Bridge Marketplace	Short term bike hoop parking for visitors close to the entrances with some more secure long term bike parking available for staff
Murray Bridge Green	Short term bike hoop parking for visitors close to the entrances with some more secure long term bike parking available for staff
Murray Bridge Railway Station	Short term bike hoop parking for visitors close to the entrances with some more secure long term bike parking available for staff
Riverfront, including Sturt Reserve, Wharf Precinct, Long Island Reserve	Short term for visitors, with small groups of bike hoops located within each of the precincts and close to the various attractions
Murray Bridge Swimming Centre	Bike hoops within the centre close to the entrance to serve visitors and staff
Schools	Suitable format of parking available for students to accommodate varying bike sizes and scooters
Murray Bridge Soldiers Memorial Hospital	Primarily long term secure bike parking for staff, small number of visitor hoops close to the entrance
Recreation facilities and local reserves	Short term for visitors, with a small group of bike hoops located close to reserve entrances or recreation facility entrances

Bicycle hoops installed in the footpaths that are conveniently located next to building entrances will typically be sufficient for short term bicycle parking requirements less than two hours for shopping and other business appointments. However, in locations where longer term and all day bicycle parking is required for staff, increased security and cover for the bicycle parking is recommended.



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The bicycle parking facilities are best located where natural surveillance exists for security, and they are easily accessible to the bicycle network and the building or facility entrances. The monitoring of their use on a regular basis will confirm the suitability of the location and if additional space or facilities are required.

4.4. Safe crossings

To support the extended footpath and trail networks, safe crossing opportunities need to be implemented where appropriate. The nature of the crossing opportunities and facilities will reflect the nature of the road to be crossed.

Local streets, with relatively low traffic volumes and speeds are unlikely to require any specific crossing facility beyond kerb ramps and adequate sight distance between vehicles and pedestrians.

As traffic volumes and speeds increase, the crossings are needed to provide a safe route for those most likely to use the crossing. In many cases a simple median refuge, enabling pedestrians to cross each direction of traffic separately may suffice. However as pedestrian volumes increase, the format of the crossing needs to consider the level of protection and priority provided for pedestrians and bicyclists where appropriate. Where the number of children or elderly pedestrians are crossing the road, the type of pedestrian crossing may need to be modified to accommodate their specific needs. Specific roads that need to be investigated for safer crossing provision include Maurice Road, Mulgundawah Road, Standen Road around the swimming pool and Long Island Road around the Murray Bridge High School.

Additional crossing formats range from school specific crossings, where crossing demand is almost exclusively related to school access, through zebra crossings (raised or flush where the traffic speeds are low) to signalised pedestrian crossings as used on Swanport Road. In each specific location, details of the pedestrian and cyclist as appropriate demand, road safety and crash history, traffic volume and traffic speed will need to be investigated to determine the most appropriate crossing format.

Within the city centre and Riverfront, the most critical location for pedestrian crossing is on East Terrace where a series of pedestrian refuges at Bridge Street, South Terrace, adjacent to the Marketplace car park access and Mary Terrace have been identified. In addition, a pedestrian refuge has been identified across Bridge Street connecting East Terrace to Railway Terrace and supporting a footpath connection on the north side of Bridge Street between the bridge and Railway Terrace.

Improved pedestrian crossing provision is also required across Bridge Street between East Terrace and Swanport Road. This covers the section of Bridge Street that has been identified for a more extensive upgrade to enhance the main street environment of Murray Bridge. Improved pedestrian crossing facilities are needed within the upgrade, considering issues such as crossing distance, proximity to parked vehicles, sight distances between pedestrians and vehicles and the prevailing speed environment.

The existing pedestrian-actuated crossings on Swanport Road between Burdekin Avenue and Long Island Road and south of Homburg Drive and the crossing on Mannum Road need to be

upgraded to include bicycle lanterns. In both cases, short sections of shared path need to be provided on the west side of Swanport Road and Mannum Road to provide cyclist connections between the crossings and Burdekin Avenue, Homburg Drive and Florence Street. An example of a shared pedestrian and bicycle crossing with pedestrian and bicycle lanterns on one pole is shown in Figure 4-6.

