1.   Introduction

1.1   Background

Greater Shepparton City Council has undertaken a review of the previous Greater Shepparton Cycling Strategy (2006-2011) and has prepared an updated version (2013-2017). After the adoption of the previous Cycling Strategy in 2006, there have been a number of the high priority proposals implemented. This update provides an opportunity to reflect on these successes, identify any on-going or new issues, and capitalise on recent advances in cycle facility design and promotion to help further encourage cycling in Greater Shepparton for commuter and recreational purposes.

GTA Consultants was engaged by Greater Shepparton City Council in February 2012 to help undertake this review and update of the Greater Shepparton Cycling Strategy.

1.2   Cycling Strategy Methodology

The key tasks for the review and update of the Cycling Strategy include the following:

- Undertake background research which reviews relevant documents, strategies and policies affecting cycling in Greater Shepparton and identify the major benefits and barriers to cycling.
- Evaluate the current cycling conditions in Greater Shepparton, including a desktop review of what facilities have been implemented as part of the 2006 Cycling Strategy.
- Engage and consult with the community through the development of a range of targeted consultation mechanisms.
- Present the latest cycling design philosophies to support current and potential cycle use, as well as outlining a design framework for the identification of what facilities are the most appropriate within a given transport corridor and within the overall transport network.
- Review and build on the commuter and recreational cycling facilities within Greater Shepparton, noting what has been proposed within the 2006 Cycling Strategy, VicRoads Municipal Bicycle Network for Shepparton and latest Precinct Structure Plans for the five growth corridors.
- Review and build on the existing sports cycling facilities within Greater Shepparton, through the identification of risks, hazards, maintenance priorities and improvement opportunities, for not only current, but potential sports cyclists and facilities.
- Review and build on the existing cycling tourism initiatives and facilities within Greater Shepparton, through the identification of how to better utilise its benefits and overcome current barriers.
- Summarise the findings and recommendations contained within the strategy in the form of an action plan.
- Identify the planning mechanisms available to Council and their relative advantages and disadvantages.

1.3   References

In preparing this report, a number of references have been made, including:

- Greater Shepparton Bicycle Strategy Review, June 2006
- National Cycling Strategy 2011-2016
- Victorian Cycling Strategy 2011-2016
- Victoria's Cycle Tourism Action Plan
- Victorian Trails Strategy 2011-2015
- Victorian Trails Strategy 2002-2010
- Hume Strategy for Sustainable Communities 2010-2020
- Dookie Walking Trail and Mountain Bike Masterplan
- Loddon Mallee Regionally Significant Trails Strategy 2010
- Greater Shepparton Planning Scheme
- Greater Shepparton Council Plan and Strategic Resource Plan 2009-2013
- Draft Greater Shepparton Universal Access and Inclusion Plan 2012-2016
- Greater Shepparton Tourism and Events Strategy
- Greater Shepparton City Council Economic Development Action Plan 2009-2012
- Greater Shepparton BikeScope Survey 2011
- Shepparton CBD Strategy
- Parking in Shepparton's CBD – Discussion Paper
- VicRoads Shepparton Municipal Bicycle Network Map, June 2005
- GIS referenced aerial map (supplied electronically by Greater Shepparton City Council)
- Cycling Aspects of Austroads Guides, March 2011
- Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths, 2009
- VicRoads, Cycle Notes (various)
- NSW Bicycle Guidelines, July 2005
- other documents and data as referenced in this report.

2. Background Research

2.1 Literature Review

In this Section of the Cycling Strategy, summaries of relevant background documents, strategies and policies affecting cycling in Greater Shepparton are provided. Highlighted within these summaries are any specific actions that affect the implementation of an updated Cycling Strategy, and more generally, initiatives and themes on how cycling is encouraged and can be applied in Greater Shepparton.

2.1.1 National Cycling Strategy 2011-2016
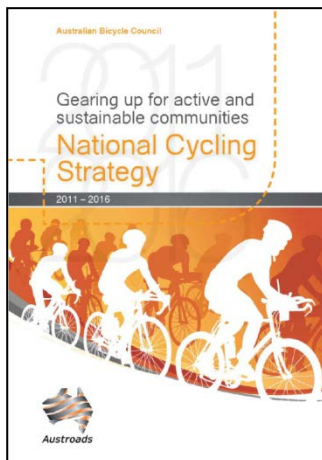
The Australian National Cycling Strategy was published in September 2010. It was prepared by the Australian Bicycle Council in partnership with Austroads. It outlines the core vision to "*double the number of people cycling in Australia over the next five years*", as well as the following:

- What cycling can do for Australia (benefits).
- Progress over the past five years (review of previous Strategy).
- Our vision (six priority actions to achieve vision).
- Governance and monitoring (identification of who is responsible for the implementation of the strategy, report requirements and how it will be evaluated).

The strategy provides six priority actions to achieve the core vision. In support of the priority actions, there are the associated objectives and numerous action points. These have been developed through the review of the previous Strategy and understanding of the latest issues and opportunities associated with cycling in Australia. Also of note is that the strategy identifies that it is best positioned to focus on data collection and analysis, consistent decision-making, guidance and sharing best practice.

The six priority actions, objectives and summary of the action points outlined in the National Cycling Strategy (2011-16) are provided as follows:

- **Priority 1: Cycling Promotion**
  Objective: Promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity.
  Action Points: Develop marketing and educational programs that promote the benefits of cycling, especially for underrepresented groups and other road users, so as to encourage all people to take up cycling. It has been noted that a key to this is the provision of cyclist-friendly workplace facilities.

- **Priority 2: Infrastructure and Facilities**
  Objective: Create a comprehensive and continuous network of safe and attractive routes to cycle and end-of-trip facilities.
  Action Points: All jurisdictions should continue to invest in developing bicycle networks and commit to the identification of required funds in the relevant budget processes. Where possible, the provision of facilities, be they paths, lanes or end-of-trip facilities, should be mandated and they should all be in line with recognised best practice design.

- **Priority 3: Integrated Planning**
  Objective: Consider and address cycling needs in all relevant transport and land use planning activities.
  Action Points: All states and territories should develop cycling action plans, and set targets and specific actions through a commitment to integrating cycling. Also, consideration should be given to incorporating active transport needs into all land use planning and infrastructure strategy documents and projects.
- **Priority 4: Safety**
  Objective: Enable people to cycle safely.
  Action Points: More and specific monitoring and analysis of crash data involving cyclists is required to develop appropriate counter measures. These, where significant, can be developed and implemented as targeted programs, such as bicycle skills training programs for school students aged between 10 and 14.
- **Priority 5: Monitoring and Evaluation**
  Objective: Improve monitoring and evaluation of cycling programs and develop a national decision-making process for investment in cycling.
  Action Points: Need to develop and agree on a national approach to data collection, which in turn will enable states and territories to set existing baselines and future targets. Also, it enables the ability to assess benefits and develop robust decision-making processes and assessments of future projects and funding.
- **Priority 6: Guidance and best practice**
  Objective: Support the development of nationally consistent guidance for stakeholders to use and share best practice across jurisdictions.
  Action Points: Development and support of coordinated publications of best practices. A list of best practicians that the government intends to support is provided in the strategy.

2.1.2 Victorian Cycling Related Documents

### Victorian Cycling Strategy 2013-2023

Cycling into the Future 2013–23 identifies six directions that will build our understanding of cycling and the types of trips Victorians make by bike, help us to increase these trips in the future and encourage more people to consider cycling:

1. **Build evidence** – build a stronger evidence base for the Victorian Government to make more informed decisions

2. **Enhance governance and streamline processes** – clarify accountability and improve co-ordination, planning and delivery

3. **Reduce safety risks** – reduce conflicts and risks to make cycling safer

4. **Encourage cycling** – help Victorians feel more confident about cycling and make cycling more attractive

5. **Grow the cycling economy** – support opportunities to grow and diversify Victoria's economy through cycling

6. **Plan networks and prioritise investment** – plan urban cycling networks to improve connectivity and better target investment in urban networks, regional trails and specialist cycle sport infrastructure.

Cycling into the Future 2013–23 will be accompanied by a series of Action Plans. The first Action Plan will be for two years. The plans will set out priority actions for the short-term to deliver the strategy's objectives. Actions will be aligned under the six strategic directions.

The Victorian Cycling Action Plan 2013 and 2014 identifies actions that will be put in place during the period of the plan. In response to criticisms by the Victorian Auditor-General's Office, the Action Plan also identifies the Victorian Government agencies that will be responsible for implementing and evaluating the actions. This approach will also be adopted in future Action Plans. The initial Action Plan establishes a whole of Victorian Government committee to co-ordinate, monitor and report on progress.

Victoria's Cycle Tourism Action Plan 2011-15
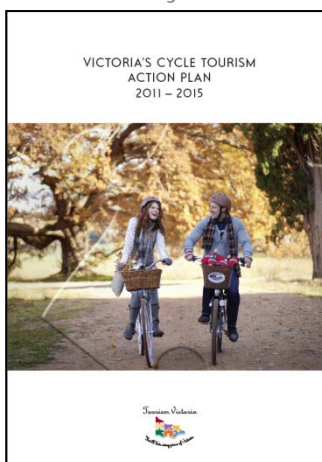
Victoria's Cycle Tourism Action Plan has been developed by Tourism Victoria. It aims to position "*Victoria as the leading state for cycle tourism*" through the leverage of its existing nature-based tourism and status as an international major event capital.

The action plan provides reason for obtaining this goal with total estimated expenditure for the year ending December 2010 by visitors participating in cycling in Victoria at $362 million and $2.4 billion for the country. It also notes that the Victorian cycle tourism market is highly dominated by the intrastate market with 84 per cent of the above expenditure coming from domestic visitors within Victoria.

In terms of how Victoria is to grow cycling tourism and establish a competitive positioning in Australia, the action plan outlines the following three directions to explore:

- strengthening the supply of cycle tourism experiences
- building consumer demand for cycle tourism experiences
- attracting and leveraging events.

For each, further discussion and specific actions are summarised as follows.

Strengthening the supply of cycle tourism experiences

"*Investment in cycling infrastructure and tourism services is needed to create iconic experiences, attract new markets, better meet the needs of existing visitors and grow yield and regional jobs*", page 14.

In terms of specific actions, they revolve around the following three areas:

- development of facilities (trails network, mountain bike parks and supporting facilities)
- undertake research to determine the current and future feasibility of projects
- attracting and leveraging events.

It also highlights a common issue with cycle tourism, which relates to transport and accessibility of facilities, especially given the inability to utilise public transport given that bicycles are not currently permitted on most services.

Building consumer demand for cycle tourism experiences

"*To attract high yield visitors a collaborative approach needs to be adopted regarding the provision of maps and information to encourage the use of cycling infrastructure*", page 16.

In order to build consumer demand the action plan outlines a need to develop marketing activities that hero the region and the experiences. To do this, the following actions are outlined:

- Promote cycle tourism as a sustainable option for visitors to the state through the sustainable section of visitvictoria.com.
- Develop a brand toolkit for cycle tourism.

Attracting and leveraging events

One of the major actions was to have Melbourne recognised as only the second UCI Bike City in the world, after Copenhagen. This has been achieved and is associated with Melbourne's hosting of a number of UCI Cycling events, including the UCI Track Cycling World Championships on 4-8 April 2012 at Hisense Arena, and the City's commitment to encouraging cycling as a viable form of transport. This provides cycling tourism with the opportunity to leverage off the recognised title and gain widespread coverage through the UCI cycling events.

The development of other events and branding opportunities to leverage off, such as hosting the international cycle planning conference Velocity (which has been awarded to Adelaide in 2014), is also outlined in the action plan.

Victorian Trails Strategy 2002-10
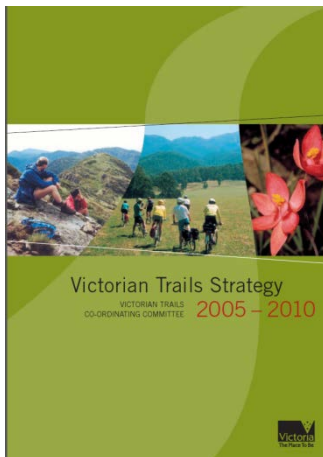
The Victorian Trails Strategy has been developed by Parks Victoria. It indicates a vision "*to have a sustainable trail network that provides diversity of experience and equity of access for the health and wellbeing of Victorians and visitors alike*".

Within the strategy the following is outlined:

- Benefits of trails to individuals and the community.
- Existing management, demand and types.
- Identification of key issues to be overcome.
- Guiding principles to develop and assess trails.
- Key directions to achieve the above vision.

For each, further discussion is provided as follows.

Benefits of trails to individuals and the community

"*Trails provide a variety of benefits to individuals, communities and the environment. These include promotion of physical and social health and wellbeing opportunities, education about natural and cultural environments, and economic returns to local communities and the state*", page 6.