Figure 4-6 Example of a Pedestrian and Cyclist Signalised Crossing



Shared pedestrian and cycling crossing over Daws Road east of Marion Road, Ascot Park (looking south)

An additional crossing facility will also be required on Swanport Road close to Unity College. This crossing will facilitate the shared path connection between the eastern side of Swanport Road and Hindmarsh Road and may also assist with existing crossing issues associated with the school. More detailed assessment of the specific crossing format will be required.

4.5. Future opportunities

A major land development project in Murray Bridge is planned at the existing Murray Bridge Racecourse that is being relocated to a new facility in Gifford Hill about 1 km south of the South Eastern Freeway. The new estate will be known as Newbridge and it will comprise mostly residential properties, a motel, a retirement village and a neighbourhood centre as shown in Figure 4-7. Newbridge will also include a north-south linear park with pedestrian and cycle paths connecting Maurice Road and Melville Terrace, which will be a key link in a walking and cycling network between this new residential community and the city centre.

Figure 4-7 Golf Course Residential Estate at the Murray Bridge Racecourse Development



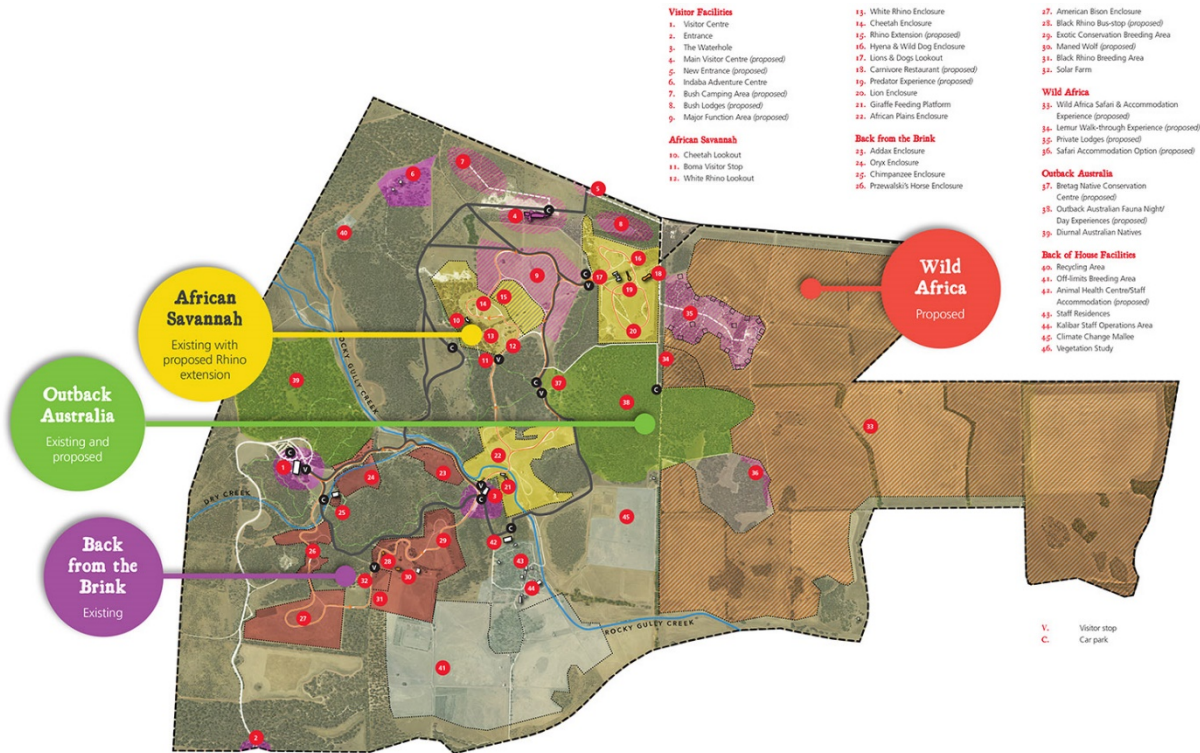
Source: Burke Urban brochure, 2015.