This section of the report indicates a number of benefits associated with trails, as indicated in the above extract, as well as the potential for flow-on benefits when combined with other activities. What also stands out is that at the time of preparing this document there was limited economic data supporting these benefits. This is slowly changing but what has consistently been shown is that investment in such facilities generally has a positive gearing, even in the short term (e.g. Regional Communities and Cycling: the Case of the Murray to Mountain Valley Trail, Victoria, Australia, 2006).

Existing management, demand and types

The majority of the trails in Victoria are managed by Parks Victoria (50%), DSE (35%) and local Councils (15%). One hour walks are the most common form of use but it is noted that there is currently a shortage of mountain bike facilities, which is resulting in uncontrolled access and use. They also mention horse riding, which is expected to remain reasonably static in use into the future, and canoeing and kayaking, which has very low use in comparison but has opportunities to be combined with walks and cycling by tourism operators.

Identification of key issues to be overcome

The key issues associated with trails revolve around the design and ongoing maintenance, lack of standards and classifications, equity of access, conflict on shared use trails, supporting facilities, coordinated research and the identification, development and marketing of iconic trails.

Guiding principles to develop and assess trails

The following guiding principles are defined in the strategy to develop and assess trails:

- Individual and community health and wellbeing.
- Protection of natural and cultural heritage.
- Economic benefits to state or region.

Key directions to achieve the above vision

The following key directions for the strategy were provided:

- Develop a consistent trail network management framework.
- Coordinate and integrate trail marketing.
- Undertake coordinated trail research.

2.1.3   Regional Related Documents

Hume Strategy for Sustainable Communities 2010-20

The Hume Strategy for Sustainable Communities is an integrated plan connecting the four distinct sub regions of Central Hume, Upper Hume, Lower Hume and Goulburn Valley that make up the greater Hume Region and the Shire of Campaspe (Northern Loddon Mallee Region) in North East Victoria. It provides a framework for long term cooperation and investment. Bicycle planning is included within the strategy as a sub-regional action as follows:

"*Develop a Goulburn Valley sub regional strategy for recreation tourism bicycle paths that is linked to a Hume Region wide Cycling Strategy. Elevate the profile and potential of cycle infrastructure to take advantage of the Murray River environmental and tourism experience*", page 20.

Dookie Walking Trail and Mountain Bike Park Master Plan

The Dookie Walking Trail and Mountain Bike Park Master Plan has been prepared by Greater Shepparton City Council. It outlines the development of a mountain bike skills park, shared path, earth start mound and trails, including one-way downhill trails on Mount Major. Also, it outlines the need and design for supporting facilities, such as storage sheds, seating, toilets and car parks.

The aim is to make this a strategic asset for Greater Shepparton City Council, Melbourne University and the community (Dookie especially). It is to cater for all abilities of riders, attract mountain bike events, increase access between Dookie College and the township, and be developed as a sustainable facility and business model for Melbourne University and the community.

Loddon Mallee Regionally Significant Trails Strategy 2010

The Loddon Mallee Regionally Significant Trails Strategy was prepared in partnership with a number of local Councils and State Government departments. It identifies seven trail proposals of regional significance, including:

* Waranga Trail – 110km cycling trail through the Heathcote-Graytown National Park and potentially connect with the trail between Murchison and Shepparton.

Furthermore, the strategy details the collective benefits and challenges of the proposals, including consideration of potential marketing opportunities, demand estimates, supporting facilities, initial implementation and maintenance costs, and potential economic returns (complete return on initial investment within three years and the creation of 70 to 87 full time jobs).

2.1.4   Municipality Related Documents

Greater Shepparton Planning Scheme

The Greater Shepparton Planning Scheme has been prepared by the Department of Planning and Community Development, and is a live document that is continually updated. It sets out a framework of state and local policies and requirements for the use, development and protection of land within the municipality.

At a state level, the Planning Scheme sets out a range of overarching objectives and implementation strategies to guide all development within the State of Victoria. Embedded within these are a range of policies with the overall objective to increase the integration and utilisation of more sustainable transport modes. These policy clauses and their associated objectives are reproduced as follows:

* Clause 18.01-1: "To create a safe and sustainable transport system by integrating land-use and transport."
* Clause 18.02-1: "To promote the use of sustainable personal transport."
* Clause 18.02-2: "To integrate planning for cycling with land use and development planning and encourage as alternative modes of travel."

At a local level, the Planning Scheme seeks to encourage cycling as a mode of transport through specific requirements for various development types. The associated clauses and directives are reproduced as follows:

* Clause 52.34: Outlines the provision of secure, accessible and convenient bicycle parking spaces and associated shower and change facilities for a range of land uses.
* Clause 55.03-11: Outlines the provision of resident and visitor bicycle parking spaces in developments of five or more dwellings.
* Clause 56.06: Sets out the access and mobility requirements, including consideration of pedestrians and cyclists, for new subdivisions.

Greater Shepparton 2030 Strategy (Report 6 – Infrastructure)

The Greater Shepparton 2030 Strategy was prepared by Greater Shepparton City Council and the Department of Sustainability and Environment, and formally adopted in October 2006. It is a blueprint for "*building sustainable economic activity and maximising the quality of life in the municipality over the next 30 years*".

Within the strategy, Section 4.2.8 identifies cycling as a legitimate mode of transport and recreational pursuit and provides the following objectives and strategies to further develop it in the municipality:

- Develop and provide a supportive road and bike path network that will service existing and planned residential and other development, including industry and agribusiness.
- Provide a bicycle and pedestrian network which facilitates easy and safe transportation, both commuter and recreational, around the municipality, particularly within the Shepparton-Mooroopna areas.

Further, this section of the strategy outlines the following implementation strategies:

- Construct a shared path network to bring people to the river and focus pedestrian and bicycle traffic.
- Develop an integrated transport plan that addresses key transport issues, road hierarchy, traffic modelling, pedestrian and bicycle network, pavement management, public transport, and parking.

Greater Shepparton Council Plan and Strategic Resource Plan 2009-13

The Greater Shepparton Council Plan and Strategic Resource Plan was prepared by Council and outlines its intended fiscal expenditure. Within the plans, it is intended that investment would be made to improve sustainable transport options through improvements in public transport services, including the development of a public transport hub in the town centre. This provides an opportunity to include end-of-trip facilities and improved access to this new transport destination and aid in the linking of more sustainable trips.

Greater Shepparton Tourism and Events Strategy

The Greater Shepparton Tourism and Events Strategy has been prepared by Council and outlines a vision to "*have a Tourism Industry which is recognised by the community for the economic and social benefit it brigs, characterised by stakeholders who work co-operatively, and an integrated product which provides a memorable experience for the visitor*".

As part of the overall tourism industry in Greater Shepparton, sustainable tourism has been identified as a key area, as it delivers positive economic, social and environmental outcomes. However, it requires a range of strategic and operational actions in key areas of product development and industry development. In regard to this, Section 5 of the strategy outlines the requirement to give consideration to the needs of the visitor, industry, community and environment, and the Challenge for Greater Shepparton is to build a sustainable tourism industry that will provide benefits to both visitors and the community whilst protecting and enhancing the destination's unique attributes.

Tourism in Greater Shepparton must:

- Support the economic and social wellbeing of the host communities.
- Maintain and enhance the quality of the local environment in which it occurs.
- Ensure the efficient management of roads for traffic, public transport, bicycles, pedestrians, parking, scooters and motorized wheelchairs, and for loading and unloading of goods.

Greater Shepparton City Council Economic Development Action Plan 2009-12

The Greater Shepparton City Council Economic Development Action Plan has been prepared for Council to outline how to achieve the following vision:

"*Greater Shepparton will be a prosperous, innovative and dynamic place where the strengths of the local and regional economy and the skills and application of the resident population will be promoted as key attributes in fostering innovation, attracting investments, developing labour skills, growing existing businesses, and creating new businesses and new jobs*", page iii.

While the action plan does not include any specific mentions of cycling or sustainable transport (other than the sustainable growth of the transport and logistics industry), tourism forms part of the plan, including plans to undertake an economic impact analysis on the contributions that sport and 'sport tourism' make to the Greater Shepparton economy.

Greater Shepparton BikeScope Survey 2011

The Greater Shepparton BikeScope survey was prepared by Bicycle (Network) Victoria. It was a 33 question online survey open to the general public that ran between 7 April 2011 and 5 May 2011. In this time there were a total of 361 completed surveys received. The questions focused on the following areas:

- What are their current cycling activities and facility preferences?
- In what condition are the existing facilities, as well as what infrastructure improvements they would like to see in Greater Shepparton.
- What scope there is to get more children walking and cycling to school and what facilities would assist this.

In regards to each of these areas, the following summaries of the responses are provided.

What are their current cycling activities and facility preferences?

Based on the four categories of bicycle riders within the survey, the most prominent was the 'Low Intensity – Recreational' type, followed by the 'High Intensity – Recreational', then the 'Low Intensity – Transport' and lastly the 'High Intensity – Transport'. Based on this, recreational cycling is the most common form of cycling in Greater Shepparton. It also follows that the preferred facility type was indicated as off-road facilities even through a high proportion indicated that they currently cycle on-road.

It should be noted that the majority of the responses to the survey came from males (58%) and between the ages of 35-49 (38%), 50-59 (32%) and 60-69 (14.5%).

What condition existing facilities are in as well as what infrastructure improvements they would like to see in Greater Shepparton

Generally responses regarding facilities in Greater Shepparton were positive, with a high rating regarding improvements in the last five years, the amount of shared paths and the level of connectivity of the bike network. However, there were low scores associated with the level of funding and ability to combine cycling and public transport.

In terms of facilities, concern was raised about poor surface quality and lack of sealed shoulders, separation from parked vehicles, absence of facilities for short trips and lack of secure bike parking.

More specifically, the locations of concern identified were Wyndham Street, Goulburn Valley Highway, Ferguson Road, Verney Road, Ford Road (also one of the most popular on-road routes), Old Dookie Road, Mitchell Road, Shepparton-Mooroopna path, Goulburn River and Broken River.

What scope there is to get more children walking and cycling to school and what infrastructure would be required to assist them

There was a significant latent demand identified with the survey, with 72% indicating that they would like to get their children walking or cycling to school. They also highlighted that the provision of additional bike paths connecting students to schools was the most desired improvement, especially in regards to Goulbourn Valley Grammar School, which recorded twice as many responses requesting this improvement compared to any other school and improvement option.

2.1.5   Shepparton Related Documents

Shepparton CBD Strategy

The Shepparton CBD Strategy was prepared by Planisphere in 2008 for Council to outline how to achieve the following vision:

"*Shepparton's central business district will be the Victorian leader and regional centre for innovation and sustainability. This will be evidenced in the management and preservation of its natural environment, design of its buildings and spaces, a thriving economy and it consolidation as a regional community and cultural focal point*", page 3.

To achieve the above vision, the strategy outlines 11 key priorities, with the following two relating to the encouragement of active and more sustainable transport modes, including cycling:

- creating a pedestrian and cycling-friendly environment
- improving movement and access by reducing traffic in the CBD, improving public transport services and cycling links and facilities.

Furthermore, the traffic management section of the strategy states that "*whilst private vehicle use will be planned for, the focus of this plan will be to improve alternative transport modes and infrastructure including cycling, walking and public transport amenities to reduce the level of private motor vehicle usage in the CBD*".

In terms of specific actions that the strategy proposes to support cycling within the CBD, it provides the following:

- Implement the Shepparton Bicycle Strategy actions (2006-2011) as a short-term priority in the CBD.
- Provide secure bicycle parking at all Council buildings and community facilities and Council controlled off-street car parks.
- Install Copenhagen-style bicycle lanes on Fryers Street as part of the Fryers Street Master Plan.
- Liaise with Walking and Cycling Branch of Department of Transport regarding the Accessible and Sustainable Travel Grants Package which will assist in encouraging more sustainable travel behaviour and improving ease of access for pedestrian, cyclists and public transport users to local facilities, jobs and activities.
- Facilitate provision of end-of-trip facilities for workers, residents and visitors in existing and new development in the CBD, by advocating Council's position at pre-application meetings and by providing landowners and developers with a copy of Bicycle (Network) Victoria's Bicycle Parking Handbook and other relevant literature.

Parking in Shepparton's CBD – Discussion Paper

The Parking in Shepparton's CBD Discussion Paper was prepared in 2011 for Council to analyse relevant data and make recommendations regarding the future provision of parking in Shepparton. Within this

discussion paper, it draws on the key priorities of the Shepparton CBD Strategy, which looks to encourage alternate modes of transport and reduce the reliance on private motorcar use.

It notes that encouraging alternate modes of transport, especially the active forms of walking and cycling, can have a public health benefit as well as reducing the actual car parking demands and level of congestion within the CBD.