In the long term, new walking and cycling connections could be considered to access the new Gifford Hill Racecourse development via Brinkley Road. This would provide local cycling access for workers and visitors to the new racecourse and the function centre and within and to the new residential development. A key constraint for improving this cycling access to this development is the width of the Brinkley Road underpass of the South Eastern Freeway.

Other residential developments are proposed, particularly where it is infill within the existing urban area, it is recommended that Council ensure that all opportunities for walking and cycling infrastructure with new through connections are considered as part of the any development layout. This may include roads, such as Old Swanport Road and Rural Avenue, to provide connections in to Brinkley Road and the surrounding area.

Monarto Zoo has a masterplan, as shown in Figure 4-8, to relocate to the main entrance on Monarto Road that connects to Rocky Gully Road in the Murray Bridge townsite. If Monarto Road is upgraded with sealed shoulders, this would be a suitable future cycling route heading west from Murray Bridge.

Figure 4-8 Monarto Zoo Masterplan



Source: Monarto Zoo Masterplan, 2015.



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5. Concept Designs and Cost Estimates

5.1. Concept designs

Concept designs for the proposed walking and cycling network shown in this masterplan were developed with landscape architecture or CAD drawings.

The types of walking and cycling infrastructure treatments include:

- On-road bicycle lanes along major road corridors
- Off-road shared paths for walking and cycling within major road corridors, including local connections where required
- Riverfront shared paths and footpaths through the reserves and parks
- Local street advisory markings, such as sharrows, for the shared road facilities
- Off-road trails with unsealed paths for cyclists

The concept designs for the bicycle infrastructure and shared use path network are shown on landscape architectural drawings in Appendix A.

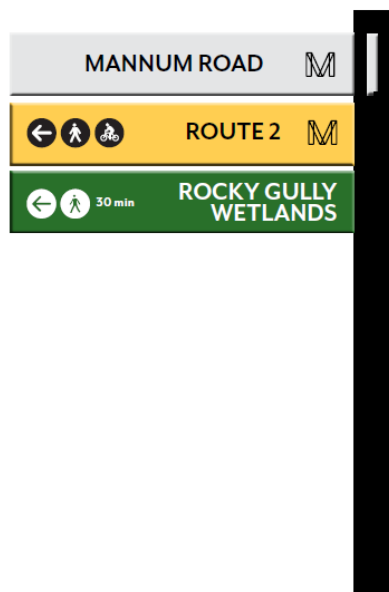
Special walking and bicycle infrastructure treatments were identified for:

- The intersection of Bridge Street, East Terrace and Railway Terrace with pedestrian and cyclist infrastructure
- Pedestrian crossings over East Terrace between Bridge Street and Mary Terrace.

These treatments are shown on CAD drawings in Appendix B.

An example of the proposed wayfinding signage for walking and cycling routes in Murray Bridge is shown in Figure 5-1.

Figure 5-1 Proposed Walking and Cycling Wayfinding Signage for Murray Bridge





5.2. Cost estimates

The assumptions for the cost estimates of the proposed walking and cycling infrastructure treatments as shown in the concept designs are given as follows:

Bicycle Lane Sign and Line Requirements

- The bicycle lane sign shall be used at the beginning of a part-time or full-time cycle lane and at locations such that the spacing does not exceed 500 m.
- The bicycle lane sign is to be used after every intersection to inform road users turning onto the road from the minor arm.
- The bicycle lane sign shall be used in conjunction with an "End" plate at the end of a part-time or full-time bicycle lane.
- Supplementary signs "Ahead" (R7-2), End (R7-4) and Times of operation (R9-1-1, R9-1-2) may be used with the sign.
- Bicycle lane operation times are to be shown with the sign at the start or repeated locations. It is not necessary to include the time plate with the "End" plate.
- Where a bicycle lane continues through an unsignalised intersection or motor traffic must cross the bicycle lane when making a turn at an intersection or major drive way, continuity lines need to be used to delineate both sides of the bicycle lane.
- Bicycle lane pavement symbols shall be used at the start of the bicycle lane and may be used on the approach and departure sides of intersections or at the end of a bicycle lane in conjunction with the "END" pavement marking.
- Bicycle lane symbols may be used on part-time lanes, only if they do not create confusion for motorists and cyclists at other times.
- Bicycle lanes commencing in a mid-block location need to have an appropriate taper marked.

Pedestrian Refuge

- Cost based on a 2 m wide refuge with kerb ramps provided on either side of the road and pedestrian / cyclist hold rails at the ramps and within the refuge.
- Allows for minor footpath connections to existing footpaths or proposed shared paths.

Bridge Street Pedestrian and Cyclist Crossing

- Cost includes a pedestrian refuge at the east side of the Channelised Right Turn (CHR) treatment, including kerb ramps and hold rails.
- Allowed for approximately 40 m seal widening by 1 m for the wearing course only. The base course was assumed to be adequate. Seal widening may not be required under the design.
- Line marking based on a zip merge on Bridge Street to enable the crossing to form.



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Bicycle Lane Upgrades

- The costs were based only on bicycle lanes located on the major road corridors.
- Sections which have been visibly upgraded within the last five years have been omitted, such as Mannum Road.
- Assumed an incorrect bicycle lane treatment has been applied at every minor intersection.
- Allowed for the provision of one bicycle lane sign and post and two symbols in each bicycle lane (one before and one after) per intersection.

Footpaths and Shared Paths

- Footpaths were estimated based on 2 m wide path and 100 mm concrete.
- Subbase was assumed to be adequate for the purposes of constructing the footpath and no allowance has been made for earthworks or drainage.
- 'Existing width to maintain' and 'Existing Type' of each road section were obtained from the existing footpaths shape file provided by the Murray Bridge Council.
- A shared path was assumed to be widened to 3 m from the existing 1.5m footpath where present.
- The length of linemarking is equal to the length of the shared path.
- The number of shared path symbols was calculated according to the symbol spacing recommendation set in the AS 1742.9 -2000, which states that 'Bicycle/pedestrian pavement symbol groups may be placed at spacings of up to 200 m.'
- The number of signs were based on the following requirements from AS 1742.9-2000 Clause 3.4 (b):
 - At the beginning of the path
 - Immediately after each road crossing
 - Elsewhere such that the spacing does not exceed 500 m
 - At the end of the path in conjunction with the END (R7-4) supplementary plate
- The number of kerb ramps is assumed to be 2 for each road section.
- Bollards are assumed not to be required. The Guide to road design part 6A Clause 7.5.3 states: 'This type of treatment (bollard terminal treatments) can create an unacceptable risk to cyclists and should only be used where provision of the preferred treatments is not practicable.' (The preferred treatment is providing a median island to create separate entry and exist terminal on the shared path.)

Advisory Bicycle Pavement Markings

- Advisory pavement markings were based on the criteria set out in the DPTI Operational Instruction 9.4 "Advisory Bicycle Pavement Marking: Shared Lane Marking (Sharrow)." This identifies the following criteria that were applied to the cost estimates:
 - The typical spacing of sharrow markings on each road would be approximately 50m in each direction.
 - The location of sharrow markings within each lane will need to be determined at detailed design based on the specified considerations of each street.
 - Additional signage would be provided within each road segment covering bicycle awareness and wayfinding.

These assumptions were applied for each of the walking and cycling infrastructure treatments by multiplying the number of symbols, signs and kerb ramps for each treatment.

The total cost estimates for the walking and cycling infrastructure are provided in Table 5-1.