It also uses a number of case studies to demonstrate the level of modal shift aware from private motorcar use that occur with the encouragement of alternate transport modes.

While no specific recommendations are made within the discussion paper regarding cycling, it does elude to giving consideration to what focus should be held for the CBD, whether it should be for through-traffic and short-term, on-street parking, or more diverse traffic modes with car parking relocated to locations that do not detract from the CBD environment.

2.2   Cycling Benefits and Barriers

Based on the review of the background documents and others, the main benefits and barriers associated with cycling are provided as follows.

2.2.1   Benefits

Cycling provides a wealth of benefits, with some being personally tangible and others having a more indirect net community benefit. Both of these types of benefits are listed below with supporting data[1] where appropriate:

Health

Cycling is considered to be a preventative health measure, especially in terms of heart disease, type 2 diabetes and some cancers. It has also been found to lead to a reduction in depression, stress and anxiety levels in individuals.

In 2006, over 1.68 million Australians cycled, which cut sedentary lifestyle disease costs by an estimated $154 million.

Traffic Congestion

Given that the ABS estimates that the annual avoidable cost of traffic congestion in Australian cities will rise to $20.4 billion by 2020 and that bicycles are considered to impose 95% less traffic congestion than an average car, cycling offers an attractive low cost solution with comparable travel speed in urban built-up areas. Particularly when in 2006 the Australian Bureau of Statistics (ABS) determined that 1.35 million (52%) Australians travelled by car to work over a distance less than 5km.

Specific to Greater Shepparton, this is likely to only be applicable to the Shepparton CBD, especially into the future with significant residential development expected within the growth areas and the highest concentration of employment localised to the CBD. As such, a shift away from private motorcar travel when getting to and from work could be expected to reduce congestion and operational demands of the main carriageways and intersections accessing the CBD.

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[1]   Refer to Economic Benefits of Cycling for Australia, Cycling Promotion Fund, June 2008 and Australian Cycling: An Economic Overview, August 2011

Greenhouse Gas Abatement

As bike riding does not emit any greenhouse gases, so any shift from motorised transport modes to cycling should see a reduction in greenhouse gas emissions. This can be significant when you consider that transport currently generates 15% of Australia's carbon emissions, or that on average a vehicle emits 252 grams of CO_2 per kilometre travelled[2].

Cost

Cycling has a modest initial start-up cost and negligible running costs (approximately 5% of a motor car). Alternatively, the private motor car has a high initial cost, and in terms of running costs, ranges between 40 and 85 cents per kilometre, which is only expected to increase, especially in relation to the fuel cost component.

Economic

The development of cycling facilities generates additional jobs and markets. The Commonwealth stimulus package of $40 million for cycling, when coupled with the additional $60 million invested by local governments, was expected to generate an additional 1,314 jobs in Australia. Also, the bike and accessories market is estimated at $1 billion per year with a work force of 10,000 in Australia.

Based on economic analysis undertaken in England there is estimated to be an overall benefit cost ratio of 3:1 in favour of cycling[3]. Further research is currently being undertaken on the social impact of cycling in many countries, including Australia. A leading source of information of this matter is available at www.bikeability.dk.

Cycling tourism is also a growth area in Australia, with events and tourist trails generating $254 million a year and a total expenditure of $2.4 billion by tourism cyclists each year.

2.2.2   Barriers

Barriers to cycling vary for each person. However, those most commonly found, such as those identified in the BikeScope Survey and Riding a Bike for Transport 2011 Survey (by the Cycling Promotion Fund in partnership with the Heart Foundation), are listed below:

- unsafe road conditions
- conflict with pedestrians and/or drivers
- not confident enough to cycle
- lack of bicycle lanes/path/trails
- no place to park/store bicycle
- no place to change/shower
- nowhere to store clothes
- fear of bike being stolen
- stranger danger
- weather conditions
- distance to travel
- too hilly
- don't like wearing a helmet
- not enough time
- not fit enough
- health problems
- unsure of best route
- can't take bicycles on public transport services
- prefer to walk
- not interested/don't like cycling.

The majority of the above barriers can be overcome through investment in infrastructure and behavioural change and educational programs. However, cycling will always compete against the

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[2]   Sourced from http://www.mynrma.com.au/motoring/car-care/green-driving-co2.htm
[3]   Source: Collection of Cycle Concepts 2012, Cycling Embassy of Denmark.

convenience and low physical effort option of motorised transport. Until the associated barriers as perceived by individuals, with motorised transport outweigh those with cycling, then motorised transport will be preferred by the majority of the community.

3. Review of Existing Cycling Environment

3.1 Study Area

The City of Greater Shepparton is in northern Victoria, approximately 180km north of the Melbourne CBD. It is bounded by the municipalities of Moira to the north, Benalla to the east, Strathbogie to the south and Campaspe to the west. These municipalities, except Campaspe, are located within the Goulburn Valley Sub-Region, which is part of the greater Hume Region.

Greater Shepparton has a population of around 60,000 and covers approximately 2,422 square kilometres (equates to about 25 people per square kilometre), which makes it the fourth largest municipality in rural Victoria. It is made up of a number of small towns, except for Shepparton, which has a population of around 27,700 and is located in the centre of the study area at the intersections of the Goulburn River and Broken River and the Goulburn Valley Highway and Midland Highway (refer to Figure 3.1).

The study area is relatively flat, with the major land uses being associated with dairying and fruit growing. Along the river system, the adjacent land is made up of conservation and flood zoned land.

Figure 3.1:   City of Greater Shepparton
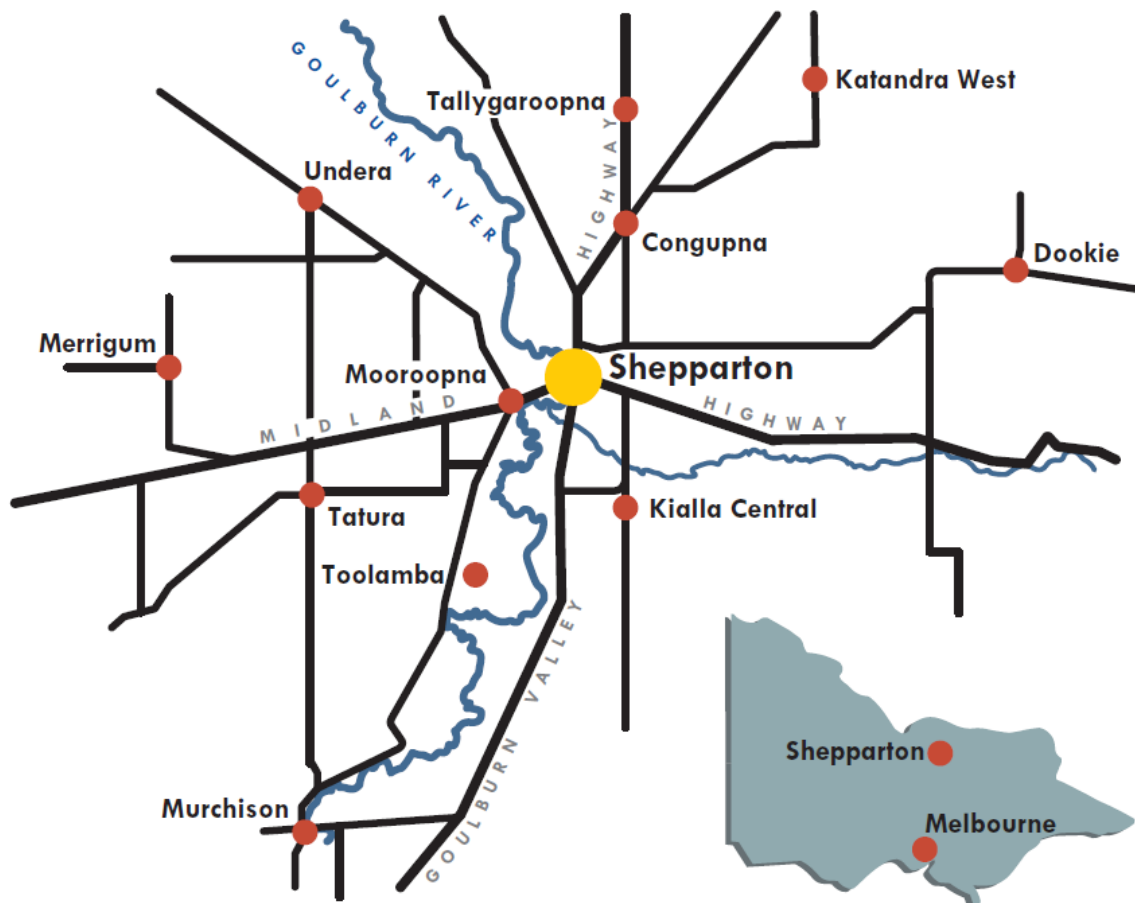
3.2   Bicycle Count Data

The current national level of collection and analysis of bicycle volume data is low. This is mostly due to the recent resurgence of cycling, which has resulted in there being demands to provide new high quality facilities and there only being a limited amount of bicycle volume data available in Greater Shepparton. Data collected by Council (various dates) and on two Super Tuesdays (1 March 2011 and 6 March 2012) counts have been summarised and presented within Tables and on maps in Appendix B.

From the tables and maps presented in Appendix B, there are no discernible trends that can be detected about bicycle volumes at the various locations. This is because of the limited data and the fact that the network is currently growing at a significant rate, so while anecdotally the number of cyclists may be increasing, they have more options and cycle more routes. The 2011 Census data (which should be available in August 2012) should help give a better indication of whether more people are cycling, at least for commuter purposes.

Given the above, the ongoing collection and analysis of bicycle volumes is recommended to assess the success of implemented facilities, help determine when new facilities are required, prepare associated business cases and obtain subsequent funding.   ACTION 1

To achieve this, identification of critical points in the network (i.e. main routes accessing the Shepparton CBD and mid-block locations along the major recreational facilities) should be undertaken and be surveyed over the same period each year, both in terms of the time of day and the year, as there can be significant variations in cycling volumes over the day, the week and year.

There is a number of counting devices now on the market that can provide continuous data recording and instant feedback. Consideration of such devices for existing and new facilities should be undertaken. They would not be required as part of all facilities, but if installed on facilities that carry the highest volumes, they can be used to factor results from surveys undertaken at other locations and different times of the year to determine normalised peak hour, daily and even yearly volumes.

3.3   Review of Bicycle Crash Stats in Greater Shepparton

A review of the reported casualty accidents involving cyclists in Greater Shepparton has been sourced from the VicRoads accident database. The 'CrashStats' database includes all reported casualty accidents since 1987.

Analysis of the reported casualty accidents for the last available ten year period (1 January 2002 to 31 December 2011) is presented in the following sections, with a complete list of the accidents and locality maps provided in Appendix C.

3.3.1   Locality

Table 3.1 provides a summary of the types of locations of recorded casualty accidents involving cyclists in Greater Shepparton.

Table 3.1:   Bicycle Accidents Summary by Location

Location [1]	Mid-block	Roundabout	Unsignalised	Signalised
Shepparton	33	9	50	8
Mooroopna	6	0	4	2
Tatura	3	0	3	0
Other	16	2	10	1
Total	**58**	**11**	**67**	**11**

[1]   Location as per the locality maps in Appendix C.

From Table 3.1 we can see that the majority of bicycle crashes occur in Shepparton (68%), with the next highest location being Mooroopna (8%). Furthermore the majority of bicycle crashes occur at unsignalised intersections (46%) and mid-block locations (39%).

3.3.2   Accident Type

Table 3.2 provides a summary of the types of the recorded casualty bicycle accidents (as per the VicRoads Definition for Classifying Accidents [DCA]).

Table 3.2:   Bicycle Accidents Summary by DCA Type

Location [1]	Intersection collision (cross traffic)	Driver emerging from driveway / laneway	Cyclist emerging from footway	Vehicle door opening	Intersection collision (right near)	Intersection collision (left near)	Rear end collision	Lane side swipe	Bicyclist out of control on carriageway
Shepparton	15	15	12	8	10	8	7	4	5
Mooroopna	1	1	1	1	1	0	1	0	0
Tatura	0	0	1	3	0	2	0	0	0
Other	4	0	0	0	0	1	2	4	2
Total	**20**	**16**	**14**	**12**	**11**	**11**	**10**	**8**	**7**

[1]   Location as per the locality maps in Appendix C.

From Table 3.2 we can see that the most common type of recorded casualty bicycle accident is at intersections with cross traffic (14%), with the next most common being when vehicles emerge from driveways/laneways (11%).

3.3.3   Severity

Table 3.3 provides a summary of the severity of the recorded casualty bicycle accidents.