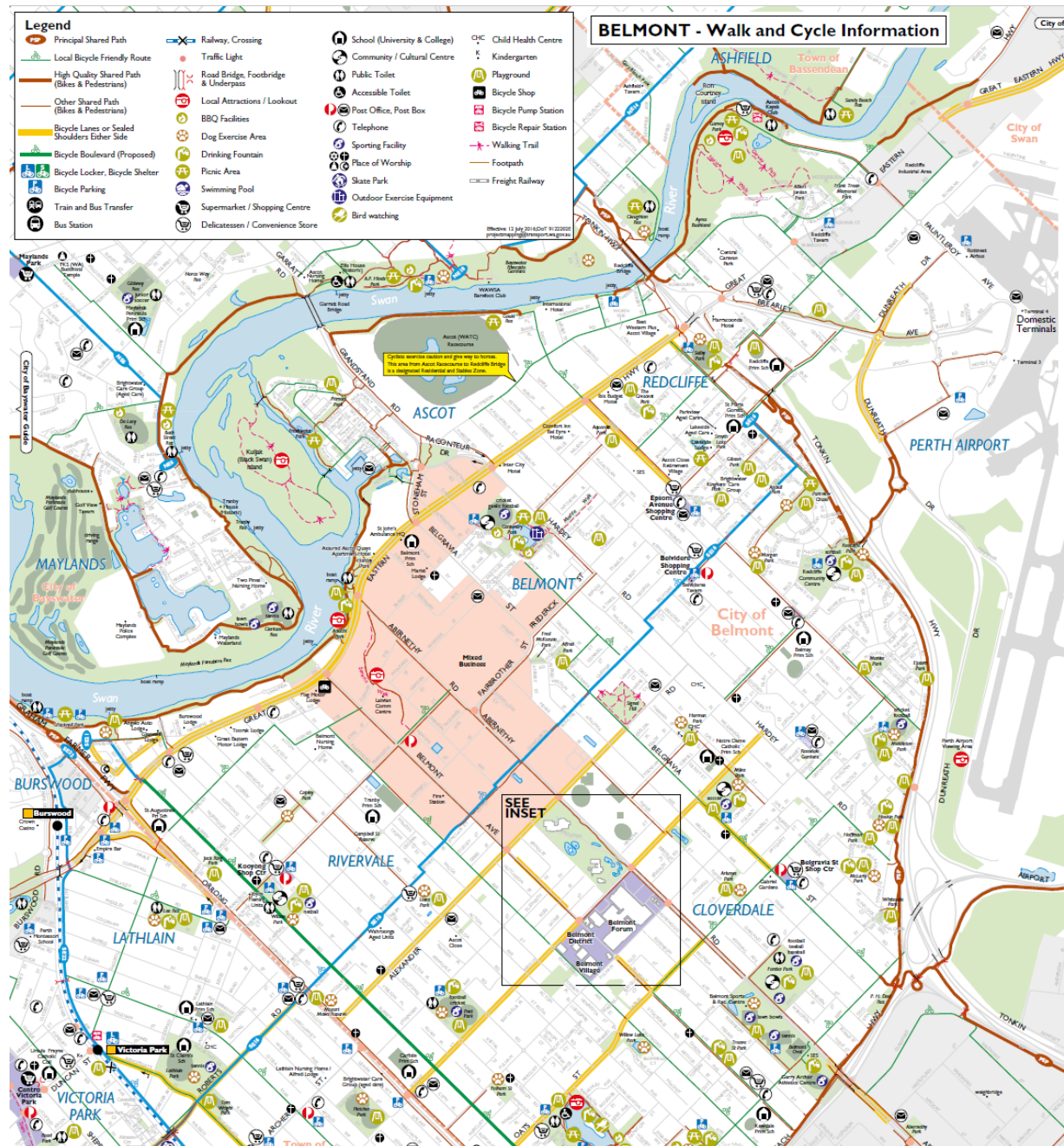
Table 5-1 Total Cost Estimates for the Walking and Cycling Infrastructure