Table 3.3:   Bicycle Accidents Summary by Severity

Location [1]	Death	Serious Injury	Other Injury
Shepparton	0	36	64
Mooroopna	0	2	10
Tatura	0	4	2
Other	2	8	19
Total	**2**	**50**	**95**

[1]   Location as per the locality maps in Appendix C.

From Table 3.3 we can see there were a total of two deaths (1%), 50 serious injuries (34%) and 95 other injuries (65%) in the ten year period. Additionally, of the six recorded casualty bicycle accidents in Tatura, four (67%) were serious.

3.4 Review of Previous Greater Shepparton Cycling Strategy

The previous Greater Shepparton Cycling Strategy (2006-11) was prepared for Council and adopted in June 2006. It had a key aim to "*increase the use of cycling as an alternative to motorised traffic*". Furthermore, it proposed the following objectives in order to achieve this:

- Improve the continuity, safety and accessibility of cycling.
- Meet the directions and outcomes of the Greater Shepparton 2030 Strategy Plan.
- Improve linkages to key destinations within major towns.
- Improve route planning development corridors.

Based on these objectives, and through an understanding of the policy context at the time and consultation with relevant stakeholders, the previous strategy outlined a suite of high, medium and low priority infrastructure proposals to be completed within five (lifetime of the strategy), 10 and 15 years respectively. It also identified facilities that should be provided as part of future developments. Timing of these later proposals is dependent on the development of the associated corridors.

A breakdown of the high, medium, low and development based priority proposals, along with any additional facilities that have been implemented over the past five years is provided in Appendix D, along with maps that illustrate all of the existing bicycle facilities in Greater Shepparton and highlight those that have been implemented over the past five years.

3.5 Existing Cycling Environment Summary

Given the above, it is clear that there has been a significant level of investment into the bicycle network within Greater Shepparton over the last five years, and while just under half of the high priority proposals have been completed, the overall expenditure exceeds what would have been required to implement them all.

The facilities that have been implemented could broadly be considered to be those that have been able to be easily accommodated within the existing built environment and not remove or significantly reallocate road capacity away from motor vehicles to cyclists.

As such, there is the beginning of a connected and continuous bicycle network within Greater Shepparton. However, there are still significant pinch points and missing links, along with new corridors and types of facilities required within existing corridors that are required to give each member of the community an opportunity to cycle for transport and recreational purposes.

To achieve this end, the on-going consideration and investment of cycling facilities is required, and it is the purpose of the subsequent sections of the strategy to identify the most feasible facilities that will see the largest increase in bicycle use in Greater Shepparton.

4.   Community Engagement and Consultation

4.1   Consultative Approach

Community engagement and consultation for the strategy has been conducted in stages across a number of stakeholder groups to accurately gauge issues and desired outcomes from the Cycling Strategy.

The consultation process for the strategy has occurred in three stages:

- Consultation with Council, relevant State Government departments and authorities, community plan steering groups, Council advisory committees, cycling groups and the general community.
- Upon completion of the draft strategy, Council departments will be given an additional opportunity to review and provide feedback.
- Following Council's initial endorsement of the strategy, the strategy will be publicly exhibited prior to adoption and incorporation into the Planning Scheme.

The first stage of the consultation process was conducted in March and April, with the draft strategy reviewed in June 2012.

4.2   Consultative Scope

A consultation framework was prepared to ensure consistency of engagement across the Council advisory committees, community plan steering groups as well as Council and State Government departments and the wider Greater Shepparton community.

This consisted of the following consultative mechanisms:

- Discussion paper - was used to get all those consulted 'up to speed' and as an initial discussion starter.
- Power point presentations – used at each face-to-face meeting to outline the aim of the strategy and facilitate relevant discussion through targeted questions tailored to each specific group.
- Questionnaires – separate questionnaires prepared for the general public (available through the Council website), school children and teachers.

The dates and consultative forums used to engage with each of the various groups are outlined in Appendix E of the strategy.

In addition, there is a tabulated summary of all responses received from the various groups, with an indication of whether and where it has been addressed or an explanation of why is hasn't in Appendix F of the strategy.

4.3   Community and Stakeholder Responses

While the majority of feedback was received at a level either specific to local areas or stakeholder interests, there were a number of common themes. They are outlined as follows.

4.3.1   Facilities and Infrastructure

A lack of cycling facilities was an issue noted in almost every consultation meeting held within the region. Specifically, the community groups in Murchison, Merrigum and Toolamba, as well as the cyclists' forum, raised this issue. Their specific concerns related to the following:

- a lack of off-street cycling paths for commuting or recreational cycling
- narrow/unsealed road shoulders that were seen as unsafe for cyclists
- lack of connectivity for cyclists between towns/destinations
- poor road crossing facilities near schools that prevent children from cycling to school
- poor road crossing facilities where paths meet major roads with fast traffic
- poor end-of-trip facilities in a number of areas
- access to bicycles for visitors and some locals was seen as problematic, particularly in Merrigum.

In addition to the concerns raised at these meetings, a number of suggestions were made to improve conditions for cyclists and to encourage more people to ride. These included the following:

- Provide direct, preferably off-road cycling paths between key towns and destinations within cycling distance. Suggested examples included:
  - Murchison – Toolamba – Shepparton (possibly along the river)
  - Murchison – Rushworth
  - Completion of Murchison Rail Trail
  - Toolamba – Old Toolamba
  - Tatura - Shepparton
  - Scenic cycling loop trails via key town destinations.

- Provide end-of-trip facilities such as bicycle racks to aid bicycle security and encourage cycling to major destinations.
- Incentives could be offered to private developments to provide end-of-trip facilities.
- Seal Mount Major TV Road to provide better access to mountain bike facilities on Mount Major.
- Provide a beginner to intermediate mountain bike trail close to Shepparton (possibly along the river).
- Provide Merrigum with a link to Kyabram given the closer proximity to the town (bearing in mind that Kyabram is not within the Greater Shepparton LGA).
- The Merrigum community meeting suggested that the introduction of a bike exchange/share program for children and visitors to be able to buy/sell cheap bicycles easily could be greatly beneficial for cycling within the area.
- A suggestion from the cyclists' forum was to develop cycling trails with community participation and involvement, suggesting that if the community were involved in the building process they would have an interest in the maintenance of the facilities.

4.3.2   Path Maintenance and Condition

The condition of existing cycling paths and routes was a major concern for a number of groups, with the point being raised at the cyclists' forum and most community consultation meetings. Specifically, some of the issues with regards to path conditions were as follows:

- poorly maintained road surfaces
- poorly swept bicycle lanes on roads, as street sweeping did not clear enough road for cyclists
- unswept cycling/shared paths
- high grass growing over/near paths
- unsealed and/or narrow road shoulders, mentioned at the Undera and Toolamba meetings
- unsealed roads, particularly around the Mount Major area where there are mountain bike facilities nearby
- large volumes of trucks cause road condition problems on signed cycling training routes -this was seen throughout the consultation process as a very prevalent issue, tying in with the issue of safety for cyclists, which is discussed below.

4.3.3   Cyclist Safety

Safety concerns were seen by all the groups consulted as one of the biggest hurdles in achieving increased bicycle use. Concerns generally related to the interaction between cyclists and traffic, the presence of large trucks on roads within very close proximity to cyclists, as well as crossing facilities on major roads. Sites identified in the consultation included:

- Wanganui Road and Goulburn Valley Highway
- Verney Road bicycle lane
- Southern railway crossing in Shepparton
- Murchison East railway crossing
- Knight Street and Railway Parade roundabout
- Main roads between the following towns:
    - Merrigum – Kyabram
    - Merrigum – Shepparton
    - New Dookie Road
    - Murchison-Mooroopna Road
    - Undera-Tatura Road
    - Echuca-Mooroopna Road.

Largely, suggestions for addressing these safety issues included the widening of roads and sealing of shoulders, construction of safe crossing points, and most preferably, the construction of off-road bicycle or shared paths. Many of these suggested improvements to facilities and infrastructure have been noted in Section 4.3.1.

4.3.4   Education and Behaviour

Promoting education and behavioural change as a method of encouraging people to cycle was suggested many times throughout the consultation process. In particular, the Goulburn Valley RoadSafe group, as well as the community steering groups in Merrigum and Dookie proposed additional education for cyclists, drivers, children and all other members of the community to promote cycling as a safe and enjoyable mode of travel.

Specifically, feedback was provided about the following points:

- Drivers were often concerned and frustrated by packs of riders riding two or more abreast
- Educating cyclists to wear visible clothing when riding, particularly at night

- Continuing advertising promoting awareness of cyclists on the road
- Promoting the purpose of on-road bicycle lanes
- Improving awareness amongst cyclists of district harvest times and their corresponding impact on traffic within the region
- Encouraging children to ride bicycles through promotional campaigns
- Promoting council programs that encourage cycling (e.g. Ride to Work day).

A specific suggestion made by both the RoadSafe group and at the cyclists' forum was to create some form of "working group" for bike riding events. This group would involve people from bicycle clubs/organisations, local police and council officers to ensure that cycling events were well planned, safe, well promoted throughout the community, and that their impact on non-participants would be minimised. It was believed that this would benefit cyclists in being able to liaise with local authorities for event days, and would benefit the local residents and businesses in being more aware of when these events are happening in their community.

Moreover, an advisory committee for Council on all aspects relating to cycling in Greater Shepparton is also sought. They could look to engage with the community and gain their input and opinion on proposed and implemented facilities and initiatives. Such advisory committee are becoming commonplace within areas that cycling is being genuinely promoted and supported by the community, such as the City of Yarra and Ryde in NSW[4]. As such, it is recommended that an advisory committee for cycling in Greater Shepparton be formed.   ACTION 2

4.3.5   Schools and Children

Only two responses were received from schools, which indicate that (at least for teachers), cycling is not a high priority. This was reinforced by telephone conversations with Department of Education and Early Childhood Development Officers who noted that principals were generally focussed on core aspects of education, such as literacy and numeracy, and while they were supportive of cycling they simply had no time or resources to address it.

There are currently no state-funded cycling programs being implemented in Government schools in Shepparton; however some principals indicated that the "bike-ed" scheme (run by Bicycle Network Victoria) has been implemented.

The two survey responses from schools indicated that:

- Generally the end-of-trip facilities fall well short of the requirements set out in Clause 52.34 of the Planning Scheme or what would be considered "good practice"
- Both schools indicated the desire for better facilities, and requested advice / assistance in funding upgrades to facilities.
- Both schools indicated that the existing bicycle parking was normally full / overflowing.

Anecdotal evidence from schools suggests that there is a gap in funding or providing adequate, secure and convenient bicycle parking facilities at schools. Further investigations into the current level of facilities, student and staff travel behaviour, and potential improvements should be undertaken to understand the issues more fully, especially given that within the Greater Shepparton BikeScope

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[4]   Links to cycling advisory committees are provided below:
http://www.yarracity.vic.gov.au/Your-Council/Consultative-Committees/Bicycle-Advisory-Committee/
http://www.ryde.nsw.gov.au/Council/Committees+/Advisory+Committees/Bicycle+Advisory+Committee+

Survey, 2011, that 72% of parents would like to see their children cycle to school, but currently do not believe there is sufficient facilities to do it safely. `ACTION 3`

4.3.6 Other feedback

In addition to the primary concerns and suggestions proposed in the feedback received from the consultation period, there were some other suggestions received for inclusion within the Cycling Strategy. These included the following:

- The need to provide additional cycling facilities that are attractive and environmentally friendly in nature. This was seen as particularly relevant for the Mount Major mountain bike hub.
- Potential for cyclists to register their bicycles with police to allow them to be tracked and returned in the event of theft, noting that bicycle insurers are now requiring the serial number imprinted on the bike frames before cover can be provided.
- Including bicycle planning as a consideration for future developments and road network improvements, noting that this is undertaken by Council's Planning Department.
- Concerns about the "rumble strip" treatments at some railway level crossings.

4.4 Council Department Consultation

A number of points were raised from the consultation with the Council departments. Most notably, the following were raised by Council:

- Inclusion of the Cycling Strategy within the Planning Scheme, making it an incorporated document when assessing town planning applications.
- The Cycling Strategy is to be the document used to determine which future bicycle projects are implemented, thus any revised strategy should identify priority areas and projects that will provide the greatest return.
- Any revised Cycling Strategy would need to complement other strategies and policies in place within council, such as the Sustainable Policy, Sport 2050 Strategy, River Connect plan and CBD Strategy.
- Improvements proposed by the Cycling Strategy need to tie in with growth corridors and proposed infrastructure, and not only by Council's Planning Department, but private developers and engaged consultants.
- Points were made about the need to address signage issues, education (for all road users) and encouraging/enabling visitors to the region (tourists and temporary workers) to cycle.
- Consideration needs to be given to construction and maintenance of facilities within the Cycling Strategy to ensure they are long-lasting and easily maintained.
- Novice cyclists need to be considered during the planning and design of facilities.