Infrastructure Item	Cost (excluding GST)
East Terrace Pedestrian Refuges	\$87,380
Bridge Street / East Terrace Channelised Right Turn	\$30,000
Shared Paths (Major Road Corridor)	\$3,949,539
Riverfront Paths	\$2,397,478
Local Road Advisory Markings (sharrows)	\$224,200
Cycle Lane Sign / Line Upgrades	\$46,200
Footpaths (Non-Reserve)	\$63,840
Total exclusive of GST	\$6,798,637
Total inclusive of GST	\$7,478,501

5.3. Supporting promotional programs

An example of an integrated walking and cycling map from the City of Belmont in Western Australia is shown in Figure 5-2. This map was produced in collaboration with the WA State Government and the City of Belmont through the TravelSmart marketing program.

Figure 5-2 Walking and Cycling Map in Belmont, Western Australia



Source: Belmont TravelSmart brochure, Western Australia, 2017.

6. Action and Implementation Plan

An action and implementation plan with a maintenance plan for the infrastructure to support the walking and cycling masterplan was developed and is given in this section.

6.1. Staged implementation

A staged implementation of the proposed walking and cycling infrastructure has been identified over ten years from 2018/2019 to 2027/2028 with an allocation of the capital cost estimates provided in Table 6-1.

Table 6-1 Staged Walking and Cycling Infrastructure Implementation Plan

Infrastructure Item	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023
East Terrace Pedestrian Refuges	\$87,380	-	-	-	-
Bridge Street / East Terrace Channelised Right Turn	-	-	\$30,000	-	-
Shared Paths (Major Road Corridor)	\$375,503	\$234,098	\$202,846	\$360,510	\$692,112
Riverfront Paths	\$157,940	\$440,467	\$440,467	\$258,512	-
Local Road Advisory Markings (Sharrows)	-	-	\$44,840	\$44,840	\$44,840
Cycle Lane Sign / Line Upgrades	-	-	\$15,400	\$15,400	\$15,400
Footpaths (Non-Reserve)	\$63,840	-	-	-	-
Total exclusive of GST	\$684,663	\$674,565	\$733,553	\$679,262	\$752,352
Total inclusive of GST	\$753,129	\$742,022	\$806,909	\$747,189	\$827,587

Infrastructure Item	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Shared Paths (Major Road Corridor)	\$687,591	\$568,827	\$314,612	\$513,439	-
Riverfront Paths	-	\$78,105	\$333,872	-	\$688,115
Local Road Advisory Markings (Sharrows)	\$44,840	\$44,840	-	-	-
Total exclusive of GST	\$732,431	\$691,772	\$648,484	\$513,439	\$688,115
Total inclusive of GST	\$805,675	\$760,949	\$713,333	\$564,783	\$756,926



6.2. Maintenance plan

A maintenance plan was developed for the footpath and cycling infrastructure with the proposed approaches given in the following sections.

6.2.1. Footpaths

The location of the existing footpath network has been mapped using a GIS database with the attributes for each section of footpath mapped. For example, the footpath information includes location, material type, footpath width and condition. This information used in conjunction with other spatial data including the location of roads, schools, retail precincts, medical facilities, community centres, playgrounds and bus routes provides valuable information in planning for the provision of footpaths.

Assessment Criteria

The assessment process for footpath maintenance has been based on a risk management process. The main criteria for evaluation are severity of the damage, the frequency of use, and the nature of the likely users, for example proximity to aged care facilities, hospitals or schools.

Three categories have been identified relating to the severity of any damage to the footpath and consequential risk to users. The severity categories are based on the height of changes within the footpath creating a potential trip hazard (displacement).

- Category 1: Displacements greater than 20 mm.
- Category 2: Displacements between 10 mm to 20 mm.
- Category 3: Displacements less than 10 mm.

As well as the physical surface of the footpath, issues that may also be identified and require prioritisation could include other trip hazards, road hazards, storm damage and tree trimming. These hazards are to be reviewed as soon as possible after they are identified and assessed for the severity of the risk.

Three categories relate to the frequency of use and these are based on the volume and nature of pedestrian usage, identifying areas throughout the city where pedestrian use is likely to be high, or potential users are more likely to be at risk from displacements in the footpath surface. The three categories are:

- 1. High pedestrian usage, such as near shopping centres and in the city centre.
- 2. Medium pedestrian usage, such as around schools, hospital and aged care facilities.
- 3. Low usage, such as general local residential streets without schools, aged care facilities and bus routes.

Sites where the severity is rated as 1 (i.e., greater than 20 mm displacement) and the frequency of use is rated as 1, would be regarded as high-risk sites, and need to be given a high priority for repair.



Reporting and Evaluation Process

Two approaches to identify the need for footpath maintenance and repair are:

- By external reporting of a problem, most likely by the local community, or
- Through a regular inspection process by Council staff.

Where the issue is raised by the local community, once the request has been received from a community member, a Council Officer will inspect the footpath within one week and complete the damage severity assessment to determine if any trip hazards exist. If a trip hazard is identified, the usage assessment will be completed to prioritise the repair requirements. Any issues determined to be a Category 1 under both criteria are recommended to be addressed by Council as a matter of urgency. It is considered that one week would be a suitable timeframe for urgent issues and one month for less urgent issues. Where the issue is deemed not to warrant immediate repair, further monitoring needs to be conducted to identify any further deterioration and subsequently integrated into a future planned maintenance strategy.

A cyclical review and maintenance programme is recommended with a schedule to visit each street within the RCMB once every two years, and focus on identifying and addressing any critical footpath tripping points, removing low hanging branches from street trees, boundary vegetation pruning, repairing pot holes, weeding, weed spraying of verges, and repair or replacement of damaged or faded signage.

As part of the cyclical review, Category 1 issues are recommended to be addressed within a week, while Category 2 and 3 issues are to be logged and identified for future repair or maintenance within an appropriate timescale or as part of other planned maintenance within the local precinct.

6.2.2. On-road Bicycle Markings (Sharrow and Line markings)

Sharrow advisory marking maintenance is required every 2 to 5 years depending on the care of installation, location of marking relative to tyre tracks and intersections, and number of vehicles.

Bicycle lanes are recommended to be reviewed at least every two years to identify and wear and fading of the line markings and symbols. Signage along bicycle routes is recommended to be reviewed for any damage or fading and replaced as required.

Bicycle lanes need to be inspected annually for any damage to the pavement surface, particularly if there is a kerb and gutter or road sealing joint within the bicycle lane which may be more susceptible to creating an uneven road surface.

6.2.3. Shared Path Maintenance

Shared paths can be maintained using many of the practices associated with either conventional road pavements where the paths are in bitumen or footpaths where they are of concrete construction.



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Smooth, debris free surfaces are a fundamental requirement for cycling safety. Most bicycles that are likely to be used on shared paths have no suspension or shock absorbers and some will have relatively thin tyres inflated to high pressures. Since bicycles could travel at speeds up to 30 km/h on the shared paths, particularly on a downhill grade, a rough surface or pothole can be particularly hazardous.

Regular maintenance activities on shared paths includes, based on the Austroads guidelines (1999):

- Filling of cracks,
- Patching of potholes,
- Trimming or removal of grass so that it does not intrude into the path,
- Sweeping of paths to remove debris such as broken glass and fine gravel (including that arising from construction and maintenance activities such as crack sealing),
- Repainting of pavement markings,
- Cleaning of signs, and
- Trimming of trees and shrubs to maintain safe clearances and sight distances.



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Appendix A Landscape Concept Plans for the Walking and Cycling Infrastructure



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Appendix B Concept Design Drawings for the Walking and Cycling Infrastructure



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Appendix C Cost Estimates for the Walking and Cycling Infrastructure