It is noted that a number of the suggestions provided by council officers and departments were similar to those provided through the community consultation discussed earlier.

4.5 State Government Consultation

Consultation was undertaken by GTA Consultants with each of the following Government departments and agencies individually:

- Department of Planning and Community Development
- Department of Transport
- Department of Business and Innovation (Tourism Victoria)
- VicRoads
- Public Transport Victoria

With each, initial contact was made by telephone to outline the purpose of the strategy and give them an opportunity to provide input, especially in terms of any current policies or programs not identified within the Discussion Paper. All expressed a desire to have input, but did not consider it prudent until the draft strategy is prepared. As such, consultation with the Government departments and agencies is recommended to be undertaken following the preparation of the draft strategy.   ACTION 4

In addition to this, more targeted consultation was undertaken with VicRoads, and in particular, the potential to update the Municipal Bicycle Network (MBN) for Shepparton. The current MBN for Shepparton was prepared in 2005, and as such, does not represent 2012 conditions. Also, with the continued growth in and around Shepparton, the current MBN does not connect with the growth corridors.

Based on the consultation with VicRoads, they are willing to review an updated MBN for Shepparton, noting that the majority of the network has already been agreed to with Council (2005 MBN), so the update would identify any proposed facilities that have now been implemented and any missing links to new areas of development.

At this time, VicRoads has not provided any criteria in further developing the MBN. As such, any identified new facilities have been based on the bicycle design framework outlined in the strategy.

5.   Cycling Encouragement Approaches

5.1   Preamble

Bicycle use is on the increase throughout Australia. The reasons for this are varied; both in terms of the associated net benefits (refer to Section 2.2.1) to individuals and society, as well as the current policy direction to improve sustainability and health-in-design of infrastructure. As a result of this, cycling is now being considered as a legitimate form of transport and a potential way to achieve a reduced reliance on private motor car use, as well as being a potentially significant form of tourism, through cycling related events and a part of holiday activities.

In order to encourage this desired mode shift from a marginal change to a significant one, a holistic approach is required. It needs to consist of both 'hard' physical infrastructure, as well as 'soft' policies and programs that help identify the benefits and reduce the barriers of cycling to individuals.

In this regard, effective encouragement of cycling involves the following areas, which are discussed further in the following sections:

- bicycle facilities and infrastructure (including route infrastructure and end-of-trip facilities)
- education, awareness and promotion of desired behavioural change
- establishing a consistent project assessment framework across transport projects.

It is also noted that a number of specific issues impacting the encouragement of cycling are currently being experienced within Greater Shepparton. These are listed as follows and are also discussed within this section of the strategy:

- DDA implications on cycling facilities
- Impact of design on maintenance.

5.2   Bicycle Facilities and Infrastructure

5.2.1   Planning Principles

The planning of a new development, redevelopment and/or transport node presents the opportunity to develop sustainable travel habits throughout catchments through adopting a hierarchy of access that gives preference to more sustainable transport modes. This concept is widely accepted and used for transport planning, with a hierarchy as follows:

- Walking
- Cycling
- Public transport
- Other modes.

The location and surrounds of a development presents a series of opportunities for maximising the mode share of cycling for trips. These include:

- Key links to nearby facilities and destinations
- Radial walking and cycling networks
- Bike parking facilities

- Bike parking and storage in conjunction with Transport-Oriented Development
- Bike fleet/ second bike arrangements in conjunction with development and employers within a suitable radius
- Bike shops in close proximity.

5.2.2   Types of Users

With cycling, users are understood along two continuums. The first being those associated with the major trip types. This is presented within Table 2.3 of Cycling Aspects of Austroads Design (2011), which has been reproduced below within Table 5.1.

Table 5.1:   Categories of Cyclists and their Characteristics

Category	Rider Characteristics	Riding Environment
Primary school children	Cognitive skills not developed, little knowledge of road rules, require supervision.	Off-road path, footpath (where permitted) or very low volume residential street.
Secondary school children	Skill varies, developing confidence.	Generally use on-road facilities or off-road paths where available.
Recreational	Experience, age, skills vary greatly.	Desire off-road paths and quiet local streets, avoid heavily trafficked routes, more experienced will prefer to use road system for long journeys.
Commuter	Vary in age, skill and fitness, some highly skilled and able to handle a variety of traffic conditions.	Some prefer paths or low-stress roads, willing to take longer to get to destinations, others want quick trips regardless of traffic conditions, primarily require space to ride smooth riding surface, speed maintenance.
Utility	Ride for specific purposes (shopping), short length trips, and routes unpredictable.	Not on highly trafficked roads, needs to include comprehensive, low-stress routes, appropriate end of trip facilities.
Touring	Long distance journeys, may be heavily equipped, some travelling in groups.	Often route is similar to that of other tourists.
Sporting	Often in groups, two abreast occupying left lane, needs similar to commuters.	Travel long distances in training on arterials, may include challenging terrain in outer urban or rural areas, generally do not use off-road routes because of high speed and conflict with other users.

Table 5.1 indicates that there are seven major rider types, along with their general riding characteristics and preferred riding environment. This gives a basic understanding of what facility types are required to support each of these user groups.

However, even within each of these major rider types, there is a wide range of skills and level of confidence that has a major influence on whether individuals chose to cycle or use other forms of transport to commute or for recreational activities, even if they would like to cycle.

This natural variation in individual's comprehension of whether cycling is a viable form of transport and recreation is the second continuum. In regards to this, Figure 5.1 illustrates that there are four main groupings of individuals in how they currently consider the viability of cycling.

Figure 5.1: Four Types of Cyclists[5]
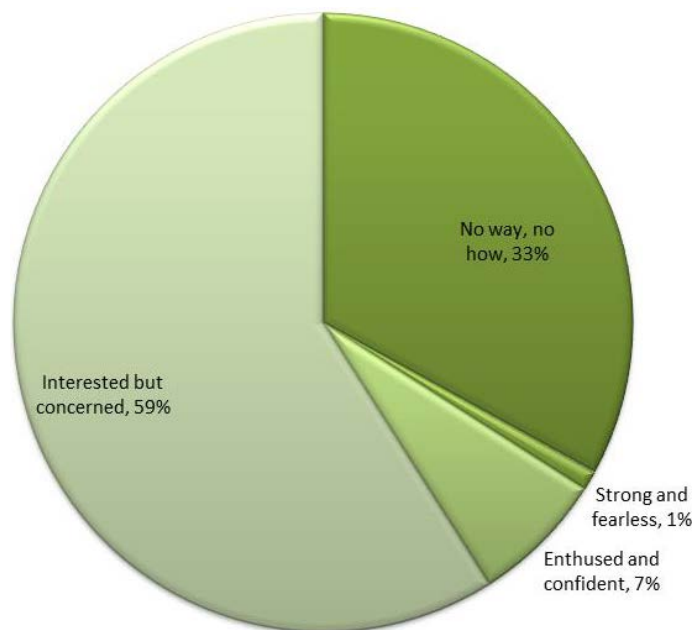
Further explanation of each of these groupings is provided as follows:

- **Strong and the Fearless** - ride regardless of road conditions: riding is a strong part of their identity and they are undeterred by cycling conditions.
- **Enthused and Confident** - are, and could be, attracted to regular riding by continuing to address the barriers to cycling: shorter trip distances, better bicycle facilities, better end-of-trip facilities.
- **Interested but Concerned** - hear messages about how easy it is to cycle, but they are afraid to ride. They don't like the cars speeding down their streets. They get nervous thinking about what will happen to them on a bicycle when a driver runs a red light, or guns their cars around them, or passes too closely and too fast.
- **No Way, No How** - not interested in cycling at all, for reasons of topography, inability, or utter lack of interest.

With this understanding, there is a large proportion of the population (nearly two-thirds) that have the potential to consider cycling as a viable form transport and recreation. This would not be for all trips or recreational activities, but cycling could become a regular part of their commute and recreational activities if the barriers associated with their decision making are overcome.

It is noted that these percentages may not be strictly applicable to Greater Shepparton, given that they are a function of many factors, such as land use mix, population densities, social norms, etc., and that surveys of other populations, such as in the UK (24%), NZ (41%) and Chile (87%), have indicated different percentages for those that are not interested in cycling at all[6]. However, what is evident is that there is a significantly larger section of the population interested in cycling than actually currently partake in it on a daily basis.

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[5]   Portland Bureau of Transportation Website, visited 25/01/11

[6]   Sourced from Assessment of the type of cycling infrastructure required to attract new cyclists, NZ Transport Agency research report 449, October 2011.

Moreover, the likely percentage of potential cyclists in Australia has been identified within the published research by the Cycling Promotion Fund and Australian Heart Foundation (2011), which showed that of the 60% of the Australians with access to a bicycle, approximately 70% were not considering using it as a primary means of transport for safety related reasons only ("interested but concern"). The issue of safety, and more generally, the viability of cycling for transport and recreation within Greater Shepparton, was also evident within the findings of the consultation undertaken and presented in Section 4.3.

For Greater Shepparton, the 2006 Census Journey to Work data recorded 3% and 1.8% of trips being undertaken by bicycle from and to Greater Shepparton respectively. While this level of use is considered to be conservative due to its historic nature, it does indicate that currently the "strong and fearless" and some of the "enthused and confident" cyclists already believe that cycling is an attractive, safe and viable transport mode in Greater Shepparton. To further increase cycling use, the barriers associated with the existing and potential riders who are "enthused and confident" and "interested but concerned" need to be overcome.

Given the above, it is recommended that commuter and recreational cyclists be considered based on a more user-ability categorisation. This is outlined in Table 5.2. Such an approach is used with great success in countries with high levels of cycling such as the Netherlands and Germany (TU-DELFT, 2000) as a method for including the broadest range of users. The four user groups listed in Table 5.2 encompass the Cycling Aspects of Austroads Guides categories and consideration of individual's comprehension of the viability of cycling.

Table 5.2:   Bicycle User Group Categories and Characteristics

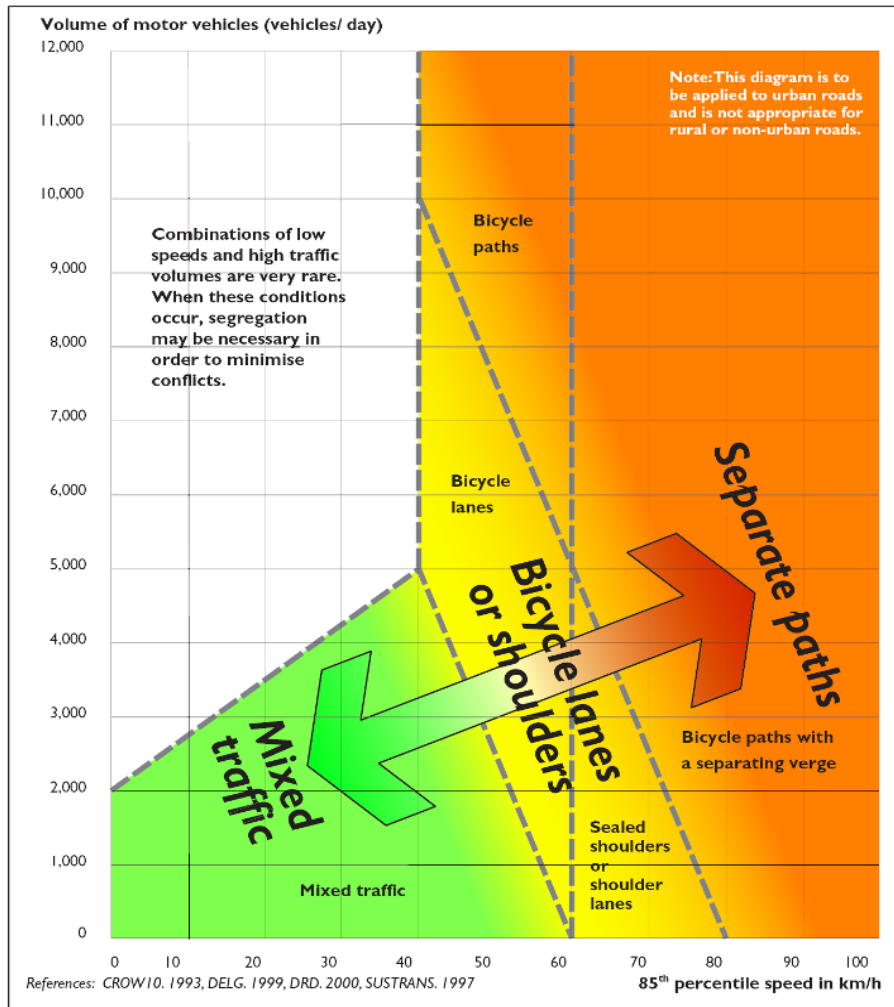| Group	Description	Characteristics
A	Vulnerable to traffic	Children between the ages of 10 and 16, the elderly, the hard of hearing, very short trips, slow speeds (less than 15km/h), traffic shy, slower reaction times.
B	Borderline "fair weather" cyclists	Infrequent adult cyclists, alert but lacking confidence, low to average riding skill, short to medium trips.
C	Active adults	Speeds between 15 and 30 km/h, alert and 'road aware', average to high level of riding skill and proficiency, all trip purposes.
D	Sports and fitness	Speeds higher than 30 km/h, prefers 'main road' environments.

5.2.3   Types of Facilities

There is a range of cycling facilities that can be implemented. These are sometimes based on the available corridor width, intersection operations, traffic volumes and speeds, continuity of an overall route, transport network hierarchy (i.e. SmartRoads) and bicycle user-ability characteristics.

While this can all be relevant, it can cloud the understanding and ability to identify what facilities are required to accommodate and encourage cyclists and result in sub-stand facilities that do not encourage any new cyclists, at best redirect existing users to use them.

What is key in the determination of what facilities are perceived as being viable by cyclists is safety, and one of the major ways that safety is perceived by cyclists is through the level of separation provided to motorised traffic. This varies between each of the four user categories outlined in Table 5.2, but as a good starting point, reference is made to Figure 2.1 of Cycling Aspects of Austroads Design (2011), which is presented in Figure 5.2.

Figure 5.2: Minimum Levels of Separation

Volume of motor vehicles (vehicles/ day)

Note: This diagram is to be applied to urban roads and is not appropriate for rural or non-urban roads.

Combinations of low speeds and high traffic volumes are very rare. When these conditions occur, segregation may be necessary in order to minimise conflicts.

Bicycle paths

Bicycle lanes

Separate paths

Bicycle lanes or shoulders

Mixed traffic

Bicycle paths with a separating verge

Mixed traffic

Sealed shoulders or shoulder lanes

References: CROW10. 1993, DELG. 1999, DRD. 2000, SUSTRANS. 1997

85th percentile speed in km/h

Source: Cycling Aspects of Austroads Guides, p13

Figure 5.2 recommends a minimum level of separation between cyclists and motor vehicles on urban roads based on the volume and speed of traffic. At low traffic speeds and volumes, a shared road environment is considered appropriate, and at high traffic speeds and volumes, separated bicycle paths are considered appropriate.

These minimum separation guidelines are considered appropriate for the development of a bicycle network within an urban environment to support the 'borderline "fair weather" cyclist' and 'active adult' cyclists, which makes up the majority of current and the potential users (approx. two-thirds of a community).

'Vulnerable to traffic' cyclists require almost complete separation of bicycle facilities to motorised traffic throughout their associated trips.

'Sports and fitness' cyclists do not require or desire the same level of separation as other groups, as they are more concerned with maintaining speeds and travelling long distances. Furthermore, they generally do not choose to ride within urban environments for exactly these reasons. Rather, they opt for rural roads with a limited number of intersections and low volumes of traffic, especially heavy vehicle volumes. However, this can result in cyclists being located in high speed environments with narrow road widths, which can either see motorists passing cyclists at close distances or motorists

crossing the centre line to pass them, all at high speeds. Reducing speeds and/or widening carriageways to at least accommodate marked bicycle lanes is advantageous for sports and fitness cyclists, but is not expected to significantly increase their numbers. However, improved facilities are likely to re-route existing users to such supportive routes.

Further to Figure 5.2, which shows the relationship between the minimum level of separation required given the prevailing traffic speeds and volumes, the three methods of separation are described as follows and illustrated in Figure 5.3:

- Physical separation. Paths, shared or exclusive-use, separated from the roadway.
- Visual separation. Line marked space on roads, bicycle lanes or shoulders.
- Mixed traffic. Riders share lane space on the road with motor vehicles and off-road with pedestrians. There are two categories of shared space:
  - Spacious profile shared space is where there is a consistently wide kerb lane to allow riders and drivers to comfortably share space according to the prevailing road speed (i.e. minimum kerbside traffic lane width of 3.7m within a 60km/h speed zone – refer to Table 4.2 of the Cycling Aspects of Austroads Guides, 2011 for further guidance).
  - Tight profile shared space can be used for bicycle routes in low-speed, low motorised traffic volume environments such as residential streets and laneways. In very low speed environments such as residential areas and on very narrow inner-city streets, where the aim is to keep all vehicle speeds low, it is preferable to restrict the lane width so that vehicles cannot pass riders and must follow each in turn (i.e. maximum traffic lane width of 3.2m).
  - It should be noted that mixed traffic lane widths of between 3.2m and 3.7m within a 60km/h speed zone can result in vehicles trying to pass cyclists without crossing the road centreline at an uncomfortable and sometimes unsafe distance. As such, mixed traffic lane widths within this range should be avoided, especially along well utilised bicycle route.

Figure 5.3:   Methods of Separation
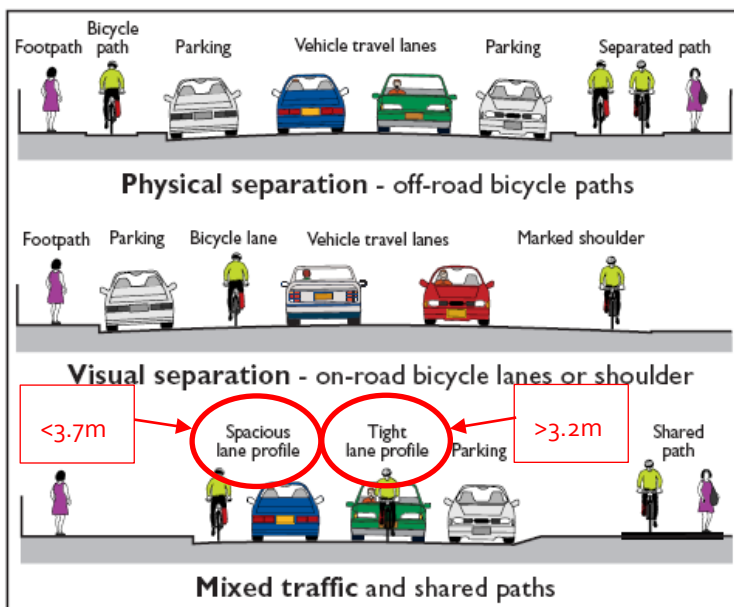
Source: RTA 2003, p14

The feedback received from residents indicated facilities which were physically separated from traffic are preferred. However, due to the limited space and high cost of these facilities, providing this type of facility is not practical in every location.

As such, and in reference to the road characteristics outlined in Table C1 of Clause 56.06 of the Greater Shepparton Planning Scheme, the minimum recommended bicycle facilities that should be provided in conjunction with the overall urban road network are provided within Table 5.3.   ACTION 5

Table 5.3:   Recommended Bicycle Facilities based on Road Characteristics

Access Lane	Traffic Volume	Target Speed	Carriageway Width [1]	Recommend Bicycle Facility
Access Lane	300vpd	10kph	5.5m	No dedicated facilities
Access Place	300-1,000vpd	15kph	5.5	
Access Street – Level 1	1,000 to 2,000vpd	30kph	5.5	
Access Street – Level 2	2,000 to 3,000vpd	40kmh	7-7.5m	
Connector Street – Level 1	3,000vpd	50kph	9.5m	Mixed traffic conditions
Connector Street – Level 1	3,000 to 5,000vpd	60kph	13.0m	On-road bicycle lanes
	5,000 to 7,000vpd	60kph	16.0m	Segregated bicycle path
Arterial Road	+7,000vph	As appropriate	As appropriate	Segregated bicycle path

[1]   Width based on providing two-way traffic and the recommended bicycle facilities

If such facilities are provided, they would be expected to cater for the majority of potential commuter and recreational users within urban environments. However, additional care is required for primary schools and other trip generators with significant proportions of "adverse to traffic" cyclists, as they require segregated facilities throughout their trip. As such, shared paths are recommended along the frontage of such developments and connecting to the connector and arterial roads that have segregated bicycle facilities.

Specific to Greater Shepparton, there are a number of bicycle facilities types already in use. These are listed as follows with a brief explanation:

- Footpath – paths in residential streets and commercial areas for pedestrian use only, except for children under the age of 12 who can cycle with or without an accompanying adult.
- Shared Path – signed 'shared paths' for cyclists and pedestrians.
- Recreational Path – paths for walkers and cyclists on developed recreational reserves in urban areas.
- Recreational Trail – walking and cycle paths in remote river / bushland / road reserve.
- On-Road Bike Lanes – marked bicycle only lanes within the road carriageway.

In addition to these, it is proposed to utilise the following facility types as part of further developing the bicycle network in Greater Shepparton:

- Segregated Bicycle Lanes – Physically segregated bicycle only lanes from motorised traffic within the road carriageway.
- Off-Road Bicycle Path – Bicycle only path within a road reserve, used to connect with other bicycle only facilities within adjacent road carriageways.

- Contra-Flow Lane – Marked bicycle only lane permitting cyclists to travel in the opposing direction to motorised vehicles within a given one-way road carriageway.
- Formalised Mixed Traffic – signposted and marked route along a road carriageway that has a cycling environment consistent with Figure 5.2 (i.e. may require Local Traffic Management measures to achieve such an environment).

5.2.4   Intersection Treatments

Another common facility issue with bicycle routes is the lack and/or inconsistent approach of on-road bicycle related intersection treatments, especially at roundabouts, which leads to indecision and potential conflict with vehicles. This is considered to be an issue within the Shepparton CBD given the number of recorded casualty accidents in Table 3.1 involving cyclists at intersections and it being a common point raised during consultation.

Roundabouts are notoriously bad for safely accommodating cyclists and it is understood that Austroads is currently undertaking research to develop improved design guidance for roundabouts.

What is currently evident is that cyclists are not clearly advised where they should position themselves as they travel through a roundabout. Currently, most on-road bicycle facilities stop short of roundabouts and cyclists try to travel on the outside of the circulating lane with vehicles travelling on their inside. Also, motorists approaching the roundabout are currently not overtly aware of cyclists within the circulating lane, given their position on the outside of the circulating lane and low volumes.

As such, it is recommended that for circulating lanes that can accommodate (or through minor widening) a bicycle lane on the outside, this should be provided with green pavement markings, bicycle logos and raised delineation techniques (such as of vibra line, rumble strips, RRPM's and/or riley kerbs[7]). For reference on such a treatment refer to Figure 5.4.

When there is insufficient width to accommodate a bicycle lane on the outside of the circulating lane, then cyclists on approach to the roundabout should be directed to travel in the centre of the lane through a narrowed approach lane. For reference on such a treatment refer to Figure 5.5. This approach can be emphasised through the use kerb extensions, signage and sharrow markings (refer to Figure 5.6) or similar.

Regardless of whichever treatment is used, speed on approach and through the roundabout is critical and needs to be addressed through increased central island circumference or revised vehicle approach alignment.
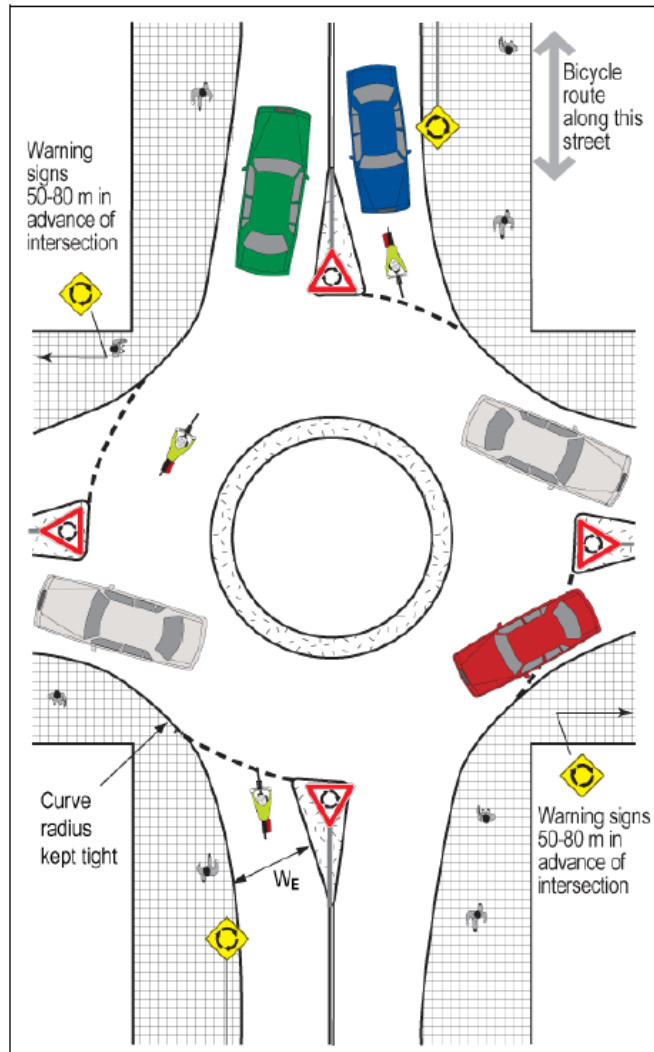
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[7]   Refer to http://www.tcaaustralia.com.au/riley.html for an example of a riley kerb.

Figure 5.4:   Bicycle Circulating Lane within a Roundabout
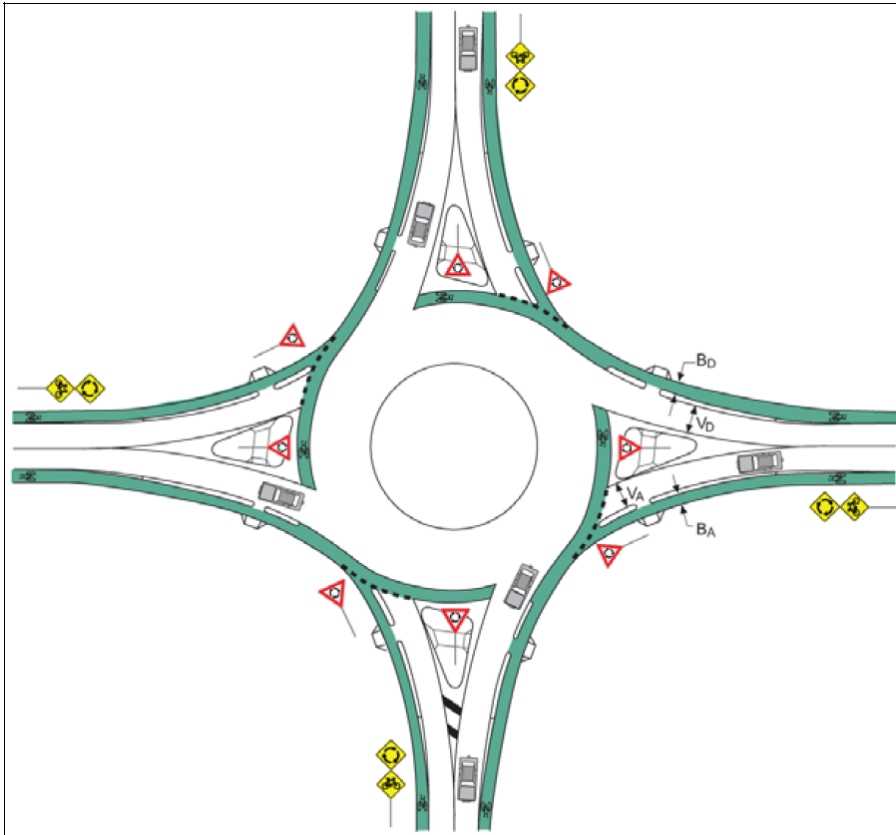
Source: Figure 5.22 of Cycling Aspects of Austroads Guides (2011)

Figure 5.5:   Mixed Traffic Circulating Lane within a Roundabout

Note: The width of the entry W$_E$ should cater for the design vehicle (e.g. service vehicle or fire truck). However, it is preferable that W$_E$ is less than 3.0m so that drivers do not attempt to enter the roundabout alongside cyclists and 'squeeze' them into the kerb.
Source: Figure 5.20 of Cycling Aspects of Austroads Guides (2011)

Figure 5.6:   Sharrow Bicycle Marking

In terms of other intersection types, reference is made to Section 5 of the Cycling Aspects of Austroads Guides (2011), which identifies the continuation of facilities up to the give way / hold lines and guidance through signalised and unsignalised intersections. These treatments along with consideration of additional green pavement markings, bicycle logos and raised delineation techniques are recommended.

For intersection treatments of off-road bicycle facilities, reference is made to Section 7.6 of the Cycling Aspects of Austroads Guides (2011), which identifies differing types of intersection treatments depending on who has priority and the level of traffic. When an off-road facility intersects a low volume road consideration can be given to providing the off-road facility with priority over the road. The decision on whether this is appropriate should be based on the resulting sightlines and respective intersecting volumes of vehicles and bicycles.

With the above, it is recommended that Greater Shepparton develop design guidelines for intersection treatments for both on-road and off-road facilities based on the above referenced sections of the Cycling Aspects of Austroads Guides (2011) and additional identified considerations.   ACTION 6

5.2.5   Comprehensive Bike Route Signage

Signing routes is very important for cyclists in complex urban street networks and along recreational trails with multiple route options. Signage can inform bicycle riders of routes which are often more direct, less heavily trafficked or more desired routes with high levels of amenity. Cycle network signage can help the community to become aware of the many route possibilities other than the prominently-signed main road network.

Directional and wayfinding signage is a critical element of any transport system. Every transport system needs these signs to help the users find their way around the network and to make full use of the system's infrastructure. We are all so use to the signage systems which are integrated into airports and railway stations along with the ubiquitous big green highway signs, that we often forget how dysfunctional these transport systems would become without their accompanying signage. Though the bicycle has been in use in our cities and towns since the end of the 19th Century, providing an urban system for bicycle travel is only a fairly recent development.

Signage provides great cohesion for the cycle network by regulating the use of roads, streets and paths, warning of hazards and difficulties, and indicating destinations where individual trips may start and end.

Further consideration of what bicycle signage is required within Greater Shepparton to support cyclist for both commuter and recreational trips, which is undertaken in Section 6.7 of the strategy.

5.2.6   End-of-Trip Facilities

End of trip facilities include:

- Bicycle parking
- Showers and change rooms
- Lockers (for clothes and equipment)
- Bicycle sales, renting and repair shops.

Bicycle parking at key trip attractors and transport nodes is an essential requirement of an integrated transport system. It helps to indicate that cycling is a legitimate and desired form of transport and recreation. Without parking facilities at locations people travel to and from, they either don't cycle or

secure their bikes informally along footpaths and in back-rooms where they leave them open to theft, vandalism and in the way of others. Key aspects of high quality bicycle parking include:

- Security: to minimise the risk of theft. Best practice involves either attended bicycle parking or a lockable shelter with internal bicycle racks for secondary locking.
- Visibility: located in an area with a high volume of passing foot traffic, to deter theft.
- Shelter: to protect against rain.
- Convenient: positioned as close as possible to the trip attractor or transport node, or within a prominent area.
- Signage: to clearly identify the direction of bicycle parking facilities from areas where the parking facility is not visible.

Bicycle parking needs to cater for both the regular and infrequent users. Whilst there may be a small degree of cross over, regular users will generally prefer high security bicycle enclosures and infrequent users will generally have their needs met by casual bicycle parking arrangements. Short term users (parking for less than 4 hours) will usually be satisfied by casual parking as well.

In terms of the other end of trip bicycle facilities, these can have just as significant an impact on encouraging and helping to support and grow bicycle use. They should be considered at every location that bicycle parking is provided, but will be dependent on the types of users, with long-term commuters requiring showers, change rooms and lockers, when short term users may only need lockers. Moreover, with both types of users, they can be further attracted through bicycle stores, be it sales, renting or repair of bikes, and bicycle friendly cafes and other commercial stores that target clientele that arrive in an informal manner. While end-of-trip commercial opportunities are likely to be realised as bicycle volumes increase, they can be fast-tracked through the supportive initiatives by Council.

5.3 Education, Awareness and Promotion

Raising the awareness, attractiveness and profile of cycling in Greater Shepparton is essential in order to change attitudes and foster a supportive environment that will enable the community to benefit from the many positive outcomes that result from a shared vision and goal to endorse cycling as a way of life.

A number of national initiatives designed to encourage cycling currently exist and can be readily adopted by cities, towns, schools, communities and businesses. These national initiatives provide a terrific opportunity to gather support for cycling as a viable transport mode and can provide the impetus to change an individual's behaviour and perceptions associated with cycling. For example, a five month follow-up survey for the National Ride to Work Program showed that 43% of new registered riders where still riding to work[8].

At a local level, communities, businesses and local governments can continue to host events throughout the year to build upon the rising interest and enthusiasm of cycling. More investment in infrastructure and a continued demonstrated commitment to improving the conditions for cyclists in Greater Shepparton will further assist in attracting more people to cycle for trips to work, school, fitness, recreation as well as other opportunities such as shopping trips.

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[8]   Source: National Ride to Work Day follow-up survey, 2010. http://ride2work.com.au/general/ride-to-work/93071/

Providing clear, quality and up to date maps and information on existing and proposed cycle facilities in Greater Shepparton is important, along with regular opportunities to share information locally and obtain advice through the establishment of specific bicycle user groups or informative websites.

The undertaking of targeted behavioural change programs to address significant behavioural barriers or the identification of mechanisms to increase the appeal (benefits) of cycling has been shown to be highly effective, especially when compared to the educational based campaigns that have historically been used and only generated small changes in behaviour. The strength of behavioural change programs is in their focus to not only educate but identify the specific decision or action that contributes to a given behaviour and addresses it through communicating initiatives, such as commitments, prompts and incentives, to develop the more desired behaviour into a social norm.

The development of behavioural change programs are not only recommended to be targeted at getting more people to cycle but at all users that share the road network, as a more harmonious environment is required to breakdown generalised perceptions and create a safer and more welcoming environment that the whole of the community is permitted to use.   ACTION 7

At the very least, the use of behaviour based assessments of various initiatives should be undertaken to investigate the level of penetration they are likely to have on changing behaviours (and the eventual goal of increasing the number of people cycling). An understanding of the likely penetration can help determine the relative effectiveness of initiatives and funding priority, because the greatest benefit that can be made is getting more people to cycle.

5.4   Project Assessment Framework

Historically, in terms of local cycling projects, prioritisation of projects has often been on the basis of cost (absolute or distance-based), ease of funding or perceived feasibility (often a measure of political or community resistance). This relatively ad-hoc approach has focused on "quick wins" at an infrastructure level, creating an under-utilised and often disjointed network.

In the current political environment, there is increasing pressure on the application of limited funding across a wide range of transport-related projects. Therefore it is important to establish a consistent project assessment framework across all transport projects such that the relative merits of (for example) a small cycling project can be compared to a major highway upgrade project.

One common tool used for road projects is cost-benefit analysis. Such analysis seeks to derive a benefit-cost ratio (BCR) through valuing in current terms:

- Capital project cost
- Maintenance and other ongoing costs
- Vehicle operating cost (VOC) savings
- Time cost savings per vehicle hour
- Accident cost savings
- Environmental externalities (costs or benefits).

Such analysis can relatively easily be applied to cycling projects with additional economic parameters, such as health benefits and tourism income. Such analysis is dependent on the availability of suitable data which can be difficult, particularly for smaller projects and the ability to accurately determine the likely increase in usership as a result of the initiative. Due to the wide-ranging benefits, quantification

can be difficult where these involve other government sectors and indirect links, such as health benefits and increased sales at the local stores from cycling related tourism.

Until recently, it was difficult to provide an objective assessment of the economic benefits of investment in cycling infrastructure. However, through the following recent research by three Australian agencies, some early insights to the likely monetary benefits have been identified:

- Cycling Promotion Fund[9] - Cycling: Getting Australia Moving
- City of Sydney[10] - Inner Sydney Regional Bicycle Network Demand Assessment and Economic Appraisal
- North Sydney Council and NSW Government - to be released in September/October 2010.

Table 5.4 provides an overview of the economic benefits of cycling identified in these three studies.

Table 5.4:   Economic Benefits of Cycling

Item	$/km Travelled (Low)	$/km Travelled (High)
Health Benefits	0.0377	0.2538
Pollution Reduction	0.0253	0.0215
Greenhouse Gas Reduction	0.0145	0.0125
Congestion Decrease	0.2666	0.2344
Noise Reduction	0.0091	0.0076
Infrastructure Provision	0.0398	0.0341
Other User Benefits	0.1449	0.1449
Other Economic Benefits	0.1600	0.1600
TOTAL	**0.6979**	**0.8688**

This data primarily relates to commuter related cycling in urban areas, so a number of the benefits, such as the decongestion benefit, is unlikely to be relevant within Greater Shepparton. However, a number of these are appropriate and are able to be used to develop detailed business cases of specific facilities and initiatives.

In terms of recreational cycling, there has also been similar economic data developed, however, more limited. An example of such data is the tourism benefits identified within the La Trobe University research paper entitled "An economic analysis of rail trails in Victoria, Australia" (Beeton, 2003). The research paper looked at three trails within Victoria, including the East Gippsland trail, the Murray to Mountains trail and the Warburton trail. The average amount spent by visitors to these trails was found to be $51.10 per person per day. This value was calculated through the collection of questionnaires from which duration of stay information was obtained, along with expenditure data on accommodation and non-accommodation items.

More recent research undertaken by La Trobe University and presented in "Regional Communities and Cycling: the Case of the Murray to the Mountains Trail, Victoria, Australia" (Beeton, 2006), identified that the average amount spent by visitors to only the Murray to Mountains Trail over the Easter weekend in 2006 was $258.00 per person per day.

And even more recently, research presented by Dr Sue Beeton at Parks and Leisure Australia Nature Based Tourism and Trails Seminar in Bendigo on 19 May 2010, indicated that the average amount spent

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[9] Bauman A., Rissel C., Garrard J., Ker I., Speidel R., Fishman E., 2008. Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling, Cycling Promotion Fund, Melbourne.

[10] City of Sydney, 2010. Inner Sydney Regional Bicycle Network Demand Assessment and Economic Appraisal. Prepared by AECOM Australia Pty Ltd, Sydney.

by visitors to only the Murray to Mountains Trail in 2009 was $244.00 per person per day. Furthermore, there was a breakdown of this amount as follows:

- Accommodation $52
- Food / Beverages $123
- Fuel $18
- Cycling Expenses $6.50
- Souvenirs / Grifts $6.50
- Other $38

Unlike the health benefits, tourism benefits are largely private commercial benefits, albeit with significant secondary community benefits in terms of employment. Employment in Greater Shepparton is of particular importance, particularly with the differences in employment levels between the winter and the summer holiday seasons and associated fruit picking months.

There is a need for further refinement and development of the various parameters in discussion with relevant agencies, such as VicRoads, to develop a methodology that stands up to scrutiny for State and Federal Government funding applications.

In the interim, as a simple yet effective method of prioritising projects where consistent quantitative data is not available, the following two-stage process is recommended.   ACTION 8

The first stage matrix shown in Table 5.5 allows equal standing to be given to both infrastructure and non-infrastructure projects. It places the overall cost of the initiative against the potential benefits. While costing is relatively well understood, the identification of the potential benefit is sometimes not. However, through the understanding of user types, proportion of the population they are affecting, an understanding of the potential benefit can be ascertained. To gain an even finer grain understanding of what is likely to provide the greatest benefit, consultation or sample testing with a focus group on a range of initiatives can be beneficial.

Table 5.5:   Priority Evaluation Matrix

Cost Estimate		Potential Benefits (High to Low)		
<$20,000*	Low	Priority 1	Priority 1	Priority 2
$20,000 - $100,000*	Medium	Priority 1	Priority 2	Priority 3
>$100,000*	High	Priority 2	Priority 3	Priority 3

* Values are indicative only and can be varied to suit the needs of local areas or government agencies

Once the relative priorities have been established, it is valuable to consider the overall feasibility of the projects or initiatives being considered. This includes, engineering feasibility, political feasibility, community consultation, environmental impact and opinion, as well as conflicting priorities and needs. This "degree of difficulty" for implementation should avoid overlap with cost considerations where possible, as this has already been considered in the first step.

Table 5.6 shows how the priorities from Table 5.5 can be translated to short, medium and long term actions through consideration of project feasibility.

Table 5.6:   Action Evaluation Matrix

Priority	Project Feasibility		
	High	Medium	Low
Priority 1	Short Term	Short Term	Medium Term
Priority 2	Short Term	Medium Term	Long Term
Priority 3	Medium Term	Long Term	Long Term

5.5   DDA Considerations

The Federal Disability Discrimination Act 1992 (DDA) aims to provide protection to anyone in Australia against discrimination based on disability. Specific to Greater Shepparton, Council's Disability Action Plan aims to allow all residents and visitors to Greater Shepparton access to services and facilities, while improving health and wellbeing, and social connectedness.

In terms of the impact on cycling facilities, consideration should be given to who the potential user groups are and their abilities. However, site and budgetary constraints can limit the useability of some facilities. It should always be a desire with any facility to enable all potential users to utilise it, but limitations exist and need to be made clear and minimised as best as possible, such as the identification of alternate routes, adjacent facilities and current and up-to-date information material to enable people of all abilities to identify how best they might access the main-stream services and facilities within Greater Shepparton.

There are specific facility types that will be designed with the aim of providing a universal bicycle network and maximise the number of community cycling for transport and recreation. The provision of equitable access must be considered for all levels of mobility. This should be delivered in consultation with the Greater Shepparton Disability Advisory Committee.

5.6   Design Implications on Maintenance

Maintenance of bicycle facilities should be considered as part of initial design and any associated development in the area and/or along the corridor. What is important in terms of the Cycling Strategy and development of the associated facilities is the identification of what design elements contribute to maintenance and how they are programmed and undertaken in Greater Shepparton.

A number of elements that can have a significant impact on the on-going maintenance of a facility are discussed as follows.

5.6.1   Surface Treatment

One of the main design elements affecting maintenance of cycling facilities is the surface treatment. There are three main types, which consist of the following:

- Concrete slab (rigid)
- Asphalt or bitumen surfacing (flexible)
- Crushed aggregate (loose).

Each of the above surface treatments requires various levels of maintenance, both in terms of frequency and how it is undertaken. Over the life-time of a facility, the level of maintenance and associated cost of a particular surface treatment can be significant. In this regard, reference is made to

Table 8.2 of the NSW Bicycle Guidelines (2005), which compares the life-cycle costs of a number of surface treatments. This comparison of surface treatments has been reproduced in Table 5.7.

Table 5.7:   Life Cycle Costs for Path Surface Materials

Material	Construction Cost[1]	Annual Maintenance Costs[2]	Life Cycle Costs[3]	Environmental impacts
Decomposed granite	$105,000	$27,000	$391,000	Reduced run-off and visual intrusion
Asphalt / bitumen	$120,000	$3,000	$152,000	Visual intrusion due to path width
Concrete	$195,000	$1,500	$210,000	Visual intrusion due to path width and colour
Boardwalk[4]	$1,200,000	$2,000	$1,221,000	Visual intrusion varies depending on location
Fibreglass reinforcement plastics	$900,000	$2,000	$921,000	Reduced visual intrusion depending on colour and width, minimal run-off

[1]   Assuming a 20 year period, 3.0m wide path, 1km, no structures.

[2]   Assuming regular periods of significant rain and flooding 30% replacement of surface annually.

[3]   Alternatives such as bluestone and limestone were also considered but there were concerns about leaching effects; shell grit is widely used in the Netherlands as a surface material for pathways through forested areas but is not commonly used in Australia.

[4]   For use in special areas where constraints exist.

Table 5.7 indicates that using concrete as a surface material has the lowest annual maintenance cost, asphalt / bitumen has the lowest overall life-cycle costs. Decomposed granite, while being the cheapest to construct, has the highest annual maintenance costs, which results in it being the most expensive over its life cycle (assumed to be 20 years) of these three options.

The decision of which surface treatment should be used for a specific facility does not start and end with the overall life-cycle cost. Consideration should also be given to the surrounding environment, specific climatic and terrain constraints, as well as the user types and volumes, which each have an impact on the on-going maintenance. With each of these considerations, discussion is provided as follows.

Surrounding Environment

The selected surface treatment should be complementary to the surrounding environment. In built-up urban environments concrete is most suited, when in national parks and reserves, crushed aggregate probably is. There is also an ability to have a surface treatment more suited to a given environment, through the use of different colours or texturing. This has been used to great effect with concrete surfaces within environmentally significant areas by texturing and colouring the surface to reduce the visual impact. Crushed rock paths are also used in parks within urban environments, where they usually have an adjacent bitumen or concrete facility, but are well used and accepted by specific users, such as joggers.

What should also be considered is whether development in the area is expected in the near future. If duplication of the roadway or development of the adjacent properties is expected in the coming years, the crushed aggregate or bitumen surface treatments may be appropriate given that the facility is likely to be removed, but it is appropriate in the short-term to provide a facility for an existing demand or general encouragement of bicycle use in the area.

Climate and Terrain Constraints

While the life-cycle costs presented in Table 5.7 are informative, they are based on a number of assumptions. One of these that significantly affects the crushed aggregate surface treatment costing is that there is regular periods of significant rain and flooding, resulting in 30% of the surface material

needing to be replaced annually. If however, the specific location of a given path is in a relatively dry area that is not prone to flooding and (probably most importantly) flat, then the on-going maintenance and overall life-cycle costs of a crushed aggregate surface treatment is significantly reduced, even to the point that it proves to be a cheaper alternative to the other surface types. Alternatively, if the area does experience frequent heavy rainfall, flooding and is undulating, then the maintenance cost for a crushed aggregate surface treatment can be even higher.

User Types and Volumes

With any facility, consideration needs to be given to the likely or desired user types and volumes. While it would not be appropriate to provide a smooth flat concrete surface within a mountain bike park, it might be appropriate to provide such facilities on the way to it due to the volume of cyclists.

Furthermore, the introduction of any facility is likely to lead to more users, and as the volumes increase a facility can be taken from an informal crushed aggregate one to a formal concrete facility. So the use of the crushed aggregate facility could be an appropriate initial choice to suitably stimulate bicycle use.

5.6.2   Road Shoulders

Another common maintenance issue that arises with cycling facilities are gravel road shoulders that are sealed to provide a bicycle lane. The issue here is that the shoulders are not able to withstand typical vehicle loads, including street sweepers, and result in the seal breaking up or forming large ruts which become more of an issue for cyclists than mixing with traffic.

The practice to seal gravel road shoulders is usually born out of a response to safety issues arising between cyclists and vehicles mixing in the traffic lane. Given the resulting safety issue, it is considered safer to maintain the existing conditions and use alternate treatments, such as reducing the speed limit, installing bicycle warnings signs and mixed traffic pavement symbols, with the preferred treatments being the installation of full strength pavement to accommodate bicycle lanes or separated facilities that are consistent with Figure 5.2.

5.6.3 Signage

Signage associated with on and off-road facilities is considered to be vital to ensure clear priority of movement and awareness of approaching conditions to cyclists as well as motorists. However, identifying the appropriate level is critical and has a direct implication with on-going maintenance. When there is an insufficient amount of signage, this can lead to potential conflicts, with too many signs potentially leading to signage overload (too many signs in the same location) or awareness complacency (advised of a potential conflict but it rarely happens). As such, the rationalisation of the use of signage should be undertaken.

It is recommended that signage should only be used where movement priority is in question and/or there is a localised potential safety hazard within the associated corridor. Furthermore, consideration of user volumes should play a role, as well as the acknowledgement that 80% of a pedestrian's vision is below the horizontal, which is no better for a cyclist. As such, signage is likely to be less effective than pavement markings for informing pedestrians and cyclists and thus, is recommended to be used sparingly.

5.6.4 Markings

As indicated above, pavement markings are considered to be even more vital than signage to indicate to pedestrians and cyclists movement priority and awareness of approaching localised safety concerns. However, given that pavement markings are generally required to be remarked annually, this can have a significant on-going maintenance implication.

With this in mind, it is recommended that pavement markings be used at all on and off-road intersections. There use at mid-block locations should be based on the user volumes, unless they are a critical element of the facility, such as on-road bicycle lanes.

Specific to off-road facilities, it is always desirable to have the shared path logos marked in both directions on either side of a crossing facility and repeated every 100m, but it is considered acceptable to only be located on the departure sides of crossing facilities and at entry points from other corridors.

Centrelines are not considered essential if the user volumes are very low and/or very tidal throughout the day. However, as volumes increase, and where directional splits tend more towards 50:50 and accommodate various users types (walking, running, cycling etc.), the need for centreline markings becomes necessary to minimise any potential conflicts and maximise the users' level of service.

5.6.5 Hand Rails

The installation of hand rails is commonly debated, partly due to their inconsistent use and understanding of their purpose, but also due to the cost, especially if they were to be installed at ever intersection of a shared path with a road and adjacent to kerbside bicycle lanes or turn boxes.

In order to develop a consistent approach on when it is considered appropriate for a hand rail to be installed, consideration must first be given to their purpose.

Hand rails are designed to be used by cyclists waiting for a suitable gap in a traffic stream. They enable a waiting cyclist to stay mounted on their bike and thus take off in a faster manner than if they had to place a foot on the ground to balance themselves while waiting. On this basis, hand rails are considered appropriate where there are limited opportunities for cyclists to safely cross an intersecting roadway, due to traffic volumes, number of lanes, speed and/or intersecting facilities user volumes.

Another benefit of using hand rails is that they provide some additional protection for shared path users and the potential to locate the activation button for a signalised crossing facility or bicycle phase at an intersection.

5.6.6 Other Elements

Consideration should also be given to the following elements that can have a significant safety, as well as on-going maintenance implication as part of any bicycle facilities, especially at crossing locations and where user volumes are high:

- potential to provide lighting that will highlight the crossing location at night
- pram ramps that are DDA compliant, making the traverse between the path and road smooth and safe.